Leonard Talmy

Toward a Cognitive Semantics

Volume I

Concept Structuring Systems

TOWARD A COGNITIVE SEMANTICS

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For Theodore Kompanetz

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Introduction

The linguistic representation of conceptual structure is the central concern of this volume and of its companion volume. While such conceptual organization in language had once been insufficiently addressed, attention to it has been increasing over the last two to three decades. The growing research in this relatively recent linguistic domain—which has generally come to be known as cognitive linguistics—has developed into an alternative approach to the study of language that now complements other approaches. The work gathered in the present pair of volumes has been a part of this growth of research and has helped to foster it. Under the common title *Toward a Cognitive Semantics*, these volumes include most of my published material up to the present. Further, this material has been wholly revised, extended, augmented by unpublished material, and thematically organized. Under its individual title *Concept Structuring Systems*, the present volume, volume I, highlights the material that demonstrates the fundamental systems by which language shapes concepts. And under the individual title *Typology and Process in Concept Structuring*, volume II highlights the material on typologies according to which concepts are structured and processes by which they are structured.

The nature and necessity of cognitive linguistics are perhaps best characterized at the outset. To this end, I consider cognitive linguistics within a larger framework of approaches to the analysis of language. For a heuristic comparison, one can select three such approaches that address the content-related portion of language (here setting phonology aside). With simple labels, these three approaches can be designated as the formal, the psychological, and the conceptual. Particular research traditions have largely based themselves within one of these approaches, while aiming—with greater or lesser success—to address the concerns of the other two approaches. These relationships suggest the following sketch.

The formal approach basically addresses the structural patterns exhibited by the overt aspect of linguistic forms, largely abstracted away from or regarded as autonomous from any associated meaning. This approach thus includes the study of morphological, syntactic, and lexical structure. For one prominent example, the tradition of generative grammar over the past four decades has, of course, centered itself within this formal approach. But its relations to the other two approaches have remained limited. It has all along referred to the importance of relating its grammatical component to a semantic component, and there has indeed been much good work on aspects of meaning, but this enterprise has generally not addressed the overall conceptual organization of language. The formal semantics that has been adopted within the generative tradition has generally included only enough about meaning to correlate with the formal categories and operations that the main body of the tradition has focused on. And the reach of generative linguistics to psychology has largely considered only the kinds of cognitive structure and processing that might be needed to account for its formal categories and operations.

The second approach, the psychological, looks at language from the perspective of relatively general cognitive systems. Thus, the field of psychology has a long tradition of examining language from the perspective of perception, memory, attention, and reasoning. Further, it has in part addressed the concerns of the two other approaches of the present heuristic comparison. Thus, it has probed language both for its formal properties and for its conceptual properties. The latter kind of investigation has included analyses of semantic memory, the associativity of concepts, the structure of categories, inference generation, and contextual knowledge. But these studies have largely remained within certain circumscribed areas. Thus, the psychological tradition has insufficiently considered the kinds of structural categories that are central to the conceptual approach, as these are characterized next. And it has insufficiently considered the global integrated system of schematic structures with which language organizes conceptual content that it expresses—itself perhaps the main target of the conceptual approach.

The third approach to language considered here, the conceptual approach, is concerned with the patterns in which and the processes by which conceptual content is organized in language. Since the term "structure" will be used to refer both to patterns and to processes, the conceptual approach can more simply be said to address how language structures conceptual content. The relatively recent tradition of cognitive

linguistics has centered itself within this approach. It has thus addressed the structuring within language of such basic conceptual categories as those of space and time, scenes and events, entities and processes, motion and location, and force and causation. It has also addressed the linguistic structuring of basic ideational and affective categories attributed to cognitive agents, such as attention and perspective, volition and intention, and expectation and affect. It addresses the semantic structure of morphological and lexical forms, as well as of syntactic patterns. And it addresses the interrelationships of conceptual structures, such as those in metaphoric mapping, those within a semantic frame, those between text and context, and those in the grouping of conceptual categories into large structuring systems. Overall, and perhaps above all, cognitive linguistics seeks to ascertain the global integrated system of conceptual structuring in language.

Cognitive linguistics, further, addresses the concerns of the other two approaches to language. First, it examines the formal properties of language from its conceptual perspective. Thus, it seeks to account for grammatical structure in terms of the functions this serves in the representation of conceptual structure.

Second, as one of its most distinguishing characteristics, cognitive linguistics aims to relate its findings to the cognitive structures that concern the psychological approach. It seeks both to help account for the behavior of conceptual phenomena within language in terms of those psychological structures, and at the same time, to help work out some of the properties of those structures themselves on the basis of its detailed understanding of how language realizes them. Thus, the tradition of cognitive linguistics is working to determine the more general cognitive structures pertaining to conceptual content that will encompass both the cognitive structures known from psychology and those known from linguistics. It is this trajectory toward unification with the psychological that motivates the term "cognitive" within the name of this linguistic tradition. The word "toward" in the title of this volume and of its companion in fact refers to the long-range form of this trajectory that I see for our research tradition: to integrate the linguistic and the psychological perspectives on cognitive organization in a unified understanding of human conceptual structure.

The appeal that cognitive linguistics makes to psychological structure is also what distinguishes it from the tradition of semantics in general. Like cognitive linguistics, the tradition of semantics, after all, has as its subject the patterns in which conceptual content is structured in language. But

unlike cognitive linguistics, it has not systematically sought to relate its findings to more general cognitive categories and processes.

In terms of this sketch, then, cognitive linguistics can be seen as complementary to other linguistic approaches. Because it has directly engaged a domain of linguistic phenomena that the other approaches had addressed either insufficiently or indirectly, its growth can be regarded as a necessary development for our understanding of language.

Although the term "cognitive linguistics" is by now well established as the name for the research tradition just described, I will refer at least to my own body of work as "cognitive semantics." The word "semantics" in the new term has the advantage of indicating the particular approach, the conceptual, within which this research is based and from which it considers the concerns of other approaches to language. The word provides this indication because, as noted earlier, semantics is specifically concerned with the conceptual organization of language.[1]

This usage calls for further comment on my view of semantics. Semantics simply pertains to conceptual content as it is organized in language. Hence, the word "semantic" simply refers to the specifically linguistic form of the more generic notion "conceptual." Thus, general conception —that is, thought—includes linguistic meaning within its greater compass. And while linguistic meaning—whether that expressible by an individual language or by language in general—apparently involves a selection from or constraints on general conception, it is qualitatively of a piece with it. Thus, research on cognitive semantics is research on conceptual content and its organization in language and, hence, on the nature of conceptual content and organization in general. In this formulation, conceptual content is understood to encompass not just ideational content but any experiential content, including affect and perception.

The issue of methodology is raised by the fact that cognitive semantics centers its research on conceptual organization, hence, on content experienced in consciousness. That is, for cognitive semantics, the main object of study itself is qualitative mental phenomena as they exist in awareness. Cognitive semantics is thus a branch of phenomenology, specifically, the phenomenology of conceptual content and its structure in language. What methodology, then, can address such a research target? As matters stand, the only instrumentality that can access the phenomenological content and structure of consciousness is that of introspection.

As is the case with any cognitive system, different aspects of the semantic system differ in their degree of accessibility to consciousness. For

example, one might be strongly aware of any particular meaning of a word one has heard, while having only slight or no awareness of, say, the extent of that word's range of polysemy or homonymy. Thus, these two different semantic aspects of a word—its current particular meaning and its range of meaning—differ in their access to consciousness. In general, those aspects of the semantic system that are more accessible to consciousness are more amenable to direct assessment by the method of introspection. In a complementary fashion, those aspects that are less accessible to consciousness can to that degree be ascertained only through the conventional nondirect methods of analysis, such as comparison and abstraction. Even in this latter case, though, an investigator must still start with the original conceptual content that itself can be accessed only through introspection. For one must begin by comparing such conscious contents in order to abstract from their patterns less conscious aspects of structure.

Like any method in a scientific endeavor, introspection must be employed with rigor. For example, it must include such procedures as the controlled manipulation of the linguistic material whose meanings are being assessed. Further, the findings resulting from introspection must be correlated with those resulting from other methodologies. Such other methodologies include the analysis of introspective reports by others, the analysis of discourse and corpora, crosslinguistic and diachronic analysis, the assessment of context and of cultural structure, the observational and experimental techniques of psycholinguistics, the impairment studies of neuropsychology, and the instrumental probes of neuroscience. With respect to this last methodology, perhaps in the long run, the neuroscientific understanding of brain function will account for the findings of introspection. Even then, though, introspection will still be needed to ensure that the neuroscientific description of the brain is, in its account, in fact addressing what is otherwise known to be subjectively present in the mind. Thus, introspection will continue to be the method needed to probe the subjective contents of consciousness.

The method of introspection can be justified in much the same way as the methods settled on by any science. In any science, a researcher must go to where the relevant data under study are to be found. For example, if one's area of scientific study is geology, one must go examine the earth. Here, "going to where the data are" entails physical travel to terrestrial sites. In the same way, if one's area of scientific study is linguistic meaning, one must go to where meaning is located. And meaning is located in

conscious experience. In the case of such subjective data, "going" to their location consists of introspection.

But while the use of introspection may call for specific justification in cognitive semantics, it is already a necessary component in most of linguistics, even apart from semantics. Thus, the formal linguistic study of syntax ultimately depends on a tissue of judgments made by individuals as to the grammaticality or the logical-inferential properties of sentences. Such judgments are purely the product of introspection.

More generally, in fact, much of human psychological theory rests on a presumption of some form of consciousness or the efficacy of introspection, whether so articulated or not. The typical psychological subject is assumed to understand the instructions for an experiment and to willingly try to perform in accordance with that understanding. Such understanding and endeavor are consciousness-related phenomena.

Consciousness is thus often a necessary concomitant at the subject end within the cognitive sciences. But in addition, one can argue, it is also necessary at the researcher end in *any* scientific endeavor, however much this endeavor is regarded as objective. Thus, even in the most technical scientific experiments, after all the displays have appeared on monitor screens, all the printouts have emerged, and all the gauges have shown particular values, some researcher will still have to assess such registrations and apprehend their import in her consciousness. Dennett (1991) has attempted to put phenomenology itself on a scientifically objective basis with his idea of heterophenomenology. This involves individuals putting their putative experiences in a written form, which can then be treated like any other object in the world. But, from the present perspective, this move omits one crucial point: someone with his own phenomenology still must then read the transcripts to apprehend their import in turn, or else they will remain just a pattern of marks on paper (or of states in a computer).

All in all, then, the use of introspection must be recognized as an appropriate and arguably necessary methodology in cognitive science, together with the other generally accepted methodologies.

Turning to the structure and content of the present volume and its companion, these volumes include most of my work on cognitive semantics and related areas of cognitive science, spanning the last two decades or so. Further, all the papers in the volumes have been revised and updated. Almost all the papers have been expanded, with their analyses extended. For most of the papers, these changes have been extensive, with several papers having been wholly rewritten. In addition, previously unpublished work has been added to the published. Due to these revi-

sions, expansions, and additions, a high proportion of the material in the two volumes is new.[2]

The changes in and the arrangement of the material have yielded a more integrated pair of volumes. Thus, the revised papers more clearly present their ideas as cohering within a single theoretical framework, and they now share a uniform terminology. And the papers, now chapters, have been sequenced not in chronological order, but rather in accordance with their subject matter.

Thus, in volume I, the chapter in part 1 establishes the theoretical orientation of both volumes in terms of conceptual structure, and it introduces the notion of extensive and integrated "schematic systems." The remaining three parts of volume I include chapters on three such schematic systems. In volume II, the chapters in part 1 examine the typological patterns that certain conceptual structures map onto. The work here mostly addresses event structure, and so it in part expands the examined scope of semantic structure from aspects of events to whole events. Next, while the preceding chapters had treated both static and dynamic cognitive processes, the chapters in part 2 step beyond that to focus on online interactive processing of multiple factors. The chapters in part 3 extend the conceptually and cognitively oriented analyses that had been applied to language in the preceding chapters to other cognitive systems, namely, to the cognitive systems that underlie culture and narrative. In fact, the last section of the final chapter on narrative structure presents in a more general form the same kind of conceptual structures that were introduced in chapter 1 of volume I. It can thus be seen that the arrangement of the chapters through the two volumes generally follows a trajectory from the more core aspects of conceptual structure in language to conceptual structure in nonlinguistic cognitive systems.

Each volume of the pair superimposes its own thematic organization on this overall sequence. Volume I sets forth the pattern of concept-structuring systems in language and examines several such schematic systems in detail. In particular, the schematic system of "configurational structure" is treated in chapters 2 and 3, that of the "distribution of attention" is treated in chapters 4 to 6, and that of "force and causation" is treated in chapters 7 and 8. Together, all such schematic systems constitute the fundamental conceptual structuring system of language, and the organizing aegis of volume I is the outlining of this fundamental system.

Volume II furthers the analysis of concept structuring in language by examining its relation to typology and process. It sets forth typologies according to which concepts are structured and processes by which they

are structured. Cognitive process can be heuristically understood to operate over three time scales. The short-term scale is that of current online processing. The mid-term scale occurs developmentally over some period of an individual's lifetime. The long-term scale occurs across the succession of an individual's momentary judgments that cumulatively—and in interaction with those of others—realize the maintenance or gradual change of various aspects of language and culture. In chapters 1 to 4, typological patterns are understood to involve this third long-term scale of process. These chapters thus treat a language's selection and maintenance of one typological category out of a small universally available set as well as the diachronic shift from one such category to another. At this time scale, chapter 4 also treats the process of hybridization that a language can manifest in a diachronic shift between two language types. Chapter 7 treats the mid-term scale of process in positing a cognitive system that governs a child's acquisition of cultural patterns. The short-term scale of process is treated in chapters 5 and 6, which, respectively, describe online resolutions to semantic conflicts and to the co-constraints of a current set of communicative goals and means. The short-term scale is further treated in chapter 8, which outlines the cognitive factors by which a producer or a recipient of a narrative structures and integrates the whole of that narrative.

It may be useful to present an outline of the themes that characterize my work and of the development they went through—as well as of where these themes first appeared and where they appear in the two volumes. Overall, this body of work from its outset has centered on semantic/conceptual structure, examining the form and processes of this structure. All the particular concerns that were listed earlier as objects of study for cognitive linguistics have in fact been central themes throughout my own work. Some specifics follow. References to previously published papers will be marked with "T-", and references to chapters in volumes I and II will be marked with "I-" and "II-".

One theme that has continued from my dissertation on is the examination of event structure. One type of event structure to which I have given much attention pertains to motion. In my analysis, the general form of such a structure consists of a basic "Motion event"—that is, an event of motion or location—together with a "Co-event" that relates to it as its Manner or Cause, all within a larger "Motion situation." Such an analysis first appeared in my dissertation, T-1972, and was developed further in T-1985b—which appears now in chapters II-1 and II-2 in a much expanded form.

As a concomitant to this study of Motion events, much research was done on the general schematic structuring of space and of time, as well as of the objects and processes that occur therein. In its most direct treatment, the analysis of spatial structure first appeared in T-1972/1975b and was further developed in T-1983—a revision of which now appears in chapter I-3. And direct analysis of temporal structure first appeared in T-1977/1978c and was developed in T-1988b—now revised as chapter I-1. It should be noted that some aspects of the way language conceptually structures Motion events in space and time appear in virtually every chapter. For example, fictive conceptualizations of Motion are described in chapter I-2, while selected windows of attention upon different phases of a Motion event are described in chapter I-4.

The Motion situation and the event complex that it comprises were subsequently generalized. This generalization involved the notion of a "framing event" to which the co-event relates, now within a larger "macro-event." This macro-event now encompasses not only a Motion situation but also situations of "temporal contouring," state change, "action correlating," and "realization." This generalization was first described in T-1991, which in expanded form now appears as chapter II-3. Further, while it was earlier seen that a co-event could relate to a Motion event as its Manner or Cause, the number of distinct relations that a co-event can bear to a framing event—what I term "support relations"—is now understood to be much greater, as shown in both chapters II-1 and II-3.

Another type of event structure that has been much analyzed in my work pertains to causation. In particular, this analysis is based on the notion of a causing event relating to a caused event within a larger causative situation. But the analysis has further aimed to identify the conceptual primitives that underlie such causative situations, both over a range of types and from the most basic to the very elaborate. Among such variants, a causative situation can include "agency," a cognitive category that then criterially depends on the distinct concepts of "intention" and "volition." This analysis of causation again first appeared in T-1972, and it was developed further in T-1976b, which now appears in a much revised form as chapter I-8. Further perspectives on linguistic causation appeared in T-1985b (chapter II-1) and in T-1996b (chapter I-4). The former of these two works describes the lexicalization patterns that represent the interaction of different causative types with different aspect types, as well as discussing how grammatical devices permit conversions between these types. The latter work describes the linguistic windowing of attention over

a causal chain and, specifically, how the medial portion of such a chain is regularly omitted from attention in what appears to be a linguistic correlate of a general attentional pattern.

Much like the generalization of the Motion situation to the macro-event, the event structure complex involving causation was generalized to one involving "force dynamics." Force dynamics covers the range of relations that one entity can bear to another with respect to force. This range includes one entity's intrinsic force tendency, a second entity's opposition to that tendency, the first entity's resistance to such opposition, and the second entity's overcoming of such resistance. It further includes the presence, absence, imposition, or removal of blockage to one entity's intrinsic force tendency by a second entity. In force dynamics, causation thus now appears within a larger conceptual framework in systematic relationship to such other concepts as permitting and preventing, helping and hindering. Force dynamics had some roots in T-1972, was developed further in T-1976b (now chapter I-8), and became greatly elaborated in T-1985a/1988a (now somewhat further expanded as chapter I-7).

As can be seen from the preceding, a principal concern of mine has been with the structure of an event complex that consists of constituent events in a particular relationship. Thus, as just discussed, in a Motion situation and its generalization to a macro-event, a co-event can bear any of a set of support relations to the framing event. And in a causative situation and its generalization to a force-dynamic situation, one component relates to another component with respect to force, including the case where the two components are themselves events. In a similar way, I examined the structure of an event complex in two further respects: the Figure-Ground relations and the subordinate/coordinate relations that can hold between constituent events. While Figure-Ground relations were addressed for the case of physical elements in T-1972, they were later generalized to apply to any type of entity, including events, thus applying to the case where one event relates as Figure to another event as Ground within a larger event complex. This generalization first appeared in T-1975a/1978a—now revised as chapter I-5 (see below for more on Figure and Ground). And the subordinate or coordinate relations that one event can bear to another within a larger event complex were analyzed into a large set of "cross-event relations," including ones that are temporal, conditional, reason based, concessive, additive, and substitutional. This further treatment of the structure of event complexes appeared in T-1978b—now wholly rewritten as chapter I-6.

A major concomitant of this work on event complexes has been concern with the patterns of the overt linguistic representation of such complexes. Thus, much attention has been paid to the syntactic representation of events with a Figure-Ground or a subordination/coordination relationship, as seen in chapters I-5 and I-6. Of special interest, though, has been the circumstance in which a complex structure at the conceptual level—say, a pair of constituent events and the relation between them—is expressed by a unitary syntactic constituent, such as by a single clause. Such telescoped representation was termed "conflation." Such conflation of a complex conceptual structure into a single clause occurs extensively in the representation of the Motion situation and of the causative situation. Analysis of the conflation patterns for such situations first appeared in T-1972, was elaborated in T-1976b, 1985b, and 1991, and now appears mainly in chapter I-8 for causation and in chapters II-1 to II-3 for Motion and its generalizations.

In thus relating the conceptual level to the formal level, I have especially examined certain patterns. These are the specific patterns in which particular semantic constituents within the conceptual complex are represented by particular syntactic constituents within a sentence. These are patterns, in other words, of what shows up where. Such "meaning-form mappings" have been represented notationally and/or diagrammatically in my work for all the event types just indicated—that is, for those involving Figure/Ground, subordination/coordination, causation, and Motion. In the case of the Motion situation in particular, it was found that different languages characteristically employ different meaning-form mappings and can be placed into a typological classification on this basis (see below for more on typologies and universals).

This perspective of meaning-form mapping went further to inform most of my work on lexical semantics. To be sure, this work has included much on the semantic infrastructure of individual morphemes. But mostly it has addressed the systematic patterns in which meanings of certain categories appear alone or are combined together in morphemes of certain classes. (Combinations of meanings in a morpheme were also called "conflation," in a parallel usage of this term.) I have treated lexical semantics of the latter kind as an integral part of the meaning-form mappings that pertain to whole conceptual complexes represented over whole sentences. Thus, in my analysis, the lexicalization pattern exhibited by a class of morphemes correlates with the syntactic pattern of the sentence structure in which that class of morphemes fits. The development and the locations of my

work on meaning-form mappings and on systematic lexical semantics are the same as those last cited above.

Work on all the preceding issues led to the notion of schematic systems. To begin with, observation of the conceptual structuring of space and of time—especially of the parallelisms between them—engendered the idea that these two forms of structuring could be combined into a single more general schematic system, that of "configurational structure." It further appeared that this schematic system of configurational structure also encompasses the linguistic representation of more domains than just those of space and time, such as the domain of qualitative properties.

Then, in addition to that of configurational structure, further large schematic systems were identified. In fact, the general picture emerged that all of the conceptual structuring that linguistic forms effect can be comprehended under a certain number of such large schematic systems. Thus, much as certain linguistic forms in a portion of discourse organize a referent situation in terms of configurational structure, so other linguistic forms specify where one is to locate one's perspective point from which to regard the now-structured referent situation. Such specifications constitute a second schematic system, that of "location of perspective point." Still further linguistic forms specify the particular distribution of attention that one is to direct over the structured situation from one's adopted perspective point. Such specifications, then, constitute a third large schematic system, that of "distribution of attention." A fourth large schematic system of "force dynamics" pertains to the linguistic representation of force interactions and causal relations occurring between certain entities within the structured situation. These four schematic systems of configuration, perspective, attention, and force are the main systems that my work has elaborated so far, but there are further schematic systems that future work will endeavor to detail. The idea of such schematic systems was first articulated in T-1983, was developed further in T-1988b, and now informs the organization of chapter I-1, as well as of volume I's parts 2 to 4.

More closely regarded, the schematic system of attention can be seen to cover several different patterns of attentional distribution that have been separately elaborated in my work. One of these can be called the "center-periphery" pattern. A case of this pattern is "Figure-Ground" organization, whose original description in my work represented an early attempt to unify psychological and linguistic categories. In Figure-Ground organization, the entity that functions as the Figure of a situation attracts focal attention and is the entity whose characteristics and fate are of

concern. The Ground entity is in the periphery of attention and functions as a reference entity used to characterize the Figural properties of concern. Figure-Ground organization was first investigated in T-1972 for objects relating to each other in Motion or causative situations, and, as noted earlier, was extended to the interrelationship of constituent events within a larger event complex in T-1975a/1978a as well as T-1978b (chapters I-5 and I-6). The center-periphery pattern was later seen to operate as well in the domain of force interactions in the form of two further thematic roles, the "Agonist" and the "Antagonist." These have appeared as cited above for force dynamics.

Other patterns of attentional distribution have also been investigated. Thus, in the pattern termed "level of attention," linguistic forms direct one's greatest attention either to a level of the component elements making up some aspect of a referent situation, or to the level of the whole that encompasses those components. This pattern was set forth in T-1978c/1988b and appears now in chapter I-1. A third pattern of attentional structure is the "windowing" of attention. In this pattern, linguistic forms can differentially direct greatest attention to, or withdraw attention from, particular portions of a referent situation. This pattern was first presented in T-1996b and appears now in chapter I-4.

In addition to treating all the preceding conceptual domains and concept-structuring systems, my work sets forth certain fundamental organizing principles that are in effect across these domains and systems. One of these principles is the centrality of schematic structure. This is the idea that the structural specifications of linguistic forms are regularly conceptualized in terms of abstracted, idealized, and often virtually geometric delineations in particular relationships with each other. T-1972 included descriptions of such schemas for paths of motion through space and for causal interactions. It also included the representation of schemas by diagrams whose structurally relevant components are labeled. Those diagrams were used to represent the schematic structure of a set of causing events expressed by Atsugewi satellites; they are reproduced in chapter II-2. While appeal to schematic structure appears in most of my papers, it perhaps reached its most developed form for representing configurational structure in T-1977 and T-1983 (now revised as chapters I-1 and I-3) and for representing force-dynamic structure in T-1985a/1988a (now revised as chapter I-7).

A second organizing principle is that the closed-class system of language is its most fundamental and comprehensive conceptual structuring

system. That is, collectively, the meanings of the closed-class forms of languages structure conceptual content in general—and do so within the more particular schematic systems otherwise examined separately. This study of the overall system can be called "closed-class semantics" or the "semantics of grammar." The idea of pitching such a study at the superordinate level that comprehends all closed-class forms first appeared in my work in T-1978c and was greatly developed in T-1988b, now revised as chapter I-1.

A third organizing principle pertaining to the conceptual structuring systems of language is that, in general, the same ideational complex can be represented in terms of alternative conceptualizations. Thus, a speaker can generally select one or another of such conceptualizations as the one she will use to represent the ideational complex that she currently wants to communicate. I termed this cognitive capacity to construe an ideational complex in a range of ways the principle of "conceptual alternativity." The idea of a systematic choice among alternatives of conceptualization was first articulated in my work in the succession of papers T-1977/T-1978c/T-1988b, now revised as chapter I-1. The idea was extended to other semantic domains in T-1983, now revised as chapter I-3, as well as in T-1996b, now revised as chapter I-4.

A fourth organizing principle is a parallelism between the linguistic representation of spatial structure and that of temporal structure. Many of the same forms of conceptual structuring are evident in both space and time, in both things and processes, and, accordingly, in the referents of both the linguistic forms that prototypically represent these, namely, nouns and verbs. The articulation of this parallelism first appeared in T-1977; it was developed further in T-1978c and still further in T-1988b (now revised as chapter I-1).

Finally, language has certain pervasive properties that my work treats at length. First, one such property is cognitive dynamism, including the system of processes that manipulate otherwise static conceptual structures in language. As discussed earlier, the work in volume II covers the long-term scale of process that pertains to typological maintenance and change, the mid-term scale that pertains to developmental change, and the short-term scale of online cognitive processing. With respect to this short-term type of process, my earliest treatment of it was in T-1976b and T-1977, now revised as chapters II-5 and II-6. The first of these works deals with the simultaneous occurrence of different communicative goals in a speaker and the cognitive processes by which they are concurrently

satisfied through the communicative means available. The second work deals with the semantic conflicts that can occur between the specifications of two forms together in the same portion of discourse, and the array of cognitive processes by which the conflicts are reconciled. These processes include "shifting," "blending," "juxtaposing," "juggling," and "blocking." In addition, T-1978c/1988b—now revised as chapter I-1—developed the idea that closed-class forms trigger cognitive operations that manipulate conceptual structures. Subsequently, in T-1983—now revised as chapter I-3—section 4 deals with the cognitive processes by which the finite, indeed relatively small, inventory of morphemes in a language can be deployed so as to represent, at least potentially, the open-ended range of the contents of consciousness. And T-1995b, now revised as chapter II-8, outlines the conceptual parameters and strata that must be interactively deployed for an individual to be the producer or the understander of a narrative. In addition to such processual forms of cognitive dynamism, the bias of language toward conceptual dynamism—that is, the propensity to represent an otherwise static concept in terms of action—was demonstrated in T-1996a, now revised as chapter I-2.

Second, the typological and universal properties of language have been treated extensively in my work. In fact, my papers have presented virtually no phenomenon in any particular language for its own sake, but only insofar as it illuminates a typological or universalist issue. Most of my typological findings are presented in chapters 1 to 4 of volume II, which represent revisions of T-1982, T-1985b, T-1987, and T-1991, while some further typological observations are made in chapter 6 of volume I, a revision of T-1978b. Chapter II-2 specifically lists a large set of typological and universal factors observable in lexical patterns. Essentially all the rest is universalist in orientation. Further, though, even the typological analyses have a universalist underpinning. Thus, in my analyses of them, the alternatives within each proposed typology are simply different permutations of the elements within a single basic pattern that is itself universal. Hence, the overarching trajectory of this body of work has been to ascertain the universal properties of conceptual organization in language.

In the exploration of one further pervasive property of language—and beyond—an organizing perspective that has been progressively developing over my work and that will inform much of my future work can be called the "overlapping systems model" of cognitive organization. In this model, human cognition comprehends certain relatively distinct major cog-

nitive systems. These appear to include language, perception, reasoning, affect, attention, memory, cultural structure, and motor control. The general finding is that each cognitive system has some structural properties that may be uniquely its own, some further structural properties that it shares with only one or a few other cognitive systems, and some fundamental structural properties that it has in common with all other cognitive systems. These have been termed "systems" because the structural overlaps across them suggest a cognitive organization other than the autonomy of Fodorian "modules."

To date, my work has examined similarities and dissimilarities of structure—in particular of conceptual structure—between language and each of several other major or lesser cognitive systems. These have been visual perception, kinesthetic perception, attention, understanding/reasoning, pattern integration (as in narrative), cultural structure, affect, and motor control. It has also examined structural properties common to all these systems.

Three of my recent papers have made major forays into other cognitive systems. T-1996a (chapter I-2) closely examines visual perception for its parallels to semantic structure. It also generalizes the traditionally distinguished systems of "perception" and of "conception" into a single unified cognitive system of "ception." T-1995a (chapter II-7) proposes that humans have a cognitive system that has evolved to acquire, manifest, and transmit cultural structure in a way comparable to that of the presumed cognitive system for language. And T-1995b (chapter II-8) proposes that humans have a cognitive system for interconnecting an assembly of mental experiences so as to form them into a single overall conceptual pattern. In particular, this system can integrate a sequence of experiences that are cognized over time into a single pattern understood as a story, a history, or a life—that is, generically, as a narrative. In its "Parameters" section, further, this last work contains the most extensive identification and analysis I have made to date of the foundational structural properties common to all the cognitive systems. This analysis is presented primarily with reference to the proposed cognitive system that underlies the structure of narrative, but the analysis is intended to be quite general across the whole range of cognitive systems.

The following is a guide to the chapters that compare the conceptual structure of language with that of another cognitive system or with all other cognitive systems in accordance with the overlapping systems model

of cognitive organization. Comparisons of language structure to the structure in visual perception appear in chapters I-1 to I-3. Comparisons of language structure to the structure of kinesthetic perception appear in chapter I-7. Comparisons of language structure to the attentional system appear in chapters I-4 to I-6. Comparisons of language structure to the structure of the understanding/reasoning system appear in chapters I-1 and I-7. Comparisons of language structure to the pattern integrating system that underlies narrative appear in chapter II-8. Comparisons of language structure to the structure of the cognitive culture system appear in chapters I-2 and II-7. Comparisons of language structure to the structure of the affect system appear in chapter I-1. And an analysis of the structuring principles that seem to run in common through all the cognitive systems appears in chapter II-8.

In all, I see the work in the present pair of volumes as joining with that of other cognitive linguists, as well as with that of other cognitive scientists, in a collective enterprise. The ultimate aim of this enterprise is to understand the general character of conceptual structure in human cognition.

Several typographical and formatting conventions are followed in this volume. In the sections where they are characterized, newly introduced terms appear in semi bold face. Linguistic forms are cited in italics. Italics are also used to indicate emphasis. Single quotes enclose any cited semantic element. For instance, they enclose the literal gloss of a non-English form. Double quotes enclose a casual or colloquial English translation of a non-English form (as well as being used for their usual functions).

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I am greatly indebted to the people who have helped in the development of the ideas in this volume, both through their work and through our discussions. I will thank them individually in the separate chapters. But here I will give my special thanks to Kean Kaufmann and Stacy Krainz, without whose counsel and assistance this volume could not have been completed.

I have dedicated this volume and its companion to the memory of the psychologist Theodore Kompanetz, my friend and mentor—and a world genius who, unfortunately for the world, did not put in writing any of the sweep and depth of his understanding.

Notes

1. For me, the addition of the word "cognitive" to that of "semantics" in this term for my work is in fact redundant, since semantics is intrinsically cognitive. The need for the qualifying word is due to the existence of alternative views of meaning as independent of mind.

2. The only published paper not included is Talmy 1975b. It was omitted because most of the material in it was treated in a more developed form in subsequent papers. Its still useful parts have been incorporated into several of the present revised chapters.

As for my dissertation, Talmy 1972, the only portion of it that appears here close to its original form is the description of Atsugewi forms in chapter 2 of volume II. Certain other portions of the dissertation are represented in more developed form in a number of the chapters in the two volumes. Note, though, that some portions of the dissertation are unrepresented here for reasons of space but are still worth consulting. They discuss material not otherwise addressed, or discuss the material in a way or in a degree of detail not represented here. As one example, the dissertation's section 10.4 on "alpha-, beta-, and gamma-order" lays out a crosslinguistic paradigm for valence permutations.

PART 1

FOUNDATIONS OF CONCEPTUAL STRUCTURING IN LANGUAGE

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Chapter 1

The Relation of Grammar to Cognition

1 INTRODUCTION

A fundamental design feature of language is that it has two subsystems, which can be designated as the *grammatical* and the *lexical* (as these are characterized below). Why is there this universal bifurcation when, in principle, a language could be conceived having only a single system, the lexical? The explanation in this chapter is that the two subsystems have distinct semantic functions, ones that are indispensable and complementary.[1] To develop this account further, we must first note that we take a sentence (or other portion of discourse) to evoke in the listener a particular kind of experiential complex, here termed a **cognitive representation** or CR.[2] The grammatical and lexical subsystems in a sentence seem generally to specify different portions of a CR. Together, the grammatical elements of a sentence determine the majority of the *structure* of the CR, while the lexical elements together contribute the majority of its *content*. The grammatical specifications in a sentence, thus, provide a conceptual framework or, imagistically, a skeletal structure or scaffolding for the conceptual material that is lexically specified.

More generally, across the spectrum of languages, the grammatical elements that are encountered, taken together, specify a crucial set of concepts. This set is highly restricted: only certain concepts appear in it, and not others, as seen later. The present chapter advances the position that this set of grammatically specified notions collectively constitutes the fundamental conceptual structuring system of language. That is, this crosslinguistically select set of grammatically specified concepts provides the basic schematic framework for conceptual organization within the cognitive system of language.

Thus, grammar, broadly conceived, is the determinant of conceptual structure within one cognitive system, language, and as such is the main object of this chapter's study. But such a study directly opens out into a wider investigation across other cognitive systems, such as those of visual perception and reasoning, and some of the broader structural parallels that then become evident are addressed in other chapters of the present volume and its companion. Hence, the greater issue, toward which the present study ultimately aims, is the general character of conceptual structure in human cognition.

As to its type, the present study can be designated as the **semantics of grammar** or as **closed-class semantics**. Its scope follows in a progression from previous types of study. Such studies have largely been an in-depth semantic analysis of a selected grammatical element (or class of elements) of particular interest within a single language, for example, the Turkish evidential suffix *-miş* (Slobin and Aksu 1982); or an exposition of the meanings and functions of all the grammatical elements of a single language, say, as in a grammar of Dyirbal (Dixon 1972); or a crosslinguistic typology of the different kinds of grammatical devices used for a single semantic function, say, to indicate the interrogative (Ultan 1978). And much previous work has also treated broader issues of grammatical meaning (Sapir 1921, Boas 1938, Whorf 1956, Jakobson 1971). But the line of research reported on in this chapter is perhaps the first to address grammatical expression in language at the superordinate level, with the aim of determining the semantic and cognitive properties and functions of this structural component of language as a whole.[3]

The terms **lexical** and **grammatical** as employed here require elaboration. The distinction between the two is made formally—that is, without reference to meaning—in terms of the traditional linguistic distinction between "open-class" and "closed-class." A class of morphemes is considered open if it is quite large and readily augmentable relative to other classes. A class is considered closed if it is relatively small and fixed in membership.

We next look at the particular classes belonging to these two types. The open classes of elements—that is, the lexical classes—that are most commonly encountered in languages are the roots of nouns, of verbs, and of adjectives. The extensive systems of ideophones, or "expressive forms" found, for example, in a number of Asian and African languages, might also be included as a type of open class. Also to be included, at a level above that of basic elements, are **lexical complexes**—that is, collocations

—like English *spill the beans* ('unwittingly reveal a jointly held secret') or *have it in for* ('bear a vengeful grudge against'). Not included are regular adverbs, which seem in all languages to be derived, as from nouns, verbs, or adjectives (as in English from adjectives by the addition of *-ly*), rather than to comprise in their own right an open class of intrinsically adverbial roots. Outside of the class of lexical complexes, the types of open classes identified here are not obligatorily present in every language but rather form a universally available set from which each language draws a subset. That is, while all languages apparently have lexical complexes as an open class, they can lack one or more of the other listed classes—the ones consisting of intrinsically ideophonic, adjectival, verbal, or nominal roots.

Apart from such open-class forms, all other linguistic forms are closed-class—and are considered here to be, quite generally, "grammatical." Such grammatical forms include both an overt type and an abstract, or implicit, type. Forms of the overt type can be bound or free. Overt bound forms are inflections, derivations, and clitics. Overt free forms can include, for example, determiners, prepositions, conjunctions, and particles (among which we would include forms like English *even* and *again*, which otherwise are often loosely termed "adverbs"). Perhaps also to be included in the overt type are such suprasegmental forms as intonation patterns, if intonation in a language is in fact found to resolve into distinct patterns that are relatively few in number and difficult to augment.

The abstract or implicit type of closed-class forms—ones without phonological substance—can include major grammatical categories (e.g., "noun," "verb"), grammatical subcategories (e.g., "count noun," "mass noun"), grammatical relations (e.g., "subject," "direct object"), word order patterns, and perhaps also "zero" forms.[4] The fact that grammatical categories, as well as the other types of abstract forms just listed, constitute closed classes is an observable design feature of language, not something to be taken for granted. In principle, a language could conceivably have, say, an open class of grammatical categories that included hundreds of distinct highly particularized members. Indeed, in one analysis, a language can have more grammatical categories than is typically reckoned, including for example, each distinct position class in a polysynthetic verb. Nevertheless, the set of grammatical categories in any language is relatively small and resistant to new additions.

Finally, perhaps also to be included among closed classes are certain categories of **grammatical complexes**, including for instance grammatical constructions, syntactic structures, and complement structures. Such

complexes consist of specific combinations of simplex closed-class forms, whether these are all abstract, all overt, or a mixture of both (and sometimes in further combination with particular open-class forms). Typically, each grammatical complex resembles a simplex closed-class form in that it represents an abstract schema with a structuring function. However, the inclusion of such complexes here involves certain difficulties. First, it may not always be a determinate matter as to which collection of simplex forms are to be taken as cohering together to constitute a single distinct complex. Second, there is some doubt whether the totality of constructional complexes in a language would in any case constitute a closed-class set—their number might rather be quite large and perhaps even relatively easy to extend (cf. the Construction Grammar approach, e.g., in Fillmore and Kay, forthcoming). To avoid such problems, the present analysis does not depend on the use of grammatical complexes. A complex is cited only if its semantic function is equivalent to that of some simplex closed-class form that otherwise occurs in some language.

2 THE NATURE OF GRAMMATICALLY SPECIFIED CONCEPTS

In this section, we elaborate on two of the foundational property differences between the grammatical and the lexical subsystems mentioned earlier. These are the fact that grammatical forms are semantically constrained while lexical forms basically are not, and the fact that the basic function of grammatical forms is to structure conception while that of lexical forms is to provide conceptual content.

2.1 Constraints on Grammatical Meaning

We begin with a simple demonstration that the concepts specified by grammatical forms are constrained in two ways: as to their categories and as to the member notions within these categories. With respect to the first kind of constraint, many languages have closed-class forms in construction with the noun, such as nominal inflections, that specify the ''number'' of the object referred to by the noun, for example its 'singularity' or 'plurality', like the English ∅ and *-s*. By contrast, no languages appear to have inflections that specify the ''color'' of the object referred to by a noun—for instance, its 'redness' or 'blueness'. Of course, the ''color'' category is readily found specified by open-class forms, as in the case of English *red* and *blue*. (Here, double quotes enclose conceptual categories, while single quotes enclose member notions within those categories.)

With respect to the second kind of constraint, even within a conceptual category acceptable for grammatical expression, there are great restrictions on the particular notions that can be specified. Thus, ''number'' notions expressed by bound closed-class forms include little more than 'singular', 'dual', 'trial', 'plural', 'paucal', and 'singulative'. Free closed-class forms can, as in English, express a few further notions, such as 'no', 'some', 'many', 'most', and 'all'. But the ''number'' category apparently never includes closed-class expression of such notions as 'even', 'odd', 'dozen', or 'numerable'. By contrast, such notions, again, *can* be specified by open-class forms, as is shown by the words just used.

2.1.1 Constraint Permitting Topological But not Euclidean Reference

Given the existence of such constraints on grammatically specifiable notions, we can seek more general principles that determine a number of constraints at once. By one such principle that emerges, grammatical referents generally have a **topological** rather than a Euclidean character. To begin with one of the topological properties exhibited, consider a deictic like the English *this* or *that* as in *This*/*That chair is broken*. A closed-class element of this type specifies the location of an indicated object as being, in effect, on the speaker side or the non–speaker side of a conceptual partition drawn through space (or time or other qualitative domain). This integral specification can be analyzed as containing the component notions enclosed by single quotes in (1).

(1) (a,b) a 'partition' that divides a space into 'regions'/'sides'
(c–e) the 'locatedness' (a particular relation) of a 'point' (or object idealizable as a point) 'within' a region
(f,g) (a side that is the) 'same as' or 'different from'
(h,i) a 'currently indicated' object and a 'currently communicating' entity

Other notions that might at first be ascribed to such deictics, such as of distance or perhaps size, prove not to apply, on the evidence of sentence pairs like (2).

(2) a. This speck is smaller than that speck.
b. This planet is smaller than that planet.

The scenes referred to by (2a) and (2b) differ greatly, involving tiny objects millimeters apart or huge objects parsecs apart. But the sentences differ only lexically, not grammatically. Hence, the scenes' differences

as to the magnitude of size or distance must arise from the open-class elements; they cannot be traced to the deictics (or other closed-class elements) in the sentences. Thus, the notions specified by a *this* or a *that* are abstracted away from any particularities of magnitude and so, to this extent, are genuinely topological. Their schematic representation of a conceptual partition remains constant, but this partition's distance can—by the characterization of topology as "rubber-sheet geometry"—be "stretched" indefinitely without challenge to any semantic constraints of the deictics. These deictics thus appear to have the topological property of being **magnitude neutral**.

Another closed-class form that exhibits this topological property in space is the English preposition *across*. This form can be used to refer to a path of any length, whether one of inches, as in *The ant crawled across my palm*, or one of thousands of miles, as in *The bus drove across the country*. Once again, what this closed-class form is dedicated to representing is a schema—in idealized form, that of a point describing a path that goes perpendicularly from one to the other of two parallel lines—and it is neutral with respect to the magnitude of that schema. Further, the same topological property can be exhibited by a closed-class form with respect to time. Thus, the English past tense inflection *-ed* can be used in the sentence *Alexander died, with dignity* with equal felicity whether the time referred to was last year, in speaking of an acquaintance, or over two millennia ago, in speaking of Alexander the Great. As before, this closed-class form refers to a particular schematic arrangement in time—in idealized form, that of a point event located within the period leading up to the point of the present moment—and is neutral with respect to temporal magnitude. These findings about an English deictic pair, preposition, and tense inflection alert us to noticing whether any grammatical elements make specifications about magnitude. A brief survey through more of English and through various other languages suggests that—while there are grammatical specifications for *relative* magnitude[5]—there are possibly never any for absolute or quantified magnitude, whether of size, distance, interval, or other parameters. We can provisionally conclude that the referents of closed-class forms do generally have the topological property of magnitude neutrality.

Another topological property is exhibited by the type of adposition that specifies, for a moving object, certain characteristics of path and of reference point or reference frame. An example of this type is English *through* as used, for instance, in *I walked through the woods*. In this usage, *through*

specifies, broadly, 'motion along a line that is within a medium'. The component notions contained here include those in (3).

(3) (a) 'motion'
(b–e) which can be thought of as 'one-to-one correspondences' between 'adjacent' points of 'space' and adjacent points of 'time'
(f) motion that describes a 'line' (i.e., a 'linear extent')
(g) the locatedness of a line within a 'medium'
(h,i) a medium—that is, a region of three-dimensional space set apart by the locatedness within it of 'material' in a 'pattern of distribution' with properties and a range of variation still to be determined

It can be observed, from a sentence pair like (4), that the concept specified by *through* is indifferent to particulars of shape or contour in the linear path described by the moving object. This is evident here because, as before, the two sentences differ only lexically, not grammatically—they both use *through* while referring to different path contours. Another cross-linguistic survey of closed-class elements suggests that they largely have this further topological property of being **shape neutral**.[6]

(4) a. I zigzagged through the woods.
b. I circled through the woods.

The same English preposition *across* seen above to be magnitude neutral can now also be seen to be shape neutral. For it can be used in a sentence like *I swam across the lake* when referring to a case in which the lake's perimeter and the swim path I followed are greatly irregular. Here, relative to the idealized schema described above for *across*, the two parallel lines have bent and joined to form an irregular loop, while the perpendicular path between them has itself angled and bent.[7]

In the aim of ascertaining any properties common to grammatically specified notions, the notions examined in detail earlier are gathered together in (5). For heuristic purposes, the notions are provisionally divided into two groups on the basis of their relation to topology. Group (a) includes the notions that properly belong to the specific mathematical system of topology, as well as the intuitively comparable notions that might belong to a language-based system of topology—one that perhaps could serve as the model for the construction of a new topology-like mathematical system. In group (b) are the notions that fall outside any

usual conception of topological properties. The first group has fourteen notions, while the second has six—an indication of a substantial propensity for grammatical elements to specify quasi-topological notions. The ratio in this direction is improved if we consider that even several notions in group (b)—the bottom three—resemble topological notions in the sense of involving relativistic relationships between quantities rather than absolutely fixed quantities.

(5) *Some notions found to be specified by grammatical elements*

a. *Topological or topology-like*		b. *Nontopological*
point	singularity	material
linear extent	plurality	space
locatedness	same	time
within	different	motion
region	"adjacency" of points	medium
side	one-to-one correspondence	entity currently indicated/ communicating
partition	pattern of distribution	

In the complementary aim of ascertaining any properties excluded from grammatical specification, the categories of notions found above *not* to be specified by the elements investigated are listed in (6). Rather than being topological, topology-like, or relativistic, these notions involve Euclidean geometric concepts—for example, fixed distance, size, contour, and angle—as well as quantified measure and various particularities of a quantity: in sum, characteristics that are absolute or fixed.

(6) *Some categories of notions seemingly rarely or never specified by grammatical elements*
absolute/quantified magnitude (of distance, size, etc.)
shape/contour of line
color

The provisional conclusion to be drawn from these findings is that, if grammatical specifications generally correspond to (linguistic-) cognitive structuring, then the nature of that structure is largely relativistic, topological, qualitative, or approximative rather than absolute, Euclidean, quantitative, or precisional.

This preponderant requirement for conceptual neutralities among closed-class elements is in sharp contrast to the referential freedom of lexical items, which can express not only structural abstractions but also

wide-ranging specificities. For example, specificity as to magnitude is seen in nouns like *inch, yard, mile, pint, gallon, hour, month,* and *year*; and as to shape, in nouns like *square*, adjectives like *straight*, and verbs like *ricochet*.

The significance of these findings can be brought into greater relief. Consider again the earlier example in which the ant crawled across my palm and the bus drove across the country. It is clear that we have a number of cognitive systems that would register and process the differences between these two situations. Thus, we would register the fact that the ant event takes place within a single span of attention, while the bus event extends over days and must be reconstructed in memory. We would process the fact that the ant event occurs within a single scope of perception, while the bus event extends well beyond any such scope and, again, can be pieced together only in memory. We have the cognitive capacity to recognize that the ant event involves a single scene, whereas the bus event involves a continuous succession of shifting scenes. We would cognize the difference in the manner of progression between the ant's alternating six-footed steps and the bus's four-wheeled rotary gliding. We would appreciate the sensorimotor differences between standing still while watching the ant's progress, and sitting through bumps and lurches while executing the progression oneself in the bus. Yet, out of all of this rich processing by various cognitive systems, none of it enters the closed-class form *across*. All that such a grammatical form is designed to represent is a spare schema abstracted away from the otherwise available cognitive representations in accordance with certain principles of abstraction, such as the topological principle. It might have been thought simple for a language at least to include two or more grammatical forms that referred to the same geometric schema but that differed in referring as well to different scales of magnitude—for example, one form for a demitasse-sized 'in' and another for an ocean basin–sized 'in'. But the remarkable finding is that, perhaps with only a few arguable exceptions, languages seem to avoid such distinctions in their closed-class subsystem. Thus, as part of its design, the language system includes a component, the closed-class subsystem, dedicated to representing solely a certain kind of abstracted conceptual structure.

As already noted, the specifically linguistic form of topology has somewhat different properties than mathematical topology. To examine such differences, consider the English preposition *in*, which in one main usage refers to a plane so curved as to define a volume of space. First, with respect to properties like those of mathematical topology, the refer-

ent of this morpheme is magnitude neutral: *in the thimble|volcano*. And it is shape neutral: *in the well|trench*.

But forms like *in* can also differ from mathematical topology either by being still more abstract or by being more specific. Thus, *in* is more abstract in that its referent is **closure neutral**—that is, indifferent to whether the curved plane leaves an opening or is wholly closed: *in the bowl|ball*. And it is **discontinuity neutral**—that is, indifferent to whether the curved plane is solid or gapped: *in the bell-jar|birdcage*. These last two properties would form a proper part of language's topological system, whereas they are strictly excluded from mathematical topology.

For the case where language exhibits greater specificity than mathematical topology, consider again the preposition *across*, as in *I swam across the lake*. This preposition is fully felicitous if I execute a straight swim path that more or less bisects the lake. But now, with the same starting point on the shore, consider a succession of swim paths located as if rotated ever further leftward. One of the later paths will not terminate on the diametrically opposite point of the shore, but at some point not too far along the shore from my starting point. Such a later path will divide the lake into two quite unequal portions, the small portion on the left of the path and the large one on the right. For such a later path, one can no longer say *I swam across the lake*. In terms of mathematical topology, there should be no difference. But here language has the following additional requirement for its schemas: The components of a schema must be of *comparable* magnitude. Thus, although a schema overall is magnitude neutral, the schema's components *are* sensitive to magnitude relative to each other and must in fact be comparably sized. Here, with respect to the idealized *across* schema, the areas on either side of the path running perpendicularly between the two parallel lines must be of comparable size.

For another example, imagine that I am standing at one end of a long narrow table that supports a glass of water 20 feet away from me and a glass of white wine 21 feet away. Although I can say *The closer glass is water and the farther glass is wine*, I can no longer use the deictics *this* and *that* to say *This glass is water and that glass is wine*. One explanation for this behavior is that the components of the *this* schema, as well as those of the *that* schema, are too internally disproportionate here. Thus, to consider just the *this* schema, it should locate its conceptual partition between the two glasses, because of the deictic contrast that the sentence sets up. But the distance from this partition to the schema's referent object, the

water glass, is too much smaller than the distance from the partition to the speaker (myself) for the schema to be viable. Distances of more comparable magnitude are required.

In sum, given the general picture developed earlier, the topology-like properties exhibited by closed-class forms must be understood as part of the system of constraints on their meaning. What is important in their topological behavior is not that closed-class forms can vary freely with respect to factors like magnitude and shape—many open-class forms can do the same. It is rather that closed-class forms are constrained from expressing any Euclidean-type particulars of such factors—a constraint that does not apply to open-class forms, which, on the contrary, are free to range over both the topological and the Euclidean. In other words, the important finding is not that the character of closed-class meaning is topological, but rather that it is *only* that and *not* Euclidean as well.

2.1.2 Further Neutralities A constraint against specifying a factor has been represented here as a **neutrality** to that factor. While two such neutralities have resembled aspects of mathematical topology and, hence, been designated by that term, closed-class forms exhibit many further neutralities. In fact, they exhibit indefinitely many more, since closed-class forms cannot express most contentful concepts, such as food preparation, gymnastics, and folk medicine. But out of all such neutralities to particular factors, some have structural significance, either because a certain factor figures prominently in other cognitive systems, or because a closely related factor *can* be represented by closed-class forms. Several further neutralities with this kind of significance are presented next.

First, most closely related to the previous topological properties is the fact that the referents of closed-class forms are also generally **bulk neutral**. That is, the delineations of a closed-class schema represent geometric idealizations abstracted away from the bulk of bodies in space (as well as from the extensions of entities in other domains). Alternatively conceived, such bulk becomes cognitively reduced, or "boiled down," to points, lines, planes, and the like. Thus, the schema of the English preposition *along* pertains only to a path moving parallel to and next to a line and is indifferent to the bulk character of that line. This property is evident in the fact that *along* can be used with equal felicity in reference to linear objects with quite different radial extensions, as in: *The caterpillar crawled up along the filament/the flagpole/the redwood tree*. As discussed in chapter I-2, the significance of bulk neutrality as a property in the closed-

class system of language is that it seems akin to an apparent structural property of visual perception, namely, the sensing of interior structure within bulk.

Another constraint on closed-class reference is that it is **token neutral**. That is, while closed-class forms regularly refer to types or categories of phenomena, they cannot refer to any particular tokens thereof. A token can be characterized as a specific spatiotemporally bounded phenomenon. By contrast, nouns are free to be either token neutral or token sensitive. In traditional terminology, these are, respectively, common nouns like *cat* and proper nouns like *Shakespeare* or *Manhattan*. Thus, while a language can have proper nouns, it cannot have, say, "proper prepositions." What such a proper preposition would be like can be readily envisaged, though. It could, for example, refer to a particular path understood as being executed only once, hence, as being a unique spatiotemporally bounded phenomenon. For an idea of what such forms might look like, each sentence in (7) is given an invented preposition—capitalized to show its status as proper—that purports to refer to a historically unique path-taking. However, constrained by token neutrality, such forms are apparently never found.[8]

(7) a. Jesus walked Astation the hill named Calvary.
    b. Moses walked Amatzah the Red Sea.

A final constraint we can observe here is that closed-class meanings are **substance neutral**—that is, they generally cannot be specific as to particular kinds of materials. Thus, the English preposition *through* applies equally well to the different substances named in the sentence: *A bubble passed through the water/milk/mercury*. This constraint would not seem worth singling out except that closed-class forms *can* be sensitive to a closely related factor, namely, phase of matter. Thus, the closed class of directional morphemes in Atsugewi (see chapter I-3) has a set of forms that together more finely subdivide the conceptual domain covered by English *into*, and these forms mark such phase-of-matter distinctions as 'into solid substance', 'into liquid', 'into fire', and 'into empty space (the air)'.

2.2 Two Venues in Which the Grammatical and Lexical Subsystems Show Their Structure/Content Contrast

We have proposed that language, as a design feature of its construction, has two subsystems with complementary functions. The open-class, or lexical, subsystem represents conceptual content, while the closed-class, or

grammatical, subsystem represents conceptual structure. We now further treat the fact that these two complementary functions appear in two venues: in any specific portion of discourse, such as a sentence, and within the language system generally or within any particular language.

2.2.1 Within a Portion of Discourse We start with the first venue, a portion of discourse. To examine the functional contrast between the closed-class and the open-class type of specification in this venue, consider the full complement of both element-types in a single whole sentence, namely, that selected in (8).

(8) A rustler lassoed the steers.

We first list the closed-class elements present in the sentence and the notions that they specify in (9).

(9) a.	-ed	'occurring at a time before that of the present communication'
b.	the	'the speaker infers that the addressee can readily identify the referent'
c.	a	'the speaker infers that the addressee cannot readily identify the referent'
d.	-s	'multiple instantiation of object'
e.	a . . . ∅	'unitary instantiation of object'
f.	-er	'performer of the specified action'
g.	grammatical category "verb" for *lasso*	'eventhood'
h.	grammatical category "noun" for *rustler*/*steer*	'objecthood' (for one possibility)
i.	grammatical relations "subject"/"object" for *rustler*/*steer*	'agent'/'patient' (among the possibilities)
j.	active voice	'point of view at the agent'
k.	intonation, word order, character of auxiliaries	'the speaker "knows" the situation to be true and asserts it to the addressee'

The open-class forms in the sentence have specifications that can be characterized as in (10).

(10) a.	rustle	property ownership, illegality, theft, livestock particular mode of activity

b. lasso — a rope configured into a loop and a tail gripped by the hand
the loop twirled, cast over the neck of an animal, tautened, and drawn
accompanying cognitive intending, directing, monitoring

c. steer — object of particular appearance, physical makeup, and so on
relation to animal kingdom
castration
institution of breeding for human consumption

In surveying the two lists, we can see these differences emerge: the grammatical elements are more numerous, and their specifications seem more spare and simpler, and more structural in function. Together, their specifications seem to establish the main delineations of the scene organization and of the communicative setting of the CR evoked by the sentence. The lexical elements are fewer in number, but their specifications are greater in quantity and complexity, and they function more to contribute content than structure. The lexical specifications are greater in three ways: compared to a grammatical specification, each has (1) more total information, (2) greater intricacy of information, and (3) more different types of information together. Taken together, their specifications comprise most of the conceptual content of the CR scene evoked by the sentence.

These grammatical-lexical differences can be set into further relief by in turn varying each element type while keeping the other constant. Thus, varying only the closed-class forms of (8), as is done in (11), seems to alter the scene organization and discourse properties of the referent event but to leave its basic contents intact: we are still on a Western cowboy landscape with the same kinds of participants and activities.

(11) Will the lassoers rustle a steer?

By contrast, varying only (8)'s open-class forms, as in (12), shifts us to a new scene altogether, perhaps to a modern office building, and yet the basic breakup of the scene and of its communicative setting seem to remain the same.

(12) A machine stamped the envelopes.

Continuing with the functional differences between the lexical and grammatical subsystems within a portion of discourse, we observe that

open-class forms and closed-class forms *can* incorporate each other's type of references, but that in doing so they tend to assimilate such references to their native type. First, to highlight the contrast between the two types of representation, consider a case where essentially the same concept can be represented by both a closed-class form and an open-class form. Thus, English tense is typically represented for a verb in a finite clause by a closed-class form, either an inflection or a modal, as in (13a) with an *-ed* for the past and an *-s* or *will* for the future. But a nominal in a prepositional phrase cannot indicate tense in that way. If relative time is to be indicated here, one must resort to open-class forms, as in (13b) with the adjectives *previous* to mark the past and *upcoming* to mark the future.

(13) a. i. When he arriv*ed*, . . .
ii. When he arrive*s*/*will* arrive, . . .
b. i. On his *previous* arrival, . . .
ii. On his *upcoming* arrival, . . .

The cognitive tendency here, it seems, is to treat the concepts of 'past' and 'future' as performing a concept-structuring function when they are expressed by the closed-class forms in (13a), but as constituting additional contributions to conceptual content when they are expressed by the open-class forms in (13b).

Next, consider the case where an open-class form incorporates a semantic component of a seemingly structural type that is otherwise characteristically represented by a closed-class form. Thus, the open-class adjective *pregnant*, in addition to having semantic components pertaining to a gestating condition, incorporates an 'all-or-none' component indicating that this condition is to be understood as being in effect either wholly or not at all—in traditional terms, constituting an "ungradable" adjective. But, as in the sentence *She is somewhat pregnant*, this adjective can be put in construction with a closed-class form, *somewhat*, which refers to a 'moderate degree along a gradient'. A semantic conflict thus exists here between the 'all-or-none' component of *pregnant* and the 'gradient' component of *somewhat*. One cognitive process that a hearer can apply to such a semantic conflict is to actively maintain the incompatible concepts in an equipollent status—a process termed "juxtaposition" in chapter 5 of volume II. This process generates an "incongruity effect" such as humor. Relevant here, though, is another cognitive process that can be applied, one that shifts the conflicting semantic component in one of the items so that it comes into accord with that in the other item. In

such a resolution—termed a process of "shift" in the discussion of conflict resolutions—it is preponderantly the open-class form that gives way to the closed-class form. And indeed here, the 'all-or-none' component of the open-class adjective *pregnant* can shift to a 'gradient' sense to yield a new meaning for *pregnant*: 'a certain degree along in the gestation process'. But it is certain that the closed-class form *somewhat* will not give way to the adjective to wind up meaning something like 'wholly'. Thus, here, as in most semantic conflicts, it is the closed-class form that determines the final conceptual structure. But this is presumably so because setting conceptual structure is precisely the linguistic function of the closed-class subsystem. Correlatively, the otherwise seemingly structure-like component within the open-class form perhaps in actuality behaves cognitively more like an aspect of its contentful reference.

Finally, consider the complementary case where a closed-class form includes a semantic component of a seemingly contentful type that is otherwise characteristically represented by an open-class form. In this regard, compare the sentences in (14a) and (14b), which formally differ only in their prepositions. Semantically, though, (14b) differs from (14a) not only in the path schema that it represents, but also by including a rather more contentful type of concept, that of 'attack', so that the *them* in this sentence is understood as referring to some sort of enemy.

(14) a. We marched/rode/sailed/advanced/ ... toward/past them.
b. We marched/rode/sailed/advanced/ ... upon them.
c. We attacked them.

Since it is the only different form, it must be the preposition *upon* that is responsible for the 'attack' notion. Yet this notion behaves differently there than it typically would if expressed by an open-class form. First, although English speakers readily identify the presence of an 'attack' notion in (14b), they typically do not attribute this notion to *upon*, often thinking instead that it is due to one of the verb choices, say, *march*, even though no 'attack' notion appears with those verbs when used with a different preposition. Second, the 'attack' notion is relatively more attentionally backgrounded than when it is expressed by an open-class form, such as by the verb *attack* itself, as in (14c). Third, perhaps one might deem that the 'attack' notion when expressed by *upon* loses some of what would otherwise be a fully contentful character and instead becomes assimilated to the path notion that *upon* more foregroundedly expresses, as if the 'attack' notion here somehow becomes "spatialized." Thus, when

expressed by a closed-class form, a concept that might otherwise be thought to be more one of the contentful type tends to become obscured, backgrounded, and structuralized. In sum, then, the formal fact of a concept's expression in an open- as against a closed-class form tends to set the function it serves as being either contentful or structural.

2.2.2 Within Language or within a Language We turn now to the venue of language as a cognitive system with general properties and constraints. Observations of the kind discussed at the outset have led to the hypothesis that the closed-class forms found in all languages—or that could occur in all possible languages—are semantically a special set, limited to representing only certain conceptual categories and, within those categories, only certain member concepts. To put this another way, language may have a universally available, limited **inventory** of concepts and conceptual categories that can ever be represented grammatically. Such an inventory is of course understood here not to be absolutely fixed in its boundaries and membership. As with every structural and substantive aspect of language—or, for that matter, of cognition—it appears that virtually nothing is rigidly absolute but rather that virtually everything is fuzzy or plastic to at least some degree. Nevertheless, we do posit a privileged inventory, albeit perhaps a partially approximate one, of grammatically expressible concepts. No comparable inventory for lexically expressible concepts exists because open-class forms can for the most part refer to anything within the whole range of the potential contents of consciousness.

At present, no single overarching principle can be adduced to account for the particular membership of the grammatically specifiable inventory. All that can as yet be discerned are several factors, each of which captures only one observable pattern of constraints—constraints that account for only a portion of the inclusions in and exclusions from the inventory. One such factor was already discussed: the constraint against Euclidean-type particulars and the allowance of topology-like neutralities for closed-class reference. Another factor is discussed in chapters I-5 and I-6: with a basis in Gestalt principles, a closed-class form may relate a Figure event to a Ground event, but it is constrained against relating a Ground event to a Figure event. More such factors of limited application can be adduced, but so far, they cannot be seen to fall out from one master principle.

The origin of the posited inventory remains to be understood. One strong possibility is that at least parts of it are innate. In terms of major

cognitive systems, the language system and the culture system (see chapter II-7) were the last to evolve. In forming, they may have copied, or developed connections to, mechanisms of cognitive structuring already present for other major cognitive systems, ones long in place, such as those of visual perception, motor control, and reasoning/inferencing. In that case, the language system would have incorporated some of those extant structuring mechanisms. But it would not have incorporated them all, and the pattern of selection may have been neither wholly systematic nor wholly functional (i.e., on a basis describable by a functionalist view). This possibility could account for any lack of an overall principle governing the inclusions within the inventory.

The posited universally available inventory has the further property of being **graduated**. Its member concepts and categories range along a cline with respect to the extent of their representation across languages. Thus, it may well be that some of the top-of-the-cline entries in the inventory in fact *are* universally realized. Likely candidates for this status include the category of "polarity" with the member notions 'positive' and 'negative', and the category of "speaker-to-hearer stance" with the member notions 'assertion' and 'question'. Other entries in the inventory may be widespread but not universal. The category of "number" may be an example. Still other entries might be rare but not wholly absent. Thus, some, but only a few, languages have closed-class representation for the category "rate" with member notions 'fast' and 'slow'. Finally, some conceptual categories or individual concepts are altogether off the inventory. As discussed at the outset, the category "color" may well be one of these, but, if not, then certainly the category of "gymnastics" is missing from closed-class representation in the inventory.

Among its other ramifications, the hierarchical inventory posited here has implications for theories of grammaticization. Such theories have typically devoted much attention to the starting points of a grammaticization process—that is, to the particular instances and types of lexical forms whose original meanings become progressively bleached. But these theories typically lack any account of the ending points of such a process—in other words, of the instances and types of grammatical meanings that result from the bleaching. The gap in such theories can be filled by the present idea of a universally available inventory of grammatically specifiable concepts. Put succinctly, the process of bleaching can lead only to a member of the inventory.

To illustrate, consider the two regular English verbs *keep* and *hate*, as in *I keep skiing* and *I hate skiing*. It will perhaps be generally agreed that if one or the other of these two verbs were to become grammaticized, say, to auxiliary status, while retaining its central sense, it would be *keep* and not *hate*. The explanation that can now be given is that the central meaning of *keep*, which pertains to temporal structure, specifically, to an iteration, fits the category of "aspect," as well as its member notion 'habitual', which are high in the graduated inventory. By contrast, the category that *hate* would fit, that of "affect," as it happens, is relatively low in the graduated inventory. Thus, perhaps no language includes a closed set of grammatical forms that subdivide the category of "affect" in a systematic manner, in the way that, say, English prepositions systematically subdivide the category of "paths executed with respect to reference objects," or that English modals subdivide the category of "force dynamics." Rather, languages exhibit only sporadic grammatical marking of instances of the "affect" category. Perhaps the most widespread of these are diminutive inflections that mark a feeling of 'affection' and pejorative inflections marking a feeling of 'dislike'. Other cases are desideratives marking 'wish' and optatives marking 'hope', undergoer constructions (as in the English *My plants all died on me*) marking 'unpleasantness', and individual forms like the English conjunction *lest* marking 'concern'. Moreover, within this already poorly represented "affect" category, the specific notion of 'hate' is perhaps still more rarely or never represented grammatically. Accordingly, the English verb *hate* is unlikely to grammaticize into an auxiliary that means 'hate'. Thus, it is the universally available inventory of grammatically expressible concepts with its particular content and hierarchy that seems to govern the possible courses of a process of bleaching toward grammaticization.

From the role of the structure and content subsystems within language in general, we turn briefly to their role within individual languages. The posited inventory of grammatically specifiable categories and concepts has been characterized as universally available, not as universally realized, because, within each language, the extant set of closed-class forms constitutes only a selection from the inventory. We have held that, within the overall language system, the inventory of concepts potentially expressed by closed-class forms functions as the conceptual structuring subsystem of language, relative to the content-providing function of its open-class subsystem. Within each language, comparably, the closed-class portion

of its lexicon functions as the conceptual structuring subsystem of that language, while the open-class portion of the lexicon functions as its contentful subsystem. It remains to determine whatever principles may govern the nature of the selection from the overall inventory for occurrence within a given language. Such principles would presumably include ones concerning the size and representativeness of the selection.

In sum, then, it is proposed that language as a cognitive system has two subsystems that perform complementary functions: providing conceptual content and determining conceptual structure. The structuring subsystem is an approximately closed graduated inventory of conceptual categories and member concepts. In each language, a portion of the lexicon consists of closed-class forms expressing concepts selected from the universal inventory, while the remainder of the lexicon consists of conceptually unrestricted open-class forms. And within any portion of discourse expressed in a particular language, the closed-class forms largely determine the structure of the conceptual complex evoked by the discourse, while the open-class forms contribute the majority of its content. Given this role in discourse, particular languages, and language in general, the closed-class subsystem has accordingly been held to be the fundamental concept-structuring system of language.

3 CATEGORIES OF GRAMMATICALLY SPECIFIED NOTIONS

The preceding sampling of grammatical elements has yielded a set of notions helpful toward discovering common semantic properties. But the set has been small and unstructured. With a broader and more systematic investigation, patterns of organization among the notions become evident. Grammatically specified notions can be seen to pattern in certain conceptual categories. These will be termed **schematic categories**. In turn, such categories group together within extensive integrated concept structuring systems. These will be termed **schematic systems** (formerly called "imaging systems").

These schematic systems are relatively independent of each other in content, with each adding a distinct conceptual dimension to those of the others, but their contributions can be coordinated and linked, at times by individual grammatical forms. Three schematic systems are presented in this chapter: configurational structure, perspective, and distribution of attention. Several additional schematic systems can be recognized, includ-

ing those of force dynamics (which includes causation) and cognitive state. The next three parts of this volume are, in fact, set up with respect to such schematic systems. These parts include chapters that pertain, respectively, to configurational structure, to attention, and to force.

The notional patterns that appear within these schematic categories and systems exhibit certain organizing principles. Among the principles of this sort that will be detailed below are the following. One principle is an extensive homology between the representation of space and that of time. The first schematic category presented, that of **domain**, includes the space-time distinction, and largely crosscuts the subsequently presented categories. These categories will, in the majority, apply to both space and time, and parallel examples from each domain will be presented side by side.

Another organizing principle is the following: Of the member notions of any schematic category represented in a language, often each notion will be incorporated in at least some lexical items. Correlatively, the language will often contain grammatical forms that interact with each lexicalization type in a way that yields the expression of another notion of the category. Each such type of interaction can be regarded as a type of cognitive operation that converts the indication of one notion to that of another within the same category. This principle can be termed that of **intracategorial conversion**.

A corollary principle is that a language with grammatical forms for converting from notion A to notion B frequently has forms as well for conversion in the reverse direction—that is, it can also trigger the reverse cognitive operation. This principle is termed **reverse convertibility**. In many cases, a language favors only one such direction, having much lexicalization with notion A and simple grammatical means for reaching notion B, but in the reverse direction having only little lexicalization and complex grammatical forms. Languages differ typologically in the directions they favor. This issue will not be taken up here but is treated at length in chapter II-1.

Some of the grammatical forms in a language function specifically to perform a particular conversion operation. Others simply make structural specifications that can come into conflict with the specification of a neighboring lexical item. In the latter case, as discussed in the preceding section, the basic pattern is that the grammatical form's specification takes precedence and triggers a kind of operation, a "shift," in the lexical item's

referent that brings it into accord. Such shifts are actually one member of a set of "reconciliation processes"—including blends, juxtapositions, schema juggling, and blockage—that can be triggered by the association of a grammatical and a lexical form with incompatible structural specifications. In the nonshift processes, the grammatical specification does not take precedence over the lexical one but plays an equal role with it. Of all these processes, this chapter treats mostly shifts, but others are discussed in chapter II-5.

4 DOMAIN

The schematic category of **domain** has two principal member notions, 'space' and 'time'. As the terms will be used below, the kind of quantity that exists in space is, generically, 'matter', and, in respectively continuous or discrete form, is 'mass' or 'objects'. The kind of quantity existing in time is, generically, 'action' and, in continuous or discrete form, is 'activity' and 'acts'—terms here used neutrally as to whether the action is static or changing, autonomous or agentive. These notions thus relate as in (15).

(15)

Domain	*Continuous*	*Discrete*
space:	mass	objects
time:	activity	acts

The domain category can be thought to correlate with a putatively further distinct category, **state of progression**, or simply to incorporate its characteristics. State of progression has the two main member notions, **progression** and **staticity**. The concept of progression involves a continuum of successiveness where not all the elements of a referent either exist or are cognized at once. The concept of staticity involves an unchanging fixity where all the elements of a referent are co-present in their pattern of interrelationships and are cognized concurrently. The domain of time, uniquely among the domains, has a fundamental association with progression. All other domains are basically associated with staticity. But operations that shift a referent from one of the member notions of the progression category to the other readily occur, and many will be described in this volume (for example, the fictive motion and the fictive stationariness of chapter I-2). Next, though, we describe shifts within the domain category per se.

4.1 Conceptual Conversions between the 'Space' and 'Time' Members of the "Domain" Category

Homologies between the linguistic structuring of space and of time will be addressed in the categories that follow. But here we address operations of conversion between these two main members of the domain category. That is, we demonstrate the intracategorial convertibility of "domain." Thus, a verb root that lexicalizes expression of an act or activity as a temporal quantity can be associated with grammatical forms, including nominalizations, that signal a cognitive operation of **reification**. By the semantic effect of this operation, the referent becomes conceptualized as an object or a mass, one that can participate in many of the same actions—such as being given or gotten—as a physical quantity, as exemplified in (16).

(16)

An act	*Reified as an object*
John called me.	John gave me a call.
I was called by John.	I got a call from John.
Activity	*Reified as mass*
John helped me.	John gave me some help.
I was helped by John.	I got some help from John.

The semantic effect observable in these sentences can be given the following elaboration—here phrased for the discrete type of the upper examples, but applying as well to the continuous type of the lower examples. The original construction represents an 'act' in terms of an Agent affecting a Patient, where the verb represents this act and carries the core notion of affecting. In the new construction, this sense becomes reconceptualized in terms of the transfer through space of a focal condensation of the action from the Agent as Source to the Patient as Goal, where the deverbal noun now represents this condensate as a kind of 'object'.[9]

It can be observed, moreover, that the paradigm of this act-to-object reconceptualization has a further member. Within the original action conceptualization, not only can the Agent affect the Patient and the Patient be affected by the Agent in the execution of an act, but the Patient can also execute the act independently. Correlatively, in the reconceptualization under reification, not only can the Agent give the reified act to the Patient and the Patient get it from the Agent, but the Patient can also "have" the reified act independently. To represent this "middle" form, British English in fact uses the verb *have* with the deverbal noun, while

American English, perhaps anomalously, prefers the use of *take*. The paradigmatic parallelism is shown in (17).

(17) *An act*	*Reified as an object*
She bathed the child.	She gave the child a bath.
The child was bathed by her.	The child got a bath from her.
The child bathed (himself).	The child had/took a bath.

Once reified, the notion of an action is amenable to many more of the conceptions of spatial pathways and manipulations typically associated with a physical object or mass than just the simple transfer from a giver to a receiver. This is seen in such English formulations as *She transferred/redirected/rerouted/forwarded John's call to me*, or *I returned his call*, or *We exchanged calls*. Further, the concept of a reified action is amenable to many of the same cognitive operations as the concept of a physical quantity, as these are represented by such grammatical processes as pluralization, modification, and quantification—for example, in *He gave me three business calls*.

A still greater range of conceptual manipulations is available for some notions. Thus, when the concept of 'attending' is conceptualized as an action through representation by a verb, English grammar affords little more expressive leeway than that found in sentences like *I attended to the music* and *She had me attend to the music*. But when conceptually reified as an entity through expression by the noun *attention*, much more is possible. Thus, the reified entity can behave like a stationary or moving Figure that surfaces as sentence subject, as in: *My attention was fixed on the music*; *My attention gradually wandered away from the music and on to the events of the day*. Or it can function as a Figure that surfaces as a direct object of a sentence, as in: *The story caught/riveted my attention; The noise attracted/drew my attention away from the book I was reading; I directed/redirected my attention toward/away from the statue; She directed/drew/called my attention to the painting on the far wall*. And the reified entity can function as a Ground appearing as an oblique object, as in: *The sound was now (squarely/firmly) in (the center of) my attention; The matter was (well) out of my attention; The report eventually came to my attention*.

Even with such increased expressive range, the conceptual reification of action still has limitations, as well as action-based challenges. As an example of limitation, our reified concept of phone calling has not extended all the way to that of a fully physical object, so that English includes no expressions like **John threw/pushed/thrust/slid a call to me*. Moreover, a

language with a system of path satellites and prepositions like English is able to express a number of spatial paths even with a verb representing the original action concept. Some of these have reified counterparts. Thus, *We called back and forth to each other* has such a counterpart in *We exchanged calls*. But some constructions of this kind do not. Thus, *I called around to set up the meeting* has no counterpart like **I circulated calls to set up the meeting*, and *I called ahead to let them know we were coming* has no counterpart like **I sent a call to let them know we were coming*. Nevertheless, the reified representation of an action would seem overall to permit a greater range of conceptual manipulations. The reason is that it employs the open class of verbs to represent such manipulations. By contrast, the representation of an action *as* an action with a verb tends to depend on such closed classes as satellites and prepositions to represent further conceptual manipulations, and such closed classes contain fewer options of expression.[10]

A reconceptualization that is the reverse of reification also occurs. A noun referring to an object or mass can be associated with grammatical forms, including verb-forming derivations, that signal a cognitive operation of **actionalizing**. By this operation, the physical referent is melded together with some of the activity in which it participates, with the semantic effect that much of the referent's tangible concrete character is backgrounded, subordinated to a conceptualization in terms of a process of occurrence, as illustrated in (18).

(18)	*Object(s)/mass*	*Actionalized as*
a.	Hail(stones) came in through the window.	It hailed in through the window.
b.	Ice is forming over the windshield.	It is icing up over the windshield.
c.	I removed the pit from the cherry.	I pitted the cherry.
d.	He has blood coming from his nose.	He is bleeding from his nose.
e.	She ejected spit into the cuspidor.	She spat into the cuspidor.
f.	Crowds of people went to the fair.	People thronged to the fair.

This analysis of the space and time members of the domain category and of conversions between them points to a possible typology. Lan-

guages appear to fall into two main typological categories on the basis of the most characteristic form of lexicalization they use to refer to physical objects and substances. Those that favor nouns—presumably the majority type—are **object-dominant** languages, while those that favor verbs are **action-dominant** languages. English is clearly an object-dominant language, preferring to refer to physical entities in terms of their tangible materiality through the use of nouns. But, as seen in the preceding example set, it also has the capacity to actionalize such reference through the use of verbs, conceptually incorporating the materiality into the dynamics of an occurrence. It does this mainly with denominal verb derivation but, in some measure, it also has simplex verbs already lexicalized to incorporate reference to physical entities. An example is *(to) flow*, which refers to a fluid substance moving along a path.

By contrast, Atsugewi, a Hokan language of northern California, is an action-dominant language. Its most characteristic way to refer to physical objects and substances is with verb roots (as well as with certain affixes to the verb root), which include such examples as: *-swal-* 'for a flexible linear object to move/be located' and *-qput* 'for loose dry dirt to move/be located' (see chapters II-1 and II-2). For example, in a situation where English might say *There's a rope lying on the ground*, Atsugewi might use the single polysynthetic verb form *ẃoswalak·a*. This form contains the verb root *-swal-* followed by the Path + Ground suffix *-ak·* 'on the ground', and preceded by the Cause prefix *uh-* 'as a result of gravity/an object's own weight acting on it'. The verb form begins and ends with a set of inflections that together indicate a third-person subject and the factual mode. As a whole, the verb form can thus be glossed as 'a-flexible-linear-object-is-located on-the-ground because-of-gravity-acting-on-it'. But to suggest its nounless flavor, the Atsugewi form can perhaps be fancifully rendered in English as: "it gravitically-linearizes-aground". In this example, then, Atsugewi refers to two physical entities, a ropelike object and the ground underfoot, without any nouns. In a pattern complementary to that of English, Atsugewi in some measure does have simplex nouns referring directly to a physical object or substance—for instance, *naha* 'head'. But most nominal forms in Atsugewi, even ones that we might think refer to some of the most basic physical entities, are nominalizations derived from verbs. For example, the noun for 'sun/moon', *ćnehẃu·*, is a nominalization of the verb root *-hẃ^{u}-*, which means 'to describe an arc across the background of the sky' and which could be used by someone looking up to observe a child leaping from one tree across to another.[11]

4.2 Further Members of the "Domain" Category

We can note that the category of domain includes other member notions than just space and time. For an example, recall from section 2 that *this* and *that* specify a partition drawn through space—and can do so through time as well—and indicate that a referent entity is on the same or the other side of the partition as the speaker. Now consider the English pronouns *you* and *they* in their indefinite usage (akin to German *man* or French *on*). These also specify a partition, but one drawn through **identificational space**, understood as a new conceptual domain. They indicate, respectively, that 'the average person' is or is not identified with the speaker in some relevant respect—that is, is on the same or the other side of the identificational partition as the speaker.

Thus, a consumer of organic food that is visiting a new neighborhood can ask a passerby about the purchase of organic food with *you*, but about the sale of organic food with *they*.

(19) a. Where can you buy organic food around here?
b. Where do they sell organic food around here?

But a person looking for a location to open an organic grocery would ask a business consultant in the neighborhood about purchases and sales with the reverse assignment of *you* and *they*.

(20) a. Where can you sell organic food around here?
b. Where do they buy organic food around here?

5 CONFIGURATIONAL STRUCTURE

The first schematic system we treat is that of **configurational structure**. This system comprises the schematic structuring or geometric delineations in space or time or other qualitative domain that closed-class forms can specify. Closed-class forms can ascribe such structure to the whole of a referent scene, thus partitioning that scene into entities in particular relationships, or to any of those entities themselves, or to the paths described by such entities when their interrelationships change through time. With respect to closed-class forms, the configurational system thus encompasses most aspects of the schemas specified by spatial or temporal adpositions, subordinating conjunctions, deictics, aspect/tense markers, number markers, and the like.

Seven schematic categories within the configurational system are presented in this section, together with an analysis of the way the first three

of these categories interact. In addition, further properties of the configurational system are treated by the chapters in part 2 of this volume. In particular, chapter I-3 examines the type of spatial relations characteristically represented by a system of adpositions, such as the closed class of English prepositions, which the present section does not directly address.

5.1 Plexity

The category here to be termed **plexity** is a quantity's state of articulation into equivalent elements. Where the quantity consists of only one such element, it is **uniplex**, and where it consists of more than one, it is **multiplex**. When the quantity involved is matter, plexity is, of course, equivalent to the traditional linguistic category of "number" with its component notions 'singular' and 'plural'. But the present notions are intended to capture the generalization from matter over to action, which the traditional terms do not do. It is true that there are the traditional terms "semelfactive" and "iterative" referring, respectively, to one and more than one instantiation of an event. But there is no real temporal equivalent to "number." "Aspect" includes too much else about the temporal structure of action. And in any case, none of the traditional terms refers generically to both the spatial and temporal domains.

Specifications as to plexity are made by both lexical items and grammatical elements, and there is interplay between the two when they are both in association. Example English lexical items that basically specify a uniplex referent are—for matter and action, respectively—*bird* and *(to) sigh*. They can occur with grammatical elements that themselves specify a uniplexity, like those italicized in (21a) (many languages have here a more regular, overt system of markers than English). But they can also occur with grammatical elements that specify a multiplexity, as in (21b). In this association, such elements can be thought to trigger a particular cognitive operation, one of **multiplexing**. By this operation, an original solo referent is, in effect, copied onto various points of space or time.

(21)

	Matter	*Action*
a. *Uniplex*	*A* bird flew in.	He sighed (*once*).
b. *Multiplex*	Bird*s* flew in.	He *kept* sigh*ing*.

The operation of multiplexing triggered by the grammatical forms shown here yields a multiplex referent that is unbounded (see section 5.2). But apart from elements signaling dual formation or the like, it is not clear

whether there are any grammatical forms (in any language) that directly yield a bounded multiplexity. Such forms might, for example, act on nominal referents to convert 'a bird' into 'a flock', 'a tree' into 'a grove', and 'a kinsperson' into 'a family', or act on verbal referents to convert 'to sigh' into 'to produce a spate of sighs'.

The reverse of the preceding pattern is also found in language. First, there are lexical items that intrinsically specify a multiplexity. English examples are *furniture* or *timber* (i.e., 'standing trees') for matter and *breathe* for action, as used in (22a). And, too, there are grammatical forms that can appear in association with these, as in (22b), signaling an operation the reverse of multiplexing—one that can be called **unit excerpting**. By this operation, a single instance of the specified equivalent units is taken and set in the foreground of attention.

(22)

	Matter	*Action*
a. *Multiplex*	Furniture overturned in the earthquake.	She breathed with full concentration.
b. *Uniplex*	A *piece of* furniture overturned in the earthquake.	She *took a* breath/ breathed *in* with full concentration.

The English grammatical forms seen above that signaled multiplexing— *-s* and *keep -ing*—consisted solely of explicit morphemes. On the other hand, the forms that signaled unit excerpting also included abstract elements: particular grammatical categories that require the insertion of one out of a certain set of lexical items, as represented in (23c,d). The forms can, moreover, contain two or more independent elements. These forms are considered here to be **grammatical complexes**, comparable to other grammatical constructions or indeed to lexical complexes (collocations): they combine distinct elements within a structural whole serving a single overall semantic function.

Actually, though, by one analysis, all grammatical forms are complexes, merely ranked along a cline of elaborateness. Under this analysis, a grammatical form includes not only any explicit and generic elements, but also the semantic and syntactic category memberships of its input and output forms, as represented throughout (23). Thus, the English multiplexing forms, in (23a,b), are merely at the simpler end of a continuum.

(23) a. $[[\underline{\quad}]_{N_{upx}} + \text{-}s]_{N_{mpx}}$
e.g., *bird: birds*

b. $[keep + [\_\_\_\_]_{V_{upx}} + \text{-}ing]_{V_{mpx}}$
e.g., *sigh: keep sighing*

c. $[N_{unit}\ \text{of} + [\_\_\_\_]_{N_{mpx}}]_{N_{upx}}$
e.g., *furniture: a piece of furniture*

d. $[V_{dummy} + [[\_\_\_\_]_{V_{mpx}} + \text{DERIV}]_{N_{upx}}]_{V_{upx}}$
e.g., *breathe: take a breath*

d′. $[[\_\_\_\_]_{V_{mpx}} + \text{PTC}]_{V_{upx}}$
e.g., *breathe: breathe in*

Support is lent to the thesis that a more elaborate grammatical complex can have a semantic unity by the existence, within the same or another language, of a simpler form with the same semantic function. As an example of just this circumstance, the English unit-excerpting complex for nouns, which is rather elaborate, is paralleled in function by a simple suffix in Yiddish, either -¨*l* or -¨*ele* (otherwise indicating diminutives), as illustrated in (24).

(24) zamd 'sand': zemdl 'grain of sand'
groz 'grass': grezl 'blade of grass'
shney 'snow': shneyele 'snowflake'

And the English unit-excerpting complex for verbs, also elaborate, has a simplex counterpart in the Russian verb suffix *-n(u)-*, which, for example, can be added to the infinitive *čix-at'*, the unmarked imperfective form that means 'to sneeze a multiplex number of times', to yield *čix-nu-t'* 'to sneeze once'.

5.2 State of Boundedness

Another category within the system of configurational structure is **state of boundedness**, which has two principal member notions, that of **unboundedness** and that of **boundedness**. When a quantity is understood as **unbounded**, it is conceived as continuing on indefinitely with no necessary characteristic of finiteness intrinsic to it. When a quantity is understood as **bounded**, it is conceived to be demarcated as an individuated unit entity. Entailed by the boundedness category, but conceptually isolable from it, is the notion of a **boundary**. In the prototypical conceptualization, a boundary touches or constitutes the outermost portion of a bounded quantity, so that the boundary "encloses" the bounded quantity, and the bounded quantity lies "within" the boundary. Where applicable, as with objects in space or actions in time, a boundary is

prototypically of a dimensionality one lower than that of the bounded quantity, so that a plane bounds a volume, a line bounds a plane, and a pair of points bounds a line. The concept of a partially bounded quantity—for example, a line with only one end point as a boundary—also figures prominently in linguistic structuring but is not treated here (see the "Motion-aspect formulas" in chapter I-3, section 2.8). An unbounded quantity, correlatively, is conceptualized as having no outer boundary.

In application to nouns, state of boundedness largely corresponds to the traditional linguistic distinction between "mass" and "count," and in application to verbs it can correspond to the distinction between "imperfective" and "perfective," among other terms (the closeness of these correspondences varies with different usages of the traditional terms). However, as with plexity, the concepts designated by the new terms are intended to capture the commonality across the space and time domains and to generalize over their usually separate analyses.

Among English examples of lexical items, *water* and (*to*) *sleep* basically specify unbounded quantities, whereas *sea* and (*to*) *dress* basically specify bounded ones. These specifications are demonstrated by the fact that these words are, respectively, unacceptable and acceptable in construction with the grammatical complex "*in* $\mathrm{NP}_{\text{extent-of-time}}$", which itself specifies boundedness, as seen in (25).

(25)

	Matter	*Action*
a. *Unbounded*	*We flew over water in one hour.	*She slept in eight hours.
b. *Bounded*	We flew over a sea in one hour.	She dressed in eight minutes.

As with plexity, grammatical elements exist that can, in construction with a lexical item, shift its basic specification for state of boundedness to the opposite value. Those acting in this way on an unbounded-type lexical item, in effect, trigger a cognitive operation of **bounding**, or **portion excerpting**. By this operation, a portion of the specified unbounded quantity is demarcated and placed in the foreground of attention. Examples of such grammatical elements in English are shown in (26). Note that while simplex grammatical forms for unit excerpting were lacking in English and had to be cited in other languages, English does have a simplex grammatical form, *some*, which can signal portion excerpting for both spatial and temporal entities.

(26) a. *matter*
$[N_{\text{bounded quantity}}\ \textit{of} + [\_\_\_]_{N_{\text{unbd}}}]$
e.g., *water*: *body of water*
another form: *some water*

b. *action*
$[[\_\_\_]_{V_{\text{unbd}}} + \text{for } N_{\text{extent of time}}]_{V_{bd}}$
e.g., *sleep: sleep for an hour*
other forms: *sleep from 3:00 a.m. to 4:00 a.m. sleep for a while| sleep some*

When semantically unbounded nouns are grammatically operated on in this way, the resulting forms with their newly bounded referents now *can* appear acceptably with the "*in* $NP_{\text{extent-of-time}}$" constituent, as seen in *We flew over a body of|some water in 1 hour*.

The reverse of the preceding pattern also exists. The English nouns *shrub* and *panel* each refer intrinsically to a bounded entity. But the grammatical elements *-ery* and *-ing* can be added to them, yielding *shrubbery* and *paneling*, forms that now refer to unbounded quantities. In effect, the grammatical elements have triggered a cognitive operation of **debounding** whereby the quantity formerly within bounds is now conceptualized in a form with indefinite extension.

In English, however, such elements are not productive. They cannot, for example, be used with *sea* to yield the meaning 'pelagic water', nor with *(a) tear* to yield 'lachrymal fluid'. One mechanism resorted to in many such cases, including that of *tear*, is the use of the plural, as in (27).

(27) Tear*s* flowed through that channel in Hades.

There seems to be a sequence of cognitive operations here in getting from a bounded to an unbounded quantity. Speculatively, the bounded quantity is first treated as a uniplex entity, it is then multiplexed, the resultant entities are conceived as spatially juxtaposed, and their boundaries are finally effaced, creating an unbounded continuum.

Another debounding mechanism available for a noun is to shift the grammatical category of the noun from count to mass. One construction with this mechanism—seen in the well-known example *There is cat all over the driveway*—includes the deformation of the original referent. But in another type of construction, the physical integrity of the original bounded object is maintained. Further, this construction, which may include a measure term of a particular dimensionality, can trigger

debounding solely along one or two dimensions of the original object. Thus, in the sentence *There are probably (10) miles of pencil in that stationery store*, which includes the one-dimensional measure term *mile*, the concept of a pencil is maintained physically intact, is debounded solely along its long axis, and might typically evoke an image of a series of pencils aligned end to end (although the same sentence with *(10) miles' worth of pencil* might simply evoke an image of successive or summary measurement). Comparably, in accord with the two-dimensional term *acre* in the sentence *There are probably (10) acres of movie screen in that old film studio*, the concept of the screen is debounded over its plane.

The preceding series of constructions shows that the concept of debounding covers several conceptual subtypes. Under debounding, the original bounded entity is extended through deformation in the "cat"-type construction. In the "shrubbery" type of construction, it has its outer boundary effaced, and it is extended outward by the addition of like material. In the "tears"-type of construction, it is extended by contiguous multiplexing, with perhaps only a partial conceptual effacement of the boundaries. And in the "pencil" type of construction, it is extended by multiplexing and the instantiations are maintained intact, but they are aligned and considered over the extent of the alignment.

Though it is not clear why, languages seem to have scant grammatical means for use with a verb to debound a reference to a bounded action. But such debounding can be readily imagined. Thus, if the verb (*to*) *dress* basically refers to the bounded action 'put on a full complement of clothing', then the debounded counterpart should mean 'put on more and more/ever more clothing'. This last locution can in fact represent the debounded sense, as in *As punishment through eternity, the demon had to put on more and more/ever more clothing*. But to represent this debounded sense, the verb *dress* itself can enter into constructions that range from being only moderately to just barely acceptable, as in ?*As punishment through eternity, the demon had to keep dressing/dress on and on/dress and dress*. Perhaps the best forms for representing the debounded sense are *dress without end/without a stop*, but these rely on lexical rather than grammatical means.

To examine the state-of-boundedness category further, with respect to an action in time, as has been seen, our concept of boundedness involves both a boundary at the initial point of the action and a boundary at its terminal point. Thus, the action is understood as occupying a finite

quantity of time and hence as consonant with the aspectual *in* phrase, which also indicates a finite temporal quantity bounded at both ends. Note that for this reason, we here use the term "bounded" instead of "telic," since the latter term has largely been used in other linguistic work to invoke only a terminating boundary on an event. In general, boundedness of action involves the concept of a finite entity of which progressively more becomes affected by the action until all of it has become affected. Such cumulatively total affectedness can, among other possibilities, consist of exhaustion, as in the nonagentive sentence *The log burned up in 10 minutes* and in the agentive *I ate the popcorn up in 10 minutes*, or of a notion of completion, as in the nonagentive *Water filled the tub in 10 minutes* and the agentive *I dressed in 10 minutes*. (The last example relies on the notion of a canonic complement of clothing over one's body that can be progressively built up to until reached.) Correlatively, unboundedness requires no notion of any finite entity, and if there is some entity getting progressively affected by an action, it is conceived of as nonfinite.

It is noteworthy that the bounded/unbounded distinction pertains only to the entity affected by the action. The action itself and the time during which the action occurs are both bounded quantities, equally so in the unbounded and in the bounded situation. Thus, in the aspectually unbounded sentence *I ate popcorn for 10 minutes*, it is the popcorn—the entity affected by the action—that is conceptualized as having no specific bounds. The action of eating itself, however, is a finite bounded quantity and the amount of time this action occupies is the finite bounded amount of 10 minutes.

These concepts have a particular realization when applying to a spatial path undertaken with respect to a reference object. Here, the bounded/unbounded distinction pertains only to the reference object, (relative to the way the path engages it); the path itself and the time taken to execute it are both finite bounded quantities. In particular, a motion sentence with either an *in* or a *for* type of temporal phrase indicates that a finite extent of time with a beginning point and an ending point has been expended on motion, that this motion occurs over a finite extent of space with a beginning point and an ending point (the path), and that the time period and the path correspond at their beginning points, at their ending points, and progressively along their lengths. This is seen, for example, both in the aspectually bounded sentence *I walked through the tunnel in 10 minutes*

and in the aspectually unbounded sentence *I walked along the shore for 10 minutes*. In both sentences, the time period is the same, 10 minutes, the traversed path is bounded and finite, (perhaps even the same length), and the progression of the cited time period is coextensively linked with the traversal of the path. The main difference between the two boundedness types is that a sentence with the *in* type of temporal phrase indicates that the reference object with respect to which the path of motion occurs has a physical or conceptual boundary coincident with the beginning and ending points of the path, while a sentence with the *for* type of phrase indicates that there is no such coincidence and, in fact, that the reference object extends beyond the path's end points. This can be termed the principle of **boundary coincidence** for determining state of boundedness. As is usual in language, these two types of indications are conceptualizations that can be imputed to a referent, so that the same referent can be depicted in either way. Thus, both *I walked through the tunnel for 10 minutes* and *I walked through a portion of the tunnel in 10 minutes* can refer to the same event of a finite path located wholly inside a tunnel. But the former foregrounds the tunnel's extension outside the path, while the latter specifies a conceptual entity, a "portion" of the tunnel, which now does have (fictive) boundaries that coincide with the path's boundaries.

5.3 State of Dividedness

The category of **state of dividedness** refers to a quantity's internal segmentation. A quantity is **composite** or (internally) **discrete** if it is conceptualized as having breaks, or interruptions, through its composition. Otherwise, the quantity is conceptualized as (internally) **continuous**.

The present category may be prone to confusion with the preceding one. Contributing to this confusion is the normal meaning range of *continuous*, which as easily covers 'boundlessness' as it does 'internal seamlessness'. However, the two categories can vary independently. Thus, in the preceding section, the lexical examples given for unboundedness, *water* and *sleep*, happened also to be internally continuous. But the same demonstration of unboundedness could have been made with internally discrete examples like *timber* and *breathe*.

Both lexical and grammatical elements are sensitive, in their specifications, to the distinctions of this category. But there appear to be no grammatical elements that solely specify discreteness or continuity for

a quantity, nor any that signal an operation for reversing a quantity's lexically specified state of dividedness. If forms of the latter type existed, we can describe how they would behave. A grammatical form for a continuous-type lexical item would signal an operation of **discretizing**, whereby the originally continuous referent would become conceptualized as a particulate aggregation. Conversely, a grammatical form for a discrete-type lexical item would trigger an operation of **melding**, whereby the separate elements of the original referent would be conceptualized as having fused together into a continuum.

Although such grammatical forms seem lacking, certain indirect or inexplicit mechanisms for these same operations do exist. Thus, the internal continuity specified by the noun *water* can be reconceptualized as internally discrete with the complex form *particles of*, as in: *Water/ Particles of water filled the vessel*. However, this complex form does not directly specify the shift but again governs a several-stage sequence of other cognitive operations. In particular, a lexical form (*particle*) that invokes the concept of a discretized unit of the continuum is pluralized, thus multiplexing that unit concept, and the resulting multiplexity is understood as internally juxtaposed and coextensive with the original continuum. But this construction capitalizes on the independently existing capacity of a plural count noun to designate a composite. Here, no simplex grammatical form directly designates a reconceptualization in terms of interior compositeness, and such forms might be universally absent.

In the reverse direction, there may also be no simplex grammatical forms that directly evoke the reconceptualization of an originally composite referent as internally continuous. In English, it is even difficult to identify complex forms that might yield this effect. Perhaps among the closer candidates for such forms are *a mass of* or *masses of*, as in *a mass/ masses of leaves*. The problems here, though, are that the former expression has a bounded referent, the latter expression is plural, and both expressions indicate great quantity.

On the other hand, there appears to be a general conceptual tendency for a basically composite-type referent of a lexical root to undergo at least some degree of spontaneous melding, without the addition of any explicit grammatical forms. Thus, lexical items with an internally discrete referent —for example, singular multiplex nouns like *foliage*, *timber*, and *furniture* —tend to evoke a conceptualization of their referents with a degree of

blurring and fusion across their component elements. This contrasts with the counterpart plural uniplex nominals *leaves*, *trees*, and *pieces of furniture*, which maintain the conceptualization in terms of an individuated composite. Spontaneous melding can also be seen in the referents of verbal forms. Thus, if we can take the verb *walk* to refer to an iterated multiplexity of component steps and the verb *step* to refer to just one of these components, *walk* then seems to evoke a greater melding across those components than does the form *keep stepping*, which overtly marks the iteration of the individual component. Comparably, the verb *breathe* suggests greater fusion across its inhalation-exhalation cycles than does the locution *take breaths*.

The two different degrees of melding just seen to be available in referring to a multiplexity might actually be best regarded as just two points along a gradient of conceptual melding from the most individuated to the most fused. Thus, evoking a point toward the most individuated end are constructions in which the elements of a multiplexity are separately indicated, as in *This tree and that tree and that tree are mature*. Indicating a multiplexity with somewhat greater melding, then, is the ordinary plural, as in *Those trees are mature*. Perhaps a still greater degree of melding is evoked by a noun with plural agreement but singular form, like that in *Those cattle are mature*. Finally, the greatest degree of melding across a multiplexity may be shown by nouns with singular agreement and singular form, like that in *That timber is mature*. Of course, beyond the melding of a multiplexity is a referent taken to be fully continuous in the first instance, like that of the noun in *This wine is mature*. Again, a similar gradient might apply to verbally specified actions. Thus, the components of action are more individuated in *The shaman stepped once, stepped again, and stepped once more across the coals*, more melded in *The shaman continued stepping across the coals*, and still more melded in *The shaman walked across the coals*, while the action in *I slid across the patch of ice* is taken to be internally continuous in the first instance. If the gradient notion proposed here holds, the term for this section's category might best be changed to "*degree* of dividedness."

In general, more grammatical phenomena in language are sensitive to the distinctions of the boundedness category than to those of the dividedness category. For one case, forms with unbounded referents share many grammatical properties, whether these referents are continuous or composite. Thus, in the domain of matter, two types of forms with unbounded

referents—mass nouns, whose referents are either continuous or composite, and plural count nouns, whose resultant referents are generally composite—share many syntactic characteristics distinct from those possessed by singular count nouns, whose referents are bounded. For example, most determiners occur either with singular count nouns alone or only with mass or plural count nouns.

(28) a. ____ book/*ink/*books:
a/each/every/either/neither
b. ____ ink/books/*book:
all/a lot of/more/most/*unstressed* some/*unstressed* any
∅ 'generic' (*In my work, I use ink/books/*book.*)
∅ 'progressively more' (*For an hour, the machine consumed ink/books/*book*.)

Correspondingly, in the domain of action, forms with unbounded referents, whether continuous (durative) or discrete (iterative), share syntactic properties not possessed by forms with bounded referents, as seen, for example, in: *He slept/kept sneezing/*sneezed once/*arrived . . . for hours/until midnight*.

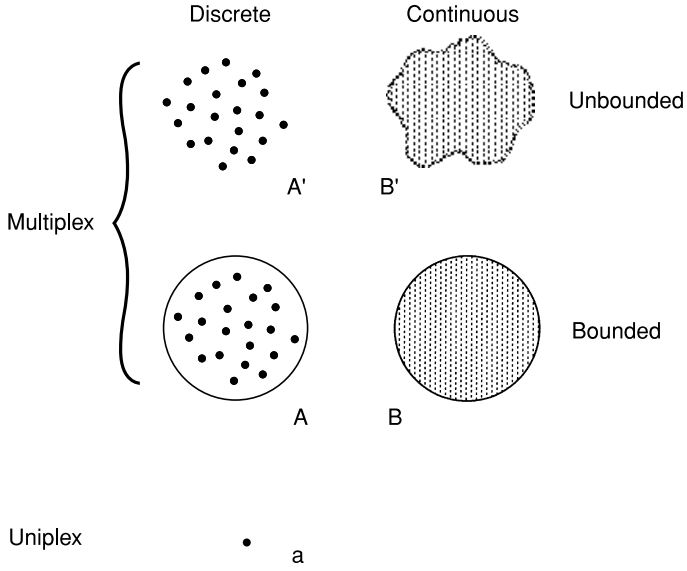
In either space or time, the general explanation for this pattern seems to be that, whether internally continuous or discrete, referents without an outer boundary accommodate syntactic forms that involve a conceptualization of quantity in partitive terms, whereas referents with an outer boundary accommodate syntactic forms that involve a conceptualization of quantity in terms of unit blocks.

Because the category of dividedness has limited realization by itself, further treatment of it will be deferred until the next section, where it can be seen in interaction with the other categories.

5.4 The Disposition of a Quantity: An Intersection of Categories

The preceding four categories of attributes—domain, plexity, state of boundedness, and state of dividedness—all pertain to a quantity simultaneously. Taken together, they can be considered to constitute a complex of attributes that may be termed a quantity's **disposition**. The intersections of these categories form an array that can be schematized as in (29).

(29)



+ the distinction between *matter* and *action*, which crosscuts all of the above

To specifically schematize action along the one-dimensional time axis, the two-dimensional format of (29) can be adapted to a one-dimensional format, with modified conventions for indicating the directional progression of the domain of time.

Each intersection of attributes indicated in (29) is specified by various lexical items (although one, a bounded multiplexity for action, is quite minimally represented in English). An example or two (most were seen earlier) is given for each intersection in (30).[12]

(30) A′: timber/furniture
(to) breathe
A: (a) grove/family
(to) molt
(The bird molted.)
a: (a) tree/bird
(to) sigh
B′: water
(to) sleep
B: (a) sea/panel
(to) empty
(The tank emptied.)

Now if the particular contentful referent for which one chooses a lexical item happens to be wedded, by that lexical item, to an unwanted set of structural specifications, there generally are grammatical means available

for converting this to a desired set. Such means range in directness from specifying the single relevant operation to involving a circuitous sequence of operations (see section 8 on **nesting**). A number of starting and ending points for such conversions, and the means for accomplishing them, are indicated in (31).

(31)

A′ → A	a stand of/some timber breathe for a while/some	B′ → B	a body of/some water sleep for a while/some
A′ → a	a piece of furniture take a breath/breathe in	—	
A′ → B′	?masses of leaves	B′ → A′	particles of water
A → a	a member of a family ?molt a single feather	—	
A → A′	members of a family (A → a → A′) molt and molt	B → B′	paneling empty and empty
a → A′	trees keep sighing	—	
a → A	a stand of trees (a → A′ → A) sigh for a while	—	

As noted, the table in (31) shows that in some cases, a conversion from one structural disposition to another cannot be accomplished directly by a single simplex closed-class form in English, but rather requires a series of nested operations. Thus, for uniplex *tree* to be converted into a bounded multiplexity, it must first be multiplexed into the unbounded multiplexity *trees*, and that in turn must undergo portion excerption to yield *a stand of trees*. The dispositional structure that this resulting form has acquired is the same as that already lexicalized in the open-class noun *grove* or *copse*.

Returning to the diagram in (29) for further consideration, we note that the two columns in the diagram reflect the dichotomy into which the state-of-dividedness category was analyzed in section 5.3. But that section also suggested relabeling this category as "degree of dividedness" since the internally discrete referents of nouns like *foliage* and verbs like *breathe* exhibit some partial degree of spontaneous melding. In a diagram based on this idea, the top row might place fully on the left such entries as *trees*,

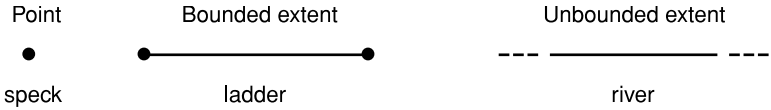
leaves, *pieces of furniture*, and *take breaths*, while placing part way toward the right such counterpart entries as *timber*, *foliage*, *furniture*, and *breathe*.

The asymmetry in the diagram in (29)—the third row having an entry only in the left column—reflects the fact that a composite quantity can yield one of its components for separate consideration, whereas an internally continuous quantity cannot do so. One might think to make the diagram symmetric by having a "b" entry in the right column of the bottom row represent a portion excerpted from the "B′" unbounded continuity. This would parallel the unit in "a" excerpted from the unbounded multiplexity in "A′." Such an excerpted portion might be represented by a circle filled in with gray. But just such a circle is already represented as the "B" entry for a bounded continuity. Since no principled distinction holds between two such entries, the diagram has been left asymmetric.

5.5 Degree of Extension

Implicit in the vertical dimension of the schematic arrangement in (29) is a further schematic category that can be called **degree of extension**. This category has three principal member notions, terms for which are given in (32) together with schematic representations of the notions for the linear case. Lexical items referring to either matter or action may be taken to incorporate specifications as to their referent's basic degree of extension, and three examples of these for the linear spatial case are also shown in (32).[13]

(32)



Now a lexical referent that is perhaps most basically conceived as of one particular degree of extension can, by various grammatical specifications that induce a shift, be reconceptualized as of some other degree of extension. For a first example, consider the event referent of *climb a ladder*, which seems basically of bounded linear extent in the temporal dimension, as is in fact manifested in (33) in conjunction with the grammatical element "*in* + $\mathrm{NP}_{\text{extent-of-time}}$".

(33) She climbed up the fire ladder in five minutes.

With a different accompanying grammatical form, like the "*at* + $\mathrm{NP}_{\text{point-of-time}}$" in (34) (as well as different contextual specifications), the event referent of the preceding can be shifted toward a conceptual schematization as a point of time—that is, as being point durational.

(34) Moving along on the training course, she climbed the fire ladder at exactly midday.

This shift in the cognized extension of the event can be thought to involve a cognitive operation of **reduction** or, alternatively, **adoption of a distal perspective**. This shift can also go in the other direction. The event referent can be conceptually schematized as an unbounded extent by the effect of grammatical forms like "*keep -ing*", "*-er and -er*", and "*as* + S", as in (35).

(35) She kept climbing higher and higher up the fire ladder as we watched.

Here a cognitive operation of **magnification**, or **adoption of a proximal perspective**, would seem to have taken place. By this operation, a perspective point is established from which the existence of any exterior bounds falls outside of view and attention—or, at most, are asymptotically approachable.

The preceding event referent was continuous, but a discrete case can exhibit the same shifts in extension. One such case, perhaps to be considered as most basically of bounded extent, is shown with that degree of extension in (36a). But the referent can also be idealized as a point, as in (36b). Here, clearly, the cows would not all have died at the same moment, yet the spread of their death times is conceptually collapsed into such a single moment. Or the referent can be schematized as an unbounded extent, as in (36c).

(36) a. The cows all died in a month.
b. When the cows all died, we sold our farm.
c. The cows kept dying (and dying) until they were all gone.

The alternative schematizations of extension just seen as specifiable for an event referent are generally also available for an object referent. Thus, for instance, the referent of *(a) box* can be specified for idealization as a point or as a bounded extent (of area or volume). Some grammatical elements making such specifications are illustrated in (37). Also set forth here are the homologies between these and the event-specific elements.

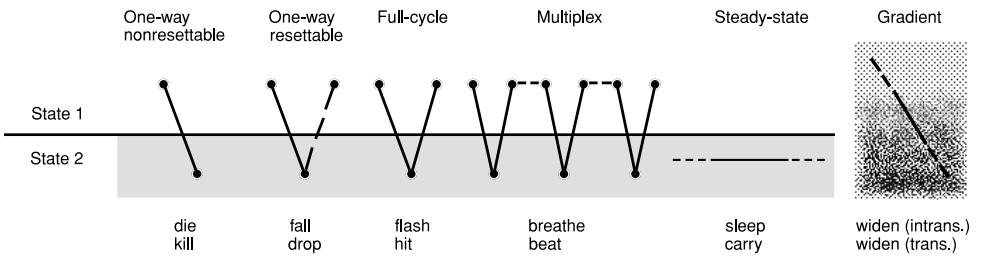
(37) a. *Point* The box is 20 feet away from the wall.
I read the book 20 years ago.
b. *Bounded extent* The box is 2 feet across.
I read the book in 2 hours.

5.6 Pattern of Distribution

The pattern of distribution of matter through space or of action through time is a further category of notions that can be both grammatically and lexically specified.[14] For action through time—the only dimension we will be looking at here—this category together with the preceding one largely constitute the traditional category of "aspect."

Several of the main patterns of distribution for action through time are shown schematically in (38) (the dots here, which represent situatedness in complementary states, should really be adjacent, but they are sketched apart with a connecting line to show the crossing of state interfaces). Also shown are illustrative English verbs, both nonagentive and agentive, that incorporate these patterns.

(38)

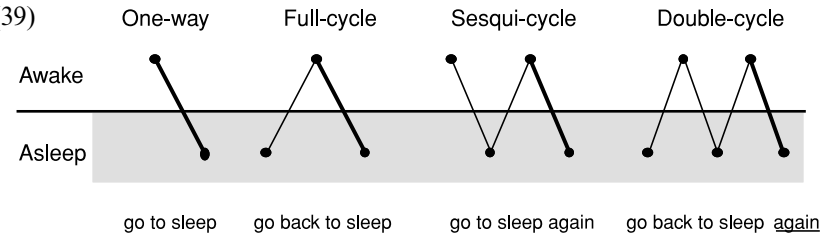


One can determine that these verbs incorporate the specifications indicated by noting the grammatical forms with which they can and cannot occur (or, to put the latter case in our terms: grammatical forms toward whose specifications they will not [readily] shift). A full demonstration is not in order here, but a few examples will show the principle.

The resettable type of a one-way event is distinguished from the nonresettable type by its compatibility with iterative expressions, as in: *He fell three times*; the nonresettable type cannot occur here: **He died three times*. This same one-way form is distinguished from a full-cycle form by its ability to appear in sentences like: *He fell and then got up*, which the latter cannot do: **The beacon flashed and then went off*. A gradient type can appear with adverbs of augmentation, as in *The river progressively widened,* unlike a steady-state type: **She progressively slept*. And so on.

Grammatical elements can, of course, also specify different patterns of temporal distribution, and the present form of diagramming can readily reveal some of their distinctions. Thus, the closed-class elements *back* and *again*, singly and in combination, can indicate versions of full-cycle, sesqui-cycle, and double-cycle patterns, as shown in (39).

(39)



Now consider the circumstance where a verb of one distribution type appears with grammatical forms of another type. The outcome seems invariably to be that the verb shifts its specifications into conformity with those of the grammatical forms. For an example we again take *die*, whose basic specifications can be adjudged as point-durational one-way non-resettable. This verb is used with its basic specifications in a sentence like (40a). But in a sentence like (40b), the grammatical form "*be* + *-ing*" induces a shift. In effect, the infinitesimal interval between the two states involved for *die*—that is, 'aliveness' and 'deadness'—is spread out, with the resulting creation of an extent-durational gradient. This is the shift in the distribution pattern's structural type. But concomitantly, a shift in the basic contentful referent is engendered. Instead of 'dying', the new gradient refers to 'moribundity'. The distinction becomes clear in noting that, as the conception is structured linguistically, one can have been dying without having died, and, correlatively, one can have died without having been dying.[15]

(40) a. He died as she looked on.
b. He was (slowly) dying as she looked on.

5.7 Axiality

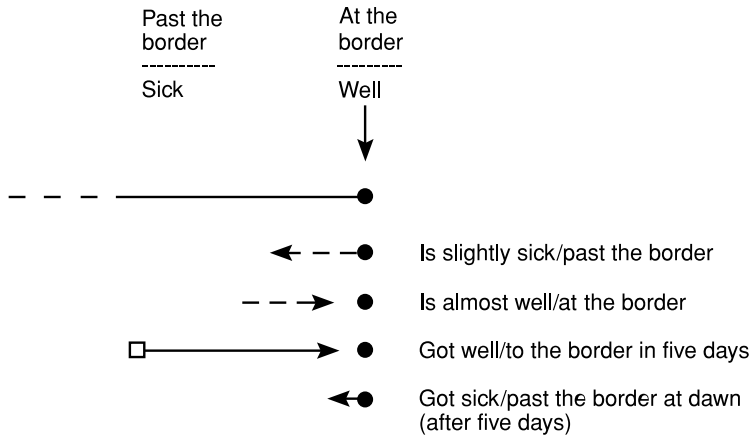
The adjectives in a pair like *well*/*sick* behave contrarily when in association with grammatical forms specifying degree like *slightly* and *almost*, as seen in (41a), and they select for different readings of temporal forms like "*in* + $NP_{extent\text{-}of\text{-}time}$", as seen in (41b). In these respects, perhaps surprisingly, they parallel the behavior of certain kinds of expressions that specify spatial relations—for example, *at the border*/*past the border*.

(41) a. i. He's slightly { sick/past the border. / *well/*at the border. }
ii. He's almost { well/at the border. / ?sick/?past the border. }

b. i. He got well/to the border in five days. (i.e., in the course of five days)
ii. He got sick/past the border in five days. (i.e., after five days had elapsed)

This behavior can be accounted for by positing that such adjectives, in referring to a more generic notional parameter, such as that of 'health', are not simply "opposites" but rather presuppose a schematic axis that is structured and directed in a particular way. Each adjective, then, labels a different portion of that axis. The adjectives here seem in particular to presuppose a directed line bounded at one end; *well* refers to the end point while *sick* refers to the remainder of the line, correlating greater degree with greater distance along the line. These are the **axial properties**, or **axiality**, of the lexical items—that is, the specific relations each has to a particular conceptual axis and to other lexical items with referents along the same axis. It is the lexicalization of such axiality that can align adjectives with expressions of spatial relation. Grammatical forms like the ones just given also have axial properties, and these can function in consonance with those of a lexical item, as in the acceptable cases of (41), now schematized as to axiality in (42).

(42)



In other cases, though, the axiality of a grammatical form can conflict with that of a lexical item and, accordingly, can cause the latter to shift in a process of resolution to the conflict (see chapter II-5). Thus, *sick* in (43)—now associated with grammatical forms that refer to an end point—shifts from its basic "directed shaft" type of axiality, and indeed from its reference to an axis of 'health'. It now specifies the end point of

an axis pertaining to 'feeling poorly'. The addition of the grammatical forms here can be thought to trigger two concurrent cognitive operations. The first is an operation of **punctifying**, whereby a linear extent is conceptually collapsed into a point, as here where the original referent of *sick* reduces from an extended range covering degrees of poor health to a point notion of definitive illness. The second operation is one of **terminalizing**, in which a gradient directed away from an initiating point, as the original referent of *sick* leads away from that of *well*, is converted into the terminating boundary of a gradient that leads toward it, as the new referent of *sick* terminates the gradient of *feeling poorly*.

(43) (After exposure to the virus, he felt worse and worse and) he was almost sick at one point. / he finally got sick in three days.

5.8 Scene Partitioning

The system of configurational structure includes the schematic delineations not only of an individual quantity such as an object, an action, or a quality, as dealt with so far, but also of a whole referent scene. Here, the system involves the conceptualization of a particular **scene partitioning**—that is, a principal division of a referent scene into parts and participants.

A lexical item can specify—in other words, can incorporate or lexicalize within itself—a particular scene partitioning of the event to which it refers. For example, the referent of the English verb *serve* partitions the full situation to which it refers into four main parts: an action, an item served, and a social dyad comprising the two roles of 'host' and 'guest'. The portion of a scene partitioning that constitutes its participant structure—generally, the sentient actor or actors that take part in the scene—can be separately termed the **personation** type for which the verb is lexicalized (as treated in chapter II-1). This schematic category, personation type, has two main member notions, the **monadic** type that involves one participant and the **dyadic** type that involves two interacting participants. Thus, while *serve* may have a four-part scene partitioning and a three-part argument structure, it is of the dyadic personation type.

But closed-class forms can also have scene partitioning or personation properties. Thus, the grammatical complex consisting of a singular subject–plus–reflexive object has the semantic specification of a single participant. When such a grammatical form occurs with a dyadic verb like *serve*, it triggers a cognitive operation of **monad formation**. The verb's

referent is thereby shifted from its original dyadic personation, illustrated in (44a), to one with monadic personation, as in (44b). In this shifted state, its referent is equivalent to that of an intrinsically monadic expression, like that in (44c).

(44) a. The host served me some dessert from the kitchen.
b. I served myself some dessert from the kitchen.
c. I went and got some dessert from the kitchen.

It must be observed that though the grammatical complex in (44b) is determinative in setting the role number as monadic, a trace of the verb's original dyadic personation type does remain. In the cognitive representation evoked by sentence (44b), the connotation of a dyad is blended in with the denotation of a monad, as if both 'host' and 'guest' are together present in the single person of the "I." The construction suggests that the self contains two complementarily functioning subparts, where one subpart acts with hostlike characteristics, such as responsibility and indulgence toward the other subpart, while the other subpart acts with guestlike characteristics, such as receiverhood and a feeling of being looked after by the first subpart.

At work here is a metaphoric process that maps a binary source domain onto a unary target domain in a cognitive operation that can be termed **introjection** (see chapter II-5). Because of this metaphoric introjection of a dyad onto the monad of sentence (44b), that sentence is (aside from other differences of reference due to the different lexical items chosen) not the full semantic equivalent of sentence (44c). The reason is that while this latter sentence also refers to a monad, it does so without any metaphoric impress of a dyad.

While introjection as an operation accompanying monad formation is well represented across languages, its reverse, a putative cognitive operation of **extrajection** that would accompany a process of **dyad formation**, appears to be represented minimally at best. Extrajection would entail that a verb basically lexicalized in the monadic personation type is used in a grammatical context with dyadic meaning, and that a metaphoric impress of the verb's unary character is mapped onto the binary referent. Perhaps the sentence in (45b) does indeed manifest something of this operation. But to be the full complement of the (44b) example, this sentence would have to suggest a metaphoric impress of unarism that encompassed the actions of the two participants in a way felt to be lacking in the simply dyadic sentence of (44c), and this is not at all clear.

(45) a. One twin sang.
b. Both twins sang together (/?jointly).
c. The twins duetted/harmonized.

6 PERSPECTIVE

The first schematic system consisted of the configurational structure that closed-class forms can specify for a referent entity. The present schematic system consists of the **perspective** that one can have on such an entity, as this is specified by closed-class forms. This system thus establishes a conceptual perspective point from which the entity is cognitively regarded. While this schematic system is presumably neutral to particular sensory modalities, it is most readily characterized in visual terms as, in effect, pertaining to where one places one's "mental eyes" to "look out" upon a referent structure.

The perspective system covers several schematic categories. Included among these categories are ones pertaining to: a perspective point's spatial or temporal positioning within a larger frame, its distance away from the referent entity, its change or lack of change of location in the course of time and the path it follows with change, and the viewing direction from the perspective point to the regarded entity. These categories are treated below.

6.1 Perspectival Location

Grammatical forms—as well as lexical forms—can specify the location that a perspective point is to occupy within a referent scene or its speech-event setting. The linguistic literature includes much work on this issue, especially with respect to deixis. In its basic form, deixis sets the position of the perspective point at the speaker's current location. For example, a Figure object's path with respect to some Ground object can be additionally characterized as moving toward or not toward the speaker's viewpoint by such closed-class forms as German *her* and *hin*, as well as by such open-class forms as English *come* and *go*.

The notion of a "deictic center" extends this basic concept to cover any location within a referent scene to which an addressee is directed to project his imaginal perspective point by linguistic forms (see Zubin and Hewitt 1995). Consider, for example, the following bit of narrative: "She sat in the rocker near her bed and looked out the window. How lovely the sky was!" In the first sentence, the use of a third-person pronoun together

with the objective scene description invites the listener to place his perspective point somewhere in the depicted room looking at the sitting woman. But in the second sentence, the exclamatory *how*-construction, together with the expression of subjective experience, induces the listener to relocate his perspective point to the location of the sitting woman, in effect, looking out through her eyes.

To treat a further example with more explanatory detail, consider the sentences in (46) (adapted from a Fillmore example used for another purpose). The first sentence induces the listener to locate her perspective point inside the room, whereas the second sentence inclines toward an external perspectival location (or perhaps to a nonspecific one). How is this accomplished? The cognitive calculations at work appear to combine a rule of English with geometric knowledge. Though often breached, an apparent general rule in English is that if the initiator of an event is visible, it must be included in the clause expressing the event, but if not visible, it must be omitted. Thus, if a glass I am holding slips from my hand, I can felicitously say to a bystander *I dropped the glass*, but not *The glass fell*. Accordingly, in (46a), no initiator of the door's opening is mentioned, hence none must have been visible. But the second clause indicates that the apparent initiator, the two men, moved from outside to inside the lunchroom. Assuming opaque walls and door, the only way that an entering initiator could not be visible to an observer during the door's opening is if that observer were located inside the lunchroom. In (46b), by contrast, the initiator is mentioned, hence must be visible. The only way a door-opening initiator who moves from the outside to the inside can be visible to an observational perspective point is if that perspective point is outside. An index of the capability of our cognitive processing is the rapidity with which a hearer of, say, sentence (46) can combine an English visibility principle, geometric understanding, and real-world knowledge to yield a clear sense of interior perspectived location.

(46) *Position of perspective point*
   a. Interior: The lunchroom door slowly opened and two men walked in.
   b. Exterior: Two men slowly opened the lunchroom door and walked in.

6.2 Perspectival Distance

A second schematic category that closed-class forms can specify for a perspective point is that of **perspectival distance**. The main member

notions of this category are a perspective point's being **distal**, **medial**, or **proximal** in its relative distance away from a regarded entity. Perspectival distance was shown in section 5.5 to correlate with the schematic category of degree of extension. There it was seen that typically a distal perspective correlates with a reduced degree of extension, a medial perspective with a median degree of extension, and a proximal perspective with a magnified degree of extension. It is not clear whether perspectival distance *necessarily* correlates with degree of extension, or with certain other categories. But it seems to be a frequent concomitant and, in any case, it can, on the basis of the visual analogy, function as an organizing aegis to coordinate conceptual phenomena pertaining to the scope, size, and granularity of a referent. Thus, *as with* a distal perspective, there occurs a conceptual correlation of larger scope of attention, apparent reduced size of entities, coarser structuring, and less detail, while *as with* a proximal perspective, there occurs a conceptual correlation of smaller scope of attention, apparent magnified size, finer structuring, and greater detail.

6.3 Perspectival Mode

A third schematic category pertaining to perspective point is **perspectival motility**—that is, whether a perspective point is **stationary** or **moving**. Rather than treating this category in isolation, we observe that its members generally function together with members of the category of perspectival distance. The member notions of these two categories tend to align thus: the stationary with the distal and the moving with the proximal. In addition, these conceptual alignments are generally further linked to two different scopes of attention—that is, with a factor from the next schematic system—respectively, with a global scope of attention and with a local scope of attention. Finally, these two associational complexes can be deemed to make up a larger schematic category, that of **perspectival mode**, whose two main members can be termed the **synoptic** mode and the **sequential** mode, as summarized in (47).

(47) *Perspectival mode*
   a. Synoptic mode: the adoption of a stationary distal perspective point with global scope of attention
   b. Sequential mode: the adoption of a moving proximal perspective point with local scope of attention

Different types of referent situations may tend to correlate with one or the other perspectival mode. In particular, a basic association may tend to

exist on the one hand between a static situation and the synoptic mode of cognizing it, and on the other hand between a progressional situation and the sequential mode of cognizing it, and realizations of such correlations with appropriate closed-class forms are readily evident. In addition, though, often an alternative set of closed-class forms can direct the cognizing of a referent situation with the opposite perspectival mode.

6.3.1 Sequentializing For illustration, consider first an example with a static referent, one of objects in location—in particular, a scene with a few houses dispersed over a valley. This single scene can be alternatively represented by the two perspectival modes. The synoptic (47a) type of perspectival mode—the one more congruent with such a referent—is invoked in (48a). It is multiply specified there by the set of grammatical forms shown underlined, namely, plural number and agreement, the determiner *some* indicating a moderate total quantity, and the locative preposition *in*. But these forms can be replaced by other grammatical forms coding for the sequential (47b) perspectival mode—as in (48b) with singular number and agreement, an adverbial expression of moderate temporal dispersion, and the motion preposition *through*. As a result of these changes, the evoked cognitive representation is converted to one where one's perspective point and attention—or one's own projected location—shift in turn from object to object. In effect, a static multiplexity of objects has been converted into a sequential multiplexity of events consisting of conceptualized encounters with each of the objects in turn. Here, a cognitive operation of **sequentializing** has been carried out.

(48) a. There are some houses in the valley.
b. There is a house every now and then through the valley.

The sentences in (49) exemplify the same contrast between the synoptic and the sequential perspectival modes, but now with the use of partially different grammatical forms.

(49) a. All the soldiers in the circle differed greatly from each other.
b. Each soldier around the circle differed greatly from the last/next.

For representing certain static spatial configurations, the sequential perspectival mode, though noncongruent in character, is nevertheless preponderantly favored over the synoptic mode. Thus, the ready colloquial formulation of (50b) with a moving perspective point is matched in the static global mode of (50a) only by a stilted scientific style.

(50) a. The wells' depths form a gradient that correlates with their locations on the road.
b. The wells get deeper the further down the road they are.

6.3.2 Synopticizing The reverse of the preceding circumstances also exists. A referent that most basically is in fact sequential—for example, a multiplex sequence of occurrences—can be represented in association with the more congruent mode for cognizing it, the sequential perspectival mode, as in (51a). The sequential mode is triggered by the presence of certain closed-class forms: singular number, an adverbial of iteration, and a preposition (or prepositional complex) expressing temporal progression. But essentially the same referent can also be presented as the object of a fixed global perspective point, that is, of the synoptic perspectival mode, as in (51b). The conceptual effect is that the entirety of the sequence is regarded together simultaneously for an integrated or summational assessment, as if the sense of progression that is associated with the temporal dimension were converted into a static presence. Here, a cognitive operation of **synopticizing** has been carried out. The closed-class forms in the present example that trigger this operation are: the perfect auxiliary, a quantifier complex indicating aggregation, plural number, and a preposition of static containment.[16]

(51) a. I took an aspirin time after time during/in the course of the last hour.
b. I have taken a number of aspirins in the last hour.

6.4 Direction of Viewing

The sequential perspectival mode has an additional application within the temporal domain to a succession of events or to the continuation of a single event. In this application, location of perspective point joins with another factor from the system of attentional distribution—that is, with **focus of attention**—to characterize a new schematic category, **direction of viewing**. This category is based on the conceptual possibility of "sighting" in a particular direction from an established perspective point, thereby attending to one or another particular portion of the temporal configuration in reference, and of shifting the direction of this sighting to another portion of the temporal configuration.

To illustrate, consider as a referent the temporal complex consisting of two events occurring in succession. Closed-class forms can direct that

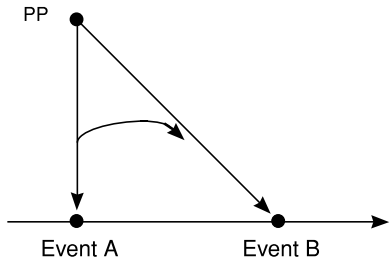
any of a set of different perspectival modes and directions of viewing be applied to essentially this same complex. Thus, as in (52a), closed-class forms can establish a perspective point that is temporally positioned at event A and from which a line of viewing can be directed first at event A itself, a **direct** viewing, and then, in a **prospective** direction, ahead to event B. Alternatively, as in (52b), a perspective point can be positioned at event B and a line of viewing aimed first in a **retrospective** direction back to event A, and then directly at event B itself. In these two cases, what moves is not, as before, the location of one's perspective point, but the direction of one's viewing.

Further, the location of the perspective point can itself also move, with a direct viewing at each location, in the manner of the original sequential perspectival mode seen in (51). Thus, in (52c), a perspective point is first established at event A, which is viewed directly, and then the perspective point moves to a location at event B, now in turn viewed directly.

(52) *Cosequential perspectival mode*

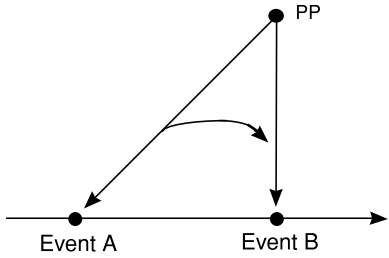
a. direct → prospective

I shopped at the store before I went home.



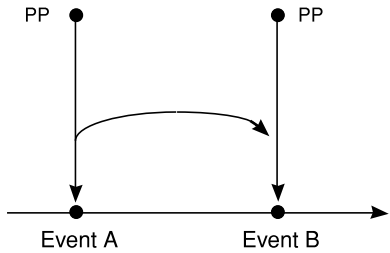
b. retrospective → direct

After I shopped at the store, I went home.



c. $direct_A \rightarrow direct_B$

I shopped at the store, and then I went home.



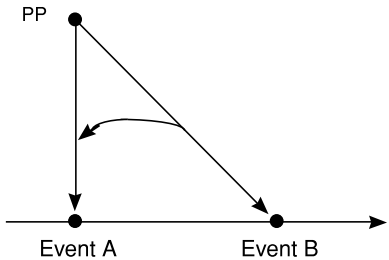
The diagrams in (52) schematize the perspective of these examples. Here, the arrowhead on the timeline represents the progression of time for the referent events, but the upper arrow indicates the progression of time pertaining to the sequence in which the viewings are conceived to be carried out.

In the earlier examples for the sequential mode and so far here, the temporal direction of the viewings has corresponded to the temporal direction of the referent events, and with respect to this relationship can be termed **cosequential**. In addition, however, the perspectival system in language often permits the opposite correlation—that is, where successive viewings are of progressively earlier events, in what can be termed an **antisequential** correlation. The antisequential counterparts to the examples in (52) appear in (53), and the accompanying diagrams now show the viewing arrow pointing backward relative to the referent-time arrow.[17]

(53) *Antisequential perspectival mode*

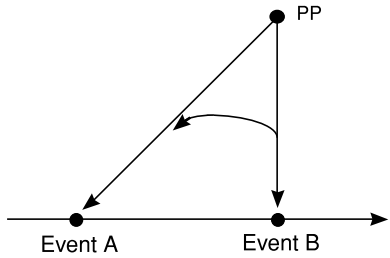
a. prospective → direct

Before I went home, I shopped at the store.

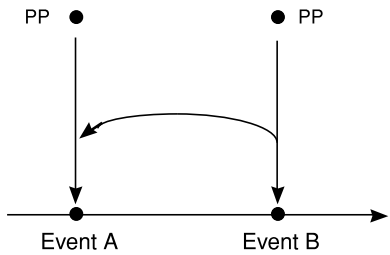


b. direct → retrospective

I went home after I shopped at the store.

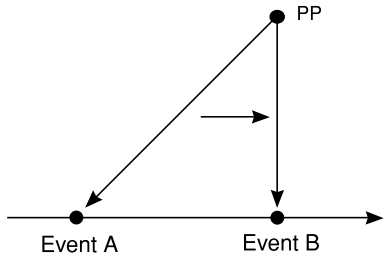


c. $\text{direct}_B \rightarrow \text{direct}_A$
I went home, but first I shopped at the store.

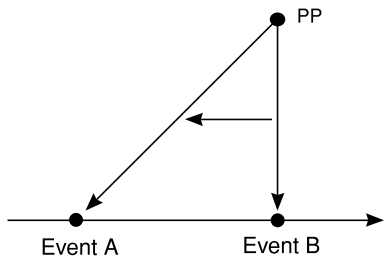


These same perspectival parameters can apply not only to a temporal complex of separate events but also to a single extent-durational event. The event represented in (54) illustrates this. This event is given a retrospective direction of viewing to its onset in the past and a direct viewing at its present. Here, the line of viewing does not make a discrete jump from one event to another (as indicated in the earlier diagrams by a curved arrow), but executes a continuous sweep along the body of the event between the retrospective orientation and the direct one (as indicated in the present diagrams by a straight arrow). As before, the line of viewing can move either cosequentially or antisequentially—seen, respectively, in (54a) and (54b)—relative to the referent event's progression.

(54) a. This festival dates from 1630 A.D.



b. This festival dates back to 1630 A.D.



7 DISTRIBUTION OF ATTENTION

The third of the schematic systems to be treated in this chapter is the **distribution of attention**. This system consists of the various patterns of different strengths with which one's attention is directed over a referent object or scene in accordance with the specifications of closed-class forms. Thus, while the first two schematic systems together ascribe a configurational structure to a referent and establish a perspective point from which to regard it, the present schematic system directs the distribution of one's attention over the given structure from the given perspective point.

Three factors in the attentional system govern the distribution of attention over a referent scene. The first factor is the **strength of attention**, which can range from **faint** to **intense**. Closed-class forms can set attentional strength with respect to either of two scales. They can set it at some value from low to high on an absolute, or zero-based, scale—a cognitive operation for which, of the terms in current linguistic use, **salience** or **prominence** seems the most apt. Or they can set it comparatively lower or higher than some reference value on a relative, or norm-based, scale—a cognitive process for which the terms **backgrounding** and **foregrounding** are apt.

The second factor is **pattern of attention**, by which attentions of different strengths are combined and arranged in particular patterns. We can identify a number of patterns that closed-class forms designate. One such pattern is **focus of attention**—a center-periphery pattern in which greater attentional strength is placed in a central region and lesser attentional strength is placed in a surrounding region. This focusing pattern is treated with respect to figure-ground organization in chapter I-5, as well as elsewhere in this volume. Another pattern is **window of attention**, in which one or more (discontinuous) regions within a referent scene are

allocated greater attention, while the remainder of the scene receives lesser attention. This windowing pattern is the subject of chapter I-4. In a third pattern, **level of attention**, either greater attention is assigned to a higher level of organization within a referent scene, while lesser attention goes to a lower organizational level, or the reverse allocation occurs. The subsections that follow all treat this pattern for setting the level of attention.

The third factor is **mapping of attention**, by which the particular parts of an attentional pattern are mapped onto particular regions of the referent scene. By the operation of this factor, a single attentional pattern can be overlaid in different ways onto the same referent scene. To illustrate with the center-periphery pattern applied variously to a single commercial scene, focal attention can either be mapped onto the seller, with lesser attention on the remainder, as in *The clerk sold the vase to the customer*, or focal attention can be mapped onto the buyer, with lesser attention on the remainder, as in *The customer bought the vase from the clerk*. Note in this regard that, in this volume, all the examples demonstrating the attentional system keep a particular referent scene constant while showing solely how a certain attentional pattern can be mapped onto it in different ways. That is, we demonstrate that closed-class forms can govern the distribution of attention without changing the contents. As with the schematic system of perspective above, that of attention readily shows how the overall concept structuring system of language is relatively distinct from the conceptual content system and can function apart from it to set or shift the latter's schematization—in the present instance, its attentional schematization.

As noted, all the following subsections pertain to the pattern for level of attention—demonstrating four different types of this pattern—which directs greater attention either to the more integral or general characteristics of a referent, or to its more compositional or particular characteristics.

7.1 Level of Synthesis

The schematic category to be considered now pertains to bounded quantities, like those schematized in the A/B row in (29). One form of locution already seen to specify such quantities is the particular type of "NP *of* NP" construction illustrated in (55a). Here the second NP specifies the *identity* of the quantity involved, itself conceptualized as without intrinsic bounds, while the first NP specifies (to use the terms introduced earlier) the **bounding**, or **portion excerpting**, per se of the quantity. Moreover,

in addition to such a pure operation of bounding, the first NP can further specify the particular **form**—the shape, size, and possibly other properties—that the excerpted portion exhibits, as in (55b).[18]

(55) a. a set of trees a quantity of water
b. a cluster of trees a puddle/drop of water

The two NPs here can be seen as coding for two different **levels of synthesis**. Describing this for the internally composite case, such as *a cluster of trees*, we can say that the second NP by itself specifies an unsynthesized multiplexity of independent elements, while the first NP specifies a particular Gestalt synthesized out of that multiplexity. These two levels can thus appropriately be termed the **componential** level of synthesis and the **Gestalt** level of synthesis.

Furthermore, language can mark an additional cognitive distinction here. Either level of synthesis can be placed in the foreground of attention while the other level is placed in the background. One grammatical device for marking such distribution of attention is the placement of the foregrounded NP at the head of the larger nominal construction (in the present English construction, placing it first). Thus, either of the two NPs we have just been looking at can appear as the head, as shown in (56a). With the use of this device, moreover, predications can be made that pertain solely to one level of synthesis or to the other, as seen in (56b).

(56) a. the cluster of trees/the trees in the cluster
b. That cluster of trees is small. / The trees in that cluster are small.

There are certain open- or closed-class forms, furthermore, whose referents are keyed to applying to only one or the other level of synthesis. Thus, *together* (in the sense of 'toward each other') tends to correlate with multiple objects at large, while *in upon -self* tends to correlate with a Gestalt formed from such a multiplexity, as seen in (57).

(57) a. The bricks in the pyramid came crashing together/*in upon themselves.
b. The pyramid of bricks came crashing in upon itself/*together.

In addition, there are closed-class forms that specifically represent a particular level of synthesis. Thus, in English, a cardinal numeral, "Num [NP]-s", as in (58ai) tends to evoke a conceptualization of its referent at the composite level of synthesis. But the closed-class suffix *-some*, or more specifically the grammatical construction "[Num]-some of [NP]-s", as in

(58aii), tends to evoke the Gestalt level of synthesis, calling for the conceptualization of a numbered multiplexity as constituting an abstract higher-order unitary entity.

A comparable distinction can be made by verb forms for events involving objects. Thus, the closed-class Russian verb prefix *s-*, taking the accusative of a plural direct object—"s-[V] [NP-pl]-ACC"—translates well as English *together*, directing attention to the composite level of synthesis, as in (58bi). But the prefix *na-* taking the genitive—"na-[V] [NP-pl]-GEN"—calls for the conceptualization that a process of gathering has created a higher-level entity, an *accumulation*, out of the objects gathered, as in (58bii).

(58) a. *In space: . . . with English CC, numeral suffix* -some
   i. four cooks
   ii. a foursome of cooks
   b. *Over time: . . . with Russian CC, verb prefix* na- [GEN]
   i. Ona s-grebla orexy v fartuk.
   "She scraped nuts together into her apron."
   ii. Ona na-grebla orexov v fartuk.
   "She scraped up an accumulation of nuts into her apron."
   (By scraping them together in her apron, she accumulated (a heap/pile of) nuts.)

The preceding phenomena have involved the shift of attention from a multiplexity to a Gestalt that it can constitute, a cognitive operation that can be called **Gestalt formation**. But also encountered in language are means for specifying the reverse: shifting attention from a Gestalt to components seen as constituting it, in an operation of **componentializing**. This operation can occur when the starting lexical item specifies an entity taken to be already at the more synthetic level, as is the case with *iceberg* in (59a). By grammatical devices like those in (59b), such an entity can be analytically converted from conceptualization as a coherent whole to that of component parts and their interrelations. Again we encounter a surface form—*in two*—that correlates with only one level of synthesis, the Gestalt level, and not with the other.

(59) a. *Gestalt level of synthesis*
   The iceberg broke in two.
   b. *Componential level of synthesis*
   The two halves of the iceberg broke apart (*in two).

The two levels of synthesis with the two directions of conceptual shift applicable to them define four notional types, as indicated in (60). The "Figure" terms here are used as described in Chapter I-5.

(60)

Example	*Type*	*Operation*
cluster of trees	"composite Figure"	Gestalt formation
trees	"multiple Figures"	↑
iceberg	"meta-Figure"	↓
two halves of iceberg	"component Figures"	componentialization

7.2 Level of Exemplarity

A second schematic category pertaining to level of attention can be observed for a multiplexity of objects. This category does not pertain to the basic reference to all the members of the multiplexity, but addresses how attention is directed and distributed within that multiplexity. By the first alternative, the **full complement** of the multiplexity is placed in the foreground of attention, all the elements of the multiplexity manifesting the indicated behavior en masse, with perhaps individual items here and there singled out in the background of attention and instantiating the indicated behavior individually. By the second alternative, a single **exemplar** out of the multiplexity is placed in the foreground of attention, representative of any of the elements that could be comparably focused in upon and seen to manifest the same behavior, with the remaining items as a group perhaps more dimly conceived in the background of attention. These alternative patterns of attentional distribution comprise the schematic category **level of exemplarity**. Perhaps most languages possess grammatical devices for evoking either level of this category. But English stands out in the extensiveness of its specifications: it has separate pairs of grammatical forms that mark the distinction for a number of different types of multiplexity. A rather full list of these pairs is indicated in (61), with examples showing first the full-complement form and then the counterpart exemplar form.

(61) a. Oysters have siphons/a siphon.
An oyster has siphons/a siphon.[19]
b. All oysters have siphons/a siphon.
Every oyster has siphons/a siphon.
c. All the members raised their hand(s).
Each member raised his hand(s).[20]

d. Many members raised their hand(s).
   Many a member raised his hand(s).
e. Some members here and there raised their hand(s).
   A member here and there raised his hand(s).
f. Members one after another raised their hand(s).
   One member after another raised his hand(s).
g. Hardly any members raised their hand(s).
   Hardly a member raised his hand(s).
h. No members raised their hand(s).
   No member (Not/Nary a member) raised his hand(s).
i. On both sides of the room stood tables/a table.
   On either side of the room stood tables/a table.

English has several further unpaired forms. The exemplar form *neither*, as in *Neither member raised his hand(s)*, has no full-complement counterpart. In a complementary way, the full-complement form *some*, as in *Some members raised their hand(s)*, has no exemplar counterpart. This last quantifier might be added to the list of paired forms, though, since Italian, for one language, does have both full-complement and exemplar forms for it.

(62) a. Alcuni membri hanno alzato la mano/le mani.
   some members have raised the hand/the hands.
b. Qualche membro ha alzato la mano/le mani.
   "some-a" member has raised the hand/the hands

7.3 Level of Baseline within a Hierarchy

In the linguistic representation of a complex of referents that are related to each other across hierarchical levels, attention can be directed to one or another of these levels for treatment as a **baseline**—that is, as the principal reference level with respect to which the other levels will be related. This schematic category will be termed **level of baseline within a hierarchy**. As with the categories of synthesis and exemplarity, the distinctions of the present category leave the basic substantive referent intact and only specify the pattern in which attention is distributed over that referent.

One type of hierarchy amenable to the present category is a hierarchy of partitive inclusion—for example, one with three levels, in which a Whole has particular Parts that, in turn, have particular Features. This type of hierarchy is illustrated by the sentences in (63), which refer to a

conceptual complex containing one entity from each of the three levels—respectively, a boy, a face, and freckles. While all three sentences in (63) equally identify the particular entities at the three hierarchical levels and their partitive relations, they differ as to which level they establish as the baseline. The baseline is placed at the level of minimal scope, that of Featural details, by (63a); at the mid-scope level, that of Parts, by (63b); and at the level of greatest scope, the Whole, by (63c). The grammatical means for setting the baseline here is the assignment of subject status in conjunction with the *have* + PP construction available in English.

(63) a. There are freckles on the boy's face.
b. The boy's face has freckles on it.
c. The boy has freckles on his face.

Since the present hierarchy is of the inclusional type, the cognitive effect of establishing one of the larger-scoped levels as baseline is to set it up as the **framing level**. Thus, (63c) sets up the large-scope Whole (the boy) as the framing level—in effect, as the "aperture" through which the other two levels (the face and the freckles) are viewed. By contrast, (63b) sets up the mid-scope Part (the face) as the framing level—that is, as the most salient aperture onto the scene through which one views the Featural level (the freckles) as well as the level of the whole (the boy), now somewhat more backgrounded in attention.

7.4 Level of Particularity

Alternative linguistic expressions can refer to essentially the same entity—that is, can evoke in a hearer's cognitive representation an entity of essentially the same identity—with greater or lesser exact particularity. This **level of particularity** ranges over a cline from greater **specificity** to greater **genericity**. With respect to their allocation of attention, alternative expressions accordingly can, by degrees along the cline, foreground more particulars of a referent while backgrounding its more abstract generalities, or they can background the particulars while foregrounding the generalities. In a given context, linguistic specifications made at either end of the particularity cline are often effectively equivalent in the information they convey, since more abstract structure is generally implicit in a detailed reference, while details can be inferred in context from a more generic reference. The difference is that the linguistic setting of the level of particularity draws primary attention to that level, and this cognitive process in turn generally engenders still further cognitive effects. The

brunt of the present category's realization seems generally borne by the *selection* of a particular open- or closed-class form that already directly expresses its referent at the desired level of particularity. There appear to be no grammatical forms whose function is solely to indicate that a referent is to be conceptualized at one or another level of particularity, nor any grammatical forms that trigger a cognitive operation of converting a lexical element's reference from one to another level of particularity. (In this respect, level of particularity is like state of dividedness, treated in section 5.3.)

To illustrate such a selection among alternative closed-class forms, consider that I can say to a person who alone has been balancing a ledger, either *You have made a mistake here* or *Someone has made a mistake here*. *You* identifies the particular agent involved, while *someone*, pitched at a more generic level, solely marks the participation of some agent. Given the context, the use of *someone* does not cause the loss of any inferable information, but it does background, or draw attention away from, the level of specific particularity.

There appears to be a general cognitive linguistic principle that the lack of any explicit naming of some factor makes available cognitive space for the contemplation of alternatives to that factor and, hence, for the deniability of that factor. (This principle is presumably the linguistic counterpart of general defensive psychological processes that provide relief from an unpleasant factor by one or another form of avoidance direct conscious apprehension of that factor.) With the use of *someone*, this "wiggle room" permits the cognitive illusion that the speaker is not squarely directing culpability at the addressee. On this basis, a succession of cognitive effects can build, one upon the other. The distraction of attention away from particularity is the initial cognitive effect. As its concomitant, deniability can be reckoned as a secondary cognitive effect. A tertiary effect of considerateness on the part of the speaker can then enter that allows the addressee a graceful exit off the hook. And, on top of this, a quaternary effect of sarcasm or irony can be intended by the speaker.

For a related example, consider the Yiddish sentences in (64). Taken from a song, (64a) is uttered by a young woman begging off from a young man's invitation to the woods. This sentence is understood in context to refer to a situation that is more specifically spelled out in (64b), though, in another context, it could also refer to the more particularized situation spelled out in (64c). These latter two sentences identify the particular participants in their respective roles. By contrast, (64a) abstracts away

from the situation enough to report only the interparticipant relationship, that one unidentified participant will act on another. Again, given the context, (64a) loses few particulars of information, but it draws attention away from them. Their explicit indication could engender an effect of too starkly calling a spade a spade; their absence has the effect of suggesting delicacy.

(64) a. Me vet zick veln kushn.
one will-3S REFL want-INF kiss-INF
"One will want to kiss another."
b. Du vest mir veln kushn.
you-S will-2S me want-INF kiss-INF
"You will want to kiss me."
c. Mir veln zikh veln kushn.
we will-1P REFL want-INF kiss-INF
"We will want to kiss each other."

8 NESTING

We have seen that grammatically specified concepts largely follow certain organizing principles, namely, spatiotemporal homology, intracategorial conversion, and reverse convertibility. Another such organizing principle is focused on here, that of **nesting**. To a large extent, one grammatically specified concept can occur embedded within another, and that within a third. Alternatively, by an interpretation of nesting that can be called **chaining**, the output of one grammatically specified cognitive operation can serve as the input to another, and the output of that as the input to a third. Discussion of such nesting or chaining is presented separately below for each of the three schematic systems treated earlier.

8.1 Nesting of Configurational Structure

Examples of the nesting of configurational structures have already been presented in connection with (27) and (30). To add to this set, consider now, first for the temporal dimension, the particularly elaborate embedding shown built up layer by layer in (65).

(65) a. The beacon flashed (as I glanced over).
b. The beacon kept flashing.
c. The beacon flashed five times in a row.
d. The beacon kept flashing five times at a stretch.
e. The beacon flashed five times at a stretch for three hours.

To describe these forms in terms of sequenced operations, in (65a), the lexical verb *flash* appears with its basic structural specification as a point-durational full-cycle uniplex event. This undergoes the cognitive operation of multiplexing, to yield the unbounded multiplexity in (65b). This structure then undergoes bounding in (65c). This bounded multiplexity then first goes through the operation of reduction to become schematized as a new pointlike uniplex quantity, and this in turn is multiplexed afresh, yielding (65d). This new unbounded multiplexity is then finally bounded in (65e). The progressive nesting of structural specifications in these five stages can be represented schematically as in (66).

(66) a. !
b. . . . ! ! ! ! ! ! ! ! ! . . .
c. [! ! ! ! !]
d. . . . [! ! ! ! !]–[! ! ! ! !] . . .
e. [[! ! ! ! !]–[! ! ! ! !] . . . [! ! ! ! !]–[! ! ! ! !]]

Analogous to this temporal nesting is the spatial example in (67).

(67) a.	I saw a duck	[. . . in the valley.]
b.	I saw ducks	"
c.	I saw a group of five ducks	"
d.	I saw groups of five ducks each	"
e.	I saw three ponds full of groups of five ducks each	"

With respect to the introductory discussion, note that configurational nesting can be thought of in these two ways: as a dynamic sequential process in which the output of one cognitive operation becomes the input to another, or as a static hierarchical structural complex in which all the conceptual components are concurrently present in their specific interrelations as in a schema. Among the cognitive possibilities, it might be that a conceptual complex like that of (65e) is understood solely in terms of a sequence of operations, as first presented above; or that it involves both this type of dynamic process and the static schematic structure that cumulatively results, like that shown in (66); or that it is understood solely in terms of such a static structure, holistically determined by the co-occurrence of the relevant closed-class forms in the sentence.

Certain correspondences hold between the dynamic and the static interpretations of configurational nesting. The basic element in the dynamic process model—that is, the initial element that acts as input to the

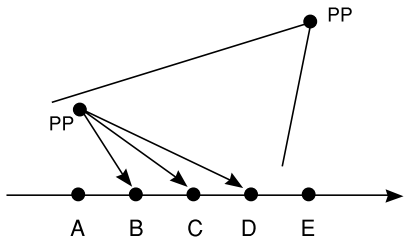
first operation, such as the uniplex point-duration event 'flash' in (65e)—corresponds in the static structure model to the hierarchically lowest (smallest) element, here, any vertical stroke in the schema in (66).

8.2 Nesting of Perspectives

The schematic system of perspective can also exhibit forms of nesting. Consider the case of temporal perspectives, as exemplified in (68) and as diagrammed in (69).

(68) At the punchbowl, John was about to meet his first wife-to-be.

(69)



In this sentence, we can identify a number of distinct perspective points and directions of viewing, both for the speaker and perhaps also for the referent actor, John. Established by the expression *be about to*, the earliest perspective point is that of the speaker—whether personally present or as a fictive projection. This perspective point is located at a point of time ("A" in the diagram) shortly before the point at which John will encounter a particular woman ("B" in the diagram). And the speaker's direction of viewing from that earlier perspective point is prospectively aimed toward that time of encounter. Next, the expression (wife-) *to-be* establishes a second prospective viewing that looks ahead to the time when the woman whom John encounters will be his wife ("C" in the diagram). The originating point of this viewing can be taken either as again that of the speaker, hence coinciding with the earliest perspective point, or as that of John at the time of encounter. Then, triggered by the word *first*, a further prospective viewing, or family of viewings, again most likely originating with the speaker at the earliest perspective point, though possibly otherwise, points ahead to a subsequent wife or wives following John's marriage with the woman at the punchbowl ("D" in the diagram). Finally, a perspective point of the speaker at the present moment of speech ("E" in the diagram) is established by the past tense of the main verb *was*. It is this perspective point at which the speaker's cumulative knowledge of the reported sequence of events is stored as memory and, in turn, which

functions as the origin of a retrospective direction of viewing over the earlier sequence. Thus, nesting in this case involves the inclusion of the earlier perspective points within the scope of the viewing from the current perspective point.

Further, this current perspective point serves as the source of knowledge that is projected back to the earlier perspective points for their seemingly prospective reports. Thus, this case of nesting additionally involves a new cognitive factor, **projection of knowledge**. By this factor, the conceptual content that accrues to one perspective point is projected into the locus of another perspective point to be redirected as if originating from that second perspective point. The main evidence that such a projection from a later to an earlier perspective is conceptually valid is that, in its basic meaning, the sentence in (68) is not understood as making *predictions* but rather as asserting *facts*, ones presented from beforehand but necessarily taken from post facto knowledge.

8.3 Nesting of Attention

Within the schematic system of attention, the category of attentional focus can be used to illustrate nesting. Consider the sentences in (70), which can both refer to the same event of commercial transfer but do so with different forms of attentional focus.

(70) a. The clerk sold the customer a vase.
b. The customer bought a vase from the clerk.

With respect to what holds in common across these sentences, their referents both include two volitional agents, a seller and a buyer, each performing certain actions intentionally. The seller performs such intentional actions as describing, packaging, presenting, and taking payment for a transferred object, while the buyer performs such intentional actions as choosing, requesting, taking possession of, and giving payment for the transferred object. Though these two sets of actions dovetail with each other and, indeed, could scarcely occur alone as sets without their counterpart, still the focus of one's greatest attention may be directed to extend over only one or the other of the two actional complexes.

Lexical forms can signal this distinction. Thus, the English verb pairs *sell* and *buy* are differentially lexicalized for invoking one or the other of these two locations of focal attention. In addition, the grammatical voice forms "active" and "passive" are devices in language for directing focal attention to one or the other pole of a transfer.

Now consider the sentences in (71). Both place primary attention on the buyer, which is expressed as the subject. Yet in certain respects these two sentences differ from each other semantically.

(71) a. The customer bought a vase.
b. The customer was sold a vase.

With its lexical selection of *buy*, (71a) locates focal attention on the buyer in a direct fashion. Accordingly, the buyer's complex of intentional actions seems strongly active, while the seller's role is quite backgrounded. By contrast, with its use of the verb *sell* together with the passive voice, the semantic effect of (71b) seems more complex and indirect, with a primary focus on the buyer but also with secondary attention directed toward the seller. More specifically, though we are in effect "looking at" the buyer and the seller is, as it were, "off stage," it is the seller's complex of intentional actions that seems more strongly active, while the buyer seems more of an inactive recipient. Paralleling the syntactic structure, this semantic effect can be seen as a conceptually nested formation in which focal attention is first directed to the seller by the lexical choice of *sell* but is then redirected to the buyer by the passive voice. If this redirection of attention were total, (71b) would be semantically indistinguishable from (71a), but in fact it is not. Rather, the redirection of attention is only partial: it leaves intact the foregrounding of the seller's active intentional role, but it shifts the main circle of viewing onto the buyer as target. Altogether, then, it can be said that attention on the seller is hierarchically embedded within a more dominant attention on the buyer.

9 FURTHER COGNITIVE CONNECTIONS

Grammatically specified structuring in language appears to correspond, in certain of its functions and characteristics, to the structuring in other major cognitive systems, such as those of visual perception and reasoning. In particular, perhaps the principal overarching function of the structuring common across cognitive systems is that of providing conceptual **coherence**—that is, acting as a means for integrating and unifying a body of otherwise disparate conceptual material. In language and, as suggested later, in vision, this fundamental function has two main global forms of realization: coherence over a scene and coherence through time.

Providing coherence over a cognized scene was the function of grammatical structuring that was originally indicated in the introduction. There it was put forward that the grammatical elements of any particular sentence together specify the structure of the cognitive representation evoked by that sentence. Their specifications act as a scaffolding or framework across which contentful material can, in effect, be splayed or draped. It can be posited that such structuring is necessary for a disparate quantity of contentful material to be able to cohere in any sensible way and hence to be amenable to simultaneous cognizing as a Gestalt. That is, without such structuring, any selection of lexically specified concepts concurrently juxtaposed by a sentence would tend to be only a collection of elements, rather than elements assembled so as to convey an integrated idea or thought complex.

In addition, in the course of discourse, a great welter of notions are expressed in rapid succession, posing the potential problem of an unconnected sequence of ideational elements. But grammatically specified structuring is a principal contributor to the conceptual coherence through time that is requisite here. Through such structuring, a cognitive continuity is maintained through this flux and a coherent Gestalt is summated over time. A language can have a great stock of closed-class elements participating in this function—for example, such English forms as *"yes, but," moreover, nevertheless, besides, instead, also.* Such forms direct the illocutionary flow, specify the "logical tissue" of the discourse, and limn out its rhetorical framework. That is, these grammatical forms establish a structure that extends over a span of time and thus provides a conceptual level with temporal constancy amidst more fleeting aspects of content.

The preceding two global forms of grammatically specified structuring apply over the scope of any single language but—to amplify here on certain observations of section 2—a further form must also be recognized that holds for language in general. While each language has to some extent a different set of grammatical specifications, there is great commonality across languages, so one can posit that each set is drawn from an inventory of concepts available for serving a structuring function in language.

Further, a qualifying property of this inventory can be adduced. It can be observed that grammatically specified concepts range crosslinguistically from ones extremely widespread—perhaps universal—and of broad application within a language, down to ones appearing in only a few languages with minimal application. Thus, the inventory of available

structuring notions that is posited here appears to be graduated with respect to their significance for the language faculty (see the tabular listing of grammatical notions in chapter II-2). For example, the notions 'entity' and 'occurrence' as expressed by the grammatical categories "noun" and "verb" are probably universal and, within any language, of broad application. On the other hand, the conceptual categories of "tense" and "number" (apart from "person") seem to be of mid to high ranking, but not universal. And notions like 'in the morning' and 'in the evening' are expressed inflectionally on the verb in just a few languages.

Perhaps surprisingly, compared to spatiotemporal structuring, the conceptual category of "affect" is rather low in the graduated inventory of concepts that language draws on for structuring purposes. This fact is unexpected, considering the importance of the cognitive system for affect within human psychological functioning. The affect category does have scattered representation, for example 'affection' expressed by diminutive affixes, 'scorn' by pejoratives, 'concern' by a conjunction like *lest*, and 'hurt' by the "adversive" construction (as in the English: *My plants all died on me*.). But seemingly no language has a system of closed-class forms marking major affect distinctions in the way that, say, the modal system in English specifies distinctions of force opposition (chapter I-7).

Such an affect system can easily be imagined, however. Consider a parent addressing a child in danger near an open window. Grammatical systems readily allow the parent to refer to the spatial structure in this situational complex—*Get away from the window!*—leaving the affective component to be inferred. But there is no closed-class form—comparable, say, to a Path satellite like *away* (see chapter II-1)—that expresses 'fear', one that could, for example, be represented by the form *afear* in *Act afear the window!* that would allow the parent to refer to the affective component of the complex and leave the spatial component to be inferred. Comparably, to a child near a freshly painted wall and about to harm it, a parent would likely again express the spatial structure—*Get away from the wall!*—leaving the affect to be inferred. There is no closed-class affect form for 'like/be nice to', which could be represented as *afavor*, that the parent could use instead—*Act aFAVOR the wall!*—thereby leaving the spatial component for inference.

Parallels can now be drawn between the structuring system operating in language and that in visual perception (see Jackendoff 1987a and chapter I-2).[21] The principal function of structure to provide coherence appears

common across the two cognitive systems, and the two global forms of such coherence outlined above for language correspond to comparable forms in the operation of vision.

First, there is a parallel between the linguistic coherence over a *referent* scene and the visual coherence over a *perceptual* scene. The welter of optical sensations registered at any one moment from some whole visual scene is rendered coherent by the perception of structural delineations running through it. For example, one looking at, say, the interior of a restaurant from one corner of the room does not see simply a pastiche of color daubs and curves but, rather, perceives a structured whole that includes the framework of the room, the spatial pattern of tables and people, and the individual tables and people themselves. And seeing a person in some posture involves perceiving a structural framework in the human figure, along the lines of the abstracted "axes of elongation" described by Marr (1982). Children's line drawings of scenes and stick-figure sketches of people, animals, and objects (Kellogg 1970) demonstrate our early capacity to abstract structure from visual scenes and scene parts.

Second, one can observe a parallel between the coherence through time in linguistic discourse and that in visual perception. If the viewer in the illustrative restaurant now walks through the room, the patterns in which visual stimuli and the perception of structure change give rise in turn to the perception of a coherent continuity of path and view occurring within an overall "scene-structure constancy."

It is reasonable to assume that, in addition to these language-vision parallels in global structuring, a number of particular structuring devices match across the two cognitive systems. Perhaps most of the grammatically specified schematic categories treated in this chapter—including, for example, state of boundedness and level of exemplarity—correspond to structuring factors in visual perception. Further, the three schematic systems seen to apply broadly to cognitive organization in language—configurational structure, perspective, and distribution of attention—seem to correspond, as whole systems, to counterparts in visual perception.

Still further parallels can be seen between language and vision in the properties of their structuring. Thus, the topology-like character of grammatical specifications may have some parallel in the character of the perceived delineations of a scene, or the internal structure of a figure, or the plan of a path to be followed through obstacles. Such perceptions of

structure seem in certain respects to abstract away from Euclidean particularities of exact magnitude, shape, or angle, and more to involve qualitative or approximate spatial relationships (see chapter I-2).

As a further parallel, the capacity of grammatical specifications to nest, one within another, and form embedded structuring seems to correspond to embedded structuring within a visual scene. Thus, the structure of the restaurant scene above involved a multiple embedding. This consisted of an overall framework, the pattern comprised by all the tables and people, the individual tables and people, and perhaps further the skeletal structure sensed within each table and person.

All of the preceding has outlined a set of structural parallels between language and vision. But, significantly, each of these two cognitive systems has prominent structuring devices that play little or no role in the other system. Thus, in visual perception, three major parameters that structure (parts of) a scene are bilateral symmetry, rotation, and dilation (expansion or contraction) (Gibson 1966, Palmer 1983) and, if color can be treated as structural, it is a fourth. In language, by contrast, grammatical specification of symmetry is minimal, perhaps limited entirely to the notion 'reciprocal'. Closed-class indication of rotation is limited in English to the prepositions or verb satellites *around* and *over* (*The pole spun around|toppled over*), and it is barely augmented in other languages. Dilation is grammatically expressed in English by the verb satellites *in* and *out* when referring to radial motion (*spread out|shrink in*) and, again, such notions are not particularly elaborated in other languages. And color, of course, was this chapter's original example of a conceptual category *not* grammatically specified.

In the other direction, there are several prominent linguistic categories of seemingly little structural function in visual perception. Examples are "status of reality," as expressed, for example, by inflections for mood, "status of knowledge," as expressed by evidentials, and "comparison of alternatives," as expressed by a category of particles that includes *instead, only*, and *also*. Further possible examples are "relative temporal location," as expressed by tense markings, "degree," as expressed by adjective inflections and modifiers (for example, English *-er, -est, almost, too*), and "force dynamics," as expressed by modals (see chapter I-7).

While language may not share these conceptual structuring categories with visual perception, it may well share some of them with other cognitive systems. Consider again any language's closed-class category of evidentials representing a schematic category of "status of knowledge" with

such member notions as: 'known from personal experience as factual', 'accepted as factual through generally shared knowledge', 'inferred from accompanying evidence', 'inferred from temporal regularity', 'entertained as possible because of having been reported', and 'judged as probable'. This linguistic category is very likely related to a category of comparable structural factors in our cognitive system for reasoning and inferencing.

Generalizing from these and related findings, the possibility is that each major cognitive system has some conceptual structuring properties that are uniquely its own, some properties that it shares with some cognitive systems but not with others, and some properties that run in common through all the systems. This is the overlapping systems model of cognitive organization described in the introduction to this volume. Determining the overall and particular character of conceptual structure is the aim of the research advanced in the present chapter, one requiring a cooperative venture among the cognitive disciplines.

Notes

1. This chapter is a substantially revised and expanded version of Talmy 1988b. That paper, in turn, was a greatly revised and expanded version of Talmy 1978c. Talmy 1977 was a precursor to the 1978 paper.

2. The word "evoke" is used because the relationship is not direct. The CR is an emergent, compounded by various cognitive processes out of the referential meanings of the sentence elements, understanding of the present situation, general knowledge, and so on.

3. More recently, research on different aspects of this broader scope has included work by Jackendoff (1983), Bybee (1985), Morrow (1986), Langacker (1987), and Slobin (1997).

4. A few notes on our terminology are in order. Below, the terms "lexical" and "open-class" are used interchangeably, as are the terms "grammatical" and "closed-class." For consistency, accordingly, the term "grammatical category" has been used here instead of the more usual "lexical category." The grammatical category of, say, "noun," of course refers not to any collection of particular nouns, but to the abstracted status of "nounhood" per se.

5. For example, augmentative and diminutive elements, insofar as they refer to size, rather than, say, affective qualities, seem to specify size relatively greater or lesser than the norm for the particular object in reference. And closed-class elements specifying distance—like English *just* or *way*, as in *just/way up there*—specify notions of 'near' and 'far' relativized to the referent situation.

6. The property at issue here is that of "manifested Euclidean shape," distinguished from that of "intrinsic topological form" because, although closed-class forms are largely neutral to the former, they can be sensitive to the latter. For

example, the Korean numeral classifier *chang* refers to an object whose intrinsic form is planar, regardless of its currently manifested shape. Thus, the classifier can be used in referring not only to a flat sheet of paper, but also to one that has been crumpled into a wad, if the speaker wishes to attend to the object's intrinsic planar form rather than to its current spheroidal shape. (See Oh 1994.)

7. If the so-called idealized form of the schema is understood simply as one alternative within a family of shapes for that schema, the term "shape-neutral" remains appropriate as the name for the schema's property. But if that idealized form is taken as being somehow basic, or unmarked, it might be preferable to say that the schema is *deformable* and exhibits the property of *plasticity* in accommodating to a referent's shape.

8. It is apparently also the case that no "proper verbs" or "proper adjectives" exist. Thus, it seems there could never be a verb like "to Deluge" referring uniquely to the so-conceived spatiotemporally bounded event of the biblical flood, as in some sentence like: *After it Deluged, Noah landed the ark*. And it seems there could never be an adjective like "Awareawake" conceived to refer uniquely to the quality of Buddha's enlightenment at its specific time and place, as in some sentence like: *Buddha became Awareawake under the Bodhi tree*. Note that although a verb like *Manhattanize* and an adjective like *Shakespearean* do include reference to a specific spatiotemporal entity, their reference as a whole is not unique, since an act of Manhattanizing can be performed many times, and many actors and/or plays of a certain style can be called Shakespearean. Thus, while such observations show that token sensitivity is not available for all open-class types, it is at least available to nouns, and it is certainly excluded from closed-class forms.

9. Perhaps this reconceptualization—together with the syntactic reformulations that correspond to it—has functioned as the model for such features as the English passive marked with *get*, as well as for the marking in Italian of the Agent in a passive with *da* 'from'.

10. In some cases, a reified deverbal noun is frozen in construction with only one verb or permits extension to just a few further verbs. Such a form can exhibit the usual grammatically marked cognitive operations but not the wide range of spatial manipulations. An example is the action-specifying verb *(to) bow*, whose deverbal noun *(a) bow* constructs mainly with *take*. Thus, one can observe such grammatical parallels as *I bowed (once)/I took a bow*; *I quickly bowed several times/ I took several quick bows*; *I bowed time after time/I took one bow after another*. A slight degree of spatial manipulation can be seen in sentences like *I directed a bow at the chair of the funding committee*. But wider spatial manipulation is not seen. Thus, there is no **I spread/swept bows across the front row of the audience*, or **I distributed bows to select members of the audience*.

11. As a possible counterpart to the preceding typology for reference to physical entities, there may be a two-category typology for the most characteristic form of lexicalization that a language uses to refer to actions. The predominant language type characteristically uses verbs to refer to actions. But some languages—including many of those in New Guinea and Australia—refer to most actions with

a nonverb class of forms, forms that merely enter into construction with the true verbs of a small closed set.

12. The lexical types for several of these intersections, it should be noted, do have traditional terms. Thus, nominal forms of the a, A or A′, and B′ types, respectively, have been called count nouns, collective nouns, and mass nouns. Verbal forms of the a, A or A′, and B′ types, respectively, have been called punctual, iterative, and durative verbs. The matrix presented here augments, systematizes, and generalizes the traditional notions.

13. This category can be considered a generalization over the earlier category of **state of boundedness** by the inclusion of the **uniplexity** notion. It can in turn itself be generalized—becoming the category *pattern* **of extension**—by the further inclusion of such notions as a quantity bounded at one end but unbounded at the other (see chapter I-3).

14. This category clearly patterns with the preceding five within a single system of notions, one that would be an expansion or generalization over **disposition of a quantity**.

15. Our main purpose here is to note the shift in structural distribution type. The shift in content will doubtless prove part of a larger pattern as well, but this is not yet worked out.

16. The use of the perfect in the synopticized (46b) form is noteworthy, pointing to a principal function of perfect forms in general. This is to indicate temporal containment—that is, the collective inclusion of action or events within a bounded extent of time (indeed, the perfect in general seems to involve a temporal span bounded at both ends). In this respect, the perfect semantically parallels the concept of spatial containment: the collective inclusion of matter or objects within a bounded extent of space. The frequent crosslinguistic occurrence of a 'have'-type verb marking the perfect may evidence a metaphorization of containment from space to time. Thus, spatial containment forms like those in (i) seem paralleled by a perfect construction like that in (ii), for which certain paraphrases, like those in (iii), suggest the parallelism more directly.

(i) a. There were five aspirins in the box.
    b. The box had five aspirins in it.

(ii) I have taken five aspirins in the last hour.

(iii) a. There were five aspirin-takings in the last hour.
      b. The last hour had five aspirin-takings in it.

17. Langacker (1987) distinguishes a pair of temporal factors comparable to the "referent time" and "viewing time" described here, but he identifies this second type as that of processing sequence. It seems preferable, however, to identify viewing time as one further schematic category, first because it can be directly specified by closed-class forms, and second because little is known of how the neural processing relevant to this linguistic category might actually proceed.

18. The two semantic functions conflated within the first NP can also appear separately in two different NPs. That is to say, all three of the semantic functions

indicated here—(a) the identity of a quantity, (b) a portion-excerpting of that quantity, (c) the form of that portion—can be separately represented by three distinct NPs together in a construction, as in:

(i) a clustering (c) of a set (b) of trees (a).

Many lexical items conflate the specification of two or all of these functions at once. Thus, conflating (c) and (b) is a *cluster*, 'a clustering form of a set', and a *drop*, 'a small globular form of an amount [of a liquid]'. A lexical item conflating all three types of notions is a *grove*: 'clustering form of a set [= cluster] of trees', and another such lexical item is a *tear*: 'small globular form of an amount [= drop] of lachrymal fluid'.

Container-contained expressions like *a can of nuts* or *a cup of coffee* that resemble the original construction can be incorporated into the present analysis by adding to the preceding series a fourth (d) term for the container. Then the third term for the form of the portion of material must be understood to correspond to the shape of the container. For example, the expression *a cup of coffee* with two nominals and one apparent relation can more analytically be understood to designate the expression in (ii) with four nominals and three relations.

(ii) a cup (d) containing a cup-interior-shaped form (c) of an amount (b) of coffee (a)

19. A pattern involving the presence or absence of ambiguity as to quantification holds throughout the list and can be illustrated with the (a) forms. For the plural form *oysters*, the plural form *siphons* is ambiguous as to whether there are one or more siphons per oyster. All the other combinations unambiguously indicate the number of siphons per oyster. Thus, with plural *oysters*, singular *siphon* indicates one siphon per oyster (though there is no comparable way to unambiguously indicate plural siphons per oyster). And, with singular *oyster*, the grammatical number of *siphon* unambiguously indicates the number of siphons per oyster. Thus, the exemplar form is always unambiguous in this regard—one of its advantages over the full-complement form.

20. The difference between *each* and *every* arising in this analysis can now be added to those observed elsewhere (for example, Vendler 1968). *Each* is the exemplar counterpart of the full-complement expression *all the*, but not of *all* without *the*. Accordingly, **Each oyster has a siphon* cannot function as a generic assertion. *Every* is not as unilaterally aligned in this way but does serve more naturally as the exemplar counterpart of *all* without *the*.

21. Clearly, the language-related faculty of the brain evolved to its present character in the presence of other already existing cognitive domains, including that of vision, and no doubt developed in interaction with their mechanisms of functioning, perhaps incorporating some of these.

PART 2

CONFIGURATIONAL STRUCTURE

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Chapter 2

Fictive Motion in Language and "Ception"

1 INTRODUCTION

This chapter proposes a unified account of the extensive cognitive representation of nonveridical phenomena—especially forms of motion—both as they are expressed linguistically and as they are perceived visually.[1] Thus, to give an immediate sense of the matter, the framework posited here will cover linguistic instances like the following sentences that depict motion with no physical occurrence: *This fence goes from the plateau to the valley; The cliff wall faces toward/away from the island; I looked out past the steeple; The vacuum cleaner is down around behind the clothes-hamper; The scenery rushed past us as we drove along.*

In a similar way, our framework will cover visual instances like the following in which one perceives motion with no physical occurrence: the "apparent motion" perceived, for example, in successive flashes along a row of lightbulbs, as on a marquee; the perceived "induced motion" of, say, a rod when only a surrounding frame is moved; the perception of a curved line as a straight line that has undergone processes like indentation and protrusion; the possible perception of an obliquely oriented rectangle (such as a picture frame) as having been tilted from a vertical-horizontal orientation; or the possible perception of a plus sign as involving the sequence of a vertical stroke followed by a horizontal stroke.

1.1 The Overall Framework

We begin with a fairly comprehensive overview of our proposed framework. Our unified account of the cognitive representation of nonveridical phenomena, just exemplified, is a particular manifestation of the "overlapping systems" model of cognitive organization. This model sees partial similarities and differences across distinct cognitive systems in the way

that they structure perceptual, conceptual, or other cognitive representations. As noted, we mainly consider similarities between two such cognitive systems: language and visual perception.

The particular manifestation of overlap that we address involves a major cognitive pattern: a discrepancy within the cognition of a single individual. Specifically, this discrepancy is between two different cognitive representations of the same entity, where one of the representations is assessed as being more veridical than the other. We presume that the two representations are the products of two different cognitive subsystems, and that the veridicality assessment itself is produced by a third cognitive subsystem whose general function is to generate such assessments.

In the notion of discrepancy that we intend here, the two cognitive representations consist of different contents that could not both concordantly hold for their represented object at the same time—that is, they would be inconsistent or contradictory, as judged by the individual's cognitive systems for general knowledge or reasoning. On the other hand, the individual need not have any active experience of conflict or clash between the two maintained representations, but might rather experience them as alternative perspectives. Further, in saying that the two discrepant representations differ in their assessed degree of veridicality, we use the less common term "veridical"—rather than, say, a term like "true"—to signal that the ascription is an assessment produced by a cognitive system, with no appeal to some notion of absolute or external reality.

Of the two discrepant representations of the same object, we will characterize the representation assessed to be more veridical as **factive** and the representation assessed to be less veridical as **fictive**. Adapted from its use in linguistics, the term "factive" is here again intended to indicate a cognitive assessment of greater veridicality, but not to suggest (as perhaps the word "factual" would) that a representation is in some sense objectively real. And the term "fictive" has been adopted for its reference to the imaginal capacity of cognition, not to suggest (as perhaps the word "fictitious" would) that a representation is somehow objectively unreal. As a whole, this cognitive pattern of veridically unequal discrepant representations of the same object will here be called the pattern of general **fictivity**.

In the general fictivity pattern, the two discrepant representations frequently—though not exclusively—disagree with respect to some single dimension, representing opposite poles of the dimension. Several different dimensions of this sort can be observed. One example of such a dimension

is "state of occurrence." Here, factive presence (the presence of some entity in the more veridical representation) is coupled with fictive absence (the absence of that entity from the less veridical representation) or vice versa. Another example of a dimension is "state of change." Here, the more veridical representation of an object could include factive stasis, while the less veridical representation includes fictive change—or vice versa. One form of this last dimension when applied to a physical complex in space-time is the more specific dimension "state of motion." Here, the more veridical representation could include stationariness where the less veridical representation has motion—or vice versa. Thus, frequently in conjunction with their factive opposites, we can expect to find cases of fictive presence, fictive absence, fictive stasis, fictive change, fictive stationariness, and fictive motion. In fact, to a large extent, general fictivity can accommodate any "fictive X."

Though treating all these types, the present study deals most with fictive motion, usually in combination with factive stationariness. It will be seen that such fictive motion occurs preponderantly more than does fictive stationariness coupled with factive motion. As will be discussed, this asymmetry reflects a general cognitive bias toward dynamism.

The general fictivity pattern can be found in a perhaps parallel fashion in both language and vision. In language, the pattern is extensively exhibited in the case where one of the discrepant representations is the belief held by the speaker or hearer about the real nature of the referent of a sentence, and the other representation is the literal reference of the linguistic forms that make up the sentence. Here, the literal representation is assessed as less veridical than the representation based on belief. Accordingly, the literal representation is fictive, while the representation based on belief is factive. Given our focus on the pattern in which fictive motion is coupled generally with factive stationariness, we here mainly treat the linguistic pattern in which the literal meaning of a sentence ascribes motion to a referent that one otherwise normally believes to be stationary. Thus, in one of the introductory examples, *This fence goes from the plateau to the valley,* we presume by our general beliefs that the fence is factively stationary, while the literal meaning of the sentence fictively presents the fence as moving.

In vision, one main form of the general fictivity pattern is the case where one of the discrepant representations is the concrete or fully palpable percept that one has of a scene on viewing it, and the other representation is a particular less palpable percept that one can concurrently

have of the same scene. Here, the less palpable percept is assessed as the less veridical of the two representations. In a way that is parallel with the linguistic case, the term "factive" may be applied to the more palpable visual representation, and the term "fictive" to the less palpable representation. We will say that an individual "sees" the factive representation but only "senses" the fictive representation (when it occurs at a particular lower level of palpability, to be discussed later). Here too, we focus on fictive motion, where the less palpable visual representation is of motion while the fully palpable representation is generally of stationariness. Thus, on viewing a certain line drawing, one may factively "see" at a high level of palpability a static "Pac Man" shape, and at the same time fictively "sense" at a low level of palpability the dynamic event of a circle having a wedge removed from it.

To accommodate this account of visual representations that differ with respect to their palpability, we posit the presence in cognition of a gradient parameter of palpability. Moreover, one may identify a number of additional cognitive parameters that largely tend to correlate with the palpability parameter. All of these "palpability-related parameters" are characterized in section 9.1. Further, these parameters appear to extend continuously through a cognitive domain larger than that generally associated with perception alone, one that in fact covers the combination of what is usually associated differentially with separate domains of perception and conception. Accordingly, to accommodate the full range of each such parameter, we advance the idea of a single continuous cognitive domain, that of "ception."

In the present chapter, we largely restrict our study of general fictivity in language to the case where both of the two discrepant representations are of a physical complex in space-time. In this way, there is generally the potential for any linguistic example to have an analog in a visual format. Accordingly, in a cross-domain correspondence of this sort, we could expect to find two component parallels. One parallel would hold between the two factive representations and the other between the two fictive representations. In particular, one parallel would hold between the linguistic representation of a sentence that is believed to be veridical and the concrete fully palpable appearance of the corresponding visual display. The other parallel would then hold between the less veridical literal reference of the sentence and a less palpable associated image perceived on viewing the display.

If we view this correspondence starting from the language end, a linguistic example of general fictivity whose representations pertain to physical entities in space-time can, in effect, be mapped onto a visual example of general fictivity. In such a mapping, the linguistic referential difference between credence and literality is then translated in the visual domain into a difference in palpability. Experimental methods would be needed to determine especially whether the parallel between the two fictive representations holds. In fact, one aim for the present study is to serve as a guide and as a call for such experimental research.

The restriction of the present study to the representation of physical forms in space-time excludes treatment of nonspatial metaphor. For example, a metaphor like *Her mood went from good to bad* would be excluded: although its source domain is motion in space-time, its target domain is the nonphysical one of mood states. However, as discussed later, linguistic metaphor as a whole fits as a category within the framework of general fictivity. General fictivity can serve as the superordinate framework because, among other reasons, its concepts and terms can apply as readily to visual representations as to linguistic ones, whereas metaphor theory is cast in concepts and terms more suitable for language alone. Using the perspective and methods of cognitive semantics, the present study of fictive motion is based in language, but extends out from there to considerations of visual perception.

1.2 Fictive Motion in Language

Fictive motion in language encompasses a number of relatively distinct categories. These categories include "emanation," "pattern paths," "frame-relative motion," "advent paths" (including "site manifestation" and "site arrival"), "access paths," and "coextension paths." This last category, perhaps the type of fictive motion most familiar in the previous linguistic literature, was termed "virtual motion" in Talmy 1983, "extension" in Jackendoff 1983, "abstract motion" in Langacker 1987, and "subjective motion" in Matsumoto 1996. Our current term "coextension paths" is used as part of the more comprehensive taxonomy of fictive motion presented here.

1.2.1 Introductory Illustration Illustrating this last category here can serve as an orientation to fictive motion in general. This category is most often illustrated by forms like *This road goes from Modesto to Fresno* or

The cord runs from the TV to the wall. But a purer demonstration of this type of fictive motion would exclude reference to an entity that supports the actual motion of other objects (as a road guides vehicles) or that itself may be associated with a history of actual motion (like a TV cord). The "mountain range" example in (1) avoids this problem.

(1) a. That mountain range lies (longitudinally) between Canada and Mexico.
b. That mountain range goes from Canada to Mexico.
c. That mountain range goes from Mexico to Canada.

Here, (1a) directly expresses the more veridical static spatial relationships in a stative form of expression, without evoking fictive motion. But (1b) and (1c) represent the static linear entity, the mountain range, in a way that evokes a sense or a conceptualization of something in motion—respectively, from north to south and from south to north. These latter two sentences manifest the general fictivity pattern. They each involve two discrepant representations of the same object, the mountain range. Of these two representations, the fictive representation—that is, the one that is assessed and experienced as less veridical—consists of the literal reference of the words, which directly depict the mountain range as moving. The factive representation, the one assessed and experienced as more veridical, consists of our belief that the mountain range is stationary. This factive representation is the only representation present in the sentence in (1a), which accordingly does not manifest the general fictivity pattern.

1.2.2 The Phenomenology of Fictive Motion Most observers can agree that languages systematically and extensively refer to stationary circumstances with forms and constructions whose basic reference is to motion. We can term this **constructional fictive motion**. Speakers exhibit differences, however, over the degree to which such expressions evoke an actual sense or conceptualization of motion—what can be called **experienced fictive motion**. Thus, for the same instance of constructional fictive motion, some speakers will report a strong semantic evocation of motion, while other speakers will report that there is none at all. What does appear common, though, is that every speaker experiences a sense of motion for *some* fictive-motion constructions.

Where an experience of motion does occur, there appears an additional range of differences as to what is conceptualized as moving. This conceptualization can vary across individuals and types of fictive motion. Even

the same individual may deal with the same example of fictive motion differently on different occasions. Included in the conceptualizations of this range, the fictive motion may be manifested by the named entity (e.g., by the mountain range in (1)); by some unnamed object that moves with respect to the named entity (e.g., a car or hiker relative to the mountain range); in the mental imagery of the speaker or hearer, by the imagistic or conceptual equivalent of their focus of attention moving relative to the named entity; by some abstracted conceptual essence of motion moving relative to the named entity; or by a sense of abstract directedness suggesting motion relative to the named entity. The strength and character of experienced fictive motion, as well as its clarity and homogeneity, are a phenomenological concomitant of the present study that will need more investigation.

1.2.3 Distinguishing Features The several distinct categories of fictive motion indicated above differ from each other with respect to a certain set of conceptual features. Each category of fictive motion exhibits a different combination of values for these features, of which the main ones are shown in (2).

(2) *Principal features distinguishing categories of fictive motion in language*
   a. Factive motion of some elements need not/must be present for the fictive effect.
   b. The fictively moving entity is itself factive/fictive.
   c. The fictive effect is observer neutral/observer based—and, if observer based:
      i. The observer is factive/fictive.
      ii. The observer moves/scans.
   d. What is conceived as fictively moving is an entity/the observation of an entity.

Out of the range of fictive-motion categories, this study selects for closest examination the category of emanation. The reason is that this category appears previously to have been largely unrecognized. The other indicated categories of fictive motion will be more briefly discussed in section 8.[2]

1.3 Properties of the Emanation Type as a Whole

Amid the range of fictive-motion categories, **emanation** is basically the fictive motion of something intangible emerging from a source. In most

subtypes, the intangible entity continues along its emanation path and terminates by impinging on some distal object. The particular values of the general fictive features of (2) that are exhibited by the emanation category are listed in (3). Specifically, the intangible entity is what moves fictively and is itself fictive, and its fictive motion does not depend on any factive motion by some tangible entity nor on any localized observer.

(3) *The feature values for emanation paths in language*
   a. Factive motion of some elements need not be present for the fictive effect.
   b. The fictively moving entity is itself fictive.
   c. The fictive effect is observer neutral.
   d. What is conceived as fictively moving is an entity.

The category of emanation comprises a number of relatively distinct types. We present four of these emanation types in section 2.5: "orientation paths," "radiation paths," "shadow paths," and "sensory paths." The illustrations throughout will be from English only in the present version of this study, but examples from other languages can be readily cited. The demonstrations of at least constructional fictive motion will rely on linguistic forms with basically real-motion referents such as verbs like *throw* and prepositions like *into* and *toward*. In the exposition, wherever some form of linguistic conceptualization is posited, we will raise the possibility of a corresponding perceptual configuration. Then, in section 7, we will specifically suggest perceptual analogs to the emanation types that have been discussed.

2 ORIENTATION PATHS

The first type of emanation that we consider is that of **orientation paths**. The linguistic conceptualization—and possibly a corresponding visual perception—of an orientation path is of a continuous linear intangible entity emerging from the front of some object and moving steadily away from it. This entity may be conceived or perceived as a moving intangible line or shaft—the only characterization used below. Alternatively, though, the entity might be conceived or perceived as some intangible abstraction moving along a stationary line or shaft—itself equally intangible—that is already in place and joined at one end to the front of the object. In addition to fictive motion along the axis of such a line, in some cases the line can also be conceptualized or perceived as moving laterally.

In this characterization, the "front" of an object is itself a linguistic conceptualization or perceptual ascription based on one of two factors: either a particular kind of asymmetry in the object's physical configuration, or the object's moving along a path, where the leading side would generally constitute the front.[3] In the main cases relevant here, such a front can be either a planar or "face"-type front, consisting of an approximately planar surface on a volumetric object, or a point-type front, consisting of an end point of a linearly shaped object.

Presented next are five subtypes of orientation paths that differ with respect to several factors, including whether the front is a face type or a point type, and whether the fictive motion of the intangible line is axial or lateral. First, though, we note the occurrence of constructions sensitive to the fictive *presence* of an intangible line aligned with the front of an object, before we proceed to its fictive motion. Consider the sentences in (4).

(4) a. She crossed in front of me/the TV.
    b. She crossed ??behind/*beside me/the TV.

The sentences here show that the verb *cross* can felicitously be used when walking transversely in front of an object with a front, but only poorly when walking behind, and not at all when walking to one side.[4] This usage pattern seems to point to the concept that there is something linear present to walk across directly in front of an object, but not elsewhere with respect to that object. We would argue that what is thus being crossed is the posited intangible line conceived to emerge from the front of an object, which will next be seen to exhibit fictive motion in a further set of construction types.

2.1 Prospect Paths

The first type of orientation path that we examine can be termed a **prospect path**. The orientation that an object with a face-type front has relative to its surroundings can be conceptualized linguistically—and perhaps perceived—in terms of fictive motion. With its front face, the object has a particular "prospect," "exposure," or "vista" relative to some other object in the surroundings. This prospect is characterized as if some intangible line or shaft emerges from the front and moves continuously away from the main object relative to the other object. The linguistic constructions, in effect, treat this line as a "Figure" moving relative to the other object as "Ground" or "Reference Object" (see chapters I-3 and I-5 for these

terms) along a path indicated by directional adpositions. In English, such constructions generally employ verbs like to *face* or to *look out*.

In the example in (5), the vertical side of a cliff acts as its face-type front. The cliff's prospect on its surroundings is characterized in terms of a fictive course of motion emerging from its face and moving along the path specified by the preposition relative to a valley as Reference Object. Again, this example manifests the general fictivity pattern. The literal sense of its words depicts a fictive, less veridical representation in which something moves from the cliff wall along a path oriented with respect to the valley. But this representation is discrepant with the factive, more veridical representation consisting of our belief that all the referent entities in the scene are static and involve no motion.

(5) The cliff wall faces toward/away from/into/past the valley.

2.2 Alignment Paths

The **alignment path** type of orientation path pertains to a stationary straight linear object with a point-type front. The orientation of such a linear object is here conceptualized linguistically—and perhaps perceived—in terms of something intangible moving along the axis of the object, emerging from its front end, and continuing straight along a prepositionally determined path relative to some distal object. As it happens, the English constructions that evoke this arrangement are not free to represent just any orientation, but are limited to the two cases where the linear object is aligned with the distal object—the front being the end either closer to or further from the distal object. The sentences in (6) illustrate this type.[5]

(6) The snake is lying toward/away from the light.

Here, the snake is the linear object with its head as the point-type front, and the light is the distal object. Of note, this construction combines a verb of stationariness, *lie*, with a path preposition, *toward* or *away from*, that coerces the verb's semantic properties. A sentence with *lie* alone would permit an interpretation of the snake as coiled and, say, pointing only its head at or away from a light. But in the normal understanding of (6), the snake's body forms an approximately straight line that is aligned with the light. That is, the addition of a path preposition in this construction has the effect of forcing a fictive "alignment path" interpretation that requires a straight-line contouring of the snake's body. The hypothesis that fictive orientation paths emerge from an object's front and move

away from the object correctly accounts for the fact that the sentence with *toward* refers to the head end of the snake as the end closer to the light, while the sentence with *away from* indicates that the head end is the further end.

2.3 Demonstrative Paths

The **demonstrative** type of orientation path again involves a linear object with a point-type front from which an intangible line emerges. But here the fictively moving line functions to direct or guide someone's attention along its path. The particular orientation of the linear object can either be an independent factor that simply occasions an instance of directing someone's attention, or can be intentionally set to serve the purpose of attentional guidance. This function of directing a person's attention can be the intended end result of a situation. Or it can be a precursor event that is instantiated or followed by another event, such as the person's directing his or her gaze, or moving bodily along the fictive path.

Thus, in the examples in (7), a linear object with a front end, such as an arrow or an extended index finger, seems to emit an intangible line from its front end. This line moves in the direction of the object's orientation so as to direct someone's attention, gaze, or physical motion along the path specified by the preposition.

(7) a. I/The arrow on the signpost pointed toward/away from/into/past the town.
b. I pointed/directed him toward/past/away from the lobby.

2.4 Targeting Paths

In a **targeting path**, an Agent intentionally sets the orientation of a front-bearing object so that the fictive line that is conceptualized or perceived as emerging from this front follows a desired path relative to the object's surroundings. This fictive motion establishes a path along which the Agent further intends that a particular subsequent motion will travel. This subsequent motion either is real or is itself fictive. Although comparatively complex, something like this sequence of intentions and actions, with a single or double fictive path, seems to underlie our concepts of 'aiming', 'sighting', or 'targeting'. Consider the sentences in (8) in this regard.

(8) I pointed/aimed (my gun/camera) into/past/away from the living room.

Here, the case of a bullet shot from the aimed gun exemplifies real motion following the preset fictive path. In contrast, the camera provides an instance of fictive motion following the fictive path, with a so-conceived photographic "probe" emerging from the camera's front.

One might ask why the camera example is included here under the targeting type of orientation path, rather than below under sensory paths along with "looking." The reason is that the act of looking is normally treated differently in English from the act of photographic shooting. We normally do not speak of "aiming" or "pointing" our gaze, and we do not conceive of the act of looking as involving first the establishment of a targeting path and then a viewing along that path.

2.5 Line of Sight

Line of sight is a concept that underlies a number of linguistic patterns and perhaps also is a component of perceptual structure. It is an intangible line emerging from the visual apparatus typically located on the front of an animate or mechanical entity. The present discussion deals only with *lateral* motion of the line of sight—that is, with shifts in its orientation. Axial fictive motion along the line of sight will be treated in the section on sensory paths. Additional evidence for treating the shifting line of sight as an orientation path is that the sentences exhibiting this phenomenon can use not just sensory verbs like *look* but also nonsensory verbs like *turn*.

In the examples in (9), the object with the vision-equipped front—whether my head with its eyes or the camera with its lens—swivels, thus causing the lateral motion of the line of sight that emerges from that front. The path preposition specifies the particular path that the line of sight follows. Consider how fictive motion is at work in the case of a sentence like *I slowly turned/looked toward the door*. A path preposition like *toward* normally refers to a Figure object's executing a path in the direction of the Reference Object, where the distance between the two objects progressively decreases. But what within the situation depicted by the example sentence could be exhibiting these characteristics? The only object that is physically moving is my turning head, yet that object stays in the same location relative to the door, not moving closer to it. Apparently what the preposition *toward* in this sentence refers to is the motion of the line of sight that emerges from my eyes. As I turn my head in the appropriate clockwise or counterclockwise direction, this line of

sight does indeed follow a path in the direction of the door and shorten its distance from it.

(9) I slowly turned/looked— // I slowly turned my camera—toward the door. / around the room. / away from the window. / from the painting, past the pillar, to the tapestry.

We can note that English allows each linguistic form in a succession of path indications to specify a different type of fictive motion. Thus, in (10), the first path-specifying form, the satellite *down*, indicates a lateral motion of a line of sight, of the type discussed in this section. Under its specification, the likely interpretation is that my line of sight is initially horizontal (I am looking "straight ahead"), and then swivels downward so as to align with the axis of a well. The second spatial form, the preposition *into*, indicates that once my line of sight is oriented at a downward angle, the fictive motion of my vision then proceeds away from me axially along the line of sight, thus entering the well.

(10) I quickly looked down into the well.

3 RADIATION PATHS

The second type of emanation we consider is that of **radiation paths**. The linguistic conceptualization of a radiation path is of radiation emanating continuously from an energy source and moving steadily away from it. This radiation can additionally be understood to comprise a linear shaft and to subsequently impinge on a second object. This additional particularization is the only type treated here. In this type, then, the radiating event can be characterized as involving three entities: the radiator, the radiation itself, and the irradiated object. This radiating event then involves three processes: the (generation and) emanation of radiation from the radiator, the motion of the radiation along a path, and the impingement of the radiation on the irradiated object. A radiation path differs from an orientation path in that the latter consists of the motion of a wholly imperceptible line. In a radiation path, though, one can often indeed detect the presence of the radiation—for example, in the case of light radiation, one can see the light. What one cannot directly detect—and, hence, what remains imperceptible—is any motion of this radiation.

The sentences in (11) reflect the preceding characterization of radiation for the particular case of light in the way that they are linguistically

constructed. This linguistic construction mainly involves the choices of subject, of path-specifying preposition, and of prepositional object. In both sentences, then, the general understanding is that the visible light is a radiation; that the sun is the source of the light (perhaps its generator, but at least its locus of origination); that the light emanates from the sun and moves steadily as a beam along a straight path through space; and that the light moves into the cave or impinges on its back wall to illuminate that spot.

(11) a. The sun is shining into the cave/onto the back wall of the cave.
b. The light is shining (from the sun) into the cave/onto the back wall of the cave.

Now, as compelling as this characterization of light radiation may be felt to be, it is, in the end, purely a conceptualization. Although physicists may tell us that photons in fact move from the sun to the irradiated object, we certainly cannot actually see any such occurrence. Therefore, any correspondence between the scientific characterization and the conceptualization of the phenomenon must be merely coincidental. In other words, the so-conceived motion of radiation from the radiator to the irradiated must be fictive motion. Since direct sight does not bring a report of light's motion, it must be other factors that lead to a conceptualization in terms of motion away from the sun, and we will speculate on those factors in section 6. At this point, however, the task is to suggest a number of viable alternatives to the normal conceptualization. These alternatives show that the unique appearance of this conceptualization cannot be explained by virtue of its being the only conceptualization possible.

One alternative conceptualization is that there is a radiation path but that it moves in the reverse direction from that in the prevailing conceptualization. Imagine the following state of affairs: All matter contains or generates energy. The sun (or a comparable entity) attracts this energy. The sun draws this energy toward itself when there is a straight clear path between itself and the matter. Matter glows when its energy leaves it. The sun glows when energy arrives at it. An account of this sort is in principle as viable as the usual account. In fact, it is necessarily so, because any phenomenon that could be explained in terms of imperceptible motion from A to B must also be amenable to an explanation in terms of a complementary imperceptible motion from B to A. However, for all its equality of applicability, the fact is that this reverse-direction scenario is

absent from—even resisted by—our normal conceptual apparatus. And it is certainly absent from extant linguistic constructions. Thus, English lacks any sentence like that in (12), and we suspect that any counterpart formulation is universally absent from the languages of the world.

(12) *The light is shining from my hand onto the sun.

The conceptualization that an object like the sun, a fire, or a flashlight produces light that radiates from it to another object is so intuitively compelling that it can be of value to demonstrate the viability of the reverse-direction conceptualization in different circumstances. Consider, for example, a vertical pole and its shadow on the ground. The sun-as-Source conceptualization here has the pole as blocking the light that would otherwise proceed from the sun onto the ground directly behind the pole. But the reverse-direction conceptualization works here as well. The sun attracts energy from the side of the pole facing it, but it cannot do so from the portion of the ground directly behind the pole because there is no straight clear path between that portion of the ground and the sun—the pole blocks the transit of energy in the reverse direction. Since no energy is drawn out of the portion of the ground behind the pole, it fails to glow, whereas the portions of ground adjacent to it, from which energy is being directly drawn, do glow.

Or consider a fire. Here, one can see that the surfaces of oneself facing the fire are brighter than the other surfaces and, in addition, one can feel that they are warmer as well. Further, this effect is stronger the closer one is to the fire. Once again, the fire-as-Source of both light and heat is not the only possible conceptualization. The same reverse-direction conceptualization used for the sun holds as well for the fire. The additions in this example are that when the fire attracts energy from the parts of one's body facing it, the departure of that energy causes not only a glow but also the sensation of warmth. (Such warmth is of course also the case for the sun, but more saliently associated with fire, hence saved for the present example.) And the one further factor here is that the attraction that the fire exerts on an object such as one's body is stronger the closer it is.

The reverse-direction conceptualization is not the only feasible alternative to the prevailing conceptualization of a radiation path. This prevailing conceptualization is composed of a constellation of factors, any one of which can be challenged. The reverse-direction alternative attempted to invert the directionality of the fictive motion in the prevailing conceptualization. But we can also test out the factor that holds that a radiation

path originates at one of the salient physical objects and terminates at the other. Thus, we can check the viability of a conceptualization in which light originates at a point between the two salient objects and fictively moves out in opposite directions to impinge on each of those two objects. The sentence in (13) tries to capture this conceptualization. However, this sentence does not work linguistically, and the conceptualization that it expresses seems wholly counterintuitive.

(13) *The light shone out onto the sun and my hand from a point between us.

Another factor in the normal conceptualization that we can try to challenge is the assumption that the radiation moves at all. Perhaps the radiation does not exhibit fictive motion at all but rather rests in space as a stationary beam. But sentences like that in (14) show that this conceptualization, too, has neither linguistic nor intuitive viability.

(14) *The light hung between the sun and my hand.

4 SHADOW PATHS

The third type of emanation can be termed a **shadow path**. This is the linguistic conceptualization—and perhaps also a perception—that the shadow of some object visible on some surface has fictively moved from that object to that surface. Sentences like those in (15) show that English suggests a conceptualization of this sort through its linguistic constructions. Thus, these sentences set up the nominal that refers to the shadow as the Figure, the object whose shadow it is as the Source, and the surface on which the shadow is located as the Ground object, here functioning as Goal. The sentences also set up the predicate as a motion verb like *throw*, *cast*, *project*, or *fall*, as well as a path preposition such as *into*, *onto*, *across*, or *against*.

(15) a. The tree threw its shadow down into/across the valley.
b. The pillar cast/projected a shadow onto/against the wall.
c. The pillar's shadow fell onto/against the wall.

We can note that with radiation paths, the argument could conceivably be made that the direction of the fictive motion proceeds, say, from the sun to my hand, because that is the direction that photons actually travel. But however tenable a weak argument like this may be, even this argument could not be used in the case of shadow paths. For there is no theory

of particle physics that posits the existence of "shadowons" that move from an object to the silhouette of its shadow.

5 SENSORY PATHS

One category of emanation paths well represented in language is that of **sensory paths**, including **visual paths**. This type of fictive motion involves the conceptualization of two entities, the **Experiencer** and the **Experienced**, and of something intangible moving in a straight path between the two entities in one direction or the other. By one branch of this conceptualization, the Experiencer emits a **Probe** that moves from the Experiencer to the Experienced and detects it upon encounter with it. This is the "Experiencer as Source" type of sensory path. By the other branch of the conceptualization, the Experienced emits a **Stimulus** that moves from the Experienced to the Experiencer and sensorily stimulates that entity on encountering it. This is the "Experienced as Source" type of sensory path. Sight, in particular, is thus either treated as a probing system that emanates from or is projected forth by a viewer so as to detect some object at a distance, or it is treated as a visual quality that emanates from some distal object and arrives at an individual, thereby stimulating a visual experience.

We can first illustrate this phenomenon using a nonagentive verb lexicalized so as to take the Experiencer as subject, namely *see*. Here, the two oppositely directed paths of fictive motion are represented by two different path phrases, as in (16).

(16) a. The enemy can see us from where they're positioned.
b. ?The enemy can see us from where we're standing.

Some speakers have difficulty with (16b)-type sentences with the Experiencer as Source, but this difficulty generally disappears for the counterpart passive sentence, as shown in (17b).

(17) a. We can be seen by the enemy from where they're positioned.
b. We can be seen by the enemy from where we're standing.

Further, generally no problem arises at all for nonvisual sensory paths—for example, those for audition or olfaction, as seen in (18).

(18) a. I can hear/smell him all the way from where I'm standing.
b. I can hear/smell him all the way from where he's standing.

The bidirectional conceptualizability of sensory paths can also be seen in alternatives of lexicalization. Thus, among the nonagentive vision verbs in English, *see* is lexicalized to take the Experiencer as subject and the Experienced as direct object, thereby promoting the interpretation of the Experiencer as Source. But *show* is lexicalized to take the Experienced as subject and can take the Experiencer as the object of the preposition *to*, thereby promoting the interpretation of the Experienced as Source. We illustrate in (19).

(19) a. Even a casual passerby can see the old wallpaper through the paint.
b. The old wallpaper shows through the paint even to a casual passerby.

Despite these forms of alternative directionality, fictive visual paths may generally favor the Experiencer as Source. This is the case for English, where some forms with the Experienced as Source offer difficulty to some speakers, and the use of a verb like *show* is minimal relative to that of a verb like *see*. Further, agentive verbs of vision in English are exclusively lexicalized for the Experiencer as subject and can take directional phrases only with the Experiencer as Source. As shown in (20a), this is the case with the verb *look*, which takes the Experiencer as subject and allows a range of directional prepositions. Here, the conceptualization appears to be that the Agent subject volitionally projects his line of sight as a Probe from himself as Source along the path specified by the preposition relative to a Reference Object.[6] However, there is no (20b)-type construction with *look* in which the visual path can be represented as if moving to the Experiencer as goal.

(20) a. I looked into/toward/past/away from the valley.
b. *I looked out of the valley (into my eyes).
〈where I am located outside the valley〉

6 A UNIFYING PRINCIPLE AND AN EXPLANATORY FACTOR FOR EMANATION TYPES

So far, this chapter has laid out the first-level linguistic phenomena that show different types of fictive emanation. It is now time to consider the principles that govern these phenomena and the context that generalizes them.

In the preceding part of the chapter, the conceptualizations associated with the different types of emanation were treated as distinct. But underlying such diversity, one may discern commonalities that unite the various types and may posit still deeper phenomena that can account for their existence. We present here a unifying principle and an explanatory factor.

6.1 The Principle That Determines the Source of Emanation

For the emanation types in which a fictive path extends between two objects, we can try to ascertain a cognitive principle that determines which of the two objects will be conceptualized as the Source of the emanation while the other object is understood as the goal. On examination, the following cognitive principle appears to be the main one in operation: The object that is taken to be the more active or determinative of the two is conceptualized as the Source of the emanation. This will be called the **active-determinative principle**.

We can proceed through the realizations of this principle as it has functioned in the different emanation types. Thus, in radiation paths, as between the sun and my hand, or the sun and the cave wall, the sun is perceived as the brighter of the two objects. This greater brightness appears to lead to the interpretation that the sun is the more active object, in particular, more energetic or powerful. By the operation of the active-determinative principle, the sun will be conceptualized, and perhaps perceived, as the source of the radiation moving through space into impingement with the other object, rather than any of the alternative feasible conceptualizations that were presented earlier. Thus, particular, this principle accounts for the absence of any linguistic formulations that depict the sun as drawing energy from objects.

Another application of the active-determinative principle can be seen in shadow paths. As between, say, a pole and the shadow of the pole, the pole is the more determinative entity, while the shadow is the more contingent or dependent entity. This is understood from such evidence as that in total darkness or in fully diffuse light, the pole is still there but no shadow is present. Further, one can move the pole and the shadow will move along with it, whereas no comparable operation can be performed on the shadow. By the operation of the active-determinative principle, the shadow-bearing object is thus conceptualized as generating the shadow, which then moves fictively from that object to an indicated surface. That is, it is by the operation of the principle that this interpretation of the

direction of the fictive motion prevails, rather than any alternative interpretation such as that the shadow itself, or something intangible, moves from the surface that it is on to the physical object.

A further realization of the active-determinative principle can be seen in the case of agentive sensory paths—ones with an Experiencer that acts as an intentional Agent as well as with an Experienced entity. Here, it seems, it is the very property of exercised agency that leads to the interpretation that the Agent is more active than the Experienced entity, which is either inanimate or is currently not manifesting relevant agency. By the operation of the active-determinative principle, then, the agentive Experiencer is conceptualized as the Source of the sensory path, whose fictive motion proceeds from the Experiencer to the Experienced. Thus, in the visual example presented earlier, *I looked into the valley*, since the referent of *I* is understood as an agentive Experiencer while the referent of *valley* is understood as a nonagentive Experienced entity, the active-determinative principle requires that the Experiencer be conceptualized as the Source of the fictive sensory motion, and this, in fact, is the only available interpretation for the sentence.

The active-determinative principle also holds for those types of orientation paths that are agentive, like targeting paths and agentive demonstrative paths. Here, the active and determinative entity in the situation is the Agent who fixes the orientation of the front-bearing object, such as a camera or the Agent's own arm with extended index finger. With our principle applying correctly again, it will be this object, positioned at the active-determinative locus, that will be conceptualized as the Source of the fictive emanation.

The fact that nonagentive sensory paths can be conceptualized as moving in either of two opposite directions might at first seem to challenge the principle that the more active or determinative entity is treated as the source of fictive emanation. But this need not be the case. It may be that either object can, by different criteria, be interpreted as more active than the other. For example, by one set of criteria, a nonagentively acting Experiencer, from whom a detectional probe is taken to emanate, is interpreted as more active than the entity probed. But under an alternative set of criteria, the Experienced entity that is taken to emit a stimulus is interpreted as being more active than the entity stimulated by it. Thus, the active-determinative principle is saved. The task remaining is to ascertain the additional cognitive criteria that ascribe greater activity to

one set of phenomena or to a competing set, and that are in effect in the absence of the principle's already known criteria (such as greater agency or energeticness).

Finally, there is a remainder of emanation types to which the active-determinative principle does not obviously apply in any direct way, namely, the nonagentive orientation path types: prospect paths, alignment paths, and nonagentive demonstrative paths. In these types, the fictive motion emanates from only one of the two relevant entities, but this entity is not apparently the more active or determinative of the two. In these cases, however, the directionality of the fictive motion may be set indirectly by the conceptual mapping of principle-determined cases onto the configuration, as described in the next section.

6.2 The Possible Basis of Fictive Emanation and Its Types

If it is correct that the more active or determinative entity is conceptualized as the Source of fictive emanation, the next question is why this should be the case. We speculate that the active-determinative principle is a consequence of a foundational cognitive system that every sentient individual has and experiences, that of "agency." Specifically, the individual's exercise of agency functions as the model for the Source of emanation. We remain agnostic on whether the connection is learned or innate. If it is learned in the course of development, then each individual's experience of agency leads by steps to the conceptualization of fictive emanation. If it is innate, then something like the same steps may have been traversed by genetically determined neural configurations as these evolved. Either way, we can suggest something of the steps and their consequent interrelationships.

The exercise of agency can be understood to have two components, the generation of an intention and the realization of that intention (see chapters I-4 and I-8). An intention can be understood as one's desire for the existence of some new state of affairs where one has the capability to act in a way that will bring about that state of affairs. The realization component, then, is one's carrying out of the actions that bring about the new state of affairs. Such exercise of agency is experienced as both active and determinative. It is active because it involves the generation of intentions and of actions, and it is determinative because it remodels conditions to accord with one's desires. In this way, one's experience of the characteristics of agency may provide one with the model for the active-determinative principle.

The particular form of agency that can best serve as such a model is that of an Agent's affecting a distal physical object—what can be called the **agent-distal object pattern**.[7] Here, an Agent that intends to affect the distal object must either move to it with her whole body, reach to it with a body part, or cause (as by throwing) some intermediary object to move to it. The model-relevant characteristics of this form of agency are that the determining event, the act of intention, takes place at the initial locus of the Agent, and the ensuing activity that finally affects the distal object progresses through space from that initial locus to the object. But these are also the characteristics of the active-determinative principle, namely, the more active or determinative entity is the Source from which fictive motion emanates through space until reaching the less active or determinative entity, the distal object. Hence, one can posit that the pattern of agency affecting a distal object is the model on which the active-determinative principle is based.

In particular, we can see how the agent-distal object pattern can serve as the model for the two main agentive forms of emanation—that is, for agentive demonstrative paths and agentive sensory paths. To consider the former case first, the specific agent-distal object pattern of extending the arm to reach for some object may directly act as the model for agentive demonstrative paths, such as an Agent extending his arm and pointing with his finger. In both cases, the extending arm typically exhibits actual motion away from the body along a line that connects with the target object, where, when fully extended, the arm's linear axis coincides with its path of motion. Possibly some role is played by the fact that the more acute tapered end of the arm, the fingers, leads during the extension and is furthest along the line to the object when the arm is fully extended. Such an agentive demonstrative path might in turn serve as the model for the nonagentive type—for example, that associated with a figure like an arrow, whose linear axis also coincides with the line between the arrow and the distal object, and whose tapered end is the end closest to the distal object and is the end conceptualized as the Source from which the demonstrative line emanates.

Similarly, we can see parallels between the agent-distal object pattern, in which the Agent executes factive motion toward the distal object, and agentive visual sensory paths, in which the Experiencer projects a fictive line of sight from himself to the distal object. Specifically: Like the Agent, the Experiencer is active and determinative. Like the Agent, the Experiencer has a front. Like the Agent's moving along a straight line between

his front and the distal object, the intangible line of sight moves in a straight line between the front of the Experiencer and the distal object. Like this line's moving away from the initial locus of the Agent, the visual sensory path moves away from the Experiencer as Source. And like the Agent's motion continuing along this line until it reaches the object, the visual sensory path progresses until encounter with the distal object. Thus, the perception of the Agent's motion in the physical world appears to be mapped onto the conceptualization of an intangible entity moving along a line. Again, such a mapping might either be the result of learning during an individual's development, or might have been evolutionarily incorporated into the perceptual and conceptual apparatus of the brain. Either way, an organism's production of factive motion can become the basis for the conceptualization of fictive motion.

In turn, this agentive visual type of fictive emanation may serve as the model for several nonagentive emanation types. In particular, this modeling may occur by the conceptual mapping or superimposition of a schematized image—that of an Experiencer's front emitting a line of sight that proceeds forward into contact with a distal object—onto situations amenable to a division into comparably related components. Thus, in the prospect type of orientation path, the Experiencer component may be superimposed onto, say, a cliff, with her face corresponding to the cliff wall, with her visual path mapped onto the conceptualized schematic component of a prospect line moving away from the wall, and with the distal object mapped onto the vista toward which the prospect line progresses.[8]

In a similar way, the schema for the agentive visual path may get mapped onto the radiation situation. Here, the Experiencer, as the active determinative Agent, is associated with the most energetic component of the radiation scene—the brightest component in the case of light, say, the sun. The visual path is mapped onto the radiation itself, for example, onto light visible in the air (especially, say, a light beam, as through an aperture in a wall), and the distal object is mapped onto the less bright object in the scene. The direction of motion conceptualized for the visual path is also mapped onto the radiation, which is thus conceptualized as moving from the brighter object to the duller object. An association of this sort can explain why much folk iconography depicts the sun or moon as having a face that looks outward.

As for shadow paths, the model may be the situation in which the agentive Experiencer herself stands and views her own shadow from

where she is located. Once again, the visual path moving from this Experiencer to the ground location of the shadow is mapped onto the conceptualization of the fictive path that the shadow itself traverses from the solid body onto the ground. A reinforcement for this mapping is that the Experiencer is determinative as the Agent, and the solid object is determinative over the shadow dependent on it.

The only emanation types not yet discussed in terms of mapping are the nonagentive sensory paths that can proceed in either direction. The direction going from the Experiencer to the Experienced is clear, since that is the same as for agentive viewing. We may account for the reverse case—where the Experienced emits a Stimulus—on the grounds that it, too, can serve as a receptive frame onto which to superimpose the model of an Agent emitting a visual path. What is required is simply the conclusion that the conceptualization of an object emitting a Stimulus can be taken as active enough to be treated as a kind of modest agency in its own right, and hence to justify this conceptual imposition of an Agent onto it.

7 THE RELATION OF EMANATION IN LANGUAGE TO COUNTERPARTS IN OTHER COGNITIVE SYSTEMS

In this section, we present a number of apparent similarities in structure or content between the emanation category of fictive motion in language and counterparts of emanation in cognitive systems other than that of language. We mainly consider similarities that language has to perception and to cultural conceptual structure, as well as to folk iconography, which may be regarded as a concrete symbolic expression of perceptual structure. A brief description of our model of cognitive organization, referred to in the introduction, will first provide the context for this comparison.

7.1 The "Overlapping Systems" Model of Cognitive Organization

Converging lines of evidence in the author's and others' research point to the following picture of human cognitive organization. Human cognition comprehends a certain number of relatively distinguishable cognitive systems of fairly extensive compass. This research has considered similarities and dissimilarities of structure—in particular of conceptual structure—between language and each of these other major cognitive systems: visual perception, kinesthetic perception, reasoning, attention, memory, planning, and cultural structure. The general finding is that each cognitive system has some structural properties that may be uniquely its own, some

further structural properties that it shares with only one or a few other cognitive systems, and some fundamental structural properties that it has in common with all the cognitive systems. We assume that each such cognitive system is more integrated and interpenetrated with connections from other cognitive systems than is envisaged by the strict modularity notion (see Fodor 1983). We term this view the **overlapping systems** model of cognitive organization (the introduction to this volume provides further details).

7.2 Fictive Emanation and Perception

The visual arrays that might yield perceptual parallels to the emanation type of fictive motion have been relatively less investigated by psychological methods than in the case of other categories of fictive motion (see below). One perceptual phenomenon related to orientation paths has been demonstrated by Palmer (1980) and Palmer and Bucher (1981). They have found that in certain arrays consisting of co-oriented equilateral triangles, subjects perceive all the triangles at once pointing by turns in the direction of one or another of their common vertices. Moving the array in the direction of one of the common vertices biases the perception of the pointing to be in the direction of that vertex. However, these experiments did not test for the perception of an intangible line emerging from the vertex that is currently experienced as the pointing "front" of each triangle or of the array of triangles. One might need experiments, for example, that test for any difference in a subject's perception of a further figure depending on whether or not a fictive line was perceived to emerge from the array of triangles and pass through that figure. But confirmation of a perceptual analog to emanation paths must await such research.

We can also note that Freyd's (e.g., 1987) work on "representational momentum" does not demonstrate perception of orientation paths. This work involved the sequential presentation of a figure in successively more forward locations. The subjects did exhibit a bias toward perceiving the last-presented figure further ahead than its actual location. But this effect is presumably due to the factively forward progression of the figure. To check for the perceptual counterpart of linguistic orientation paths, experiments of this type would need to test subjects on the presentation of only a single picture containing a forward-facing figure with an intrinsic front.

The robust and extensive representation of fictive emanation in language calls for psychological research to test for parallels to this category

of fictive motion in perception. That is, the question remains whether the appropriate experimental arrangements will show for this category particular perceptions that accord with the general fictivity pattern, hence, with the concurrent perception of two discrepant representations, one of them more palpable and veridical than the other. Consider, for example, visual arrays that include various front-bearing objects, designed to test the perception of fictive orientation paths in their various types—prospect paths, alignment paths, demonstrative paths, and targeting paths. One would need to determine whether subjects, on viewing these arrays, see the factive stationariness of the depicted objects at the fully palpable level of perception but concurrently sense the fictive motion of something intangible emanating from the objects' fronts at a faintly palpable level of perception.

Similarly, to probe for visual counterparts of linguistic radiation paths, research will need to test for anything like a fictive and less palpable perception of motion along a light beam, in a direction away from the brighter object—a perception concurrent with, perhaps superimposed on, the factive and more palpable perception of the beam as static. Comparably, to test for a visual parallel to linguistic shadow paths, experimental procedures will need to probe whether subjects, on viewing a scene that contains an object and its shadow, have some fictive, less palpable sense of the shadow as having moved from that object to the surface on which it appears, concurrently with a factive and palpable perception of everything within the scene as stationary. Finally, to check for a perceptual analog of visual sensory paths in language, one can use either a scene that depicts someone looking or a subject's own process of looking at entities to determine whether the subjects simply perceive a static array of entities, or additionally superimpose on that a less palpable perception of motion along the probing line of sight. In fact, a series of experiments (e.g., Winer and Cottrell 1996)—while not directly probing a subject's perception of the process of another person's employing his vision—does probe a subject's beliefs in this regard. This study has shown that a large percentage of subjects, ranging from schoolchildren to college students, preferentially hold a notion of extramission—the notion that sight involves something emerging from the eyes—over a notion of intromission. The subjects display this extramission preference both in their responses to questions and, even more so, to computer graphic displays that present something moving in either direction between a depicted viewer and viewed object.

7.3 Fictive Emanation and Folk Iconography

Fictive representations that are normally only sensed at a lower level of palpability can sometimes be modeled by fully palpable representations. An example to be cited later is the use of stick-figure drawings or of pipe-cleaner sculptures to explicitly image objects' schematic structure, which is normally only sensed. In the same way, various aspects of fictive emanation that are also normally only sensed have been made explicit in the concrete depictions of folk iconography.

For example, fictive sensory paths of the agentive visual type are linguistically conceptualized as an intangible line that an Agent projects forward from his eyes through space into contact with a distal object. But this is exactly the character of Superman's "X-ray vision" as depicted in comic books. Superman sends forth from his eyes a beam of X-rays that penetrates opaque materials to make contact with an otherwise obscured object and permits it to be seen. Note that Superman's X-ray vision is not depicted as stimuli that emanate from the obscured object and proceed toward and into Superman's eyes where they might be perceptually registered. Such an Experienced-to-Experiencer path direction might have been expected in that our understanding of X-ray equipment is that the radiation moves from the equipment onto a photographic plate on which the image is registered. This plate might have been analogized to Superman's eyes. However, the conceptual model in which the Agent emits a sensory Probe appears to hold sway in the cartoon imagery.

There is a comparable example based on the fact that the linguistic conceptualization of an Agent emitting a visual Probe is represented not only by grammatical constructions and other closed-class forms, but also in metaphoric expressions. Thus, the expression "to look daggers at," as in *Jane looked daggers at John*, represents the notion that Jane's mien, reflecting a current feeling of hate for John, is elaborated as the projection of weapons from her eyes to John. Cartoon depictions in fact show a line of daggers going from the Experiencer's eyes to the body of the Experienced.

The linguistic conceptualization of fictive demonstrative paths emerging from the point-type front of a linear object, as from a pointing finger, seems also to parallel a type of iconographic depiction. This is the depiction of magical power beams that an Agent can project from his extended fingertips. For example, movies and comic books often have two battling sorcerers raise their extended hands and direct destructive beams at each other.

Finally, it is the author's observation—though a careful study would be needed—that in the process of a child's or adult's schematic drawing of the sun, after a circle for the body of the sun is completed, lines that represent its radiation are drawn radially outward from the circle, not inward toward it. If so, this iconographic procedure reflects the linguistic conceptualization of fictive radiation paths as emanating and moving off from the brightest object. Further, iconographic representations of the sun and moon often depict a face on the object, as if to represent the object as containing or comprising an Agent emitting the radiation of light. As noted in section 6.2, a representation of this sort can be attributed to the mapping of the schema of an agentive visual sensory path onto the radiation situation, much as it may be mapped onto other fictive-motion types.

7.4 The Relation of Fictive Emanation of Ghost Physics and Other Anthropological Phenomena

We can discern a striking similarity between fictive motion—in particular, orientation paths—and the properties ghosts or spirits exhibit in the belief systems of many traditional cultures. The anthropologist Pascal Boyer (1994) sees these properties as a culturally pervasive and coherent conceptual system that he calls "ghost physics." Boyer holds that ghost and spirit phenomena obey all the usual causal expectations for physical or social entities, with only a few exceptions that function as "attention attractors." Certain of these exceptions are widespread across many cultures. Mainly, such exceptions are invisibility or the ability to pass through walls or other solid objects. But other kinds of potential exceptions, ones that on other grounds might have equally seemed to be candidates for conceptualization as special properties, instead appear never to occur. An example of this is temporally backward causality. That is, cultural belief systems seem universally to lack a concept that a ghost can at one point in time bring about some state of affairs at a prior point in time.

Boyer has no explanation for the selection of particular exceptions that occur in ghost physics and may even find them arbitrary. However, we can suggest that the pattern of standard and exceptional properties is structured and cognitively principled. In fact, the findings reported in this chapter may supply the missing account. The exceptional phenomena found to occur in ghost physics may be the same as certain cognitive phenomena that already exist in other cognitive systems and that then are tapped for service in cultural spirit ascriptions. The linguistic expression

of fictive demonstrative paths and its gestural counterpart may well provide the relevant properties.

To consider gesture first, if I, for example, am inside a windowless building and am asked to point toward the next town, I will not, through gesticulations, indicate a path that begins at my finger, leads through the open doorway and out the exit of the building, and finally turns around and moves in the direction of the town. On the contrary, I will simply extend my arm with pointed finger in the direction of the town, regardless of the structure around me. That is, the demonstrative path, effectively conceptualized as an intangible line emerging from the finger, itself has the following crucial properties: (1) It is invisible, and (2) it passes through walls. These are the very same properties that are ascribed to spirits and ghosts.

These properties hold for the conceptualization that accompanies the linguistic expression of fictive demonstrative paths. For example, in the set of sentences *this arrow points to|toward|past|away from the town*, the use of any of the directional prepositions suggests the conceptualization of an intangible line emerging from the front end of the arrow, following a straight course coaxial with the arrow's shaft, and moving along the path represented by the preposition. Once again, this imaginal line is invisible and would be understood to pass through any material objects present on its path.

In addition to such demonstrative paths, we can observe further relations between cultural conceptualizations and another type of fictive emanation, that of agentive visual paths. First, consider the notion of the "evil eye," found in the conceptual systems of many cultures. In a frequent conception of the evil eye, an agent who bears malevolent feelings toward another person is able to transmit the harmful properties of these feelings along the line of her gaze at the other person. This is the same schema as for a fictive visual path: the Agent as Source projecting forth something intangible along her line of sight to encounter with a distal object. Second, a specific instance is found in the traditional tale of the Clackamas Chinook (Jacobs 1958) about the great-grandson of the Sun. This youth's spirit power is that of fire. And, in particular, the boy sets on fire any object toward which he directs his gaze. Again, the conceptualization here is apparently that the Agent's personal power moves from himself along his line of sight for execution when it reaches the terminus at a distal object.

Relations between fictive motion and cultural conceptualizations extend still further. One may look to such broadly encountered cultural concepts

as those of mana, power, fields of life force, or magical influence emanating from entities. Such forms of imagined energy—just like the fictive emanations of linguistic construals—are conceptualized (and perceived?) as being invisible and intangible, as being (generated and) emitted by some entity, as propagating in one or more directions away from that entity, and in some forms as then contacting a second distal entity that it may affect. The structural parallel between such anthropological concepts of emanation and the emanation type of fictive motion that we have here described for language is evident and speaks to a deeper cognitive connection.

It thus seems that the general fictivity complex generates the imaginal schemas of fictive motion not only in the cognitive systems of language and of visual perception, but also in that of cultural cognition, specifically in its conceptualizations of spirit and power. That is, in the cognitive culture system, the structure of such conceptions as ghost phenomena, harmful influence, and magical energy appears not to be arbitrary. Nor does it exhibit its own mode of construal or constitute its own domain of conceptual constructs of the sort posited, for example, by Keil (1989) and Carey (1985) for other categories of cognitive phenomena. Rather, it is probably the same or a parallel instance of conceptual organization already extant in other cognitive systems. In terms of the "overlapping systems" framework outlined earlier, general fictivity of this sort is thus one area of overlap across at least the three cognitive systems of language, visual perception, and cultural cognition.

8 FURTHER CATEGORIES OF FICTIVE MOTION

As indicated earlier, language exhibits a number of categories of fictive motion beyond the emanation type treated so far. We briefly sketch five further categories here.[9] For each, we suggest some parallels in visual perception that have already been or might be examined. The purpose of this section is to enlarge both the linguistic scope and the scope of potential language-perception parallelism. In the illustrations that follow, the fictive-motion sentences are provided, as a foil for comparison, with factive-motion counterpart sentences, shown within brackets.

8.1 Pattern Paths

The **pattern-paths** category of fictive motion in language involves the fictive conceptualization of some configuration as moving through space.

In this type, the literal sense of a sentence depicts the motion of some arrangement of physical substance along a particular path, while we factively believe that this substance is either stationary or moves in some other way than along the depicted path. For the fictive effect to occur, the physical entities must factively exhibit some form of motion, qualitative change, or appearance/disappearance, but these in themselves do not constitute the fictive motion. Rather, it is the pattern in which the physical entities are arranged that exhibits the fictive motion. Consider the example in (21).

(21) *Pattern paths*
As I painted the ceiling, (a line of) paint spots slowly progressed across the floor.
[cf. As I painted the ceiling, (a line of) ants slowly progressed across the floor.]

Here, each drop of paint does factively move, but that motion is vertically downward in falling to the floor. The fictive motion, rather, is horizontally along the floor and involves the linear pattern of paint spots already located on the floor at any given time. For this fictive effect, one must in effect conceptualize an envelope located around the set of paint spots or a line located through them. The spots thus enclosed within the envelope or positioned along the line can then be cognized as constituting a unitary Gestalt linear pattern. Then, the appearance of a new paint spot on the floor in front of one end of the linear pattern can be conceptualized as if that end of the envelope or line extended forward so as now to include the new spot. This, then, is the forward fictive motion of the configuration. By contrast, if the sentence were to be interpreted literally—that is, if the literal reference of the sentence were to be treated as factive—one would have to believe that the spots of paint physically slid forward along the floor.

In one respect, the pattern-paths type of fictive motion is quite similar to the emanation type. In both these categories of fictive motion, an entity that is itself fictive—in other words, is an imaginal construct—moves fictively through space. One difference, though, is that the emanation type does not involve the factive motion of any elements within the referent scene. Accordingly, it must depend on a principle—the active-determinative principle—to fix the source and direction of the fictive motion. But the pattern-paths type does require the factive motion or change of some components of the referent situation for the fictive effect

to occur. This is what determines the direction of the fictive motion, so no additional principle need come into play.

The perceptual phenomena generally termed "apparent motion" in psychology would seem to include the visual counterpart of the pattern-paths type of fictive motion in language. But to establish the parallel correctly, one may need to subdivide apparent motion into different types. Such types are perhaps mostly based on the speed of the process viewed and, one may speculate, involve different perceptual mechanisms. Much research on apparent motion has employed a format like that of dots in two locations appearing and disappearing in quick alternation. Here, within certain parameters, subjects perceive a single dot moving back and forth between the two locations. In this fast form of apparent motion, the perceptual representation most palpable to subjects is in fact that of motion, so it would not correspond to the linguistic case.

On the other hand, a slower type of apparent motion may exist that can be perceived and that now would parallel the linguistic case. One example might consist of a subject viewing a row of lightbulbs in which one bulb after another briefly turns on at consciously perceivable intervals. Here, it may be surmised, a subject will have an experience that fits the general fictivity pattern. The subject will perceive at a higher level of palpability —that is, as factive—the stationary state of the bulbs, as well as the periodic flashing of a bulb at different locations. But the subject will concurrently perceive at a lower level of palpability—and assess it as being at a lower level of veridicality—the fictive motion of a seemingly single light progressing along the row of bulbs.

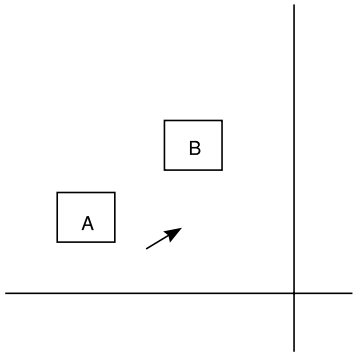
8.2 Frame-Relative Motion

With respect to a global frame of reference, a language can factively refer to an observer as moving relative to her stationary surroundings. This condition is illustrated for English in (22a). But a language can alternatively refer to this situation by adopting a local frame around the observer as center. Within this frame, the observer can be represented as stationary and her surroundings as moving relative to her from her perspective. This condition is illustrated in (22b). It is thus a form of fictive motion, one in which the factively stationary surroundings are fictively depicted as moving. In a complementary fashion, this condition also contains a form of fictive stationariness, for the factively moving observer is now fictively depicted as stationary. Stressing the depiction of motion, the general type of fictive motion at work here is termed **frame-relative**

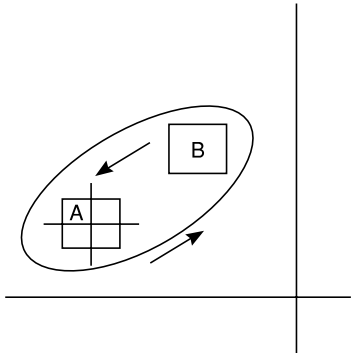
motion. We term the specific fictive effect here the **observer-based** type of frame-relative motion.

Further, a language can permit shifts between a global and a local framing of a situation within a single sentence. For instance, the example in (22c) shifts from the global frame to the local frame and, accordingly, shifts from a directly factive representation of the spatial conditions to a fictive representation. But one condition that no language seems able to represent is the adoption of a part-global and part-local conceptualization that is, accordingly, part factive and part fictive. Thus, English is constrained against sentences like (22d), which suggests the adoption of a perspective point midway between the observer and her surroundings.[10]

(22) *Frame-relative motion: with factively moving observer*



a. *Global frame: fictive motion absent*
I rode along in the car and looked at the scenery we were passing through.



b. *Local frame: fictive motion present*
I sat in the car and watched the scenery rush past me.
[cf. I sat in the movie-set car and watched the backdrop scenery rush past me.]

c. *Shift in mid-reference from global to local frame, and from factive to fictive motion*
I was walking through the woods and this branch that was sticking out hit me.
[cf. I was walking through the woods and this falling pinecone hit me.]

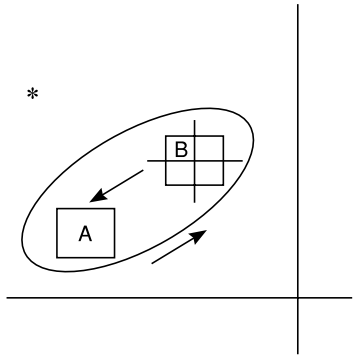
d. *Lacking: part global–part local frame with part factive–part fictive motion*
*We and the scenery rushed past each other.
[cf. We and the logging truck rushed past each other.]

In the preceding examples, the observer was factively in motion while the observed (e.g., the scenery) was factively stationary—properties expressed explicitly in the global framing. In a complementary fashion, a sentence can also express a global framing in which, factively, the observer is stationary while the observed moves. This situation is illustrated in (23a). However, this complementary situation differs from the earlier situation in that it cannot undergo a local reframing around the stationary observer as center. If such a local frame were possible, one could find acceptable sentences that fictively depict the observer as moving and the observed as stationary. But sentences attempting this depiction—like (23bi) with a uniform local framing and (23bii) with a shift from global to local framing—are unacceptable. The unacceptable fictive local framing that they attempt is diagrammed in (23).

(23) *Frame-relative motion: with factively stationary observer*

a. *Global frame: fictive motion absent*
   i. The stream flows past my house.
   ii. As I sat in the stream, its water rushed past me.

b. *Local frame: blocked attempt at fictive motion*
   i. *My house advances alongside the stream.
   ii. *As I sat in the stream, I rushed through its water.



We can suggest an account for the difference between moving and stationary observers in their acceptance of fictive local framing. The main idea is that stationariness is basic for an observer. Accordingly, if an observer is factively moving, a sentence is free to represent the situation as such, but a sentence may also "ratchet down" its representation of the situation to the basic condition in which the observer is stationary. However, if the observer is already stationary—that is, already in his basic state—a sentence may only represent the situation as such and is not free to ratchet up its representation of the situation into a nonbasic state.

If this explanation holds, the next question is why stationariness should be basic for an observer. We can suggest a developmental account. An infant experiences the translational type of optic flow as a result of being carried along by a parent long before the stage at which it itself locomotes—that is, the stage at which it will agentively bring about optic flow itself. Thus, before the infant has had a chance to integrate its experience of moving into its perception of optic flow, it has months of experience of optic flow without an experience of moving. This earlier experience may be processed in terms of the surrounding world as moving relative to the self fixed at center. This experience may be the more foundational one and persist to show up in subtle effects of linguistic representations like those just seen.

One possible corroboration of this account can be cited. Infants at the outset do have one form of agentive control over their position relative to their surroundings, namely, turning the eyes or head through an arc. This action brings about not the forward type of optic flow just discussed, but a transverse type (though not one of extended rotation). Since the infant can thus integrate the experience of motor control in with experience of transverse optic flow at a foundational level, we should not expect to find

a linguistic effect that treats observer stationariness as basic relative to an observer's arc-sized turning motion. Indeed, English, for one language, typically permits only factive representations of such turning by an observer, as in *As I quickly turned my head, I looked over all the room's decorations*. It does not typically ratchet down to a fictive stationary state for the observer, as in **As I quickly turned my head, the room's decorations sped by in front of me*. A sentence of the latter sort would be used only for special effect, not in the everyday colloquial way in which the forward-motion cases are treated.

On the other hand, as still further corroboration, since extended spinning is not within the infant's early volitional repertoire but comes under agentive control only later, it should behave like forward translational motion and permit a linguistic reframing. Indeed, this is readily found, as in English sentences like *As our space shuttle turned, we watched the heavens spin around us*, or *I rode on the carousel and watched the world go round*.[11]

Psychological experiments have afforded several probable perceptual parallels to frame-relative motion in language. One parallel is the "induced motion" of the "rod-and-frame" genre of experiments. Here, prototypically, while a rectangular shape that surrounds a linear shape is factively moved, some subjects fictively perceive this frame as stationary while the rod moves in a complementary manner. However, this genre of experiments is not observer based in our sense, since the observer herself is not one of the objects potentially involved in motion. Closer to our linguistic case is the "motion aftereffect,"—for example, present where a subject has been spun around and then stopped. Here, the subject factively knows that she is stationary but concurrently experiences a perception—one that is assessed as less veridical, hence fictive—of the surroundings as turning about her in the complementary direction. Perhaps the experimental situation closest to our linguistic type would in fact be a subject's moving forward through surroundings, much as when riding in a train. The question is whether such a subject will concurrently perceive a factive representation of herself as moving through stationary surroundings, and a fictive representation of herself as stationary with the surroundings as moving toward and past her.

8.3 ADVENT PATHS

An **advent path** is a depiction of a stationary object's location in terms of its arrival or manifestation at the site it occupies. The stationary state of

the object is factive, whereas its depicted motion or materialization is fictive and, in fact, often wholly implausible. The two main subtypes of advent paths are "site arrival," involving the fictive motion of the object to its site, and "site manifestation," which is not fictive motion but fictive change, namely the fictive manifestation of the object at its site. This category is illustrated in (24).

(24) *Advent paths*
  A. *Site arrival*
    1. *With active verb form*
      a. The palm trees clustered together around the oasis.
      [cf. The children quickly clustered together around the ice cream truck.]
      b. The beam leans/tilts away from the wall.
      [cf. The loose beam gradually leaned/tilted away from the wall.]
    2. *With passive verb form*
      c. Termite mounds are scattered/strewn/spread/distributed all over the plain.
      [cf. Gopher traps were scattered/strewn/spread/distributed all over the plain by a trapper.]
  B. *Site manifestation*
      d. This rock formation occurs/recurs/appears/reappears/shows up near volcanoes.
      [cf. Ball lightning occurs/recurs/appears/reappears/shows up near volcanoes.]

For a closer look at one site-arrival example, (24a) uses the basically motion-specifying verb *to cluster* for a literal but fictive representation of the palm trees as having moved from some more dispersed locations to their extant neighboring locations around the oasis. But the concurrent factive representation of this scene is contained in our belief that the trees have always been stationarily located in the sites they occupy. Comparably, the site-manifestation example in (24d) literally represents the location of the rock formation at the sites it occupies as the result of an event of materialization or manifestation. This fictive representation is concurrent with our believed factive representation of the rock formation as having stably occupied its sites for a very long time.

We can cite two psychologists who have made separate proposals for an analysis of visual forms that parallels the linguistic site-arrival type of

fictive motion. Pentland (1986) describes the perception of an articulated object in terms of a process in which a basic portion of the object, such as, its central mass, has the remaining portions moved into attachment with it. An example is the perception of a clay human figure as a torso to which the limbs and head have been affixed. Comparably, Leyton (1992) describes our perception of an arbitrary curved surface as a deformed version of a simple surface. For example, a smooth closed surface is described as the deformation of a sphere, one that has undergone forces that he terms protrusion, indentation, squashing, and resistance. He shows that this set of processes corresponds to the psychologically salient causal descriptions that people give of shapes—for example, of a bent pipe or a dented door. In a similar way, as described in the tradition of Gestalt psychology, certain forms are regularly perceived not as original patterns in their own right, but rather as the result of some process of deformation applied to an unseen basic form. An example is the perception of a Pac Man–shaped figure as a circle with a wedge-shaped piece removed from it.

To consider this last example in terms of our general fictivity framework, a subject looking at such a Pac Man shape may experience two discrepant perceptual representations at the same time. The factive representation, held to be the more veridical and perceived as more palpable, will be that of the static Pac Man configuration per se. The fictive representation, felt as being less veridical and perceived as less palpable, will consist of an imagined sequence that starts with a circle, proceeds to the demarcation of a wedge shape within the circle, and ends with that wedge exiting or being removed from the circle.

8.4 Access Paths

An **access path** is a depiction of a stationary object's location in terms of a path that some other entity might follow to the point of encounter with the object. What is factive here is the representation of the object as stationary, without any entity traversing the depicted path. What is fictive is the representation of some entity traversing the depicted path, whether this is plausible or implausible. Though it is not specified, the fictively moving entity can often be imagined as being a person, some body part of a person, or the focus of one's attention, depending on the particular sentence, as can be seen in the examples of (25).

(25) *Access paths*
   a. The bakery is across the street from the bank.
      [cf. The ball rolled across the street from the bank.]
   b. The vacuum cleaner is down around behind the clotheshamper.
      [cf. I extended my arm down around behind the clotheshamper.]
   c. The cloud is 1,000 feet up from the ground.
      [cf. The balloon rose 1,000 feet up from the ground.]

In greater detail, (25a) characterizes the location of the bakery in terms of a fictive path that begins at the bank, proceeds across the street, and terminates at the bakery. This path could be followed physically by a person walking, or perceptually by someone shifting the focus of his gaze, or solely conceptually by someone shifting her attention over her mental map of the vicinity. The depicted path can be reasonable for physical execution, as when I use (25a) to direct you to the bakery when we are inside the bank. But the same depicted path may also be an improbable one. This would be the case when I use (25a) to direct you to the bakery when we are on its side of the street. It is unlikely that you will first cross the street, advance to the bank, and then recross to find the bakery. Rather, you will likely just proceed directly forward to the bakery. Further, a depicted access path can also be physically implausible or impossible. Such is the case for referents like that in *That quasar is 10 million light-years past the North Star*. Apart from the use of fictive access paths such as these, an object's location can generally also be directly characterized in a factive representation—for example, that in *The bakery and the bank are opposite each other on the street*.

Does the fictivity pattern involving access paths occur perceptually? We can suggest a kind of experimental design that might test for the phenomenon. Subjects can be shown a pattern containing some point to be focused on, where the whole can be perceived factively as a static geometric Gestalt and/or fictively as involving paths leading to the focal point. Perhaps an example would be a "plus"-shaped figure with the letter A at the top point and, at the left-hand point, a B to be focused on. A subject might factively and at a high level of palpability perceive a static representation of this figure much as just described, with the B simply located on the left. But concurrently, the subject might fictively and at a lower level of palpability perceive the B as located at the end point of a path that starts at the A and, say, either slants directly toward the B, or moves first down and then left along the lines making up the plus.

8.5 Coextension Paths

A **coextension path** is a depiction of the form, orientation, or location of a spatially extended object in terms of a path over the object's extent. What is factive here is the representation of the object as stationary and the absence of any entity traversing the depicted path. What is fictive is the representation of some entity moving along or over the configuration of the object. Though it is not specified, the fictively moving entity can often be imagined as being an observer, or the focus of one's attention, or the object itself, depending on the particular sentence, as can be seen in the examples of (26). Note that in (26a) the fictive path is linear, in (26b) it is radially outward over a two-dimensional plane, and in (26c) it is the lateral motion of a line (a north-south line advancing eastward), which is further correlated with a second fictive change (increasing redness).

(26) *Coextension paths*

a. The fence goes/zigzags/descends from the plateau to the valley.
   [cf. I went/zigzagged/descended from the plateau to the valley.]
b. The field spreads out in all directions from the granary.
   [cf. The oil spread out in all directions from where it spilled.]
c. The soil reddens toward the east.
   [cf. (i) The soil gradually reddened at this spot due to oxidation.
   (ii) The weather front advanced toward the east.]

Consider the fictivity pattern for (26a). On the one hand, we have a factive representation of the fence as a stationary object with linear extent and with a particular contour, orientation, and location in geographic space. Concurrently, though, we have the fictive representation evoked by the literal sense of the sentence, in which an observer, or our focus of attention, or perhaps some image of the fence itself advancing along its own axis, moves from one end of the fence atop the plateau, along its length, to the other end of the fence in the valley.

We can ask as before whether the general fictivity pattern involving coextension paths has a perceptual analog. The phenomenon might be found in a visual configuration that is perceived factively at a higher level of palpability as a static geometric form and, concurrently, perceived fictively at a lower level of palpability in terms of pathways along its delineations. For example, perhaps a subject viewing a "plus" configuration will see it explicitly as just such a "plus" shape, while implicitly sensing

something intangible sweeping first downward along the vertical bar of the plus and then rightward along the horizontal bar (see Babcock and Freyd 1988).

9 "CEPTION": GENERALIZING OVER PERCEPTION AND CONCEPTION

In this section, we suggest a general framework that can accommodate the visual representations involved in general fictivity, together with representations that appear in language.

Much psychological discussion has implicitly or explicitly treated what it has termed "perception" as a unitary category of cognitive phenomena. If further distinctions have been adduced, they have been the separate designation of part of perception as "sensation," or the contrasting of the whole category of perception with that of "conception/cognition." Part of the motivation for challenging the traditional categorization is that psychologists do not agree on where to draw a boundary through observable psychological phenomena such that the phenomena on one side of the boundary will be considered "perceptual" while those on the other side will be excluded from that designation. For example, as I view a particular figure before me, is my identification of it as a knife to be understood as part of my perceptual processing of the visual stimuli, or instead part of some other, perhaps later, cognitive processing? And if such identification is considered part of perception, what about my thought of potential danger that occurs on viewing the object? Moreover, psychologists not only disagree on where to locate a distinctional boundary, but also on whether there even is a principled basis on which one can adduce the existence of such a boundary.

Accordingly, it seems advisable to establish a theoretical framework that does not imply discrete categories and clearly located boundaries, and that recognizes a cognitive domain encompassing traditional notions of both perception and conception. Such a framework would then further allow for the positing of certain cognitive parameters that extend continuously through the larger domain (as described later). To this end, we adopt the notion of **ception** here to cover all the cognitive phenomena, conscious and unconscious, understood by the conjunction of perception and conception. While perhaps best limited to the phenomena of current processing, ception would include the processing of sensory stimulation, mental imagery, and currently experienced thought and affect. An indi-

vidual currently manifesting such processing with respect to some entity can now be said to "ceive" that entity.[12]

The main advantage of the ception framework in conjoining the domains of perception and conception is not that it eliminates the difficulty of categorizing certain problematic cognitive phenomena. Though helpful, that characteristic, taken by itself, could also be seen as throwing the baby out with the bathwater, in that it by fiat discards a potentially useful distinction simply because it is troublesome. The strength of the ception framework, rather, is precisely that it allows for the positing or recognition of distinctional parameters that extend through the whole of the new domain, parameters whose unity might not be readily spotted across a gerrymandered category boundary. Further, such parameters are largely gradient in character, and so can reintroduce the basis of the discrete perception-conception distinction in a graduated form. After all, the trouble with the perception-conception distinction is not that there is no motivation for it, but that it has been treated as a disjunct dichotomy.

We propose 13 parameters of cognitive functioning that appear to extend through the whole domain of ception and to pertain to general fictivity. Most of these parameters seem to have an at least approximately gradient character—perhaps ranging from a fully smooth to a merely rough gradience—with their highest value at the most clearly perceptual end of the ception domain and with their lowest value at the most clearly conceptual end of the domain. It seems that these parameters tend to covary or correlate with each other from their high to their low ends. That is, any particular cognitive representation will tend to merit placement at a comparable distance along the gradients of the respective parameters. Some of the parameters seem more to have discrete regions or categorial distinctions along their lengths than to involve continuous gradience, but these, too, seem amenable to alignment with the other parameters. One of the 13 parameters, the one that we term "palpability," appears to be the most centrally involved with vision-related general fictivity. Given that the other 12 parameters largely correlate with this one, we term the whole set that of the "palpability-related parameters."

This entire proposal of palpability-related parameters is heuristic and programmatic. It will require adjustments and experimental confirmation with regard to several issues. One issue is whether the set of proposed parameters is exhaustive with respect to palpability and general fictivity (presumably not), and, conversely, whether the proposed parameters are

all wholly appropriate to those phenomena. Another issue is the partitioning of general visual fictivity that results in the particular cognitive parameters named. Thus, perhaps some of the parameters presented later should be merged or split. More generally, we would first need to show that our proposed parameters are in synchrony—aligned from high end to low end—sufficiently to justify their being classed together as components of a common phenomenon. Conversely, though, we would need to show that the listed parameters are sufficiently independent from each other to justify their being identified separately, instead of being treated as aspects of a single complex parameter.

9.1 Palpability and Related Parameters

The parameter of palpability is a gradient parameter that pertains to the degree of palpability with which some entity is experienced in consciousness, from the fully concrete to the fully abstract. To serve as reference points, four levels can be designated along this gradient: the **(fully) concrete** level, the **semiconcrete** level, the **semiabstract** level, and the **(fully) abstract** level. These levels of palpability are discussed in the next four sections and illustrated with examples that cluster near them. In this section, we present the 13 proposed palpability-related parameters. As they are discussed here, these palpability-related parameters are treated strictly with respect to their phenomenological characteristics. There is no assumption that levels along these parameters correspond to other cognitive phenomena such as earlier or later stages of processing.

1. The parameter of **palpability** is a gradient at the high end of which an entity is experienced as being concrete, manifest, explicit, tangible, and palpable. At the low end, an entity is experienced as being abstract, unmanifest, implicit, intangible, and impalpable.

2. The parameter of **clarity** is a gradient at the high end of which an entity is experienced as being clear, distinct, and definite. At the low end, an entity is experienced as being vague, indistinct, indefinite, or murky.

3. The parameter of **intensity** is a gradient in the upper region of which an entity is experienced as being intense or vivid.[13] At the low end, an entity is experienced as being faint or dull.

4. The **ostension** of an entity is our term for the overt substantive attributes that the entity has relative to any particular sensory modality. In the visual modality, the ostension of an entity includes its "appearance" and motion—thus, more specifically, including its form, coloration, texturing, and pattern of movements. In the auditory modality, ostension

amounts to an entity's overt sound qualities, and in the taste modality, its flavors. As a gradient, the parameter of ostension comprises the degree to which an entity is experienced as having such overt substantive attributes.

5. The parameter of **objectivity** is a gradient at the high end of which an entity is experienced as being real, as having autonomous physical existence, and as having its own intrinsic characteristics. Such an entity is further experienced as being "out there"—that is, as external to oneself, specifically, to one's mind if not also one's body. At the low end of the gradient, the entity is experienced as being subjective, a cognitive construct, a product of one's own mental activity.[14]

6. The gradient parameter of **localizability** is the degree to which one experiences an entity as having a specific location relative to oneself and to comparable surrounding entities within some spatial reference frame. At the high end of the gradient, one's experience is that the entity does have a location, and that this location occupies only a delimited portion of the whole spatial field, can be determined, and is in fact known. At midrange levels of the gradient, one may experience the entity as having a location but as being unable to determine it. At the low end of the gradient, one can have the experience that the concept of location does not even apply to the ceived entity.

7. The gradient parameter of **identifiability** is the degree to which one has the experience of recognizing the categorial or individual identity of an entity. At the high end of the gradient, one's experience is that one recognizes the ceived entity, that one can assign it to a familiar category or equate it with a familiar unique individual, and that it thus has a known identity. Progressing down the gradient, the components of this experience diminish until they are all absent at the low end.

8. The **content/structure** parameter pertains to whether an entity is assessed for its content as against its structure. At the content end of this parameter—which correlates with the high end of other parameters—the assessments pertain to the substantive makeup of an entity. At the structure end of the parameter—which correlates with the low end of other parameters—the assessments pertain to the schematic delineations of an entity. While the content end deals with the "bulk" form of an entity, the structural end reduces or "boils down" and regularizes this form to its abstracted or idealized lineaments. A form can be a simplex entity composed of parts or a complex entity containing smaller entities. Either way, when such a form is considered overall in its entirety, the content end can provide the comprehensive summary or Gestalt of the form's character.

On the other hand, the structure end can reveal the global framework, pattern, or network of connections that binds the components of the form together and permits their integration into a unity.

9. The **type-of-geometry** parameter involves the geometric characterization imputed to an entity, together with the degree of its precision and absoluteness. At the high end of this parameter, the assessments pertain to the content of an entity and are (amenable to being) geometrically Euclidean, metrically quantitative, precise as to magnitude, form, movements, and so on, and absolute. At the low end of the parameter, the assessments pertain to the structure of an entity, and are (limited to being) geometrically topological or topology-like, qualitative or approximative, schematic, and relational or relativistic.

10. Along the gradient parameter of **accessibility to consciousness**, an entity is accessible to consciousness everywhere but at the lowest end. At the high end of the parameter, the entity is in the center of consciousness or in the foreground of attention. At a lower level, the entity is in the periphery of consciousness or in the background of attention. Still lower, the entity is currently not in consciousness or attention, but could readily become so. At the lowest end, the entity is regularly inaccessible to consciousness.

11. The parameter of **certainty** is a gradient at the high end of which one has the experience of certainty about the occurrence and attributes of an entity. At the low end, one experiences uncertainty about the entity—or, more actively, one experiences doubt about it.

12. What we will dub the parameter of **actionability** is a gradient at the high end of which one feels able to direct oneself agentively with respect to an entity—for example, to inspect or manipulate the entity. At the low end, one feels capable only of receptive experience of the entity.

13. The gradient parameter of **stimulus dependence** is the degree to which a particular kind of experience of an entity requires current online sensory stimulation in order to occur. At the high end, stimuli must be present for the experience to occur. In the midrange of the gradient, the experience can be evoked in conjunction with the impingement of stimuli, but it can also occur in their absence. At the low end, the experience does not require, or has no relation to, sensory stimulation for its occurrence.

The terms for all the preceding parameters were intentionally selected so as to be neutral to sense modality. But the manner in which the various modalities behave with respect to the parameters—in possibly different ways—remains an issue. We briefly address this issue later. But for

simplicity, the first three levels of palpability presented next are discussed only for the visual modality. Our characterization of each level of palpability will generally indicate its standing with respect to each of the 13 parameters.

9.2 The Concrete Level of Palpability

At the concrete level of palpability, an entity that one looks at is experienced as fully manifest and palpable, as clear and vivid, with the ostensive characteristics of precise form, texture, coloration, and movement, and with a precise location relative to oneself and to its surroundings, where this precision largely involves a Euclidean-type geometry and is amenable to metric quantification. The entity is usually recognizable for its particular identity and is regarded as an instance of substantive content. The entity is experienced as having real, physical, autonomous existence—hence, not as dependent on one's own cognizing of it. It is accordingly experienced as being "out there"—that is, not as a construct in one's mind. The viewer can experience the entity with full consciousness and attention, has a sense of certainty about the existence and the attributes of the entity, and feels he can volitionally direct his gaze over the entity, change his position relative to it, or perhaps manipulate it to expose further attributes to inspection. Outside of abnormal psychological states (such as the experiencing of vivid hallucinations), this concrete experience of an entity requires currently online sensory stimulation—for example, in the visual case, one must be actually looking at the entity. In short, one experiences the entity at the high end of all 13 palpability-related parameters.

Examples of entities experienced at the concrete level of palpability include most of the manifest contents of our everyday visual world, such as an apple or a street scene. With respect to general fictivity, a representation ceived at the concrete level of palpability is generally experienced as factive and veridical. It can function as the background foil against which a discrepant representation at a lower level of palpability is compared.

9.3 The Semiconcrete Level of Palpability

We can perhaps best begin this section by illustrating entities ceived at the semiconcrete level of palpability, before outlining their general characteristics. A first example of a semiconcrete entity is the grayish region one "sees" at each intersection (except the one in direct focus) of a Hermann grid. This grid consists of evenly spaced vertical and horizontal white

strips against a black background and is itself seen at the fully concrete level of palpability. As one shifts one's focus from one intersection to another, a spot appears at the old locus and disappears from the new one. Another example of a semiconcrete entity is an after image. For example, after staring at a colored figure, one ceives a pale image of the figure in the complementary color when looking at a white field. Comparably, after a bright light has been flashed on one spot of the retina, one ceives a medium-grayish spot—an "artificial scotoma"—at the corresponding point of whatever scene one now looks at. An apparently further semiconcrete entity is the phosphene effect—a shifting pattern of light that spans the visual field—which results, for example, from pressure on the eyeball.

In general, an entity ceived at the semiconcrete level of palpability, by comparison with the fully concrete level, is experienced as less tangible and explicit, as less clear, and as less intense or vivid. It has the quality of seeming somewhat indefinite in its ostensive characteristics, perhaps hazy, translucent, or ghostlike. Although one has the experience of directly "seeing" the entity, its less concrete properties may largely lead one to experience the entity as having no real physical existence or, at least, to experience doubt about any such corporeality. Of the semiconcrete examples cited above, the grayish spots of the Hermann grid may be largely experienced as "out there," though perhaps not to the fullest degree because of their appearance and disappearance as one shifts one's focus. The "out there" status is still lower or more dubious for afterimages, artificial scotomas, and phosphenes, since these entities move along with one's eye movements. The Hermann grid spots are fully localizable with respect to the concretely ceived grid and, in fact, are themselves ceived only in relation to that grid. But an afterimage, artificial scotoma, or phosphene image ranks lower on the localizability parameter because, although each is fixed with respect to one's visual field, it moves about freely relative to the concretely ceived external environment in pace with one's eye movements. The identifiability of a semiconcrete entity is partially preserved in some afterimage cases, but the entity is otherwise largely not amenable to categorization as to identity.

Generally, one may be fully conscious of and direct one's central attention to such semiconcrete entities as Hermann grid spots, afterimages, scotomas, and phosphenes, but one experiences less than the fullest certainty about one's ception of them, and one can only exercise a still lower degree of actionability over them, being able to manipulate them only by

moving one's eyes about. The ception of Hermann grid spots requires concurrent online sensory stimulation in the form of viewing the grid. But, once initiated, the other cited semiconcrete entities can be ceived for a while without further stimulation, even with one's eyes closed.

With respect to general fictivity, a representation ceived at the semiconcrete level of palpability on viewing a scene is generally experienced as relatively more fictive and less veridical than the concrete-level representation usually being ceived at the same time. The type of discrepancy present between two such concurrent representations of a single scene is generally not that of fictive motion against factive stationariness, as mainly treated so far. Rather, it is one of fictive presence as against factive absence. That is, the fictive representation—for example, of Hermann-grid spots, of an afterimage, of an artificial scotoma, or of phosphenes—is assessed as being present only in a relatively fictive manner, while the factive representation of the scene being viewed is taken more veridically as lacking any such entities.

9.4 The Semiabstract Level of Palpability

An entity at the semiabstract level of palpability is experienced as present in association with other entities that are seen at the fully concrete level, but it itself is intangible and nonmanifest, as well as vague or indefinite and relatively faint. It has little or no ostension, and with no quality of direct visibility. In viewing a scene, one's experience is that one does not "see" such an entity explicitly but rather "senses" its implicit presence. In fact, we will adopt **sensing** as a technical term to refer to the ception of an entity at the semiabstract level of palpability while engaging in online viewing of something concrete.[15] One experiences an entity of this sort as "out there," perhaps localizable as a genuinely present characteristic of the concrete entities viewed, but not as having autonomous physical existence. Insofar as such a sensed entity is accorded an identity, it would be with respect to some approximate or vague category.

A sensed entity is of relatively low salience in consciousness or attention, seems less certain, and is difficult to act on. Often a sensed entity of the present sort is understood as a structural or relational characteristic of the concrete entities viewed. Its type of geometry is regularly topology-like and approximative. Such sensed structures or relationships can often be captured for experiencing at the fully concrete level by schematic representations, such as line drawings or wire sculptures, but they lack this degree of explicitness in their original condition of ception.

Since the semiabstract level of palpability is perhaps the least familiar level, we present a number of types and illustrations of it. We can here characterize the pattern of general fictivity that holds for several of the types presented below. General fictivity works in approximately the same way for four of the types: object structure, path structure, reference frames, and force dynamics. To characterize the general fictivity pattern for these four types together, we refer to them here collectively as "structurality." The representation of structurality that one senses in an object or an array is generally experienced as more fictive and less veridical than the factive representation of the concrete entities whose structurality it is. The representation of structurality is a case of fictive presence rather than of fictive motion. This fictive presence contrasts with the factive absence of such structurality from the concrete representation. Unlike most forms of general fictivity, the representation of concrete content and that of sensed structurality may seem so minimally discrepant with each other that they are rather experienced as complementary or additive. (The type in section 9.4.4 involving structural history and future has its own fictivity pattern, which will be described separately.) Much of visually sensed structure is similar to the structure represented by linguistic closed-class forms, and this parallelism will be discussed in section 11.

9.4.1 The Sensing of Object Structure One main type of sensed entity is the structure that we sense to be present in a single object or over an array of objects due to its arrangement in space. We term this the **sensing of object structure**. To illustrate first for the single-object case, consider an object of the geometric type that can be exemplified, say, by a vase or by a dumpster. When one views an object of this type, one sees at the concrete level of palpability certain particulars of ostension, such as outline, delineation, color, texture, and shading. But in addition, at the semiabstract level of palpability, one may sense in the object a certain structural pattern, one that consists of an outer envelope and a hollow interior.

More precisely, an object of this type is sensed—in terms of an idealized schematization—as consisting of a plane curved in a way that defines a volume of space by forming a boundary around it. A structural schema of this sort is generally sensed in the object in a form that is abstracted away from each of a number of other spatial factors. Thus, this "envelope/interior" structural schema can be sensed equally across objects that differ in magnitude, like a thimble and a volcano; that differ in shape, like a well and a trench; that differ in completeness of closure, like a beachball

and a punchbowl; or that differ in degree of continuity/discontinuity, like a bell jar and a birdcage. This pattern of ception shows—as is appropriate to the semiabstract level of palpability—that the type of geometry (parameter 9) that is here sensed in the structure of an object is topological or topology-like. In particular—as just seen from the set of geometric factors that are disregarded—object structure sensed as being of the envelope-interior type is magnitude neutral and shape neutral, as well as being closure neutral and discontinuity neutral.

For a more complex example, on viewing a person, one sees at the fully concrete level of palpability that person's outline and form, coloration and shading, textures, the delineations of the garments, and so on. However, one does not see but rather senses the person's bodily structure in its current configuration—for example, when in a squatting or leaning posture. A sensed structural schema of this sort can be made concretely visible, as when a stick-figure drawing or a pipe-cleaner sculpture is shaped to correspond to such a posture. But one does not concretely see such a schema when looking at the person—one only senses its presence. The Marrian abstractions (Marr 1982) that represent a human figure in terms of an arrangement of axes of elongation is one theoretization of this sensed level of ception.

A comparable sensing of structure can occur for an array of objects. Consider, for example, a first object with the envelope/interior structure characterized above, where a second object is located at a point or points of the interior space of the first object. Examples might be some water in a vase or a radio in a dumpster. On ceiving such a complex, one may sense in it a structural schema of "inclusion," with the second object included within the first. As in the single-object case, this object array also exhibits a number of topology-like neutralities. Thus, not only can the first object and the second object themselves each vary in magnitude and shape, but in addition the first object can exhibit any orientation relative to the second object and can be located throughout any portion or amount of the second object's interior space, while still being sensed as manifesting the "inclusion" schema.

For a more intricate example, when one views the interior of a restaurant, one senses a hierarchically embedded structure in space that includes the schematic delineations of the dining hall as the largest containing frame, and the spatial pattern of tables and people situated within this frame. Perhaps one can see some of the hall's framing delineations concretely—for example, some ceiling-wall edges. But for the most part, the

patterned arrangement in space seems to be sensed. Thus, if one were to represent this sensed structure of the scene in a schematic drawing, one might include some lines to represent the rectilinear frame of the hall, together with some spots or circles for the tables and some short bent lines for the people that mark their relative positions within the frame and to each other. However, though it is representable thus, this is an abstraction that is for the most part not concretely seen as such, but rather only sensed as present.

Further cases perhaps also belong in this object-structure type of sensing. Thus, parts of objects that are not concretely seen but are known or assumed to be present in particular locations may be sensed as present at those locations. This may apply to the part of an object that is being occluded by another object in front of it, or to the back or underside of an object not visible from a viewer's current perspective.[16]

9.4.2 The Sensing of Path Structure When one views an object moving with respect to other objects, one concretely sees the path it executes as having Euclidean specifics such as exact shape and size. But in addition, one may sense an abstract structure in this path. The path itself would not be a case of fictive motion, for the path is factive. But the path is sensed as instantiating a particular idealized path schema, and it is this schema that is fictive. We term this the **sensing of path structure**. Thus, one may sense as equal instantiations of an "across" schema both the path of an ant crawling from one side of one's palm to the opposite side, and the path of a deer running from one side of a field to the opposite side. This visually sensed "across" schema would then exhibit the topological property of being magnitude neutral. Comparably, one may equally sense an "across" schema in the path of a deer running in a straight perpendicular line from one boundary of a field to the opposite boundary, and in the path of a deer running from one side of the field to the other along a zig-zag slanting course. The visually sensed "across" schema would then also exhibit the topological property of being shape neutral.

9.4.3 The Sensing of Reference Frames Perhaps related to the sensing of object/array structure is the **sensing of a reference frame** as present amidst an array of objects. For example, in seeing the scenery about oneself at the concrete level of palpability, one can sense a grid of compass directions amidst this scenery. Such compass directions are not concretely seen, but solely sensed at the semiabstract level of palpability.

One may even have a choice of alternative reference frames to sense as present (as described in chapter I-3). For example, consider a person who is looking at a church facing eastward toward the right with a bicycle at its rear. That person can sense within this manifest scene an earth-based frame, in which the bike is *west* of the church. Or she can sense the presence of an object-based frame, in which the bike is *behind* the church. Or she can sense the presence of a viewer-based frame radiating out from herself, in which the bike is to the *left* of the church. Levinson (1996b) and Pederson (1993) have performed experiments on exactly this issue, with findings of strong linguistic-cultural biasing for the particular type of reference frame that is sensed as present.

One may also sense the presence of one or another alternative reference frame for the case of a moving object executing a path. Thus, on viewing a boat leaving an island and sailing an increasing distance from it, one can sense its path as a radius extending out from the island as center within the concentric circles of a radial reference frame. Alternatively, one can sense the island as the origin point of a rectilinear reference frame and the boat's path as an abscissal line moving away from an ordinate.[17]

9.4.4 The Sensing of Structural History and Future Another possible type of sensed phenomenon also pertains to the structure of an object or of an array of objects. Here, however, this structure is sensed not as statically present but rather as having shifted into its particular configuration from some other configuration. In effect, one senses a probable, default, or pseudohistory of activity that led to the present structure. We term this the **sensing of structural history**. A sensed history of this sort is the visual counterpart of the fictive site-arrival paths described for language in section 8.3. The examples of visual counterparts already given in that section were of a figurine perceived as a torso with head and limbs affixed to it; of an irregular contour perceived as the result of processes like indentation and protuberation; and of a Pac Man figure perceived as a circle with a wedge removed.

In addition to such relatively schematic entities, it can be proposed that one regularly senses certain complex forms within everyday scenes not as static configurations self-subsistent in their own right but rather as the result of deviation from some prior, generally more basic, state. For example, on viewing an equal-sided picture frame hanging on the wall at an oblique angle, one may not ceive the frame as a static diamond shape, but may rather sense it as a square manifesting the result of having been tilted

away from a more basic vertical-horizontal orientation. Another example is the sensing of a dent in a fender not as a sui generis curvature but as the result of a deformation. One senses a set of clay shards not as an arrangement of separate distinctively shaped three-dimensional objects but as the remains of a flowerpot that had been broken. One may even sense toys that are lying over the floor not simply as comprising some specific spatial static pattern but rather as manifesting the result of having been scattered into that configuration from a home location within a box.

Viewing an entity may lead one to sense not only a history of its current configuration, but also to sense a potential or probable future succession of changes away from its current configuration. Such a **sensing of structural future** might involve the return of the entity to a basic state that it had left. For example, on viewing the previous picture frame hanging at an angle, one may sense its potential return to the true (probably as part of imagining one's manipulations to right it).

In terms of general fictivity, the sensing of an entity's structural history or future is a less veridical representation of fictive motion in a sensory modality. It is superimposed on the factively and veridically seen static representation of the entity. Thus, with respect to the picture-frame example, the difference between the factive and the fictive modes of ceiving the frame is the difference between, on the one hand, seeing a static diamond and, on the other hand, sensing a square with a past and a future.

9.4.5 The Sensing of Projected Paths Another type of sensed ception can be termed the **sensing of projected paths**. One form of path projection is based on motion already being exhibited by a Figure entity—for example, a thrown ball sailing in a curve through the air. A viewer observing the concretely occurrent path of the object can generally sense —but not palpably see—the path that it will subsequently follow. Here, we do not refer simply to unconscious cognitive computations that, say, enable the viewer to move to the spot at which she could catch the ball. Rather, we refer here to the conscious experience a viewer often has of a compelling sense of the specific route that the object will traverse. One may also project backward to sense the path that the ball is likely to have traversed before it was in view. Path projection of this sort is thus wholly akin to the sensing of structural history and future discussed in the preceding section. The main difference is that there the viewed entity was itself stationary, whereas here it is in motion. Accordingly, there the sensed changes before and after the static configuration were largely

associations based on one's experience of frequent occurrence, whereas here the sensed path segments are projections mostly based on one's naive physics applied to the viewed motion.

Another form of projected path pertains to the route that an agentive viewer will volitionally proceed to execute through some region of space. It applies, for example, to a viewer standing at one corner of a restaurant crowded with tables who wants to get to the opposite corner. Before starting out, such a viewer will often sense at the semiabstract level of palpability an approximate route curving through the midst of the tables that he could follow to reach his destination. The viewer might sense the shape of this path virtually as if it were taken by an aerial photograph. It may be that the initially projected route is inadequate to the task, and that the route-sensing process is regularly updated and re-projected as the viewer moves along his path. But throughout such a process, only the physical surroundings are seen concretely, whereas the path to follow is sensed. This form of projected path is akin to the linguistic fictive access paths described in section 8.4.

9.4.6 The Sensing of Force Dynamics Also at the semiabstract level of palpability is the **sensing of force dynamics**—that is, of the force interrelationships among otherwise concretely seen objects. Included in such sensed force dynamics are the interactions of opposing forces such as an object's intrinsic tendency toward motion or rest; another object's opposition to this tendency; resistance to such opposition; the overcoming of resistance; and the presence, appearance, disappearance, or absence of blockage. (See chapter I-7 for an analysis of the semantic component of language that pertains to force dynamics.)

To illustrate, Rubin (1986) and Engel and Rubin (1986) report that subjects perceive (in our terms, sense) forces at the cusps when viewing a dot that moves along a path like that of a ball bouncing. When the bounce is progressively heightened, the perception is that a force has been added at the cusps. Complementarily, when the dot's bounce is reduced, the force is perceived as being dissipated. Further, Jepson and Richards (1993), using two equal rectangles arranged to form a "T," note that when this T is on its side with the T's "head" rectangle vertical and its "stem" rectangle horizontal, then the percept is as if the stem rectangle is "attached" or glued to the head rectangle, analogously to what is sensed in the viewing of an object stuck to a wall. But there is no such perception of an "attaching force" when the T is upside down with its head rectangle

horizontal on the bottom and its stem rectangle vertical on top. In this case, only contact, not attachment, is perceived, just as what would be expected in viewing an object resting on a horizontal surface.

For a less schematic example, consider a scene in which a large concrete slab is leaning at a 45° angle against the outer wall of a rickety wooden shed. A person viewing this scene would probably not only see at the concrete level the slab and the shed in their particular geometric relationship, but also would sense a force-dynamic structure implicit throughout these overt elements. This sensed force structure might include a force (manifested by the shed) that is now successfully but tenuously resisting an unrelenting outside force impinging on it (manifested by the slab) and that is capable of incrementally eroding and giving way at any moment.

9.4.7 The Sensing of Visual Analogs to Fictive Motion in Language

Finally, the set of fictive motion types presented in this chapter before this section on ception can now be recalled for their relevance to the present discussion. Most of the visual patterns previously suggested as counterparts of the linguistic fictive motion types seem to fit at the semiabstract level of palpability—that is, they are sensed. Further, in terms of general fictivity, these visual analogs have involved the sensing of fictive *motion*; they do not involve the sensing of fictive *presence* (as was the case for the representations of "structurality" just seen). As a summary, we can list here the fictive types from sections 2.5 and 8, all of which participate in this phenomenon. Thus, we may sense at the semiabstract level of palpability the fictive motion of the visual counterparts of orientation paths (including prospect paths, alignment paths, demonstrative paths, and targeting paths), radiation paths, shadow paths, sensory paths, pattern paths, frame-relative motion, advent paths, access paths, and coextension paths. With the addition of the cases of structural history/future and projected paths characterized just above, this is a complete list of the fictive types proposed, in this chapter, to have a visual representation sensed as fictive motion.

9.5 The Abstract Level of Palpability

The cases cited so far for the first three levels of palpability have all depended on concurrent online sensory stimulation (with the exception that afterimages, artificial scotomas, and phosphenes require stimulation shortly beforehand). But we can adduce a level still further down the

palpability gradient, the (fully) abstract level. At this level, one experiences conceptual or affective entities that do not require online sensory stimulation for their occurrence and may have little direct relation to any such stimulation. Largely clustering near the lower ends of the remaining palpability-related parameters, such entities are thus largely impalpable, abstract, vague, and perhaps faint, lacking in ostensive characteristics, not amenable to localization in space, and not readily amenable to identification as to category. They are often experienced as subjective, hence, existing in oneself rather than "out there."

Such conceptual and affective entities do seem to exhibit a range of settings along the remaining palpability-related parameters. Thus, they can range from full salience in attention to elusiveness or virtual inaccessibility to consciousness; one can range from certainty to puzzlement over them; and one may range from a capacity to manipulate them in one's mind to an experience of being only a passive receptor to them. Finally, they can exhibit either content or structure, and, insofar as they manifest a type of geometry, this, too, can exhibit a range, though perhaps tending toward the approximative and qualitative type.

Such abstract entities may be ceived as components in the course of general ongoing thought and feeling. They might include not only the imagined counterparts of entities normally ceived as a result of online stimulation—for example, the experience only in imagination of the structure that one would otherwise sense online while viewing an object or array in space. But they might also include phenomena that cannot normally or ever be directly ascribed as intrinsic attributes to entities ceived as the result of online sensory stimulation. Such phenomena might include the following: the awareness of relationships among concepts within one's knowledge representation; the experience of implications between sets of concepts, and the formation of inferences; assessments of veridicality; and assessments of change occurring over the long term. Further possible inclusions are experiences of social influence (such as permissions and requirements, expectations and pressures); a wide range of affective states; and "propositional attitudes" (such as wish and intention).

Many cognitive entities at the abstract level of palpability are the semantic referents of linguistic forms, and so can also be evoked in awareness by hearing or thinking of those forms. These forms themselves are fully concrete when heard, and of course less concrete when imagined in thought. But the degree of concreteness that they do have, it seems, tends to lend a measure of explicitness to the conceptual and affective phe-

nomena that are associated with them. And with such greater explicitness may come greater cognitive manipulability (actionability) and access to consciousness. However, these are phenomena that, when experienced directly without association with such linguistic forms, may be at the fully abstract level of palpability. Despite such upscaling lent by linguistic representation, it is easiest to give further examples of ceptually abstract phenomena by citing the meanings of certain linguistic forms. Since open-class forms tend to represent more contentful concepts, while closed-class forms tend to represent more structural—and hence, more abstract—concepts, we next cite a number of closed-class meanings so as to further convey the character of the fully abstract end of the palpability gradient, at least insofar as it is linguistically associated.[18]

First, a schematic structure that one might otherwise sense at the semi-abstract level of palpability through online sensory stimulation—as by looking at an object or scene—can also be ceived at the fully abstract, purely ideational level in the absence of current sensory stimulation by hearing or thinking of a closed-class linguistic form that refers to the same schematic structure. For example, on viewing a scene in which a log is straddling a road, one might sense the presence of a structural "across" schema in that scene. But one can also ceive the same "across" schema at the abstract level of palpability by hearing or thinking of the word *across* either alone or in a sentence like *The log lay across the road.*

We can next identify a number of conceptual categories expressed by linguistic closed-class forms that are seemingly never directly produced by online sensory stimulation. Thus, the conceptual category of "tense," with such specific member concepts as 'past', 'present', and 'future', pertains to the time of occurrence of a referent event relative to the present time of speaking. This category is well represented in the languages of the world, but it has seemingly scant homology in the forms of ception higher on the palpability scale that are evoked by current sensory stimulation. A second linguistically represented category can be termed "reality status"—a type largely included under the traditional linguistic term "mood." For any event being referred to, this category would include such indications as that the event is actual, conditional, potential, or counterfactual, and would also include the simple negative (e.g., English *not*). Again, aspects of situations that are currently seen, heard, smelled, and so on at the concrete level or sensed at the semiabstract level are seemingly not ceived as having any other reality status than the actual. Similarly, the linguistically represented category of "modality," with such member notions as

those expressed by English *can*, *must*, and *should*, has little concrete or sensed counterpart.

To continue the exemplification, a further set of categories at the abstract level of palpability that can be evoked by closed-class forms pertain to the cognitive state of some sentient entity. These categories, too, seem unrepresented at the higher levels of palpability. Thus, a conceptual category that can be termed "speaker's knowledge status," represented by linguistic forms called "evidentials," particularizes the status of the speaker's knowledge of the event that she is referring to. In a number of languages (e.g., in Wintu, where it is expressed by inflections on the verb), this category has such member notions as 'known from personal experience as factual', 'accepted as factual through generally shared knowledge', 'inferred from accompanying evidence', 'inferred from temporal regularity', 'entertained as possible because of having been reported', and 'judged as probable'. Another linguistic category of the cognitive-state type can be termed the "addressee's knowledge status." This is the speaker's inference as to the addressee's ability to identify some referent that the speaker is currently specifying. One common linguistic form representing this category is that of determiners that mark definiteness—for example, the English definite and indefinite articles *the* and *a*. Further grammatically represented cognitive states are intention and volition, purpose, desire, wish, and regret.

For some final examples, a linguistic category that can be termed "particularity" pertains to whether an entity in reference is to be understood as unique (*That bird just flew in*), or as a particular one out of a set of comparable entities (*A bird just flew in*), or generically as an exemplar standing in for all comparable entities (*A bird has feathers*). But the online ception of an entity at the concrete or semiabstract level may not accommodate this range of options. In particular, it apparently tends to exclude the generic case—for instance, looking at a particular bird may tend not to evoke the ception of all birds generically. Thus, the ception of genericness in human cognition may occur only at the abstract level of palpability. Finally, many linguistic closed-class forms specify a variety of abstract relationships, such as kinship and possession. The English ending *'s* can express both of these relationships, as in *John's mother* and *John's book*. Again, online ception, such as viewing John in his house and Mrs. Smith in hers, or viewing John in the doorway and a book on the table, may not directly evoke the relational concepts of kinship and possession that the linguistic forms do.[19]

10 FURTHER TYPES AND PROPERTIES OF CEPTION

The full structure of the entire system of ception certainly remains to be characterized. But some brief notes here will sketch in a few lineaments of that structure. We cite some further types of ception, some forms of dissociation across the palpability-related parameters outlined above, and some differences among the various sensory modalities as to their parametric behavior.

10.1 Imagistic Forms of Ception

What can be termed **imagistic ception** includes such forms of cognitive representation as mental imagery, of course regardless of whether this is related to vision or to other sensory modalities. Along the gradient parameter of stimulus dependence, imagistic ception seems to fall in the midrange. That is, it can be evoked in association with an entity ceived at the concrete level during online stimulation by that entity. For example, on seeing a dog, one can imagine the sight and sound of it starting to bark, as well as the sight and kinesthesia of one's walking over and petting it. But imagistic ception can also occur without online stimulation, as during one's private imaginings. It needs to be determined whether imagistic ception can also occur at the low end of the stimulus-dependence parameter—that is, whether aspects of it are unrelated to sensory attributes, as in the case of many conceptual categories of language.

10.2 Associative Forms of Ception

What can be termed **associative** forms of ception pertain to ceptual phenomena that are evoked in one in association with an entity during one's online sensory stimulation by it, but that one does not ascribe to that entity as intrinsic attributes of it. Such associated phenomena could include: (1) mental imagery, as just discussed; (2) actions that one might undertake in relation to the entity; (3) affective states that one experiences with respect to the entity; (4) particular concepts or aspects of one's knowledge that one associates with the entity; and (5) inferences regarding the entity.

Having already discussed mental imagery, we can here illustrate the remaining four of these types of associative ception. As examples of associated action (2), on viewing a tilted picture frame, one might experience a motoric impulse to manipulate the frame so as to right it. Or, on viewing a bowling ball inexorably heading for the side gutter, one might

experience or execute the gyrations of "body English" as if to effect a correction in the ball's path.

In fact, with respect to such kinesthetic effects, there may be a gradient of palpability—parallel to what we have posited for ception—that applies to motor control. Proceeding from the least to the most palpable, at the low end would be one's experience of intending to move; in the midrange would be one's experience of all-but-overt motion, including checked movement and covert body English; and at the high end would be one's experience of one's overt movements.

Associated affect (3) has such straightforward examples as experiencing pleasure, disgust, or fear at the sight of something—for example, of a child playing, of roadkill, or of a mugger. Associated knowledge or concepts (4) could include examples like thinking of danger on seeing a knife, or thinking of one's childhood home on smelling fresh bread. And examples of associated inference (5) might be gathering that Mrs. Smith is John's mother from the visual apparency of their ages and of their resemblance, or inferring that a book on a table belongs to John from the surroundings and John's manner of behaving toward it.

10.3 A Parameter of Intrinsicality

Associative forms of ception like those just adduced may be largely judged to cluster near the semiabstract level of palpability. In fact, the phenomena described in section 9.4 as "sensed" at the semiabstract level and the associative phenomena reported here may belong together as a single group ceived at the semiabstract level of palpability. But the sensed type and the associative type within this group would still differ from each other with respect to another gradient parameter, what might be called **intrinsicality**. At the high end of this gradient, the sensed phenomena would be experienced as intrinsic to the entity being ceived at the concrete level. That is, one would ceive them as being actually present and perhaps as inherent attributes—such as structure and patterns of force impingement—that one, as ceiver, is "detecting" in the concretely seen entity. But, at the lower end of the intrinsicality gradient, the associative phenomena presented here would be experienced as merely associated with the concretely ceived entity. That is, one would experience them as incidental phenomena that one, as ceiver, brings to the entity oneself.

This intrinsicality parameter, however, is actually just the objectivity gradient (parameter 5) when it is applied to phenomena associated with an entity rather than to the entity itself.

To be sure, where a particular phenomenon is placed along the intrinsicality gradient varies in accordance with the type of phenomenon, with the individual, with the culture, and with the occasion. For a classical example, if one ceives beauty in conjunction with seeing a particular person, one may experience this beauty as an intrinsic attribute of the person seen, much like their height. Alternatively, one may experience the beauty as one's personal interpretive response—that is, as produced by oneself as the beholder.

10.4 Dissociations among the Palpability-Related Parameters

While the 13 palpability-related parameters generally tend to correlate with one another for the types of ception that had been considered, some dissociations can be observed. For example, with respect to the imagistic forms of ception, visual mental imagery can have a fairly high degree of ostension (parameter 4)—for instance, having relatively definite form and movement. At the same time, however, it may rank somewhere between the semiconcrete level and the semiabstract level along the palpability gradient (parameter 1) and at a comparably midrange level along the clarity gradient (parameter 2). For another case of dissociation, already noted, the cognitive phenomena expressed by closed-class linguistic forms are generally at the most abstract level of the palpability gradient (parameter 1). But the conscious manipulability of the linguistic forms that express these conceptual phenomena ranks them near the high end of the actionability gradient (parameter 12). Or again, some affective states may rank quite low on most of the parameters—for example, intangible on the palpability gradient (1), murky on the clarity gradient (2), and nonostensive on the gradient of ostension (4)—while ranking quite high on the intensity gradient (3) because they are experienced as intense and vivid. The observation of further dissociations of this sort can argue for the independence of the parameters adduced and ultimately justify their identification as distinct phenomena.

10.5 Modality Differences along the Palpability Gradient

In the discussion on ception, we have mostly dealt with phenomena related to the visual modality, which can exhibit all levels along the palpability gradient except perhaps the most abstract. But we can briefly note that each sensory modality may have its own pattern of manifestation along the various palpability-related parameters adduced. For example, the kinesthetic modality, including one's sense of one's current body

posture and movements, may by its nature seldom or never rank very high along the palpability, clarity, and ostension parameters, perhaps hovering somewhere between the semiconcrete and the semiabstract level. The modality of smell, at least for humans, seems to rank low with respect to localizability (parameter 6). And the modalities of taste and smell, as engaged in the ingestion of food, may range more over the content region than over the structure region of the content/structure parameter (parameter 8). Comparison of the sensory modalities with respect to ception requires much further investigation.

11 CONTENT/STRUCTURE PARALLELISMS BETWEEN VISION AND LANGUAGE

The analysis to this point permits the observation of two further parallelisms between vision and language.

11.1 The Complementary Functions of the Content and Structure Subsystems in Vision and Language

First, each of the two cognitive systems, vision and language, has a content subsystem and a structure subsystem. Within online vision—for example, in the viewing of an object or array of objects—the content subsystem is foremost at the concrete level of palpability, while the structure subsystem is foremost at the semiabstract level of palpability. In language, the referents of open-class forms largely manifest the content subsystem, while the referents of closed-class forms are generally limited to manifesting the structure subsystem. The two subsystems serve largely distinct and complementary functions, as will be demonstrated next, first for vision and then for language. A number of properties from both the content/structure parameter (8) and the type-of-geometry parameter (9) align differentially with the distinctive functioning of these two subsystems. These properties include ones pertaining to bulk as against lineaments, Euclidean geometry as against topology, absoluteness as against relativity, precision as against approximation, and, holistically, a substantive summary as against a unifying framework.[20]

We can first illustrate the properties and operations of the two subsystems in vision. For a case involving motor planning and control, as in executing a particular path through space, the content subsystem is relevant for fine-grained local calibrations, while the structure subsystem can

project an overall rough-and-ready first approximation. Thus, to revisit an earlier example, a person wanting to cross the dining area of a restaurant will likely plot an approximate, qualitative course curving through the tables, using the sensed semiabstract level of structure in a spatial array. But in the process of crossing, the person will attend to the Euclidean particulars of the tables, using the concrete level of specific bulk content, so as not to bump into the tables' corners. If such were possible, a person operating without the overall topology-like subsystem would be reduced to inching along, using the guidelines of the precision subsystem to follow the sides of the tables and the curves of the chairs, without an overarching schematic map for guidance. On the other hand, a person lacking the precision subsystem might set forth on her or his approximate journey but encounter repeated bumps and blockages for not being able to gauge accurately and negotiate the local particulars. The two subsystems thus perform complementary functions and are both necessary for optimal navigation, as well as other forms of motor activity.

We can next illustrate the two subsystems at work in language. To do this, we can observe the distinct functions served by the open-class forms and by the closed-class forms in any single sentence. Thus, consider the sentence *A rustler lassoed the steers*. This sentence contains just three open-class forms each of which specifies a rich complex of conceptual content. These are the verb *rustle*, which specifies notions of illegality, theft, property ownership, and livestock; the verb *lasso*, which specifies a rope looped and knotted in a particular configuration that is swung around, cast, and circled over an animal's head in a certain way; and *steer*, which specifies notions of a particular animal type, the institution of breeding for human consumption, and castration.

On the other hand, the sentence contains a number of closed-class forms that specify relatively spare concepts serving a structuring function. These include the suffix *-ed* specifying occurrence before the time of the current speech event; the suffix *-s* specifying multiple instantiation, and the "zero" suffix (on *rustler*) specifying unitary instantiation; the article *the* specifying the speaker's assumption of ready identifiability for the addressee and the article *a* that specifies the opposite of this, and the suffix *-er* specifying the performer of an action. Further inclusions are the grammatical category of "noun" (for *rustler* and *steers*) indicating an object and that of "verb" (for *lassoed*) indicating a process, and the grammatical relation of "subject" indicating an Agent and that of "direct object" indicating a Patient.

The distinct functions served by these two types of forms can be put into relief by alternately changing one type of form in the above sentence while keeping the other constant. Thus, we can change only the closed-class forms, as in a sentence like *Will the lassoers rustle a steer?*. Here, all the structural delineations of the depicted scene and of the speech event have been altered, but since the content-specifying open-class forms are the same, we are still in a Western cowboy landscape. But we can now change only the open-class forms, as in *A machine stamped the envelopes*. Here, the structural relationships of the scene and of the speech event are the same as in the original sentence, but with the content-specifying forms altered, we are now transposed to an office building. In sum, then, in the referential and discourse context of a sentence, the open-class forms of the sentence contribute the majority of the content, whereas the closed-class forms determine the majority of the structure.

Thus, both in ceiving and motorically negotiating a visual scene and in cognizing the reference of a sentence, the two cognitive subsystems of content and of structure are in operation, performing equally necessary and complementary functions, as they interact with each other.

11.2 Comparable Character of the Structure Subsystem in Vision and in Language

Given this demonstration that visual perception and language each have a content subsystem and a structure subsystem, we next need to determine the relationship between the two content subsystems and the relationship between the two structure subsystems. Focusing here only on the latter issue, we find that the structural subsystem in vision and that in language exhibit great similarity.

First, recall that section 9.4 on ception at the semiabstract level of palpability proposed that we can sense the spatial structure and force-related structure of an object or an array of objects when viewing it. It was suggested that any structure of this sort is sensed as consisting of an idealized abstracted schema with a topology-like or other qualitative type of geometry. And recall from the preceding subsection that the linguistic system of closed-class forms is dedicated to specifying the structure of some part of or the whole of a conceptual complex that is in reference. Note now, then, that when such linguistically specified structure pertains to space or force, it, too, consists of idealized abstracted schemas with topology-like properties. In fact, the character of the structuring yielded by visual sensing and that yielded by the linguistic closed-class system appear to be highly similar.

The structure subsystems of vision and language exhibit a further parallel, one that pertains to fictivity. Recall the observation in section 9.4 that the structural schemas that one semiabstractly senses to be present in an object or array are assessed as being fictive, relative to the factive status of the way one concretely sees the object or array. Now, the structural schemas expressed by linguistic closed-class forms—here, specifically, those pertaining to space and force—are also fictive representations, relative to the factive character of the objects and arrays that a language user understands them to pertain to. That is, all these cases of abstracted or conceptually imposed schemas—whether sensed visually or specified by linguistic closed-class forms—can be understood as a form of fictivity. They constitute not fictive motion but fictive presence—here, the fictive presence of structure. Accordingly, the extensive body of linguistic work on spatial schemas—for instance, Talmy 1975b, 1983 and Herskovits 1986, 1994, among much else—constitutes a major contribution to fictivity theory. In particular, Herskovits has made it a cornerstone of her work to treat the spatial schemas that she describes as "virtual structures" (previously termed "geometric conceptualizations"), which are to be distinguished from the "canonic representations" of objects "as they are."

With the preceding as the general picture, we now point to some particular cases of parallelism between the structure subsystem of vision and that of language. With respect to the structure of an array of objects, it was proposed in section 9.4.1 that one can visually sense the presence of an "inclusion" type of structural schema on viewing a two-object complex in which one object is sensed as located at a point or points of the interior space defined by the other object. This schema can be topologically or qualitatively abstracted away from particulars of the objects' size, shape, state of closure, discontinuity, relative orientation, and relative location. Now, the spatial schema specified by the English preposition *in* exhibits all these same properties. This closed-class form can thus be used with equal appropriateness to refer to some object as located *in a thimble, in a volcano, in a well, in a trench, in a beachball, in a punchbowl, in a bell jar*, or *in a birdcage*. Further, it can be said that in abstracting or imposing their schema, the structure subsystems of both vision and language produce a fictive representation, relative to the concreta of the object array.

Comparably, section 9.4.2 addressed the topology-like properties of the structure sensed in the path of a viewed moving object. But this type of

visually sensed structure also has linguistic closed-class parallels. Thus, the English preposition *across*—which specifies a schema prototypically involving motion from one parallel line to another along a perpendicular line between them—exhibits the topological property of being magnitude neutral. This is evident from the fact that it can be applied to paths of a few centimeters, as in *The ant crawled across my palm*, as well as to paths of thousands of miles, as in *The bus drove across the country*. In a related way, the preposition *through* specifies (in one sector of its usage) a schema involving motion along a line that is located within a medium. But, topology-like, this schema is shape neutral. Thus, *through* can be applied equally as well to a looped path, as in *I circled through the woods*, as to a jagged path, as in *I zigzagged through the woods*. And, again, the topological schemas thus visually sensed in or linguistically imputed to a path are fictive representations relative to the Euclidean particulars seen or believed to be present.

For a final case of a vision-language parallelism of structure, section 9.4.3 suggested that on viewing certain scenes one may sense the presence of either a rectilinear or a radial reference frame as the background against which an object executes a path. But these two alternate schemas can also be represented by closed-class forms in language. Thus, English *away from* indicates motion from a point on an ordinate-type boundary progressing along an abscissal-type axis within a rectilinear grid. But *out from* indicates motion from a central point along a radius within a radial grid of concentric circles. These alternative conceptual schematizations can be seen in sentences like *The boat drifted further and further away|out from the island*, or *The sloth crawled 10 feet away|out from the tree trunk along a branch*. Here, both reference frames are again clearly fictive cognitive impositions on the scene, whether this scene is viewed visually or referred to linguistically.

In sum, the characteristics comparable across visual and linguistic structuring of space and force include the following: they both have comparable schematic abstractions; in both, these abstractions are topology-like; and in both, these abstractions are fictive. The following summary statement may capture the comparability of linguistic and perceptual structuring, as long as it is interpreted within this chapter's context of explanation and terminology: One understands or expresses grammatically much of what one senses visually.

11.3 Possible Neural Bases for the Similarity of Structure between Vision and Language

One can heuristically explore ideas for a neural basis for the similarities just discussed between the structure subsystem of visual perception and that of language.

One possibility is that some particular neural system, independent of both vision and language, is responsible for processing schematic structure in general. Then we can suppose that both visual sensing and linguistic closed-class representation are connected into that single neural system for this common characteristic of their mode of functioning.

Another possibility is that a neural subsystem for processing schematic structure is included within the neural system that underlies visual perception, and that the neural system that underlies language has connections to this structure-processing subsystem, from which it secondarily derives its structuring functions—those associated with closed-class forms. For this possibility, we have posited the structuring subsystem as located within the visual system, since vision is evolutionarily prior to language. As the language system evolved, it may have connected with the structuring subsystem already present within visual perception.

A third possibility is that two approximate duplicates of a neural subsystem for processing schematic structure exist, one occurring within the neural system underlying visual perception, and the other in the neural system underlying language.

Apart from these possibilities of where it appears, the hypothesized neural system or subsystem for processing schematic structure should be accorded one further characteristic. The schematic structures that are the products of its processing are experienced as being less veridical, hence, fictive, relative to the products of certain other neural systems, those that process the concrete ostensions of ceived entities.

11.4 Structural Explicitness in Vision and Language

The cognitive system pertaining to vision in humans has another feature that may have a partial counterpart in language. It has a component for representing in an explicit form the kinds of schematic structures generally only implicitly sensed at the semiabstract level of palpability. We here call this the component for **schematic pictorial representation**.

In iconographic representation, a full-blown pictorial depiction manifests the content subsystem. But the structure subsystem can be made

explicit through the component of schematic pictorial representation by schematic depictions involving the use of points, lines, and planes, as in both static and filmic cartoons and caricatures, line drawings, wire sculptures, and the like. The very first pictorial depictions that children produce—their "stick-figure" drawings—are of this schematic kind. For example, a child might draw a human figure at an early phase as a circle with four lines radiating from it, and later as a circle atop a vertical line from which two lines extend laterally right and left at a midpoint and two more lines slope downward from the bottom point. Thus, in depicting an object or scene that he has viewed, a child represents not so much its concrete-level characteristics as the structure that he can sense in it at the semiabstract level of palpability.

It must be emphasized that such schematizations are not what impinges on one's retinas. What impinges on one's retinas are the particularities of ostension: the bulk, edges, textures, shadings, colorings, and so on of an entity looked at. Yet, what emerges from the child's hand movements are not such particulars of ostension, but rather one-dimensional lines forming a structural schematic delineation. Accordingly, much cognitive processing has to occur between the responses of the retinas and these hand motions. This processing in a principled fashion reduces, or "boils down," bulk into delineations.

As proposed in this study, such structural abstractions are in any case necessary for the ception of visual form, both of single objects and of object arrays (see Marr 1982), and constitute a major part of what is sensed at the semiabstract level of palpability. And as proposed in the preceding section, this ception of structural abstraction may be the product of a specific cognitive system. It then appears that the component of the visual system involved in producing external depictions taps specifically into this same abstractional schematic structuring system. In fact, in the developmentally earliest phase of its operation, a child's iconographic capacity would appear to be linked mainly to this structure-processing system, more so than to the cognitive systems for concretely ceiving the full ostension of objects.

The component of language that may partially correspond to this representational explicitness is the closed-class system itself, as characterized in the preceding subsection. The linguistic linkage of overt morphemes to the structural schemas that they represent lends some concreteness to those cognitive entities, otherwise located at the fully abstract level of palpability. These morphemes constitute tangible counterparts to the

abstract forms, permit increased actionability upon them, and perhaps afford greater conscious access to them. The form of such morphemes, however, does not reflect the form of the schemas that they represent, and in this way, this language component differs crucially from the pictorial schematic representations, which do correspond in structure to what they represent.

While this section has pointed to parallelisms of structure between vision and language, it remains to chart the differences. It may be expected that the structure subsystems in vision and language differ in various respects as to what they treat as structural, their degree and type of geometric abstraction, the degree and types of variation that such structural features can exhibit across different cultural groups, and the times and sequences in which these structural features appear in the developing child.

11.5 Some Comparisons with Other Approaches

The present analysis raises a challenge to the conclusions of Cooper and Schacter (1992). They posit "explicit" and "implicit" forms of visual perception of objects—apparently the concepts in the literature closest to this chapter's concepts of the concrete and semiabstract levels of palpability. But they claim that their implicit form of perception is inaccessible to consciousness. We would claim instead, first, that entities such as structural representations that are sensed at the semiabstract level of palpability (like those treated in section 9.4) can in fact be experienced in awareness at least at a vague or faint degree of clarity, rather than being wholly inaccessible to consciousness. And, second, the fact that vision and language—both largely amenable to conscious control—can generally render the structural representations of the structure subsystem explicit suggests that these representations were not inaccessibly implicit in the first place.

Separate cognitive systems for representing objects and spaces have been posited by Nadel and O'Keefe (1978), by Ungerleider and Mishkin (1982), and by Landau and Jackendoff (1993), who characterized them as the "what" and the "where" systems. To be sure, these systems fit well, respectively, into the content and structure subsystems posited in Talmy (1978c/1988b) and here. However, the "where" system would seem to comprise only a part of the structure subsystem, since the former pertains to the structural representation of an extended object array—the field with respect to which the location of a Figure object is characterized—

whereas the latter also includes the structural representation of any single object.

12 THE RELATION OF METAPHOR TO FICTIVITY

Metaphor theory, in particular as expounded by Lakoff and Johnson (1980), accords readily with general fictivity. The source domain and the target domain of a metaphor supply the two discrepant representations. The representation of an entity within the target domain is understood as factive and more veridical. The representation from the source domain that is mapped onto the entity in the target domain, on the other hand, is understood as fictive and less veridical.

For example, linguistic expressions often involve space as a source domain mapped onto time as a target domain. This can be seen in sentences like *The ordeal still lies ahead of us*, and *Christmas is coming*. Here, the static spatial relation of "frontality" is mapped onto the temporal relation of "subsequence," while the dynamic spatial relation of "approach" is mapped onto temporal "succession." In terms of general fictivity, factive temporality is expressed literally in terms of fictive spatiality here.

One observation arising from the fictivity perspective, perhaps not noted before, is that any of the Lakoff and Johnson's three-term formulas—for example, love is a journey, argument is war, seeing is touching—is actually a cover term for a pair of complementary formulas, one of them factive and the other fictive, as represented in (27).

(27) Fictive: X is Y
Factive: X is not Y

Thus, factively, love is *not* a journey, while in some fictive expressions, love *is* a journey. The very characteristic that renders an expression metaphoric—what metaphoricity depends on—is the fact that the speaker or hearer has somewhere within his cognition a belief about the target domain contrary to his cognitive representation of what is being stated about it, and has somewhere in his cognition an understanding of the discrepancy between these two representations.

One reason for choosing to adopt fictivity theory over metaphor theory as an umbrella aegis is that it is constructed to encompass cognitive systems in general rather than just to apply to language. Consider, for example, a subject viewing a round and narrow-gapped C-like figure. In terms of general fictivity, the subject will likely see a C at the con-

crete level of palpability—its factive representation. Concurrently for the same figure, she will sense a complete circle at the semiabstract level of palpability—its fictive representation. She will experience the former representation as more veridical and the latter one as less so, and may experience a degree of discrepancy between the two representations. This, then, is the way that the framework of general fictivity would characterize the Gestalt phenomenon of closure.

As for the framework of linguistic metaphor, if its terms were to be extended to cover vision, they might characterize the perception of the C figure as involving the mapping of a source domain of continuity onto a target domain of discontinuity, so that the subject experiences a visual metaphor of continuity. An extension of this sort should indeed be assayed. But at present, both psychologists and linguists might balk at the notion of closure as a metaphor. Meanwhile, the outline of a general framework for addressing such phenomena across cognitive systems is here in place.

13 FICTIVE X

In this section, we recap and augment the observations throughout the text that phenomena other than motion can have fictive status in both language and vision. The cognitive phenomenon of fictivity is more general than just fictive motion, in fact covering **fictive X**, where X can range over many conceptual categories.

To begin with, the counterpart of fictive motion, namely, fictive stationariness, has already been seen in frame-relative motion. In the examples given, when the scenery is fictively treated as moving toward the observer, the observer herself is fictively treated as stationary. In addition, certain linguistic formulations treat motion as if it were static. For example, instead of saying *I went around the tree*, which explicitly refers to my progressive forward motion, one can say *My path was a circle with the tree at its center*, which confines the fact of motion to the noun *path* and presents the remainder of the event as a static configuration.

Visual counterparts of fictive stationariness can be found in the viewing of such phenomena as a waterfall or the static pattern of ripples that can form at a particular location along a flowing stream. Here, one ceives a relatively constant configuration while all the physical material that constitutes the configuration constantly changes. This situation is the reverse of the "pattern paths" of section 8.1. There, the physical substance was

for the most part factively stationary, while the fictive pattern that it formed moved. Here, the physical material is factively moving, while the fictive pattern that it forms is stationary.

Comparably, fictive change in some property was already seen in the coextension path example in (26c): *The soil reddens toward the east*. Here, a factively static situation—a spatially distributed difference in color—is fictively reconstrued as a progressive change in color as one's attention fictively moves across the space. Another example of this type is *The road disappears for a while by the lake and then reappears toward the border*. Here, the factive spatial arrangement of two sections of road with no road between them is fictively construed as a single continuous entity, and as one fictively moves one's attention along this entity, it fictively changes from being present, to being absent, to being present again.

We can present another example for a further fictive category. Parallel to frame-relative motion and stationariness are frame-relative change and staticity. Exemplifying these two types is the following sentence that could be wryly uttered by a professor: *The entering freshmen keep getting younger*. Here, factively, the professor is getting older, while the students on average stay the same in age. But the sentence fictively depicts the professor as static in age, while the students change downward in age.

Visual perception may also exhibit fictive change and stasis without the involvement of motion. Although relevant experiments have apparently not been conducted, we can suggest a type of experiment to try. A subject would look at a central disk of one brightness encompassed by a surround of a different brightness. Then the surround is factively made brighter while the center factively retains its original brightness. Here, the subject may instead perceive the center as becoming darker while the surround remains the same. For such a subject, the center would be undergoing fictive change, while the surround exhibits fictive stasis.

Finally, recall that both language and visual perception exhibit fictive presence in the form of abstract schematic structure that they can impute to entities. Thus, the English preposition *in*, as used in a sentence of the form *X is in Y*, imputes an "envelope + interior" schema to Y. The delineations of this schema are not factively to be found in Y, hence we can say that this schema has a fictive presence in Y. And this schema is in fact conceptually imposed on Y regardless of Y's factive particulars of ostension. In a comparable way, as part of one's visual perception on viewing a human figure in some posture, one may fictively sense the presence within the bulk of the figure a schematic "stick figure" consisting

of a certain arrangement of axes of elongation—something that is not factively present in the human body.

14 A COGNITIVE BIAS TOWARD DYNAMISM

Now that we have further elaborated the nature of fictive motion and fictive stationariness, we can compare their relative frequency of occurrence in language and, perhaps also, in vision. In terms of metaphor theory, fictive motion in language can be interpreted as the mapping of motion as a source domain onto stationariness as a target domain. A mapping of this sort can be seen as a form of cognitive **dynamism**. Fictive stationariness, then, is the reverse: the mapping of stationariness as a source domain onto motion as a target domain. This sort of mapping, in turn, can be understood as a form of cognitive **staticism**. Given this framework, it can be observed that, in language, fictive motion occurs preponderantly more than fictive stationariness. That is, linguistic expressions that manifest fictive motion far outnumber ones that manifest fictive stationariness. In other words, linguistic expression exhibits a strong bias toward conceptual dynamism as against staticism.

The cognitive bias toward dynamism in language shows up not only in the fact that stationary phenomena are fictively represented in terms of motion more than the reverse. In addition, stationary phenomena considered by themselves can in some cases be represented fictively in terms of motion even more than factively in terms of stationariness. The factive representation of a stationary referent directly as stationary is what chapter I-1 terms the "synoptic perspectival mode," and—in a related way—what Linde and Labov (1975) term a "map," and what Tversky (1996) terms the "survey" form of representation. This is illustrated in (28a). Correspondingly, its fictive representation in terms of motion exemplifies Talmy's "sequential perspectival mode," and, comparably, what both Linde and Labov and Tversky term the "tour" form of representation, as illustrated in (28b).

(28) a. There are some houses in the valley.
b. There is a house every now and then through the valley.

While this example allows both modes of representation, other examples virtually preclude a static representation, permitting only a representation in terms of fictive motion for colloquial usage, as seen in (29).

(29) a. ??The wells' depths form a gradient that correlates with their locations on the road.
b. The wells get deeper the further down the road they are.

In a similar way, factively static phenomena in cognitive systems other than language may also be more readily cognized in fictively dynamic terms than in static terms. For example, in vision, on viewing a picture hanging on a wall at an angle, a person may more readily ceive the picture as a square that has been tilted out of true and that calls for righting, whereas he may require a special effort to ceive the picture statically as a diamond. Comparably, in the cognitive system of reasoning, one usually progresses through a proof step by step rather than seeing the full complement of logical relationships all at once.

In fact, cognitive dynamism is so much more the normal mode that the cognizing of staticism is often regarded as a special and valued achievement. Thus, an individual who suddenly ceives all the components of a conceptual domain as concurrently co-present in a static pattern of interrelationships is said to have an "aha experience." And an individual that ceives a succession of one consequent event after another through time as a simultaneous static pattern of relationships is sometimes thought to have had a visionary experience.

Notes

1. This chapter is a moderately revised version of Talmy 1996a.

I am grateful to Lynn Cooper, Annette Herskovits, Kean Kaufmann, Stephen Palmer, and Mary Peterson for much valuable discussion. And my thanks to Karen Emmorey for corroborative data on fictive motion in American Sign Language, most of which unfortunately still remains to be incorporated in an expanded version of this study.

2. This study is planned as the first installment on a more extensive treatment of all the fictive categories.

3. Bucher and Palmer (1985) have shown that, when in conflict, configuration can prevail over motion as a basis for ascription of "front" status. Thus, if an equilateral triangle moves along one of its axes of symmetry, then that line is seen as defining the front-back. Whether the triangle's vertex leads along the line of motion, or trails, it is still seen as the front. Where the vertex trails, the triangle is simply seen as moving backward.

4. Note that the notion of crossing behind a front-bearing object may be partially acceptable, possibly due to a conceptualization like this: The posited intangible line, while more salient in front, actually extends fully along the front-back axis of the object.

5. Due to the constraint noted above, this construction cannot refer to nonaligned fictive paths—for example, **The snake is lying past the light* to refer to a snake lying straight with its head pointing past the light. Still needing explanation, however, is why this construction can also not be used for aligned arrangements with path geometries other than 'toward' or 'away from', as in **The snake is lying into/out of the mouth of the cave* to refer to a snake lying straight with its head pointing into or out of a cave mouth.

6. The Experienced is optionally included in or omitted from the type of construction in (i).

(i) I looked into the valley (at the mound located in its center).

7. Other forms of agency probably function more poorly as models. Such other forms might include an Agent's affecting some cognitive state within herself (e.g., making herself feel happy), or an Agent's affecting some proximal physical object that she is already in contact with.

8. This mapping may be reinforced by the fact that the prospect path ascribed to an inanimate configuration, such as a cliff wall or a window, is often associated with an actual viewer located at that configuration and directing her or his visual path along the same path as the prospect line. Thus, in (i), one readily imagines a viewer standing at the cliff edge or in the bedroom looking out along the same path as is associated with the cliff wall or the window.

(i) a. The cliff wall faces/looks out toward the butte.
    b. The bedroom window faces/looks out/opens out toward the butte/onto the patio.

9. To note the correspondences, Jackendoff (1983) has abstracted a concept of pure "directedness" with four particularizations. The first of these is actual motion. The second is "extension" (e.g., *The road goes from New York to LA*), corresponding to our coextension paths. The third is "orientation" (e.g., *The arrow points to/toward the town*), which corresponds to the demonstrative subtype of our orientation paths. The fourth is "end location" (e.g., *The house is over the hill*), which corresponds to our access paths.

10. However, Karen Emmorey (personal communication) notes an apparent counterexample to this condition in American Sign Language. The example is where one signs that a car is racing across pavement and goes into a skid. She writes: "The signer uses the classifier for vehicles (thumb, index, and middle finger extended; palm oriented to left) to represent the car, and the classifier for flat objects (B handshape, fingers extended and touching, palm down) to represent the pavement. To show the pavement rushing past underneath the car, the B handshape moves rapidly back and forth under the vehicle classifier. This shows the fictive motion of the pavement. For this expression the vehicle classifier does not move. But then when the signer shows the car going into a skid, the vehicle classifier turns on its edge and moves in an arc. At the same time, the B handshape representing the avement rushing past continues to move."

11. Given the extent of frame-relative motion and its alternate reframings in human cognition and language, it can be posed as a puzzle why, in the history of the mainstream of scientific thought, it took so long for the idea of a rotating earth even to be considered as a possibility beside the idea of the sky or its luminous bodies as circling around the earth. One contributing element may be the apparent cognitive factor that stationariness, rather than either translational or rotary motion, is basic for an observer. This cognitive bias may have long tilted astronomical theorizing toward the view that the entities external to the earth are in motion relative to us.

12. The term and perhaps the basic concept of "ception" derive from a short unpublished paper by Stephen Palmer and Eleanor Rosch titled "'Ception': Per- and Con-." But the structuring of the ception concept found here, as well as the parameters posited to extend through it, belong to the present approach.

Already in common usage are other terms are neutral to any perception-conception distinction, though perhaps without much recognition of conferring that advantage. Such terms include "representation," to "experience," to "cognize," and sometimes "cognition." All these terms have their particular applications and will be used in this chapter. But the new term "ception" is specifically intended to emphasize the continuity across the larger domain and the existence of largely gradient parameters that span it.

13. Perhaps this parameter alone out of the 13 has an open-ended upper region, allowing increasingly greater degrees of intensity. Thus, the point along this parameter that would tend to correlate with the high ends of the other parameters should be located within its upper region.

14. Recall that this entry, like the others, is intended as a phenomenological parameter. An entity is assigned to the high end of the gradient because it is *experienced* as being "out there," not because it fits a category of a theoretical ontology according to the tenets of which the entity "*is*" out there.

Though the experience of external versus internal is the relevant issue for the present parameter, we can note that our usual scientific ontology would maintain something like the following about the perception of an entity that it takes to be located external to one's body. Once stimuli from the entity impinge on the body's sensory receptors, the neural processing of the stimuli, including the portion that leads to conscious experiencing of the entity, never again leaves the body. Despite this fact, we experience the entity as external. Our processing is specifically organized to generate the experience of the entity's situatedness at a particular external location. We lack any direct conscious experience that our processing of the entity is itself internal. In physiological terms, we apparently lack brain-internal sense organs or other neural mechanisms that register the interior location of the processing and that transmit that information to the neural consciousness system.

15. The adoption of the verb "to sense" as a term for this purpose is derived from its everyday colloquial usage, not from any other uses that this word may have been put to in the psychological literature.

16. See Petitot 1995 for a mathematical model of visual and linguistic structuring of objects in space.

17. As discussed in section 11.2, linguistic forms can select between these two reference-frame alternatives. Thus, English *away from* selects for the rectilinear frame, while *out from* selects for the radial frame, as in the following examples.

(i) The boat drifted further and further away/out from the island.
(ii) The sloth crawled 10 feet away/out from the tree trunk along a branch.

Perhaps related to the sensing of reference frames is the ception of geographic boundaries that are only partially or not at all based on concretely visible physical formations—what Smith (1995) terms "fiat boundaries."

18. As treated extensively in chapter I-1, open-class forms are categories of forms that are large and easily augmented, consisting primarily of the roots of nouns, verbs, and adjectives. Closed-class forms are categories of forms that are relatively small and difficult to augment. Included among them are bound forms like inflectional and derivational affixes; free forms like prepositions, conjunctions, and determiners; abstract forms like grammatical categories (e.g., "nounhood" and "verbhood" per se), grammatical relations (e.g., subject and direct object), and word order patterns; and complexes like grammatical constructions and syntactic structures.

19. We note that linguistic categories like the preceding have been presented only to help illustrate the abstract end of the palpability parameter, not because that parameter is relevant to general fictivity in language. It should be recalled that the palpability gradient has been introduced here mainly to help characterize general fictivity in vision. Though linguistic reference can be located along it, this parameter is not suitable for characterizing general fictivity in language. As discussed, general fictivity in language involves the discrepancy between the representation of one's belief about a referent situation and the representation of a sentence's literal reference. The mapping of two such language-related representations into the visual modality does tend to involve a palpability contrast, but the original two representations themselves do not.

20. Talmy (1978c, 1988b) first observed this homology between vision and language as to a content/structure distinction. These papers also present an expanded form of the linguistic demonstration synopsized below.

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Chapter 3

How Language Structures Space

1 INTRODUCTION

This chapter is concerned with the structure ascribed to space and the objects within it by linguistic "fine structure," the subdivision of language that provides a fundamental conceptual framework.[1] The primary aim of the chapter is to characterize the general properties of this structuring and the linguistic-cognitive system in which it participates.

Previous linguistic space studies, by authors like Gruber (1965), Fillmore (1968), Leech (1969), Clark (1973), Bennett (1975), Herskovits (1982), Jackendoff (1983), and indeed, myself (Talmy, 1972, 1975a, 1975b), have laid a groundwork by isolating many of the basic geometric and dimensional distinctions that languages mark, and by recognizing the patterns that these form.[2] The present study, however, aims beyond pure description of spatial categories to an account of their common fundamental character and place within larger linguistic-cognitive systems.

This aim is addressed in several ways. First, the chapter considers the foundational role played in linguistic space descriptions by **schematization**—a process that involves the systematic selection of certain aspects of a referent scene to represent the whole, while disregarding the remaining aspects. A range of schematization types is documented in section 2, including some by which a scene receives its primary division into subparts and some that attribute to these parts certain structural conformations. Section 3 then provides an overview of the little-recognized generic properties of schematization; these properties include idealization, abstraction, and a topological type of plasticity, as well as a disjunct character, which permits alternative schematizations of a single scene.

Second, the study addresses the cognitive processes attending schematization in communication, treating both the speaker's decision-making

process concerning the alternative of schematization and degree of specificity she wishes to convey for a scene and also the listener's image-constructing process as it interacts with this selection (section 3.2).

Finally, the findings on how languages represent space are taken as a particular case of the system by which language represents meaning in general, with the conclusion that this system is not so much "classificatory" in a strict sense as it is *representative*, supplying the requisite schemas for a sufficiently dense and distributed "dotting" of semantic space (section 4.1.1).

A few comments may be in order on the manner of presentation. I have concentrated on English as my primary source of examples. But the general applicability of the examples—and such generality is the aim since this study's concern is with universal properties of languages—is underwritten by my work with a range of languages. Finally, since first-order observations must precede higher-level generalizations, section 2 is primarily devoted to cataloging certain major types of scene and object schematizations, while section 3 abstracts their common properties and determines the larger system in which these take part. Thus, the reader more concerned with theoretical demonstration and systematic principles can skip directly to section 3 and infer many of the particulars described earlier.

1.1 The Fine-Structural Level of Language

The fact that this analysis will focus on only one subdivision of language, its "fine-structural level," calls for some justification. In a study of how conceptual material is represented in language, one must distinguish two main levels, each with possibly distinct properties and organization. One of these is the macroscopic expository level. Here, within the scope of a sentence, a paragraph, or a whole discourse if need be, one can convey conceptual content of any sort, including feelings, local gossip, and practical medicine—or indeed, the organization of space, time, and causality. The main resource for this level is a language's stock of open-class lexical elements—that is, commonly, the stems of nouns, verbs, and adjectives.

The second level, which can be characterized as the fine structural, is that of closed-class "grammatical" (as distinguished from "lexical") forms—including grammatical elements and categories, closed-class particles and words, and the syntactic structures of phrases and clauses, as detailed in chapter I-1.[3] These forms also represent conceptual material, but from a much more limited array. They do not refer to items of gossip

or medicine. They represent only certain categories, such as space, time (hence, also form, location, and motion), perspective point, distribution of attention, force, causation, knowledge state, reality status, and the current speech event, to name some main ones. And, importantly, they are not free to express just anything within these conceptual domains but are limited to quite particular aspects and combinations of aspects, ones that can be thought to constitute the "structure" of those domains. Thus, the closed-class forms of a language taken together represent a skeletal conceptual microcosm. Moreover, this microcosm may have the fundamental role of acting as an organizing structure for further conceptual material (including that expressed by the open-class elements)—as if it were a framework that the further material is shaped around or draped over. More speculatively, this language-based microcosmic selection and organization of notions may further interrelate with—and even to some degree constitute—the structure of thought and conception in general. Hence, the importance of determining the fine-structural level's representation of various conceptual domains—and in particular that of space, under study here, which itself may play a central role by functioning as a (metaphoric) model for the structuring of other domains.

An illustration can be given of the exclusive nature of the fine-structural system—the fact that only certain notions and not others are permitted representation—with this example of spatial descriptions that one person might give to another while standing at the edge of a field.

(1) a. This field is plowed in concentric circles. Look at the middlemost furrow. There is a pit dug at one point of it. The plow you are looking for is in that pit.

Here, a complex set of spatial configurations and relationships are conveyed in an expository paragraph. That may well be the only way to do so. But now consider another expository description, one that seems comparable to (1a) except that it is still more complex.

(1) b. This field has two borders that are relevant to us. These two borders are roughly parallel and don't coincide. Any perpendicular line between them would run crosswise to the pull of gravity—in other words, would be horizontal. We're standing at one point on one border. There's a point on the other border that's roughly on a perpendicular line drawn from our point. The plow you're looking for is at that point.

What is special in this case is that all the spatial information can be equivalently conveyed in English by a single closed-class word, the preposition *across*, as in

(1) b′. The plow is across the field.

By contrast, there is no simplex word that represents the spatial information in (1a), a word that would function like the hypothetical preposition *apit* in

(1) a′. *The plow is apit the field.

Moreover, a search through the world's languages would probably turn up no cases of a closed-class element representing the (1a) configuration, whereas the (1b) configuration is clearly well represented. What is it about some spatial configurations, but not others, that makes them crosslinguistically suitable for fine-structural representation, and hence foundational status? This study will research the properties common to such special forms.

The fact that this study, for the sake of accessibility, draws mainly on English to demonstrate points about spatial fine structure will necessarily involve us in a treatment predominantly of prepositions. However, the points made apply generally to the comparable closed-class elements of other languages as well—hence, also to space-indicating noun affixes, postpositions, adpositional phrases based on a noun, affixes on the verb, and so on.

2 BASIC SPATIAL DISTINCTIONS MADE BY LANGUAGE

Our conceptualization of spatial structure can be understood to exhibit two main subsystems. One subsystem consists of all the schematic delineations that can be conceptualized as existing in any volume of space. This subsystem can be thought of as a matrix or framework that contains and localizes. Static concepts relevant to it include **region** and **location**, and dynamic concepts include **path** and **placement**.

The second subsystem consists of the configurations and interrelationships of material occupying a volume of the first subsystem. The second subsystem is thought of more as the contents of space. Such contents can constitute an **object**—a portion of material conceptualized as having a boundary around it as an intrinsic aspect of its identity and makeup—or a **mass**, conceptualized as having no boundaries intrinsic to its identity and makeup.

The material subsystem of space can bear certain static relations to the matrix subsystem of space. With respect to relations that it can exhibit directly, material can, for example, **occupy** a region and be **situated** at a location.

Spatial properties that material entities exhibit in themselves or with respect to each other can also be related to schematic delineations of the containing framework. We can see three forms of this. First are the spatial properties that a single object or mass of material exhibits in itself. Examples are the contour of the entity's external boundary that determines its shape—for instance, the shape of a doughnut or a skyline—and its internal structure, such as the interior disposition of a solid or a latticework. Second are the spatial properties that one material entity can have with respect to another. These include geometric relations, like those specified by such English prepositions as the ones in *X is near|in|on Y*, as well as ones specified more elaborately. Third are the spatial properties that a set of material entities can exhibit as an ensemble. These include their "arrangement," potentially to be conceptualized as a Gestalt of geometric patterning, as in a cluster or a sheaf. (An ensemble whose multiplex composition has been backgrounded can be conceptualized spatially in the same way as a single object or mass.)

The material subsystem of space can also bear certain dynamic relations to the matrix subsystem of space. With respect to relations that it can exhibit directly, material can, for example, **move** through a region or along a path, or exhibit a **transposition** from one location to another. Spatial properties that material entities exhibit in themselves or with respect to each other can also be related to schematic delineations of the containing framework in the same three ways as before. Thus, first, a single material entity can exhibit dynamic spatial properties in itself. Examples include change of shape—for example, twisting or swelling. Second, one entity can execute various paths relative to another entity. Examples are the paths represented by the English prepositions in *X moved toward|past|through Y*. Third, a set or ensemble of entities can alter their arrangement. Examples of this are scattering and converging.

2.1 The Primary Breakup of a Spatial Scene

One main characteristic of language's spatial system is that it imposes a fixed form of structure on virtually every spatial scene. A scene cannot be represented directly at the fine-structural level in just any way one might wish—say, as a complex of many components bearing a particular

network of relations to each other. Rather, with its closed-class elements and the very structure of sentences, the system of language is to mark out one portion within a scene for primary focus and to characterize its spatial disposition in terms of a second portion (as treated in this section), and sometimes also a third portion (treated in section 2.7), selected from the remainder of the scene. The primary object's **spatial disposition** here refers to its site when stationary, its path when moving, and often also its orientation during either state.

2.1.1 Characterizing One Object's Spatial Disposition in Terms of Another's The spatial disposition of a focal object in a scene is largely characterized in terms of a single further object, also selected within the scene, whose location and sometimes also "geometric" properties are already known (or assumed known to an addressee) and so can function as a reference object (see the more detailed discussion in chapter I-5). The first object's site, path, or orientation is thus indicated in terms of distance from or relation to the geometry of the second object. For example, in the sentences

(2) a. The bike stood near the house.
b. The bike stood in the house.
c. The bike stood across the driveway.
d. The bike rolled along the walkway.

the bike's site is characterized in (2a) by *near*, in terms of distance from the house's location ("proximal"). The bike's site is characterized in (2b) by *in*, in terms of the house's location *and* geometry ("colocational" + "part of interior"). The bike's site *and* orientation are characterized in (2c) by *across* in terms of the driveway's location and geometry ("colocational" + "the former's axis perpendicular to the latter's long axis"). And the bike's *path* is expressed in (2d) by *along* in terms of the walkway's location and geometry ("colocational" + "colinear with the long axis"). Throughout characterizations of this sort, it remains implicit that the second object can be used as a reference only by virtue, in a recursive manner, of its own known spatial disposition with respect to the remainder of the scene. That is, spatial characterizations expressed overtly (as with prepositions) ultimately rest on certain unexpressed spatial understandings.

The distinct referencing functions that have here been isolated for a scene's two main objects are seen generally, though not absolutely, to

correlate with other property differences between the two objects. The alignment is as follows:

(3)

Primary object	*Secondary object*
• Has unknown spatial (or temporal) properties to be determined	Acts as a reference entity, having known properties that can characterize the primary object's unknowns
• More movable	More permanently located
• Smaller	Larger
• Geometrically simpler (often pointlike) in its treatment	Geometrically more complex in its treatment
• More recently on the scene/in awareness	Earlier on the scene/in memory
• Of greater concern/relevance	Of lesser concern/relevance
• Less immediately perceivable	More immediately perceivable
• More salient, once perceived	More backgrounded, once primary object is perceived
• More dependent	More independent

It might be argued for cases like (2) that language simply relates two objects in space without any inequality of status—in other words, without one serving as reference for the other. But the semantic reality of their functional difference can be demonstrated simply by interchanging their nouns in a sentence pair like that in (4).

(4) a. The bike is near the house.
b. The house is near the bike.

One could have expected these sentences to be synonymous on the grounds that they simply represent the two inverse forms of a symmetric spatial relation. But the obvious fact is that they do not have the same meaning. They *would* be synonymous if they specified *only* this symmetric relation—that is, here, the quantity of distance between two objects. But in addition to this, (4a) makes the nonsymmetric specification that the house is to be used as a fixed reference point by which to characterize the bike's location, itself to be treated as a variable. These nonsymmetric role assignments conform to the exigencies of the familiar world, where in fact houses have locations more permanent than bikes and are larger landmarks, so that (4a) reads like a fully acceptable sentence. The sentence

in (4b), on the other hand, sounds quite odd, and is thereby well flagged as semantically distinct from (4a). Since the assertion of nearness is unchanged, the reason for the difference can only be that (4b) makes all the reverse reference assignments, ones that in this case do not happen to match the familiar world.

It might at first be thought that certain grammatical constructions, like the reciprocal, are means available in a language specifically to avoid assigning different referencing roles, which otherwise are inescapably imposed upon a basic proposition in formulations like (4). But in fact, the reciprocal does not abstract the symmetric relation common to the inverse asymmetric forms, but rather *adds* the two together. This is shown by the fact that the reciprocal for the preceding example

(5) The bike and the house are near each other.

sounds odd in just the same way as (4b) itself—that is, because of the implication that the house is somehow a floating entity to be fixed with respect to a stable bike.

2.1.2 Figure and Ground The distinct roles played by the "primary" and "secondary" objects just described for linguistic schematization appear to be closely related to the notions of "Figure" and "Ground" described in Gestalt psychology, and the same terms can be applied to them. Thus, in examples (2a) and (2b), *bike* functioned as the **Figure** and *house* as the **Ground**. But for their specifically linguistic application, the Figure and Ground concepts must be given the following particular characterization.

(6) *The general conceptualization of Figure and Ground in language*
The Figure is a moving or conceptually movable entity whose site, path, or orientation is conceived as a variable the particular value of which is the relevant issue.
The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure's site, path, or orientation is characterized.

In a linguistic context, the term **Reference Object** may at times be more suggestive than Ground and will be used interchangeably with it from now on.[4]

In a linguistic context, the Figure and Ground notions amount to semantic roles or "cases," in the sense of Fillmore's (1968) "Case

Grammar.'' The present notions, in fact, compete with those of Fillmore, and certain advantages can be claimed for them. Full comparison aside (see chapter I-5), one main difference is that four Fillmorian cases—''Locative,'' ''Source,'' ''Path,'' and ''Goal''—because they incorporate particulars of direction, fail to capture the crucial spatial factor they have in common, their function as reference object for a figural element, a function specifically delegated to our Ground notion. Further, because it names separate cases for several different incorporated directionals, Fillmore's system is open to question over how it can handle novel directional distinctions that some language might mark or directions that do not clearly fit any established case. For example, should the directionals represented by the prepositions in *The ball rolled across the crack./past the TV./around the lamp*. all be classed as ''Path''? By identifying a core Ground notion, our system can set up a separate Directional component for the various attendant path types—one that can, within universal constraints, expand or contract and exhibit somewhat different structurings as appropriate for each particular language. This separation, moreover, corresponds to the usually encountered division of morpheme classes, where the Ground notion is expressed by a noun root (plus any modifiers) and the Directional notions by closed-class elements such as noun affixes or adpositions.

2.2 Figure and Ground Geometries and Their Relations

The particular spatial schemas ascribed to Figure and Ground objects by closed-class elements of languages can be specifically termed **geometries**, and their basic types and distinguishing features can be regarded as a map of the kinds of spatial discriminations language is concerned with.

One major feature of this ''map'' is that closed-class spatial elements generally characterize the Figure's geometry much more simply than the Ground's geometry. The explanation for this can perhaps be found in our very mode—in large part presumably innate—of conceiving, perceiving, and interacting with the contents of space. In this mode, our predominant concern is with a smaller portion of focal interest within a broader field and, often also, with a determination of that portion's spatial relation to the field, so that we can achieve direct sensory (or imaginal) contact with it. The very concept of the ''location'' of an object within space—with its implication of an immediate containing region, itself cross-indexed within the space—owes its existence and character to this cognitive mode. And ''localizing'' an object (determining its location), in turn, involves

processes of dividing a space into subregions or segmenting it along its contours, so as to "narrow in" on an object's immediate environment. Accordingly, elements like prepositions largely delineate a field and the reference objects in it with some particularity, while typically treating the focal object as reducible simply to a geometric point. Nevertheless, some spatial elements do indicate greater Figural complexity, and their types are analyzed in sections 2.2.1 and 2.2.2.

As just noted, closed-class specifications for Figure geometries more complex than a point do exist and are addressed at length in this chapter. But Levinson (1992) cites the Mayan language Tzeltal as a challenge to the idea that point geometries always predominate. He notes that in referring to a locative situation (though not to a motion event), Tzeltal typically uses a verb that refers to the Figure's shape and orientation, doing so, in fact, more specifically than the abstractions of our usual geometric schemas. Further, the Ground nominal is often accompanied solely by a generic locative preposition that can cover the range of English *at*, *in*, *on*, and *near*. His point is that Tzeltal uses a strategy for the listener to locate a Figure object in a surrounding scene that depends on scanning for and spotting the object from linguistically specified shape characteristics, rather than on partitioning the scene with elaborate Ground geometries and finding the Figure with respect to that.

While it may be true that Tzeltal locative sentences are often constructed as just described, several points in Levinson's argument about them can be faulted. Most important, the Tzeltal verbs that refer to the Figure's shape and orientation—the "position" verbs—are not a small closed class, but rather number in the hundreds, and thus either are or come near to being an open class. The claim in this chapter for a preponderance of Figural point geometry pertains only to closed-class forms, and so this claim remains unchallenged by the Tzeltal data. If open-class forms were to be included in consideration, then we would need to note that English also has no small number of verbs that refer to the Figure's shape and orientation. Examples include *lie*, *sit*, *stand*, *lean*, *dangle*, *squat*, *kneel*, *crouch*, *sprawl*, *bow*, *bend*, *curve*, *arch*, *sag*, *droop*, *cluster*. Further, position verbs are not obligatory in Tzeltal locative sentences. The language also has a generic 'be located' verb comparable to English *be*. And the language can in addition use verbs with no reference to the Figure's shape or orientation—for example, ones with meanings like 'roast' or 'dry', as in *The beetle is roasting|drying at the fire*. Finally, with

its closed-class set of prepositional complexes, Tzeltal can as readily refer to elaborate Ground geometries as English. (Levinson makes a point of the fact that much of this set derives by analogic processes from body-part terms, but whatever its diachronic origins, this set is today a schematically abstract closed-class system.)

A further general feature of the "map" of geometric distinctions that languages typically mark is that objects are not characterized as to just any properties of physical configuration or makeup. Missing from the catalog of geometric types that follows, for example, are virtually all properties specific to metric spaces (including the Euclidean) such as particular size, length, distance, angle, or contour, as well as more substantive properties like texture, material, or identity. Instead, the objects are characterized almost solely by more qualitative or "topological" properties such as their type of structural conformation, degree of subdivision ("partiteness"), number of relevant dimensions, boundary conditions, and symmetry versus distinguishability of parts.

2.2.1 Geometric Relations of a Nonpoint Figure to a Ground Though the seeming majority of spatial elements schematize the Figure solely as a point or related simple form, in contrast with the treatment given the Ground, one type accords the Figure a full geometry and relates it to that of the Ground. Elements of this type can in fact represent a quite elaborate spatial complex, simultaneously indicating a particular geometry for the Figure, another one for the Ground, the Figure's position or path with respect to the Ground, and the concurrent relation of the Figure's geometry to that of the Ground—that is, its orientation thereto. An example of this type is the English preposition *across*, as in

(7) The board lay across the railway bed.

The preposition here indicates that the Figure (the board) is linear, that the Ground (the railway bed) is "ribbonal"—in other words, a plane bounded along two parallel edges (what Herskovits (1986) terms a "strip")—and that these two forms bear certain positional and orientational relations to each other, summarized as follows.

(8) (F = the Figure object; G = the Ground object)
   a. F is linear (and generally bounded at both ends).
   b. G is ribbonal: a plane with two roughly parallel edges as long as or longer than the distance between them.

c. The axis of F is horizontal.
(The plane of G is typically, but not necessarily, horizontal.)
d. The axes of F and G are roughly perpendicular.
e. F is parallel to the plane of G.
f. F is adjacent to—not in—the plane of G.
g. F's length is at least as great as G's width.
h. F touches both of G's edges.
i. Any extension of F beyond G's edges is not enormously greater on one side than on the other, nor than the width of G itself.

If one or the other of these factors fails to hold in a referent situation, then some expression other than *across* must be used. For example, the plane of the Ground may be vertical, but if the axis of the Figure is still horizontal, as in the parenthesized sentence of (9c′), then *across* can still be used. But if the Figure is not horizontal (factor c), then instead of *across* one must use some expression like *up and down on/against*, as in the unparenthesized sentence of (9c′). If the Figure's axis is not perpendicular to that of the Ground (factor d) but rather parallel to it, then *along* is more suitable, as in (9d′). If the Figure is not parallel to the plane of the Ground (factor e) but is rotated away from it, then a locution like *stick into/out of* may apply, as in (9e′). If the Figure is not adjacent to the plane of the Ground (factor f) but is part of it, then the preposition *in* is more appropriate, as in (9f′). If the Figure's length is not great enough to span the Ground's width (factor g), then the preposition *on* is more fitting, as in (9g′). Next consider the case where the Figure is long enough to be able to span the Ground's width and indeed is perpendicular to the Ground's length, but, say, is so positioned as to lie half on and half off the ribbon of the Ground. Here, the Figure does not touch both edges of the Ground (factor h), but it does satisfy all the factors (a) through (g). But then the form *across* would again no longer apply, and some locution like *half on* or *extend halfway onto* would be needed, as in (9h′). Finally, if the Figure satisfies all of the earlier factors but extends beyond both edges of the Ground by an amount disproportionately large relative to the width of the Ground (factor i), then one might use the preposition *over* instead of *across*, as in (9i′ (i)). And if the Figure extends disproportionately beyond just one edge of the Ground, then a locution referring to one end of the Figure might be used, as in (9i′ (ii)).

(9) c′. (The spear hung across the wall.) The spear hung up and down on the wall.

d′. The board lay along the railway bed.
e′. The board stuck (obliquely) into the railway bed. / The (horizontally level) spear stuck (obliquely) into the wall.
f′. The board lay (buried) in the railway bed.
g′. The board lay on the railway bed.
h′. The board lay half across the railway bed/extended halfway across the railway bed/extended onto the railway bed.
i′. (i) The 50-foot board lay over the railway bed.
(ii) The end of the 50-foot-long board lay across the railway bed.

2.2.2 The Orientation of the Figure Relative to the Ground Prepositions of the *across* or *along* type can generally be used even in situations where a Figure's site relative to a Ground is already known. In this case, they shed their localizing function and serve solely to indicate the Figure's orientation with respect to the Ground. They are then equivalent to expressions like *crosswise to* and *parallel to*, which always indicate orientation alone:

(10) a. The gate was set across/crosswise to the pier.
b. The gate was set along/parallel to the pier.

2.3 The Range of Geometries of the Figure

Looking over those linguistic elements that relate a full Figure geometry to one for a Ground, we find represented a certain array of Figural geometries more complex than just a point. One type here seems universal. Languages allow a term referring to a point Figure that is in motion, and therefore describing a linear path, to apply as well to a linear Figure moving coaxially along the same path, and sometimes also to a stationary linear Figure positioned in coincidence with such a path, as in the following English examples.

(11) (i) *Motion of a point Figure*
(ii) *Coaxial motion of a linear Figure*
(iii) *Coaxial location of a linear Figure*
a. (i) The ball rolled . . . (ii) The trickle flowed . . . (iii) The snake lay . . .
across the railway bed.
b. (i) The ball rolled . . . (ii) The trickle flowed . . . (iii) The snake lay . . .
along the ledge.

c. (i) The ball rolled . . . (ii) The trickle flowed . . . (iii) The snake lay . . .
around the tree trunk.

d. (i) The ball rolled . . . (ii) The trickle flowed . . . (iii) *The snake lay . . .
past the rock.

e. (i) The ball rolled . . . (ii) The trickle flowed . . . (iii) *The snake lay . . .
through the tube.

f. (i) The car drove . . . (ii) The stream flowed . . . (iii) *The road lay . . .
from Burney *to* Redding.

While a stationary linear Figure as such is excluded from the reference of some spatial terms, as in (11d) to (11f), it can be rendered suitable there if it is conceptualized as having a leading edge in virtual motion, or as being scanned along its length by one's focus of attention—as is generally indicated by verbs that unlike *lie*, suggest movement, as in (12).[5]

(12) This road runs past the factory/extends through the tunnel/goes from Burney to Redding.

Reference to a moving point (and, hence, also to a moving coaxial line) may be considered more basic than reference to a stationary line. As one form of evidence for this proposition, those forms in (11) that refer to only one of these two types, rather than covering both types—namely, (11d) to (11f)—all apply to the motion type, not to the locative type. Accordingly, we can reinterpret the linear-locative *across* case in (8), even with its elaborate features, as derived in some way from the moving case, as suggested in (13).

(13) A point moved across a bounded plane.
→ A line was located across a bounded plane.

Thus, although the example of locative linear *across* was introduced as representing an instance of Figural geometry more complex than a point, even it may reduce to a form of Figural point geometry.

Although there is thus some question here whether linear Figure geometry has any original (nonderivative) reference, at least by English prepositions, we can look further to observe that at least some such prepositions do genuinely indicate other nonpoint Figural geometries. One preposition, *over*, in one usage represents the Figure as planar, fur-

ther specifying that it is largely coextensive with and everywhere touching a planar Ground (or a salient planar part of a Ground), as in (14).

(14) The tablecloth lay over the table. / The tapestry hung over the east wall of the living room.

An additional group of prepositional expressions characterizes the Figure as a distributed quantity—indifferently, either as a continuous mass or a composite aggregate. These expressions further distinguish the Figure as having a one-, two-, or three-dimensional distribution in agreement with the dimensionality of the Ground object, as shown in (15).

(15)

		The Ground is:
{There was oil / There were droplets of oil}	*all along* the ledge.	linear
	all over the table.	planar
	throughout the aquarium.	volumar

(Note that *over* and *all over* behave in the distinct ways outlined here and are not interchangeable.)

2.4 The Range of Geometries of the Ground

In accordance with our mode of cognizing space, linguistic closed-class elements—while they usually treat the Figure as a point or simple extension thereof—mark an elaborate range of geometric distinctions for the Ground. Certain main types in this range are surveyed here and in the next section.

2.4.1 Degree of Partiteness In one such type, the Ground's "partiteness" is marked in degrees increasing from unity to comminution. One such series of English prepositions is presented in (16).

(16) *Prepositions indicating progressively greater partiteness for the Ground*

The Ground is treated schematically

as a single point by *near*:

a. The bike stood *near* the boulder.

a point pair by *between*:

b. The bike stood *between* the boulders (i.e., two of them).

a set of points—more than two, but typically not very many—by *among*:

c. The bike stood *among* the boulders.

as an aggregate mass—that is, a set of points that are numerous enough, and closely enough spaced relative to their size, to approximate or be conceptualized as a continuous mass—by *amidst*:

d. The bike stood *amidst* the cornstalks.

As a kind of limiting case for this series, *through* in one of its motion usages characterizes the Ground as anything from an aggregate on up to a continuous mass, a range that can be generalized as forms of a *medium*:

e. The tuna swam *through* the minnows/the seaweed/the polluted water.

2.4.2 Qualitative Geometric Configuration Another group of prepositions—usually referring basically to motion—represents the Ground as of one or another qualitative kind of integrated geometric configuration, as shown in (17).

(17) *Prepositions indicating different geometric configurations for the Ground*

The Ground is treated schematically

as a bounded plane by *across*:

a. The bike sped *across* the field.

as a linear enclosure—that is, as a kind of cylindrical form—by *through* (in another of its usages):

b. The bike sped *through* the tunnel.

as a surface so curved as to define a single volume by *into*:

c. The bike sped *into* the sports hall.

Languages other than English often mark different, sometimes additional, geometric distinctions for the Ground, ones that can seem quite exotic from our perspective. The class of space-characterizing elements in these languages is not always one of prepositions, or even postpositions, adjacent to the noun that indicates the Ground. Thus, Atsugewi, a California Indian language that I have worked on, has a set of suffixes appearing on the verb that mark some 50 distinctions of Ground geometries and the paths that relate to them. Some dozen of these suffixes mark distinctions covered by the English preposition *into*, which does not itself reflect such finer subdivisions.[6] (The "+" below indicates that the form must be fur-

ther followed by a suffix indicating 'hither' or 'hence'; the superscript vowel represents a special phonological element of this language.)

(18)

-iĉt	'into a liquid'
-cis	'into a fire'
-isp -u· +	'into an aggregate' (e.g., bushes, a crowd, a ribcage)
-wam	'down into a gravitic container' (e.g., a basket, a cupped hand, a pocket, a lake basin)
-wamm	'into an areal enclosure' (e.g., a corral, a field, the area occupied by a pool of water)
-ipsn^{u} +	'(horizontally) into a volume enclosure' (e.g., a house, an oven, a crevice, a deer's stomach)
-tip -u· +	'down into a (large) volume enclosure in the ground' (e.g., a cellar, a deer-trapping pit)
-ikn +	'over-the-rim into a volume enclosure' (e.g., a gopher hole, a mouth)
-iĵs^{u} +	'into a corner' (e.g., a room corner, the wall-floor edge)
-mik·	'into the face/eye (or onto the head) of someone'
-miĉ	'down into (or onto) the ground'
-cis^{u} +	'down into (or onto) an object above the ground' (e.g., the top of a tree stump)
-iĵs	'horizontally into (or onto) an object above the ground' (e.g., the side of a tree trunk)

Although the Atsugewi forms subdivide the semantic domain of *in* beyond what English speakers might have thought that 'in-ness' merited, these forms still by no means get down to any level of semantic primitives. On the contrary, it can be observed that the references of the Atsugewi forms in turn represent easily discernible complexes of still finer components. Thus, the form *-wam* referring to a container and the form *-ipsn^{u} +* referring to an enclosure (specifically, a volumetric type of enclosure) each comprise a constellation of factors and differ from each other with respect to all these factors. The container form indicates that the Figure moves prototypically downward to enter the Ground object, fills much of the empty volume defined by the Ground, is pressed against the sides of the Ground by gravity (hence involving force dynamics in addition to spatial configuration), and would spill radially outward if those sides were not in place. Examples of its usage include the motion of

acorns into a basket, articles into a pocket, and water into a lake basin. By contrast, the enclosure form indicates that the Figure prototypically moves horizontally to enter the Ground, sits alone on the Ground's bottom otherwise surrounded by the empty volume that the Ground defines, does not press against the sides of the Ground, and would remain in place if those sides were not present. Examples of its usage include the motion of a dog into a room, a cake into an oven, a broom into the space between a refrigerator and a wall, and a rock into a deer's stomach. For cases with properties between those of the two constellations, it is probable that Atsugewi speakers would choose one of the two full schematic complexes and impose it on the intermediary spatial referent.

While perhaps reeling from the semantic pyrotechnics of a language like Atsugewi, we should not overlook the additional distinctions that English does mark, not with distinct forms, but with distinct combinations of and constraints on its forms. For example, in referring to entry of an enclosure, either *in* or *into* will serve, as seen in (19a). (In the definitions here and below, braces enclose the type of entity that the prepositional object must refer to.)

(19) a. *in(to):* 'into {an enclosure}'
I ran in the house/into the house.

But there is a separate usage, referring to passage through an opening in the wall of an enclosure, that can be expressed only by *in* and not also by *into*, as seen in (19b). (This same pattern holds for *out* as against *out of*: *I ran out the back door.* / *out of the back door.)

b. *in:* 'through {an opening} into an enclosure'
I crawled in the window/*into the window.

And there is a third usage, for which only *into* will serve, indicating impact with a solid object:

c. *into:* 'into collision with {an object}'
I ran into the wall/*in the wall.

Moreover, while English has such geometrically encompassive forms as *in*/*into*—spanning geometric situations as different as immersion amidst liquid and encirclement by a curved plane—it does also possess forms with finer specifications, ones that thus more closely approximate the Atsugewi-type forms. For example, *inside*, unlike *in*/*into*, can refer to enclosures, but not also to liquids, as seen in (20). Thus, in effect, the

closed-class system of English, like that of Atsugewi, does recognize 'liquid immersion' as a distinct concept, but only, as it were, by **semantic subtraction**, since this concept is merely implicit in the difference between the smaller semantic range of *inside* and the larger one of *in*/*into*.

(20) a. The ball { is in / fell into } the water.
*The ball { is inside / fell inside } the water.
b. The ball { is in / fell into } the box.
The ball { is inside / fell inside } the box.

Finally, English extends its familiar prepositions in their standard constructions to include further reference to various complex geometries. One particular pattern of such extension was already seen in (19b). This pattern accounts for a small set of complex geometric references. In this pattern, a preposition relevant to a certain object A within the geometric complex in reference is used instead with an object B that bears a particular relation to object A.

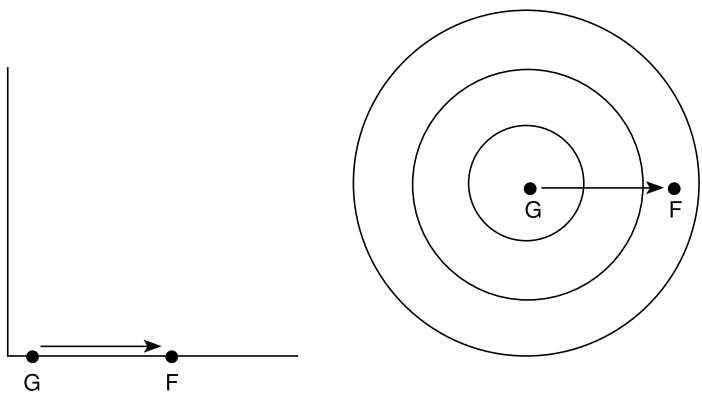
(21) a. *in*/*out:* 'through {an opening} into/out of an enclosure'
I crawled in/out the window.
[as if, e.g., from: I crawled through the window into/out of the house]
b. *across:* 'along/over {a bounded linear extent} across a bounded plane/space'
I walked across the bridge.
[as if, e.g., from: I walked along/over the bridge across the canyon]
c. *around:* 'along {a linear extent} around a bounded plane'
I ran around the track.
[as if, e.g., from: I ran along the track around the field][7]

2.4.3 Association with a Framework A spatial form such as a preposition can appeal not only to geometric characteristics actually present in a Ground object—as just seen for the partiteness or configuration of a Ground object—but also to the geometric characteristics of a virtual framework that is only fictively associated with the Ground. In particular,

a Ground object that is geometrically idealized as a point can be conceptualized as being situated within a rectilinear framework—in effect, at the intersection of the *x*-axis and *y*-axis of a Cartesian coordinate system. Alternatively, it can be conceptualized as situated at the center of a radial or concentric framework—in effect, at the origin of a polar coordinate system. Thus, in English, both *away from* and *out from*, as in (22), refer to the motion of a schematically pointlike Figure along a path that progressively increases its distance from a schematically pointlike Ground. But *away from* suggests the conceptualization that the Ground is, in effect, on a line and that the Figure's path begins at the Ground point and extends perpendicularly to that line, as represented in diagram (23a). On the other hand, *out from* suggests the conceptualization that the Ground is, in effect, at the center of a set of concentric circles and that the Figure's path begins at the Ground point and extends radially through those circles, as represented in diagram (23b).

(22) The boat drifted further and further away/out from the island.
The sloth crawled 10 feet away/out from the tree trunk along a branch.

(23)



a. b.

2.5 Asymmetric Ground Geometries

While the preceding Ground geometries have all been in a certain sense "regular," with homologous parts or aspects not distinguished from each other, a major group of space-characterizing linguistic forms makes appeal to a Ground object's having some form of **asymmetry**, or **biasing**,

in its structure. Either it has structurally distinct parts—parts that in themselves are distinguishable from one another and can form a basis for spatial discriminations—or it has some kind of unidirectionality. This unidirectionality can consist either of a static one-way directedness or, dynamically, of an actual path of motion. Here, "asymmetry" is used as a technical term intended to refer not to all, but only to certain, forms of nonsymmetry, as these are characterized below.

2.5.1 Asymmetry of Parts The prepositions in section 2.4 did not appeal to a Ground object's having any parts with distinguishable identities. In the use of *across* with reference to a field, for example, there is no a priori singling out of one edge of the field as the starting point over the other edge as terminus, and in the use of *through* with a tunnel, one end of the tunnel is as good as the other. But in other cases, the important factor is distinguishable parts. This can be termed **asymmetry of parts**. Typically, objects have such parts in opposed pairs. Objects with only one such pair are a headlight with a front and a back or a tree with a top and a bottom. Objects with two pairs of distinguishable parts and a third derivative pair are a TV or a person or a building—all having a front and a back, and a top and a bottom, and, derived from these, a right and a left, where the parts of this last pair are generally not different from each other in shape or features. A partially different three-way pattern is usually ascribed to an object like a lizard, with a head (front) end and a tail (rear) end, an upper (dorsal) side and an under (ventral) side, and again a derivative right and left. The objects that exhibit such differentiation of parts cover a distribution of types. They range from the integral forms just mentioned, to composite objects like a line of people, to objects of geographic extent like a fairground or the plane of the earth.

A general way to characterize the present asymmetric kind of geometry is that here (at least) one part of an object is uniquely identifiable without any external indicators—either because that part has its own distinguishing characteristics or because it has a distinct relation to the structure of the whole object.

2.5.1.1 Contact with an Asymmetric Part Expressions that refer to a Reference Object's parts in order to localize a Figure divide into three kinds according to the amount of separational distance that they indicate. In one kind the Figure is in contact with—either within the substance of or simply touching—the physical part singled out from the Reference

Object. In English, the part thus named is treated as a regular noun and, because of its function within the noun phrase, therefore usually occurs after *the*.

(24) a. The mosaic is { on the front of / on the back of / on the (right/left) side of } the church.

b. The boy is in the front of the line.

c. The carousel is in the front of the fairground.

2.5.1.2 Adjacency to an Asymmetric Part The second type of expression uses a Reference Object's part to indicate the volume of space, or portion of terrain, *immediately adjacent* to it, and localizes the Figure within that region. In such expressions in English, the words *front* and *back* have no *the* before them.

(25) The bike is { in front of / in back of/behind / on one side of/beside / on the right/left of } the church.

The police officer is in front of the line.

The parking lot is in front of the fairground.[8]

The fact that these expressions cannot be used to localize Figures at a greater distance shows that they indicate relative adjacency to the Reference Object. For example, a bike directly lined up with the front of a church but three blocks away cannot be said to be "in front of" the church.

Notice that the human body, although presumably the prototype for the ascription of asymmetric geometries to many other objects, is not structurally treated as any kind of special case in many languages, including English. Thus, in the examples above, the word *church* can be replaced by *me* without any disturbance to the spatial indications or grammaticality of the expressions (except that perhaps a preferable alternative to *on the right/left of me* is *on my right/left*).

2.5.1.3 At Some Distance from an Asymmetric Part The third type of expression is like the second except that the adjacency condition is removed. The Figure is localized in a particular quadrant by reference to some Reference Object part, but it is at any remove. However, this type is poorly represented in English. Perhaps only *to the right/left of* really serve in this sense. Note that the English construction with this property is the

one that contains *to* (not, say, the one containing *on*), as in *The bike is to the right of the church* (anywhere from three feet to three blocks). *Rearward of* might work for the back direction, as in *The bike is rearward of the church*, but *forward of* will certainly not do for the front direction. In general, conveying these concepts requires lengthy expressions, and then ones that are not neutral to distance but in fact indicate nonadjacency, as in *The bike is a ways off from the front of the church*.

2.5.2 Asymmetry in Directedness A sense of unidirectionality, itself a form of asymmetry, can attach to some axis in an object or other spatial array that functions as a Ground. This can be termed **asymmetry in directedness**. In the type we first consider here, this unidirectionality can be static, consisting of a sense of one-way directedness implicit within the object or array. With this static directedness, it is thereby possible, within the object or array alone, to characterize a Figure's path of motion along the contained axis as occurring in one direction or its opposite. In some cases, such a directed axis can be conceptualized as having an end point that is associated with a particular asymmetric part of the object or array. Or it can be conceptualized as having two end points associated with two different asymmetric parts and as extending from one of those parts to the other. In such cases, the direction of a Figure's path can be characterized by either of the two asymmetric systems, the one based on parts or the one based on directionality. Several types of configurations exhibit these properties.

One type is a queue—for example, a line of people all facing in the same direction. Such a queue has an asymmetric directedness, one that points in the direction the people are facing in. A Figure can be characterized as moving in this direction by such English forms as *ahead* or *forward*, and as moving in the opposite direction by forms like *backward* or *back down*, as shown in (26a). Alternatively, expressions like *toward the front* and *toward the rear* appeal to a queue's asymmetry of parts, as seen in (26b).

(26) (The people who were queued up at the box office assisted the man in the wheelchair.)
   a. They passed his $20 bill ahead in the line, and passed his ticket back down the line.
   b. They passed his $20 bill to the front of the line, and passed his ticket back to the rear of the line.

Another venue for asymmetric directedness is the interior anatomy of an organism's body. Here, English terms like *ventrally* appeal to a concept of a directed axis from the back toward the stomach side of a body, and refer to the motion of a Figure in that direction, as seen in (27a). This type, again, also permits a construal in terms of asymmetry of parts with such expressions as *toward the ventral side*, as seen in (27b).

(27) In an affected fish, the parasites hatch along the spine
  a. and move ventrally/dorsally through the tissue.
  b. and move through the tissue toward the ventral/dorsal edge of the fish.

A further type of asymmetric directedness is present in a gradient. In a gradient, the quantity of some factor differs progressively in some direction. A Figure can then be characterized as moving in the direction of increasing or decreasing quantity. An expression like English *along* can indicate such motion with respect to a gradient. It does not intrinsically indicate increase or decrease, but once this feature is established in a given context, a term like *against* can refer to motion in the opposite direction, as seen in (28). The gradient form of directedness does not readily allow a counterpart construal in terms of asymmetry of parts.

(28) The growing axon moves along/against the interstitial chemical gradient to encounter its target.

A number of languages, such as Samoan, express a fourth type of asymmetric directedness with a pair of forms that can be roughly glossed as 'seaward' and 'inland'. The 'seaward' term can refer to motion from the center of an island toward the sea, or from the island into the sea, or from one sea location to another that is further from the island. Complementarily, the 'inland' term refers to motion from one sea location to another that is closer to the island, or from the sea onto the island, or on the island toward its center. These referents of the terms could in principle be characterized very simply as 'away from/toward the center of the island'. Here, the direction is based on a form of asymmetry of parts, since it is determined with respect to a particular part of the spatial array. But apparently the usual construal evoked by these terms is of an asymmetric directedness that permeates the array, and any notion of the island's center is greatly backgrounded. In a parallel way, the center of the earth could in principle be used to characterize the meanings of English *up* and *down*, but here, too, the 'upward' and 'downward' senses

seem to suffuse the vertical axis, and any concept of an end point at earth's center lies outside of main attention. Apropos of this observation, the earth is in fact a fifth venue of asymmetrically directed axes, and it will be treated as such separately in section 2.6.

2.5.3 Asymmetry of Motion In the preceding section, the unidirectionality associated with a Ground object or array was of the static type, termed "directedness." But such unidirectionality can also be dynamic, consisting of an actual path of motion, whether of the whole Ground object or of some part of it. Such Ground motion constitutes a form of asymmetry—one that can be termed **asymmetry of motion**—and the path of a Figure object can be characterized with respect to it. For the case in which the moving Ground is an extended linear entity and the Figure is situated within it, the English term *with* generally represents the Figure's path as parallel to and heading in the same direction as the motion of the Ground object, while the form *against* represents the Figure's path as heading in the opposite direction, as seen in (29). The situations that these terms refer to probably also include a sense of force dynamics in the interaction of the Figure with the Ground.[9]

(29) a. Jane swam with/against the current.
b. Jane sailed with/against the wind.
c. Jane biked with/against the (flow of) traffic.

In addition, English has some special forms for particular moving Grounds, as seen in (30). Note here that *upstream*/*downstream* permit the Figure to move alongside the moving Ground, not just within it. Note also that any construal in terms of asymmetry of parts—say, of the Figure's motion with respect to a stream's end points, its source or mouth—seems semantically unrealistic.

(30) a. Jane swam/drove her car upstream/downstream.
b. Jane ran upwind/downwind.

2.6 The Earth as a Ground with Asymmetric Geometry

The earth is regularly used as a Ground object in languages' systems for structuring space, and as such is—along with the human body—the most important case of an asymmetric geometry. It generally encompasses a three-way opposition like that of English up and down, north and south, east and west.

In principle, one could consider the asymmetry in these oppositions to be based either on distinguishable parts or on instances of directedness. Under the former interpretation, one would single out such reference portions of the earth as the north and south poles or an "east" and a "west"—that is, an eastern/western horizon, coast, land mass, and so on. Then, in saying, for example, *The balloon floated north(ward)|east(ward)*, one would be referring to motion toward the north pole or toward the east. Similarly, indication of an object's vertical motion might appeal to a concept of movement toward or away from a singled-out reference portion of the earth. Thus, indication of an object's motion up or down in the air, as in *The balloon floated up|down*, might appeal to a concept of movement toward or away from the surface of the earth, while indication of an object that moves within the ground, as in *The oil drill tip moved up|down*, might evoke the earth's center as a reference point.

However, our everyday usage of earth-based geometry generally seems more to appeal to a sense of certain forms of directedness implicit throughout earth-associated space, or to a use of the familiar visual backdrop as a reference for such forms of directedness. Some evidence can be adduced for the primacy of this asymmetry-in-directedness interpretation. If asked, an average English speaker would probably answer that there is no qualitative difference between the two sentences *The plane flew north* and *The plane flew east*, only a difference in the heading. One might then need to point out that the plane could continue flying north only until it reached the North Pole, and then it would be flying south, whereas the plane could continue flying east indefinitely. That is, the fact that there is an end point to northern directedness is greatly backgrounded in attention. A northerly heading is thus generally experienced as consisting of a pervasive directedness, rather than as a Goal-targeted course. The same finding might result on asking for a qualitative difference between *The balloon floated up* and *The balloon floated down*. The fact that the upward path would be unlimited, whereas the opposite path would by definition cease to be downward either at the surface or at the center of the earth, would seem to be backgrounded in the average speaker's attention.

Possibly even when the form of a spatial expression suggests singled-out reference points, a predilection for directionality could prevail, so that both *Sue drove north* and *Sue drove toward the north* would be felt equally as involving pure directedness.

The earth can also be used as a Ground object to characterize not location or path, but the orientation of a Figure with a more complex (especially linear) geometry. Section 2.2.2 considered such orientations generally with respect to any Ground object, with English here using expressions like *along/parallel to* or *across/crosswise to*, which require indication of the particular Ground object involved. When the earth provides the reference geometry, however, a language usually furnishes special locutions to indicate orientation, ones that do not call for explicit mention of the earth or its geometric delineations. Thus, instead of locutions like those in (31a), we find the special forms in (31b).

(31) The beam is
  a. ?parallel to/crosswise to the earth's up-down direction.
  b. vertical/horizontal.

2.7 Characterizing Location by More Than One Reference Object

The spatial expressions treated so far have involved the partitioning of a referent scene at only a first order of complexity. They have characterized a Figure's spatial disposition on the basis of just a single Ground object, whose internal structural characteristics alone—whether asymmetric or irrelevant to symmetry—sufficed for the task, as in (32).

(32) The bike is near/in/behind the church.

But language also permits easy reference to a more complex partitioning of a spatial scene. Most frequently, this involves the distinction between a **primary Reference Object**, one that has the same syntactic position and largely the same semantic role as the single Ground objects studied up until now, and a **secondary Reference Object**, which in many cases is not explicitly named but merely implied by a particular spatial term.[10] Such further Reference Objects are considered here under two categories: those that "encompass" the primary Reference Object and those wholly outside it. We treat such further Reference Objects here only for their capacity to characterize the location of a Figure; their capacity to characterize the path or orientation of a Figure arises by extension from their locative capacity.

2.7.1 Encompassive Secondary Reference Object One type of secondary Reference Object, generally with an asymmetric geometry based on directedness, encompasses the primary Reference Object. That is, its forms

of directionality permeate—can be referred to throughout—the environment of the primary Reference Object. It can be termed an **encompassive secondary Reference Object**. In section 2.5.2, it was seen that different types of Ground objects and arrays that contained some asymmetric directedness could, in their own right, serve to characterize the path of a Figure. Here, we see how such types can also serve as secondary Reference Objects, working in conjunction with an enclosed primary Reference Object, to characterize the location of a Figure.

Thus, the queue discussed earlier simply as a Ground array directed from back to front can also function as a secondary Reference Object that encloses a primary Reference Object within it, as seen in (33).

(33) John is ahead of Mary (in the line).

To localize the Figure, John, we need to know not only the location of a primary Reference Object, Mary, but also the directionality of a second object that is distinct from it and, in the present case, encompassive of it, a queue. The Prepositional phrase *ahead of* implies just such an exterior lineup. Moreover, it is appropriate regardless of the direction in which "Mary" is facing. By contrast, if there were no queue and Mary were the sole Reference Object, a more suitable spatial expression would be *in front of*, though now Mary must actually face John.

Similarly, the directed interior of an organism's body, discussed earlier simply as a Ground, can also function as a secondary Reference Object, as seen in the following example.

(34) In this fish species, the swim bladder is ventral to the spine.

Here, *swim bladder* refers to the Figure, *spine* refers to the primary Reference Object, and *ventral to* includes reference to the secondary Reference Object.

The commonest secondary Reference Object of the encompassive type is the directed space set up by the earth. This can be used to localize a Figure object at any of the three removes from the Reference Object discussed earlier, as in (35).

(35) a. The mosaic is on the east wall of the church. [*physical contact with a part of the primary Reference Object*]
b. The bike is on the east side of the church. [*location in a region adjacent to the primary Reference Object*]
c. The bike is east(ward) of the church. [*location at an unspecified remove from the primary Reference Object*]

As with the contrast between *ahead of* and *in front of*, an expression like *on the east side of* implies the presence, relevance, and identity of a secondary Reference Object, whereas an expression like *on the left side of* —despite the identity of syntactic form between the two—has no such implication in its relevant reading. In this reading, the "left" expression (as in *The bike is on the left side of the church*) makes appeal to nothing outside the primary Reference Object itself, referring only to one of its distinct parts in order to narrow down the locale of the Figure. However, the "east" expression (as in *The bike is on the east side of the church*) requires looking outside the main Reference Object, to the arrangement of the earth's orientations, in order to effect a comparable narrowing down of locale. In this process, it still, however, does not name the earth overtly, as *ahead of* mentioned no queue, and the earth's axes are indicated much less saliently than the primary Reference Object, without their own independent noun phrase.

The earth-based vertical axis plays a comparable backgrounded role as a secondary Reference Object in a whole paradigm of English expressions, those in (36). Together, these constitute another series, like those in section 2.4, where the primary Reference Object varies along some parameter. As arrayed from left to right here, these expressions imply a decreasing relevance of the primary Reference Object's other—non-verticality-related—characteristics to the localization of the Figure.

(36)	(a)	(b)	(c)	(d)	(e)
Upward-directed	on the top of	on top of	over	above	higher than
Downward-directed	on the bottom of	underneath	under	below	lower than

The columns of forms in (36) contrast semantically with each other in the following ways. First, the forms in (36a) do not strictly belong to the present paradigm because they make no direct appeal to earth-based verticality as a secondary reference. They refer to intrinsic parts of the primary Reference Object regardless of the object's current orientation (though these parts *are* named for their *canonic* orientation with respect to the earth). Thus, a fly that is "on the top of" a TV that happens to be lying on its side now flanks the TV rather than being uppermost on it. A fly that is "on top of" this TV—using (36b's) *the*-less expression—*would* be uppermost on it, resting on its side panel.

The forms in (36b) indicate a Figure's physical contact with the primary Reference Object, in particular with that portion of it that is most extreme, in either direction, with respect to the earth-based vertical dimension—for example, *The seagull is on top of the round boulder*, which indicates that the bird is touching the uppermost part of the rock. The forms in (36b) share with those in (36c) and (36d) the indication that the Figure and the Reference Object are vertically aligned—that is, that a single up-down line could be drawn through the two objects—but it differs from them in indicating physical contact, which they both deny.

The (36c) forms differ from those of (36d) in seeming to suggest a location closer to the Reference Object, a location somehow more related to or "in the sphere of" the Reference Object, and one in a direct line of sight with the Reference Object without other objects in the way. Thus, *The seagull is over the boulder* seems to suggest that the bird is about to relate to the boulder in some way (e.g., alight on it or pick off some food from it) or is closer to the boulder than the same sentence with *above* would do. Thus, the use of *above* in *The seagull is above the fog bank* would be preferable to the use of *over* when the idea to be conveyed is that the bird is *clear of* the fog and thereby out of relation to it. The use of *above* is mandatory in *The sixth floor is above the first floor*, because there is intervening matter.

The (36e) forms differ from the preceding three groups in that they do not necessarily indicate vertical alignment. Thus, *The seagull is higher than the top of the tree* does not require that the bird be directly over the tree. All these four groups of forms tend to exhibit "slippage" toward the right. For example, while *underneath* predominantly suggests physical contact, it can also be found functioning like *under*. And *above* is often found used like *higher than* with the indication of vertical alignment relaxed.

Here, as in all semantic analysis, care must be taken not to confuse separate senses of a word. Thus, the 'surface-covering' meaning that *over* has in *Hang the calendar over the hole in the wall*, which would be lacking if *above* were the preposition used, is a distinct sense described for *over* in section 2.3 and should not be confounded with its verticality sense. This latter reappears when the context is changed to render the surface-covering meaning impossible, as in *Hang the microphone over (= above) the large hole in the wall.*

Again, spatial expressions that at the surface appear entirely similar—like the English single-word prepositions *in* and *over*—can be of quite different semantic types. One type characterizes location in terms of the geometry of a single object. Thus, for example, *in the box* appeals only to the box's establishment of an interior space. The other type uses two objects. For instance, *over the box* appeals not only to our knowledge about the box—in this case, only its location rather than its geometry—but also, though less saliently, to our knowledge about earth-based upward directedness.

A number of spatial terms are extremely covert in their incorporation of a secondary Reference Object role for earth-based orientations, in particular for the vertical dimension or its complement, the horizontal plane, as seen in (37). For some terms, such as (37d), the implication of a secondary reference is so subliminal that one is surprised to learn of its having any role at all. Because of these additional covert references, terms like *in* and *across* that were earlier treated, in a simplified way, as not looking outside the primary Reference Object must now be seen as actually somewhat more complex.

(37) a. *across*: The plane of the primary Ground can have any orientation, but the Figure's path must be horizontal:
The fly walked across the tabletop./across the blackboard from right to left. /*across the blackboard from bottom to top.

b. *past*: The Figure's path must be horizontally to one side of, not over, the primary Ground (contrast Italian *passare*, which is indifferent to this horizontal/vertical distinction):
The bullet flew past my head, grazing my temple. /*grazing my pate.

c. *around*: The Figure's path involves a horizontal deviation from straightforward horizontal motion—complementing *over*/*under*'s indication of a vertical deviation from such a motion:
I went around the fence. vs. I went over/under the fence.

d. *in*: The primary Ground object cannot merely surround the Figure, but must also be in its canonical vertical orientation so as to contain or enclose the Figure in its customary way.
with the opening of the bowl up/*of the tent down:*
The pear is in the bowl. / He's standing in the tent.
with the bowl/*the tent inverted:*
The pear is under/*in the bowl. / He's standing on/*in the tent. (tent example is from Shingo Imai)

2.7.2 External Secondary Reference Object The other type of secondary Reference Object is one that is wholly outside the primary object, that exhibits a range of often nonasymmetric geometries, and that is generally expressed by an independent nominal, thereby exhibiting a degree of salience comparable to that of the primary object. One type of such an **external secondary Reference Object** functions like a geometric point that singles out the particular portion of the primary Reference Object nearest to it—or, alternatively, furthest from it. This portion in turn serves to characterize the location of an adjacent Figure, as seen in (38). This strategy for localizing a Figure thus works through an "externally characterized Ground part."

(38) a. The bike is on the side of the church toward the cemetery.
= The bike is on the cemetery side of the church.
b. The bike is on the side of the church away from the cemetery.

The speaker's own body in its current location is also able to serve as this kind of external secondary Reference Object. This is a situation for which English (among many languages) provides specialized locutions.

(39) a. The bike is on this side of the church.
(i.e., on the side of the church toward me)
b. The bike is on the other side of the church.
(i.e., on the side of the church away from me)

The speaker—or some comparable entity, such as the last perspective point adopted in a discourse—also serves as an external secondary Reference Object when incorporated as a component in the meaning of certain prepositions. An example is *beyond*, as in (40).

(40) The travelers are now beyond the continental divide.

Here, the location of the travelers (the Figure) is understood as being on the side of the continental divide (the primary Reference Object) that is away from the location of the speaker or perspective point (the external secondary Reference Object).

Another strategy for localizing a Figure by means of an external secondary Reference Object works through a fictive **Figure-encountering path** (equivalent to an "access path," as characterized in chapter I-2). In this strategy, an external point object can be used as a guide by which to establish a Figure-encountering path, as seen in (41). Locutions of this type indicate that the Figure is located somewhere along the line from the primary Reference Object to the secondary Reference Object.

(41) a. The bike is toward the cemetery from the church.
b. The bike is this way (i.e., toward me) from the church.

Note that this same strategy is also used for an encompassive secondary Reference Object. Thus, in all expressions of the type *John is ahead of/east of/over Mary*, the location of the Figure ("John") is ascertained by—conceptually, perceptually, or with physical motion—beginning at the primary Reference Object ("Mary") as a starting point and then proceeding along a path determined by a form of directedness in the secondary encompassive Reference Object ("ahead in a queue"/"toward the east"/"upward") until encountering the Figure.

Although two Reference Objects are named in the external secondary Reference Object type, we can still distinguish which object is "primary" and which is "secondary" on the basis of syntactic analogy with the encompassive secondary Reference Object type, where this is clear.

(42) a. *Encompassive type* X is east of Y [Y = *primary Reference Object*]
b. *External type* X is toward Z from Y [Y = *primary Reference Object*]

But the distinction begins to blur in the external type, since both Reference Objects receive comparable prominence from their equal expression by overt nominals. Further, the external object and the Figure-encountering path that it determines can be geometrically more complex than just a point and a straight line toward it. In English, virtually the whole range of Ground and path geometries with terms to specify them can also be used as external secondary references.

(43) The bike is across the street/down the alley/around the corner from the church.

Moreover, such geometric indications can be strung together in a sequence to make up a quite complex Figure-encountering path.

(44) The bike is across the street, down the alley, and around the corner from the church.

The implication in locutions of the (43) and (44) type is that the Figure is at the end point of the specified path. To counter this implication, one must add Some special phrase, like *somewhere* (*along the way*). In reaching locutions such as these, we can perhaps no longer speak of a "primary" or a "secondary" Reference Object, but now must speak in

terms of a starting point and a multiply-determined path, all together functioning as a Reference Complex by which to localize the Figure.

2.7.3 Reference Frame Projected Out by a Secondary Reference Object Considering again the case of a pointlike object acting as an external secondary Reference Object, a special further circumstance can hold where the object has an asymmetric geometry. This asymmetric geometry can be conceptualized as radiating out beyond the object, thereby defining a reference frame. Where the object is movable—the usual case—the reference frame is relative to the object's current position and orientation. The commonest object of this sort is a person, especially one of the participants in a speech event. The clearest illustrations emerge where there is no geometric interference from the primary Reference Object—that is, where this object itself has no asymmetry in the relevant dimensions, like a silo or a tree with no intrinsic front, back, right, or left. Thus, in a sentence like

(45) The bike is to the left of the silo.

it is the speaker or hearer whose intrinsic front/back/right/left extends out and defines a framework by which the Figure is localized with respect to the primary Reference Object (the silo).

Notice that once this reference frame is projected out by the external secondary Reference Object, it behaves much like an encompassive secondary Reference Object. In particular, it permits the Figure-encountering strategy. Thus, just as the encompassive *The bike is west of the silo* uses the earth-based east-to-west directionality to outline a fictive path from the silo to the bike, so too the sentence *The bike is left of the silo* relies on the left-to-right directionality of the reference frame projected out from the speaker as external point object, and also outlines a fictive path from the silo to the bike.

Note that, in the preceding section, when the speaker functioned as an external secondary Reference Object, he was treated geometrically as a punctual object assessed solely for his location to serve as a kind of guidepost. But here, the speaker is assessed for her asymmetric geometry projecting out as a reference field.

2.7.4 Asymmetry Imputed by a Secondary Reference Object onto a Primary One We just saw that the reference frame generated by an external object—the speaker or hearer—can have its left-right (lateral)

orientation applied to a primary Reference Object, like a silo, in sentences like *The bike is to the right/left of the silo*. Now what about the front/back orientation? A perfectly consistent extension of the pattern for right/left would be to place the bike on the opposite side of the silo from the speaker/hearer with the prepositional complex *in front of*, as in (46a), and between the speaker/hearer and the silo with the preposition *behind*, as in (46b). The reason that this arrangement should be considered consistent is that the silo's asymmetric assignments would then correspond to those of a standing human: in clockwise succession, front, right, back, left.

(46) a. The bike is in front of the silo.
b. The bike is behind the silo.

This consistent use of the generated reference frame is in fact exactly what some languages, such as Hausa, employ. In English, however, a spatial phenomenon wholly distinct from any seen so far is involved. Rather than simply sitting amidst an externally projected orientational frame, the primary Reference Object has an asymmetric geometry *imputed* to it, one derived by mirror-image reversal from the secondary Reference Object (the speaker/hearer). It, in effect, has acquired its own front and back, and its front now faces that of the donor object. With this additional factor, *The bike is in front of the silo* now means that the bike is *between* the silo and the speaker/hearer, while *The bike is behind the silo* means that the bike is on the *opposite* side of the silo from the speaker/hearer. Notice that this phenomenon takes place only for the front/back axis, not also for the lateral axis, which remains as described earlier. Thus, the clockwise sequence around the silo for English is front, left, back, right.

Hill (1975) has made a cross-cultural study of the difference in the way that these "in front of"/"in back of" references are conceptualized—with the primary Reference Object as "facing" or "aligned" with the speaker or hearer. He has used test situations like placing a glove, a ball, and a bat in a row extending away from the subject and then asking "What is in front of the ball?" His findings are that two-thirds of schoolchildren and 90 percent of graduate students in America respond as if considering the primary Reference Object to face toward them, while 90 percent of Hausa subjects treat the object as facing away from them—that is, aligned with them.

2.7.5 The Range of Ways in Which Reference Objects Localize Figures

In all, the bases on which the location of a Figure can be characterized

with respect to Reference Objects fall into just a few main types. The simplest type involves only a single Reference Object, making appeal to the geometric properties of the Ground object alone, as discussed in sections 2.4 to 2.6. Localization by this type can be said to be **Ground based**, as in *The bike is near/behind the church*.

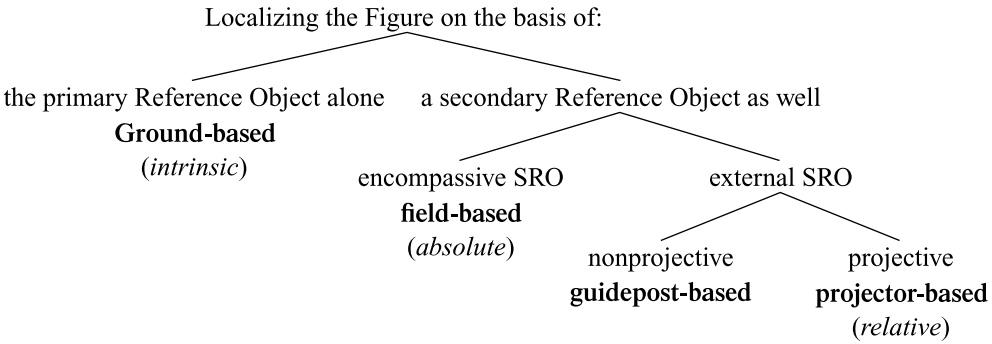
The remaining types involve a secondary Reference Object. Where this secondary Reference Object encompasses the primary Reference Object, as discussed in section 2.7.1, the localization can in general be said to be **field based**. As discussed further below, this field-based type can involve different particular Reference Objects, such as a queue, as in *John is ahead of Mary in line*, or the earth, as in *The bike is east of the church*.

As discussed in section 2.7.2, an external secondary Reference Object can also be used to localize a Figure. We first discuss the case where such an external object is **nonprojective**—that is, it either lacks an asymmetric geometry or, if it has one, its projection is not being used for a localizing function. Such an external object is frequently a geometrically punctual entity whose location is used as a guide by which to characterize the location of the Figure, as in *The bike is on the side of the church toward the cemetery*, or to "plot" a course for encountering the Figure, as in *The bike is toward the cemetery from the church*. In some cases, the external secondary Reference Object is a geometric complex that offers sequential guidance for plotting the Figure-encountering course, as in *The bike is across the street, down the alley, and around the corner from the church*. The speaker can also function as an external punctual object, often with special locutions for the situation, as in *The bike is on this side of the church*. The use of such a nonprojective external object to localize a Figure will be said to be **guidepost based**.

Finally, as discussed in section 2.7.3, an external secondary Reference Object can have an asymmetric geometry that projects out from it to form a reference frame. The use of such a reference frame for localizing the Figure can be said to be **projector based**. The speaker or some previously established viewpoint frequently serves as the source of the projection, as in *The bike is left of the silo* (from where I'm standing/from the last spot I mentioned).

The terminology of Levinson (1996) can be correlated with the present terminology. Generally, his "intrinsic" corresponds to the present "Ground based," his "absolute" to the present "field based," and his "relative" to the present "projector based." The accompanying figure shows these relationships. His system of terminology, though, appears to

have several limitations. It does not recognize or include a term for our "guidepost-based" system for localizing a Figure. And our "field-based" system for localizing would seem to capture a generalization missed by his "absolute" notion. First, our field system covers not only earth-based localizing, but also, for one additional type, queue-based localizing—itself not otherwise recognized by his taxonomy. Second, the term "field" avoids the problem that his term "absolute" has, to refer to the same type of localizing system, namely, that this system is often relative. An example is when an astronomer considers earth-based compass points with respect to celestial orientation, or, when a floating aircraft carrier is used to set local orientations even as it shifts relative to the earth's compass points.



NB: The projection of a projector-based system becomes the field of a field-based system.

A set of terms referring to specific Reference Objects can be adopted that crosscuts the preceding terms for type of referencing function. Thus, an **earth-based** system can use the earth and its associated reference frame as a Ground-based type of system for localizing a Figure, as in *I drove east*. Or it can use it as a field-based type of referencing system, as in *I drove eastward from Chicago*. Likewise, a **queue-based** system can function either as a Ground-based system for localizing a Figure, as in *John moved ahead in line*, or as a field-based referencing system, as in *John is ahead of Mary in line*. In a comparable way, a **speaker-based** system can use the speaker as a nonprojective landmark in a guidepost-based system for localizing a Figure, as in *The bike is this side of the silo*. Or it can use the speaker as an object with asymmetric geometry in a projector-based referencing system, as in *The bike is left of the silo* (i.e., as reckoned from where I am standing while facing the silo).

Of course, any particular spatial locution in a language is often capable of use in more than one localizing system. Thus, in this chapter, it is true, we have used the spatial form *behind* to illustrate solely a Ground-based ("intrinsic") system (as in *The bike is behind the church*). And the spatial form *left of* has been used only to illustrate a projective speaker-based ("relative") system (as in *The bike is left of the church* (*from where I'm standing*)). But in fact, both forms can be used for either localizing system. Thus, *behind*, even when used in the same sentence as just above, can instead be employed in a projective-speaker-based system to refer to a bike located on the opposite side of the church from where I am standing. And *left of*, again in the same sentence as before, can instead be used in a Ground-based system to refer to a bike located at the left flank of the church. Accordingly, in an analysis of any particular spatial example, the usual care needed in semantic work must be taken to ascertain the underlying conceptual schemas that are present, without unduly identifying any specific expression with a unique reading.

2.8 Further Distinctions

The descriptions presented so far in section 2 represent just one part of a much broader complex in language for structuring the domain of space-time. A brief outline here can help to indicate further parts of the complex. I have so far identified and analyzed in some detail four of the ramified systems in language, encoded at the fine-structural level, that characterize different kinds of relationships among entities within space or time. There are a number of such systems, but these four are the main ones that involve the conceptual structuring of space and time. I term them **schematic systems**. These systems are largely independent, with each adding a distinct conceptual dimension to those of the others. Each system offers a range of alternative structural characterizations, among which a speaker chooses so as to convey a particular conceptualization of a scene. The first schematic system—the one that I have termed **configurational structure** and that the present chapter predominately addresses—specifies geometries: abstract geometric characterizations of entities and their relationships to each other within different reference frames.

While this chapter has so far discussed only those characterizations that apply to physical objects within space, by looking at the distinct dimension of time, we can see that language applies much of the same "geometric" structuring to that dimension as well, as evidenced by these spatial-temporal homologies in English.

(47)

	Space	*Time*
a.	A bird sat along the ledge.	I sneezed (once) during the performance.
	a point located on a bounded linear extent	
b.	Birds sat all along the ledge.	I sneezed all during the performance.
	points distributed over a bounded linear extent	
c.	This road goes as far as Chicago.	He slept until she arrived.
	a linear extent bounded by a point at its further end	
d.	This road extends for three miles.	The performance lasted for three hours.
	a bounded linear extent measured for length	

The temporal dimension viewed in its integral functioning with the spatial domain yields the special conceptual complexes of "stationariness" and "motion," only partially dealt with earlier. In analysis of this conjunction, a certain small set of primitive **Motion-aspect formulas**—ones that seem to underlie all more complex characterizations of stasis and movement in association with aspectual structure in language—appears to emerge universally. These formulas can be represented schematically as in (48). In each formula, the initial term is the **fundamental Figure schema** (always a point). A deep preposition written in capitals represents a **Vector**. And following the Vector is a **fundamental Ground schema**. The appendix to this chapter presents a more rigorous and detailed treatment of this system of formulas.[11]

(48) a. A point BE_{LOC} AT a point, for a bounded extent of time.
(The napkin lay on the bed/in the box for three hours.)

b. A point MOVE TO a point, at a point of time.
(The napkin blew onto the bed/into the box at exactly 3:05.)

c. A point MOVE FROM a point, at a point of time.
(The napkin blew off the bed/out of the box at exactly 3:05.)

d. A point MOVE VIA a point, at a point of time.
(The ball rolled across the crack/past the lamp at exactly 3:05.)

e. A point MOVE ALONG an unbounded extent, for a bounded extent of time.
(The ball rolled down the slope/along the ledge/around the tree for 10 seconds.)

e′. A point MOVE TOWARD a point, for a bounded extent of time.
(The ball rolled toward the lamp for 10 seconds.)

e″. A point MOVE AWAY-FROM a point, for a bounded extent of time.
(The ball rolled away from the lamp for 10 seconds.)

f. A point MOVE ALENGTH a bounded extent, in a bounded extent of time.
(The ball rolled across the rug/through the tube in 10 seconds.)
(The ball rolled 20 feet in 10 seconds.)

f′. A point MOVE FROM-TO a point pair, in a bounded extent of time.
(The ball rolled from the lamp to the door/from one side of the rug to the other in 10 seconds.)

g. A point MOVE ALONG-TO an extent bounded at a terminating point, at a point of time/in a bounded extent of time.
(The car reached the house at 3:05/in three hours.)

h. A point MOVE FROM-ALONG an extent bounded at a beginning point, since a point of time/for a bounded extent of time.
(The car has been driving from Chicago since 12:05/for three hours.)

In these Motion-aspect formulas, the geometries of the Figure and the Ground are represented by the simplest schemas that they can have. But they are not limited to these schemas. The Figure and Ground geometries are free to extend in any dimension or direction that the formula does not pertain to. This freedom can be termed the principle of **extendability in ungoverned directions**. To illustrate, consider formula (48e′), which represents the Figure as an object idealizable as a point, moving toward a Ground object that is also idealizable as a point. These idealizations are in fact appropriate for the referent of a sentence like *The car sped toward the village*. But the formula applies as readily for a Figure that is best idealized as a line, say, one aligned with the path, as in the referent of the sentence *The train sped toward the village*. Further, the Figure can be best idealizable as a line oriented transversely to the path, as in *The front line of troops advanced toward the village*. Or, indeed, such a Figural transverse line can extend into the third dimension to constitute a plane transverse to the path, as in *The cold weather front advanced toward the village*. Or the Figure can be idealizable as a planar object still lying in the original plane, as in *The carpet of floodwater advanced toward the village*. Or,

of course, the Figure can be conceptualized as an entire three-dimensional volume, as in *The storm region advanced toward the village*. To be sure, the Ground is equally capable of such extensions, as seen in *The car sped toward the border|the cliff wall*.

The principle of extendability in ungoverned directions applies as well even to more specific spatial schemas built upon the Motion-aspect formulas. Thus, consider the schema represented by the English satellite *out* in its sense of 'radial motion', which is ultimately based on formula (48e″). The simplest Figure schema for this Path satellite would seem to be indeed a point, as in *The boat sailed further and further out from the island*, where the Figure's path is conceptualized as radially traversing concentric circles. Such a point can, to be sure, extend into a line aligned with its path, as in *The caravan of boats sailed further and further out from the island*. But such a Figural point can also extend into a line oriented transversely to its path—moreover, one that also forms a circle, as in *The circular wave spread out from the point at which the leaf fell onto the water*. Further, such a line can extend into a planar schema that still lies on the original plane, as in *The oil spread out over the water from where it spilled*. Or the circular line can extend into the third dimension to form a schematic cylinder, as in *The ring of fire spread out as an advancing wall of flames*.

The second schematic system specifies **perspective point**—the point within a scene at which one conceptually places one's "mental eyes" to look out over the rest of the scene—and characterizes its location, distance away, and mode of deployment. A scene's geometric structuring, set by the previous schematic system, is largely independent of these perspectival indications. One ready illustration here involves the difference between a stationary distal perspective point with synoptic scope of attention, and a moving proximal perspective point with local scope of attention (as detailed in chapter I-1). The former of these is indicated in a sentence like *There are some houses in the valley* by the use of such closed-class elements as the plural *-s* with its agreeing *are*, the locative preposition *in*, and the presence of a quantifying constituent (*some*). The latter perspectival mode, on the other hand, is expressed in *There is a house every now and then through the valley* by its elements, the singular *a* with its agreeing *is*, the motion preposition *through*, and a temporally distributive constituent (*every now and then*), with the indication that one is to cognize this identical scene as if with a temporal sequence of close-up

inspections. This latter type, with movement of a perspective point rather than of an object within a scene, is another example of fictive motion, which has already been noted twice, once in (12) for the virtual-motion effect of expressions like *This road extends through the tunnel*, and once in section 2.7.2's discussion of localizing a Figure by means of a Figure-encountering "path," as in expressions like *The bike is down the alley from the church*.

It is possible that a treatment of perspective point should also include the obverse of this fictively moving scan over a stationary scene, namely the **freeze-frame** phenomenon, where one fixes on a "snapshot" taken from the path of an actually moving object. This is seen, for example, in expressions reporting on a courier's progress: *He's through the tunnel!*, *past the guardhouse!*, *into the bunker!*, where the path point fixed on is the one that follows immediately after completion of the path indicated by the preposition.

The third schematic system specifies the particular **distribution of attention** to be given to a referent scene from an indicated perspective point. It affords alternative patterns of primary and secondary, and so on, as well as minimal, attention on different elements within essentially the same scene. This system is the one responsible for establishing among selected objects within a scene the roles of Figure, primary Reference Object, and secondary Reference Object, treated at length earlier.

It is also this system, accordingly, that can function to indicate that minimal attention should be directed to some portion of a scene. The system can do so by omitting explicit reference to that portion under conditions where its presence is nevertheless fully implied, as in (49a) where the middle portion of a path is deemphasized, and in (50a) where an obviously necessary agent is excluded from the framing of a scene (as detailed in chapter I-4).

(49) a. The crate fell out of the plane into the ocean. [*beginning and end of path*]
b. The crate fell out of the plane, through the air, into the ocean. [*full path*]

(50) a. My cufflink finally turned up at the bottom of the clotheshamper. [*event alone*]
b. I finally turned up/found my cufflink at the bottom of the clotheshamper. [*event plus agency*]

The attentional system also involves setting the particular level, out of several hierarchically nested levels that can be present, on which to place main focus in attending to a Gestalt—for example, that of a freckled boy, as in (51).

(51)

	Main focus is on:
a. There are freckles on the boy's face.	the level of finest detail
b. The boy's face has freckles on it.	the mid-scope level
c. The boy has freckles on his face.	the framing level

A fourth schematic system pertains to **force dynamics**—that is, the ways that objects are conceived to interrelate with respect to the exertion of force, resistance to force, the overcoming of such resistance, barriers to the exertion of force and the removal of such barriers, and so on. Such indications, which seem mostly to reflect our kinesthetic/somesthetic sensory modality, are additional to and largely independent of the other three systems' indications, which together mostly reflect our visual modality. This system's operation is seen, for example, in the difference between a force-dynamically neutral expression like *The ball rolled along the green*, which depicts an instance of motion simply as an autonomous occurrence, and a force-implicational expression like *The ball kept rolling along the green*, for which one reading suggests that the ball had a natural tendency toward rest that was being overcome by an external force toward movement (such as a breeze). (See chapter I-7 for an extensive treatment.) As this brief outline indicates, the material in section 2 should be taken as only part of a much broader description of language's structuring of space and analogical dimensions.[12]

3 SCHEMATIZATION IN THE REPRESENTATION OF SPACE

We have just seen some of the basic geometric concepts distinguished by the closed-class spatial expressions of language, and we are therefore now in a position to investigate the more abstract properties that govern this representation. As indicated in the introduction, a fundamental character of the way that space is represented at language's fine-structural level is that it is *schematic*. That is, only particular selections of all the aspects present in spatial scenes are actually referred to by linguistic elements, while all the other aspects are disregarded. These remaining aspects can vary indefinitely without any effect on the choice of linguistic elements to

represent the scenes. Thus, every fine-structural spatial expression actually represents a family of spatial configurations that all share certain abstractable characteristics.

3.1 The Basic Properties of Individual Schemas

The particular schematic abstractions represented by individual spatial expressions, such as English prepositions, can be called *schemas*, and their properties can be investigated at three levels. The first is that of the components that go to make them up. The present chapter is too limited to treat this level adequately, so I simply note here that schemas are largely built up from such rudimentary spatial elements as points, bounded and unbounded lines, bounded and unbounded planes, and the like, and that these elements are governed by properties pertaining to their combination, coordination, cancelability, and so on. The second level, treated in this section (3.1), is that of the properties pertaining to the behavior of whole individual schemas. The third level, treated in section 3.2, involves the relationships that individual schemas have to each other within the larger system of schema usage. (See Herskovits 1986, 1997 for more on such spatial schematization.)

3.1.1 Idealization The actual, "literal" referent of any spatial expression, such as an English preposition, is a particular assemblage of primitive geometric components in the form of an abstract schema. This schema, however, must be conceptually applied to a full, repletely detailed referent. The term **idealization** will refer to this process of "application," where a referent spatial entity is conceptually idealized in terms of a schema applied to it. Idealization thus includes the process by which familiar objects, in all their bulk and physicality, are differentially "boiled down" to match ascribed schemas. The cognitive nature of these processes must yet be worked out for the operation of language in particular, but they will no doubt resemble certain processes of perception and Gestalt formation or those operative in the drawing of stick figures by children (see chapter I-2).

Some typical cases of the linguistic idealization process are the following. Idealization occurs where a physical object with one dimension much greater than the other two, say a pencil or a person or a skyscraper, is conceptualized as a line—as when used with the preposition *along* (*An ant crawled along the pencil. | The snake slithered down along the performer. | The outside elevator rose along the skyscraper.*). Or it occurs where a bulk

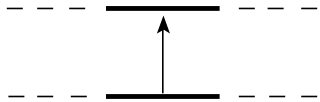
form with some concavity in it, such as a birdbath or a volcano, is conceptualized as a planar enclosure of volume—as when used with the preposition *in* (*the water in the birdbath*/*the lava in the volcano*). Or it occurs where a roughly equidimensional bulk, like a boulder or a planet, is conceived as a single point—as when used with the preposition *near* or *from* (*a pelican near*/*20 feet from the boulder* or *an asteroid near*/*10,000 miles from the planet*).

Idealization can be illustrated more fully with the schema specified by *across* in its usage referring to a path of motion. As an approximate verbal characterization (consult the diagrams in (53)), this is:

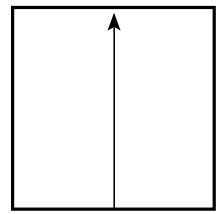
(52) *Across schema*
(motion of the Figure along the whole length of) a horizontal path line that runs perpendicularly from one edge to the other of a planar Ground object bounded by two opposite parallel edges, where this plane is "not laterally collapsible."

The last phrase in this characterization pertains to the relative lengths of the plane's two axes: the axis that is parallel to the plane's defining edges, and the perpendicular axis that is parallel to the Figure's path line. The meaning of the phrase is that the axis running parallel with the two edges cannot be so short, compared to the path-line axis, that it can be conceptually collapsed into that line itself, leaving the plane able to be regarded as one dimensional. Thus, the edge-aligned axis may be indefinitely long, as in the case of a river being crossed, schematized in figure (53a). Or it can be about the same length as that of the path-aligned axis, as with a square field being crossed, diagrammed in (53b). But it *cannot* be relatively short, like the narrow axis of a pier being traversed in the longer direction (53c). Such an arrangement makes the referent object more idealizable as a line that is co-oriented with the path, a configuration for which the schema associated with *along* is more appropriate. The critical range within which the edge-aligned axis becomes "too" narrow needs consideration. Perhaps in its basic usage, the *across* schema becomes inapplicable where the edge-aligned axis is at all perceptibly shorter than the path-aligned axis, as in the case of an oblong pool being swum in the longer direction, depicted in (53d). But even such a basic usage typically still allows some degree of "stretch" so as to apply to an only moderately oblong pool, though never to a long pier. Such a stretch is one of the types of schema deformation treated in chapter II-5.

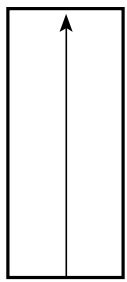
(53)



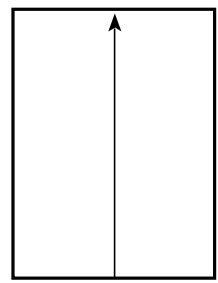
a. Across the river



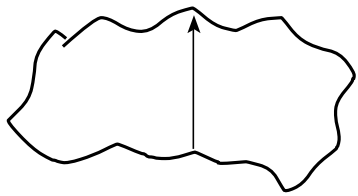
b. Across the square field



c. *Across the pier



d. ?Across the swimming pool



e. Across the lake

Taken as an abstract whole, the *across* schema thus requires that a physical object be idealizable—relative to a path executed with respect to it—as a plane with certain orientational and boundary conditions and with axes whose relative lengths obey certain constraints. This case thus shows that a schema can act like a filter passable to only some physical objects. That is, it can act as an integrated set of factors that test for an object's reducibility to a particular complex of schematic elements.

3.1.2 Abstractedness "Abstractedness" is one way to name the complementary property to idealization. While idealization involves finding within a physical object the delineations that correspond to a particular schema, abstractedness involves ignoring the rest of the object. Thus, in the use of *across*, it is of no consequence whether a referent object lacks side boundaries, as in the case of a river (53a above), or has them, as with

a square field (53b). Equally irrelevant is whether the plane is a liquid layer (the river) or a solid surface (the court). Thus, the characterizability as a two-edged plane that the *across* schema calls for classes together a multifarious set of objects. The difference between these objects is abstracted away from—hence, can be disregarded for this particular categorization.

3.1.3 Topology The degree to which language's spatial schemas abstract away from physical characteristics is even greater than suggested so far. Not merely does a schema attend only to geometricized delineations within a physical object. Not merely are physical bulk forms within an object idealized down to the points, lines, planes, and so on of the schema (with the remainder disregarded). But a schema also abstracts away from any specificity as to shape (curvature) or magnitude for these points, lines, and planes—and hence, also from any specificity as to angles or distances between them as they relate within the schema. This sort of further abstraction is characteristic of the spatial relations defined within the mathematical field of topology. It is metric spaces, such as classical Euclidean geometry, that observe distinctions of shape, size, angle, and distance. Distinctions of this sort are mostly indicated in languages by full lexical elements—for example, *square*, *straight*, *equal*, plus the numerals. But at the fine-structural level of conceptual organization, language shows greater affinity with topology. (One might further postulate that it was this level—and its counterparts in other cognitive systems—that gave rise to intuitions from which the field of topology was developed.) We can illustrate linguistic topology now under two of its characteristics. See chapter I-1 for further discussion of the present approach, and see Petitot and Doursat 1997 for a mathematical treatment of the linguistic topology in this approach.

3.1.3.1 Irrelevance of Shape It is easy to see that spatial elements generally permit wide ranges of shape variation. For example, the use of *in* requires that a Reference Object be idealizable as a surface so curved as to define a volume. But that surface can be squared off as in a box, spheroidal as in a bowl, or irregular as in a piano-shaped swimming pool; it can be open over a whole quadrant as in the preceding examples, or closed to form a complete enclosure as in a shed. It can also be an unbroken solid as in the previous examples, or have gaps, like a cupped hand, an open-work basket, or a house with its doors and windows open. As we

see, none of these variations of physical manifestation affect the use of *in*. Likewise, the two edges called for by the *across* schema need not be neat parallel lines. One can also swim "across" a lake, where the opposed "edges" are highly curved and full of irregularities, as suggested in diagram (53e).

Freedom of shape applies not only to the Reference Object itself but also to paths characterized with respect to it. Consider *through* in its use referring to a linear path within a medium. Not only is the "medium" free to range from a fluid ("through the water") to a dispersed aggregate ("through the timber"), but the path can take almost any contour.

(54) I arced/zigzagged *through* the woods.

That is, regardless of whether the path constitutes a straight line, an arc of a circle, or a set of zigs and zags, no change of preposition is called for. *Through* suffices for them all, simply because the abstraction that it refers to is insensitive to such further properties.

3.1.3.2 Irrelevance of Magnitude To a large extent, languages distinguish the same spatial characteristics for small objects and distances as for great ones. This is not simply a necessary fact, one just to be presumed. It would be very easy to imagine that objects capable of fitting in one's hand and broad geographic terrains, say, might have very different spatial characteristics of relevance to humans and that language forms would reflect such differences. Yet, the evidence is that very much the same spatial structures are distinguished all along the size spectrum, a fact that then testifies to the overall unity of our linguocognitive spatial system. To illustrate, consider these two sets of sentences.

(55) a. i. The lamp stood in the box.
ii. The man stood in the barn.
iii. The building stood in the valley.
b. i. The ant crawled across my palm.
ii. The man walked across the field.
iii. The bus drove across the country.

Here, the range in the size of a Reference Object, from a palm to a country, and the corresponding range in the length of the path traveled, are irrelevant to the choice of schema-specifying preposition.

Comparably, the use of the spatial terms *this* and *that*—indicating objects relatively closer to and farther from the speaker—can be equally used in the two sentences in (56).

(56) a. This speck is smaller than that speck.
b. This planet is smaller than that planet.

Again the difference in size between a speck and a planet, and the difference in the distances involved—from millimeters to parsecs—is irrelevant to the use of the spatial terms.

3.2 Relationships Among Different Schemas

We have been looking at the properties of single spatial schemas considered in isolation. But every language makes available not one, but many schemas, all constituting different configurations within the same conceptual domain, that of (objects in) space. What are the principles that govern the speaker's selection from among these schemas to make a particular reference? What are the semantic relations between the different individual schemas? And what relation does the full set of individual schemas bear to the spatial domain as a whole? We now explore these questions.

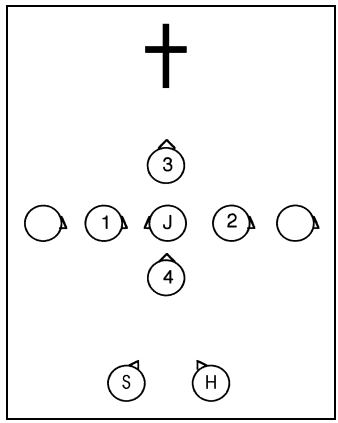
3.2.1 Alternatives in Schematization Because of the nature of idealization as applied to a physical entity—that is, where all those characteristics of the entity not pertinent to a particular schema are disregarded as irrelevant—it is generally the case that those very characteristics will include some that *are* relevant to other schemas. Thus, different schemas can usually be applied with equal appropriateness to the same physical configuration, capitalizing on different sets of characteristics contained in the configuration—and, correspondingly, disregarding different sets. We can observe two forms of such alternative schematization.

3.2.1.1 An Object Participating in Different Spatial Configurations In one form, a single physical entity can participate in several different spatial configurations and so be subject to alternative schematizations. Thus, a single box as a Ground object can have different Figures bearing different spatial relations to it—say, a dish on it, a ball in it, and a doll 20 feet away from it—whether on different occasions or concurrently. The dish's 'on' relation requires of the box that it have a horizontal plane uppermost on its bulk, but disregards any other features of that bulk—in this case, for instance, it cares not at all that the box has an interior space. By contrast, the ball's 'in' relation requires this latter feature of the box but is neutral to whether or not one of the box's sides (as opposed to its open face) is turned topmost so as to provide a surface for something to

be 'on'. The doll's 'away from' relation to the box is indifferent to either of the preceding two spatial conformations and is sensitive only to whether the box's bulk is localized enough, rather than distributed overly much—relative to the separational distance involved—that it can be treated as a single point.

Similarly, a further example here is like the preceding one in that several different Figure objects concurrently bear different spatial relations to a single Ground object by appealing to different aspects of that Ground object's spatial characteristics. What is striking in this new example, though, is that the *same* spatial form—namely, *in front of*—is used to represent all the different spatial relations. It accomplishes this by appealing either to the Ground object alone or to one of several different secondary Reference Objects that are co-present in the same referent complex. This complex—here, a scene within a church—is schematized from an overhead perspective in diagram (57), where circles represent people and the "noses" show the directions in which the people are facing. In this scene, John ("J") is standing backward in a queue that extends from left to right in the church, and the speaker ("S") and hearer ("H") are close to the entryway. With respect to this complex, the answer to the question *Who is in front of John?*—or, equivalently, the value of the variable in *Someone is in front of John*—can refer to any one of four different individuals, those designated by numbers in the diagram.

(57)



Here, person 1 is in front of John with respect to the asymmetric geometry intrinsic to John—specifically, with respect to his front—where John alone is taken into consideration as a Reference Object. Person 2 is in front of John—who now is treated as a primary Reference Object with only a schematically pointlike geometry—with respect to the asymmetric

geometry of the queue as a secondary Reference Object, specifically, with respect to its left-to-right directedness. Person 3 is in front of John—who again is treated as a point-geometric primary Reference Object—with respect to the asymmetric back-to-front geometry of the church's interior. And person 4 is in front of John—once again a pointlike primary Reference Object—with respect to the asymmetric reference frame projected outward by the speaker-hearer. Note that these distinct geometric assessments can often be linguistically disambiguated by the addition of certain short phrases, as in (58).

(58) a. Who is in front of John that he is facing? (= person 1)
b. Who is in front of John in the line? (= person 2)
c. Who is in front of John in the church? (= person 3)
d. Who is in front of John from where we are standing? (= person 4)

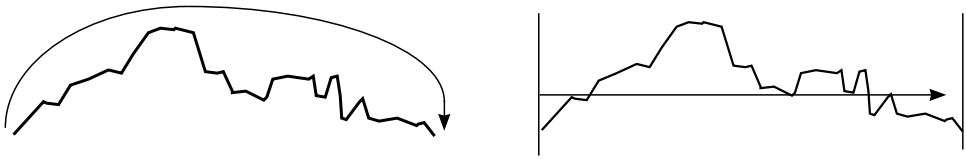
3.2.1.2 A Single Spatial Configuration Open to Different Schematizations

In the second type of case, the same physical configuration without any variation in its contents—say, a particular Figure moving or located with respect to a particular Ground object—is nevertheless open to alternative schematizations. Consider the example of a wheatfield with a man going from one side of it to the other. This configuration is complex enough to allow different schematizations. If we say that the man went *across* the wheatfield, then we are abstracting forth one aspect of the wheatfield complex, the fact that it has a horizontal bounded land parcel, and are disregarding the fact that there is wheat growing atop this land. If, on the other hand, we say that the man went *through* the wheatfield, then the wheatstalks, conceived together as constituting a medium, are abstracted forth from the whole physical complex, and now the presence of a land surface underneath, horizontal and bounded, is irrelevant.

The flexibility afforded by the linguistic processes of idealization and topology allows even further latitude for the imaging of a physical configuration in more than one way. Consider, for example, a cluster of mountains and a path that goes from one edge of the cluster to the opposite edge. If the mountains are thought of in terms of their elevation above the ground, the preposition *over* is best used, coding for a path schema something like that diagrammed in (59a). If, however, the mountain crests are thought of as defining a sort of plateau within which the path resides, then the preposition *across* is wholly appropriate as indicated in diagram (59b). In either case, we should note the immense degree of

abstraction from the actual physical details present for such a situation—an index of our cognitive capacity for idealization.

(59)

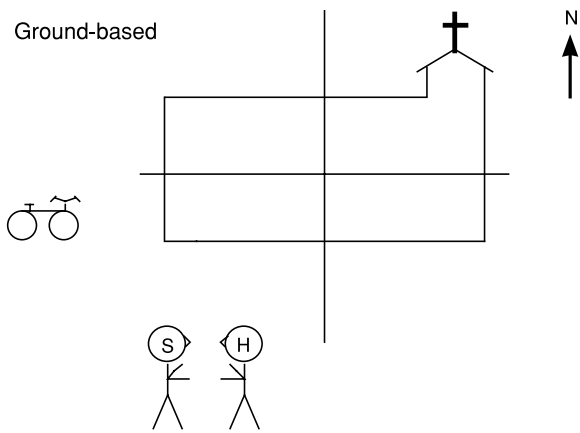


a. over the mountains

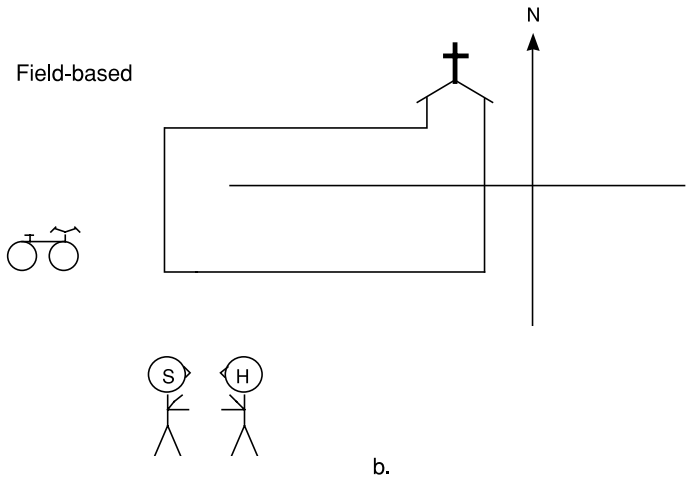
b. across the mountains

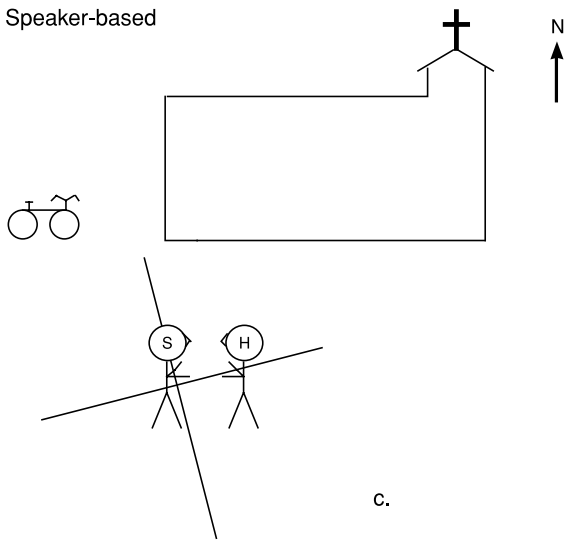
Another case of alternativity falls directly out of the analysis of asymmetric geometries in sections 2.5 and 2.6. The arrangement in which an object with an intrinsic asymmetric geometry is situated within the earth-based reference frame and is positioned with respect to a speaker-hearer dyad automatically permits alternative characterizations of location. Thus, the location of a particular bike relative to a church—as depicted in (60)—can be characterized by appeal to the asymmetric geometry of the church as primary Reference Object, with the form *behind* as in (61a). Alternatively, it can be characterized by appeal to the asymmetric geometry of the earth as an encompassive secondary Reference Object, with the form *west of*, as in (61b). Or it can be characterized by appeal to the asymmetric geometry of the speaker as an external secondary Reference Object that projects out a reference frame, with the form *left of*, as in (61c).

(60)



a.





(61) The bike is { a. behind the church / b. west of the church / c. left of the church }.

Two nonobvious examples of alternativity now can round out our characterization. A person standing some five feet away from and pointing to a bicycle in a driveway has the option of saying either *Get this bicycle out of the driveway!* or *Get that bicycle out of the driveway!* The

forms *this* and *that*, in effect, set up a conceptual partition in space and suggest that an indicated object is on the same side of the partition as the speaker, or on the opposite side, respectively. The point here is that the single spatial configuration of speaker, bicycle, and driveway allows for the imposition of either of these two partitioning schemas, in accordance with the speaker's conceptualization of the scene.

And, referring to the single situation of a bin full of cabbage heads, one could say either *The cabbage in the bin is all turning brown* or *The cabbages in the bin are all turning brown.* That is, this particular physical configuration allows schematization either as a mass quantity, conceived of without internal differentiation (indicated by use of the grammatical singular for the Figure), or as a set of discrete items, conceptualized with a network of divisional spacing running throughout (as indicated by the grammatical plural form).

In the cases of alternativity just reviewed, it is the speaker that selects one schema over another from those available and applicable, and it is thus the speaker that determines the highlighting of one group of factors or of another. In this choice, the speaker is presumably responding to preferences of emphasis or viewpoint, or to some sense of differential importance or salience among the features of a configuration. But the determiners of, and the degree of consciousness involved in, the selection await investigation.

3.2.2 Culture or Language "Preselecting" among Alternative Schematizations While in the preceding cases it was in the speaker's province to select among alternative schemas that could all equally be applied to a given spatial situation, in certain cases the culture or the language requires one particular way of looking at the situation over other possibilities. In effect, the option of selecting a preferred emphasis or viewpoint is removed from the speaker in these cases—a linguocultural "preselection" among the potential alternatives has already been made.

For example, the spatial relations of a passenger to surround-type vehicles like a car or a bus seem enough alike that for either vehicle a speaker should have the option of imaging the passenger as being either *in* the vehicle as a whole, thus invoking an 'enclosure' schema, or *on* some surface within the vehicle (say, its floor or seat), thus invoking a 'platform' schema. But for prototypical reference to vehicular use, English requires that a car be schematized as an enclosure, so that a rider necessarily is *in* this vehicle, or gets *into* or *out of* it, whereas a bus is schema-

tized as a platform, so that a passenger must be *on* it, or get *onto* or *off of* it.

To be sure, this distinction in usage is neither wholly frozen nor unprincipled. Thus, for nonprototypical depictions, a speaker still has the option of saying that a passenger is *in a bus* to emphasize its character as an enclosure, as in *There was an artist in the bus sketching its contours*. And, as Fillmore has pointed out, the use of *on* with a bus depends on its functioning as a vehicle. Thus, speaking of a decomissioned bus in a junkyard, one would say that some children are playing *in* the bus, not *on* it. One might add that a Figure not intending to use the bus as a vehicle readily permits the use of *in*, as in *There was a stray dog/a bomb in our bus*. Furthermore, the English use of *on* or *in* with a vehicle seems generally to mark the distinction between the vehicle's having a walkway (or walking area) or not having one. Thus, a passenger is on an airplane, but in a helicopter; on a ship, but in a boat; on a train, but in a carriage; (usually) on a submarine, but in a diving bell; and, of course, on a bus, but in a car. Thus, the use of *on* with the class of vehicles that has horizontal surfaces that one in fact walks "on" is motivated by the usual geometric schema of that preposition.

Nevertheless, although the use of *on* responds in a principled way to a geometric factor in a vehicle, there is no a priori reason why that particular factor should, in the requirements of English, take precedence over the fact that the vehicle is also an enclosure. Such a factor and its precedence certainly do not appear in most other languages. Thus, German has also preschematized cars and buses but treats them *both* as enclosures. Accordingly, the point demonstrated by the bus-type case in English is its obligatory requirement in prototypical usage for adopting the platform schema over the enclosure schema, and the preselectivity on the part of English that this shows.

While the preceding case showed a contrast of schematization *within* a single language/culture, some preselections of schematization are so pervasive throughout the local context that they can easily go unnoticed until one steps over to another language/culture. Thus, our linguocultural view of a table has us regard the tabletop as comprising the table's essential geometric character, with the legs merely as incidental appendages. Thus, a ball thrown across from one squatting person to another between the legs of a table is said to be thrown *under* the table. In Atsugewi, by contrast, a table can be regarded as tabletop plus legs all taken together as a volumar configuration, so that the same ball would be said to be thrown

through the table. The option for such an idealization is not present for English speakers—and may rarely have even been envisioned.

Similarly, we saw above that, to localize a Figure, English affords the option of referring to the geometric asymmetry of the primary Reference Object, or of the earth, or of the speaker, as in *a bike behind/west of/left of the church*. But the option to refer to earth geometry turns out to be available only where the primary Reference Object is permanently positioned, like a church. Localization done with respect to a mobile object, such as a Person, can generally make appeal only to the object's own asymmetric geometry and not also to earth-based compass points.

(62) a. the bicycle just to my right/*just east of me
b. the itch on my right arm/*on my east arm

By contrast with English, the Native American language Wintu is reported to avoid reference to any intrinsic right/left laterality, even for mobile objects, and instead to refer in fact to earth-based geometry. That is, the speakers of this language would in fact say sentences like "My east arm itches."[13]

It is difficult to resolve whether "preselection"—that is, constraints on options in schematization—is a purely formal aspect of a language's rule system or is always originally due to some psychocultural exigency that has become conventionalized in language usage. Cases of both types may exist. Thus, we would probably want to appeal to the notion of different cultural emphases—specifically, with respect to one's mode of perception—to account for the distinct understandings of the phrase "in front of" generally found among Americans as opposed to Hausas (section 2.7.4). The case for culturally different emphases is supported by Hill's (1975) observation that individuals' understanding of the phrase is not uniform throughout each culture but is a matter of proportion, one that in fact varies according to age. On the other hand, one might want to ascribe to pure linguistic formalism the fact that the option for viewing cabbage as either a mass or a discrete aggregate—*The cabbage(s) in the bin is (are) all turning brown* (section 3.2.1.2)—is not available for celery, which has only the 'mass' option (that is, without resort to expressions like "stalks of"), nor for Brussels sprouts, which have only the 'aggregate' option.

(63) a. The celery in the bin is / *The celeries in the bin are
b. *The Brussels sprout in the bin is / The Brussels sprouts in the bin are

—all turning brown.

That is, it may seem that at issue here is purely the formal assignment of particular lexical items to one or another noun type (to the "mass" or the "count" noun type). Even here, though, the psychocultural question enters. The assignment of lexical items to noun types might not be simply arbitrary, as "purely formal" implies, but rather might reflect cultural norms of imaging physical material—norms that respond to an object's size, its frequency of occurring together with other like objects, its resolvability into some substance-like homogeneity, and so forth.

3.2.3 Disjunctiveness of the Alternative Schematizations A fundamental characteristic of schematization at the fine-structural level is its **disjunct mode of representation**, rather than a continuous mode of representation. Thus, a language can have nothing like a "schema continuum"—that is, an array of directly expressible schemas, with each differing from its neighbors by only one feature or feature value in a fairly continuous way. Rather, each language uses a small set of "quantally" separated schemas with which to represent all possible spatial configurations. Each schema in such a set differs from the others by a *number* of features *simultaneously*. This lack of "in between" forms is not a flaw in the organization of language, but an apparently necessary—perhaps even superior—design feature that is compensated for by other properties, as discussed later.

The lack of ready expressions for the whole range of interstitial spatial configurations means that a speaker does not have the expressive freedom at the fine-structural level to convey just the right schematization with just the right emphases for her current way of conceptualizing a particular spatial form. At this level, therefore, languages exhibit a failure of precision. Particular instances of such failure can be grouped into two types: cases of overspecificity, where the closest available schemas specify more than what the image in the speaker's mind calls for, and cases of underspecificity, where the nearest schemas specify less than the speaker would like to indicate about her image.

3.2.3.1 Overspecificity of the Closest Available Schemas To illustrate overspecificity, one spatial configuration for which all the prepositionally indicated schemas in English are too specific is the following: a linear path located on only a portion of a roughly horizontal plane without boundaries in the region of consideration. The path can, for example, be that of a man taking a walk, and the plane can be a prairie. How is one to express

this configuration using a preposition? One cannot with full appropriateness say *He walked across the prairie* because *across* implies the presence of two opposite borders and a path that spans the full breadth between them—a physical arrangement lacking in the present case. Similarly, one cannot say *He walked along the prairie*, which implies a narrow-strip shape for the plane, nor *He walked over the prairie*, which implies an upbulging curvature to the plane, nor *He walked through the prairie*, which implies the presence of a medium atop the plane (compare the wholly appropriate *He walked through the sage-covered prairie*). Also inappropriate is *He walked around the prairie* (comparable to *He walked around the track*), which implies a narrow-strip plane with a curvature in the horizontal. In fact, the present configuration falls "in the cracks" between the schemas represented by English prepositions, all of them too specific for it. What would be needed is a new English preposition, say, *aflat* as in *He walked aflat the prairie*, that refers to nothing more property laden than a path located on a horizontal plane.

Another example of a configuration "in the cracks" in English is a path extending from one end to the other of a narrow-strip-shaped plane, such as a walk from end to end on a pier. It is not wholly appropriate to say here *She walked along the pier* because *along* implies the *absence* of end points to the path. This sentence would normally be understood to involve walking only a conceptually unbounded partial distance along the pier. This interpretation is supported by the fact that the sentence with *along* accepts a temporal expression with *for*, which is compatible with unbounded actions, but not a temporal expression with *in*, compatible with bounded actions: *She walked along the pier for/*in 20 minutes*. Again, a new preposition would be needed to capture the exact configuration involved, perhaps something like *alength*, as in *She walked alength the pier in 20 minutes*.

3.2.3.2 Underspecificity of the Closest Available Schemas An immediate example of the underspecificity circumstance can be seen in the earlier case of the "wheatfield" (section 3.2.1.2). One spatial configuration into which this object can be idealized is a horizontal bounded plane with an associated medium atop it. But there is no single English preposition that captures the relationship of a horizontal path to this relatively complex configuration. A speaker using either of the two closest prepositions, as in *He walked across the wheatfield* or *He walked through the wheatfield*, must choose between omitting reference to the bounded-plane character of the

object or to its medium-constituting character. To specify the more complex schematic referent, we would again need a new preposition, perhaps one like that in *He walked throughcross the wheatfield*.

For a more elaborate example, consider the diverse possible configurations of points on a plane. English has two ready expressions to schematize these. One, consisting of a quantifying term plus the preposition *on*, indicates the number of points present but not their spatial distribution:

(64) There is a dot/There are several/some/many/50 dots on the board.

The other expression, involving a simple plural plus the prepositional phrase *all over*, as in *There are dots all over the board*, cannot be used with a quantifier to indicate number. Thus, one cannot say **There are several/some/many/50 dots all over the board*. But this prepositional phrase does indicate a certain range of spatial distributions—roughly, those for which every subregion of the plane has at least one point in it, with the size of the subregion used for this assessment depending on the total number of points present. Notice that the *all over* schema does not require a great density of points—at the lower limit, just a few will suffice as long as they have the requisite distribution. Contrariwise, numerosity alone does not ensure that the *all over* schema *will* apply—a multitude of points could be present, but all concentrated in one region of the plane, thus lacking the necessary distribution.

Now, between these two expressions, all possible configurations of points on a plane are encompassed: there are no "cracks" in the coverage. But this broad applicability is won by giving up greater specificity. There is no direct way to indicate both number *and* all-over distribution at once. And there are no direct expressions to indicate any distribution *other* than the all-over type, such as when points on a plane occur in clusters, or in concentric circles, or in some density gradient. Thus, the schema for each of these two expressions is underspecific—and no other simple expressions exist in English—for the purpose of referring directly to many other particular configurations.

3.2.4 Means for Getting "In Between" Disjunctive Alternatives We have seen that any language has only a small set of closed-class elements that code for a similarly small set of schemas. These cannot possibly refer directly with precision to the myriad of conceptualizations of spatial configuration that a speaker can have in mind to convey. We must therefore ask what processes there might be by which a listener can come to

form some of the same conceptualizations that the speaker has. I point to four such processes here.

3.2.4.1 Canceling Features of Overspecific Schemas An overspecific schema includes one or more features that are inappropriate to a speaker's understanding of a particular spatial configuration. In a case where *all* the available schemas are overspecific, one procedure available to the speaker is simply to proceed with the use of one of the schemas regardless, without making any additional correctives. The listener's understanding of the spatial configuration, derived in part from the context to that point (see the discussion of "Image-Constructing Processes" in section 3.2.4.3), can engender a cancelation or suspension of the schema's nonfitting features. Thus, on hearing *She ran across the boulevard for five seconds and then stopped in the middle*, a listener can gather from the context that the runner's path did not reach the opposite side of the street. That is, the listener understands that everything about the *across* schema applies to the referent configuration except the feature 'path terminates on opposite border'. Similarly with the earlier "prairie" example, a speaker could simply settle on using *across* to say *He walked across the prairie* and count on the hearer to suspend all three inappropriate features: 'the plane has two opposite boundaries', 'the path originates on one boundary', and 'the path terminates on the opposite boundary'.

Note that where a schema is too specific for what a speaker *desires* to convey about some spatial configuration but nevertheless is wholly appropriate to it—that is, has no nonfitting features—it cannot be used with the expectation that the hearer will suspend the undesired features. No feature cancelation will occur. To avoid conveying the undesired features, the speaker must use other means. Thus, a speaker wanting to remain unspecific about which of a trip's two end points was the start and which the finish cannot use *from . . . to*, as in *She drove from San Diego to San Francisco last night*, and expect the hearer to feel ignorant about the direction of the trip. He may instead take advantage of the availability of another spatial expression, namely, *between . . . and*, which is neutral with respect to origin and terminus, as in *She drove between San Diego and San Francisco last night*.

Significant to the understanding of language organization is the fact that the use of a word that expresses an overspecific schema, and hence that calls for feature cancelation, can sound forced or awkward. This contrasts with the full acceptability of a word whose schema has been

involved in processes of idealization or topological shifts, as described in sections 3.1.1 to 3.1.3. That is, language is apparently so organized that the processes involved in feature cancelation are not as free to operate as are "flexibility"-type processes, though it must nevertheless be recognized that there is *some* structural provision for them to occur.

3.2.4.2 The Use of Open-Class Elements A major linguistic means for the expression of spatial configurations, outside of the possibilities of the closed-class elements, is in fact afforded by a language's open-class elements. While these may not play a fundamental structuring role at the fine-structural level, they do provide hundreds of particular, sometimes idiosyncratic, characterizations of space. English examples of such forms are nouns like *zigzag* and *spiral*, adjectives like *concentric* and *oblique*, or verbs like *ricochet* and *streak* (*Paint streaked her cheeks*). Their use can be integrated into the regular constructions involving closed-class elements, as in a sentence like *There's a spiral of dots on the board*, or can figure in distinct constructional types of their own, as in *The board is streaked with dots*.[14]

3.2.4.3 Image-Constructing Processes in the Hearer At the comprehension end of communication, surely the most important means for arriving "between" morphemes' disjunct specifications is the hearer's **image-constructing processes** (no purely visual connotation is intended here)—occurring at what was called the "macroscopic level" in the introduction. Uncovering the nature of these processes is one of the most significant tasks awaiting cognitive-linguistic research. What can be said so far, however, is that the hearer somehow combines the reference ranges of a sequence of grammatical and lexical elements with each other and with her understanding of the world and of the current speech situation in a way that there emerges a fairly detailed image, one taken to be close to what the speaker wanted to convey. The image may go through revisions as more is heard or more is called up from general knowledge. Of note here, though, is that this image will in general be of considerably greater specificity than the explicit linguistic references themselves. For example, person B hearing from person A that *There are dots all over the board* may combine his sense of the configurational range allowed by the *all over* schema with general expectations of how dense such a dotting might be (no one is likely to have applied hundreds of such marks) and with a knowledge of person A's tendency to become upset over minor matters

and so to exaggerate, so as to come up with an image of a few chalk marks located here and there over parts of the board.

3.2.4.4 Elaboration of Descriptions by the Speaker Within the domain of the speaker, surely the main property of language that enables finer characterization of a spatial configuration is that language permits an elaboration of references made to the same configuration. Such an elaboration can consist simply of a concatenation of descriptive specifications, such as *There are dots all over the board, and they increase in density toward the bottom edge*. Or it can consist of bits of separate indications scattered through a discourse. Two theoretical points stand out about this elaborative property of language.

The first is that while this property may be so taken for granted that it rarely draws explicit recognition, it is not in principle a necessary aspect of linguistic organization. One can imagine a communication system in which every designation of a spatial configuration would be limited to a single characterization by one of a small set of prepositions, and that would be all that could be expressed about that referent. The fact that a speaker can refer repeatedly and from different perspectives to the same referent is a positive, not a neutral, feature of language organization.

Second, these elaborative processes for the speaker are not in principle correlatively linked to the listener's image-constructing processes. The latter are indeed necessary if the former occur—they must gather and integrate into a single image the relevant references scattered through an utterance. But image construction could play a role even with a fixed-format form of expression, for it would be needed to combine even such minimal indications with contextual and general information in a way that yielded a fuller picture. Accordingly, the speaker's elaborative processes are a feature of language organization that is additional to the feature of the hearer's image-constructing processes.

We can take special note of one form of elaboration, **nesting**, in which the output of one descriptive construction is cycled back as the input to another. We have a clear example of nesting in *There are clusters of dots all over the board*. Here the phrase *clusters of dots*, which is roughly equivalent to the full assertion "The dots are in clusters," constitutes a description of a first-level, more local spatial pattern in which certain dots configure. The elements of this pattern, the "clusters," can in turn be treated as new units to which a further spatial characterization is applied: that they are "all over" the board. Thus, the more local configuration is nested within the more global configuration.

A subtler case of nesting also serves as a solution to the earlier "prairie" example's difficulty of expression. That example's special configuration can now be exactly captured by the locution *He walked along on the prairie*. In this sentence, there is an inner characterization "He walked along." As it happens, the element *along* here is structurally not a preposition relating a Figure to a Ground (as it would be in *He walked along the pier*) but is a verb satellite that simply indicates a point Figure's line-defining forward progression. This self-subsistent motion event is then characterized as taking place "on" a prairie, the configuration that nests it. Since *on* makes no requirements as to boundaries for a planar Ground (as *across* does), the new nested locution is perfectly suited for the unbounded prairie case.

Note that because of nesting and the various concatenative forms of elaboration—employing both closed-class and lexical elements—it is possible to characterize extremely intricate spatial configurations, as (65) shows.

(65) There are some clusters of dots near the lower left of the board and streaks of dots all over the rest of the board, with an occasional spiral of dots located here and there.

4 THE WAY LANGUAGE REPRESENTS MEANING, AS GENERALIZED FROM THE WAY IT STRUCTURES SPACE

The presentation thus far—a survey of the basic spatial distinctions marked by closed-class elements and the properties that characterize them generally—has achieved, albeit with varying degrees of resolution, a form of descriptive comprehensiveness over one whole semantic domain, that of the structure of space and its contents. Through this purchase on one domain, we can now consider the system of semantic representation that is generally characteristic of language. It is by this system that language breaches an ever-present disparity—that between its finite and relatively small set of fine-structural elements representing an equally small set of disjunct schemas, on the one hand, and the indefinitely large perceptual and conceptual continuum potentially to be referred to, on the other hand. While section 3.2.4 just treated several means built into language for getting "in between" such disjunct specifications, we further need to begin a description of the *general* character of this representational system.

4.1 Linguistic Categories as Largely Noncontiguous

The traditional view is that any closed-class system in a language—for example, the set of space-characterizing prepositions in English or the set of object-indicating "numeral classifiers" of Chinese—constitutes for some semantic domain a classificatory system with the following properties. Its categories to a large extent are contiguous (start up near the boundaries at which others leave off), are exhaustive (leave few gaps), are mutually exclusive (exhibit little overlap), and, generally perhaps, are of roughly equal size. An image readily associable with such a conception is a two-dimensional array of adjacent "pigeonholes"—contiguous and exhaustive of their frame, well-partitioned, same-sized—where any particular item clearly fits into one pigeonhole or another. But this concept's actual applicability requires examination.

4.1.1 Forms with Relatively Specific Reference This examination is best carried out with respect to a particular semantic gradient. The meanings of the elements of a closed set tend to range along a gradient of specificity from very general to very specific. Examples among English prepositions might be *near* toward the general end of the specificity gradient, and *across* toward the specific end. The more specific a term is, the narrower a band it indicates on a greater number of semantic parameters simultaneously. It is the specific elements of a set that most challenge the traditional classificatory concept and require attention.

To be sure, in some morpheme sets, even the specific terms can exhibit the pigeonhole form of classification, sometimes even over extensive portions of the semantic domain. This behavior is often seen, for example, within a language's sets of personal pronouns, kinship terms, and color terms. Thus, to consider the color domain in English, a term like *pink*—which denotes a rather specific range of colors that are red in hue, moderately high in lightness, and pale in saturation—neighbors the equally specific term *lavender*, from which it differs primarily in the parameter of hue and, along another dimension, neighbors a further specific term, *rose*, from which it differs mainly in lightness. But what characterizes morpheme sets like these is that their semantic domains—like the array of pigeonholes—are determined by only a small number of dimensions or parameters. Thus, the domain of color terms is structured only with respect to hue, lightness, and saturation (plus, in most languages perhaps, a few parameters pertaining to the surface or object bearing the color). For such restricted domains, it is feasible for the number of even fairly

specific terms to be quite low and still provide comprehensive coverage of the domain.[15]

By contrast, the majority of semantic domains in language are *n* dimensional, with *n* a very large number. Spatial semantics appears to constitute a domain of this sort. Thus, no fewer than the following 20 parameters are relevant to the domain of spatial configuration as expressed by closed-class elements such as English prepositions and deictics.

(66) a. Partitioning of a spatial configuration to yield a Figure and a Ground
b. Schematic geometry of the Figure object
c. Schematic geometry of the Ground object
d. Symmetry or asymmetry in the geometry of the Figure and of the Ground
e. An object's asymmetric geometry based on its parts or on a directedness within it
f. Number of relevant dimensions in an object's schematic geometry
g. Boundary conditions of an object's schematic geometry
h. An object's geometry as continuous or composite
i. Orientation of the Figure with respect to the Ground
j. Relative distance/magnitude of the Figure compared to the Ground
k. Presence/absence of contact of the Figure with the Ground
l. Figure's distribution of substance relative to that of the Ground
m. Presence/absence of self-referentiality for a Figure-Ground configuration
n. Presence/absence of further Reference Objects
o. External projection of a secondary Reference Object's geometry
p. Imputation of asymmetry onto a primary Reference Object
q. Orientation of the Figure or Ground to the earth/speaker/other secondary Reference Object
r. Further embeddings of one Figure-Ground configuration within another or concatenations of one upon another
s. Adoption of a perspective point from which to regard the configuration
t. Change in the location of a Figure or perspective point through time (hence, paths of motion and perspectival scans)

With so many parameters, full domain coverage by fairly specific references would require thousands of distinct vocabulary items, and coverage by *very* specific references would require millions. Such an arrangement is not in principle impossible for a symbol system, but natural languages appear to be under a constraint that limits the number of distinct symbolic elements they can utilize, and in fact never exhibit systems of same-category elements in such numbers. Rather than showing a contiguous array of specific references, languages instead exhibit a smaller number of such references in a scattered distribution over a semantic domain. That is, a fairly specific reference generally does not have any immediate neighbors of equal specificity.

This arrangement can be illustrated with the example in section 2.2.1 of a board lying across a railway bed. The English preposition *across* here designates a rather specific spatial configuration with the nine properties listed in (8), including the requirements that the board be horizontal, be perpendicular to the railway bed's main axis, reach from one side of the railway bed to the other, and be adjacent to, but not in, the plane of the railway bed. Now what if a board bears all but one of these same spatial relations to the railway bed? It could, for example, extend horizontally and perpendicularly from one track to the other but a little distance beneath them (hence be buried in the bed) or above them, but not directly atop them. In such cases, *across* would no longer serve. But there are no equally specific prepositions—such as forms like *acrinss* and *acrupss*—to handle the new spatial configurations. All that English provides to refer to these configurations are such severely underspecific general terms as *in* and *over*, which can be used even if the board is not horizontal, not perpendicular to the tracks, and too short to span them.

There is a large referential distance between *across* and the other specific prepositions of English, such as *around*, *through*, *alongside*, *underneath*, *past*, *beside*. Thus, with English prepositions as the exemplar of semantic representation in general, we can say that, for the organization of relatively specific references in language, there appears to be at work a principle different from that of classification in the traditional sense of a contiguous "pigeonhole"-like partitioning of semantic domains. The principle seems, rather, to be one of *representativeness*. The references are not exhaustive of these domains, but representative of them. In particular, (67) applies.

(67) With its stock of relatively specific morphemic references, a language must provide a sufficiently distributed and dense (but not too dense) dotting over a semantic "*n*-dimensional conceptual space"—both over individual semantic domains and over the whole of semantic reference.

4.1.2 Forms with Relatively General Reference The more general terms of a closed set—for example, the spatial terms *in* and *over*, as used in the preceding railway example—appear to have a special form of functioning, one not much shared by more specific terms, in the way they represent elements of a scene. A key to understanding their functioning is found in the nature of the schematization process. A morpheme never specifies a referent as to the full detail in which it exists in fact, in perception, or in conception, but rather specifies a particular complex of aspects abstracted from the total referent. Nevertheless, a communicator generally wants to convey a complete picture of a referent situation—that is, to engender the emergence of a full image in the mind of an addressee. Such transmission is accomplished in language by a complementary pair of processes: the sender represents the whole of a conceptual complex with only a portion thereof, and the receiver "fleshes out" or **reconstitutes** the whole from this portion by the operation of her image-constructing processes (section 3.2.4.3). The sender's process, which can be termed **part-for-whole representation**, is a natural concomitant of schematization, and could have been treated in section 3.1 along with the other concomitants, idealization, abstractedness, and topology. As a particular feature of its operation, a speaker, in order to convey some referent *at all*, must at times resort to fastening upon any aspect of that referent for which there is *some* ready-to-hand term available in the language, whether or not that aspect is especially relevant to his larger discourse. Thus, in the railway example, if a board is horizontal, is perpendicular to and spans the railway bed, *and* happens to be buried in it, a speaker has no recourse but to utilize this last aspect, as in the expression *the board in the railway bed*, even if this aspect is wholly irrelevant, in order to designate the presence of the board's complex of spatial relations at all. This, then, would seem to be a major function of the more general terms in a language. Because their specifications are minimal, they refer to aspects present in a broad range of full conceptual complexes and so can be seized on so as to convey those complexes as a whole, in conjunction with the reconstitution process on the receiving side.

4.2 The Effect of Systemic Constraints on Language

The properties observed so far in this section—a specificity gradient among closed-class terms; a representative "dotting," not a comprehensive classification, exhibited by specific terms; part-for-whole representation as a major function of general terms—can be understood as resulting from several constraints that language is under at once. The character of human communication imposes several requirements: language must be able to represent all of an enormous referential field, express conceptual material of certain kinds with great enough specificity, and convey this information at a fast enough rate. Language might in theory be able to accomplish all this with an inventory of millions of specific terms, except that it appears to be under an additional constraint limiting the total number of distinct symbolic elements it can employ, presumably due to the difficulties of processing the great degree of phonetic discrimination and memory accessing that would be entailed. Moreover, if such terms were uniformly *very* specific, any utterance would require stringing together too many of them to accord with the timing requirement of communication. So language must at least reduce its inventory of specific terms.

But it may not do so without also including a number of general terms, because otherwise the requirement of whole-field coverage would not be satisfied. General terms are necessary for referring to interstitial conceptual material, that between the references of specific terms. Such terms accomplish this largely by indicating one aspect of a more complex concept, in accordance with a process of part-for-whole representation and its complement, reconstitution. On the other hand, language could not abandon specific terms entirely in favor of all general ones because it would then fail the specificity requirement of communication. After all, full-field coverage could be achieved by just a few very general terms. Thus, the five English words *someone*, *something*, *do*, *happen*, and *be*, plus a few grammatical morphemes for tense, modality, and the like, can in construction encompass virtually all conceptual phenomena with sentences like *Someone did something*, *Something happened*, and *Something is*. But these would lack all necessary specificity. Hence, language needs both specific and general terms.

Further, the same reasoning that has led to this conclusion also requires that the specific terms be well distributed over the whole of semantic reference. For if they were not, there would be large regions covered only by general terms, again insufficient to the requirement of specificity.

One further feature can be pointed out about this distribution of specific references. While there are undoubtedly factors that encourage the positioning of these at certain locations within semantic space—such as a high frequency of occurrence or cultural significance attaching to some specific notions—their locations must nevertheless be to a great extent arbitrary, constrained primarily by the requirement of being representative of the lay of the semantic landscape, as evidenced by the enormous extent of noncorrespondence between specific morphemes of different languages, even where these are spoken by the peoples of similar cultures.

In conclusion, our examination of how language structures space has not only uncovered basic characteristics of a significant cognitive domain as reflected in a major cognitive system, language, but has also shed light on the general nature of conceptual representation in that same system.

5 APPENDIX: MOTION-ASPECT FORMULAS + CONFORMATIONS

This appendix excerpts and updates the treatment in Talmy 1975b of Motion-aspect formulas. However, the derivational approach that characterizes some portions has been left intact.

The core subset of the Motion-aspect formulas of (48) is shown here in a more symbolic format. These formulas use the following symbols to represent the fundamental Figure and Ground schemas.

$\text{POINT}_{S/T}$: Specifies an unextended point of space or time.

${}_{E}\text{POINT}_{S/T}$: Specifies an extended point of space or time.

$\text{EXTENT}_{S/T}$: Specifies an unbounded extent of space or time.

${}_{B}\text{EXTENT}_{S/T}$: Specifies a bounded extent of space or time.

(68) a. a POINT_S BE_{LOC} AT a POINT_S, FOR an ${}_{B}\text{EXTENT}_T$
b. a POINT_S MOVE TO a POINT_S, at a POINT_T
c. a POINT_S MOVE FROM a POINT_S, at a POINT_T
d. a POINT_S MOVE VIA a ${}_{E}\text{POINT}_S$, at a POINT_T
e. a POINT_S MOVE ALONG an EXENT_S, FOR an ${}_{B}\text{EXTENT}_T$
f. a POINT_S MOVE ALENGTH an ${}_{B}\text{EXENT}_S$, IN an ${}_{B}\text{EXTENT}_T$

In the use of one of these formulas to refer to a particular situation, the fundamental Ground schema is typically elaborated further. Built on it is an additional geometric complex—the **Conformation**—that relates the fundamental Ground schema to the schema for a full Ground object.

Each language lexicalizes its own set of such geometric complexes. An example of such a Conformation in English—one that represents interior location—is shown in (69). In the formulations that follow, such Conformations will be represented as relative clauses on the fundamental Ground schema to indicate its role in elaborating that schema.

(69) a POINT_S IS OF the INSIDE OF an ENCLOSURE

In a complex structure consisting of a Motion-aspect formula and a Conformation, the expressions for particular full figure and ground objects can be associated with the initial and final geometric schemas, respectively, as in

(70) a POINT_S BE_{LOC} AT a POINT_S that IS OF THE INSIDE OF an ENCLOSURE
the ball *the box*

(which ultimately yields *The ball is in the box*). The particular figure and ground objects specified in such a complex structure can be appropriate only if they are capable of being idealized as the geometric schemas in the structure. Thus, (29) can specify a semantically well-formed situation only if 'the ball' is topologically idealizable as 'a point of space' and 'the box' as 'an enclosure'.[16]

Thus, even a simple Path-specifying form like English *in* or *across* actually corresponds to a complex structure. In particular, in derivational terms, it arises from the last portion of a Motion-aspect formula together with the first portion of a Conformation. We will now consider six such structures—built from the last portions of (68a) to (68c) together with the first portions of two different Conformations—and sketch the derivations leading from these to the corresponding surface path expressions of English. The last portion of a Conformation (the geometric schema for the full Ground object) is shown only in brackets and is assumed not to participate directly in the derivation.[17]

(71)

(A)	For (68a)	For (68b)	For (68c)
a.	AT a POINT_S that IS OF the INSIDE OF [AN ENCLOSURE]	TO a POINT_S that IS OF the INSIDE OF [AN ENCLOSURE]	FROM a POINT_S that IS OF the INSIDE OF [AN ENCLOSURE]
b.	AT a POINT_S OF the INSIDE OF	TO a POINT_S OF the INSIDE OF	FROM a POINT_S OF the INSIDE OF
c.	AT the INSIDE OF	TO the INSIDE OF	FROM the INSIDE OF
d.	AT IN	TO IN	FROM IN
e.	—	—	FROM OUT
f.	IN AT	IN TO	OUT FROM
g.	*in*	*in (to)*	*out (of)*

(71)	(B)	a.	AT A POINT$_S$ that IS OF the SURFACE OF [a VOLUME]	TO a POINT$_S$ that IS OF the SURFACE OF [a VOLUME]	FROM a POINT$_S$ that IS OF the SURFACE OF [a VOLUME]
		b.	AT a POINT$_S$ OF the SURFACE OF	TO a POINT$_S$ OF the SURFACE OF	FROM a POINT$_S$ OF the SURFACE OF
		c.	AT the SURFACE OF	OF the SURFACE OF	OF the SURFACE OF
		d.	AT ON	TO ON	FROM ON
		e.	—	—	FROM OFF
		f.	ON AT	ON TO	OFF FROM
		g.	*on*	*on (to)*	*off(-of)*

Note that the derivations in (71) apply equally well to Russian through the (f) forms. In deriving further to the surface (g) forms, the deep morphemes IN, OUT, ON, and OFF key in the appropriate Russian prepositions, while the deep Vector morphemes AT, TO, and FROM key in case markers for the governed noun.

(72)	f.	IN AT	IN TO	OUT FROM
	g.	*v*+-PREPOSITIONAL	*v*+-ACCUSATIVE	*iz* + -GENITIVE
	f.	ON AT	ON TO	OFF FROM
	g.	*na*+-PREPOSITIONAL	*na*+-ACCUSATIVE	*s* + -GENITIVE

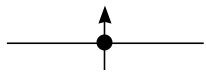
In addition, the (c) forms are represented at the surface in (for one language out of many) Japanese—for example, in *no ue ni* 'at top surface of' (= 'on'), in *no ue ni/e* 'to top surface of' (= 'onto'), and in *no ue kara* 'from top surface of' (= 'off of'). The right-hand (d) forms are represented at the surface in Hebrew in *mē 'al* 'from on' (= 'off of'). The right-hand (e) forms are represented at the surface in older English in expressions like *She ran from out the house*. And the right-hand (f) forms are represented at the surface in modern English—using the word *from* instead of *of*—when they precede a nonnominal expression, as in *Get out from in front of the television*.

We now consider elaborations of the Motion-aspect formulas of (68d) to (68f) in (73), (74), and (75), respectively. In each case, the Motion-aspect formula's Vector and fundamental Ground schema are shown in construction with several different Conformations. For each such construction, a derivational sketch, a pictorial diagram, and an illustrative sentence are given. Although not shown above, the aspect indications that are an intrinsic part of Motion-aspect formulas are included below.

(73) a. VIA a $_{E}$POINT$_{S}$ that IS$_{LOC}$ TO-ONE-SIDE-OF [a POINT] AT a POINT$_{T}$
VIA TO-ONE-SIDE-OF [a POINT] AT a POINT$_{T}$
past [a POINT] AT a POINT$_{T}$

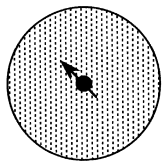
The ball sailed past his head (at exactly 3:00).

b. VIA a $_{E}$POINT$_{S}$ that IS$_{LOC}$ ON and PERPENDICULAR TO [a LINE] AT a POINT$_{T}$
VIA ON [a LINE] AT a POINT$_{T}$
across [a LINE] AT a POINT$_{T}$



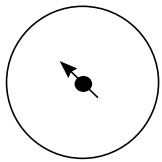
The ball rolled across the border (at exactly 3:00).

c. VIA a $_{E}$POINT$_{S}$ that IS$_{LOC}$ IN and PERPENDICULAR TO [a PLANE] AT a POINT$_{T}$
VIA IN [a PLANE] AT a POINT$_{T}$
through [a PLANE] AT a POINT$_{T}$



The ball sailed through the pane of glass (at exactly 3:00).

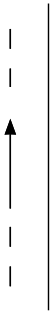
d. VIA a $_{E}$POINT$_{S}$ that IS$_{LOC}$ INSIDE and PERPENDICULAR TO [a CIRCLE] AT a POINT$_{T}$
VIA INSIDE [a CIRCLE] AT a POINT$_{T}$
through [a CIRCLE] AT a POINT$_{T}$



The ball sailed through the hoop (at exactly 3:00).

(74) Here and in (75), wherever UP and *up* appear, DOWN and *down* are equally appropriate.

a. ALONG an EXTENT_S that IS_{LOC} TO-ONE-SIDE-OF and PARALLEL-TO [a LINE] FOR an ${}_B\text{EXTENT}_T$
ALONG TO-ONE-SIDE-OF [a LINE] FOR an ${}_B\text{EXTENT}_T$
along[side] (a LINE) FOR an ${}_B\text{EXTENT}_T$

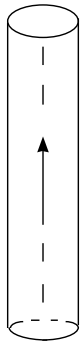


She walked along (side) the fence (for 5 minutes).

b. ALONG an EXTENT_S that IS_{LOC} ON and PARALLEL-TO [a LINE] FOR an ${}_B\text{EXTENT}_T$
ALONG ON [a LINE] FOR an ${}_B\text{EXTENT}_T$
along [a LINE] FOR an ${}_B\text{EXTENT}_T$

I walked along the path (for 20 minutes).

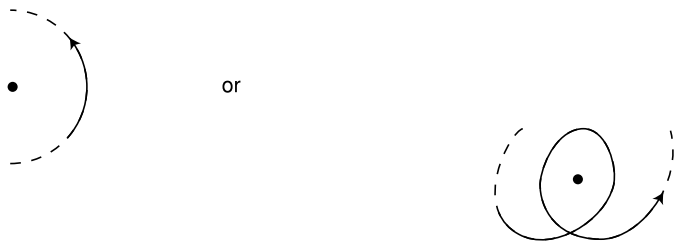
c. ALONG an EXTENT_S that IS_{LOC} INSIDE and PARALLEL-TO [a CYLINDER] FOR an ${}_B\text{EXTENT}_T$
ALONG INSIDE [a CYLINDER] FOR an ${}_B\text{EXTENT}_T$
through [a CYLINDER] FOR an ${}_B\text{EXTENT}_T$



I walked through the tunnel (for 20 minutes).

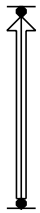
c′. UP ALONG an EXTENT_S that IS VERTICAL and IS_{LOC} INSIDE and PARALLEL-TO [a VERTICAL CYLINDER] FOR an ${}_B\text{EXTENT}_T$
UP ALONG INSIDE [a VERTICAL CYLINDER] FOR an ${}_B\text{EXTENT}_T$
up [a VERTICAL CYLINDER] FOR an ${}_B\text{EXTENT}_T$
I crawled up the chimney (for 1 minute).

d. ALONG an EXTENT_S that IS_{LOC} RADIALLY TO-ONE-SIDE-OF [a POINT] FOR an ${}_B\text{EXTENT}_T$
ALONG RADIALLY TO-ONE-SIDE-OF [a POINT] FOR an ${}_B\text{EXTENT}_T$
around [a POINT] FOR an ${}_B\text{EXTENT}_T$



I ran around the house (for 20 seconds).
I ran around the house (for 2 hours).

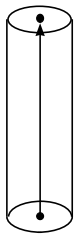
(75) a. ALENGTH an $_{B}$EXTENT$_{S}$ that IS$_{LOC}$ ON, PARALLEL-TO, and COTERMINOUS-WITH [a BOUNDED LINE] IN an $_{B}$EXTENT$_{T}$
ALENGTH ON [a BOUNDED LINE] IN an $_{B}$EXTENT$_{T}$
the length of [a BOUNDED LINE] IN an $_{B}$EXTENT$_{T}$ (no English preposition corresponds to this structure)



I walked the length of the pier (in 10 minutes).

a′. UP ALENGTH an $_{B}$EXTENT$_{S}$ that IS VERTICAL and IS$_{LOC}$ ON, PARALLEL-TO, and COTERMINOUS-WITH [a VERTICAL BOUNDED LINE] IN an $_{B}$EXTENT$_{T}$
UP ALENGTH ON [a VERTICAL BOUNDED LINE] IN an $_{B}$EXTENT$_{T}$
up [a VERTICAL BOUNDED LINE] IN an $_{B}$EXTENT$_{T}$
I walked up the ladder (in 20 seconds).

b. ALENGTH an $_{B}$EXTENT$_{S}$ that IS$_{LOC}$ INSIDE, PARALLEL-TO, and COTERMINOUS-WITH [a BOUNDED CYLINDER] IN an $_{B}$EXTENT$_{T}$
ALENGTH INSIDE [a BOUNDED CYLINDER] IN an $_{B}$EXTENT$_{T}$
through [a BOUNDED CYLINDER] IN an $_{B}$EXTENT$_{T}$

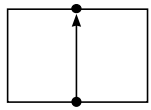


I walked through the tunnel (in 30 minutes).

b′. UP ALENGTH an $_{B}$EXTENT$_{S}$ that IS VERTICAL and IS$_{LOC}$ INSIDE, PARALLEL-TO, and

COTERMINOUS-WITH [a VERTICAL BOUNDED CYLINDER] IN an $_{B}EXTENT_{T}$
UP ALENGTH INSIDE [a VERTICAL BOUNDED CYLINDER] IN an $_{B}EXTENT_{T}$
up [a VERTICAL BOUNDED CYLINDER] IN an $_{B}EXTENT_{T}$
I crawled up the chimney (in 3 minutes).

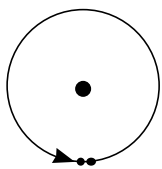
c. ALENGTH an $_{B}EXTENT_{S}$ that IS_{LOC} ON
and COTERMINOUS-WITH [a BOUNDED PLANE] IN an $_{B}EXTENT_{T}$
ALENGTH ON [a BOUNDED PLANE] IN an $_{B}EXTENT_{T}$
across [a BOUNDED PLANE] IN an $_{B}EXTENT_{T}$



I walked across the field (in 5 minutes).

c′. UP ALENGTH an $_{B}EXTENT_{S}$ that IS VERTICAL
and IS_{LOC} ON and COTERMINOUS-WITH [a VERTICAL BOUNDED PLANE] IN an $_{B}EXTENT_{T}$
UP ALENGTH ON [a VERTICAL BOUNDED PLANE] IN an $_{B}EXTENT_{T}$
up [a VERTICAL BOUNDED PLANE] IN an $_{B}EXTENT_{T}$
The fly walked up the wall (in 30 seconds).

d. ALENGTH an $_{B}EXTENT_{S}$ that IS_{LOC} RADIALLY TO-ONE-SIDE-OF [a POINT]
and COTERMINOUS-WITH ITSELF IN an $_{B}EXTENT_{T}$
ALENGTH RADIALLY TO-ONE-SIDE-OF [a POINT] IN an $_{B}EXTENT_{T}$
around [a POINT] IN an $_{B}EXTENT_{T}$



I ran around the house (in 40 seconds).

Notes

1. This chapter is a substantially revised and expanded version of Talmy 1983. The appendix included in this version is a revised excerpt from Talmy 1975b.

I am indebted to Herb Pick, Charles Fillmore, Jennifer Lowood, and Eileen Eastman for their editorial comments on content and style in earlier drafts of this manuscript. And for our discussions over the years on language and space, I want to thank Melissa Bowerman, Charles Fillmore, Annette Herskovits, Ray Jackendoff, Paul Kay, George Lakoff, David Mark, Dan Slobin, and David Zubin.

2. Continued analysis since the publication of Talmy 1983 has appeared in many works, including Levelt 1984, 1996; Zubin and Svorou 1984; Herskovits 1986, 1997; Langacker 1987; Brugman 1988; Vandeloise 1991; and Regier 1992.

3. The linguistic term "open-class" refers to any set of elements, like noun stems, that is quite large in number and can rather readily add new members. "Closed-class" is applied to a set of elements—for example, verbal inflections for tense, pronouns, prepositions—that are relatively small in number and fixed in membership.

4. Other linguists working on space have described notions similar—though generally not identical—to these, and have employed different terms for them. Thus, Gruber's (1965) "theme" and Langacker's (1979) "trajector" are quite comparable to my Figure, while Langacker's "landmark" compares with my Ground. Fillmore's (1968) "Patient" includes, but is more general than, the present Figure notion, but he has no analog to my Ground, as discussed next.

5. The "virtual motion" referred to here is one type within the elaborate system of "fictive motion" described in chapter I-2, namely, the type termed "coextension paths."

6. Because of this semantic range of English *in*, Lakoff and Johnson's (1980) selection of the term "container" to label the literal and metaphoric meaning of *in* does not well represent this morpheme's coverage and can be misleading. Thus, for example, 'containment' pertains to only a small subset of Atsugewi's distinctions. A better label for the general meaning of *in* might be "a surround," so that one could speak of a "surround metaphor."

7. Perhaps a version of this pattern underlies prepositional *up* and *down* in English.

(i) up/down: 'up/down along {a linear extent}/through {a cylinder}
I climbed up the ladder. / I crawled down the chimney.
[as if, e.g., from: I climbed up along the ladder/crawled down through the chimney]

8. On the basis of a broader range of expression in English—such as on the *east side of*, *on this side of*—the word *side* in one of its usages can be considered a general term for referring to the region adjacent to a particular Reference Object part. Accordingly, the specialized expressions in (25) can be considered equivalent to fuller expressions containing the word *side* as follows:

in front of = on the front side of
in back of/behind = on the rear side of
on the right/left = on the right/left side of

9. The use of *with* and *against* with something like a traffic signal, as in *I crossed the street with/against the light*, probably rests on a conceptualization of the traffic light as a fictive emanation (see chapter I-2). In this conceptualization, the emanation flows out from a red light, but into a green light, which is in view before a pedestrian, and can interact force dynamically with certain cognitive characteristics of the pedestrian.

10. We note again that our term "Reference Object" is equivalent to and interchangeable with our term "Ground." It is used preferentially in the present section only because it may lend itself more suggestively to the descriptions offered.

11. With regard to examples (48g) and (48h), the Spanish prepositions *hasta* and *desde* appear to capture exactly the (g) and (h) notions—for both space and time—of motion or temporal continuation along an extent bounded at only one end, so that *hasta Chicago* means 'as far as/up to Chicago' and *hasta 3:00* means 'until 3:00,' while *desde Chicago* means 'from Chicago and onward' and *desde 3:00* means 'since 3:00'.

12. By way of cross-referencing, part 1 of this volume treats the first three schematic systems. Part 2 treats the first schematic system (configurational structure). Part 3 treats the third system (attention). And part 4 treats the fourth system (force dynamics).

13. This phenomenon was perhaps first observed for a language, specifically, for Wintu, by Harvey Pitkin (personal communication). But it has since then been explored in great detail by Levinson (1996b), Pederson (1993), and others in the Cognitive Anthropology Research Group at the Max Planck Institute for Psycholinguistics.

14. To this open-class group in English belong a number of **postural** verbs that characterize how certain complex geometric objects, including the human body, enter a variety of configurations and, in some cases, relate spatially to further reference objects: *bow*, *bend*, *crouch*, *squat*, *kneel* (*on*), *lie* (*on*), *sit* (*on*), *stand* (*on*), *lean* (*against*), *hang* (*from*), *huddle* (*together*).

15. Although the spatial domain has too many parameters to behave like the kinship or color domains, microportions of the domain can exhibit the pattern of contiguous specific classification. Thus, English *across* and *along* together form a two-member subset that schematizes most versions of a path extending over a bounded plane, with the venue of one preposition giving way to that of the other as the plane's ratio of axis lengths changes in magnitude.

16. Note that a single physical object can be idealized into several different geometric schemas. Thus, a particular box is idealized as an enclosure in the situation specified by *The ball is in the box*, but it is idealized as a point in the situation specified by *The box is 20 feet away from the wall*.

17. With regard to (71Af), in standard American English, *into*, *onto*, and *off of* can appear without their second element as *in*, *on*, and *off*. But *out of* cannot do so. At least in some dialects, however, this *can* happen: *I fell out the bed*.

PART 3

ATTENTION

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Chapter 4

The Windowing of Attention in Language

1 INTRODUCTION

Using the perspectives and methods of cognitive semantics, this study sets forth the system with which languages can place a portion of a coherent referent situation into the foreground of attention by the explicit mention of that portion, while placing the remainder of that situation into the background of attention by omitting mention of it.[1] Terminologically, the cognitive process at work here is called the *windowing of attention*, the coherent referent situation with respect to which the windowing must take place is an *event frame*, the portions that are foregrounded by inclusion are *windowed*, and the portions that are backgrounded by exclusion are *gapped*. In engaging this subject, the present chapter treats a number of phenomena. It examines five generic types of event frame—a path, a causal chain, a cycle, a participant interaction, and an interrelationship—and it considers the cognitive factors that constitute and bound such event frames. It examines the properties of the windowing process, including its capacity for embedding or for multiple co-occurrence, as well as the functions that this process may serve within the overall organization of cognition. It investigates a number of concomitant cognitive phenomena including the nature of attention, foregrounding and backgrounding, conceptual alternativity, cognitive splicing, goal-schema constancy, causal transparency and the sense of causal immediacy versus distance, conceptual contrast frames, and the systematic relationship of factuality to affect states and explanation types. It speculates on correlations between the windowing structure in language and comparable structuring in perception and motor control, including the ways these are manifested in the experiments of virtual reality. And it observes the commonality of windowing

structure in spoken language and in the sign-language systems spontaneously developed by certain deaf children, a commonality that testifies to the fundamental character of the cognitive structure presented here.

The windowing of attention is just one fragment of the much vaster cognitive system constituting the conceptual structuring of language. In hierarchical terms, the windowing of attention—along with level of attention, center of attention, scope of attention, and network of attention—is part of the larger cognitive structural category in language that can be termed the **distribution of attention**. This category can be considered a **schematic system**. In turn, this system—along with other schematic systems such as configurational structure, location of perspective point, force dynamics, and cognitive state—together constitute the fundamental delineation of conceptual structuring in language.[2]

2 THE NATURE OF ATTENTIONAL WINDOWING

Linguistic forms can direct the distribution of one's attention over a referent scene in a certain type of pattern, the placement of one or more **windows** of greatest attention over the scene, in a process that can be termed the **windowing** of attention. In this process, one or more portions of a referent scene—where each portion has internal continuity but is discontinuous from any other selected portion—will be placed in the foreground of attention while the remainder of the scene is backgrounded. The most fundamental formal linguistic device that mediates this cognitive process is the inclusion in a sentence of explicit material referring to the portion or portions of the total scene to be foregrounded, and the omission of material that would refer to the remainder of the scene intended for backgrounding. This device is the only one to be treated here and the one for which the term "windowing" will be reserved.[3] Although only a certain portion or portions of the referent scene are explicitly specified when thus windowed, it is understood as part of the nature of the windowing process that—given the appropriate context—the addressee will be able to infer the remainder of the scene. Generally, the same referent scene can be windowed in any of several different ways—that is, different patterns of selected windows can be placed over the scene. This latitude is another manifestation of the fundamental linguistic property of **conceptual alternativity** described in chapter I-3, and it will be exemplified in all the categories of windowing treated below.

To introduce some of the terminology employed below, a referent scene that is sequential in nature or that has been sequentialized conceptually can have a window of strongest attention placed over its beginning, middle, or end portion—or, as will be said here, may have **initial**, **medial**, or **final windowing**. On the other hand, such a scene can have a particular portion without a window on it, backgrounded by the lack of sentence constituents referring to it, and accordingly here be said to have **initial**, **medial**, or **final gapping**.

2.1 The Event Frame

To be viable, the concept of windowing requires a basis on which to distinguish between two kinds of material missing from a sentence: a kind whose referent would indeed be understood as belonging to the represented scene, and another kind whose referent would be felt as peripheral or incidental. Serving such a function, something like the following consideration is needed: Arising from whatever causes, whether in part innately universal ones or in part linguistically or culturally specific ones, language users apparently tend to conceive certain elements and their interrelations as belonging together as the central identifying core of a particular event or event type. Other elements, ones that on other grounds might have seemed to share an equally intimate involvement in the event, are instead conceptualized as peripheral or incidental.

A set of conceptual elements and interrelationships that in this way are evoked together or co-evoke each other can be said to lie within or to constitute an **event frame**, while the elements that are conceived of as incidental—whether evoked weakly or not at all—lie outside the event frame. Prominent examples of event frames include the so-conceived entirety of an object's path, that of a causal chain, and that of an interchange of entities (including an exchange of possessions, as in Fillmore's "commercial event"). Typically **not** included within an event frame, however, are, for example, the day of the week on which an event occurred, the geographic locale in which the event occurred, the ambient temperature of the space in which the event occurred, or the state of health of a participant in the event—even though such factors can be fully or even necessarily as much involved in an event as the factors that do get treated as part of the event.

This notion of an event frame is very close to Fillmore's (e.g., 1982) concept of a frame or scene when applied to an event, but there appear to

be several differences of emphasis or of conceptual basis. First, where Fillmore emphasizes mainly the co-presence of certain interrelated conceptual elements, our notion of an event frame is intended to stress as well the exclusion of other conceptual elements from the privileged core. Second, a frame for Fillmore seems to represent a concept or phenomenon that may be specific to a particular language or set of languages and that may be determined only within a particular sociocultural context. Our event frame, however, is generally understood as a more generic category that is quite likely universal across languages, that at least in part corresponds to the structuring in other cognitive systems such as visual perception, and that may well be innately determined. Such a generic status is thus assumed for the event frame types treated below—hence, for the path, the causal-chain, the cycle, the participant-interaction, and the interrelationship event frames. Fillmore's commercial scene, which involves an exchange of possessions, thus might under further investigation come to be seen as constituting only one particular form of a generic type of event frame that consists of an interchange of entities and that is demarcated in accordance with some general factor such as reciprocity or symmetry.

It remains to be determined whether there are relatively general conceptual factors or cognitive principles that govern which clusterings of conceptual material are felt to constitute coherent event frames of particular types. To this end, the analysis below successively posits a number of factors that may contribute to the demarcation of different types of event frames. To preview them, we can at this point indicate the factors that will be proposed. First, in an event frame of motion, the so-conceived entirety of an object's path may be demarcated by periods of stationariness that temporally bound the period of motion, or by "path singularities"—that is, abrupt qualitative shifts in the path direction or in the surrounding medium. It can also be demarcated by a normative scope of perception or by the analysis of a path complex into an embedded structure of one path nested within another. It can further be demarcated by the spatial coincidence of two points of a path when this path is closed or by two bilaterally symmetric elements that represent corresponding points in a reflection about a central axis. Second, in an event frame of agentive causation, the so-conceived entirety of a causal chain may be demarcated by the initiating volitional act of an agent and by the final goal that the agent intends as a result of this act, where this act and goal mark the beginning and the end of the agent's scope of intention. Third, in a cyclic

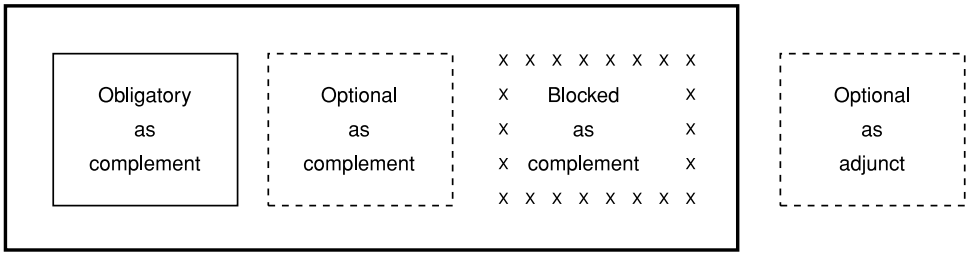
event frame, the so-conceived entirety of a cycle is generally demarcated by two temporal points that bear the same phase relation to two congruent stretches of occurrence, where these two points are conceptualized as part of a "home" phase. Fourth, in a participant-interaction event frame, the occurrence of two distinct punctual events extrinsic to a certain circumstance that extends through time can mark out a portion of that circumstance and establish that portion conceptually as an event frame. Finally, an interrelationship event frame can be demarcated by the coentailment of its component elements, by the complementary relationship of its component elements where there are only two of these, or by the capacity of its component elements to function as alternative conceptualizations juxtaposed within a single comparison frame.

Given such relatively general factors that help determine portions of conceptual material that will be felt to constitute unitary coherent event frames, is there any still more general cognitive principle that runs in common through these factors or that characterizes the ways in which they function to demarcate the event frames? Such a principle seems to be that the organizing factors function to establish what is conceptualized as a **boundary** around the portion of conceptual material constituting the event frame. This boundary separates that portion from other conceptual material. As might be expected, such a boundary—and, hence, an event frame in general—exhibits various prototype effects such as those described by Rosch (1978) and Lakoff (1987). For example, the boundary might not be a sharp line but a gradient zone, and its particular scope and contour—hence, the particular quantity and portions of material that it encloses—might vary in accordance with the specific context or type of context. Nevertheless, some sense of boundary appears to be present across the relevant cases and to govern certain associated characteristics. First among such characteristics is the definitional one that the material enclosed within the boundary is felt to constitute a unitary coherent conceptual entity distinct from the material outside the boundary. Second, there seems to be some sense of **connectivity** throughout the material enclosed within the boundary and, contrariwise, some sense of **discontinuity** or **disjuncture** across the boundary between the enclosed and the external material. Such conceptualized connectivity and disjuncture might be spatial, temporal, or causal, for example, or might further pertain to information or to perception. Heuristically, thus, it might be spatial, where within the boundary there is access from any one point to any other point without blockage but where the boundary acts as a barrier to

movement from points within to points outside; or temporal, where the material within the boundary extends through a continuous period of time without gaps, but where this material is conceptually excerpted from the surrounding flow of time; or causal, where effects can freely propagate within the boundary but not beyond it. Further, it might be informational, where information or knowledge about particular phenomena held at one point is available at other points within the boundary but not to or from points outside the boundary; or perceptual, where there is perception of all points within the boundary from any point also within it, but not perception of points or from points outside the boundary. Third, the various portions of the material within the boundary are felt to be **co-relevant** to each other, whereas the material outside the boundary is not relevant to that within. This sense of relevance may be able to override the different forms of connectivity—for example, in a commercial scene, bringing together just those participants during periods of action that comprise the exchange of goods and money, excerpted from their spatio-temporal surround.

2.2 Event Frames and Complement Structure

Undoubtedly, something of this sense for what lies inside and what lies outside a conceptual event frame has motivated syntacticians, beyond purely formal evidence, to distinguish between "complements" and "adjuncts," respectively. But the explicit positing of the event frame as a linguistic entity permits an elaboration of complement structure theory that might not otherwise be possible. Current theory recognizes two types of complements to a lexical item that represent its semantic arguments: an obligatory complement, which must accompany the lexical item, and an optional complement that may or may not do so. To these two types of complement we could add a third type, a **blocked complement**, to be adduced where a predicate arguably has an associated argument that cannot be expressed in construction with the particular lexical item.[4] In our terms, such an argument would be felt to be an intrinsic part of a particular conceptually coherent event frame, an argument that might be expressed in construction with some other lexical item that refers to this event frame but one that cannot be expressed in construction with the lexical item in question. These relationships are illustrated in the accompanying diagram. Here, the large rectangle represents a particular event frame. Inside the rectangle, the solid-line square represents an obligatory complement, the dotted-line square an optional complement, and the



Xed-line square a blocked complement. Outside the rectangle, the dotted-line square represents an element that can be optionally expressed as an adjunct.

All three types of complements, as well as adjuncts, can be illustrated for the verb *spend*, which invokes the Fillmorean commercial scene that includes as arguments a seller, a buyer, goods, and money. Thus, the sentence in (1) shows in italics the verb's obligatory complements, the buyer as subject and the money as object; shows in parentheses an optional complement, the goods as prepositional object; shows in brackets a blocked complement, the seller in an attempted oblique constituent; and shows in braces two optional adjuncts referring to locale and day of week.

(1) *I* spent *$50* (for/on this book) [*from/by/to/for/ . . . the clerk] {at that store} {last Friday}.

To illustrate the potential extent of complement blockage, we can consider what may be posited as the event frame for force dynamics (chapter I-7), which necessarily includes an Antagonist and an Agonist, the two main entities engaged or potentially engaged in an opposing force interaction. The verb *permit* refers to one such force-dynamic event frame and requires complements referring to both of the force entities—the Antagonist as subject and the Agonist as direct object—as seen in (2a). But, in their force-dynamic usage, the English modals regularly block expression of the Antagonist, requiring solely the Agonist as subject. This is seen in (2b) for the modal *may*, which refers to the same type of force-dynamic event frame as *permit*.

(2) a. I permit you to go to the park.
b. You may go to the park (*by/from/ . . . me).

The force-dynamic event frame further serves as the event frame for a more extended form of complement blocking. In one of its constructions, the verb *require*, like *permit*, refers to a particular type of force-dynamic event frame and requires complements referring to both of the force entities—again, the Antagonist as subject and the Agonist as direct object—as seen in (3a). The modal *must*, which refers to the same type of force-dynamic event frame as *require*, can participate in the usual modal construction seen just preceding—blocking expression of the Antagonist and requiring expression of the Agonist as subject—as in (3b). But most modals can participate in a still further construction, characterized in chapter I-7 as involving "Agonist demotion," which exhibits an extreme case of complement blockage. It blocks complements referring both to the Antagonist and to the Agonist—that is, it blocks the entire substantive core of the force-dynamic event frame, as illustrated for *must* in (3c).

(3) a. I require that you let the cookies stay in the jar.
b. You must let the cookies stay in the jar (*by/from . . . me).
c. The cookies must stay in the jar (*by/from/ . . . you, *by/from/ . . . me).

To argue out some of the theoretical issues, we note that one view concerning the complement structure of a lexical item holds that this structure—its requirements, allowances, and exclusions—is exactly consonant with the semantic structure of the lexical item, if that semantic structure is assessed adequately. According to this view, there can be no such thing as a blocked complement, since the semantics of the lexical item could have no component that lacks a corresponding syntactic component. For example, a proponent of this view might argue, on the basis of sentences like *I spent $50 and 100 hours of my time on that ham radio kit*, that the verb *spend* does not really involve the notion of a seller but rather refers to a frame more generic and smaller than a full commercial scene, one that contains an agent expending possessed resources in order to attain a desired goal, so that it is no surprise that the verb's complement structure would exclude reference to a seller. But a closer inspection reveals that when *spend* is used to refer to the outlay of money, as against other kinds of resources, that money must in fact go to a seller engaged with the agent in a standard commercial transaction. For example, in the preceding illustrative sentence, the verb *spend* could not have been used if the $50 had not been given to a seller in exchange for the kit but rather, say, was used as paper ignited to melt solder. Further, the verb *spend*

cannot even be used, say, in **I spent $50 on their ritual mask*, if in exchange for the mask the money was given to native tribes people who wanted it for its aesthetic or curiosity value rather than as part of our standard commercial transaction (as observed by Kean Kaufmann). Thus, when applied to money, the verb *spend* still requires the participation of a knowing seller, even though this participant cannot be expressed by a complement of the verb.[5] With evidence such as this, we would therefore maintain the contrary view that while there is generally much correspondence in language between the system of formal syntactic structure and the system of semantic structure, the two systems nevertheless each have at least in part their own independent structuring patterns and principles. One possibility is that the semantic structure that pertains to event frames derives from, or is simply comprised of, the structure of our conceptual organization, a structure that perhaps is in part innate and universal, while the syntactic complement structure of particular lexical forms in a language can either directly reflect that semantic structure or can partially deviate from it in a kind of frozen grammaticization.

We now examine in sequence several different types of event frame for the forms of attentional windowing that they support.

3 PATH WINDOWING

The first type of event frame considered is that of the so-conceived entirety of a path of motion, here termed a **path event frame**, with respect to which the windowing process can be termed **path windowing**. This windowing process can be treated with respect to three different categories of paths, to be discussed in turn—open paths, closed paths, and fictive paths—all of which can exhibit a cognitive process called cognitive splicing.

3.1 Open Path

An *open path* here will refer to a path that is described by an object physically in motion in the course of a period of time, that is conceptualized as an entire unity thus having a beginning and an end, and whose beginning point and ending point are at different locations in space. To illustrate open-path windowing, the example in (4) pertains to a single particular instantiation of the open-path type but with various patterns of windowing and gapping imposed on it. Thus, (4a) presents the event with maximal windowing over the whole of the conceptually complete

path, while (4b) presents three forms of gapping over one portion of the path and (4c) presents three forms of windowing over one portion of the path.[6] It is understood here that the gapped portions are attentionally backgrounded relative to the foregrounded windowed portions but that, given sufficient context, a hearer would reconstruct each of the partially gapped paths in (4b) and (4c) into the same conceptualization of a complete path.

(4) The crate that was in the aircraft's cargo bay fell—
   a. *With maximal windowing over the whole of the so-conceived entire path*
      —out of the plane through the air into the ocean.
   b. *With gapping over one portion of the path*
      i. Medial gapping = initial + final windowing
         —out of the plane into the ocean.
      ii. Initial gapping = medial + final windowing
         —through the air into the ocean.
      iii. Final gapping = initial + medial windowing
         —out of the airplane through the air.
   c. *With windowing over one portion of the path*
      i. Initial windowing = medial + final gapping
         —out of the airplane.
      ii. Medial windowing = initial + final gapping
         —through the air.
      iii. Final windowing = initial + medial gapping
         —into the ocean.

We can suggest factors that may play a role in the putative cognitive processes by which an open path becomes conceptualized as an event frame—that is, as a unitary event bounded off from surrounding material of space, time, or other qualitative dimensions. One such factor might be the **scope of perception** that one might imagine as being normatively or canonically available at the referent scene. For instance, in generating or in interpreting the sentences of the preceding example, speakers or hearers might imagistically locate a viewpoint for themselves at a canonic position between the aircraft and the ocean whence the crate's path from the plane to the ocean would fall within the available scope of perception and thereby be treated as a unity. Since from such a viewpoint the crate would not be visible either in its prior motion while in the cargo bay nor in its subsequent motion through the water to the ocean floor, such additional

surrounding paths of motion would be excluded from the event frame in the operation of the putative scope-of-perception factor.

Another possible cognitive factor would function to frame together a sequence of phenomena that was assessed as having one qualitative character and separate that off from otherwise adjoining sequences assessed as being qualitatively different. One form of this factor, involving stationary boundary periods, would treat a period of stationariness as qualitatively distinct from a period of motion, so that the attribute of unitary entityhood could be cognitively ascribed to a period of continuous motion that was bounded by two stationary periods. Although perhaps otherwise frequent, this form of the factor would not play a role in the preceding aircraft example since the crate is in fact in motion both before and after the path represented in the sentences.

However, the factor of qualitative difference may have other forms, ones that would apply to the example. One such form might be the treatment of a conceivedly abrupt shift in path direction as marking the distinction between two qualitatively distinct paths and the conceivedly sharp-angled point of the shift as marking the boundary between the two paths. Such a **path singularity** form of the factor could be at work in the aircraft example to mark the beginning point of the crate's fall. Another form of the qualitative factor might address any abrupt shift in the character of the space surrounding a path—for example, change in the ambient medium. This form of the factor could then apply in the example to the passage of the crate's path from air to water, treating that as the end point of the preceding portion of motion.

When they have the requisite character, certain qualitative shifts in a path complex may lead to a conceptual reanalysis of the path into an embedded structure consisting of one smaller distinct path nested within a larger path that can then act as a background reference frame. Thus, though the crate in the aircraft example may be assumed to have objectively traced out a complex path consisting of a horizontal segment followed by a descending parabola, a hearer of the example sentence would probably reconceptualize the motion situation. This reconceptualization would involve a salient straight downward vertical path that is abstracted out as separate from an attentionally = horizontal forward path that preceded the vertical plummet and that the aircraft maintains after dropping the crate. The simpler parts of such a conceptually nested path structure would tend to be demarcated by the so-conceived singularity points located at qualitative shifts.

3.2 Closed Path

The second kind of path, here termed a **closed path**, will refer to the same kind of entity as the open path described in the preceding section with the exception that its beginning point and ending point coincide at the same location in space, so that the path now constitutes a circuit. If this single starting and ending point is treated as lying outside the motional path itself and, hence, outside the event frame, then the initial, medial, and final portions of the event can be additionally identified as being the **departure**, the **away**, and the **return** portions of the path.

The cognitive factors for demarcating an event frame that were adduced in the preceding section might all serve in bounding a closed path as well, with perhaps the factor pertaining to stationary boundary periods as the likeliest to play a role. In the case of a closed path, however, we can perhaps adduce an additional factor, that of spatial coincidence—that is, the fact that two points of the path occupy the same location in space—which permits the conceptualization of the stretch of path looping to and from this location as a unitary entity. This closed-path type will figure below as well in the treatment of cycles with phase windowing.

The example in (5) illustrates this closed-path type. Given the context, the whole event in (5a) can effectively be evoked by any of the alternatives of windowing indicated in (5b): basically, all the possibilities occur except windowing of the departure portion alone. Again, the windowed portions are foregrounded in attention while the gapped portions are backgrounded.

(5) a. [I need the milk.]
(1) Go (2) get it out of the refrigerator (3) (and) bring it here.

b. The whole can be represented by:

i. 2:	Get it out of the refrigerator.	[*medial windowing*]
ii. 3:	Bring it here.	[*final windowing*]
iii. 1+2:	Go get it out of the refrigerator.	[*final gapping*]
iv. 2+3:	Get it out of the refrigerator and bring it here.	[*initial gapping*]
v. 1+3:	Go bring it here.	[*medial gapping*]
vi. 1+2+3:	Go get it out of the refrigerator and bring it here.	[*full windowing*]

3.3 Fictive Path

A spatial configuration that is otherwise understood as static through time can often be alternatively conceptualized so as to be rendered "conceptually sequentialized" and to include a path of "fictive motion" (as characterized in chapters I-1 and I-2). One type of such a **fictive path** is the "trajectory" exhibited by a person's focus of attention shifting over a conceived scene. When the linguistic formulation of a sentence is of the sort that can direct a hearer's attention along such a trajectory, this indication of a fictive path is amenable to the same windowing patterns as is a reference to a path of physical motion.

One English construction that directs one's attentional focus along a spatial path in this way is "X BE across Y from Z." This construction is comparable to the construction "X BE between Y and Z" in that both specify a complex spatial schema that includes two reference points (the Ground objects Y and Z). But the "between" construction calls for a stationary distal perspective point with global scope of attention over the spatial schema as a whole, whereas the "across from" construction specifies a moving proximal perspective point with local scope of attention on elements of the schema taken in sequence. In particular, the construction directs that one's focus of attention describe a path that begins at point Z, that next traverses the extent of Y, and that lastly terminates at point X. This construction thus specifies a fictive equivalent of an open path. The construction is exemplified for two different referent scenes in (6), shown with full windowing, medial gapping, and initial gapping, respectively.

(6) a. *With maximal windowing*
   i. My bike is across the street from the bakery.
   ii. Jane sat across the table from John.
   b. *With medial gapping*
   i. My bike is across from the bakery.
   ii. Jane sat across from John.
   c. *With initial gapping*
   i. My bike is across the street.
   ii. Jane sat across the table.

In the (b) forms, the spatial complex is medial gapped by the omission of the Y component of the construction. Here, the gapped portion is backgrounded and its identity is generally provided by the context or by convention, while the discontinuously windowed portions, the Figure and

"initial Ground," are conceptually abutted against each other (as described further in the next section). In the (c) forms, the spatial complex is initial gapped by omission of the entire "from Z" constituent. In this case, again, the backgrounding of the initial reference point is associated with the assumption that its identity is clear from the context or from convention. To illustrate and elaborate on this idea with a sentence like *The injured cow is across the field*, the implicit initial point is typically (1) a location already in reference (e.g., across from where I had said the tractor had broken down), or (2) the current deictic center (e.g., across from where we are now standing), or possibly (3) a canonical location (say, across from the only gas station on the road).

Again, the cognitive factors for demarcating an event frame that were adduced earlier for an open path of physical motion might all serve in bounding a fictive open path. However, in the case of the *across from* schema and certain other fictive path types, one may perhaps adduce an additional factor of bilateral symmetry, where the two X and Z elements that can be understood as bounding the event frame can in some respect be taken to represent corresponding points in a reflection about a central axis. A factor of this sort seems more evident where the two elements have reversed geometries (e.g., have fronts pointing in opposite directions so as to face each other), as would generally be inferred for the scenes represented by sentences like *Jane sat across from John* or *The couch was located opposite the armchair*. But even in the scene represented by the sentence *My bike is across the street from the bakery*, the bike and the bakery can in some sense be regarded as the bilaterally symmetric "bookends" at either end of a path that lies a bit beyond either side of a geometric strip (the street).

3.4 Conceptual Splicing

With particular regard to the attentional backgrounding that takes place for the medial path portion, consider together all the medial-gapped forms of path windowing above: *The crate fell out of the plane into the ocean, Go bring the milk here, My bike is across from the bakery,* and *Jane sat across from John*. For these and similar cases, the medial portion of the path in some hearers' cognitive representations may reduce to so minimal a state in conscious conceptualization that the discontinuous initial and final phases may seem to run together contiguously, perhaps even seamlessly. This cognitive phenomenon can be termed **conceptual splicing** and may be taken to constitute a particularly significant cogni-

tive process. The next section will present further forms of conceptual splicing and will explore its cognitive ramifications.

4 CAUSAL-CHAIN WINDOWING

What on other grounds and in other cognitive systems can be understood as a "causal continuum" is, instead, in the conceptual organization that seems to underlie much of the linguistic and, no doubt, additional cognitive systems, prototypically conceptualized as a sequence of linked "events," or "subevents"—that is, the equivalent of a so-conceived chunking of the continuum into relatively discrete packets—in which the sense of causality may be associated only with the boundary between each subevent and its linked successor.[7]

A causal chain can constitute another type of sequential event frame, a **causal-chain event frame**, which exhibits windowing of attention in what may be termed **causal-chain windowing**. Analyzed in the way that seems to underlie much linguistic structure and possibly other cognitive structure as well, the type of causal chain understood to be initiated by an intentional agent progresses through the sequence of subevents characterized next and schematized in (7) (see chapter I-8). The cognitive agent first intends that a particular event will occur and that it will result from her action. The agent then generates an act of volition, a subevent that will cause a certain whole-body or body-part motion in the case where the intended outcome is in the physical realm. The resulting bodily motion is a subevent that will then—in the case where it is not itself the final intended outcome—cause a second physical subevent.

To this point, three levels of initiation can be distinguished: the agent's original conceiving of an intention can be regarded as the event that initiates the entire processual complex, with its identifying of a goal and the steps that can lead to it; the volitional act can be regarded as the subevent that initiates the full causal sequence of subevents; and the bodily motion can be regarded as the subevent that initiates the physical portion of this causal sequence.

Resulting from the subevent of bodily motion, there may then ensue an intermediate causally linked chain of subevents. And resulting from the body-motion subevent or from the last in such an intermediate chain of subevents, there may next occur a penultimate subevent, which would thus constitute the immediate cause of the final result. Finally, caused by one of the preceding subevents, there takes place the final resulting

subevent—that is, the goal that the agent originally aimed for as the end of her scope of intention.

(7) Semantic composition of a physical causal chain with an initiatory intentional agent

Agent's scope of intention
[——————————→]
[1] → [2] → [3] → [4] → [5]
Sequence of causally chained subevents

[1]: Agent's act of volition that activates bodily motion
[2]: Bodily motion of the agent (particular body part(s) or whole body) that initiates the physical causal chain
[3]: Intermediate causally chained subevents
[4]: Penultimate subevent = immediate cause of final result
[5]: Final resulting subevent = agent's intended goal within scope of intention

NB: a. [3] may be absent
b. [3] may be absent and [2] may coincide with [4]
c. [3] and [4] may be absent and [2] may coincide with [5]

With regard to factors that might function to cognitively demarcate an event frame of the causal-chain type, certainly in the present kind involving an initiatory agent, the straightforward determiner of such demarcation would be the agent's scope of intention. More specifically, the event frame would consist of the sequence of occurrent or projected causal subevents, beginning with the agent's volitional act and ending with the agent's goal, that is encompassed within the scope of intention assumed for, attributed to, or claimed by the agent.

4.1 Discontinuous Windowing over Agent + Result (+ Immediate Cause)

What is noteworthy about the characteristic or grammaticized structure of constructions that refer to causal chains in most familiar languages is that the entire medial portion of the sequence is gapped, with discontinuous windows solely on the initiatory agent and the finally resulting subevent. For example, a standard English causative construction like *I broke the window* refers to the initiatory agent, "I," and to the final subevent, "the window broke," and indicates that the former intended to, and did, bring about the latter. But there is no indication of what bodily motions the agent undertook to execute the intention—say, my bending down and

moving my hand to grasp a rock on the ground, straightening up and lifting the rock with my hand, swinging my arm while holding the rock in my hand, and releasing the rock from my hand, thus propelling it forward. Nor is there an indication of what intervening causally linked subevents might have occurred—say, the rock's sailing through the air followed by the rock's making contact with the window; nor of what the immediate cause of the final result might have been—say, the rock's forcefully impacting with the window.

Of the material characteristically gapped from the middle of a causal chain, the portion that seems crosslinguistically to have the next-most-ready means for expression is the penultimate subevent of the causal chain—that is, the immediate cause of the final intended result. In English, this penultimate subevent is readily expressed in a *by*-clause, as in the case where the situation in which I intentionally lift, swing, and propel a rock through the air into a window to break it can be expressed by a sentence like *I broke the window by hitting it with a rock*, shown in (8g). This *by*-clause, however, does not accommodate any other subevents in the whole causal chain, from the act of willed bodily motion to the ante-penultimate subevent, as seen in the unacceptability of (8a) through (8e). For many speakers, even a *by*-clause like that in (8f) is not acceptable, and speakers who do accept it do so because they feel that the clause contains within it reference to the penultimate subevent in which the rock actually impacts the window.[8]

(8) *English by-clause reserved for penultimate subevent*
I broke the window
a *by grasping a rock with my hand.
b. *by lifting a rock with my hand.
c. *by swinging a rock with my arm.
d. *by propelling a rock through the air.
e. *by throwing a rock toward it.
f. ?by throwing a rock at it.
g. by hitting it with a rock.

Supporting the next-most-privileged status of the penultimate subevent in a causal chain is the fact that some languages do in fact characteristically or obligatorily identify that event in a causative construction. Thus, in Atsugewi, in most cases a verb root requires a prefix, selected from a set of some two dozen, that specifies the penultimate subevent (see Talmy 1972 as well as chapters II-1 and II-2). For example, consider a situation

in which I used my hands to build a fire with which to destroy a house. To refer to this situation, I can use the verb root *-miq-* '(to cause) an architectural structure to lose its structural integrity' together with the instrumental prefix *mu:-* 'by acting [on the Patient] with heat/fire'. But I cannot use that verb root together with the instrumental prefix *ci-* 'by acting manipulatively [on the Patient] with one's hands'. The reason is that the former prefix refers to the mandated penultimate subevent whereas the latter prefix refers to an earlier subevent.

In a comparable way, in the characteristic English verb + satellite construction in which the satellite expresses the final resulting event and the verb expresses a prior causal subevent, this causal subevent must again be the penultimate one, and nothing earlier (see chapter II-3). Thus, if I have grasped a lever and then used it to pry a lid off a box so as to open the box, I can refer to this causal sequence with *I levered the box open* but not with **I grasped the box open*. Similarly, the previous arson situation—in which I have lit a fire so that a house would catch fire from that and proceed to become consumed in flames to the point of its destruction—can be referred to by the sentence *I burned the house down*, but not by a sentence whose verb expresses any causal subevent prior to the penultimate one, as in **I lit/kindled the house down*.

4.2 Windowing of Causal Chains with Intermediate Cognitive Agents

Following the activities of an initiating Agent, an ensuing causal chain can include additional cognitive entities whose agency is essential in the sequence leading to the final reported result (see chapter I-6). However, to the extent that material referring to such intermediary agents is gapped from a sentence, the intentions, volitional acts, and effects of these agents are attentionally backgrounded, conceptually neglected, and thereby rendered causally "transparent"—that is, subject to the conception of a causal continuity progressing directly through such agents rather than stopping at each agent and being renewed by a fresh act of intention and volition. This effect is seen, for example, in the sentence *I'm going to clean my suit at the dry-cleaning store on the corner*, which omits mention of the cleaners whom the speaker will engage to do the job. Further, the amount of the neglectable intervening material can be enormous, as seen in the referent of a sentence like (9a), which, though mediated by a whole society over decades, can still be conceptualized in terms of a juxtaposition of an individual initiator and a final result.

(9) a. The Pharaoh built a pyramid for himself/*him.
b. The Pharaoh had a pyramid built for himself/him.
c. The Pharaoh had his subjects build a pyramid for *himself/him.

This example further allows us to note that the syntax of the reflexive in English, though usually treated in solely formal terms, nevertheless can be seen to correspond to actualities of conceptualization. In this regard, we can observe that the form in (9a), which windows only the initiator and the final result and distracts little attention onto intermediary factors, requires the reflexive in referring back to the initiator and excludes any use of the nonreflexive for this purpose. However, the (9b) form, whose "*have* + *-EN*" construction adds a window onto the presence of an intermediary agency, though not onto its identity, permits *either* the reflexive *or* the nonreflexive. Further, the (9c) form, with a construction that now also refers explicitly to an identified mediating agency, requires the nonreflexive and excludes use of the reflexive.

In this sequence of forms, we can discern the presence of clines in three different linguistic systems—syntax, semantics, and conceptual structure—and of correlations across these clines. Thus, with respect to syntax, there is a dual cline that involves both a successively lengthening verb complex and a shift along an obligatory-optional axis. In particular, proceeding through (9) above, the cline progresses from a simplex "V" (*build*) with a requirement for the reflexive in (9a); through the form "*have -EN* + V" with the allowance of either the reflexive or the nonreflexive in (9b); to the complex "*have* + NP + V" with a requirement for the nonreflexive in (9c).

In correlation with this syntactic cline, there is a cline in referential semantics—that consisting of the specification of the intermediary agency—which ranges from null specification in (9a), through indication of the presence of such agency without specification of its identity in (9b), to specification of both its presence and its identity in (9c).

And, in correlation with these syntactic and semantic clines, there is an attentional-conceptual cline with dual aspects. In this cline's progression from (9a) to (9c), there is an increase in the strength of attention directed to the presence of the intermediary agents (as distinguished from the mention and identification of them that was treated in the preceding cline). Further, there is a qualitative shift in the conceptualization of the relationship between the initiator and the final outcome that ranges from

a sense of direct causal immediacy in (9a)—another case of the cognitive splicing effect—to a sense of causal distance in (9c).

The lexicosemantic "logic" here is presumably that a reflexive form suggests a more direct connection between two references to a single entity, thus according better with the conceptual immediacy of the initiator-outcome relationship in (9a), whereas a nonreflexive form suggests a more distant connection between two references to a single entity, thus according better with the conceptually greater causal distance between the initiator and the final outcome in (9c).

The middle form, (9b), is the most telling for a demonstration that the role of semantics is here more determinative than that of syntax. For while there may be solid syntactic arguments for the necessity of the reflexive in (9a) and for the nonreflexive in (9c), there is no immediately obvious non–ad hoc syntactic justification for open use of either the reflexive or the nonreflexive in the (9b) form. But the semantic-conceptual account involving a gradient in the cognitive salience of the intermediate causal factors does accord neatly with the overt linguistic behavior.[9]

4.3 Cognitive Underpinnings of Causal Windowing and Gapping

Again, what is cognitively noteworthy in the characteristic medial gapping of causal sequences is the great degree to which the middle portion is reduced in one's field of attention, and sometimes seemingly eliminated from it, in the cognitive process of conceptual splicing noted earlier. With its patterns of causal windowing and gapping, language structure here appears to reflect a cognitive structuring in which a sentient agent's intention for the occurrence of a particular state or event and its actual occurrence are characteristically conceptualized together as a kind of melded unity in the foreground of attention, with little or no attention directed to the intervening mediating stages. This conceptual arrangement would seem to match a presumed kind of experience recurrent from earliest age on in which an intention and its realization, both in awareness, feel seamlessly linked. This experience includes little or no awareness of mediating actions and events—ones that, if considered, might be taken for granted as automatic bodily movements and expectable physical occurrences.[10]

One may speculate that biological evolution has resulted in this form of cognitive structuring of attention for its selective advantages, namely, that it constitutes a functionally relevant type of invariant or constancy in

cognition while allowing for other forms of necessary plasticity. The constancy here is the goal of achieving a correspondence between an intention to effectuate some particular circumstance and seeing to it that that circumstance in fact becomes realized through whatever activities prove necessary. Where cognitive organization must remain plastic is in the determination and marshaling of such necessary activities, since the conditions attendant on realizing some purpose can vary greatly.

There are two main categories of such variation. First, the physical and functional constitution of any individual organism can change, whether by ontogenetic development or by environmental impact, including injury. Second, the characteristics of an organism's surroundings, both physical and social, can change during its lifetime or can vary in accordance with where the organism is born. The overall function of the cognitive processes here posited to be in operation would thus be to maintain a goal schema as constant and to execute it through variously appropriate means across constitutional and environmental variety and change.

To illustrate these notions, consider as a candidate for a commonplace cognitive invariant the intention to move forward while avoiding obstacles. With respect to constitutional change through ontogeny, as a human individual develops from an infant into an adult, she will replace crawling on all fours by bipedal walking to effectuate this forward-motion intention, thus ontogenetically changing the means marshaled while maintaining the goal schema intact. As for constitutional change due to external impact, if that individual were to suffer the loss of a leg, the baby crawling on three limbs or the adult walking with crutches would now execute a new movement pattern while still realizing the same goal of forward motion with avoidance of obstacles. To exemplify environmental variety, if the adult learns to drive a car, he replaces the use of alternating leg movements for that of a slight pressure of the right foot on a pedal to effectuate the same goal of forward motion, and he replaces judging lateral clearance for the span of his shoulders by assessing instead the clearance for his car's fenders in maintaining the same goal of avoiding obstacles.

In fulfilling the function of maintaining goal-schema constancy, the degree of plasticity of execution can clearly be enormous, as evidenced, for example, by a human's ability to learn to move forward across a range of implementations as disparate as crawling on all fours, limping along on crutches, driving a car, swimming underwater, or propelling herself in the

microgravity of a space shuttle. In all such cases, the primary attentional window can remain constant, encompassing only the intended goal and its realization, and, once proficiency has been achieved, little or no attention may be directed to the particular physical means and movement patterns engaged in to execute this goal. A cognitive concomitant of this attentional restriction can be an experience in the individual of the maintenance or continuation of a single "sense of body" across all the variation of physical means for executing the goal—or, from a dynamic perspective, an experience in the individual of the projection of his baseline sense of body into the divergent new means employed to execute the goal. This phenomenon is evident, for example, in the way that a driver can invest his car with the experiential property of being an extension of his body or even of constituting his body, or in the way that the operator of a remote robotic device (such as a mechanical arm) often has the experience of being present at the distal location in what has come to be termed "telepresence."

Note further that the implementational range of the disregarded intermediate causal phenomena can encompass the role not only of the body and mechanical extensions of the initiating agent but also of the voluntary cognitive and physical contributions of other mediating sentient agents. Linguistic evidence of this expanded plasticity was given in the preceding section. Comparably, for the preceding conceptual case of intended forward motion, an individual who has, say, taken a bus part of the way in getting to town can experience his going into town in terms of his intention to do so and its realization, with little or no attention directed to his reliance on a bus driver to transport him in the bus over a portion of the path. Evidently, our cognitive system of executional plasticity can include the utilization of the actions of other agents so that these, too, subserve our cognitive constancy system for intentions and their realization.

Given the familiar examples of plasticity in motor execution and in bodily identification noted in the preceding, little surprise should be caused by the recent successes of computer-based "virtual reality" in placing an individual in circumstances unusual for perception and motor control. Virtual reality simply makes extended use of plasticities long since selected for and everywhere evident. If anything, virtual reality systems at present are still shy of incorporating certain commonplace capabilities of our everyday executional plasticity—for example, our inclusion of the actions of other agents as being within our control in addition to our control over our bodies and their direct extensions. Where the tech-

niques of virtual reality can in fact prove most instructive is, complementarily, in ascertaining the constraints on and limitations of human plasticity. For example, would it be feasible for a subject in a virtual reality system to adapt to conditions where the more slowly she moves, the faster the scene shifts, and vice versa, or where the softer the pressure she exerts, the more forcefully the objects in the scene behave, and vice versa? Could a subject learn to bodily identify with an octopus figure depicted in the virtual scene, integratedly controlling each of the eight limbs with eight different kinds of motion of her own body?

The perspectives and evidence arrayed above argue for the selective advantage in the evolution of a cognitive system of intentional constancy—which maintains certain abstract schemas of intention and its realization—beside a cognitive system of executional plasticity. In the same way that cognitive linguistics has proposed other close correspondences between linguistic structure and the structure of nonlinguistic cognitive systems, the thesis proposed here is, specifically, that the portion of an agentive causal chain characteristically windowed in linguistic structure corresponds to the cognitive system of intentional + realizational constancy, while the characteristically gapped material corresponds to the cognitive system of executional plasticity.

5 PHASE WINDOWING

A further type of event frame consists of an event that iterates in a cycle—what will be termed a **cycle event frame** here. A sentence referring to such an event can direct the positioning of a window of strongest attention over a particular phase of that iterating cycle—a cognitive process that is termed **phase windowing** here. The overall event comprised of an iterating cycle is sequential but may have no clear beginning, middle, or end portions in reference. However, each component cycle when abstracted out can be thought to have the usual initial, medial, and final portions of a sequential event. Further, though, now that this sequence repeats and can be interpreted as additionally having a rest state between iterations, it can be considered to have an **initial**, **medial**, and **final phase** as well as a **base phase** that occurs after the final phase and before the initial phase. In the specific case where the overall event is a motion event and one component cycle constitutes in particular a closed path of the type treated in section 3.2, then the earlier distinctively labeled portions of a closed path now become its "departure phase," "away phase," and

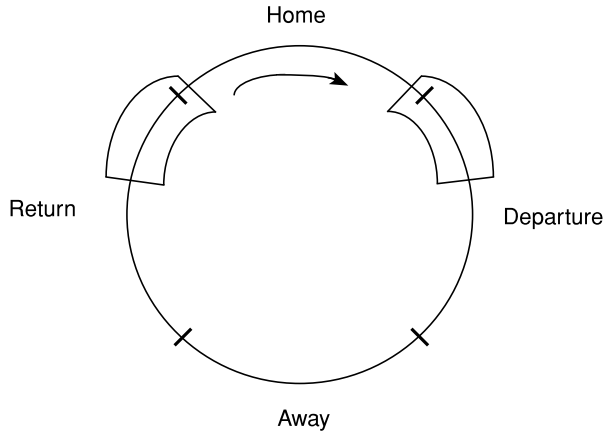
"return phase," while the base phase can now be distinctively labeled as its **home phase** and be understood as constituting the state of locatedness at the spatially coincident point of the closed loop.

The conceptual event frame associated with a cyclic occurrence may have a hierarchical structure, unlike previous cases. Rather than comprising a larger frame that directly spans the overall event, it would seem instead to consist of a frame around just one cycle's worth, but with the sense that successive iterations of this cycle are superimposed on each other within the single smaller frame. Thus, with respect to the factors that can cognitively define an event frame, one can here posit a further factor, that of the part-for-part congruence of one segment of occurrence with another—a property of direct mappability between segments. This factor can function to cognitively delimit a portion of occurrence that can constitute such a segment and that can thus be conceptualized as a unit event. Here, any two temporal points that bear the same phase relation to two such congruent stretches of occurrence can be taken to constitute the boundaries of one cycle's worth. And, in particular, points of this sort that occur within what can be conceptualized as the "basic" or "home" portions of occurrence have a privileged status for constituting the boundaries of a cycle.

To illustrate cycles with an iterated closed path, the sentences in (10) can all—given a sufficiently constrained context—be taken to pertain to the same cyclic event frame in which the home phase consists of a pen lying on a table, the departure phase consists of the pen falling off the table onto the floor, the away phase consists of the pen lying on the floor, and the return phase consists of my picking the pen up from the floor and placing it back on the table. Exhibiting alternative options for attentional windowing, however, the sentence in (10a) windows greatest attention on the departure phase of this cycle (or, more precisely, on just the earlier portion of the departure phase, comprising the pen's falling down off of the table but not down onto the floor), leaving the remainder of the cycle in the background of attention. The sentence in (10b) windows only the return phase (or, more precisely, only the later portion of the return phase, comprising my lifting the pen up onto the table but not up off the floor). The sentence in (10c) places discontinuous windows over the departure and return phases while leaving the remainder of the cycle in the background—as schematized in the accompanying diagram. Thus, here as before, the language affords the speaker alternatives of attentional windowing on essentially the same event frame with the addressee feasibly

able to infer the different gapped portions for each alternative so as to reconstruct back to the same single event frame. Further, the sentence in (10c) can be taken to induce cognitive splicing in the hearer by conceptually running together the departure and return phases, with the extreme backgrounding or loss now not only of the medial phase but also of the base phase (i.e., of the static home and away phases).

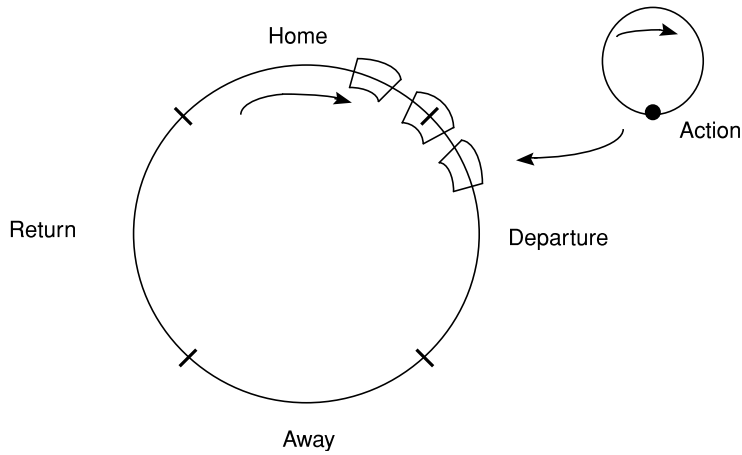
(10) a. *With departure-phase windowing*
The pen kept falling off the table.
b. *With return-phase windowing*
I kept putting the pen back on the table.
c. *With departure-phase plus return-phase windowing*
The pen kept falling off the table and I kept putting it back.



In this chapter's examples, including the preceding example, alternatives of windowing constitute different attentional patterns, but these patterns are placed over what can otherwise be the same single referent. However, the cycle event frame can also support referentially nonequivalent phase windowings. This can arise where a particular phase window is established by some reported external coincident event, rather than by the speaker's predilection. To illustrate, the main cyclic event could be an iterated closed path undertaken by a Mr. Smith with respect to his office: being in the office (home phase), leaving it for another location (departure phase), being at that other location (away phase), and going from that location back to his office (return phase). And the external coincident event could be my repeated telephoning of Mr. Smith always during the same particular phase of his path cycle. The three sentences in (11) express

such a coincidence for three different phases of this cycle; the diagram schematizes the coincidence pattern for sentence (11c).[11] The phase windowings selected out in this way are clearly part of three referentially distinct situations.

(11) Whenever I phoned,
  a. Smith was always just about to step out of his office.
  b. Smith was always just stepping out of his office.
  c. Smith had always just stepped out of his office.



6 PARTICIPANT-INTERACTION WINDOWING

Consider a complex situation that consists of two parts: (1) a primary circumstance, and (2) some participant(s) interacting with that circumstance on (at least) two different occasions. A "participant" here can be a participant either of the expressed referent event or of the current speech event. A participant's interaction with the circumstance can be direct, as in observing or considering the circumstance, or indirect, as in asking another participant about the circumstance. In referring to the whole of such a situational complex, some languages have provision for the alternative placement of a window of heightened attention on one or the other of these two interactions. In particular, linguistic devices direct an addressee to adopt one of the two participant interaction times as the point at which to locate his temporal perspective point, and to place around the interaction there an attentional window that could include such elements

of the interaction as the activity, the surrounding scene, or the cognitive content of the participant.

The whole situational complex can be understood to constitute a new type of event frame, the **participant-interaction event frame**, which permits alternatives of **participant-interaction windowing**. This type of event frame shares a characteristic with the preceding types (and in this respect all these types differ from the type treated next), namely, that it constitutes a sequence of phenomena differing through time and that, accordingly, the alternative windows of attention differ with respect to their temporal placement.

Considering again the kinds of factors that can demarcate the boundaries of an event frame, the present type of event frame may exhibit a further such factor: the occurrence of two distinct punctual events extrinsic to a certain circumstance that extends through time can mark out a portion of that circumstance and establish that portion conceptually as an event frame. Here, in particular, a portion of the primary circumstance is marked out by two participant interactions with it.

For a first illustration, the two short segments of discourse in (12) can be interpreted as referring to a single situational complex that is of the sort just outlined.

(12) a. John met a woman at the party last week. Her name was Linda.
b. John met a woman at the party last week. Her name is Linda.

Here, the primary circumstance is the temporally unbounded state of a certain woman's having the name Linda. It can be argued for (12a) and perhaps even more strongly for (12b) that each of these segments of discourse equally evokes the same concept of a pair of participant interactions with this circumstance.

The first interaction, an indirect one, is that of John with the primary circumstance of a woman's being named Linda, namely, his encounter at the party last week with the woman bearing that name. He may have asked and/or been told her name, or the discourse may be providing that information without his having learned it. The second interaction, a direct one, is my—that is, the speaker's—consideration of the woman's name at the present moment of speaking. In the second sentences of (12a) and (12b) referring to the woman's having a name, the use of the past tense in (12a) and of the present tense in (12b) then signals the differential placement of an attentional window over one or the other of these interactions.

This past tense in (12a) might seem peculiar, since the past tense is largely associable with an event that has terminated before the present moment, whereas in fact the state of the woman's bearing her name is continuous. The explanation for the use of the past tense here, we would argue, is that, despite the overt syntax, it does not apply to the main referent of the sentence—that is, to the woman's being named Linda—but rather to the time of the first participant interaction: to John's encounter with the woman. The window of attention placed around that temporal point would then include aspects of the interaction, some of them inferred or imagined, such as John's interchange with the woman or the surrounding party scene. On the other hand, the present tense of (12b) signals the adoption of the temporal perspective of the second participant interaction—that is, the present moment—and directs the placement there of an attentional window that includes something of the interactional context, such as my contemplation of the woman's name-bearing state either in its current relevance or in its ongoing unbounded character.

Accordingly, we have here in the participant-interaction case a type of windowing rather comparable to those in the preceding sections where each of two formulations evokes the entirety of a particular event frame while explicitly indicating only certain subportions of that event frame and thus establishing a selective window of attention on it.

Although it was just argued that each of the discourse sequences in (12) at least implicitly evoked a pair of participant interactions with the primary circumstance, nothing in the sequences explicitly specified the duality of interaction. But in (13), the word *again* unmistakably indicates that there were at least two interactions in the situation.

(13) a. What was your name again, please?
b. What is your name again, please?

In the situational complex here, the primary circumstance is the unboundedly continuous state of your having a particular name. The two interactions with this circumstance are, at an earlier moment, your or someone's saying your name in my presence, perhaps with my having asked you for it, and, at the present moment, my asking you for your name.

The initial interaction, while taking place, would have been in the present tense, consisting, for example, of my asking you *What is your name?*, or of your saying *I'm Susan*, or of someone's saying *This is Susan*. But my subsequent question to you would need to be something like one

of the forms in (13). This is because, by the requirements of English for reflecting the pragmatic circumstances here, if I have forgotten or did not catch your name the first time and assume that you and I remember my prior presence at the name's utterance, my subsequent asking must include a marker specifically acknowledging the repetition. Such a marker could be the word *again* or the English "echo question" intonation pattern. Thus, both sentences of (13) explicitly indicate that the present question is the second of two interactions with the same intent on my part to learn your name.

But this second-question formulation with *again* permits the use of either the past or the present tense. And, as before, the past form may at first seem paradoxical in its usage with a temporally unbounded referent (your having a name). However, the explanation of this behavior, as posited previously, is that the choice of tense in the main verb does not pertain to the overt referent of the clause but rather to my two interactions with that referent—that is, the earlier or the later instance of my hearing or asking about the referent. In particular, the past tense of (13a) selects the time of my initial interaction as the point at which one is to locate one's temporal perspective so as to place a window of heightened attention over that interaction, while the present tense of (13b) requires the performance of these same cognitive processes for my later interaction, the one occurring at the present moment of speaking.

Certain observations can serve to reinforce and refine our proposal that attentional windows are placed over participant interactions with the primary circumstance. First, the view that the past and present tenses in the preceding examples direct the placement of windows only over the two participant interactions that we have cited is buttressed by our clear English-speaker intuition that they could not refer to any other bounded temporal periods. Thus, the past in (12a) could not refer to a moment between the time of last week's party and the present moment—say, to a moment three days ago—nor to some time before the party. Comparably, the past in (13a) could not refer to a point between the last time I heard your name and the present moment, nor between any previous occasions of my hearing your name if there were more than one of these.

Second, some might note that the overt tense that appears in the example sentences is expressed as part of a reference to the primary circumstance, rather than as part of some explicit reference to the participant interaction that we have posited. Accordingly, some might prefer to see an alternative analysis in terms of the primary circumstance alone. Such

an analysis might hold that a delimited portion of the unbounded primary circumstance is conceptually marked out for consideration in isolation and that only this portion is placed in a tense relation with the present moment. However, this approach is easily faulted. The primary circumstance does not have to be continuous and unbounded, as it has been in the previous examples, but can also be a punctual event that occurs only once. Yet here, too, the account in this section will still hold. Thus, each of the sentences in (14) equally reflects two interactions I have had with you over your knowledge of a plane schedule. And they would seem to differentially window respectively the earlier interaction and the present interaction. But there is now no possibility of interpreting the tense as applying to some marked out subportion of the primary referent, since this is now the punctual and upcoming plane departure.

(14) a. When was her plane going to leave again tomorrow?
b. When is her plane going to leave again tomorrow?

Further, if there really were a tense-located referent of the sentence that indeed consisted of a temporally delimited subportion of an otherwise unbounded circumstance, then that referent portion should be compatible with an overt constituent that explicitly refers to the delimited time period in question. But such additional constituents, on the contrary, render the sentence unacceptable, as seen in (15).

(15) a. John met a woman at the party last week. Her name was Linda
*while he was there. / *when he asked her for it. / *when she told him.
b. What was your name again
*when I asked you for it before? / *when you told me it before?

The unacceptability of these sentences further indicates that the use of a past or present tense in the example sentences of this section cannot be accounted for simply as some automatic syntactic reflex involving, say, some sequence-of-tense rule that is triggered by some other time-specific constituent but, rather, must genuinely reflect a semantic option.

Note that some participant-interaction-type sentences can support an alternative "evidentiary" reading that does permit temporally specific adjuncts. Thus, the segments of discourse in (16a) and (16b) would probably first be read in accordance with the participant-interaction analysis of earlier examples—with the unbounded iterative activity of a geyser's spouting replacing the unbounded static state of bearing a name. In this

reading, the two segments would refer to approximately the same situational complex and differ only as to their pattern of attentional windowing.

(16) a. I was in Yellowstone Park last year. Old Faithful spouted regularly.
b. I was in Yellowstone Park last year. Old Faithful spouts regularly.
c. I was in Yellowstone Park last year. Old Faithful spouted regularly (—at least) while I was there.

But, in addition to such participant-interaction readings, these two sentences can have evidentiary readings that now have meanings substantially different from each other. Under such readings, in (16a), I report only what I witnessed during my visit and suggest no inferences about activity outside that scope. But in (16b), I use what I witnessed as evidence to confirm the general notion that there is continuous unbounded activity. And, in (16c), a temporally delimiting constituent of the type seen above to be unacceptable appears compatibly with the past tense form here. Such evidentiary readings do not instantiate participant-interaction event frames or windowing and, accordingly, their tenses apply directly to the overtly expressed referent in the usual way.

In all the preceding examples of this section, the primary circumstance being referred to is unchanging through the progression of time. However, reference to a circumstance that does change with time can constitute a further case that looks like participant-interaction forms, but really is not. In such a case, the choice of tense applies directly to the primary referent rather than to a participant interaction, and a temporally specific adjunct is permissible. This can be seen in (17a), where the changing primary circumstance is the time of day.

(17) a. The time was 10:53 when I asked for it.
b. *The woman's name was Linda when I asked for it.

Accordingly, with the *again*-question frame used earlier, if I am now asking you for the time of day for the second time—where the first time I asked was sufficiently earlier to render the answer you then gave pragmatically useless—I cannot felicitously use the past tense, as in (18a), but must rather use the present, as in (18b).

(18) a. #What time was it again, please?
b. What time is it again, please?
c. What time was it again when I asked you before?

On the other hand, I can felicitously wish to know the answer you delivered on the earlier occasion—for example, where I was recording in a notebook the ongoing results of an experiment. In this case, the past tense would be acceptable and could now be used with an overt constituent explicitly referring to the past moment in question, as seen in (18c).

Note that the *again* in the sentences of (18) still pertains to the speaker's dual interaction with the primary circumstance, namely, to the fact that I have now twice heard or asked you for the time. But—unless the time of my first interaction is pragmatically recent enough, in which case the tenses in (18a) and (18b) can revert to their participant-interaction windowing usage—the tense can now no longer be used to window one of these interactions since its use is preempted for pertaining to a particular subportion of the changing circumstance.

Finally, consider again the original examples of participant-interaction windowing. Here as elsewhere, although the choice of window placement does not affect the principal situational complex being referred to, it does have further semantic consequences. Thus, the tense used can suggest the relevance that the primary circumstance has to current concerns, with the past suggesting lack of relevance and the present suggesting the presence of relevance. For example, the past tense in (12a) can suggest that John's association with the woman last week at the party ended there, while the present tense in (12b) can suggest that their association has continued to the present and is of current relevance.

7 INTERRELATIONSHIP WINDOWING

A frequent type of language-relevant cognitive entity is a conceptual complex that contains or is comprised of parts not autonomous in themselves but intrinsically relative with respect to each other, where the presence of one such part necessarily entails the presence of the other parts. A conceptual complex of this sort is here called an **interrelational complex** and can constitute a further type of event frame, the **interrelationship event frame**. Such an internally self-entailing complex could logically be considered a single-unit entity, but our conceptual and attentional systems are so organized as to be able to conceptualize the whole as if portioned out into quasi-independent elements to which heightened attention can be differentially directed. With respect to its linguistic expression, such a complex can be conceptually partitioned—in a way that may be universal—into parts expressed by syntactically distinct constituents. Frequently, a

language will permit alternatives of windowing over one or another part of such a complex, while mention of the remaining parts is omitted—although their presence is still understood. Such alternatives of **interrelationship windowing** allow the selection of a locus of strongest attention within a complex or the adoption of a particular perspective over the complex while—given the appropriate context—still conveying the whole of the complex.

Note that the earlier types of windowing do not seem to fit this notion of an intradependent interrelationship. For example, for path windowing, a later path segment is not entailed by an earlier one but is rather represented as being additionally present. By contrast, in interrelational complexes, the relevant components co-define each other. Accordingly, once again considering the factors that can function to demarcate an event frame, the boundaries of an interrelationship event frame can apparently be determined by a new factor, that of co-entailment. Apart from these differences, however, what is common to both the earlier types and the present type is that each event-frame type supports alternatives of the placement of attentional windows over it, and the gapped portions are largely recoverable by the hearer—whether by inferences involving entailment or by inferences involving familiarity with other event frame–determining factors at work in a particular context.

We examine here two kinds of interrelationship event frames, one based around Figure and Ground roles, and the other around factual and counterfactual conditions.

7.1 Figure-Ground Interrelationship

As they are characterized in chapter I-5 for their function in language, the Figure and the Ground in a spatial scene are relative concepts necessarily characterized with respect to each other. The Figure is a moving or conceptually movable entity within the scene whose site, path, or orientation is conceived of as a variable of which the particular value is the relevant issue and that is characterized with respect to the Ground. The Ground is a stationary reference entity within the scene with respect to which the Figure's site, path, or orientation is characterized. As described in chapter II-1, the Figure and Ground are components of an event of Motion (covering both motion and location) that includes two further components, as in the semantic structure in (19).

(19) [Figure + Fact-of-Motion + Path + Ground]

This Motion event well exemplifies the kind of conceptual entity that is intrinsically irreducible—that is, of which no part can exist without the rest—but that in general is conceptually and linguistically partitioned into components that can be treated differentially as to attentional distribution. This conceptual entity, then, constitutes a particular type of interrelationship event frame, the **Motion event frame**, and it can support a particular type of attentional alternativity, **Figure-Ground windowing**.

To illustrate this type of windowing, consider a scene in which paint is peeling off a wall, where the paint would be understood to function as the Figure relative to the wall as Ground. For mention of both the Figure and the Ground within a single sentence, English often has available two counterpart constructions (analyzed in detail in chapter 10 of Talmy 1972), one in which the Figure appears as the subject and the Ground in an oblique phrase, as in (20a), and another in which these grammatical relations are reversed, as in (20b).

(20) a. The paint is peeling from the wall.
b. ?The wall is peeling of its paint.

If there were a need to gap reference to the Figure or the Ground, the constituent referring to it would have to be omitted. Since English does not generally permit the omission of a subject NP but can often omit an oblique constituent, as here, (21) shows two further counterpart constructions based on the preceding pair but with the oblique constituents missing.

(21) a. The paint is peeling.
b. The wall is peeling.

Given the appropriate context, then, (21a) refers to the original scene but with windowing of the Figure (plus the activity) and gapping of the Ground, whereas (21b) windows the Ground (plus the activity) while gapping the Figure.[12] Thus, with such alternative constructions, one can refer to basically the same interrelational spatial complex of codependent Figure/Ground elements and selectively window one or the other of those elements.[13]

7.2 Factual-Counterfactual Interrelationship

A linguistic construction can have the semantic property of presenting the referent of its overtly expressed material as being the case or, alternatively, as not being the case. In traditional terminology, these are, respectively, factual and counterfactual constructions.

Further, a language can have a pair of constructions, one of them factual and the other counterfactual, such that if their overtly expressed materials are positive-negative counterparts of each other, then both constructions make the same overall statement. Given the availability of a particular doublet of such paired constructions, a speaker can make the same overall statement in choosing either one of the constructions, but the speaker would also thereby select whether to direct greater attention to something that was the case or to something that was not the case. Since each member of such a pair of counterpart factual-counterfactual construction types entails the other, their referent types together can be considered to constitute a certain kind of interrelationship event frame, a **factuality event frame**, and the directing of heightened attention to one or the other of these referent types can be called **factuality windowing**.

A factuality event frame exhibits a still further property. Under selective attentional windowing, it can support not only the exclusive consideration of one chosen alternative by itself, but also the placement of the two alternative conceptualizations within a single frame of consideration, so that, although main attention is on only one of the alternatives, the other alternative is still present in a backgrounded way to act as a foil for comparison. An event frame that in this way evokes larger-frame juxtapositions of alternative conceptualizations, can be further said to constitute a **comparison frame**. The characteristic of constituting a comparison frame can then function as one further factor for demarcating an event frame, and the factuality event frame seems to derive some of its characterizability as an event frame from this factor. Certain constructions and lexical forms in a language tend to evoke comparison frames, and the following do so for the occurrence versus the nonoccurrence of some referent.

First, a syntactically negative clause (e.g., *I didn't go to John's party last night*) overtly names something that did not take place but tends to evoke consideration of the corresponding unrealized positive event—and in this respect it differs from a simple positive clause, which tends not to evoke consideration of its negative counterpart. Second, even a syntactically positive main clause when it is adjoined by a *because*-clause (e.g., *I went to the movies last night because they were playing my favorite film*) tends to evoke its unrealized counterpart (a failure to go to the movies) since the inclusion of a reason or cause that has given rise to some realized phenomenon suggests that, in the absence of that cause, the phenomenon would not have occurred. Third, a nonsimple positive clause that also

includes a constituent placing the referent event at some point along a scale of certainty or realizedness (e.g., *Sue may have gone to John's party last night, | Perhaps Sue is at John's party now, | I just barely got to the movies last night*) brings into consideration the existence of such a scale and thereby evokes the consideration of points nearer the opposite pole of the scale. Fourth, an interrogative form, even of an otherwise simple positive clause (e.g., *Did Sue go to John's party last night?*), has as its main semantic point the issue of the occurrence or nonoccurrence of the situation it refers to and, of course, naturally contrasts the occurrence status of its overtly expressed material against the opposite occurrence status. And fifth—the topic of this section—a grammatically counterfactual construction (e.g., *I would have gone to John's party last night if I had had the time*) overtly names a counterfactual event that did not take place (*I . . . have gone to the party*), but it also evokes its factual complement, what actually took place (my staying away from the party). These five types would all seem to be "space builders" in Fauconnier's (1997) terms.

Among sentence types, perhaps mainly it is a simple positive factual declarative clause (e.g., *I went to the movies last night*) that raises in consciousness only the named event without the backgrounded accompaniment of its unrealized alternative. Although it may be the case that a positive statement of this kind is generally made only if its referent is taken to be news to the hearer, unanticipated relative to some baseline of expectation, it seems that such a statement is not usually experienced as an assertion averred contrastively against the potential of its nonoccurrence. Apparently at work here is a cognitive asymmetry that accords to the positive and to the factual the status of having primacy and of being basic, so that the negative and the counterfactual are on the contrary conceptualized as secondary and nonbasic, perhaps as somehow derived from the basic by some cognitive process of reversal.

In addition to construction types like those above, certain lexical items seem to incorporate within their lexicalization a scope encompassing both realization and nonrealization. Thus, the verb *miss*, as in *I missed the target*, seems not to simply refer directly to a projectile's passing to one side of a target, but rather to evoke a two-stage bipartite conceptualization consisting first of the projectile's hitting the target and then the denial of such an occurrence, with a conceptual shifting of the projectile's path off to one side. Comparably, the verb *regret*, as in *I regret that I lent him money*, though referring directly to an actually occurrent event, nevertheless conjures up the wished-for nonoccurrence of that event. Similarly,

the use of the verb *succeed*, as in *I succeeded in opening the window*, shares in common with its nonuse, as in *I opened the window*, a reference to an actually occurring event. But its use differs from its nonuse in that (among other effects) it sets this occurrence of the event within a comparison frame for a contrast with the possibility of the event's nonoccurrence.

As indicated earlier, given that a construction can evoke within a single comparison frame both the factual and counterfactual alternatives of a situation, the issue of windowing enters where the same situation can be referred to by either of two constructions, where one construction names the factual form of the situation while evoking its counterfactual alternative, and where the other construction does the opposite. Why might languages afford ready syntactic means for focusing on what has not occurred? In explanation, one can adduce for the systems of discourse or narrative such factors as the motivation to achieve a heightened effect by specifying a goal that was vainly sought (in the case where the nonoccurrent was preferable to the occurrent), or by specifying a danger that was avoided (in the case where the nonoccurrent was less desirable than the occurrent).

Notationally in the specific analyses that follow, the symbol A, as a mnemonic for "Actual," will represent any particular factual alternative, while the symbol $\sim$A will represent the corresponding counterfactual. For any particular example, in addition, a P may be used to indicate a clause whose overt syntactic form is positive, while not-P would indicate a syntactically negative clause. Thus, the sentence *I didn't go to the party* can here be represented symbolically as A (not-P) to suggest a paraphrase like "What actually happened is that it was not the case that I went to the party." In truth-value terms, A and $\sim$A entail each other with the sign of their proposition reversed—that is, A (P) is equivalent to $\sim$A (not-P), and A (not-P) is equivalent to $\sim$A (P)—but in terms of conceptual organization, it is necessary to discriminate an A/$\sim$A factual-counterfactual parameter separately from a P/not-P syntactically positive-negative parameter.

The symbols A/$\sim$A are chosen over the symbols T/F of truth-conditional semantics for several reasons. First, the truth-conditional symbols are used in an objectivist system of reference, whereas the orientation here is of a conception-based system of reference, whose theoretical distinctness can be better kept in attention by the use of distinct symbols.[14] Second, it is clearer to show explicitly the counterpart relationship between a matched factual-counterfactual pair with the use of a reversal-type operator like "$\sim$" than with the use of two separate symbols like T

and F, which obscures the fact and the nature of their interrelationship. Third, the assignment of the simpler symbolic representation, A, to the factual and of the more complex and derived representation, ∼A, to the counterfactual corresponds to the cognitive asymmetry that accords basic status to the factual and nonbasic, possibly derived, status to the counterfactual.

7.2.1 Affective States Associated with Factuality States Our first specific demonstration of a factuality interrelationship is of the linguistic representation of the counterpart affective states that are experienced with respect to a pair of factual and counterfactual complements. We first consider the case where the counterfactual circumstance is held to be more desirable than the actual circumstance. Here the affective pattern consists of two emotional states: 'regret' over what factually happened and a 'wish' for what counterfactually did not happen. These two states are understood to refer to the same single situation, as represented in (22), and to differ essentially only as to their placement of attention.

(22) ∼A more desirable than A—associated affective states:
regret over A "=" wish for ∼A

That is, as we typically understand them, each of these emotions conjures up the full comparison frame of the factual-counterfactual interrelationship, but focuses attention on only one of the alternative factuality states while evoking the other as a background comparand. In the terms used above, each of these states windows attention on one alternative of the interrelational complex.

English constructions that represent these two affective states and their attentional windowings are shown in (23a) and (23b), respectively, here exemplifying a case where the factual circumstance is an absence of activity ("I didn't go to the party").

(23) a. *Windowing A—i.e., what did take place*
I regret that I didn't go to the party. / I regret not having gone to the party.
It's too bad I didn't go to the party.
b. *Windowing ∼A—i.e., what did not take place*
I wish I had gone to the party.
If only I had gone to the party. / Would that I had gone to the party.
I should have gone to the party.

We next consider the inverse condition where the counterfactual is held to be *less* desirable than the actual. With the desirability thus reversed, the associated emotions—again ones whose character must depend on bringing both factuality alternatives into a single frame of comparison—would seem to be, on the one hand, pleasure over the actual realization of what has occurred considered against the possibility of its not having occurred, and on the other hand hypothetically contemplated displeasure over what did not occur considered against the knowledge of what has in fact occurred, as indicated in (24). In English, at least, it is evident that there are fewer constructions and lexicalizations that represent this arrangement of factors than in the case where the nonoccurrent alternative was the preferable one. Some of the most serviceable forms that do occur for this poorly represented pattern are given in (25)—here again illustrating a case where the factual circumstance is an absence of activity ("I didn't go to the lecture").

(24) A more desirable than ∼A—associated affective states:
Pleasure at realizing A as against ∼A
"=" hypothetically contemplated displeasure with ∼A as against A

(25) a. *Windowing A—i.e., what did take place*
It's a good thing that I didn't go to the lecture.
I am (sure) glad that I didn't go to the lecture.
b. *Windowing ∼A—i.e., what did not take place*
It would have been too bad if I had gone to the lecture.
I would/could have gone to the lecture to my misfortune.

The differential favoring of the former case (the counterfactual as preferable) over the latter case (the factual as preferable) is evidenced, first, by the greater availability of open-class lexical forms that directly lexicalize the favored affectual patterns. For example, here English has the fully specific lexical forms *regret* and *wish* for the first case as against nothing but the partially serviceable *sure glad* or the too general *glad* for the second case. In addition, the favored case exhibits a greater representation by closed-class forms, which, as chapter I-1 argues, collectively represent the fundamental conceptual structuring system of language. Thus, many languages express the 'wish' notion by subjunctive-like morphemes or by unique constructions like the English *would that* and *if only* or by specific modal forms comparable to English *should*. And the 'regret' notion has at least some closed-class representation—for instance, in Yiddish by the

particle form *nebekh*. This particle can be glossed as 'poor me/you/him/...' (and is hence comparable to English *alas* except for being fully syntactically integrated within the sentence) as in *Ikh bin nebekh nisht gegangen oyf der siimkhe*, "I alas didn't go to the party." But closed-class representation for the unfavored patterns—the 'sure glad that' and 'would have been too bad if' notions—is not immediately apparent.

This difference in closed-class representation can be highlighted by noting that the favored pattern can be represented (as it was in (23b)) by a basic member of the modal system, *should*, whose meaning can be approximately characterized as 'would to one's betterment, benefit, and pleasure' (see chapter I-7). However, the unfavored pattern has no counterpart modal with the meaning 'could to one's worsening, detriment, and displeasure', which could have fit into a sentence in (25b), as if to express something like "*I would-to-my-misfortune [= Modal] have gone to the lecture."

This observation of more and less favored affective patterns suggests a program of investigation. In sequence this program would involve (1) isolating the factors that, occurring together in patterns, appear to underlie affective and cognitive states with obvious lexical or constructional representation; (2) recombining those factors so as to generate a full array of potential patterns; (3) searching various languages for lexical or constructional representation of all such generated patterns; and (4) seeking explanations for the apparent distribution of well and poorly represented patterns.

7.2.2 Explanation Types Associated with Factuality States Our second specific demonstration is in the general semantic domain of **explanations**—in which one circumstance "A′" is proposed to account for another circumstance "A"—where we observe that complementary explanation types can be associated with the two complementary factuality states. The basic equivalence of explanation types across the factual-counterfactual distinction can be formulated as in (26).

(26) A because A′
"=" ∼A-[conditional] if ∼A′

This generic formulation can be considered to encompass distinct subtypes of explanation on the basis of additional parameters, such as whether A or ∼A is held to be the preferable circumstance and whether there is an Agent either in A or in A′ who is deemed to be responsible for

or in control of the specified event by dint of his intentions and actions. However, at least in English (though other languages must be checked), the explanation constructions generally do not overtly mark any such subtypes—unlike the affect constructions, which explicitly distinguish different affective states. Accordingly, the different explanation types proposed next generally correspond to constellations of solely inferable factors. However, given the ascription of a particular explanation type to a presented construction, there will be a specific counterpart explanation type to be ascribed to the construction whose factuality is complementary to that of the first construction.

As before, we begin further analysis with the case where what has not occurred, $\sim$A, is held to be more desirable than what has occurred, A. Consider in addition the case where a particular cognitive agent is deemed to be responsible for A but not for A′. Here, then, an actual circumstance A′ that is outside a particular agent's control and that is offered to account for another actual but undesired circumstance for which the agent is responsible, A, can be construed to constitute an **excuse** for A. Complementarily, explicit reference to the nonoccurrent but desired circumstance $\sim$A can be construed as **reassurance** (or **bravado** for a first-person report) about the agent's capacity to realize $\sim$A in the potential case where cause A′ remains nonoccurrent as $\sim$A′. These relationships are symbolized and illustrated in (27).

(27) $\sim$A more desirable than A—associated explanation types where: An Agent is responsible for A but is not in control of A′.
   a. *Structure of the explanation types*
      Excuse for A: A because A′
      "=" reassurance (bravado) as to $\sim$A: $\sim$A-[conditional] if $\sim$A′
   b. *Example with* A
      I didn't catch the frisbee, A′: the car was in the way
      factual—excuse
      I didn't catch the frisbee because the car was in the way.
      A (not-P) because A′ (P′)
      Counterfactual—reassurance|bravado
      I would have caught the frisbee if the car hadn't been in the way.
      $\sim$A-[conditional] (P) if $\sim$A′ (not-P′)

Proceeding now to the case where the occurrent A is held to be more desirable than the nonoccurrent $\sim$A, we further consider the case in

which a specified agent is in control of A′ but not of A (an unspecified agent is in control of A). Here, A can be understood as the compensation or **reward** that follows from the agent's execution of A′. Correspondingly, any potential nonexecution of A′ by the agent would be understood to result in the nonoccurrence of A, hence to constitute the **threat** of noncompensation—relationships symbolized and exemplified in (28).

(28) A more desirable than ∼A—associated explanation types where: A specific agent is in control of A′ but not of A (which another agent controls)
   a. *Structure of the explanation types*
      A as a reward: because A′
      "=" ∼A as a threat: if ∼A′
   b. *Example with* A
      He got a raise, A′: he worked hard
      Factual—reward
      He got a raise because he worked hard.
      A (P) because A′ (P′)
      Counterfactual—threat
      He wouldn't have gotten a raise if he hadn't worked hard.
      ∼A-[conditional] (not-P) if ∼A′ (not-P′)

The explanation types that are complementary with respect to factuality states also bear specific relations to each other with respect to force dynamics (see chapter I-7)—that is, the semantic component of language that pertains to the interactions of opposing forces such as an object's intrinsic tendency toward motion or rest, another object's opposition to this tendency, resistance to such opposition, the overcoming of resistance, and the impingement, disimpingement, or nonimpingement of blockage. Employing the terminology of chapter I-7, we can note that, for all the explanation types, the A circumstance functions as the Agonist—that is, the force-bearing entity of focal attention—while the A′ circumstance functions as the Antagonist, or the opposing force-bearing entity. We can also see that the Agonist has an intrinsic tendency toward rest—in this case, toward nonoccurrence—and that the Antagonist is the stronger of the two circumstances. In the factual explanation types, like the excuse and reward types, the Antagonist circumstance impinges on the Agonist circumstance and thus overcomes its tendency toward rest—that is, it forces it into occurrence. On the other hand, the counterfactual explanation types, such as the reassurance and threat types, depict a potential

world in which the Antagonist circumstance does not impinge on the Agonist circumstance, which is thus free to manifest its intrinsic tendency toward rest—that is, toward nonoccurrence.

Although abbreviated, the analysis in this section serves to demonstrate the existence of an integrated system that interrelates four semantic-syntactic domains that might otherwise have been thought to be independent: the windowing of attention, factuality states, affective-cognitive states, and force dynamics. It further shows that factuality and counterfactuality are complementary states within a single conceptual interrelationship and that languages afford devices for placing a window of primary attention over either of the two states.

8 MULTIPLE AND NESTED WINDOWING

Although the windowing process has so far been treated separately for each type of event frame, in fact multiple instances of windowing can occur at the same time, each with respect to several concurrent event frames. In some cases, one instance of windowing would have to be understood as nested within another, whereas in other cases, two instances of windowing would have either an indeterminate hierarchical relationship or an equipollent status. The sentences in (29) exhibit a successively greater number of instances of windowing.

(29) a. The ball rolled off the lawn back onto the court.
b. The ball rolled back onto the court.
c. The ball rolled back.
d. I rolled the ball back.
e. I kept rolling the ball back.
f. If I hadn't kept rolling the ball back, there would have been no game.

The initial sentence (29a) here exhibits a simple path event frame, complete perhaps except for a medial gapping. Sentence (29b) refers to the same path event frame but now with initial and medial gapping, hence windowing only the final portion of the path. Sentence (29c), treating the path event frame as an interrelationship event frame—in particular, as an event of motion with a Figure and a Ground—retains the Figure (the ball) within its windowing but gaps the last remaining indication of the Ground (the court). Sentence (29d) now adds an agent-initiated causal chain to the previous already-gapped motion event, thus representing a

causal-chain event frame, and, as is typical for English, windows only the agent and the final resulting subevent, while gapping specification of all the intervening causal actions. Sentence (29e) puts the previously gapped referent into an iterated cycle, thus representing a cycle event frame, but windows solely that referent as the return phase of the cycle, while gapping mention of the home, departure, and away phases of the cycle. Finally, sentence (29f) places the windowing complex to this point within a comparison frame, in particular, within a factuality event frame that windows consideration of the counterfactual while gapping consideration of the factual.

To regard one entire windowing complex that results from the concurrent or nested application of several distinct windowing processes, consider sentence (29e) as an example. Of the entire event that it refers to, this sentence windows the presence of a path but has gapped virtually the entirety of its particulars except for an indication that it is a return path (*back*); it windows the presence of a motion event and, within that, the Figure (*the ball*), but has gapped the Ground; it windows the presence of an agent-initiated event frame, but within this it windows only the agent (*I*) and the final resulting subevent (rolled the ball back) while gapping mention of all the intervening actions such as my volitionally bending down, grasping the ball, and propelling the ball into motion; and it windows the presence of an iterated cycle (*kept*), and within this the return phase, but it gaps the remainder of the cycle, including the ball's use within the court, its path from the court to the lawn, and its resting on the lawn. It is thus evident that a sentence can allude to quite an extensive referential complex while gapping an enormous amount of conceptual material from this complex.

9 SOME EVIDENCE FOR THE FUNDAMENTAL CHARACTER OF THE WINDOWING PROCESS

A range of types and alternative patterns of windowing are exhibited by the communicative signing systems that deaf children generate spontaneously and autonomously in certain circumstances. As studied by Susan Goldin-Meadow, such children have hearing parents who aim without success to communicate aurally and who employ gestural indications no more extensively or elaborately than most hearing parents use with their hearing children. To express themselves to their parents, such deaf children develop their own signing systems, ones whose structure and com-

ponents are largely not based on any external exemplars. Accordingly, one may interpret the characteristics of such systems as reflecting fundamental properties of cognition and of conceptual organization, where perhaps these properties are themselves innately determined. Thus, the fact that windowing figures prominently in such spontaneous signing systems argues for the conclusion that the cognitive processes of attentional windowing and gapping are sufficiently fundamental that they are not specific to spoken languages but appear at least through the whole cognitive domain of natural communication systems.

To illustrate, we can describe the alternatives of path-windowing patterns and of causal-chain-windowing patterns that were exhibited by a deaf child, David, observed between the ages of two years ten months and four years ten months (Goldin-Meadow 1979; Goldin-Meadow and Mylander 1990; Goldin-Meadow, personal communication). Consider first the circumstance where David would want another person to move a particular object from where it was located to a new location. One way he indicated this idea was first to point to the particular object by extending an index finger at the object and then retracting the finger a bit, and next, with the hand reoriented, to point in the same way to the new location. The initial pointing was aimed directly at the object, whether this was resting at some inanimate location or was already in the grasp of the other person. The subsequent pointing was aimed directly at the new location if this was an inanimate site, with the whole gesture perhaps adequately translated with the English verb *put* as in *Put that there*. But if a person—whether a third person or David himself—was to be the recipient or new possessor of the object, the subsequent pointing gesture was aimed at the person's chest, not hands. The whole gesture is now perhaps well translated with the English verb *give* as in *Give that to him|me*.

It is not clear whether for David the conceptualization underlying the initial pointing was of the object alone or of the object at its initial spatial location. It is further unclear whether subsequent pointing at a person's chest was conceptualized solely as marking that person as a recipient or also as a spatial location. Nevertheless, the fact that the overall gesture does indicate initial and subsequent regions of the surrounding space that approximate and are temporally iconic with the beginning and ending points of a desired motion and the fact that the gesture does not indicate any intermediate regions of the space suggests that the gesture is much like a spoken-language indication of a path with initial and final windowing and with medial gapping.

Another way David would represent a desired object transfer was to begin as before by pointing at the object but then to indicate the path through the surrounding space that the object should follow. He would trace out this path usually again with his index finger, now reextended, or, on occasion, with a new hand shape that represented how the other person might hold the particularly contoured object while moving it (e.g., a fist shape for holding a long thin object such as a spoon). He might then finish by pointing at the desired posttransfer location, or simply stop after a sufficient execution of the path-tracing gesture where the continued trajectory and terminus of this path could be inferred. Accordingly, to continue the comparisons, this gestural complex without the final pointing would seem to correspond to spoken-language forms of initial plus medial path windowing with final gapping, while the gestural complex that included the final pointing would seem to correspond to a full-path windowing.

David employed a still further type of gesture to express a desired object transfer, one exhibiting yet another path windowing pattern. For example, to indicate to the experimenter that she should go put her coat in the closet, David, without any initial point at the coat, began his gesture with a flat hand held palm downward (a hand shape used to signal carrying an object so as to place it) moving in a line toward the closet, and finished by pointing at the closet. We can now interpret this further gestural type as exhibiting medial plus final windowing with initial gapping. Thus, David demonstrated a process of selection among alternative patterns of windowing over a path event frame.

David's gestural communication also exhibited what may be interpreted as alternative patterns of causal-chain windowing. Consider, for example, the two ways in which David would represent his using drumsticks to beat his toy drum. He could clench his hands as if each were holding a drumstick and alternately swivel his hands as if swinging the drumsticks repeatedly down onto and up off of a drumhead. Alternatively, he could extend the index finger of each hand as if these were the drumsticks themselves and alternately swivel his hands as if his fingertips—the ends of the "drumsticks"—were hitting the drumhead.

It seems likely that David formed both these gestural complexes out of the one framework of a single conceptual structure, an event frame of the causal-chain type. This causal chain would have consisted of a precursor subevent [0], comprised of an intentional Agent's exercise of volition on

his body; the resulting bodily movement [1], which is the initial subevent of the physical part of the causal chain that here consists of the hands clenching and alternately swiveling; the resulting medial subevent [2], consisting of the drumsticks alternately swinging; and the resulting final subevent [3], consisting of the tips of the drumsticks alternately hitting the drumhead at the bottom of their arc.

By a narrow windowing interpretation, where only the overtly visible gesture is taken to be within the window, David's first gestural complex windows only the initial subevent [1] of the causal chain—that is, the subevent in which the hands clench and swivel. (Or, if one takes the first gestural complex to include the whole of David's person as well as his hands, it windows together the precursor subevent [0]—that is, the agent exercising volition—along with the initial subevent of the causal chain.) By the narrow interpretation, the second gestural complex would then window the medial subevent [2] of the causal chain—that is, the subevent in which the drumsticks swing.

A wider windowing interpretation would include in a window the overt gesture plus its most directly suggested concomitant. Under this interpretation, the first gestural complex windows both the initial subevent [1] of the clenching swiveling hands, which it shows overtly, plus the directly suggested medial subevent [2] of swinging drumsticks—that is, it windows the initial plus medial portion of the causal chain. Comparably under a wide interpretation, the second gestural complex windows both the medial subevent [2] of drumstick swinging, which it shows overtly, plus the directly suggested final subevent [3] of drumstick tips hitting the drumhead—that is, it windows the medial plus final portions of the causal chain.

Under either the narrow or the wide interpretation, it is strongly to be inferred that David was windowing only portions of a full causal event frame while intending to communicate the whole of the event frame, and was thus spontaneously exhibiting the cognitive windowing process in the causal domain much as in the spatial path domain before.

Such spontaneous and autonomously generated manifestations of a windowing process acting on implicit event frames, occurring in a gestural system in a way that seems fully parallel with the same phenomena earlier demonstrated for spoken language, strongly suggest that these attentional phenomena are a fundamental part of conceptual structuring in the human cognitive system for communication and perhaps also in much of human cognition in general.

10 LINGUISTIC WINDOWING AND THE COGNITIVE SYSTEM OF ATTENTION

We can now briefly consider the functions that the linguistic windowing process serves with respect to the overall organization of cognition, looking in particular at the functions served by windowing, by gapping, and by the alternatives of patterning that these can enter into.

Since the fundamental characteristic of windowing is the selective distribution of attention with respect to a conceptual complex, we must first consider more closely the nature of attention before we can determine the cognitive functions of the windowing process. Our view is that the faculty of attention is the operation of a particular cognitive system. This attentional system is able to establish active connections with aspects of other cognitive systems. The attentional system appears to have extreme flexibility as to what it is able to link up with in this way (perhaps as much flexibility as any cognitive system has), and it seems able to shift these linkups with great rapidity.

In a linkup of this sort, the attentional system lends its own processing properties to the usual functioning of the other system. These properties may be quantitative as well as qualitative and executive in character.

Thus, quantitatively, the posited attentional system may include an especially fine-grained and finely differentiated set of neural connections that allow it to function in the following ways: It enhances the processing of the other linked-up system. It differentiates factors in the other system in a more fine-structural fashion. It processes concurrently a greater number of factors present in the other system than that system itself can process. And it lowers the threshold above which certain kinds of activation in the other system can lead to further neural consequences (i.e., as a form of increased "alertness," it permits or enhances a response to weaker signals).

In addition, the attentional system may have certain special processing capabilities that allow it to function qualitatively and executively in the following ways: It selects certain factors within the other linked-up system for special processing. It compares and contrasts various factors in the other system with each other. It detects incompatibilities across such factors and brings them into an encounter for potential resolution. It brings in processing from still other cognitive systems to form a larger field of integrated processing. And, in the execution of this last function, it modulates or brings about interactions between such other cognitive systems

whose forms of processing might otherwise have little or no compatibility with each other.

It is possible that different proportions of the attentional system can be engaged in a linkup with another cognitive system in a process that gives rise to attentional gradience. The operations of the other cognitive system would thus be able to occur, over a range: more in the foreground or more in the background of attention. It is further assumed that the attentional system is able to link up at any given moment with only limited portions of other systems, so that its distinctive processing capabilities are in effect a limited cognitive resource.

We can now apply these observations to windowing in language. The establishment of a linguistic window over certain portions of a conceptual complex correlates with the linkup of the attentional system with the corresponding aspects of the cognitive system processing that conceptual complex. On the positive side, one function served by this establishment of windows of attention over certain portions of a conceptual complex is that the enhanced processing capabilities of the attentional system can thereby be associated with only those conceptual areas currently assessed as the most relevant or important relative to larger concerns and goals.

In a complementary fashion, the gapping of certain portions of a conceptual complex permits certain conceptual areas that are assessed as less relevant, more redundant, or more obvious (i.e., capable of being filled in by the hearer) to continue on unenhanced at their usual background level of processing. In addition, gapping allows the limited resource of the enhancement system to be reserved for the more important areas. These two properties of gapping thus subserve the function of the efficiency of communication of conceptual material.

The phenomenon of alternativity in linguistic windowing would clearly arise from the flexibility characteristic of the attentional system. If the attentional system were rigidly connected with the system processing a conceptual complex, one could attend only to certain portions of that complex, never to other portions. The function served by this alternativity is that approximately the same conceptual complex can be differentially adapted to different patterns of concerns that occur within different contexts.

11 CONCLUSION

The present chapter has examined a fundamental form of conceptual and attentional organization as this is evidenced primarily in language, though

its more general cognitive counterparts have also been addressed. We have seen that human cognition appears to systematically segment the occurrence of phenomena into certain types of unitary coherent conceptual packets, here termed *event frames*, where each type of event frame includes certain kinds of conceptual material but not other kinds. We posited a number of conceptual factors that help determine which phenomena are in this way packeted together into an event frame. A common cognitive principle was posited as running through these different factors: we conceptualize an event frame as demarcated by a boundary, one that encloses a region of coherence, co-relevance, and connectivity. The different types of event frame are understood to constitute generic conceptual categories that are probably universal across languages, possibly innate, and apparently in correspondence with conceptual structures present in cognitive systems outside that of language.

This chapter has treated several types of event frames: a path, a causal chain, a cycle, a participant interaction, and an interrelationship. This last type of event frame includes both the Figure-Ground interrelationship and the factual-counterfactual interrelationship, and in the latter we demonstrated a systematic relationship that affect states and explanation types bear to factuality.

Our cognition has the further capacity to select particular portions out of an event frame and to direct greatest attention to those portions while placing the remainder of the event frame in the background of attention. This cognitive process has here been termed the *windowing of attention* when it is realized in language by the inclusion of explicit linguistic material for the portions to be foregrounded (*windowed* portions) and the exclusion of any explicit material for those portions to be backgrounded (*gapped* portions). As part of a general cognitive capacity here termed *conceptual alternativity*, we are further able to perform the selective windowing process in different patterns for the same event frame. Several event frames are able to co-occur or to be embedded one within another, each with its own windowing pattern, so as to form a rather extensive referential complex with a corresponding complex of composite windowing.

For any event frame, those portions that are selected for placement in the foreground of attention may be experienced as forming a seamless continuous unity in a cognitive process here termed *cognitive splicing*. This process may well constitute one of the major psychological constancies, though one perhaps little recognized. Such a constancy could

have evolved for the selective advantage of (among other things) maintaining a single goal schema, consisting of a particular intention plus its realization, invariant across a wide range of executional variation.

Finally, we observed the strong parallels between windowing in spoken language and what seems to be a fully comparable process in the spontaneously developed signing systems of certain deaf children. Here, as well as in the parallels between linguistic windowing and perception or motor control, and in several further respects, the linguistic structures examined in this chapter can be seen as reflecting general and fundamental forms of cognitive organization.

Notes

1. This chapter is a moderately revised version of Talmy 1996a.

For their advice and assistance, my thanks go to Kean Kaufmann, Ruth Shields, Robert Van Valin, and David Wilkins.

2. Chapter I-1 outlines this framework and discusses another portion of the attentional system, the "level of synthesis."

3. This factor, the presence versus the absence of overt language material, is only one linguistic device for the setting of attentional salience. Other devices, to be treated in subsequent work, include the following: hierarchy among grammatical categories, hierarchy of grammatical relations, positioning at certain sentence locations instead of other locations, head versus nonhead constituency within a construction, degree of morphological autonomy, solo expression versus joint conflation, phonological length, and degree of stress. While most of these other devices can place attention along a gradient, windowing is taken to set attentional salience at two discrete levels: relatively foregrounded or backgrounded.

4. Some precedent for the notion of a blocked complement is present in Jackendoff's (1990) "constant argument," which can be expressed in an optional complement when specific but which, in effect, is blocked in standard speech when generic. An example of a constant argument is the argument pertaining to money in connection with the verb *buy*. Thus, one can say *I bought the book for $50*, but not **I bought the book for money*.

5. This argument is further strengthened by the fact that it has been conducted over examples containing the more liberal of the two prepositions—*on* instead of *for*—that *spend* permits with its goods-specifying complement, for instance, above with *that ham radio kit*. With *on*, not only can the expenditure of nonmonetary resources be mentioned, but the money itself could have been used either to buy the goods mentioned or to purchase other things—for example, paint, tools, insurance, expert advice—for use in the maintenance of the goods. But the use of the alternative preposition, *for*, permits reference only to money used in exchange for the goods and precludes reference to the expenditure of other resources: *I spent $50 (*and 100 hours of my time) for that ham radio kit*.

6. These alternative patterns of path windowing are presented here as if they might simply be a matter of the speaker's choice. But, of course, various discourse and pragmatic factors play a role. Though such factors are not further addressed here, it can be noted that narrative style can affect the selection. Thus, in the presentational style of the oral literature of the Clackamas Chinook (Jacobs 1958), there is a strong tendency to provide full windowing for all the open paths referred to. Examples are the following excerpts from Jacobs' literal translations.

(i) a. They left him, they went on, they came to the third mountain.
b. When it was dark, then they went, they went along, they got to there.

7. In less prototypical conceptualizations, the causality can encompass not only direct causation but also allowance or enablement, and it can occur not only at the boundary marking the end of one subevent and the start of another subevent (onset causation) but also throughout the duration of a single subevent (extended causation) (see chapter I-8).

8. Although this formulation in terms of a requirement for penultimacy may lie in the right direction, refinements and emendations are clearly needed. For example, although the sentence *?*I broke the window by throwing a rock* seems rather marginal, its close kin, *I broke a window by throwing rocks* seems relatively acceptable. In search of an explanation, we can note that, in general, a contributing factor in acceptability may be the issue of granularity or chunking—for example, the amount of the causal continuum that is conceptually framed together for consideration as a penultimate event. Thus, in the more acceptable sentence here, the window did not break as a result of my aiming some particular rock at it. Rather it broke as a chance consequence of my hurling rocks in various directions, so that the relevant chunk size of the penultimate event may be felt to extend from the act of throwing to the chance impact of one of the missiles with a window—a larger subevent that perhaps metonymically can be referred to as "throwing rocks." Further sentences pose additional challenges—for example, why it is fine to say *He killed himself by jumping out the window* instead of *He killed himself by throwing himself onto the pavement*—and it is not clear if the factor of granularity alone can resolve them.

9. Kuno (1987) has extensively investigated the conceived degree of immediacy or distance between two references to the same agent.

10. One indicator of the degree of backgrounding of the medial causal material is the fact that even linguistic analyses of agentive expressions failed to explicitly note the necessary presence of a bodily act by the agent until this was pointed out in Wierzbicka 1975 and in Talmy 1976b (here, chapter 8).

11. Actually, these sentences exhibit an additional factor beyond windowing, "direction of viewing." The window in (11a) is located in the latter portion of the home phase but includes a prospective viewing ahead to the initial point of departure, while the window in (11c) is located in the earlier portion of the departure phase but includes a retrospective viewing back to the initial point of departure.

12. This analysis shows a point neglected in previous work (e.g., Keenan and Comrie 1977), which posited the advancement or demotion of a term along a hier-

archy of grammatical relations. That work emphasized advancement as a process for increasing the prominence of a referent, but spoke little of demotion as a process for getting a referent into an oblique constituent that could then be deleted in order to background that referent.

13. Although the inclusion of the oblique Figural phrase in (20b) is awkward for that particular example, other examples exhibit all four of the construction types treated in (20) and (21), e.g., the forms in (i) and (ii) below. The Figure or Ground roles of the noun phrases are indicated symbolically here.

(i) a. The gasoline [F] slowly drained from the fuel tank [G].
    b. The fuel tank [G] slowly drained of gasoline [F].
(ii) a. The gasoline [F] slowly drained.
    b. The fuel tank [G] slowly drained.

14. Truth-value semantics and logic assume or proceed as if assuming the view that there is a direct relation between a linguistic expression and what is held to be its counterpart (its ''referent'') in the world. Cognitive linguistics, on the other hand, maintains that the relation between a linguistic expression and something in the world cannot be direct but must, in effect, ''pass through'' the mind of the language user. In particular, the relevant primary relationship is between the linguistic expression and the mind of the language user, who must first cognize the expression. Thus, a linguistic expression must first evoke a particular conceptual content in the language user's mind, being considered there by the imaginal cognitive system. This content can then be further related to other conceptual contents in the same mind, including concepts about the world.

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Chapter 5

Figure and Ground in Language

1 INTRODUCTION

This chapter investigates the pervasive system by which language establishes one concept as a reference point or anchor for another concept.[1] It posits the existence in language of two fundamental cognitive functions, that of the **Figure**, performed by the concept that needs anchoring, and that of the **Ground**, performed by the concept that does the anchoring. This pair of concepts can be of two objects relating to each other in space in an event of motion or location—and represented by nominals in a single clause. Or the pair of concepts can be of two events relating to each other in a temporal, causal, or other type of situation—and represented by the main and subordinate clauses of a complex sentence. Cognitive anchoring mainly involves one of the major schematic systems of language, that of attention and its differential distribution.

2 FIGURE AND GROUND IN A SINGLE CLAUSE

We first expand on the pair of cognitive-semantic categories just introduced. Their relevance shows up, in the first instance, in relation to a semantic event of motion or location (as treated in chapter II-1)—that is, an event conceptualized as involving one physical object moving or located with respect to another. Here, each object is taken as bearing to the whole event a significant and distinct relation, termed respectively that of "Figure" and that of "Ground." The following sentences exemplify these categories.

(1) a. The pen lay on the table.
    b. The pen fell off the table.

In both, *the pen* specifies the object that functions as Figure, and *the table* the object that functions as Ground.[2]

The terms Figure and Ground have been taken from Gestalt psychology, but they are written with capitals here to mark the distinctness of their linguistic usage from their original usage. In their linguistic usage, they have the following specific characterizations.

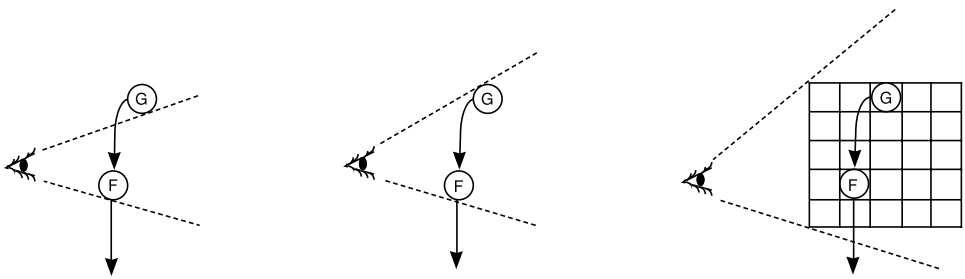
(2) *The general conceptualization of Figure and Ground in language*
The Figure is a moving or conceptually movable entity whose path, site, or orientation is conceived as a variable, the particular value of which is the relevant issue.
The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure's path, site, or orientation is characterized.

The text below will sometimes refer to a reference entity as a "reference point" to take advantage of that English expression's ready-made indication of our Ground function. But the expression's inclusion of the term "point" can be disregarded. For neither the Figure entity nor the Ground entity need be topologically idealizable as a geometric point for their basic definitional roles to be fulfilled. The Figure or the Ground can as readily be a multiplicity of points, a linear extent, an area, or a volume, as illustrated by (3).

(3) a. Rocks filled the box.
b. The river flowed alongside the mountain range.

With the aid of the accompanying diagrams—schematizing, as an example, a pen falling off a table—it can be seen that for there to be any notion of the motion of an object (i.e., a Figure), there must also be present both a reference object (a Ground) and a reference frame.

(4)



a. b. c.

For, as illustrated in (4a), if an observer (or conceiver) has in sight (or mind) only the Figure object, she can know only that the object exists, but nothing of change of position. Even when, as in (4b), the observer sees both Figure and Ground objects—still without any reference frame, however—she can additionally know only that there is a change from the two objects' being together to their being apart, but could not know which object moved (or if both moved), nor whether there is any further motion once the two objects are apart, since there is no way to determine (change of) distance. Only when the observer sees both objects within a framework, as in (4c), can she know which object is stationary, which object moves, by how much, and along what path. The notion of the motion of an object also crucially depends on the correlation of the spatial points of its path with points of the temporal continuum, but this is for subsequent study of the relation of space and time in language.

This tripartite partitioning of a spatial scene into a Figure object, a Ground object, and a reference frame as background affords a basis for relating the linguistic Figure/Ground concepts to the psychological figure/ground concepts. When a Figure object and a Ground object in a linguistic representation are considered only with respect to their relation to each other, apart from any background, then the former object is indeed the psychological figure and the latter object is the psychological ground. Such a bipartite partitioning of a referent scene is the likeliest conceptualization for a sentence like *The ball rolled across the table*. But consideration of a background can be further included for a tripartite scene partitioning. This is the likeliest conceptualization for a sentence like *The ball rolled past the lamp*, since here one must consider not only the two principal objects, the ball and the lamp, but also the region surrounding the lamp, through which the ball moves. In this case, one interpretation is that the combination of the linguistic Figure object and Ground object together functions as a psychological figure, while the background now functions as a psychological ground.[3] Under this interpretation, one set of psychological figure/ground relations is embedded within another. The Figure object is the psychological figure to the Ground object as the psychological ground. But in addition, the combination of the two objects is a psychological figure to the background as a psychological ground.

While the categories of Figure and Ground are clearly assignable within a motion event where one object is moving and the other is stationary, they might there be thought to be merely a restatement of the fact of this movement versus locatedness rather than independent notions in their own right. The existence of these categories in semantics can be

demonstrated, therefore, if they also appear in a locational event where both objects are stationary. We undertake such a demonstration here.

One might initially expect two sentences like

(5) a. The bike is near the house.
b. The house is near the bike.

to be synonymous on the grounds that they simply represent the two inverse forms of a symmetric relation. This relation here simply pertains to the small quantity of distance between two objects. However, the two sentences in fact do not mean the same thing. They *would* be synonymous if they specified *only* the cited symmetric relation. But in addition to this, (5a) makes the nonsymmetric specifications that, of the two objects, one (the house) has a set location within a reference frame (here, implicitly, the neighborhood, world, and so on) and is to be used as a reference object by which to characterize the other object's (the bike's) location. Correlatively, the location of the other object is understood as a variable (realistically so in this instance, since the bike will be in different locations on different occasions) whose particular value is the relevant issue.

On the other hand, (5b) makes all the reverse specifications. However, these happen not to conform with the exigencies of the familiar world, a fact that renders the sentence somewhat peculiar, and hence more clearly flags the sentence as different from (5a). The nonsynonymy of the two sentences is thus due to the differentiality with which their nominals specify the semantic functions of variable point and reference point—that is, of Figure and Ground. This can be indicated by parenthesized function markings abbreviatedly symbolized as F and G in (6).

(6) a. The bike (F) is near the house (G).
b. ?The house (F) is near the bike (G).

Even where a speaker does not want to indicate anything about Figure-Ground assignment, language inescapably *imposes* that semantic addition upon a basic proposition in formulations like the preceding ones. It might at first be thought that certain grammatical constructions, such as the reciprocal, are specific means available in a language with which to avoid expressing such role assignment. But in fact, the reciprocal does not abstract the symmetric relation common to two inverse asymmetric forms, but rather *adds* the two together. This is shown by the fact that the reciprocal counterpart of the (6) sentences semantically is odd in the same way that (6b) is odd.

(7) ?The bike and the house (F_1 & F_2) are near each other (G_2 & G_1).

More factors must be introduced to explain why the reversal of "bike" and "house" in (6a) yields a sentence semantically so different from the first, and peculiar to boot. After all, two sentences like

(8) a. John (F) is near Harry (G).
b. Harry (F) is near John (G).

also have their nominals reversed, but they do not differ from each other so dramatically, and both are semantically ordinary. Both the "bike/house" example and the "John/Harry" example accord with the characterizations of Figure and Ground in (2) in that their second-appearing nominal acts as Ground with respect to their first-appearing nominal as Figure. Thus, in (8b), "John" is set up as a reference point with known location for establishing the location of Harry. But if these initial characterizations were all that mattered, then it should suffice merely to say that, in *The house is near the bike*, the "bike" has simply been set up to act as a reference point for locating the house. The fact that such function assignments are instead so problematic indicates that there are certain additional characteristics that render one entity more suitable for functioning as Ground or another entity as Figure. Such characteristics can be considered the "associated characteristics" of Figure and Ground that tend to correlate with the definitional properties already given for them in (2). A heuristic set of these follows. Note that the last five associated characteristics, as well as aspects of the definitional characteristics, broadly involve the schematic system of attention and its differential distribution.

(9)

	Figure	Ground
Definitional characteristics	Has unknown spatial (or temporal) properties to be determined	Acts as a reference entity, having known properties that can characterize the Figure's unknowns
Associated characteristics	• more movable	• more permanently located
	• smaller	• larger

Figure	Ground
• geometrically simpler (often pointlike) in its treatment	• geometrically more complex in its treatment
• more recently on the scene/in awareness	• more familiar/expected
• of greater concern/ relevance	• of lesser concern/ relevance
• less immediately perceivable	• more immediately perceivable
• more salient, once perceived	• more backgrounded, once Figure is perceived
• more dependent	• more independent

The peculiarity of the sentence *The house is near the bike* can thus be accounted for by the fact that its assignment of a Figure role to "house" and a Ground role to "bike" flouts most of the associated characteristics in the list.

However, the associated characteristics are only tendential correlates of the Figure and Ground functions, whereas the definitional characteristics are determinative of them. Thus, the sentence *The house is near the bike* is not barred from use even though it contravenes the associated characteristics. On the contrary, it is a fine sentence in a context that permits the definitional Figure/Ground properties to hold. An example might be where the bike is ridden by a famous individual in a small town who parks it in the same spot known by all, and where I am trying to tell a new friend how to get to my house. Even in this new context, the "house" as Figure and the "bike" as Ground still fail most of the associated characteristics. The context allows the "house" and the "bike" newly to accord only with two of the associated characteristics, namely, with "less versus more familiar" and "of greater/less concern." But the "house" and the "bike" do obey the definitional properties here, which permits their felicitous use as Figure and Ground, respectively, in the new context.

The view has sometimes been expressed that it is not legitimate to claim the existence of Figure and Ground functions on the basis of forms like the "bike/house" sentence pair with one member of the pair so peculiar,

when more modest forms like the "John/Harry" sentences show little or no difference. It is easy to fault this view, though. The same argument could have been advanced to disprove claims of the existence of subject versus direct object. An arguer might say that the semantic difference between two sentences referring to unusual events, such as *The dog bit the man* and *The man bit the dog*, should not be used for demonstration of subject versus object function. Instead, a sentence with a more commonplace referent like *A dog bit a dog* would be better. And in this latter sentence, reversal of the nominals yields no discernible semantic difference. We would reply, though, that a subject/object distinction does exist in the "dog/dog" sentence. After all, it refers to a situation in which, of two dogs, only one bites the other. In the same way, we would continue, a Figure/Ground distinction does exist in the John/Harry example pair. True, it is harder to see the subject versus direct object difference in the "dog/dog" sentence, or the Figure versus Ground difference in the "John/Harry" sentence pair. But the fact that one has found a sentence in which the difference is hard to discern does not disprove its existence there, nor fault the class of sentences in which the difference is easier to see.

The method of reversing the nominals in a sentence to highlight the existence of Figure and Ground roles in a locative event has so far used an otherwise symmetric relation 'near'. But the same method can apply as well to an asymmetric relation if we consider together that relation and its inverse. An example of such an **inverse pair** is 'above/below', as in (10).

(10) a. The TV antenna (F) was above the house (G).
b. ?The house (F) was below the TV antenna (G).

All the same semantic arguments that were advanced earlier for the examples with *near* can be made as well for the pair of forms *above* and *below*.

The Figure/Ground functions extend to some nonphysical situations—for example, ones involving relational states—that behave homologously with the preceding physical situations. Thus, though some might at first claim an invertible symmetry for it, the locative-like sentence in (11a) that expresses a static relational state and that can be taken to derive from something like (11b), is not understood in the same sense as (11c).

(11) a. She resembles him.
b. She is near him in appearance. / Her appearance is near his appearance.
c. He resembles her.

All the reasons given above apply: not merely quantity of resemblance is being specified, but, additionally, one of the objects (the second-named one) is taken as a reference point and the other object (the first-named one) is taken to have a variability whose particular value is at issue. As with the "bike" and "house" example for location, this asymmetry can be highlighted by choosing objects with different capacities to serve as a reference point.

(12) a. My sister (F) resembles Madonna (G).
b. ?Madonna (F) resembles my sister (G).

And the asymmetry is unarguable for an analog to a motion sentence—here, a change of relational state, as seen in (13).

(13) She (F) grew to resemble him (G). $\neq$ He (F) grew to resemble her (G).

Here, there is an analogy between (1) an object acting as Figure because its location shifts so as to move physically closer to the stationary location of a Ground object, and (2) an object acting as Figure because its appearance changes so as to become more similar to the static appearance of a Ground object.

For a further extension of Figure and Ground from the physical domain, an 'equational' sentence, whose very name implies an assumption of its invertible equivalence, actually shows the same difference between its nominals as to variable versus reference point functions as was seen above for the spatial sentences. This can be seen on semantic inspection of an inverse pair of sentences like that below in an example drawn from comicdom, where it is known that the 'real' identity of the man from Krypton is 'Superman' and his identity of disguise is 'Clark Kent'. It is thus appropriate to treat the former identity as a fixed reference point and the latter identity as displaced therefrom, and inappropriate to treat them in the reverse way, hence the difference in acceptability between the otherwise equivalent inverse sentences in (14).

(14) a. Clark Kent is Superman.
b. ?Superman is Clark Kent.

So semantically parallel are 'equational' sentences to locative sentences that one could even propose including in their underlying structures a deep preposition homologous with *at*, as if one could say at the surface, for example,

(15) Clark Kent is at Superman.

There is in fact syntactic evidence for something of this sort in English with the preposition *as*, at least for copula sentences where the second nominal expresses the role or function of the first. As (16) shows, an *as* appears overtly in an inverted type of sentence construction, just as an *at* does. But no *as* appears where an *at* does in a noninverted construction, thus yielding the typical form of the English copula construction without any preposition. Yet, the parallelism with *at* might suggest a virtual *as* before the second nominal.

(16) a. Jim is on the throne in the play. ⇒ The play has Jim on the throne (in it).
b. Jim is [as] the king in the play. ⇒ The play has Jim as the king (in it).

Some languages do in fact have an adposition at the surface beside the predicate nominal of a copula sentence, like Samoan with its *'o* preposition as in

(17) a. 'o se atua ia
(as) a god he
'He was a god.'
b. 'o le agasala 'ea le tulafono
(as) the sin (interrogative) the law
'Is the law sin?'

and Japanese may include such a form more disguisedly, in its *desu* verb, as in (18).

(18) kore wa pen desu.
this (topic-marker) pen is
'This is a pen.'

This verb in some of its paradigmatic forms clearly breaks up into a postpositional particle *de* plus the verb *aru* (otherwise the 'be-located' verb for inanimate objects). Further, one of the few cases in Japanese in which a nominal is not otherwise followed by a postposition is the construction in which it is followed by the form *desu*, presumably because a postposition is already coalesced within this form. The *de* that is apparently coalesced in *desu* may be identified with the postposition *de* that appears elsewhere with locative or instrumental meaning. This analysis might then make the whole Japanese copula construction with *desu*

parallel to that of Russian, where the predicate nominal is generally in the instrumental case, as in (19).

(19) on byl doktorom (instr).
he was as a-doctor (doctor-instr).
'He was a doctor.'

It would be less apt to characterize equational sentences on the model of mathematics than to do the reverse. For, in the standard form of equations, like

(20) $y = 3x^2 + 1$

y, Figure-like, is considered a 'dependent variable' and appears alone on the left, while *x*, Ground-like, is considered an 'independent variable', appears on the right, and is there grouped together with all operators and modifiers. This arrangement has no purely mathematical significance but rather derives from the same cognitive-semantic processes that determine the form of sentences like those in (21).

(21) The bike is to the left of the house. / Clark Kent is really Superman in disguise.

3 FIGURE AND GROUND IN A COMPLEX SENTENCE

As part of the system of spatiotemporal homology that is found in language (see chapter I-3), the reference of Figure and Ground to the relative location of objects in space can be generalized to the relative location of events in time. Paralleling their characterization earlier for spatial objects, the categories of Figure and Ground can be given the following more specific characterization for temporal events.

(22) *The temporally specific conceptualizations of Figure and Ground in language*
The Figure is an event whose location in time is conceived as a variable the particular value of which is the relevant issue.
The Ground is a reference event, one that has a stationary setting relative to a reference frame (generally, the one-dimensional timeline), with respect to which the Figure's temporal location is characterized.

The notions of Figure and Ground may be related to the notions of asserted and presupposed and may in fact be a generalization over them by virtue of referring not only to propositions but also to entities.

The applicability of these semantic categories to temporal structures can be seen in a complex sentence like (23).

(23) He exploded after he touched the button.

This sentence seems to assign a Ground interpretation to the button-touching event—setting it up as a fixed, known reference point—and seems to assign a Figure interpretation to the explosion event—establishing the location in time of this more salient occurrence with respect to the other. As with the earlier demonstration for the "bike/house" example, as well as for the asymmetric "above/below" inverse pair, the suggestion that such differential functional assignments have taken place here is confirmed simply by noting that the inverse sentence

(24) He touched the button before he exploded.

is different in meaning. To this speaker, in fact, it sounds comical, acquiring a suitable seriousness only after the imagining of such special circumstances as an official search into the possible causes of a known death.

The form of the complex sentences cited here—that is, consisting of a main and a dependent clause with subordinating conjunction—can be understood as deriving from a syntactically deeper structure of a different form. This form is more closely reflected in a surface sentence that consists of two nominalized clauses, a verb of occurrence, and a "subordinating preposition" as in the following analogs of the preceding sentences.

(25) a. His exploding (F) occurred after his touching the button (G).
b. His touching the button (F) occurred before his exploding (G).

This form is homologous with that of a locative spatial sentence. In all three sentence types—the one-clause spatial locative, the one-clause temporal sentence with preposition, and the complex sentence with conjunction—the subject(-like) constituent functions as Figure and the object(-like) constituent functions as Ground.

Since either of the asymmetric relations in an inverse pair specifies the same relational information equally well, the advantage to a language in having lexicalization for both members of the pair—as English has for the relation of 'temporal succession' with *before* and *after*—is precisely that either of the related events can be presented as the Figure. In any language, however, there can be semantic inverse pairs for which simple means of expression exist for only one of the relations (and it may be

deemed that the language's expressive range suffers for the lack of the other).

Such is the case in English—for example, for the asymmetric inverse pair expressing 'temporal inclusion' between a 'point event' and an 'extent event'. When it is the point event that is relatively less known and is to be temporally located with respect to the better-known extent event—specifically, as 'included within' it—the relation has simple lexical representation, as in (26).

(26) Shāh Mat of Persia was assassinated during Caesar's reign. / while Caesar reigned.

But when it is the extent event that is relatively less known and is to be temporally located with respect to a better-known point event—specifically, as 'including' it—English has no simple apt lexical representation, as seen in (27).

(27) ?Shāh Rūkh ruled Persia around/through/before and after Christ's crucifixion.

In the preceding presentation of how English lexicalizes the relations of 'temporal succession' and 'temporal inclusion', it may have seemed that each language with ready means for expressing an asymmetric temporal relation is idiosyncratic in whether it has simple lexical forms for both members of the inverse pair or for only one of the members. However, it may well be that for any asymmetric relation between events, there is some universality as to which of the two directions that the asymmetry can be conceptualized in has priority. In fact, probably for every inverse-relation pair, one of two universal statements holds, either the implicational universal in (28a) or the absolute universal in (28b).

(28) a. Only where a language has some lexical means—not more complex but either equally complex or simpler means for the specification of an asymmetric relation R between events—does it also have means for the specification of the inverse relation R_{INV}.

b. Whereas a language may have lexical means for the specification of the asymmetric relation R between events, it never has such for the inverse relation R_{INV}.

An example of an asymmetric relation to which the implicational universal statement (28a) seems to apply is in fact that of 'temporal succession', for which the concept 'after' has priority as the basic member R of

the inverse pair.[4] English, as we saw, has the lexical means, and equally simple means, for the expression both of this relation and of its inverse in the words *after* and *before*. Atsugewi for one, however, expresses the notion 'after' simply and directly with a verb suffix (akin in function to Russian's "past gerundive" ending), as in (29).

(29) Having-eaten, we left.

But it expresses the notion 'before' in a more complex and indirect way—by the addition of two independent words to the 'after' verb form—as in (30), which is the inverse counterpart of the preceding.

(30) Still not having-left, we ate.

The implicational universal (28a), if it applies to 'after' versus 'before', thus implies that a language may, like English, have means for expressing 'before' equally simple as for 'after', or may, like Atsugewi, have less direct means for expressing 'before' than 'after', but that no language will have simpler and more direct means for expressing 'before' than for expressing 'after'.

An example of an asymmetric relation to which the absolute universal statement (28b) seems to apply is in fact 'temporal inclusion', for which the notion 'included within' has primacy over the inverse notion 'including'. As we saw, English accords with this pattern by lexicalizing the 'included within' notion in the forms *during* and *while*, but by having no lexicalization of the 'including' notion. And a spot-check shows that other languages follow this pattern as well.

Another example of an asymmetric relation to which the second universal statement seems to apply is the notion of "continuous concurrence"—that is, 'concurrence of one temporal extent with another'—as expressed, for example, by English *(all) during* and *the whole time (that)* or *while*. Since this relation may at first seem symmetric (aside from issues of Figure and Ground), it first behooves us to show that it is not. This can be done by demonstrating that there is a difference in the characteristics required of the first and of the second events that may comprise the terms of the relation, and that therefore the terms cannot always be acceptably reversed. The following sentences reveal that for the second event in the relation, the extent of time occupied is necessarily bounded at both ends, since a second-position clause specifying an event that is inherently unbounded (at either end), such as the state of being dead, creates an unacceptable sentence.

(31) She was studying in an American college the whole time that her father in Iran was ill. / *her father in Iran was dead.

On the other hand, the first event in the relation need not be bounded at both ends, as is shown by putting into first position the same clause specifying an inherently unbounded event, and this time getting an acceptable sentence.

(32) Her father in Iran was sick/dead the whole time that she was studying in an American college (but she didn't know it).

The difference between the first event and the second event of the relation as to its need to be temporally bounded is schematized in the accompanying diagram.

(33) 

Given this first demonstration of the asymmetry of the notion 'concurrence of one temporal extent with another', the absolute universal's holding for this relation would mean that while many languages may have a direct means for expressing the equivalent of (34a), none will have the means for expressing (34b).

(34) a. Her father in Iran was dead while she was studying in an American college (but she didn't know it).
b. *She was studying in an American college while$_{INV}$ her father in Iran was dead.

There is a second demonstration of the asymmetry of the relation 'concurrence of one temporal extent with another'. Of the two events comprising the terms of this relation, if the possibility of occurrence of one event is contingent on the occurrence of the other event, which is therefore determinative, it is only the contingent event that can function as the first term of the relation, while the determinative event must function as its second term. For example, since the act of dreaming is contingent on the state of being asleep, a clause specifying the former can acceptably appear only in first position in a sentence that expresses the occurrence, extensionality, and contemporaneousness of the two events.

(35) a. He dreamt while he slept.
b. *He slept while he dreamt.

Note that there is no general constraint against referring to an event of dreaming in a subordinate clause, since it can occur there as long as it is not contingent on the main clause event.

(36) He twitched while he dreamt.

If the absolute universal holds for this redemonstratedly asymmetric relation 'concurrence of one temporal extent with another', it would mean that no language has a lexical equivalent for $while_{INV}$ such that it can express the equivalent of

(37) *He slept $while_{INV}$ he dreamt.[5]

and indeed, in at least the several languages I have asked for such a form in, none exists.

It can be clear only after an extensive survey of languages whether there exists any universal bias toward one as against the other relation of asymmetric inverse pairs, like the ones discussed above as well as of other pair types. It would have to be determined whether such bias is total or is proportional, involving relative simplicity of expression. But it is tentatively suggested that such a survey will reveal that sentences like the upper ones of the following pairs (merely an illustrative selection) represent the favored, or unmarked, relations of inverse pairs. And the survey might reveal that sentences like the lower ones in the pairs represent relations—the corresponding inverses—that are either never or not more simply expressed. In fact, in most cases here, these can be indicated only by specially devised phrases. The illustrations of interevent relations that follow are grouped by semantic type, and the examples treated earlier in the text are included under their type. Where English permits it, we represent a subordinated event both by a subordinating conjunction with a clause and by a subordinating preposition with a nominal.[6]

(38) *Possibly universal unidirectionality in Figure | Ground assignment to the events in an interevent relation*

a. *Temporal sequence (with causality)*

i. She departed *after* his arrival. / *after* he arrived.
He arrived *before* her departure. / *before* she departed.

ii. We stayed home *because of* his arrival. / *because* he had arrived.
*He arrived *to-the-occasioning-of-(the-decision-of)* our staying home.

iii. We went out *despite* his arrival. / *even though* he had arrived.
*He arrived *in-ineffective-counteracting-of-(the-decision-of)* our going out.
iv. The door slammed shut *from* the wind blowing on it.
*The wind blew on the door *to* its slamming shut.
v. I broke the window *by* leaning against it.
*I leaned against the window *to* breaking it.
vi. We'll stay home *in the event of* his arrival. / if he arrives.
*He will arrive *as-a-potential-event-occasioning* our staying home.
vii. We'll go out *except in the event of* his arrival. / *unless he arrives*.
**He will arrive as-the-only-potential-event-counteracting* our going out.
viii. She awoke *upon* his arrival. / *when* he arrived.
*He arrived *immediately-before-(and-occasioning)* her awakening.
ix. She slept *until* his arrival. / *until* he arrived.
*He arrived *immediately-before-(and-occasioning)-the-end-of* her sleeping.

b. *Temporal inclusion*
x. He had two affairs *during* his marriage. / *while* he was married.
*He was married *through-a-period-containing* two affairs of his/his having two affairs.

c. *Contingency*
xi. He dreamt *(all) during* his sleep. / *while*/*the whole time* he slept.
*He slept *(all during*$_{INV}$ his dreaming. / *while*$_{INV}$ he dreamt.)

d. *Substitution*
xii. He's playing *instead of*/*rather than* working.
*He's not working *in-replacement-by* playing.

An inspection of the biases in this array reveals that each is not simply peculiar to its own relation pair, but that they generally follow a pattern. Consider those pairs—gathered together in (38a)—for which the two

related events are temporally sequential with respect to each other. With the exception of the 'until'-type in (38aix) (but see below), the favored relation has the earlier-occurring event in the subordinate clause and the later-occurring event in the main clause, where they function, respectively, as Ground and Figure. This observation suggests that the following possibly universal tendency may exist for language.

(39) *Sequence principle*
The unmarked (or only possible) linguistic expression for any particular relation between two events in temporal sequence treats the earlier event as a reference point, or Ground, and the later event as requiring referencing—that is, as the Figure. Where the complete syntactic form is a full complex sentence, the two events are in the subordinate and the main clause, respectively.

Note that the semantic relationships stated in the principle are the determinative factors and can apply even where the syntactic form is not that of a full complex sentence. In fact, there are certain variant syntactic forms that nevertheless basically conform to the semantic bias. These include, for example, syntactic forms in which what would otherwise be the subordinate clause appears as a pronoun, as in (40a), is implicit or deleted, as in (40b), or is conflated into the main clause, as in (40c).

(40) a. He arrived; she left despite that [= his arriving]. (*see chapter I-6*)
b. She broke the window [by ACTing ON it with SOMETHING]. (*see chapter I-8*)
c. I kicked the ball over the fence.
[= I MOVED the ball over the fence by kicking it.]
(*see chapter II-1*)

All the relation types in (38a) with events in sequence can, and some chiefly do, also express causality between the events. A pattern can be discerned here, too. The favored pair member has the causing event in its subordinate clause and the resulting event in the main clause. To be sure, in the physical world, cause and result correlate with earlier and later, and if linguistic conceptualizations always followed physics, this linguistic finding about causality would be predictable from the previous one about sequentiality. They do not, however, and so the observation about causality (demonstrated in more detail in chapter I-8) prompts the following independent statement of suggested universal tendency.

(41) *Cause-result principle*
The unmarked (or only possible) linguistic expression for a causal relation between two events treats the causing event as Ground and the resulting event as Figure. Where the complete syntactic form is a full complex sentence, the two events are in the subordinate and the main clause, respectively.

The problem of the apparently exceptional sequential properties of *until* may find resolution by observation of its causal properties. For when the relation has a causal implication—as it can in the top sentence of (38aix)—it follows the general pattern at least in part: The causing event—'his arrival' in (38aix)—is expressed in the subordinate clause. Now, semantically, what this event causes is *not* the event overtly expressed in the main clause—'her sleeping' in (38aix)—but rather the *end* of that event. And temporally, that end is indeed after the causing event. From this, we may infer a deeper precursor for the *until* forms, one for which both the clauses conform to both the universal tendencies. Such a deeper form, if exemplified for (38aix), would look like the form in (42).

(42) [THE END OF [she slept]] OCCUR AT [he arrived].

This form would then be taken to derive into either alternative in (43)

(43) a. [she slept] END AT [he arrived]
b. [she slept] EXTEND TO [he arrived]

which would in turn give rise to the roughly equivalent surface sentences in (44).

(44) a. She stopped sleeping when he arrived.
b. She slept (continued sleeping) until he arrived.

Principles comparable to the preceding two on sequence and cause may be at work as well for the types of forms in (38b) to (38d). Thus, the following proposed principle may govern the asymmetric relation of 'temporal inclusion' between two events, as this was illustrated in (38bx).

(45) *Inclusion principle*
A larger, temporally containing event acts as Ground (in the subordinate clause) with respect to a contained event as Figure (in the main clause).

The following principle may govern the asymmetric relation of 'contingency' between two events, as this was illustrated in (38cxi).

(46) *Contingency principle*
An event that is necessary for or determinative of a second event acts as Ground (in the subordinate clause) with respect to the second event that is contingent or dependent on it, which acts as Figure (in the main clause).

And the following principle may govern the asymmetric relation of 'substitution' between two events, as this was illustrated in (38dxii).

(47) *Substitution principle*
An expected but nonoccurring event acts as Ground (in the subordinate clause) with respect to an unexpected but occurring substitute event, which acts as Figure (in the main clause).

If these universal tendencies prove to be the case, we can speculate on deeper reasons for them. Assuming that linguistic universals reflect innate organizational and functional characteristics of the language-related portions of the brain, we may suppose that some of these characteristics are continuous with those of more general cognition-related areas. Let us consider here only the first universal about sequential events from this perspective.

At times, a newly cognized item will illuminate or necessitate the rearrangement of items already in memory. But generally, cognitive effects seem to operate in the other direction: items already in memory constitute the basis, afford the analytic categories, and function as the reference points by which a newly cognized item is assessed, characterized, and analyzed. In particular, of two nonconcurrent events, both cognized, the earlier one will, of course, already be in memory when the later one is newly occurrent, and so is generally to be used as part basis for the latter's assessment. The parallelism between this cognitive characteristic—the earlier used as basis for assessing the later—and the linguistic characteristic—earlier and later treated semantically/syntactically as Ground/subordinate clause and Figure/main clause, respectively—suggests the following possibility. This feature of cognitive functioning may well have become incorporated in the innate structuring for conceptual/grammatical organization of the brain's language system, as the latter evolved.[7]

4 FIGURE AND GROUND IN A SELF-REFERENCING EVENT

Starting with the basic Figure-Ground Motion event that was first described, we can by stages build up to a more complex event, that of **self-**

referencing Motion and the way that Figure and Ground function therein. (See Talmy 1972 and chapter I-8 for details.) To begin with, the situation specified by the sentence

(48) The red leaf drifted toward the brown leaf.

is to be understood by the analysis developed in this chapter as a motion event in which the red leaf, as Figure, moves with respect to the brown leaf, as Ground. Similarly, the event specified by

(49) The brown leaf drifted toward the red leaf.

is a motion event in which the brown leaf, as Figure, moves with respect to the red leaf, as Ground.

Consider now the complex situation that consists of the previous two events taking place concurrently—that is, where, of the two leaves, each, as Figure, moves with respect to the other, as Ground. This situation can be represented by each of the successively more-derived sentences in (50).

(50) a. The red leaf drifted toward the brown leaf and (at the same time) the brown leaf drifted toward the red leaf.
b. *The red leaf and the brown leaf drifted (respectively) toward the brown leaf and the red leaf.
c. The red leaf and the brown leaf drifted toward each other.
d. The red leaf and the brown leaf drifted together.
e. The two leaves drifted together.

Such a situation, although analyzable—and just now treated—as conjunctional and hence complex, may also be analyzed as a single motion event in which a set of objects acting as a **composite Figure** moves with respect to a set of objects acting as a "composite Ground"—symbolizable as F′ and G′. In addition here, there is the special circumstance that the Figure and the Ground are the same objects (i.e., the Figure constitutes its own Ground), so that the new situation can be interpreted as a simple motion event consisting of a set of objects, as composite Figure, moving with respect to itself, as composite Ground. It is for this reason that we refer to a situation analyzed in this way as a **self-referencing Motion event**.

We next come to the case of a Motion event that, in order for it to be represented by a syntactic structure, can be treated *only* as a self-referencing Motion event and not also as a conjunction of simple Motion events. We have such a situation where the Figure objects (and, hence, the

Ground objects) do not admit of a definite specification as to number (such as 'two') as in the preceding case. Rather, they are "nonnumerate" —that is, of a number that is unknown, perhaps because it is relatively large. Consequently the spatial relations among the objects can be specified not as a sum of simple relations between, say, pairs of objects, but only, when considered together as a Gestalt-like whole, specifically, as a **configuration**. Examples include the following.

(51) a. The leaves floated into a circle.
b. The leaves floated out of the circle [that they were in].
c. The leaves floated in a circle.
[in the locative sense, hence, like: The pens lay in a circle.]

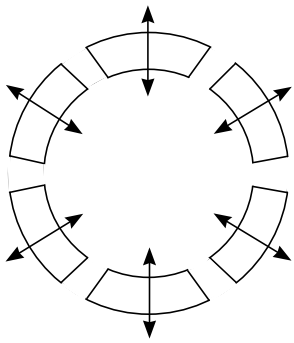
We now proceed to the case of a self-referencing Motion event that, in order for it to be amenable to representation by a syntactic structure, must be treated at a still higher level of Gestalt formation than in the case just considered. We have such a situation where the Figure "objects" (and, hence, Ground "objects") not only admit of no definite specification as to number but also of none as to identity (such as that of 'leaves'). Rather, they are "nondiscrete": the continuous so-conceivable "components" of a single larger object that *is* specifiable as to identity. Consequently, a spatial relation can be represented here not as a configuration of some composite Figure/Ground objects, but only as the **shape** of the single larger object. On this view, it is the imagined components of the larger object that are the real composite Figure-Ground—that is, that for all their non-discreteness must nevertheless be understood as the 'objects' moving or located with respect to each other, even though it is only the whole that can have a lexical item to specify it. Accordingly, the semantic functions performed by the whole cannot be considered those of "Figure" and "Ground," but can be given the new terms **meta-Figure** and **meta-Ground**, to be symbolized as F″ and G″. An example of such a meta-Figure and meta-Ground is the balloon in (52).

(52) a. The balloon puffed out. / The balloon expanded into a round shape.
b. The balloon shrank in. / The balloon shrank into a tube shape.
c. The balloon is round.

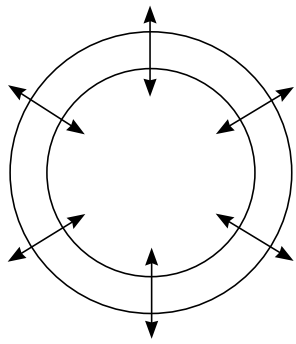
Here, *the balloon* may need to be understood at a more analytic level. For the motion cases of (52a) and (52b), the nondiscrete components of the balloon, as composite Figure, move away from or toward each other, as

composite Ground—as suggested by the Figure in (53a). This finer level of granularity may be conceptually present even though the event (for it to be expressible by a syntactic structure) must be treated at the next higher level of organization, where the whole of the balloon, as meta-Figure, moves out from or in on itself, as meta-Ground—as suggested by the Figure in (53b).

(53)



a.



b.

Similarly, the self-referencing locative event of (52c) may need to be understood in terms of component parts relating to each other in a configuration—as if one could represent this event as *The components of the balloon are in [the configuration of] a sphere*—even though it is only the meta-Figure as a whole to which the shape term *round* can be applied.

Note that a language can have many lexical predicates that take a meta-Figure as subject or direct object and that express its self-referencing Motion. And this Motion need not be as geometrically simple as in the

preceding "balloon" examples. Thus, the English verbs in the following examples all represent complex self-referencing motion for their meta-Figure subjects: *The vase broke|shattered*, *The pavement buckled*, *The flag furled up*, *The can crumpled under the weight*, *The banner waved in the wind*. In fact, the preceding considerations allow us in part to relate the "Figure" concept of our analysis to the "Patient" concept of the customary analysis. The kind of Patient that consists of an object moving or located in space is simply our Figure. But what is often thought to be the most prototypical kind of Patient, an object undergoing a change of shape, as in breaking or crumpling, is our meta-Figure.

5 FURTHER FIGURE AND GROUND PROPERTIES

Figure and Ground properties can involve semantic factors beyond those treated so far—such as perspective point, multipart complexity, incorporation into action or direction, indeterminacy, and multiple embedding—each associated with certain syntactic patterns.

5.1 The Grammatical Relations of Figure and Ground

The principles in (2) that determine Figure/Ground functions can be used to ascertain the syntactic constituents in which the Figure and the Ground are expressed. In the sentences of (6) and (8), the Figure and Ground functions of the two nominals vary in correlation with their grammatical relation: subject as Figure and oblique object as Ground. But in other cases, the nominals keep the same semantic function, even through changes in grammatical relation, as the sentences in (54) show.

(54) a. Smoke (F) slowly filled the room (G).
b. The room (G) slowly filled with smoke (F).

In both these sentences, *the room* retains its Ground function as reference entity or **anchor** that serves to characterize the path of *the smoke*, with its Figure function as variably located entity.

There is clearly a semantic difference between such inverse forms, but it seems to involve other factors than variable-point versus reference-point functions. One such factor may be "perspective point": where one places one's mental eyes to look out over the rest of the scene in reference (see chapter I-1). Thus, for sentence (54a), one may feel oneself riding the crest of an advancing smoke wave, while for sentence (54b), one might feel oneself positioned, say, at the room's rear watching the wave approach.

Sentences like these evidence a possible universal property: in their basic expression, the Figure has syntactic precedence over the Ground. For nominals in a single clause, this precedence consists of expression along a case hierarchy. In a nonagentive clause, the Figure is subject and the Ground is (oblique) object. In an agentive clause, where the Agent is subject, the Figure is direct object and the Ground is oblique object. When applied to the clauses in a complex sentence, the precedence principle yields the Figure as the main clause and the Ground as the subordinate clause. By the interpretation in (25) of a complex sentence of this sort as being based on a locative-type sentence with subject and oblique object, the statement of precedence for a complex sentence reduces to that for a single clause. Any Figure/Ground assignments other than these are taken to be nonbasic or derived.

The evidence for this precedence principle is, first, that sentences of the locative type in (5) regularly assign Figure and Ground functions to the subject and object, respectively, regardless of the characteristics of the nominals' referents. Second, sentences of the motion type in (54) that permit a reverse-precedence form are rather atypical. The most characteristic motion sentences exist only in the basic-precedence form with Figure as subject and Ground as object. Thus, the basic-precedence form in (55a) has no inverse counterpart like that in (55b).

(55) a. The ball (F) rolled into the box (G).
b. *The box (G) rolled (in) with the ball (F).

Third, in sentence types that do permit inverse forms with reverse Figure-Ground precedence, the normal precedence form is still basic. This is shown by the fact that the normal precedence form permits a range of path types, as in (56a). But the inverse form neutralizes such distinctions down to a single marker, as seen in (56b). (In English, this marker is generally *with* for all paths with a TO vector, and *of* for all paths with a FROM vector.)

(56) a. I (A) loaded hay (F) (up/down) into/onto the truck (G).
b. I (A) loaded the truck (G) with hay (F).

In markedness theory, it is the unmarked form—that is, the form that is basic with respect to a particular factor—that permits other factors to have a greater range of variation.

Thus, where we find cases allowing both precedence orders for both the nonagentive and the agentive—as with the verbs *suffuse* and *drain*—we

consider half of the four forms to have basic precedence and half to have the nonbasic reverse precedence.[8]

(57) *Basic:* Perfume (F) slowly suffused through the room (G).
Reverse: The room (G) slowly suffused with perfume (F).
Basic: I (A) slowly suffused perfume (F) through the room (G).
Reverse: I (A) slowly suffused the room (G) with perfume (F).
Basic: The gasoline (F) slowly drained from the fuel tank (G).
Reverse: The fuel tank (G) slowly drained of gasoline (F).
Basic: I (A) slowly drained the gasoline (F) from the fuel tank (G).
Reverse: I (A) slowly drained the fuel tank (G) of gasoline (F).

5.2 Complex Ground in a Complex Constituent

A sentence like

(58) The pen rolled off the table onto the floor.

is not taken to specify two Paths and two Grounds. Rather, it refers to an event in which the Figure object follows a single Path with respect to a single Ground, but where this Path and Ground are complex. In most cases, these complex referents are not amenable to representation by a simplex constituent—that is, by a single prepositional phrase consisting of a single preposition and a single nominal. In such cases, a language may have syntactic provision for a complex construction to represent the conceptual complex, as English does above.

Some Path and Ground cases of this kind can be represented syntactically either by a single prepositional phrase or by a complex, as in (59).

(59) a. I swam from one side to the other side of the river in one minute.
b. I swam across the river in one minute.

Such cases demonstrate directly how it might be semantically reasonable to construe the reference of a syntactic complex as a single, albeit complex, Path + Ground.

5.3 Figure and Ground in Constituents Other Than Nominals

The Figure and the Ground of a Motion event need not be represented solely by nominals. They can also be represented in other grammatical

categories. For example, in its most characteristic pattern, Atsugewi represents the Figure in the verb root and the Ground in a verb suffix (one of a set of suffixes that express Path + Ground together), as detailed in chapters II-1 and II-2. And English has certain minor systems of verbs that incorporate the Figure—for example, to *pit, skin, shave, tag* (as in *I pitted the cherry* or *I tagged the suitcase*)—as well as of verbs that incorporate the Ground, like to *shelve, box, quarry* (as in *I shelved the books* or *They quarried the marble*).

5.4 Indeterminacy of Figure/Ground Assignment

Note that a language can have syntactic formations that represent a motion event between two objects but that leave indeterminate which of the two objects is the moving Figure and which the stationary Ground, or indeed whether both objects are Figures moving with respect to their opposites as Grounds. Thus, in the English sentence

(60) I sheathed my sword.

it is not clear whether I moved my sword into its sheath, moved the sheath over the sword, or moved them both together at the same time.

5.5 Embedding of Figure/Ground Relations

A single clause can represent the semantic complex of one Figure/Ground relationship embedded within a second one, and when it does, some of the nominals within that clause can serve dual functions. In this regard, consider the sentence *The lion chased the gazelle through the forest*. In the first instance here, the lion functions as Figure with respect to the gazelle as Ground. If they both run at the same speed, then in fact this particular Figure-Ground relation is static. Further, however, the pair of animals together functions as a composite Figure with respect to the forest as Ground. In this case, the Figure moves with respect to the Ground. Here, then, the gazelle functions as the Ground with respect to the lion, but it also functions as part of the composite Figure with respect to the forest.

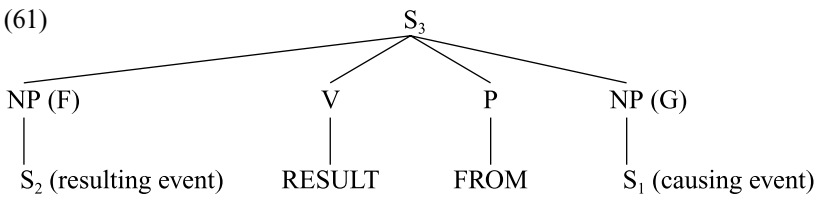
A comparable embedding is represented in the sentence *The lion slowly gained on the gazelle* as well as in the sentence *The lion caught up with/overtook the gazelle*. Once again, the lion is Figure with respect to the gazelle as Ground, while the pair of animals together moves as Figure with respect to some background as Ground—though this latter in the present sentences is not readily expressible. Here, however, the Figure-Ground relationship of the lion to the gazelle is not static, but rather

motile, since the lion moves toward or up to the gazelle. Again, the gazelle serves a dual function with respect to Figure and Ground roles.

6 ROLE DERIVATION: FIGURE OF THE CAUSING EVENT = INSTRUMENT OF THE CAUSATIVE SITUATION

The system set forth here includes provision for the derivation of semantic functions like those of Figure and Ground. Here, "derivation" means that a nonbasic, higher-level semantic function permits construal solely in terms of basic functions related to each other within a semantic structure. For a particular case, the entity that functions as the Figure in a causing event is understood to function as the "Instrument" with respect to a whole causative situation. As detailed in chapter I-8, a basic causative situation consists of two events where one event occurs as the result of the other. The former is the resulting event and the latter is the causing event. The resulting event functions as the Figure in the whole situation, and the causing event functions as Ground. These semantic categories and relations can be represented as diagrammed in (61).

(61)



Within such a structure, an example of the derivation (or reinterpretation) of a lower-level Figure into a higher-level Instrument is the following.

(62) S_1: A baseball (F_1) sailed into the aerial (G_1)
S_2: The aerial (F_2) toppled off the roof (G_2).
S_3: The aerial ($F_2 \Rightarrow F_3$) toppled off the roof ($G_2 \Rightarrow G_3$) from a baseball ($F_1 \Rightarrow I_3$) sailing into it ($G_1 = F_3$).

Here, the referent of *a baseball* functions as the Figure within its own lower-level event (a causing event), *A baseball sailed into the aerial*. But it functions as the Instrument, marked by the preposition *from*, within the larger causative situation, *The aerial toppled off the roof from a baseball sailing into it*. This Instrument function is clearer when the causing event is represented as a relative clause, as in *The aerial toppled off the roof from a baseball that sailed into it*. And its Instrument function becomes

unambiguous when an analog of this structure is embedded within an agentive matrix. In this case, the previous marker *from* is replaced by the more familiar Instrument marker *with*, as in *I toppled the aerial off the roof with a baseball (that I threw at it)*.

The preceding account may only hold for the most prototypical conception of an Instrument of a whole causative situation: that it is the Figure of the causing event. But the conception of Instrument may also cover elements with other semantic relationships. Thus, an element that does not impinge on the resulting event's Figure directly, causing it to move, but that forms part of the complex Ground with respect to which the resulting event's Figure moves, may also be marked with a *with*-type form. In some languages, such *with*-type marking is the only option. For such languages, the concept of Instrument seems to be more generic, applying to a certain range of elements within the whole causative situation to which the resulting event's Figure relates. But English typically prefers, and in some cases only allows, a spatial preposition indicating the Path relation of the resulting event's Figure to the nonprototypcial element. Such a space-prepositional option is generally not available for the prototype case of a causing-event Figure functioning as Instrument. Thus, English largely maintains as a distinct category what is here posited as the prototype Instrument, the causing-event Figure.

To illustrate, portions of the food items in the sentences of (63) are the Figure of the resulting event and of the whole causal situation, since they move from their pooled location through space into Bobby's mouth. The spoon in (63a) is the Figure of the causing event, directly causing a portion of food to undergo its motion, and hence is a prototype case of Instrument. English here can felicitously use only *with*. But the straw in (63b) does not directly cause the milk to move—suction does—and only directs the path of the milk as a conduit, thus serving as part of a Ground complex. Accordingly, this element can be marked with a relevant spatial preposition, *through*, here in addition to *with*, extended to cover this nonprototypical case. In (63c) and (63d), the plate and the bowl again do not directly cause the food to move—presumably a piece of silverware does that—but only constitute a part of the Ground complex with respect to which the food moves. Again, as such Ground elements, they can take the relevant spatial prepositions, but now resist a *with*.

(63) a. Bobby eats his stew with a spoon.
b. Bobby drinks his milk through/with a straw.

c. Bobby must learn to eat his stew off of/?with a plate.
d. Bobby must stop eating his stew out of/??with a bowl.

By contrast, a causing-event Figure that functions as a prototypical Instrument for the whole causal situation generally cannot take a spatial preposition as an alternative to a *with*, as seen in (64).

(64) a. I pushed the block across the table with/*ahead of a pool cue.
b. I sliced the salami with/*under a knife.

7 COMPARISON OF FIGURE AND GROUND WITH OTHER PROPOSED CASE SYSTEMS

To place the present study within a contrastive framework, we first compare Fillmore's (1968) case system with our system and point out certain difficulties with the former that are overcome by the latter.

In Fillmore's system, several problems arise out of the fact that all the cases are ranged together on a single level without subgrouping or some other index of abstracted partial commonality. Thus, first, there is nothing explicit in Fillmore's system to show that six of his cases

(65) Source, Goal, Path, Locative, Patient, Instrument

have in common the property of pertaining to objects moving or located with respect to one another—as distinguished, for example, from Agent. By contrast, our system abstracts that property out into its integral and embeddable unit, the motion/location event, in which there appear only those case roles that together are equivalent to the above set of six.

Second, there is nothing in Fillmore's system to show that the first four of his cases above, Source, Goal, Path, and Locative, have in common a property—their function as reference point—not shared by any other case, such as Patient, Instrument, or for that matter, Agent. By contrast, our system abstracts out precisely what is common to these cases, their reference-point function, and sets that up in its own right as the pertinent role notion, Ground. The reason for this difficulty in the Fillmorean system is that it incorporates certain spatiodirectional specifics in its very case notions themselves. It builds the spatiodirectional notion 'from' into its Source case, 'to' into Goal, 'along' and so on into Path, and 'at' into Locative. This difficulty does not arise in our system, because all spatiodirectional specifics are abstracted out into an independent category,

Path. In particular, the 'from/to/along/at' notions that inform Fillmore's spatial cases are placed together in the **Vector** component of our Path category (see chapter II-1). Once such spatiodirectional notions are removed from Fillmore's cases, what is left is their single common reference-point role—that is, our Ground case.

Third, there is nothing in Fillmore's system to show that of the preceding four related cases, the first three, Source, Goal, Path, have in common a property that is counterposed by a property of the fourth case, Locative. The former three cases pertain to motion, while the latter case pertains to stationariness. In our system, this pair of motive states as a set is abstracted out as a category in its own right, (Fact of) Motion. Each state of Motion is individually designated by a deep verb, MOVE or BE_{LOC}. And the counterposed complementarity of the two states is captured by the condition that one and only one of the two deep verbs must appear in the syntactic structure that represents a Motion event.

Several further problems in Fillmore's system are associated with the fact that it incorporates spatiodirectional notions into its case notions. First, although the Fillmorean spatial cases differ from each other with respect to the Vector notions 'to/from/along/at', they can be used alike to pertain to the conformational portion of spatiodirectional notions. This conformational portion includes such concepts as 'surface' or 'interior'. Thus, for Fillmore, the cases Locative, Goal, and Source would pertain respectively to the three occurrences of the noun *box* in *on the box*/*onto the box*/*off of the box*, as well as to the three occurrences of that noun in *in the box*/*into the box*/*out of the box*. But the Fillmorean system has no provision for capturing the conformational commonality that exists across the first three phrases, namely, that of a 'surface', nor the commonality across the second three phrases, that of 'interior'. By contrast, our system abstracts out spatiodirectional characteristics of this sort and places them together in the **Conformation** component of its Path category.

Second, Fillmore's use of spatiodirectional features as the basis for setting up distinct cases entails the problem as to which features of what degree of fineness should be used and, correlatively, how many cases of what sort there should be. For example, the spatiodirectional features 'from', 'to', and 'along' seem to be the differential bases for Fillmore's having set up the cases Source, Goal, and Path, which, accordingly, well suit nominals like the final ones in (66)

(66) The ball rolled
Source: out of the bathroom/off the table/away from the sofa.
Goal: into the kitchen/onto the carpet/up to the wall.
Path: along the hallway.

But to what cases—the preceding ones or some new ones—are we to assign the final nominals in (67)?

(67) The ball rolled across the crack/past the TV/around the lamp.

Likewise, as seen earlier, the same issue is raised by the very applicability of a case like Goal to many distinct conformational forms like *into N*, *onto N*, and *up to N*. Should there not be as many cases here as distinct expressions? Note that the issue here of how fine to set the case-distinguishing features causes special problems in the context of the remainder of Fillmore's case system. For other cases are associated with only a single meaning-preserving marker, as Instrument is with *with*, whereas the cases here are associated with many different markers that add distinctions of meaning.

Our system's Path category must face comparable issues—that is, how to represent all the distinctions and capture all the generalizations relevant to spatiodirectional characteristics. But it has more, and more flexible, internal machinery to do so, not the single dimension of noun cases that must also suit other, quite distinct functions.

The following formula for a Motion event in our system includes indication of all the features discussed so far in this section that render this system perhaps truer to the structure of language than Fillmore's system.[9]

(68) [Figure Motion {MOVE/BE_{LOC}} Path
(= Vector + Conformation + Deictic) {path/site}
Ground]$_{\text{Motion event}}$

As for other comparisons, our Figure is essentially the same as Gruber's (1965) "theme," but Gruber, like Fillmore, did not abstract out a semantic form like our Ground. Langacker's (1987) "trajector" and "landmark" are highly comparable to our Figure and Ground and, specifically, his landmark has the same abstractive advantages that Ground does over the systems of Gruber and Fillmore.

8 CHILD ACQUISITION OF FIGURE/GROUND PATTERNS

Melissa Bowerman (personal communication) has found the linguistic Figure-Ground notions relevant to interpreting certain data from her

daughter Christy from 3;6 to 4;6 years of age. When Christy at 3;6 first started using verbs like *hit, bump*, and *touch* with explicit nominals for both Figure and Ground, she normalized their expression to the predominant pattern. Instead of the rarer pattern required by these verbs: "I hit/bumped/touched G with F"—that is, with inverted Ground-Figure precedence, as discussed in section 5—she produced forms of the type "I hit/bumped/touched F to G." Sometimes this involved undoing certain one-object forms of the type "I hit/bumped/touched G," which she had earlier produced correctly. There was no issue of her having difficulty in introducing a *with* phrase, for she had been correctly producing instrumental *with*s from age two. Bowerman hypothesizes that the child at the later age pieces together the notions of Figure and Ground and the main pattern for their order and grammatical relations, and then overgeneralizes this. Some examples of utterances (C = Christy, M = mother) are included in (69).

(69) a. I hitted this into my neck. *(After bumping self with toy.)*
b. Feel your hand to that. *(= Feel that with your hand. C instructing M to put her hand over one end of a hose, then C blows through other end.)*

Her other daughter, Eva, made the same reformulations, including ones for *fill*:

(70) a. My other hand's not yukky. See? 'Cause I'm gonna touch it on your pants.
b. This is something we can fill some stuff up in. *(Bringing basket to C.)*
c. M: You can get a baggie out of the drawer.
C: Then fill some marshmallows up in it?

Notes

1. This chapter is a greatly revised version of Talmy 1978a, itself a revised and amplified version of Talmy 1975a.

2. Though greatly elaborated in chapter II-1, the following background sketch can help in a reading of this chapter by itself. Insofar as they pertain to moving or located objects, Figure and Ground are two components out of four that make up the next more complex unit, an event of motion or location. The other two components are the **Path**—the particular course followed or site occupied by the Figure with respect to the Ground—and the **Fact of Motion**, which has two states, motion or stationariness. The capitalized term **Motion** is used to refer

equally to either motion or stationariness, and the capitalized term **Path** is used equally for either a path or a site. Outside the Motion event proper, the Figure can concurrently be in some independent activity or state, which bears the relation of "Manner" to the first event.

Thus, in (1), the Path is specified by *off* and *on* (as being, respectively, 'from a point of the surface of' and 'at a point of the surface of'). The Fact of Motion is specified by *rolled* and *lay* (as 'moved' and 'was located'). And a Manner is simultaneously specified by these same words (as 'spinning about the axis [the while]' and 'in horizontal contact along its length [the while]'.

3. Other interpretations are possible. One is that the Figure object alone serves as the psychological figure, while the combination of the Ground object and the background together serves as the psychological ground. Another interpretation is that the linguistic Figure and Ground are two distinct psychological figures against the background as psychological ground.

4. The remarks made here about particular relations that exemplify the universals are not based on a survey of many languages but rather on a spot-check, and are accordingly to be considered heuristic, pointing to a direction for investigation.

5. Not to be confused with this apparently universally lacking conjunctional form is an often gerundive or participial type of form present in many languages, including English, which arises secondarily by a process I have called "copy-clefting" (see chapter I-6).

He slept and he dreamt the while. ⇒ He slept, dreaming (the while).

6. This investigation, it should be reemphasized, only involves the expression of relationships by a subordinator in a complex sentence. Coordinate sentences do exist that express the related propositions in the same order as in the lower pair members. Thus, there are, for example, the following counterpart sentences.

b′. He arrived, (and) so we stayed home.
c′. He arrived, but we went out anyway.
l′. He's not working, but playing instead.

But even these forms are not countercases to the observation of universal bias toward one relation of an inverse pair. For in such coordinate sentences, the right-hand clause is equivalent to the whole of one of the complex sentences, and always one of the favored ones. This can be concluded on the basis that *instead* = *instead of that*, *so* = *because of that*, and *anyway* = *despite that*, as argued in chapter I-6.

7. There is still this problem, though: Hearing a complex sentence of the 'temporal sequence' type involves not the cognizing of two actually occurring separate events, but the cognizing of adjacent descriptions thereof. That is, the force of our argument can apply fully only to the experiencing of the referents of the clauses, rather than to the experiencing of the clauses themselves. Accordingly, one would need to appeal to some notion such as that iconic representation in language inherits some of the same cognitive effects as the original phenomena that are being "iconized."

8. Talmy (1972, sect. 10.4) gives an elaborate treatment of such forms. And chapter II-1 discusses certain concepts that are regularly expressed with reverse Ground-Figure precedence.

9. It is of course clear by now that Fillmore's "Path" and our "Path" refer to different concepts. For Fillmore, "Path" pertains to an object expressed by a nominal, an object that the moving entity progresses along. Our "Path"—consisting of the three components: Vector, Conformation, and Deictic—encompasses all spatio-directional schemas apart from any objects that may manifest or partake in them.

Chapter 6

Structures That Relate Events

1 INTRODUCTION

This chapter concerns the types of sentence structures that represent a Figure event related to a Ground event.[1] The relation that the Figure event bears to the Ground event can be temporal, causal, concessive, or additive, among a range of further possibilities. Such sentences will be said to represent **cross-related events**, and the relation that they represent is the **cross-event relation**.

The linguistic literature has included much work on syntactic structures that represent other types of relations between events. One such type is the argument-predicate relation. Here, one event that is represented by a clause and introduced by a complementizer is related as an argument to another event that is represented by a predicate form. An example is the relation of the *that* clause to *believe*, as in *I believe that she came*. A second type is the relation of a relative clause, which represents one event, to a nominal within a higher clause, which represents another event.

Much attention has also been directed to cross-related Figure-Ground events when these are represented in the form of complex sentences with a main clause and an adverbial clause. Indeed, chapter I-5 examined such complex sentences with the aim of demonstrating that their two represented events have a Figure and Ground function. But there has been relatively little attention to the range of other structures that can represent such cross-related events, nor to the systematic syntactic and semantic relationships that extend across such structures. This chapter directly addresses the full range of such structures and the relationships that extend across them, with particular attention to the semantic relationships.

In this endeavor, much reliance is placed on a method that can be termed the tracking of **semantic alignment**. By this method, first, we

treat two syntactic structures as related if they both represent the same semantic structure, and, second, we track the systematic patterns in which particular components of the semantic structure are differently represented by the components of the two syntactic structures. That is, we characterize the pattern of alignment between the two syntactic structures in accordance with the locations in which they represent corresponding semantic components.

The example sentences in (1) can provide an introductory sense of the topic. Each pair of sentences represents the same semantic structure, but the first sentence has the syntactic structure of a complex sentence, while the second sentence has a coordinate sentence structure. These two structures can be seen to exhibit the following pattern of semantic alignments. The first clause of the complex sentence corresponds semantically to the second clause of the coordinate sentence. The second clause of the complex sentence corresponds to the first clause of the coordinate sentence. Further, as will be argued, the second clause of the complex sentence also corresponds to a particular constituent within the second coordinate clause. This constituent, to be called the "adverbial pro-clause," is realized in the following examples as *so, anyway, then*, and *also*.

(1) a. They stayed home because they were feeling tired.
They were feeling tired, and so they stayed home.
b. They went out even though they were feeling tired.
They were feeling tired, but they went out anyway.
c. She went home after she stopped at the store.
She stopped at the store, and then she went home.
d. He works at a sideline in addition to holding down a regular job.
He holds down a regular job, and he also works at a sideline.

Such forms and their constituents have terms in traditional grammar, which this chapter both adopts and augments. In traditional grammar, the upper form in each pair is, as noted, a "complex sentence" consisting of a "main clause" and a "subordinate clause" or "adverbial clause." The subordinate clause is introduced by a "subordinating conjunction"—for example, *because*—which takes a standard finite clause with subject and tensed predicate. In addition, we will say that a subordinate clause can be introduced by a **subordinating preposition**, such as *despite*, which takes a nominalized clause, as in *They went out despite their feeling tired*. We will extend the use of the terms subordinating conjunction and sub-

ordinating preposition to functionally equivalent complex forms, such as the underlined phrases in *They went out even though they were feeling tired.* | *in spite of their feeling tired.* The term **subordinator** will be used here to cover both a subordinating conjunction and a subordinating preposition (including their more complex forms).

In traditional grammar, the lower form in each pair is a "compound sentence" or a "coordinate sentence" consisting of a "main clause" and a "coordinate clause." The coordinate clause is introduced by a "coordinating conjunction." However, we will call such coordinate sentences **copy-cleft** sentences for reasons developed below.

Our main concern in this chapter is semantic. It is to further establish the semantic category of cross-related Figure and Ground events, together with a range of the cross-event relations that they manifest. And it is also to trace the semantic correspondences across the range of syntactic structures that represent this category. Accordingly, the main function of the syntactic formulations and diagrams used in this chapter is to help reveal the semantic correspondences and relationships, rather than to advance any particular syntactic approach. Hence, the syntactic formulations and diagrams have been cast in a relatively neutral form.

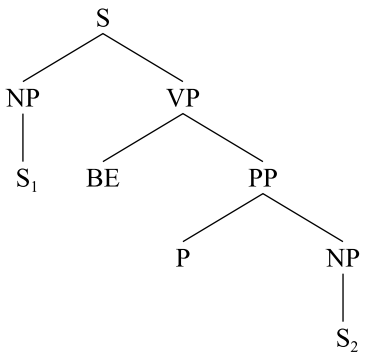
2 A FAMILY OF SYNTACTIC STRUCTURES THAT REPRESENT CROSS-RELATED EVENTS

The semantic structure of a Figure event related to a Ground event can be represented by a certain family of syntactic structures. We now progress through the members of this family.

2.1 Simple Sentence

We can begin with a grammatically simple sentence type that represents the two events as nominals. Here, the Figure event is the subject nominal and the Ground event is an object nominal. Each of these nominals can either be a nominalized clause or some noun or pronoun that refers to the whole of an event. As diagrammed in (2), the figure event is represented by an S with the subscript 1, and the Ground event by an S with the subscript 2. Each S node is placed under an NP node to indicate that the event it represents is expressed by a nominalized clause or by some other nominal form.

(2)



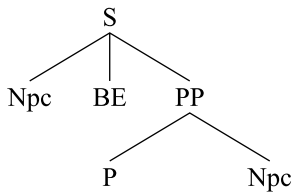
A variant version of the proposed syntactic structure might represent the cross-event relation by a single constituent, a deep verb, that would then take the Ground-event nominal as a direct object. (Such a structure might, for example, represent the sentence *Her going home followed her stopping at the store*.)

But the present version distributes this role over two constituents: a copula *BE* and a preposition that takes the Ground-event nominal as its prepositional object. The reason for this division is that it allows for the separate representation of two distinguishable functions, that of assertion and that of identification. The main verb *BE* serves to assert or foreground the existence of a relation that the Figure event bears to the Ground event—whereas, in other constructions, this relation is presupposed or backgrounded. And the preposition P serves to identify the particular relation that the Figure event bears to the Ground event. The *BE* constituent is typically realized in English by the copula *be*. For its part, the P constituent can represent any of a range of cross-event relations—for example, that of the 'concession' semantic type, or of the 'reason' or 'additionality' semantic type. Thus, in English, a P representing the 'concession' semantic type can be realized by the preposition *despite* or by the prepositional complex *in spite of*. The sentences in (3) exemplify the present type of syntactic structure. Such sentences are, to be sure, not the most colloquial in English, but they take their place within the range that does include more colloquial forms.[2]

(3) a. Their staying home was because of their feeling tired.
b. Their going out was in spite of their feeling tired.
c. Her going home was after her stopping at the store.
d. His working at a sideline is in addition to his holding down a regular job.

Because it will play an important role later, we now introduce the fact that the combination of an S node under an NP node can be represented by a pro-form. Such a form will be termed a **nominal pro-clause** and symbolized as Npc. The simple-sentence type of syntactic structure with nominal pro-clauses representing both the Figure event and the Ground event would appear as in (4).

(4)



Anaphoric forms like *this* or *that* can instantiate the nominal pro-form in English. Example sentences with two such anaphoric forms appear in (5), and these—given sufficient context—might be able to refer to the same semantic situations as those referred to in (3).

(5) a. This was because of that.
b. This was in spite of that.
c. This was after that.
d. This was in addition to that.

A further feature of the simple-sentence type of syntactic structure is that it makes explicit the semantic parallelism between a cross-event relationship and a cross-object relationship, as well as the possibility of a syntactic parallelism between the two. Specifically, it shows a parallelism between a Figure event bearing a particular temporal, causal, or other such relation to a Ground event, and a Figure object bearing a particular spatial relation to a Ground object. An example of both semantic and syntactic parallelism is seen in (6).

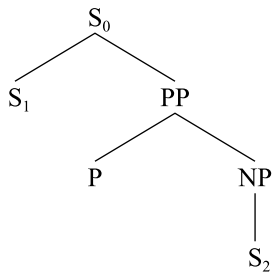
(6) a. Her going home (F) was after her stopping at the store (G).
b. The bike (F) was behind the church (G).

2.2 Complex Sentence with Subordinating Preposition

The next type of syntactic structure we consider—diagrammed in (7)—differs from the preceding simple-sentence type in that the Figure event is expressed not by a nominalized clause but by a finite clause. This finite clause thus now constitutes the main clause of the full sentence. The prepositional phrase—otherwise the same as in the preceding syntactic structure—is now an adverbial adjunct to the main clause. This prepositional phrase still contains reference to the Ground event, and so we will

consider it a subordinate clause introduced by a subordinating preposition. Accordingly, the full sentence is here considered as a complex sentence with a subordinating preposition. Here, as throughout this presentation, the S node that dominates a complex sentence is marked with the subscript 0. Semantically in such a complex sentence, the Figure event—which was presupposed in the simple sentence—is now asserted, while the existence of its particular relationship to the Ground event is now not asserted but presupposed.

(7)



The same examples seen before are now shown in (8) with this new syntactic structure. They are now more colloquial. Further, the coreferential possessive forms (here, *their*, *her*, and *his*) can be omitted in such complex sentences, which thereby become still more colloquial.

(8) a. They stayed home because of (their) feeling tired.
b. They went out in spite of (their) feeling tired.
c. She went home after (her) stopping at the store.
d. He works at a sideline in addition to (his) holding down a regular job.

The example sentences in this chapter are generally composed so that their two clauses have the same subject. By keeping this factor constant, other grammatical differences between the forms can be observed more clearly. But different-subject clauses have their own grammatical particularities, hence some examples with this characteristic are also included to point out such distinctions. In the present context, we can note that prepositional complex sentences with different-subject clauses, like those in (9), do not permit omission of the second subject, as do the coreferential forms seen above.

(9) a. They stayed home because of their child's crying.
b. They went out despite their child's crying.
c. She went home after the store's closing.

d. John works at a sideline in addition to Jane's holding down a regular job.

It is perhaps customary to reserve the terms "complex sentence" and "subordinate clause" or "adverbial clause" for the case of a sentence that contains a subordinating conjunction plus finite clause, as treated next. But we argue that these terms—and the structural concepts that they represent—should be extended to the present case of a sentence that contains a subordinating preposition plus a nominal that refers to an event. In support of this view, we note that generally only a subset of the prepositional forms in a language can take event-specifying nominals. Indeed, such forms can often not also serve in the semantic functions of the other prepositional forms, such as to indicate spatial relations between object-specifying nominals. These two types of prepositions—event-nominal taking and object-nominal taking—as well as prepositions exhibiting an overlap of function, are illustrated for English in (10).

(10) a. *Prepositional types*
   i. *Prepositions that take only object-specifying nominals*
   to, into, out of, up, down, along, across, around, over, under, above, below, behind
   ii. *Prepositions that take only event-specifying nominals*
   during, after, because of, despite, in addition to, instead of, in case of
   iii. *Prepositions that can take either object- or event-specifying nominals*
   on, upon, from, before, past

b. *Examples of the usage or nonusage of the different prepositional types*
   The balloon floated [a/*b/c] the chimney.
   I will eat [*a/b/c] working.

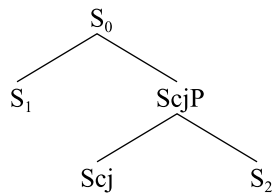
Accordingly, it might be appropriate to establish a formally distinct grammatical subcategory of prepositions—perhaps P_E—that only enter into construction with event-specifying nominals. Such a P_E would then be the same as our subordinating preposition. Perhaps the event-specifying nominal type that it takes should itself be accorded the formal status as a distinct grammatical subcategory, NP_E. And perhaps the combination of two such subcategories should itself be dominated by a subcategorial PP_E. For simplicity, we have avoided all such notational niceties in the syn-

tactic structures shown here. But, in principle, it would only be the subcategorial PP_E that one would wish to regard as a subordinate clause. And it would only be this subcategorial constituent that one would wish to grouped together with the constituent consisting of a subordinating conjunction plus a finite clause.

2.3 Complex Sentence with Subordinating Conjunction

The preceding syntactic structure included the combination of a subordinating preposition and a nominalized clause. In place of that combination, our next syntactic structure instead has the combination of a subordinating conjunction and a finite clause. This subordinating conjunction is here labeled Scj. Correspondingly, where the previous combination constituted a prepositional phrase, shown dominated by a PP node, the present string constitutes a **subordinating conjunctional phrase**, which is dominated by a ScjP node. As with the earlier PP, this phrase is a subordinate or adverbial clause that is in construction with the main clause. The whole sentence is still a complex sentence, though now one with a subordinating conjunction, as diagrammed in (11).

(11)



Like the subordinating preposition seen earlier, the subordinating conjunction can represent any of a range of cross-event relationships, in fact, generally ones of the same semantic types. Thus, the subordinating conjunction can generally represent the 'concession' semantic type or the 'reason' semantic type.

Within a language, for any such semantic type, the lexical elements in the one grammatical category can differ in form from those in the other grammatical category. Thus, expressing the 'concession' semantic type, English has as subordinating prepositions the forms *despite* and *in spite of*, but as subordinating conjunctions it has the distinct forms *although, though*, and *even though*. And, expressing the 'reason' semantic type, English has as subordinating prepositions the forms *because of, due to*, and *on account of*, but as subordinating conjunctions, it has *because, since*, and *as* with only a partial similarity in the "because" forms.

Of course, a language can have the same form serving for both grammatical categories. Thus, to express the cross-event relation 'posteriority', English has the same form *after* both as subordinating preposition and as subordinating conjunction. This can be seen in *She went home after stopping at the store*, and *She went home after she stopped at the store*.

Often a language that has both subordinating prepositions and subordinating conjunctions will have a lexical form in one of these grammatical categories without a counterpart form in the other grammatical category. Thus, English can express the cross-event relation of 'additionality' with its subordinating prepositional complex *in addition to*, but it has no subordinating conjunction to express this relation.

The prior example sentences are reillustrated in (12) with the corresponding subordinating conjunctions—except, of course, for the 'additionality' case. These are the most colloquial forms yet.

(12) a. They stayed home because they were feeling tired.
b. They went out, even though they were feeling tired.
c. She went home after she stopped at the store.

Synchronically as well as diachronically, certain constructions with subordinating prepositions within a language can be reinterpreted as, or can turn into, constructions with subordinating conjunctions. Thus, consider the English cases in which a subordinating preposition—which requires a nominal form of a clause—takes not a gerundive version of such a nominal but rather a version with a complementizer and a finite clause. Thus, the form *despite the fact that they were feeling tired* would appear instead of the form *despite their feeling tired*. Now, a syntactic reinterpretation of the first form could consist of treating the words *despite the fact that* as a subordinating conjunctional complex, which then simply takes the finite clause *they were feeling tired*.

Just such reinterpretations have occurred diachronically in English. Thus, English *because* developed from the prepositional complex *by [the] cause that*. Certain forms in other languages also seem well on their way toward such "conjunctivization." Thus, Russian *po tomu chto S* and French *parce que S*—both of which can be glossed as 'due-to it that S'—can be regarded as acting as single conjunctional units, comparable to that in English *because S*. In a similar way, Yiddish *nokhdem vi S*, 'after it as S', can be regarded as a subordinating conjunction comparable to that in English *after S*.

2.3.1 Subordinating Conjunction with a Gerundive English has a further category of subordinators with distinctive grammatical properties that resemble those both of subordinating conjunctions and subordinating prepositions. Forms in this category can be discerned for those cross-event relations for which the subordinating prepositions and conjunctions are phonologically distinct. A form in this category has the phonological shape of a regular subordinating conjunction, but while the latter takes a clause in finite form, the new category takes the clause in gerundive form, much as a subordinating preposition must do. Accordingly, we can designate the earlier category as the **finite type** of subordinating conjunction, and the new category as the **gerundive type** of subordinating conjunction. Of the cross-event relations we will be considering below (see the extended listing in (47)), four exhibit gerundive-type subordinating conjunctions, shown in italics in the illustrations in (13a). Other subordinating conjunctions do not participate in this construction, as illustrated in (13b).

(13) a. i. *'Concession'*
They went out *although* feeling tired.
ii. *'Concurrence'*
She dreamt *while* sleeping.
iii. *'Punctual coincidence'*
She said goodbye *when* leaving.
iv. *'Conditionality'*
If experiencing seasickness, one should take an antinausea pill.
b. i. *'Reason'*
*They stayed home *because/since* feeling tired.

Despite the preceding similarities, a gerundive-type subordinating conjunction differs from a subordinating preposition in that it allows only a subject coreferential with that of the Figure clause, and it refuses any possessive form to represent this subject, as shown in (14).

(14) a. *They went out, although their feeling tired. / although their child's crying.
b. *She dreamt while her sleeping. / while her husband's watching TV.

Note that subordinators with the same phonological shape for both conjunction and preposition—for example, *after, before, since*—may also

have a gerundive-type subordinating conjunction, but the present tests cannot discern that possibility. Thus, the subordinator in (15a) must be a subordinating preposition, since it is followed by a subject-representing possessive. But the subordinator in (15b) could either be the same subordinating preposition with the possessive omitted, or it may represent a switchover to a gerundive-type subordinating conjunction.

(15) a. She went home after her stopping at the store.
b. She went home after stopping at the store.

2.3.2 Zero Subordinating Conjunction with a Gerundive For expressing certain cross-event relations, English has a further construction that quite resembles a complex sentence with a gerundive-type subordinating conjunction, except that no conjunction is present. In this construction, the subordinate clause is simply in a gerundive form, and, as with the gerundive-type subordinating conjunction, it requires a subject coreferential with the main clause subject and it refuses a possessive form referring to that subject. The only apparently distinct characteristic of this construction is that it tends to favor sentence-initial positioning. Since this construction lacks any overt indication of the cross-event relation being expressed, the latter can be determined only on semantic grounds. Some relations to which the construction appears to apply are exemplified in (16a), while some that appear to reject the construction are illustrated in (16b). (Again, the examples and relation terms refer forward to the listing in (47).) Note that the example for 'posteriority' in (16aii) depends on the perfect formation within the gerundive construction for its viability.

(16) a. i. *'Reason'*
Feeling tired, they stayed home.
ii. *'Posteriority'*
Having stopped at the store, she went home.
iii. *'Concurrence'*
Sleeping on the couch, she dreamt about the day's events.
iv. *'Regard'*
I was careful/took care drying the cups.
b. i. *'Concession'*
*Feeling tired, they went out.
ii. *'Anteriority'*
*Going home, she stopped at the store.

iii. *'Subsequence'*
*Escaping, he has been spotted once.
iv. *'Conditionality'*
*Losing her job, she will move back to Boston.

Looking outside English, one construction that may well be structurally homologous with the zero-conjunction gerundive form just discussed is the Latin participial clause, whose subject is coreferential with the main clause subject, and whose usage covers a range of cross-event relations. Further, the Latin ablative absolute construction appears to be the counterpart of the participial construction for the case in which the subjects are different. Such an absolute construction would appear to fit well our generic characterization of a subordinate clause within a complex sentence. But it may represent a yet further distinct syntactic type beside the prepositional and the conjunctional types that we have been treating.

2.4 Complex Sentence with Initial Subordinate Clause

Consider first here the basic, or unmarked, constituent order for different cross-event sentence types. As seen in section 2.1, there is a syntactic and semantic parallelism between a simple sentence that relates a Figure object to a Ground object (e.g., spatially), and a simple sentence that relates a Figure event to a Ground event. For both structures in English, the unmarked order is for the Ground constituent to follow the assertional constituent—that is, the constituent in which the assertional component of the sentence's meaning is localized—which there was the copula. Thus, *The bike was behind the church* is a more unmarked construction than *Behind the church was the bike*. And, analogously, a construction like *Their staying home was because of their feeling tired* is more unmarked than *Because of their feeling tired was their staying home*.

It may be judged that a comparable principle of unmarked constituent order applies as well to the complex sentence type just discussed in sections 2.2 and 2.3. Here, the assertional constituent is the main clause, and the Ground constituent is contained in the subordinate clause, which follows the main clause in the sequence that is seemingly the most unmarked in structure. Thus, the complex sentence in (17a) may be deemed more unmarked than the construction in (17b).

(17) a. They stayed home because they were feeling tired.
b. Because they were feeling tired, they stayed home.

Of course, in English, structures with the subordinate clause before the main clause do occur readily as well. Their syntactic structure can be represented by reversing the two main substructures of the tree diagrams in (7) and (11). Now, in terms of syntax, such forms may be judged to be more marked in structure. But in terms of functional or pragmatic properties, they exhibit characteristics distinct from those of the structurally unmarked sentences and presumably at the same level of markedness with them. Thus, in a complex conditional sentence with marked order, like *If she comes, we'll stay*, the hearer already expects the contingent character of the main clause event, since the condition that determines it was expressed first. But in the counterpart form with unmarked order, *We'll stay if she comes*, the hearer might initially take the main clause event as given, and then subsequently have to undertake some corrective processing to demote its status to one of contingency. Such functional concomitants of Figure-Ground event order presumably account for the different proportions of sentence-initial and sentence-final appearance of the subordinate clause that has been observed for different cross-event relations (see Diessel 1996).[3]

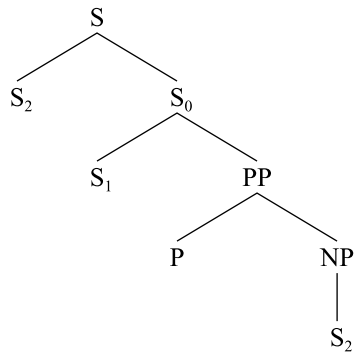
2.5 Paratactic Copy-Cleft Sentence

The next set of syntactic structures we consider includes a major syntactic and semantic break from the previous structures. In the previous structures, the Ground event was referred to only once. It was represented lower down in the syntactic hierarchical structure than the Figure event—and was accordingly expressed after the Figure event in its most basic realization in English. And, in the complex-sentence forms, it was represented as presupposed or more backgrounded by comparison with the Figure event, which was asserted or more foregrounded. In the new syntactic structures, on the other hand, the Ground event is represented twice, one of these representations is at or near the top of the hierarchical structure, and that representation separately serves to assert or foreground the Ground event.

Specifically, as diagramed in (18), the syntactic structures in the new set all have an initial representation of the Ground event, symbolized as before by an S_2 node, followed by the whole of a complex sentence with subordinating preposition, as before symbolized by an S_0 node. This complex sentence contains the other representation of the Ground event with another S_2 node. The fact that the initial S_2 is a duplicate of the

subsequent embedded S_2 has suggested our term for this set of structures as **copy-cleft** structures.

(18)



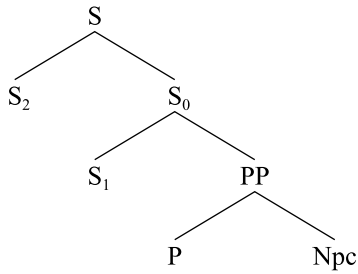
The most basic form of these structures just consists of the S_2 constituent followed by the S_0 constituent in what can be termed the **paratactic copy-cleft** form. This form can be regarded simply as a succession of two separate sentences. But for consistency of exposition, we will treat the two sentences as constituents of a single higher sentence—which is the interpretation represented in the tree diagram. And examples illustrating the form will be written as a single sentence with a semicolon between the two constituents.

Parallel to the earlier examples with the 'concession' type of cross-event relation, the counterpart for a paratactic copy-cleft sentence appears as in (19). Here, the same S_2 clause literally appears twice, once in finite form and once nominalized. Such forms can of course occur for particular stylistic effects and might scan better with a heavier stress on the subordinating preposition and a low pitch on the nominalized clause.

(19) They were feeling tired; they went out despite their feeling tired.

More often, though, the second reference to the Ground event appears as a nominal pro-clause—in English, usually *that*—which is coreferent with the initial reference to the Ground event. The corresponding syntactic structure with such a nominal pro-clause is shown in (20), and the counterpart to the preceding example is shown in (21).

(20)

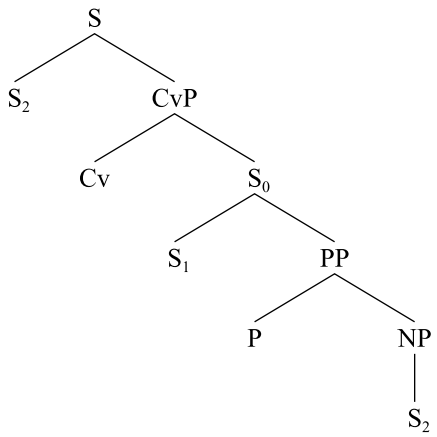


(21) They were feeling tired; they went out despite that.

2.6 Connective Copy-Cleft Sentence

It seems probable that all languages have paratactic copy-cleft constructions of the type just seen. But the next syntactic structure we consider is the basis for a typology. Some languages employ this structure, while others do not (as discussed below). This new syntactic structure is that for a **connective copy-cleft** sentence. Where the paratactic type of copy-cleft sentence simply had an embedded complex sentence as a constituent, the present structure has two constituents, a **connective**, here symbolized by a Cv, and the complex sentence. These two constituents together constitute a **connective phrase**, dominated by a CvP node, as diagrammed in (22).

(22)



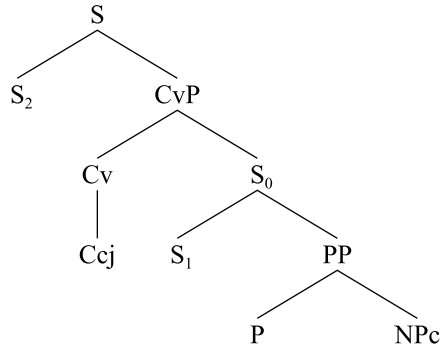
As will be treated below, the connective has three main forms: a coordinating conjunction, a form that represents relativeness in a clause, and a form that represents nonfiniteness in a clause. We now consider only the

coordinating conjunction form, and represent it with a Ccj node that is directly dominated by the Cv node.[4] In English, the coordinating conjunction is regularly realized as either *and* or *but*. Thus, the counterpart of the paratactic copy-cleft example in (21) here appears as in (23).

(23) They were feeling tired, but they went out despite their feeling tired.

Much as in the paratactic case, a version of the connective copy-cleft structure can contain a nominal pro-clause in the place of the later-occurring S_2, which is coreferential with the initial occurrence of the S_2. The syntactic structure for this appears in (24), here shown with the coordinating conjunction option for the connective. The corresponding example sentence appears in (25).

(24)



(25) They were feeling tired, but they went out despite that.

It seems probable that, at a basic level, the semantic parameter that determines the choice between the use of *and* and *but* for the coordinating conjunction is distinct from the semantic parameters that pertain to the Figure-Ground event relations. The conjunctional choice largely involves the observance or the breaking of expectations about an association between two events (see Segal and Duchan 1997, Koenig and Benndorf 1998). For their part, the cross-event relations involve the semantics of 'reason', 'concession', 'posteriority', 'additionality', and the like. And these two semantic domains can be independent, as seen in (26).

(26) a. They were feeling tired, and/but they went out despite that.
b. She stopped at the store, and/but she went home after that.
c. He holds down a regular job, and/but he works at a sideline in addition to that.

To be sure, the two semantic domains can interact or exhibit pragmatic correlations. Thus, a cross-event relation of 'concession' is mostly more consonant with a *but* conjunction, even though it can be expressed with the accompaniment of either conjunction, as represented in (27a). Second, a cross-event relation of 'reason' virtually demands an *and*, as seen in (27b). Third, a cross-event relation of 'anteriority' virtually demands a *but*, as seen in (27c). Further, purely lexical constraints exist. Thus, the concessive adverbial pro-clause *yet* (see below)—unlike other concessive forms—requires *and* and refuses *but*, as in (27d). Nevertheless, the two semantic domains appear to be basically distinct.

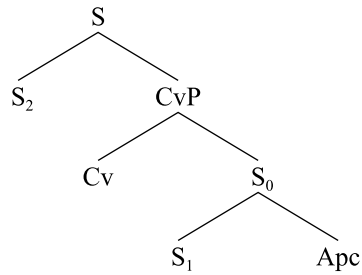
(27) a. They were feeling tired, but/?and they went out despite that.
b. They were feeling tired, and/*but they stayed home because of that.
c. She went home, but/*and she stopped at the store before that.
d. They were feeling tired, and/*but yet they went out.

2.7 Copy-Cleft Sentence with Adverbial Pro-Clause

We have just seen a particular type of pro-form—a nominal pro-clause, or Npc—appear in the syntactic structure for either a paratactic or a connective copy-cleft form. This pro-form represented the second reference to the Ground event, and it was anaphorically coreferential with the antecedent initial representation of the Ground event. In English, this nominal pro-clause is typically expressed by the form *that*, and takes part in such subordinating prepositional phrases as *despite that, because of that, after that, in addition to that*.

Now, in the next structure we consider, in the place of this entire constituent, the subordinating prepositional phrase, there now stands a new type of pro-form. Recall that this constituent is an adverbial clause (or is the equivalent of one, if only a subordinating conjunctional phrase is taken to be a true adverbial clause). Accordingly, its replacement is a pro-form for an adverbial clause that—as will be seen below—is itself instantiated by forms that are adverbial. Thus, we term this new constituent an **adverbial pro-clause**, and symbolize it as Apc. Considering only the connective type of copy-cleft sentence, the syntactic structure that contains the new pro-form is shown in (28).

(28)



Thus, where example (25) had the form *despite that*—a subordinating prepositional phrase with nominal pro-clause—the counterpart example in (29) has the form *anyway* as an adverbial pro-clause. In English, this type of construction is often the most colloquial of all the options for representing the relation of a Figure event to a Ground event.

(29) They were feeling tired, but they went out anyway.

The adverbial pro-clause is a major type of grammatical category represented in languages around the world that has not been duly recognized. English has many lexical forms in this grammatical category that take part in some of the most colloquial constructions. There are often a number of adverbial pro-clause forms for a single cross-event relation. Thus, we just saw an example with *anyway* as an adverbial pro-clause for 'concession'. But beside that form, English also has *even so, all the same, nevertheless, regardless, still, yet, however*, and *though*.

Further, the adverbial pro-clause forms can be wholly distinct from the subordinator forms. It was previously noted that forms can differ even across the subordinator types. Thus, for 'concession', the subordinating conjunction *although* differs from the subordinating preposition *despite*. And now the observation can be added that the adverbial pro-clause *anyway* and all its just-indicated peers differ from these prior forms. Also as before, though, an adverbial pro-clause form can be the same as or similar to a subordinator form. Thus, as seen below in (47E), the form *since* serves in all three grammatical capacities to express the cross-event relation of 'subsequence'.

With respect to position within a sentence, for the constituent that consists of a subordinating preposition and a nominal pro-clause, the basic location in English is sentence-final. And for many adverbial pro-clauses—which can replace that constituent—the basic position is also sentence-final. This is the case for *anyway*, as in the example sentence seen

above. But other adverbial pro-clauses either must, or preferentially, do occupy other sentence positions. Thus, one of the adverbial pro-clause equivalents of *anyway*, namely *yet*, must occur just before the final clause, as in (30a). And another equivalent adverbial pro-clause, namely *still*, preferentially occupies a position between the subject nominal and the main verb, as in (30b). Such constructions may call for representation by syntactic structures similar to, but distinct from, that in (28).

(30) a. They were feeling tired, and yet they went out.
b. They were feeling tired, but they still went out.

This observation about their range of position requirements leads into a more general observation about adverbial pro-clauses: they can be highly individualistic in their grammatical behavior. Unlike subordinating conjunctions and prepositions, which generally all have the same fixed position in the sentence, stress level, intonation contour, and junctural transitions, each adverbial pro-clause can have its own requirements or range of variation with respect to these and still further grammatical factors. In this regard, consider again the set of adverbial pro-clauses for 'concession' in English. The patterns of behavior for six of these is illustrated in (31).

With regard to one parameter of variation, that of position, in (31) the symbol 1 indicates that the adverbial pro-clause can appear clause-initially, that is, just before the finite clause; 2 indicates that it can appear between the subject NP and the main verb; and 3 indicates that it can appear clause-finally. We see that *nevertheless* and *hence* can appear in all three positions; *yet* can occur only initially and *though* only finally; *still* can occur only initially and medially; and *anyway* appears mainly finally and perhaps also initially.

With regard to connectivity, all of the forms can appear in a paratactic copy-cleft construction—in effect, therefore, directly after a semicolon, as symbolized below by "**;**". Further, though, two of the adverbial pro-clauses, *nevertheless* and *still*, can follow a coordinating conjunction, preferentially *but*; *yet* can follow a coordinating conjunction, but only *and*; and *hence* and *though* cannot occur with a coordinating conjunction at all.

An additional factor is that both *hence* and *though* must be pronounced with a separational juncture and, when final, with low pitch—that is, with the suprasegmental pattern of a parenthetical aside, symbolized below with an underline, "**__**". But the other three adverbial pro-clauses are integrated into the phonetic stream of their clause. Still further differences

appear. For example, *yet* is typically pronounced with a high-level pitch, short duration, and very slight junctural pause following it—a phonetic complex not used for the other forms.

Thus, although the adverbial pro-clause forms cited here are all semantically akin, grammatically each is a law unto itself. This fact exemplifies a much more general property of language as a type of system, that it is **densely constrained**. That is, principles as to the particular formal properties that may, must, or must not be exhibited in a language largely do not apply over broad portions of the grammar, but rather vary from form to form, where such "forms" can range from single morphemes to extended constructions.

(31) They were feeling tired
  a. *nevertheless*
    1 ;/but nevertheless they went out.
    2 ;/but they nevertheless went out.
    3 ;/but they went out nevertheless.
  b. *anyway*
    3 ;/but they went out anyway.
    ?1 ;/but anyway they went out.
  c. *still*
    1 ;/but still they went out.
    2 ;/but they still went out.
  d. *yet*
    1 ;/and yet they went out.
  e. *however*
    1 ;/however, they went out.
    2_ ;/we, however, went out.
    3_ ;/they went out, however.
  f. *though*
    3_ ;/they went out, though.

The adverbial pro-clauses so far discussed in this section have all pertained to the cross-event relation of 'concession'. We can now add some examples for other relations. Thus, an adverbial pro-clause that expresses the relation of 'reason' and that is a counterpart of *because of that* is *so*, as in (31a). An adverbial pro-clause that expresses 'posteriority' and is a counterpart of *after that* is *then*, as in (31b). And one that expresses 'additionality' and that is a counterpart of *in addition to that* is *also*, as in (31c).

(32) a. They were tired, and so they stayed home.
b. She stopped at the store, and then she went home.
c. He holds down a regular job, and he also works at a sideline.

Now that the category of adverbial pro-clauses has been established, we can point to its occasional occurrence outside of copy-cleft structures. In English, an adverbial pro-clause can appear in the main clause of a complex sentence, especially if the subordinate clause has appeared initially, as seen in (33).

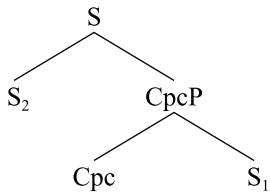
(33) a. Even though they were feeling tired, they went out *anyway*.
b. After she stopped at the store, she *then* went home.
c. In addition to holding down a regular job, he *also* works at a sideline.
d. If he is smiling, *then* he's in a good mood.

Such an occurrence of an adverbial pro-clause does not add new information, but only expresses again the same cross-event relation already expressed by the preposed subordinating conjunction. Accordingly, an apt term for this use of the form is a *resumptive* or *pleonastic* adverbial pro-clause. This repetition of information generally becomes apparent if the adverbial pro-clause is spelled out as a subordinating preposition plus a nominal pro-clause, as in this revision of (33b): *After she stopped at the store, she went home after that*. The acceptability of sentences of this sort is greater if the resumptive form is phonologically different from the original subordinator.

2.8 Copy-Cleft Sentence with Conjunctional Pro-Clause

The preceding section showed that a single form, the adverbial pro-clause, could stand in the place of a composite constituent, that consisting of a subordinating preposition and a nominal pro-clause. We now see that a language can carry this sort of substitution relationship one step further. Where one copy-cleft sentence might contain both a coordinating conjunction and an adverbial pro-clause, a counterpart sentence can contain instead of that combination a single new form, one that otherwise behaves syntactically like a coordinating conjunction but that semantically encompasses the combined meaning of the earlier two constituents. We will term such a form a **conjunctional pro-clause** and symbolize it as Cpc. A syntactic structure with this new grammatical category is indicated in (34).

(34)



None of the cross-event relations cited so far exhibit this new form in English. But it is exhibited by another relation, 'negative additionality'—that is, one deficiency augmented by another. This relation can be represented in English in a complex sentence by the subordinating conjunction *no more than*, which takes a positive form of both the Figure and the Ground events, as in (35a), or by *any more than*, which takes a negative form of the Figure event, as in (35b).

(35) a. He takes odd jobs no more than he holds down a regular job.
b. He does not take odd jobs any more than he holds down a regular job.

The copy-cleft counterpart of this complex sentence can take the coordinating conjunction *and* plus any one of three different adverbial pro-clauses—*also, either*, and *neither*—each of which requires a different position within the clause, as shown in (36).

(36) He does not hold down a regular job,
and he also does not take odd jobs.
and he does not take odd jobs either.
and neither does he take odd jobs.

Now, as seen in (37), the new formation that corresponds semantically to the preceding type of structure contains the form *nor*. This form appears to behave like a coordinating conjunction, but it requires none of the prior adverbial pro-clause forms for the same meaning to be conveyed.

(37) He does not hold down a regular job, nor does he take odd jobs.

One may think of this *nor* as equivalent to the combination of the sequence *and neither* that appeared in (36c), since (1) it has just about the same meaning, (2) it requires auxiliary inversion just like *neither*, and (3) the form *neither* cannot co-occur with it. In fact, neither the form *neither* nor the form *also* can co-occur with *nor*, as seen in (38a) and (38b).

(38) He does not hold down a regular job,
  a. *nor neither does he take odd jobs.
  b. *nor does he also take odd jobs.
  c. nor does he take odd jobs either.

Now, *nor* can co-occur with *either*, as seen in (38c), and this fact might suggest that *nor* does not include expression of a cross-event relation—a task left to the form *either*—but is simply equivalent to the combination *and not*. But this idea does not hold up, since *nor* cannot stand in the place of other combinations of *and* plus *not*, as seen in (39). The apparent reason for this failure is that *nor* really does refer specifically to the cross-event relation of 'negative additionality' and not to any other relation, or to no relation at all. The ability of *either* to co-occur with *nor* would then finally have to be understood as pleonastic.

(39) a. i. They didn't stay home because they weren't feeling tired.
  ii. They weren't feeling tired, and so they didn't stay home.
  iii. *They weren't feeling tired, nor (so) did they stay home.
  b. i. They didn't go out even though they weren't feeling tired.
  ii. They weren't feeling tired, but they didn't go out anyway.
  iii. *They weren't feeling tired, nor did they go out (anyway).

Thus, it can be concluded that *nor* in the present construction is genuinely equivalent to the combination of a coordinating conjunction and an adverbial pro-clause that itself refers to the cross-relation of 'negative additionality' and anaphorically to the Ground event. Accordingly, *nor* represents a novel grammatical category, for which the term "conjunctional pro-clause" seems apt.

Another example in English of a conjunctional pro-clause is the form *or* when it refers to the cross-event relation of 'exceptive counterfactuality'. This relation is expressed within an English complex sentence by the subordinating conjunction *except* or *only*, as seen in (40a). In the counterpart copy-cleft construction, it is expressed by a subordinating preposition like *except for*, as in (40b), or by the adverbial pro-clause form *otherwise*, or by its now obsolescent equivalent, *else*, as in (40c).

(40) a. I would have joined you, except (that)/only I was busy.
  b. I was busy, but I would have joined you
  except for that/but for that/other than for that.
  c. I was busy, but otherwise/else [obs] I would have joined you.
  d. I was busy, or (else) I would have joined you.

The *or* in (40d), then, is the corresponding conjunctional pro-clause, which may be thought to be equivalent to the combination *but otherwise*. Again, the ability of *else* to co-occur with the *or* may be considered pleonastic. Alternatively, since *else* in such constructions is itself all but obsolete, it may be considered simply part of a complex form of conjunctional pro-clause.

Additional evidence that the *or* in this copy-cleft construction is a distinct grammatical category with its own distinct semantics is that it cannot be paired with an *either* in the prior clause, whereas this can be done by the *or* that is used in the usual 'alternative' sense, as seen in (41).

(41) a. *Either I was busy or I would have joined you.
b. Either I was busy, or I was fooling myself into thinking I had a lot to do.

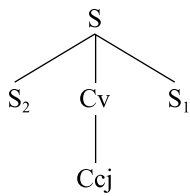
2.9 Copy-Cleft Sentence without Representation of a Cross-Event Relation

English, for one language, permits structures that consist of a finite clause, representing what we have otherwise identified as a Ground event, followed simply by a coordinating conjunction and a finite clause representing a Figure event. These structures, though, lack any specific indication of a particular cross-event relation, as seen in (42).

(42) a. They were feeling tired, and they stayed home.
b. They were feeling tired, but they went out.
c. She stopped at the store, and she went home.
d. He holds down a regular job, and he works at a sideline.

We can present two interpretations of such forms. By one interpretation, such forms exhibit a distinct syntactic structure, one that might be considered a "true" coordinate sentence, as this has been traditionally understood, and not a copy-cleft formation at all, as diagrammed in (43). Here, the subscripting of the component clauses for Figure and Ground representation is parallel to that used before, but it is no longer clear if such indexing is semantically appropriate.

(43)



Toward an alternative interpretation, though, consider the semantics of the coordinating conjunctions in forms of this sort. It seems probable that the presence of a coordinating conjunction—as against its absence in a paratactic construction—does express the concept of the 'existence' of a relation between the linked events. It thus shares that component of meaning with the elsewhere-occurring pro-clause forms (either adverbial pro-clause or subordinating preposition plus nominal pro-clause), which indicate both this component and the specific cross-event relation that is present. But it does not seem likely that the coordinating conjunction also indicates such a specific cross-event relation. In fact, as seen in section 2.6, the semantic difference between particular coordinating conjunctions such as English *and* and *but* is basically distinct from the semantic differences among the pro-clauses. Thus, there is little reason to hold that the occurrences of *and* in (42a) to (42c) literally have such extended meanings as, respectively, 'and so', 'and then', 'and also', as some might maintain. In our view, rather, it is likelier that the 'so', 'then', and 'also' components of meaning are not part of the 'and' meaning—that they are at most only semantically consonant with the 'and' meaning. By this view, they are merely implicit in the sentence as a "zero" realization of a distinct structural component, namely, of a pro-clause type of constituent.

Comparably for the relation of 'anteriority', there is little reason to hold that the occurrence of *but* as in (44b) has the meaning 'but first'. More likely, its meaning is merely consonant with that of an adverbial pro-clause like *first*, and that the latter, overtly present in (44a), is simply omitted in (44b).

(44) a. She went home, but first she had stopped at the store.
b. She went home, but she had stopped at the store.

Thus, an alternative interpretation of forms like those in (44) is that they are simply copy-cleft sentences in which the otherwise expected adverbial pro-clause is omitted. On this view, a particular cross-event relation is structurally implicit, but is unspecified. By this interpretation, in fact, there may not even exist any "true" coordinate sentences as traditionally conceived. All candidates for such a status would instead be copy-cleft sentences with an unexpressed cross-event relation. Thus, the syntactic structure depicted in (28) would serve here as well, with the proviso that the pro-clause—for example, the Apc—has no lexical realization. This is the interpretation favored here.

3 COMPARISON OF FORMS AND STRUCTURES

The family of semantic and syntactic factors distinguished to this point can now be brought together as an ensemble, both for their structural interrelationships and for the range of meanings they can be used to express.

3.1 Factors That Distinguish the Cross-Event Structures

The syntactic structures treated in the foregoing discussion have differed from each other with respect to a certain set of formal factors. These factors can be abstracted and codified, as in (45). Many of these structural factors can be present or absent independently of each other, and so they characterize not only the foregoing structures but further structures not discussed.

(45)
1. A structure can represent the Figure event either (a) as a nominalized clause or (b) as a main clause (the factor distinguishing the simple sentence type from the remaining types).
2. The adverbial clause in the structure is based either (a) on a subordinating preposition or (b) on a subordinating conjunction.
3. The adverbial clause can occur either (a) finally (the apparently unmarked order in English) or (b) initially.
4. The structure either (a) lacks or (b) has an initial duplicate representation of the Ground event (the factor distinguishing a complex sentence from a copy-cleft sentence).
5. In the copy-cleft case, the structure either (a) lacks or (b) has a connective after the initial duplicate (the factor distinguishing a paratactic from a connective copy-cleft sentence).
6. The embedded reference to the Ground event (the second reference to the Ground event in the case of a copy-cleft structure) is represented either (a) lexically or (b) by a pro-form (typically, a nominal pro-clause).
7. A structure that would (a) otherwise have a constituent consisting of a subordinating preposition and a nominal pro-clause can (b) instead represent this constituent with an adverbial pro-clause.

8. The adverbial pro-clause can occur either (a) finally (the apparently unmarked position for most such forms in English) or else (b) initially or between subject and verb.
9. A structure that would (a) otherwise have a constituent consisting of a subordinating preposition plus a nominal pro-clause or of an adverbial pro-clause can (b) instead omit this constituent.
10. A structure that would (a) otherwise contain both a coordinating conjunction and either a subordinating preposition plus nominal pro-clause or an adverbial pro-clause can instead (b) represent this combination with a conjunctional pro-clause.

We illustrate the application of these structural factors with the semantically related set of concessive sentences in (46). For each sentence, the applicable factors are indicated. Note that the (46k) form has no concessive counterpart, and so switches to expressing the 'exceptive counterfactuality' relation.

(46) a. Their going out was despite their feeling tired.
[1a, 2a, 3a, 4a, 6a]
b. They went out despite their feeling tired.
[1b, 2a, 3a, 4a, 6a] (same as preceding, but with 1b instead of 1a)
c. They went out even though they were feeling tired.
[1b, 2b, 3a, 4a, 6a] (same as preceding, but with 2b instead of 2a)
d. Even though they were feeling tired, they went out.
[1b, 2b, 3b, 4a, 6a] (same as preceding, but with 3b instead of 3a)
e. They were feeling tired; they went out despite their feeling tired.
[1b, 2a, 3a, 4b, 5a, 6a]
f. They were feeling tired; they went out despite that.
[1b, 2a, 3a, 4b, 5a, 6b, 7a] (same as preceding, but with 6b instead of 6a and with 7a added)
g. They were feeling tired, but they went out despite that.
[1b, 2a, 3a, 4b, 5b, 6b, 7a] (same as preceding, but with 5b instead of 5a)
h. They were feeling tired, but they went out anyway.
[1b, 2a, 3a, 4b, 5b, 6b, 7b, 8a, 9a, 10a]

i. They were feeling tired, but they still went out.
[1b, 2a, 3a, 4b, 5b, 6b, 7b, 8b, 9a, 10a] (same as preceding, but with 8b instead of 8a)
j. They were feeling tired, but they went out.
[1b, 2a, 4b, 5b, 6b, 9b]
k. They were feeling tired, or (else) they would have gone out.
(expresses a different relation than the above forms)
[1b, 2a, 4b, 5b, 6b, 10b]

3.2 Comparison of Forms Expressing Cross-Event Relations

In (47), we illustrate several of the syntactic structures seen earlier that can represent a Figure event relating to a Ground event for 15 different cross-event relations. For each type of syntactic structure, we show in italics the particular forms in English that represent the specific relation. Thus, each (a) form below is a complex sentence with a subordinating conjunction or its alternatives. Each (b) form is a copy-cleft sentence with a subordinating preposition and a nominal pro-clause, or variants thereof. Each (c) form is a copy-cleft sentence with an adverbial pro-clause. And each (d) form is a copy-cleft sentence with a conjunctional pro-clause.

There are some particular observations. Four of the cross-event relations,—'cause', 'additionality', 'substitution', and 'regard' in (47I), (47L), (47N), and (47O)—lack a subordinating conjunction in English, and so no (a1) form is provided. We include instead an (a2) form that is a complex sentence with subordinating preposition. Such a form is also included for the 'concurrence', 'punctual coincidence', 'conditionality', and 'negative additionality' relations in (47F), (47H), (47J), and (47M), where the usage of the subordinating preposition differs from that in the (b) form. The cross-event relation of 'regard' in (47O) lacks an adverbial pro-clause in English, and so no (c) form is provided. Note that adverbial pro-clauses under (c) that allow a clause-final placement are shown there, while those that do not are presented in separate sentences.

(47) a1: Complex sentence with subordinating conjunction
a2: With subordinating preposition
a3: With subordinating conjunction and gerundive
a4: With zero subordinating conjunction and gerundive
b1: Copy-cleft sentence with nominal pro-clause; b2: with its variants
c1: Copy-cleft sentence with adverbial pro-clause; c2: paratactic form

d: Copy-cleft sentence with conjunctional pro-clause

A. *'Reason'*
   a1. They stayed home *because|since|as* they were feeling tired.
   a4. Feeling tired, they stayed home.
   b1. They were feeling tired, and they stayed home *because of|on account of|due to* that.
   b2. … and they stayed home *for* that *reason|on* that *account*.
   … and they stayed home there*for*.
   c1. They were feeling tired, and *so|therefore|hence* they stayed home.

B. *'Concession'*
   a1. They went out *although|though|even though* they were feeling tired.
   a3. They went out, *although* feeling tired.
   b1. They were feeling tired, but they went out *despite|in spite of|regardless of|notwithstanding* that.
   c1. They were feeling tired, but they went out *anyway.|even so.|all the same.|nevertheless.|regardless.*
   … but they *still* went out.
   … and *yet* they went out.
   c2. They were feeling tired; *however*, they went out.
   … they went out, *however.|though*.

C. *'Anteriority'*
   a1. She stopped at the store *before* she went home.
   b1. She went home, but she had stopped at the store *before|prior to* that.
   c1. She went home, but she had stopped at the store *first|before|beforehand.*

D. *'Posteriority'*
   a1. She went home *after* she stopped at the store.
   a4. Having stopped at the store, she went home.
   b1. She stopped at the store, and she went home *after|subsequent to* that.
   c1. She stopped at the store, and *then|afterward* she went home.

E. *'Subsequence'*
   a1. He has been spotted once *since* he escaped.
   b1. He escaped, but he has been spotted once *since* that.
   b2. … but he has been spotted once *since* then.
   c1. He escaped, but he has *since* been spotted once.

F. *'Concurrence'*
(NB: The illustration is of 'contingent concurrence', since 'dreaming' depends for its occurrence on 'sleeping'. For an example of 'noncontingent concurrence', replace *dream* by *sing* and *sleep* by *work*.)
a1. She dreamt *while*/*as* she slept.
a3. She dreamt *while* sleeping.
a4. Sleeping, she dreamt. (Sleeping on the couch, she dreamt about the day's events.)
b1. She slept, and she dreamt *during*/*in the process of* that.
c1. She slept, and she dreamt *the while*/*in the process*/*at the same time*.

G. *'Continuous concurrence'*
a1. He was lying *the whole time that* he gave his account of the events.
b1. He gave his account of the events, but he was lying *all during* that.
c1. He gave his account of the events, but he was lying *all along*/*the whole time*/*all the while*.

H. *'Punctual coincidence'*
a1. She said goodbye *when* she left.
a2. She said goodbye *on*/*upon* leaving.
a3. She said goodbye *when* leaving.
a4. Leaving, she said goodbye.
b2. She left, and she said goodbye *at* that *point*/there*upon*.
c1. She left, and she said goodbye *then*.

I. *'Cause: nonagentive'*
a1. ——
a2. The napkin slid off the table *from*/*as a result of*/*due to* the wind's blowing on it.
b1. The wind blew on the napkin, and it slid off the table *from*/*as a result of*/*due to* that.
c1. The wind blew on the napkin, and it slid off the table *as a result*.

I′. *'Cause: agentive'*
a1. ——
a2. The batter provided some excitement for the fans *by* driving in three runs.

b2. The batter drove in three runs, and (he) provided some excitement for the fans *in* that *way*/there*by*.

c1. The batter drove in three runs, and (he) *thus* provided some excitement for the fans.

J. *'Conditionality'*

a1. She will move back to Boston *if*/*in case*/*in the event that* She loses her job.

a2. She will move back to Boston *in case of*/*in the event of* her losing her job.

a3. *If* experiencing seasickness, one should take an antinausea pill.

b1. She could lose her job, and she would move back to Boston *in the event of* that.

b2. . . . and she would move back to Boston *in* that *event*/*in* that *case*.

c1. She could lose her job, and she would move back to Boston *then*.

K. *'Exceptive counterfactuality'*

a1. I would have joined you, *except (that)*/*only* I was busy.

b1. I was busy, but I would have joined you *except for*/*but for*/*other than for*/*if not for*/*if it were not for* that.

c1. I was busy, but *otherwise*/*else* [obs] I would have joined you.

d. I was busy, *or (else)* I would have joined you.

L. *'Additionality'*

a1. ——

a2. He works at a sideline *in addition to*/*besides*/*on top of*/*as well as* holding down a regular job.

b1. He holds down a regular job, and he works at a sideline *besides*/*in addition to*/*on top of*/*as well as* that.

c1. He holds down a regular job, and he works at a sideline *also*/*too*/*in addition*/*besides*/*as well*/*to boot*.

M. *'Negative additionality'*

a1. He takes odd jobs *no more than* he holds down a regular job.
He does not take odd jobs *any more than* he holds down a regular job.

b1. He does not hold down a regular job, and he takes odd jobs *no more than* that.

c1. He does not hold down a regular job,
and he *also* does not take any odd jobs.
and he does not take any odd jobs *either*.
and *neither* does he take any odd jobs.
d. He does not hold down a regular job, *nor* does he take any odd jobs.

N. *'Substitution'*
a1. ——
a2. He watched TV *instead of* studying.
b1. He didn't study, but he watched TV *instead of* that.
c1. He didn't study, but he watched TV *instead.*
. . . , but *rather*, he watched TV

O. *'Regard' (in the sense of 'with regard to')*
a1. ——
a2. I took care *in* drying the cups. / I was careful *in*/*at*/*about* drying the cups.
a4. I took care/was careful drying the cups.
b1. I dried the cups, and I took care/was careful *in*/*at*/*about* it.
b2. . . . , *and* I took care/was careful there*in*.
c1. ——

3.2.1 Variants of the Nominal Pro-Clause Consider again a subordinating prepositional phrase that contains a pro-form referring to the Ground event. Earlier, this phrase consisted of a subordinating preposition and a nominal pro-clause. Examples were *despite that* and *in spite of that*. But, as just seen in the (b2) forms of (47), we can now add that there are several variants related to such a structure.

In one such variant, the form *then* appears in its nominal usage with the meaning 'that time'. This form can simply replace *that* in the representation of certain temporal cross-event relations, as in *since then*, which occurs side by side with *since that*, as was seen in (47E).[5]

Another variant is now largely obsolescent in English, though its counterpart is current in German. In this variant, the morpheme *there-* is the pro-form referring to the Ground event, and it is followed by the subordinating preposition. Thus, comparable to *because of that* is *therefor*, comparable to *after that* is *thereafter*, and comparable to *at that point* is *thereupon*. Several forms of this sort were shown in the (b2) entries of (47).

In a third variant, the pro-form that refers to the Ground event is not a nominal, but rather an adjectival or determiner form that is in construc-

tion with the noun within a prepositional complex. An example of this sort is *in that event*, which exists side by side with *in the event of that*, as seen in (47Jb1 and 47Jb2). Some prepositional complexes, such as *in spite of [that]*, do not permit this variant: **in that spite*. On the other hand, other prepositional complexes require the variant, as seen in *for that reason*, but **for the reason of [that]*.

What runs in common through all these variants and allies them as a single type—grouped together in the (b) forms of (47)—is a certain structural factor. They all contain a particular lexeme that refers solely to the Ground event and that is distinct from an accompanying lexeme that separately refers to the relation that the Figure event bears to it. Thus, the underlined forms in (48) are pro-forms referring simply to the Ground event, while the remainder expresses the cross-event relation.

(48) *since* <u>*then*</u>*/*<u>*thereafter*</u>*/in the event of* <u>*that*</u>*/in* <u>*that*</u> *event*

On the other hand, an adverbial pro-clause is a single lexeme that as a whole refers to both the Ground event and the relation that the Figure event bears to it. While such a lexeme may comprise two or more morphemes (e.g., like *all the same*), these do not refer separately to the Ground event and to the relation.

Diachronically, of course, a phrase of the first type can become an adverbial pro-clause. Thus, for English speakers today, the form *therefore* must largely be taken as a simple adverbial pro-clause, rather than as a variant of a subordinating prepositional phrase with separate reference to the Ground event and to the cross-event relation.

4 COGNITIVE-LINGUISTIC COMPARISON OF CROSS-EVENT STRUCTURES

To establish the linguistic domain of cross-related events and their representation, we have needed to orient the presentation so far in a more formal direction so as to set forth the basic patterned array of structures that participate in the domain. But it is now time to take a more cognitive direction and turn to a semantic, pragmatic, and processing comparison of the structures.

4.1 Semantic Structure as a Means for Correlating Syntactic Structures

Some attention to a particular adverbial pro-clause will clarify its behavior and open out into a general discussion of relationships among cross-

event syntactic structures. Consider the form *so* in *They were feeling tired, so they stayed home*. On seeing this sentence in isolation, one might at first assume—on the basis of the apparent structure and the intonation contour of the form—that the *so* is simply a subordinating conjunction introducing an adverbial clause and that the whole form is a complex sentence. In support of this assumption, one could observe that the *so* can only appear just before the finite clause, like a subordinating conjunction, but not in other positions within the clause, as adverbial forms are often able to do.

In the case of *so*, though, two aspects of syntactic behavior definitively defeat this initial assumption. First, the clause introduced by *so* cannot appear sentence-initially in the way that subordinate clauses generally can: **So they stayed home, they were feeling tired*. Second, the *so* can be preceded by the coordinating conjunction *and*, as in *They were feeling tired, and so they stayed home*. No regular subordinating conjunction permits this, as seen in **I left work and because I was sick*, or **We will stay and if she comes*. This behavior alone would seem to require the conclusion that *so* is an adverbial pro-clause that can only appear clause-initially and that permits the omission of a coordinating conjunction before it.

Further, though, the semantic organization of the sentence calls for the same conclusion. Chapter I-5 has shown that, given a pair of complementary asymmetric relations between events, generally only one of them can be lexicalized as a subordinating conjunction, and that Figure and Ground roles can be assigned to the two events in only one way, perhaps universally so. Thus, the asymmetric relation in which event A is 'temporally included within' event B is logically equivalent to the reverse asymmetric relation with the events reversed—that is, the relation in which event B 'temporally includes' event A. But (49) shows that, of these two relations, only the former can be lexically represented by a subordinator—at least in English, and perhaps universally. And this privileged relation assigns the Figure role to the included event A and the Ground role to the including event B. The inclusion principle presented in (50), which states these findings, may be based on more general principles of Gestalt psychology.

(49) a. He had two affairs *during* his marriage. / *while* he was married.
b. *He was married *through-a-period-containing* his having two affairs.

(50) *Inclusion principle*
The unmarked (or only possible) linguistic expression for a relation of temporal inclusion between two events treats the larger, containing event as Ground and the smaller, contained event as Figure. Where the complete syntactic form is a full complex sentence, the two events are in the subordinate and the main clause, respectively.

In a similar way, the relation in which a caused event A that 'results' from a causing event B is equivalent to the reverse case in which event B 'causes' event A. But, again, only the former relation can be lexicalized in a subordinator, as seen in (51). And, again, the cause-result principle that characterizes this behavior, shown in (52), may derive from a more general Gestalt principle.

(51) a. They stayed home *because of* their feeling tired. / *because* they were feeling tired.
b. *They were feeling tired *to-the-occasioning-of-(the-decision-of)* their staying home.

(52) *Cause-result principle*
The unmarked (or only possible) linguistic expression for a causal relation between two events treats the causing event as Ground and the resulting event as Figure. Where the complete syntactic form is a full complex sentence, the two events are in the subordinate and the main clause, respectively.

Accordingly, one can generally determine the type of syntactic structure that a cross-event sentence has solely on semantic grounds. For example, we can note that the two sentences in (53) are semantically alike, both referring to the same single situation; that the pair of events in that situation are related causally; and that the 'feeling tired' event is the cause, while the 'staying home' event is the result. By the cause-result principle, the causing event functions as the Ground event, while the resulting event functions as the Figure event. Since the sentence in (53a) represents the Figure event in the main clause and the Ground event in a dependent clause, this form must be a complex sentence with a subordinator. On the other hand, since the sentence in (53b) represents the Ground event in the main clause and the Figure event in the dependent clause, this form must be a copy-cleft sentence with an adverbial pro-clause. Thus, now on the basis of semantic alignments over whole sentential structures, *so* is once

again confirmed as an adverbial pro-clause rather than as a subordinating conjunction.

(53) a. They stayed home because they were feeling tired.
b. They were feeling tired, so they stayed home.

The pattern just described for events cross-related as to 'reason' is just a particular instance of a general principle of semantic alignment, stated in (54).

(54) *Principle of semantic alignment in the representations of cross-related Figure and Ground events*
a. The same Figure event that is represented in the main clause of a complex sentence appears in the second main constituent of a copy-cleft sentence.
b. The same Ground event that is represented in the subordinate clause of a complex sentence appears as the initial clause in a copy-cleft sentence, and additionally in an anaphoric form within the second major constituent of the sentence.

A good diagnostic for tracking the assigned locations in this principle of semantic alignment is provided by the cross-event relation of 'contingent concurrence' illustrated in (47F). As concurrent events performed by a single individual, an event of 'dreaming' is generally taken to be contingent on a determinative event of 'sleeping', in that one can sleep without dreaming but one cannot prototypically dream without sleeping. By a principle of contingency put forward in chapter I-5, where this example is discussed, in a complex sentence with a subordinating conjunction, the contingent event must be the Figure event, represented in the main clause, and the determinative event must be the Ground event, represented in the subordinate clause. This constraint is demonstrated by the acceptability of (55a), in which the 'dreaming' and the 'sleeping' events are located as just described, as against the unacceptability of (55b), in which these two events are represented with their locations reversed. The fact that the sentence in (55c) is acceptable shows that there is no general constraint against referring to an event of dreaming in a subordinate clause, since it can occur there as long as it is not semantically contingent on the main clause event.

(55) a. She dreamt while she slept.
b. *She slept while she dreamt.
c. She twitched while she dreamt.

Now, by the principle of semantic alignment, we should find that in a copy-cleft sentence, the contingent 'dreaming' event can only be represented in the second major constituent of the sentence, while the 'sleeping' event can only appear as the main clause. The reverse of these two locations should be unacceptable. And, indeed, this is just what is found, as seen in (56).

(56) a. She slept, and she dreamt in the process/the while.
b. *She dreamt, and she slept in the process/the while.

4.2 Copy-Cleft Structure as a Compensation for Constraints on Subordinators

From a certain perspective, a copy-cleft construction can be regarded as a means that a language can employ to circumvent its own lexical constraint on subordinators. As we have seen, the pattern in which cross-event relations may be lexicalized as subordinating conjunctions and prepositions in a language is for the most part under a strict constraint of **unidirectionality**. Namely, for any inverse pair of asymmetric relations between two events, generally only one of those relations is ever found lexicalized in the form of a subordinator. Thus, given two related events, only one of those events can be treated as Figure and only one as Ground—respectively, those that constitute the first term and the second term of the privileged asymmetric relation. Accordingly, given a particular subordinator in a complex sentence, only one event type can be asserted in the main clause and only one can be presupposed in the embedded clause.

In some cases, languages do permit the lexicalization of subordinators in either direction. This is often the case with the 'before'/'after' notions of temporal succession. In that case, two complementary complex sentences with the reverse assignment of Figure/Ground status and of assertional/presuppositional status can occur, as illustrated for English in (57ai) and (57aii). But where unidirectionality prevails—as is generally the case with 'concession'—only one form of status assignment occurs, like that in (57bi). On the other hand, any reverse form can only be suggested, not realized, as in (57bii). However, such reversed status assignment, disallowed from representation by a complex sentence, *can* be represented by a copy-cleft sentence, such as that in (57c).

(57) a. i. She stopped at the store before she went home.
ii. She went home before she stopped at the store.

b. i. They went out even though they were feeling tired.
ii. *They were feeling tired in-ineffective-counteracting-of (-the-decision-of) their going out.
c. i. They were feeling tired, but they went out anyway.

Thus, apart from any other functions that may be adduced for it, the existence of the copy-cleft structure in language can be accounted for as a compensation for the unidirectionality of subordinator lexicalization within what can be regarded as a system of interdependent relational means encompassed by language.

4.3 A Pragmatic Property of the Copy-Cleft Construction

Though it may have been clear in the foregoing discussion, we can point explicitly to a particular pragmatic property of the copy-cleft construction. This construction provides for the independent assertion of a proposition that would otherwise be expressed solely presuppositionally. And it further provides for the concurrent presuppositional expression of the same proposition. Both illocutionary forms are often necessary for a proposition: first, an assertion of it because it is new information, and then, once it is established in the domain of the known, the presuppositional use of it as a reference-point Ground against which to assert a further proposition.

Thus, in the copy-cleft sentence of (58b), the event of 'her stopping at the store' does not solely function as a known reference event in relation to which the event of 'her going home' can be temporally located. In addition, it is separately asserted for the addressee who is now finding out about it for the first time. Accordingly, if an addressee were to hear the complex sentence form in (58a), which does not additionally assert the reference event, he could well respond to the speaker's apparent presumption of certain prior knowledge on his part in the following way: "Oh, I didn't even know she'd stopped at the store in the first place." But he could not object in this way on hearing the copy-cleft form of (58b), which does assert the event.

(58) a. She went home after stopping at the store.
b. She stopped at the store, and then she went home.

4.4 Processing Advantages of the Copy-Cleft Construction

An apparent advantage for cognitive processing afforded by the copy-cleft construction is that it breaks up a certain type of complexity into more

easily handled parts. The type is where a complicated constituent requiring much linguistic processing is itself embedded within a complicated construction that also requires much processing. For a noncleft construction, the processing of the former must take place amid the processing of the latter in what may be too cumbersome a performance task. But the copy-cleft construction provides for the processing of the constituent independently and beforehand. And it leaves a place-holding token of the resulting conceptual Gestalt—that is, a pro-form—in the larger construction for the processing, now simplified, next to occur there. The easing of the performance load provided by the copy-cleft construction certainly appears in the clausal forms treated so far, but it is even more notably evident in the nominal forms discussed below in section 9. A preview of an example discussed there is shown in (59). It illustrates how a copy-cleft form, that in (59b), can afford greater ease of processing by comparison with a noncleft form like that in (59a).

(59) a. Now we'll investigate *the more general process of population stabilization*.
b. Now we'll investigate *a more general process, that of population stabilization*.

5 A LANGUAGE TYPOLOGY FOR CROSS-EVENT STRUCTURES

Perhaps every language has the copy-cleft structure—at least of the paratactic type. Thus, in Japanese, beside a complex sentence type like that in (60a), there exists a paratactic copy-cleft structure like that in (60b).

(60) a. *Complex sentence*
hongyoo o motte ite, John wa hukugyoo o motte iru.
main-work OBJ holding, John TPC side-work OBJ holds
'John holds down a side job, in addition to holding down a main job.'
b. *Paratactic copy-cleft sentence*
John wa hongyoo o motte iru; sono ue ni hukugyoo o motte iru
John TPC main-work OBJ holds that top at side-work OBJ holds
'John holds down a main job; on top of that, he holds down a side job.'

But the most noteworthy typological phenomenon in the expression of cross-event relations is that some languages, like Japanese and Jívaro, virtually lack copy-cleft structures with a coordinating conjunction. That is, they virtually lack any forms corresponding to English *and* and *but* between clauses. To illustrate this, consider again the introductory pairs

of examples in (1). For each pair, expressing a particular cross-event relation, English had both a complex sentence with subordinator as the upper form, and a copy-cleft sentence with adverbial pro-clause as the lower form. But Japanese has counterparts for only the upper forms. We schematize these complex sentence forms for Japanese in (61). Here, the structural formulas and the English examples have the subordinate clause occurring in sentence-initial position to accord with Japanese syntax.

(61) a. E: Because S_2, S_1. (Because they were feeling tired, they stayed home.)
J: S_2 tame ni/kara, S_1.
b. E: Although S_2, S_1. (Although they were feeling tired, they went out.)
J: S_2 ga/keredomo/-te mo, S_1.
c. E: After S_2, S_1. (After she stopped at the store, she went home.)
J: S_2 -te/ato ni/kara, S_1.
d. E: In addition to S_2, S_1. (In addition to holding down a regular job, he works at a sideline.)
J: S_2 -te/si/hoka ni/ue ni, S_1.

If English can represent cross-related events with either a complex sentence or a coordinated copy-cleft sentence, and if Japanese only has the former of these two structures, the typological question arises whether any language has only the latter structure. Although the possibility must be investigated, there is some indication that Mandarin may at least favor a copy-cleft structure with adverbial pro-clause to express a Figure event related to a Ground event.

6 THREE TYPES OF CONNECTIVES

As noted earlier, there are three different types of connectives—the Cv constituent—that can be present in a language (that is, pending any observation of still further types). One of these types is the coordinating conjunction, Ccj, which takes a finite form of its clause, as already discussed. Another type is a form of connective that represents relativeness in a clause, to be symbolized as Rel, which again takes a finite form of its clause. The third type is a form of connective that represents nonfiniteness in a clause, to be symbolized as Nf. In English, this type can be realized as either a gerundive or an infinitival form. All three types can be illustrated in English for the same cross-related pair of Figure-Ground events, as

shown in (62). Note that the infinitival constituent in (62c′) is to be understood in a sense akin to that of the gerundive constituent in (62c), not in any purposive sense that might be akin to that of an "in order to" constituent.

(62) *Connective copy-cleft counterparts of the complex sentence*
The batter provided some excitement for the fans by driving in three runs.
The batter drove in three runs, . . .
a. *Conjunctional*
and he provided some excitement for the fans thereby. / and thereby provided some excitement for the fans.
b. *Relative*
whereby he provided some excitement for the fans.
c. *Nonfinite*
providing some excitement for the fans thereby. / thereby providing some excitement for the fans.
c′. to provide some excitement for the fans thereby.

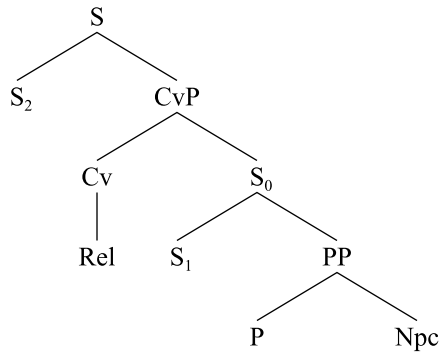
One justification for treating the category of coordinating conjunctions, relativeness, and nonfiniteness as three alternates of a single more abstract category is the fact that they do not co-occur. Thus, there are no sentences corresponding to the ones in (62) that contain any two, or all three, of the alternates, as seen in (63).

(63) The batter drove in three runs, . . .
a. *Conjunctional + relative*
*and whereby providing some excitement for the fans.
b. *Conjunctional + nonfinite*
*and thereby providing some excitement for the fans.
c. *Relative + nonfinite*
*whereby providing some excitement for the fans.
d. *Conjunctional + relative + nonfinite*
*and whereby providing some excitement for the fans.

6.1 The Relative Connective

Section 2.6 presented a connective copy-cleft structure in which the Cv node was particularized as a coordinating conjunction, Ccj, which in turn could be realized in English by such forms as *and* and *but*. The counterpart syntactic structure in which the connective node is particularized as a category for relative clause status, Rel, is represented in (64).

(64)



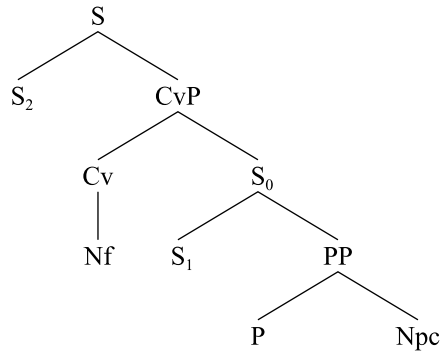
With regard to its pattern of occurrence, a relative connective phrase can be used in English essentially wherever this language has the (b) type of form shown in (47). That is, wherever an English connective phrase can have a pro-form referring to the Ground event alone, it can also exhibit a relative formation there. It was seen earlier that such pro-forms mainly appear in English either as a nominal pro-clause, typically *that*, as an adjectival or determiner form, also typically *that*, or as a suffixed *there-*. These three realizations of the pro-clause all have their relative counterparts, respectively: *which*, *which*, and *where-*, as shown in (65).

(65) a. i. She stopped at the store, and she went home after that.
ii. She stopped at the store, after which she went home.
b. i. She could lose her job, and she would move back to Boston in that case.
ii. She could lose her job, in which case she would move back to Boston.
c. i. The batter drove in three runs, and he thereby provided some excitement for the fans.
ii. The batter drove in three runs, whereby he provided some excitement for the fans.

6.2 The Nonfinite Connective

Paralleling the two corresponding copy-cleft structures already shown, (66) shows the connective copy-cleft structure in which the connective category Cv is particularized as the category for nonfiniteness in a clause, Nf.

(66)



This structure is exemplified in (67) for the cross-event relation of 'concurrence', already seen in (47F). The (i) forms are complex sentences with the subordinating prepositional complex *in the process of*. The (ii) forms are the corresponding copy-cleft sentences with the nonfinite connective. The (a) and (b) forms have different-subject clauses, while the (c) and (d) forms have same-subject clauses. The (a) and (c) forms have positive Figure events, while the (b) and (d) forms have negative Figure events.

(67) a. i. The gas spilled all over in the process of my draining the tank.
ii. I drained the tank, with the gas spilling all over in the process.
b. i. The gas did not spill all over in the process of my draining the tank.
ii. I drained the tank without the gas spilling all over in the process.
c. i. I spilled the gas all over in the process of draining the tank.
ii. I drained the tank, spilling the gas all over in the process.
d. i. I did not spill the gas all over in the process of draining the tank.
ii. I drained the tank without spilling the gas all over in the process.

6.2.1 Gerundive Forms Although in some languages the nonfinite category may be realized by a single undifferentiated form, in English two types can be distinguished, a gerundive type and an infinitival type. And this gerundive type, which we treat first, seems to be associated with the preposition *with* or its negative counterpart, *without*. These two preposi-

tions appear with a different-subject clause, as in (67a) and (67b), and the preposition *without* appears with a same-subject negative clause, as in (67d). Only a same-subject positive clause, as in (67c), lacks a preposition—though some theoretical approaches might posit the presence of an underlying *with* form—and so it appears like a pure gerundive form.

Other languages, such as Spanish, appear to have only a pure gerundive formation in their corresponding construction, using their usual negative form in the negative clauses. But the English *with*-based prepositions may initially give the appearance of being subordinating prepositions introducing a nominalized clause with which they constitute a subordinate clause. The construction may in fact have some structural characteristics of this sort, as will be discussed in section 7, on "secondary subordination." Nevertheless, this gerundive construction affords syntactic and semantic evidence of its being a connective-based constituent within a copy-cleft formation.

The first form of evidence is that the gerundive clause can contain an adverbial pro-clause or a subordinating preposition plus nominalized pro-clause. As has been seen, these constituents are of the kind that is usual for unmistakable copy-cleft sentences—for example, ones with a coordinating conjunction. Such forms, shown in italics, are presented in conjunctional and gerundival counterparts in (68) for two different cross-event relations.

(68) a. I drained the tank,
  i. and I didn't spill the gas all over *(in the process (of that)|during that|the while*.
  ii. without spilling the gas all over *(in the process (of that)|during that|the while*.
 b. The batter drove in three runs,
  i. and he provided some excitement for the fans *thereby|in that way*.
  and he *thus* provided some excitement for the fans.
  ii. providing some excitement for the fans *thereby|in that way*.
  thus providing some excitement for the fans.

The second form of evidence is that the new gerundive forms follow the same principle of semantic alignment, presented in (54), as do copy-cleft sentences with a coordinating conjunction. Once again, the dream/sleep example for 'contingent concurrence' can be used as a diagnostic to track the syntactic locations of the Figure event and the Ground event, as seen

in (69). The fact that the contingent Figure event of 'dreaming' can only appear in the gerundive constituent and not in the main clause demonstrates that this gerundive constituent is behaving just like the second constituent of a copy-cleft sentence, and not like the subordinate clause of a complex sentence.

(69) a. She slept, dreaming in the process/the while.
b. *She dreamt, sleeping in the process/the while.

Each type of connective has its own pattern of usage with the different cross-event relations. The coordinating conjunction form of the connective was able to occur with all the cross-event relations that we have examined—whether realized as an *and* or as a *but*—as was evident in A–O of (47). But the gerundive form of the nonfinite connective is more selective in English. As seen in (70), it occurs gracefully with some 8 relation types, awkwardly perhaps with some 2 additional relations, and not at all with some 5 relations, out of a total of 15 relation types under consideration. Any principle governing its pattern of occurrence is not immediately evident, though there appears to be a tendency toward its acceptable occurrence with cross-event relations that involve some form of simultaneity.

(70) a. *'Reason'*
*They were feeling tired, so/therefore staying home.
b. *'Concession'*
*They were feeling tired, going out anyway. / still going out.
c. *'Anteriority'*
She went home, having first stopped at the store. / having stopped at the store beforehand.
d. *'Posteriority'*
She stopped at the store, going home after that. / ?then going home. The fawn rose for a second to its feet, then immediately falling back down.
e. *'Subsequence'*
*He escaped, having since been spotted.
f. *'Concurrence'*
She slept, dreaming the while.
g. *'Continuous concurrence'*
He gave his account of the events, lying all along/the whole time/all the while.

h. *'Punctual coincidence'*
?She left, saying goodbye at that point/thereupon/then.
i. *'Cause: agentive'*
The batter drove in three runs, thus/thereby/in that way providing some excitement for the fans.
j. *'Conditionality'*
*She could lose her job, moving back to Boston in that event.
k. *'Exceptive counterfactuality'*
*I was busy, otherwise woulding have joined you.
*I was busy, otherwise having joined you. / otherwise joining you.
l. *'Additionality'*
He holds down a regular job, working at a sideline in addition to that. / as well/too.
?He holds down a regular job, also working at a sideline.
m. *'Negative additionality'*
?He does not hold down a regular job, taking no odd jobs either.
n. *'Substitution'*
He didn't study, having watched TV instead. / ?rather having watched TV.
o. *'Regard'*
I dried the cups, taking care in it. / being careful at/about it.

As discussed in section 2.9, a conjunctional copy-cleft form can often omit the constituent that identifies the particular cross-event relation that is in reference, leaving it to be inferred both from context and from its patterns of interaction with the choice of *and* or *but* for the coordinating conjunction. In a similar way, a nonfinite type of copy-cleft form can omit the relation-identifying constituent. But it can do so only under more restricted circumstances. Thus, of the ten relations that show a gerundive form in (70), only two seem to allow omission of the adverbial pro-clause or of the subordinating preposition plus nominal pro-clause, namely, 'anteriority' and 'concurrence', as illustrated in (71).[6]

(71) a. *'Anteriority'*
She went home, having eaten her lunch.
b. *'Concurrence'*
She went home eating her lunch.

We can seek to explain this English constraint on the use of the gerundive without indication of the cross-event relation. A clue may be found in the gerundive's tense properties. As just seen in (71), though the gerundive construction is nonfinite, it can still indicate relative tense. It uses the form *having V-en* for prior time and the basic form *V-ing* for relatively current time. In addition, it can exhibit relatively later time with the presumptive form *be-ing to V*, where the expected form *being* is omitted from the overt expression, as suggested in (72).

(72) a. *Complex sentence*
They were never again to meet after they parted.
b. *Copy-cleft with cross-event relation indicated*
They parted, [being] never again to meet after that.
c. *Copy-cleft with cross-event relation not indicated*
They parted, never again to meet.

We can now propose an account for the gerundive's behavior in English. It is that a copy-cleft form with a gerundive connective can be used to express many, though not all, cross-event relations provided that the relation is overtly expressed. But if no relation is expressed, the gerundive form reverts to an unmarked state, that of expressing only the cross-event relation of 'concurrence'. The gerundive construction, though, can then use its relative tense indications to simulate the expression of two other cross-event relations. With the perfect form of the gerundive, it can be posited, the "aftermath" of the Figure event is concurrent with the Ground event, hence, the Figure event itself can be understood to bear the relation of 'anteriority' to the Ground event. And with the future form of the gerundive, it is the "lead up" to the Figure event that is concurrent with the Ground event, so that the Figure event itself is understood to bear the relation of 'posteriority' to the Ground event.

If the *-te* form in Japanese can be treated as gerundival for consideration here, its availability for use in copy-cleft structures can be checked. To set the background, it can be noted that the *-te* form is regularly used as a subordinator for a subordinate clause in a complex sentence to express the cross-event relations of 'concurrence', as in (73a), and 'posteriority', as in (73b).

(73) a. Nemutte ite, yume o mita.
sleeping being, dream OBJ saw
'She dreamt while she slept.'

b. Mise ni yotte, uti e kaetta.
store at having-stopped, home to returned
'She returned home, after having stopped at the store.'

Recall from section 5 that Japanese generally lacks copy-cleft structures with a connective—there considered for the case in which the connective is a coordinating conjunction. And, following suit, it can here be observed that Japanese also generally seems to lack copy-cleft structures in which the connective is a nonfinite form. Thus, the *-te* form cannot be used in a CvP connective phrase to express the cross-event relation of 'posteriority'.

(74) *Sono ato de uti e kaette, mise ni yotta.
after that home to returning store at stopped
'She stopped at the store, returning home after that.'

However, in what may be its only breach of copy-cleftlessness (except perhaps for manner adverbs, as discussed below), Japanese does allow use of the *-te* form in a nonfinite connective phrase when the relation being expressed is that of 'concurrence', as seen in (75).

(75) (?Sono aida ni) yume o mite ite, nemutta
(that-of course in) dream OBJ seeing being, slept
'She slept, dreaming (in the course of that.)'

6.2.2 Infinitival Forms Beside its gerundive form, English also has an infinitival form of the nonfinite connective. But, in its basic usage, it is extremely limited. Of the 15 cross-event relations in (70), it seems viable only with 2, as shown in (76).[7]

(76) d. *'Posteriority'*
The fawn rose to its feet for a second, immediately to fall back down after that.
i. *'Cause: agentive'*
The batter drove in three runs, thus/thereby/in that way to provide some excitement for the fans.

To expand the investigation, we can observe that Yiddish also has an infinitival connective form, though this only takes part in a specific construction and only represents the cross-event relation of 'concurrence'. In this construction, the infinitive in *tsu* expresses the manner of locomotion that is concurrent with a deictic motion verb, as shown in (77).

(77) a. Es iz gekumen tsu geyn/forn in shtot a soykher.
it is come to walk/ride to town a merchant
'A merchant came walking/riding into town.'
(i.e., "A merchant came into town, walking/riding during that")
b. Er hot gebrakht tsu trogn/firn skheyre
he brought to carry/cart wares
'He carried/carted in wares.'
(i.e., "He brought wares, carrying/carting them during that")

6.2.3 Adverbial Forms Rather speculatively, though still in this chapter's spirit of tracking semantic correspondences, we consider the possibility that a manner adverb can be regarded as a reduced form of a nonfinite connective phrase within a copy-cleft construction. Such an adverb would represent a Figure event that bears the relation of 'regard' to a Ground event and share the same subject with it, a type first seen in (47O). For a standard adverb in *-ly* to occur appropriately in English, perhaps the basic Figure event must be stative and be represented by an adjectival predicate. The illustration in (78) shows the corresponding constructions for a complex sentence and several copy-cleft forms, including the one with an adverb.

(78) a. *Complex sentence*
I was careful in/at/about drying the cups.
b. *Copy-cleft with conjunctional connective*
I dried the cups, and (I) was careful in/at/about it.
c. *Copy-cleft with gerundive connective*
I dried the cups, being careful in/at/about it.
d. *Copy-cleft with manner adverb*
I dried the cups carefully.

What works in favor of this copy-cleft interpretation for manner adverbs is the semantic alignment. The manner adverb *carefully* in (78d) expresses the same notion, and the same relationship of that notion to the whole conceptual structure of the sentence, as do the main clause of (78a) and the subordinate clauses of (78b) and (78c). And such a manner adverb intrinsically has the same "subject" as the main clause verb, much as the same subject is necessarily shared by the two clauses in a 'regard' relation.

Certain formal factors stand against the interpretation, though. The manner adverb does not allow the same explicit specification of the

'regard' relation as (78b) and (78c) do with the phrases *in/at/about it*. Further, the manner adverb is phonologically integrated into the initial clause, without following a junctural break. Finally, the manner adverb can appear between the subject NP and the verb, which the subordinate clauses of (78b) and (78c) cannot do. The case awaits further assessment. If the interpretation does hold, though, it represents another case of copy-cleft formation in any language with manner adverbs, including Japanese, where it would then constitute a second breach of that language's general copy-cleftlessness.

6.2.4 A Split System Some languages have a split system of two or more distinct nonfinite forms for use in copy-cleft constructions that between them divide up the expression of the various cross-event relations. Thus, Swahili, in addition to having a nonfinite form—marked by a *-ki-* prefix in the verb—that expresses at least 'concurrence' and, it seems, several other notions, has a further nonfinite form—marked by a *-ka-* prefix—that specifically expresses 'posteriority', as shown in (79). Thus, this form is comparable to the English gerundive construction *then VP-ing*, as was seen in (70d).

(79) ni-li-kwenda soko-ni, ni-ka -rudi
I-PAST-go market-to I-then ... -ing-return
'I went to the maket, then returning.'

The verb containing *-ka-* is understood to be a nonfinite form because it lacks the overt tense markers that a finite verb form in Swahili has. Rather, it regularly follows a finite form, deriving its tense sense from it. If the *-ka-* form had been finite, then it would have merited a comparison to the English conjunctional connective in *and then VP*.

7 SECONDARY SUBORDINATION

In English and presumably in other languages, a type of structure exists that in several respects appears syntactically like a complex sentence with a subordinate clause, but in which the semantic alignment resembles that of a copy-cleft structure and in which differences in formal behavior also occur. On this latter basis, we will hold that such forms indeed are essentially copy-cleft in character, and have only a secondary appearance as complex sentences, hence we term the phenomenon **secondary subordination**.

7.1 Secondary Subordinating Conjunctions

One type of secondary subordinate clause has what looks like a subordinating conjunction, four examples of which are italicized in (80).

(80) a. I spent a lot of money on my sound system, *although* I haven't even played it once since I bought it.
b. Everyone already knows that the earth is a sphere, *whereas* I now know that the earth is a hollow sphere. [said by a mad scientist]
c. The fence was repaired well, *while* the gate still needs some work.
d. She was lecturing to her class *when* suddenly the door burst open.

The semantic effect of these subordinating conjunction look-alikes can actually seem more akin to that of a relative type of connective construction. This is suggested in (81), where the forms are labeled with the subscript 2 to distinguish them from the putatively true subordinating conjunctions.

(81) a. *although*$_2$: 'notwithstanding which'/'in the face of which'
b. *whereas*$_2$: 'in contrast with which'/'in contradistinction to which'/'above and beyond which'
c. *while*$_2$: 'in distinction to which'/'in comparison with which'
d. *when*$_2$: 'in the midst of which'/'at a point during which'

Here are some reasons for proposing such a correspondence. First, consider the *although*$_2$ form, which is compared with the putatively true subordinator *although*$_1$ in (82).

(82) a. I spent a lot of money on my sound system, *although*$_1$/even though I had no interest in music. / despite my having no interest in music.
b. I spent a lot of money on my sound system, *although*$_2$/*even though I haven't even played it once since I bought it. / *despite my not playing it even once since I bought it.

First, with respect to formal properties, *although*$_2$ is distinct from *although*$_1$. Phonologically, its clause must be pronounced with the low-intoned prosody of an aside, whereas the *although*$_1$ clause may be so pronounced and typically is not. Further, *although*$_1$ can be replaced by

even though, or its clause can be replaced by *despite* plus a nominalized version of the clause, without substantial change in the meaning of the sentence, whereas *although*$_2$ does not permit such replacements.

Second, the two forms differ with respect to semantic properties. Consider the *although*$_1$ clause exemplified in (82a), namely, that in *I spent a lot of money on my sound system, although*$_1$ *I had no interest in music*. This clause refers to a circumstance that has existed prior to the main clause event and that may continue to hold during it. This circumstance has been ineffective either in acting physically against the occurrence of the main clause event, or in serving as a reason against the Agent's voluntarily undertaking the main clause event. Thus, the main clause event has occurred against the background of hindrance from, and of potential blockage by, the preexisting subordinate clause event. This is a standard instance of the way that a Figure event relates to a Ground event. A semantically comparable structure with the embeddedness of the two clauses reversed—that is, with the Ground event expressed as the main clause and the Figure event as an embedded clause—would in fact be a typically concessive copy-cleft form of the sort we have been analyzing: *I had no interest in music, but I spent a lot of money on my sound system anyway*.

Consider now the *although*$_2$ clause exemplified in (82b), namely, that in *I spent a lot of money on my sound system, although*$_2$ *I haven't even played it once since I bought it*. By contrast, this clause refers to a circumstance that has occurred after the main clause event and that never hindered or threatened to block it, but rather, that has simply been inconsistent with the intent of that event. Thus, semantically, it is the main clause event that acts like the Ground, since it is earlier and provides the background against which one considers the subsequent *although*$_2$-clause circumstance, which therefore acts as a Figure. That is, the sentence with *although*$_2$ has the Ground event–Figure event alignment of a copy-cleft form. And, in fact, when one seeks an alternative structure that would be semantically comparable to this sentence but with the embeddedness of its clauses reversed, one finds a regular complex sentence with a standard subordinate clause and a Figure-Ground alignment, something like *I did not even play my sound system once since I bought it, notwithstanding my spending a lot of money on it*.

Since the *although*$_2$ phrase includes a finite clause, it seems more parallel to a conjunctional or relative type of connective phrase than to the nonfinite type. And since *although*$_2$ includes reference to a cross-event

relation with a 'notwithstanding' sense, its parallels should include a subordinating preposition like *notwithstanding* or *in the face of*. Thus, *although*$_2$ is parallel to forms like *but notwithstanding that* or *notwithstanding which*. This latter relative type has been selected to represent secondary subordinators, as in (81).

Turning now to *whereas*$_2$, since this form appears to express a symmetric notion of contrast between two events, one might at first assume that the two clauses it relates could simply be reversed without much effect on the sentence. And yet it is apparent that the sentence in (80b) cannot undergo such an inversion, as seen in (83).

(83) a. Everyone already knows that the earth is a sphere, whereas$_2$ I now know that the earth is a hollow sphere.
b. *I now know that the earth is a hollow sphere, whereas everyone already knows that the earth is a sphere.

The same arguments can be applied here that were advanced in chapter I-5. There it was claimed that a predicate like *be near* is not symmetric, but rather is lexicalized for taking a Figure entity as subject and a Ground entity as object. Given the different characteristics prototypically associated with a Figure and a Ground, a sentence like *The bike is near the house* is generally acceptable, whereas in most circumstances, the inverse version, **The house is near the bike*, is unacceptable. In a similar way, *whereas*$_2$ is asymmetric in that it requires a Figure event in one position and a Ground event in another, though it places these in the reverse order from *be near*. In particular, we can determine that it requires that the main clause represent the Ground event and that the embedded clause represent the Figure event, since, as can be seen from the example, it is the main clause that expresses the earlier more general circumstance, while the embedded clause expresses a later more specific circumstance.

As with *although*$_2$, a sentence with *whereas*$_2$ has a counterpart with the embeddedness of the clauses reversed that behaves like an ordinary complex sentence with the Figure event in the main clause and the Ground event embedded after a true subordinating preposition. Such a sentence here might be the following: *I now know that the earth is a hollow sphere, above and beyond everyone's already knowing that the earth is a sphere*. It thus seems that *whereas*$_2$ can roughly correspond to *above and beyond which*, and that a *whereas*$_2$ clause is parallel to a relative connective phrase within a copy-cleft structure. We can add here that secondary *while*$_2$ seems to behave much like *whereas*$_2$.

Note that as a vocabulary item, *whereas* is specifically lexicalized as a secondary subordinating conjunction—it has no primary look-alike—and so no subscript 2 is strictly necessary to mark it. By contrast, the other forms we have been considering—*although*, *while*, and *when*—do have look-alike counterparts that serve as true subordinating conjunctions.

For a final case, consider the previously illustrated *when*$_2$, shown again in (84a), which we have glossed as 'in the midst of which', or 'at a point during which'. The semantic alignment accompanying the *when*$_2$ appears to favor a secondary conjunctional status for this form. The reason is that the main clause event is the larger containing event, which typically serves as a Ground, while the embedded clause refers to a smaller, indeed punctual, event that is contained within the larger one, a property typically exhibited by a Figure, as per the "inclusion principle" presented in (50). As might accordingly be expected, a true complex sentence with a true subordinator like *in the midst of* and with the events represented in the reverse order, like that shown in (84b), is semantically equivalent to the sentence under inspection.

(84) a. She was lecturing to her class when$_2$ suddenly the door burst open.
b. Suddenly the door burst open in the midst of her lecturing to her class.

Syntactically, moreover, *when*$_2$ has the specific property that its clause cannot appear initially, a formal characteristic that distinguishes it from *when*$_1$. In this respect, *when*$_2$ differs from the other secondary subordinators. Thus, (85) contrasts the fact that *although*$_2$ accepts initial positioning with the fact that *when*$_2$ refuses it.

(85) a. Although I haven't even played it once since I bought it, I spent a lot of money on my sound system.
b. *When suddenly the door burst open, she was lecturing to her class.

7.2 Secondary Subordinating Prepositions and Gerundives

The preceding section proposed the existence of subordinating conjunctions with a formally and semantically secondary status. In addition, the nonfinite connective construction, already treated in section 6.2, was there already seen to have a secondary status, and can be considered here specifically in that regard. Thus the *with* or *without* that accompanies certain nonfinite connective formations can be considered a secondary

subordinating preposition. An example of one, here marked with the subscript 2 to signal its secondary status, appears in (86b). This form can be contrasted with a primary subordinating preposition. An example of one for 'posteriority', here marked with a subscript 1 to signal its primary status, is given in (86a).

(86) a. I drained the tank after$_1$ setting up containers to hold the gas.
b. I drained the tank without$_2$ spilling the gas all over in the process.

Comparably, section 2.3.2 described a gerundive clause without any specific subordinator. This might be considered a primary gerundive clause functioning as a genuine subordinate clause within a true complex sentence. An example of such a gerundive, one in the perfect form to express 'posteriority' and marked with the subscript 1 to signal its primary status, appears in (87a). Relative to this form, the gerundive clause in (87b) has a secondary status, parallel to that of the other secondary forms discussed here, and so also marked with the subscript 2.

(87) a. I drained the tank, having$_1$ set up containers to hold the gas.
b. I drained the tank, spilling$_2$ the gas all over in the process.

7.3 Nested Secondary Subordination

In the preceding sections, the emphasis was on the semantic and syntactic peculiarities of certain subordination-resembling forms that lead one to consider them as a secondary type of construction, separate from their primary look-alikes. But we can also consider their similarities to primary subordination. One such similarity was already observed. This is the fact that all but one of the cited secondary forms allow sentence-initial positioning, just as their primary models do. Thus, while conjunctional and relative connective phrases cannot prepose, as seen in (88a), able to do so are almost all the constituents introduced by secondary forms, whether conjunctional, prepositional, or gerundival, as seen in (88b).

(88) a. i. *And then she went home, she stopped at the store.
ii. *But they still went out, they were feeling tired.
iii. *After which she went home, she stopped at the store.
iv. *Whereupon I entered, the door swung open.
b. i. Although I haven't played it even once since I bought it, I spent a lot of money on my sound system.
ii. Without spilling any gas in the process, I drained the tank.
iii. Dreaming the while, she slept.

But further, to a small extent, a sentence with secondary subordination can behave like an ordinary complex sentence for which, in turn, a new copy-cleft form can serve as the counterpart.[8] Thus, the sentence in (89a), reprised from above, was already discussed as constituting a copy-cleft formation with a gerundive connective accompanied by the secondary subordinator *without*. But, relative to this form, the sentence in (89b) itself behaves like a copy-cleft form. (Here, the pronominalization *doing so* reads better than *that*.)

(89) a. I drained the tank without spilling the gas in the process (of it).
b. I didn't spill any gas in the process of draining the tank, draining it without doing so.

8 CLAUSE CONFLATION

Chapters II-1 to II-3 investigate a type of complex semantic structure, which we have termed a "macro-event," that consists of a "framing event" and a "Co-event," as well as the relation that the latter bears to the former. For the most part, perhaps completely, the semantic structure of a macro-event is most directly represented by the syntactic structure of a basic complex sentence, rather than, say, of a copy-cleft sentence. That is, the framing event appears mostly to act as a Figure event, and the co-event as a Ground event that bears a particular relation to the Figure event. This indeed appears to be the likeliest interpretation where the co-event bears the relation of 'Cause' to the framing event, as shown for both nonagentive and agentive cases in (90).

(90) *A macro-event as a complex event (structured like a complex sentence), composed of*
a framing event as Figure event + relation + a co-event as a Ground event
a. *Nonagentive cause*
[the napkin MOVED off the table] WITH-THE-CAUSE-OF
[the wind blew on the napkin]
The napkin moved off the table from/as a result of the wind blowing on it.
b. *Agentive cause*
[I $_{A}$MOVED the keg into the pantry] WITH-THE-CAUSE-OF
[I kicked the keg with my left foot]
I moved the keg into the pantry by kicking it with my left foot.

Now, the reason for distinguishing macro-events from the general type of structure examined in section 2.2—namely from the type that can be represented by a complex sentence with a subordinating preposition—is that they have a certain common property: a macro-event can also be represented by a single clause.

Languages fall into two main typological categories on the basis of the way they map a macro-event onto syntactic structure. We can look here at one such category, that of the "satellite-framed" languages, of which English is an example. In the single-clause form in these languages, the predicate of the co-event is represented by the verb, and other co-event components by adjuncts, while the framing-event components are represented by the remainder of the clause. Thus, the semantic structures just seen represented by complex sentences in (90) can also be expressed by monoclauses like those in (91).

(91) a. The napkin blew off the table from the wind.
b. I kicked the keg into the pantry with my left foot.

The syntactic structure of this single-clause type of sentence manifests what we have called "clause conflation." The structure interweaves constituents that represent various components of both the Figure event and the Ground event. That is, it interweaves constituents that in a syntactically standard complex sentence would have been segregated and would have separately referred to the Figure event or the Ground event. Such a clause-conflational sentence, then, constitutes a still further syntactic structure that represents a pair of cross-related events and that can now be added to the family of such structures presented in section 2. We do not here include a tree diagram for this structure to join the others in section 2. But chapters II-1 to II-3 provide representations of the semantic-syntactic mappings involved here.

What seems more open to interpretation, though, is the semantic-syntactic status of a macro-event in which the co-event bears the relation of 'Manner' to the framing event. Perhaps it too should simply be considered to correspond most directly to a complex sentence with Figure-Ground precedence that represents a cross-event relation of 'concurrence'. The troublesome point, though, is that, in the likeliest corresponding complex sentence, the subordinate clause can include the adverbial pro-clause *in the process* or *the while*. This suggests that this subordinate clause—most readily rendered in a gerundive form—actually constitutes a case of secondary subordination and hence that the whole sentence is a

copy-cleft structure with Ground-Figure precedence. This matter is illustrated in (92). Here, the (a) form represents the macro-event structure most directly, the (b) form renders that structure with more suggestive English phrasing, where it is not clear whether the gerundive clause is primary or secondary, and the (c) form is the usual English clause-conflated reflex of the macro-event.

(92) a. [the craft MOVED into the hangar] WITH-THE-MANNER-OF [the craft floated on a cushion of air (in the process (of that)/ the while)]
b. The craft MOVED into the hangar, floating on a cushion of air (in the process (of that)/the while)
c. The craft floated into the hangar on a cushion of air.

We do not here resolve the ambiguity of interpretation. But note that, under either interpretation, the Manner relation that is represented by this kind of conflation is a particular subtype of the cross-event relation of 'concurrence'. And this Manner subtype must be present for the conflated form to be viable.

9 COPY-CLEFTING OF NOMINALS

It is not only clauses that can exhibit copy-cleft structure, but also nominals. Nominals can exhibit such structure either across the scope of a whole sentence or within an NP constituent. To consider first the sentence-spanning type, the syntactic formation that has been referred to in the generative literature as left-dislocation can now be regarded as a certain extension of copy-cleft structure from clauses to nominals. Or, conversely, what this chapter has been treating as copy-cleft structure can be considered as an extension of left-dislocation from nominals to clauses.

For a French illustration, the sentence in (93a) might, for the present purposes, be analogized to a complex sentence. Relative to this, the sentence in (93b) resembles a clausal copy-cleft form in that it has an initial duplicate of the constituent in question—here, not a clause, but a nominal, *ma mère; it has an anaphoric pro-form where the original sentence had a full NP—specifically, the pronoun la* elided to *l-*; and it has a similar constructional meaning, as discussed below.

(93) a. J'ai vu ma mère.
'I saw my mother.'

b. Ma mère, je l'ai vue.
'My mother, I saw her.'

By one interpretation, American Sign Language can produce a multiple copy-cleft structure involving two nominals with different functions in a sentence. Thus, beside a putatively more basic structure like that in (94a) is a doubly copy-cleft form like that suggestively rendered in (94b) (each sign that would be made is indicated by an italicized English word).

(94) a. *Hank went-to Fresno*.
b. You know *Hank*? You know *Fresno* Well, *he-went-there*.

As noted, nominal copy-clefting can take place not only across the scope of a whole sentence, but also within an NP constituent. For example, in German, beside a putatively more basic possessor-possessed construction like that in (95a) is the regularly used copy-cleft formation in (95b). (The formation can also be used for most grammatical relations besides that of direct object.)

(95) a. Ich habe *den Bleistift* *des Jungen* gesehen.
I have the pencil (ACC) the boy (GEN) seen
'I saw the boy's pencil.'
b. Ich habe *dem Jungen* *seinen Bleistift* gesehen.
I have the boy (DAT) his pencil (ACC) seen
'I saw the boy's pencil.'

One can envisage nonoccurrent structures between (95a) and (95b) that in certain respects are comparable to structures seen in section 2 for clauses. Thus, if (96a) below can be taken to underlie (95a) above, then (96b) can be taken as the structure that now includes an initial duplicate—appearing in the dative—of the original genitive constituent, itself still appearing in its right-hand position. The structure in (96c) is the same, but with the later occurrence of the constituent now an anaphoric pronoun. The structure in (96d) simply represents the genitive pronoun as a possessive pronominal in its usual prenominal location. It is this form, then, that underlies the overt form, shown in (96b).

(96) a. [der Bleistift -ACC] [der Junge -GEN]
b. [der Junge -DAT] [- der Bleistift -ACC] [der Junge -GEN]
c. [der Junge -DAT] [der Bleistift -ACC] [er ('he') -GEN]
d. [der Junge -DAT] [sein- ('his') Bleistift -ACC]

English, too, exhibits a copy-cleft formation within an NP constituent, as seen by comparing the straightforward construction italicized in (97a) with the copy-cleft construction italicized in (97b).

(97) a. Now we'll investigate *the more general process of population stabilization*.
b. Now we'll investigate *a more general process, that of population stabilization*.

10 CONCLUSION

This chapter has shown that a certain semantic structure—a Figure event relating to a Ground event—is of central significance. In evidence of this, we have shown that language devotes an extensive array of syntactic structures to the representation of this semantic structure. And a language can allocate a large number of lexical forms of several distinct grammatical categories to represent the range of relations borne by the Figure event to the Ground event. Our method of "semantic alignment" allows one to trace the semantic correspondences across the participating syntactic structures and lexical forms, and so to establish the patterns of relationship that they exhibit. Tracking semantic alignment can also help distinguish between two structures that otherwise resemble each other, as in the case of primary and secondary subordination. The patterns of relationship across structures are not only shown to apply to clauses, but also to extend to nominals. And languages appear to fall into two typological categories on the basis of whether they have or lack a conjunctional copy-cleft structure.

Notes

1. This chapter is a wholly rewritten and expanded version of Talmy 1978b. In turn, that paper was a moderately revised version of a paper titled "Copy-Clefting," which appeared in *Working Papers on Language Universals*, no. 17, June 1975, Stanford University; copyright 1975 by the Board of Trustees of the Leland Stanford Junior University.

My thanks go to Haruo Aoki for help with the Japanese forms in this chapter, and to Kean Kaufmann, Jean-Pierre Koenig, and Holger Diessel for their helpful comments on the present rewritten version.

2. We have avoided sentences here with a form like *take place* in lieu of *be*—as in a counterpart to (3c) like *Her going home took place after her stopping at the store*—because they have a different structure. The *take place* does not serve to assert the cross-event relation. Rather, the full constituent preceding the *after* is

really the main clause of the whole form, itself a complex sentence, a structure treated in the next section.

3. Among other observations, Diessel finds that 'reason' adverbial clauses with *since* occur mostly in initial position, while those with *because* are mostly final. One account for this behavior is that English has only one basic subordinating conjunction for 'reason', but that this has two suppletive forms, *since* and *because*. Each form, then, is lexicalized for representing the conflation of the semantic component 'reason' together with a pragmatic component of preferential initial or preferential final occurrence.

4. In traditional terminology, the use of the term "conjunction" in both "subordinating conjunction" and "coordinating conjunction" suggests a view that these latter two grammatical categories are simply variants of a single grammatical phenomenon. In our analysis, however, there is no particular connection at all—syntactic or semantic—between subordinating conjunctions and coordinating conjunctions.

5. Note that in addition to this nominal use of *then*, (47) has three semantically distinct forms of *then* as an adverbial pro-clause. These are the forms representing 'posteriority', 'punctual coincidence', and 'conditionality' in (47D), (47H), and (47J), which have the senses, respectively, 'after that', 'at that point', and 'in that event'. Some languages have distinct forms for these same three senses of *then*. Thus, Yiddish has, respectively, *dernokh, demolt*, and *dan*.

6. The acceptability of a sentence like *I dried the cups, taking great care* suggests that the relation of 'regard', as presented in (70o), also allows omission of its specific expression. But a likelier explanation is that this sentence is simply interpreted as expressing the relation of 'concurrence'.

7. Another infinitival usage that includes the word *only* and that adds to the Figure event the semantic indication that it is some kind of 'reversal of expectation', especially one in a negative direction, has much wider occurrence over the cross-event relations. Examples include the following sentences:

(i) They were feeling tired, only to go out anyway.

(ii) She slept, only to dream about frightening events.

(iii) She stepped out the door, only to turn around at that point and hurl an insult.

8. If a classical transformation approach were to hold that a standard copy-cleft structure derives transformationally from a complex sentence structure, then, on the basis of the evidence here, it might also hold that the transformation of copy-clefting is cyclic.

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PART 4

FORCE AND CAUSATION

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Chapter 7

Force Dynamics in Language and Cognition

1 INTRODUCTION

A semantic category that has previously been neglected in linguistic study is that of **force dynamics**—how entities interact with respect to force. Included here is the exertion of force, resistance to such a force, the overcoming of such a resistance, blockage of the expression of force, removal of such blockage, and the like.[1]

Though scarcely recognized before, force dynamics figures significantly in language structure. It is, first of all, a generalization over the traditional linguistic notion of "causative": it analyzes 'causing' into finer primitives and sets it naturally within a framework that also includes 'letting', 'hindering', 'helping', and still further notions not normally considered in the same context.

Force dynamics, furthermore, plays a structuring role across a range of language levels. First, it has direct grammatical representation. In English, our main language of demonstration, such representation appears not only in subsets of conjunctions, prepositions, and other closed-class elements but, most significantly, also as the semantic category that most uniquely characterizes the grammatical category of modals as a whole, both in their basic and in their epistemic usages. Force-dynamic patterns are also incorporated in open-class lexical items and can be seen to bring many of these together into systematic relationships. Lexical items involved in this way refer not only to physical force interactions but, by metaphoric extension, also to psychological and social interactions, conceived in terms of psychosocial "pressures." In addition, force-dynamic principles can be seen to operate in discourse, preeminently in directing patterns of argumentation, but also in guiding discourse expectations and their reversal.

Finally, the conceptual system for force interaction that appears to be built into language structure can be related to other cognitive domains. The linguistic system, in fact, shows close parallels with the conceptual systems for force interaction both in naive physics and psychology, and in early science, as well as in casual treatments of modern science—though it is often at variance with rigorous modern science. Overall, force dynamics thus emerges as a fundamental notional system that structures conceptual material pertaining to force interaction in a common way across a linguistic range: the physical, psychological, social, inferential, discourse, and mental-model domains of reference and conception.

In historical perspective, developed concepts of force interactions are of course not novel, in particular, for physical phenomena, long the study of disciplines like physics. Outside the physical, perhaps the most familiar application is that of Freud to the psyche, with such psychodynamic concepts as libido and drives, repression and resistance, id-superego conflict, and a tension-reduction model for restoring equilibrium. To my knowledge, however, systematic application of force concepts to the organization of meaning in language remained neglected until an initial endeavor in Talmy 1976a and, as an initial presentation as a basic linguistic system, in Talmy 1981. Earlier reference to force, of course, is to be found. Whorf (1941) cited and diagrammed force opposition as the referent of a particular Shawnee root, and the psychologist Fritz Heider (1958), whose work has recently come to my attention, discussed force concepts in modality. But these treatments were neither systematic nor explanatory. More recently, Gee and Kegl (1982:348–350) have developed a system involving forces to account for certain motion concepts in American Sign Language. Sweetser (1982, 1984), adopting the present force-dynamic framework, has carried it into an account of the epistemic senses of modals. Aspects of the present system have also been incorporated into the theoretical frameworks of Pinker (1989, 1997), Jackendoff (1990), and Brandt (1992).

The method I adopt here in investigating the category of force dynamics is based within the broader approach of cognitive semantics. This approach includes the idea that language uses certain fundamental notional categories to structure and organize meaning, but that it excludes other notional categories from this role. The included categories are most directly evident across languages as the categories of concepts that are expressed by closed-class forms—or, broadly speaking, by *grammar*—such as inflections and particles, as well as grammatical categories, rela-

tions, and constructions (see chapter II-1). Many of these same notional categories play a prominent role as well in structuring lexicalization patterns for open-class lexical items. To illustrate, many languages have noun inflections that indicate the *number* of the noun's referent, but they never have inflections that indicate this referent's *color*. From similar observations, we can construct two sets, one consisting of notional categories like 'color' that never appear in languages' closed-class forms, and the other of those that regularly do so and thus play a basic conceptual structuring role. In addition to number, this set will contain such generally recognized categories as aspect, mood, and evidentiality. One purpose of this study is to establish force dynamics as a further member of this privileged set of fundamental semantic categories. Beyond this, as cognitive scientist as well as linguist, I address the issue of how the semantic structuring evident within language relates to conceptual organization in other cognitive systems, such as the perceptual modalities and reasoning. In other work (Talmy 1983, 1987), I have compared the system that language uses to schematize and structure space and time, with properties of visual perception. Here, I will compare the way that linguistic force dynamics organizes conceptions of physics and psychology with the naive as well as the scientific mental models that we use to reason about these same areas.

The earlier outline of force-dynamic properties largely matches this chapter's sequencing, which steadily proceeds from more basic to more complex forms. First shown are the fundamental force-dynamic distinctions together with a system for diagramming them (sections 1 and 2). This leads to a demonstration of force dynamics as a generalization over the traditional causative (section 3). Next is shown how language extends physical force concepts to the expression of internal psychological interactions (section 4). This expansion allows us to bring together in a systematic pattern a number of lexical items that involve such psychodynamics (section 5). Language is then shown to further extend force-dynamic concepts to social interactions, and to organize lexical items with social reference in the same way as the psychological ones (section 6). The progression of parameters to that point permits an examination of the modal system in force-dynamic terms (section 7). Then a look at discourse shows how force-dynamic concepts extend, without augmentation, to the discourse factors that direct argumentation and to a familiar phenomenon here called **vector reversal** (section 8). The final text section (section 9) compares the conceptual models of physics and psychology that are built

into language in its force-dynamic system with comparable models in other cognitive domains. In the conclusion (section 10), further lines of research on force dynamics are sketched out, and the system is set within larger contexts, both that of other conceptual systems in language and that of human conceptual structure as a whole.

1.1 Illustrating the Category

Since force dynamics is a novel category in linguistics, it would be best to give it immediate illustration. The minimal pairs in (1) mostly contrast force-dynamically neutral expressions with ones that do exhibit force-dynamic patterns, showing these in a succession of semantic domains.

(1) a. be VPing/keep VPing [*physical*]
   i. The ball was rolling along the green.
   ii. The ball kept (on) rolling along the green.
   b. not VP/can not VP [*physical/psychological*]
   i. John doesn't go out of the house.
   ii. John can't go out of the house.
   c. not VP/refrain from VPing [*intrapsychological*]
   i. He didn't close the door.
   ii. He refrained from closing the door.
   d. polite/civil [*intrapsychological: lexicalized*]
   i. She's polite to him.
   ii. She's civil to him.
   e. have (got) to VP/get to VP [*sociopsychological*]
   i. She's got to go to the park.
   ii. She gets to go to the park.

Illustrating the purely physical realm, (1ai) depicts a force-dynamically neutral event. The use of the word *keep* in (1aii), however, brings in either of two force-dynamic patterns: either the ball has a tendency toward rest that is being overcome by some external force acting on it, say, the wind, or the ball presently has a tendency toward motion that is in fact overcoming external opposition to it, say, from stiff grass.

In (1b) a psychological force factor joins the physical one. The force-dynamically neutral expression in (1bi) merely reports an objective observation, John's not going out. But (1bii), in addition to the same observation, also sets forth a full force-dynamic complex: that John *wants* to go out (conceivable as a forcelike tendency toward that act), that there is some kind of force or barrier opposing that tendency, and that the latter is stronger than the former, yielding a net resultant of no overt action.

Example (c) illustrates that language can depict a force opposition as wholly psychological, and in fact as occurring within a single psyche. Again, both (ci) and (cii) refer to the same overtly observable situation, an agent's nonaction. But (cii) in addition represents this situation as the resultant of an intrapsychological conflict, one between the agent's urge to act and the same agent's stronger inhibition against acting.

Example (d) exhibits the same type of force-dynamic contrast as (c) but demonstrates that this can be lexicalized. While the *polite* of (di) is neutral, (dii)'s *civil* indicates that the subject's basic tendency here is to be impolite but that she is successfully suppressing this tendency.

Example (e) demonstrates that language extends force-dynamic concepts as well to interpsychological—that is, social—interactions. Here, both of the expressions exhibit force-dynamic patterns, but of different types, ones that yield the same overt resultant for different reasons. In (ei), the subject's desire (= force tendency) is not to go to the playground, but this is opposed by an external authority who does want her to do so, and prevails. In (eii), the subject's desire *is* to go to the playground, and stronger external circumstances that would be able to block her from doing so are reported as either disappearing or not materializing, thus permitting realization of the subject's desire.

2 BASIC FORCE-DYNAMIC DISTINCTIONS

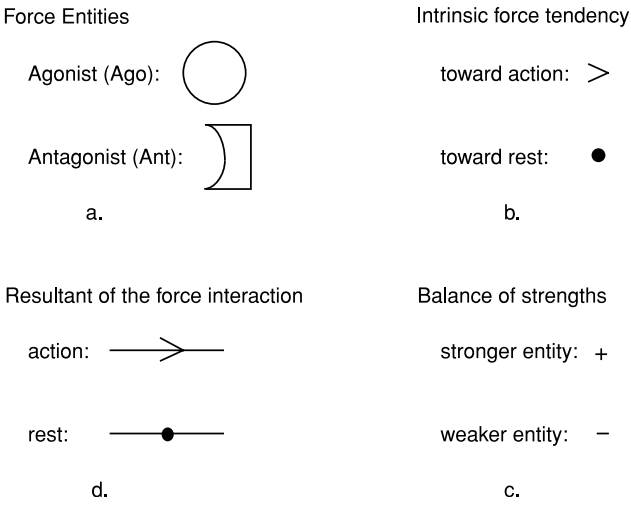
We begin the progression of force-dynamic parameters with the most fundamental—the ones that are operative throughout the system. In the present section, these are considered only for their application to the realm of physical force.

2.1 Steady-State Force-Dynamic Patterns

Underlying all more complex force-dynamic patterns is the steady-state opposition of two forces, and we now examine the factors that comprise it. The primary distinction that language marks here is a role difference between the two entities exerting the forces. One force-exerting entity is singled out for focal attention—the salient issue in the interaction is whether this entity is able to manifest its force tendency or, on the contrary, is overcome. The second force entity, correlatively, is considered for the effect that it has on the first, effectively overcoming it or not. Borrowing the terms from physiology where they refer to the opposing members of certain muscle pairs, I call the focal force entity the **Agonist** and the force element that opposes it the **Antagonist**.[2] In the system of

diagramming used throughout this chapter to represent force-dynamic patterns, the Agonist (Ago) will be indicated by a circle and the Antagonist (Ant) by a concave figure, as shown in (2a).

(2)



Note: Laterality is irrelevant—mirror-image diagrams represent the same force-dynamic pattern.

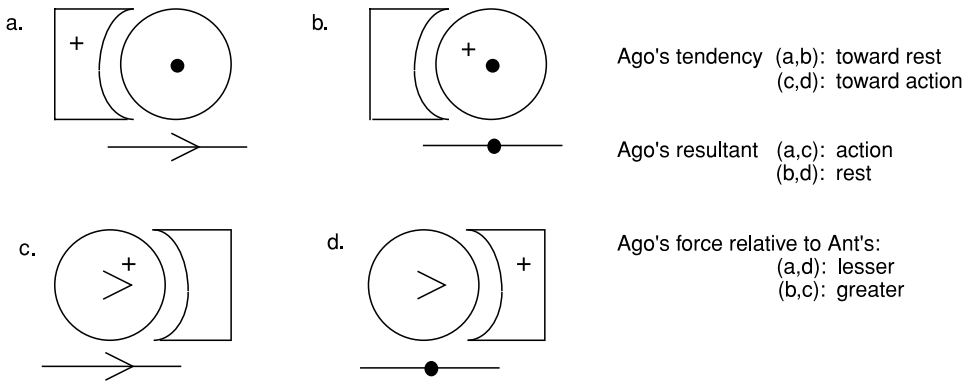
As language treats the concept, an entity is taken to exert a force by virtue of having an intrinsic tendency toward manifesting it—the force may be constant or temporary, but it is in any case not extrinsic. In an entity's force tendency, language again marks a two-way distinction: the tendency is either toward motion or toward rest—or, more generally, toward action or toward inaction. Diagrammatically, an Agonist's tendency toward action will be represented by an arrowhead and a tendency toward rest by a large dot, as seen in (2b), placed within the Agonist's circle. Unless needed for labeling purposes, no tendency marker is shown within the Antagonist symbol, since it is here understood to be opposite that of the Agonist.

A further concept in association with opposed forces is their relative strengths. As language treats this, the entity that is able to manifest its tendency at the expense of its opposer is the stronger. In the diagrams, a plus is placed in the stronger entity (and a minus, when necessary, can indicate the weaker entity), as in (2c). Finally, according to their relative strengths, the opposing force entities yield a resultant, an overt occurrence. As language schematizes it, this resultant is one either of action or

of inaction, and it is assessed solely for the Agonist, the entity whose circumstance is at issue. The resultant will be represented as a line beneath the Agonist, one bearing either an arrowhead for action or a large dot for inaction, as in (2d).

With these distinctions in hand, we are able to characterize the four most basic force-dynamic patterns, those involving steady-state opposition, as diagrammed and exemplified in (3). To describe these in turn, (3a) involves an Agonist with an intrinsic tendency toward rest that is being opposed from outside by a stronger Antagonist, which thus overcomes its resistance and forces it to move. This pattern is one of those to be classed as "causative," in particular involving the extended causation of motion. The sentence in (3a) illustrates this pattern with a ball that tends toward rest but that is kept in motion by the wind's greater power. In (3b), the Agonist still tends toward rest, but now it is stronger than the force opposing it, so it is able to manifest its tendency and remain in place. This pattern belongs to the "despite" category, in this case where the Agonist's stability prevails despite the Antagonist's force against it. In (3c), the Agonist's intrinsic tendency is now toward motion, and although there is an external force opposing it, the Agonist is stronger, so that its tendency becomes realized in resultant motion. This pattern, too, is of the "despite" type, here with the Antagonist as a *hindrance* to the Agonist's motion. Finally, in (3d), while the Agonist again has a tendency toward motion, the Antagonist is this time stronger and so effectively *blocks* it, rather than merely hindering it: the Agonist is kept in place. This pattern again represents a causative type, the extended causation of rest.[3]

(3) *The basic steady-state force-dynamic patterns*



a. The ball kept rolling because of the wind blowing on it.
b. The shed kept standing despite the gale wind blowing against it.
c. The ball kept rolling despite the stiff grass.
d. The log kept lying on the incline because of the ridge there.

Of these four basic force-dynamic patterns, each pair has a factor in common. As the diagrams are arranged in the matrix in (3), each line captures a commonality. In the top row, (a,b), the Agonist's intrinsic tendency is toward rest, while in the bottom row (c,d), it is toward action. In the left column, (a,c), the resultant of the force opposition for the Agonist is action, while in the right column, (b,d), it is rest. More significantly, the diagonal starting at top left, (a,d), which represents the cases where the Antagonist is stronger, captures the factor of extended causation. These are the cases in which the resultant state is *contrary* to the Agonist's intrinsic tendency, results *because of* the presence of the Antagonist, and would otherwise *not occur*. And the diagonal starting at top right, (b,c), which gives the cases where the Agonist is stronger, captures the "despite" factor. In fact the very concept of 'despite/although' can be characterized in terms of the common factor in this subset of force-dynamic patterns. Here, the resultant state is *the same* as that toward which the Agonist tends, results *despite* the presence of the Antagonist, and would otherwise *also occur*. Thus, the force-dynamic analysis so far captures certain basic general concepts—for example, 'despite' as counterposed to 'because of', as well as certain particular concepts, such as 'hindering' and 'blocking'. In doing so, an advantage of the present analysis becomes evident: it provides a framework in which a set of basic notions not usually considered related are brought together in a natural way that reveals their underlying character and actual affinity.

As the examples in (3) demonstrate, certain force-dynamic concepts have grammatical—that is, closed-class—representation. With the Agonist appearing as subject, the role of a stronger Antagonist can be expressed by the conjunction *because* or the prepositional expression *because of* (which in other languages often appears as a simple adposition), while the role of a weaker Antagonist can be expressed by the conjunction *although* or the preposition *despite*. Force-dynamic opposition in general can be expressed by the preposition *against*, as seen in (3b) or in such sentences as *She braced herself against the wind* | *They drove the ram*

against the barricade. Perhaps the single form most indicative of the presence of force dynamics here is *keep -ing*. Technically, of course, this expression is not a closed-class form, since it is syntactically indistinguishable from any regular verb taking an *-ing* complement, such as *hate*. Nevertheless, its very frequency and basicness suggest for it a status as an "honorary" auxiliary, in the same way that *have to* can be taken as an honorary modal akin to the authentic *must*. Moreover, in the course of language change, *keep* is likelier than, say, *hate* to become grammaticalized, as its equivalents have done in other languages and much as *use to*, which stems from a syntactically regular verb, is now partially grammaticalized in its limitation to a single form. Whether *keep* is taken as closed-class or not, its force-dynamic role can be seen as well in other forms that are unimpeachably closed-class, such as the adverbial particle *still* and the verb satellite *on*, as illustrated in (4).

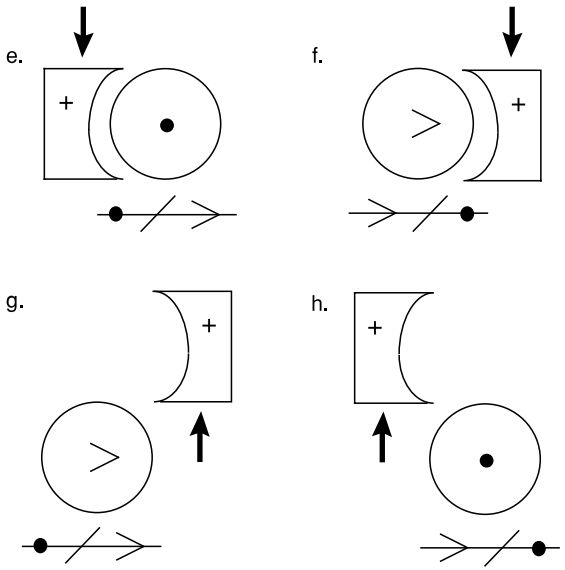
(4) a. The ball kept rolling
b. The ball was still rolling } despite the stiff grass.
c. The ball rolled on

2.2 Shifting Force-Dynamic Patterns

At this point, another factor can be added—change through time—and with it, the steady-state force-dynamic patterns give rise to a set of change-of-state patterns.

2.2.1 Shift in State of Impingement In one type of changing pattern, the Antagonist, rather than impinging steadily on the Agonist, instead enters or leaves this state of impingement. The cases with a stronger Antagonist (based on (3a,d)) are the most recognizable and are considered first. As they are diagrammed in (5), these shifting patterns are not indicated with a sequence of static snapshots, but with the shorthand conventions of an arrow for the Antagonist's motion into or out of impingement, and a slash on the resultant line separating the before and after states of activity. These patterns are exemplified in (5) with sentences now taking the Antagonist as subject.

(5)



e. The ball's hitting it made the lamp topple from the table.
f. The water's dripping on it made the fire die down.
g. The plug's coming loose let the water flow from the tank.
h. The stirring rod's breaking let the particles settle.

To consider each in turn, the pattern in (5e) involves a stronger Antagonist that comes into position against an Agonist with an intrinsic tendency toward rest, and thus causes it to change from a state of rest to one of action. Thus, this is another pattern to be classed as causative, but this time it is the prototypical form, the type most often associated with the category of causation. If the two steady-state causative types, (3a,d), may be termed cases of **extended causation**, the present type can be called a case of **onset causation**, in particular, onset causation of motion. The pattern in (5f), correlatively, is that of onset causation of rest. In it, the stronger Antagonist comes into impingement against an Agonist that tends toward motion and has been moving, and thus stops it.

The four patterns that thus constitute the general causative category, (3a,d; 5e,f), have in common one property, absent from all other force-dynamic patterns, that emerges from force-dynamic analysis as definitional for the concept of causation. This property is that the Agonist's resultant state of activity is the opposite of its intrinsic actional tendency.

In the remaining patterns, these two activity values are the same. The force-dynamic interpretation is that an object has a natural force tendency and will manifest it unless overcome by either steady or onset impingement with a more forceful object from outside. This is a family of circumstances that language classes together under a single conceptual aegis, one that can appropriately be termed the "causative."

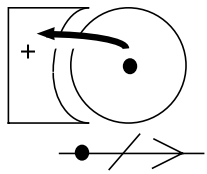
In the next pattern, (5g), the concept of 'letting' enters, and with it, further demonstration of the force-dynamic framework's power to bring together, in a systematic account, notions whose relatedness may not have previously been stressed. In (5g), a stronger Antagonist that has been blocking an Agonist with a tendency toward motion now disengages and releases the Agonist to manifest its tendency. This is the prototypical type of letting, onset letting of motion. In (5h), accordingly, is a nonprototypical type of letting, onset letting of rest, where an Antagonist that has forcibly kept in motion an Agonist tending toward rest now ceases impinging on this Agonist and allows it to come to rest. Where the category of causing was seen to depend on a notion of either the start or the continuation of impingement, the present 'letting' patterns involve the *cessation* of impingement.

As the shifting force-dynamic patterns are arrayed in (5), each line of the matrix again isolates a systematic factor. The diagonal starting at the top left, (e,h), holds as constant the Agonist's tendency toward rest, while the opposite diagonal, (f,g), does this for the tendency toward action. The top row, (e,f), indicates onset causation, while the bottom row, (g,h), indicates onset letting. And the left column, (e,g), represents the Agonist's starting into action, while the right column, (f,h), represents its stopping. The patterns as they are arrayed in columns thus serve to represent the category of force-related starting and stopping.[4]

2.2.2 Shift in Balance of Strength It was said at the beginning of this section that an Antagonist's entering or leaving impingement with the Agonist was only one type of shifting force-dynamic pattern. We can now outline another form. The Antagonist and Agonist can continue in mutual impingement, but the *balance* of forces can shift through the weakening or strengthening of one of the entities. For each impingement-shift pattern in (5), there is a corresponding balance-shift pattern. The correspondence can be understood this way: instead of a stronger Antagonist's arriving or leaving, to thus begin or end its overpowering effect, an Antagonist already in place can become stronger or weaker with the same

results. One of these patterns is selected for illustration in (6), with the arrow here indicating the shift in relatively greater strength (of course with no implication of any actual transfer of force from one entity to the other). In one of its usages, the word *overcome* represents this pattern and is shown exemplifying it.

(6)

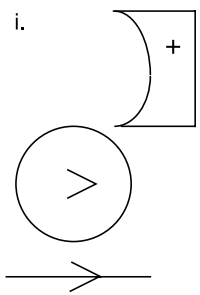


The enemy overcame us as we stood defending the border.
[enemy = Ant, us = Ago]

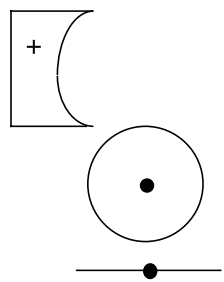
2.3 Secondary Steady-State Force-Dynamic Patterns

The cases in (5) where the Antagonist moves away from the Agonist suggest further cases in which the Antagonist *remains* away. In fact, corresponding to each of the steady-state patterns in (3), with an Antagonist opposing an Agonist, is a secondary steady-state pattern with the Antagonist steadily disengaged. Where this Antagonist is stronger, we have the two patterns for 'extended letting'. Illustrated in (7i) is extended letting of motion and, in (7j), extended letting of rest. These together with the patterns for 'onset letting' seen in (5g,h) comprise the general category of 'letting'. It can now be seen that the major delineations within the overall causing/letting complex can be characterized in terms of types of impingement by a stronger Antagonist. Causing involves positive impingement: onset causing correlates with the start of impingement and extended causing with its continuation. Letting involves nonimpingement: onset letting correlates with the cessation of impingement and extended letting with its nonoccurrence.

(7) i.



j.



i. The plug's staying loose let the water drain from the tank.
j. The fan's being broken let the smoke hang still in the chamber.

I have called the present group of steady-state patterns "secondary" because, it seems, they must be considered conceptually derivative, founded on a negation of the basic steady-state forms. The notions of Agonist and Antagonist, it can be argued, intrinsically involve the engagement of two bodies in an opposition of force, and reference to an Agonist and Antagonist not so engaged necessarily depends on their potential for such engagement. In Fillmore's (1982) terms, the disengaged cases presuppose the same semantic frame as the engaged cases.

2.4 The Relation of Agency to the Force-Dynamic Patterns

I should make clear why I have used for illustration, as in (5) and (7), sentences based on two clauses and without an agent, when linguists familiar with the causative literature are used to sentences like *I broke the vase*. The reason is that I regard such nonagentive forms as more basic than forms containing an agent. As argued in chapter I-8, the inclusion of an agent in a sentence, though often yielding a syntactically simpler construction, actually involves an additional semantic complex. An agent that intends the occurrence of a particular physical event, say, a vase's breaking, is necessarily involved in initiating a causal sequence leading to that event. This sequence must begin with a volitional act by the agent to move certain parts or all of his body. This in turn either leads directly to the intended event or sets off a further event chain, of whatever length, that leads to the intended event.

To represent a whole sequence of this sort, many languages permit expression merely of the agent and of the final event, like English in *I broke the vase*. Here, the sequence's remaining elements are left implicit with their most generic values (see chapter I-4). The next element that can be added by itself to the overt expression is the one leading directly to the final event—that is, the penultimate event, or else just its (so-called) instrument, as in *I broke the vase (by hitting it) with a ball*. This privileged pair of events, the penultimate and the final, forms the identifying core of the whole agentive sequence. It can in fact be excerpted from there for expression as a basic precursor-result sequence, as in *The ball's hitting it broke the vase*.

This is the basic sequence type of our illustrative sentences. In it, all the causal and other force-dynamic factors can be worked out in isolation,

and yet be known to hold as well when occurring within a larger sequence containing an agent. In this way, the sentences of (5) can be immediately associated with corresponding agentive sentences, as exemplified in (8), and there maintain all the same force-dynamic properties.

(8)

Autonomous	*Agentive*
The ball's hitting it made the lamp topple.	I made the lamp topple by hitting it with the ball.
The plug's coming loose let the water flow out.	I let the water flow out by pulling the plug loose.

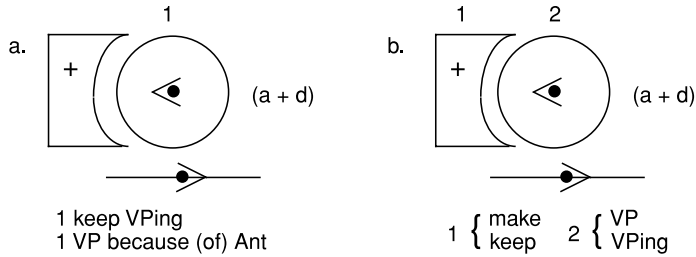
2.5 Alternatives of Foregrounding in Force-Dynamic Patterns

All of the interrelated factors in any force-dynamic pattern are necessarily co-present wherever that pattern is involved. But a sentence expressing that pattern can pick out different subsets of the factors for explicit reference —leaving the remainder unmentioned—and to these factors it can assign different syntactic roles within alternative constructions. Generally, the factors that are explicitly referred to, and those expressed earlier in the sentence or higher in a case hierarchy, are more foregrounded—that is, have more attention directed to them. As with the agentive situation, those factors not explicitly mentioned are still implicitly present, but backgrounded.

With respect to representation, we can identify the explicit factors and their syntactic roles with a system of labeling on the force-dynamic diagrams. For this system, I borrow from Relational Grammar the use of 1 to indicate the element appearing as subject, and 2 for direct object. The label VP is placed beside the element that will be expressed as a verbal constituent. The particular syntactic character of this constituent can range widely, as we will see, so that the VP must be construed actually to designate a form of abstracted verb-phrasal base. An element not labeled is generally not represented explicitly in the construction. When labeled, a complete diagram thus represents a specific construction, usually one of sentential scope and with particular lexical inclusions. In addition, I use the following convention for capturing a commonality: where two patterns differ in only one factor—such as a tendency toward action versus a tendency toward rest—and also underlie the same construction, they can be represented in a single diagram with both values marked, for example, with both arrowhead and dot.[6]

Turning now to actual cases, a difference in foregrounding due to syntactic role can be shown for the steady-state force-dynamic patterns of (3a,d), diagrammatically combined in (9). Familiar already from (3), the Agonist can be foregrounded by subject status, while the Antagonist is backgrounded either by omission or as an oblique constituent, as shown in (9a) with constructions involving intransitive *keep* or prepositional/conjunctional *because (of)*. Alternatively, the same force-dynamic patterns can be viewed with the reverse assignment of salience, where the Antagonist is foregrounded as subject and the Agonist backgrounded as the direct object, as shown in (9b) with constructions involving transitive *keep* or *make*.

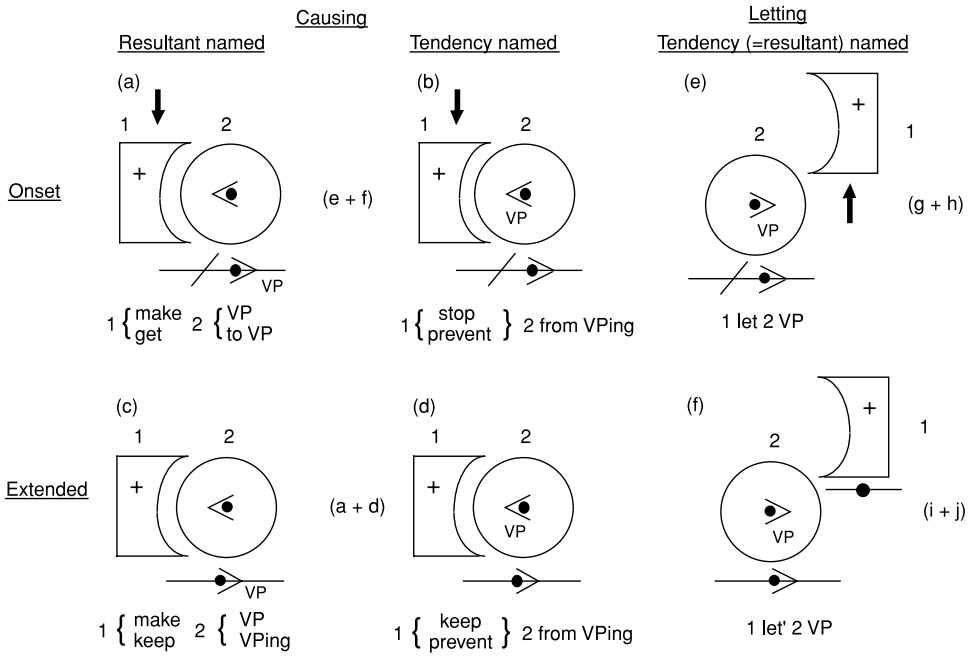
(9)



a. The ball kept rolling. / The ball is rolling because of the wind.
b. The wind kept the ball rolling. / The wind is making the ball roll.

The other main alternation in foregrounding pertains to the actional properties of a force-dynamic pattern. Either the Agonist's actional *resultant* can receive the main explicit representation in a construction, as in the cases seen so far, or its actional *tendency* can. Of course, this distinction in emphasis can apply only to causative patterns, since in these alone do the two actional values differ. The diagram in (10) brings together all the causing and letting patterns we have seen, here only with the Antagonist foregrounded, and the constructions that represent them. The new constructions are those in (b) and (d), which refer to the Agonist's *tendency* in causative patterns. Note that here the key force-dynamic word *keep* occurs again, but now in conjunction with *from* in a construction indicating 'prevention'. With these additions, the force-dynamic analysis relates still further linguistic phenomena within a single framework. (Note that examples for the (e) and (f) patterns appear in (7).)

(10)



The added soap (a) got the crust to come off. (b) stopped the crust from sticking.
The shutting valve (a) made the gas stay inside. (b) stopped the gas from flowing out.
The fan (c) kept the air moving. (d) kept the air from standing still.
The brace kept the logs lying there. (d) kept the logs from rolling down.

2.5.1 Asymmetry in the Expression of 'Make' Versus 'Let' English offers more syntactic options for the expression of 'making' than it does for 'letting'. For 'making', the Antagonist can be mentioned either by itself or along with the event in which it is involved, while 'letting' has only the latter option, as illustrated in (11a,b). This asymmetry continues when the 'making' and 'letting' patterns are embedded within an agentive matrix (as also noted by Jackendoff 1976), as seen in (11c,d). It is for this reason that in the 'letting' diagrams of (10e,f), the 1 indicating subjecthood was shown marking the Antagonist together with the Antagonist's activity.

(11) a. i. The piston's pressing against it made the oil flow from the tank.
ii. The piston made the oil flow from the tank.
b. i. The plug's coming loose let the oil flow from the tank.
ii. *The plug let the oil flow from the tank.

c. i. I made the oil flow from the tank by pressing the piston against it.
ii. I made the oil flow from the tank with the piston.
d. i. I let the oil flow from the tank by loosening the plug.
ii. *I let the oil flow from the tank with (*of/*from) the plug.

The explanation for this asymmetry may lie in a language-universal treatment of 'instrument' as involving only positive impingement. For supporting evidence, note that in talking about causing a stacked display of cans to topple, an instrumental *with*-phrase as in (12) can refer either to the beginning of impingement (12a) or to its continuation (12b), but not to its cessation (12c). And there is no other phrasal indication for such a reverse instrument, as seen in (13).

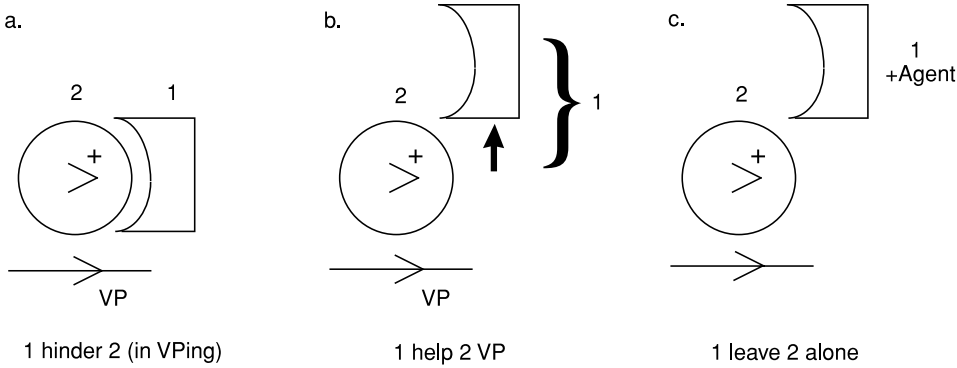
(12) I toppled the display *with a can*—covers:
a. . . . by throwing a can at it.
b. . . . by pressing against it with a can.
c. *. . . by pulling a can out from the bottom tier.

(13) *I toppled the display *from*/*of*/ . . . *a can*.

2.6 Force-Dynamic Patterns with a Weaker Antagonist

Since our initial look at the basic steady-state patterns, all the force-dynamic patterns dealt with have had a stronger Antagonist. But the present framework allows for a set of eight patterns with weaker Antagonist. These are the two steady-state patterns in (3b,c) with the Antagonist impinging against the Agonist, and correspondingly: two with this Antagonist coming into impingement, another two with the Antagonist leaving impingement, and a final two with the Antagonist remaining out of impingement. As a set, these patterns seem to play a lesser role than the set with stronger Antagonist, but certain patterns among them are nevertheless well represented in English. This is certainly the case for the earlier-discussed 'despite/although' formulations, where the Agonist appears as subject. In addition, for cases with the Antagonist as subject, (14) shows patterns with the Antagonist (a) engaged (the same as the steady-state (3c) pattern, now labeled), (b) disengaging, and (c) steadily disengaged, where these underlie constructions with *hinder*, *help*, and *leave alone*, respectively.

(14)



a. Mounds of earth hindered the logs in rolling down the slope. / The benches hindered the marchers in crossing the plaza.
b. Smoothing the earth helped the logs roll down the slope. / Removing the benches helped the marchers cross the plaza.
c. I left the rolling logs alone. / The police left the marchers alone in their exit from the plaza.

It is significant that the lexical verb *help* should be found in a force-dynamic context. As illustrated in (15), there are four transitive verbs in English that take an infinitive complement without *to*, namely, *make*, *let*, *have*, and *help* (i.e., outside of perception verbs, which form a separate class in also taking an *-ing* complement). We have already seen *make* and *let* figure deeply in the expression of basic force-dynamic patterns. *Have* is also force dynamic, expressing indirect causation either without an intermediate volitional entity, as in *I had the logs roll down the south slope*, or, as is usual, with such an entity: *I had the boy roll the log along*. And now we find *help* also with force-dynamic usage. The significance of this is that a syntactically definable category can be associated with a semantically characterizable category, thus lending relevance to both and support to the idea of structural integration in language. More will be made of this cross-level association of categories in the discussion of modals.

(15) I made/let/had/helped the logs roll along the ground.

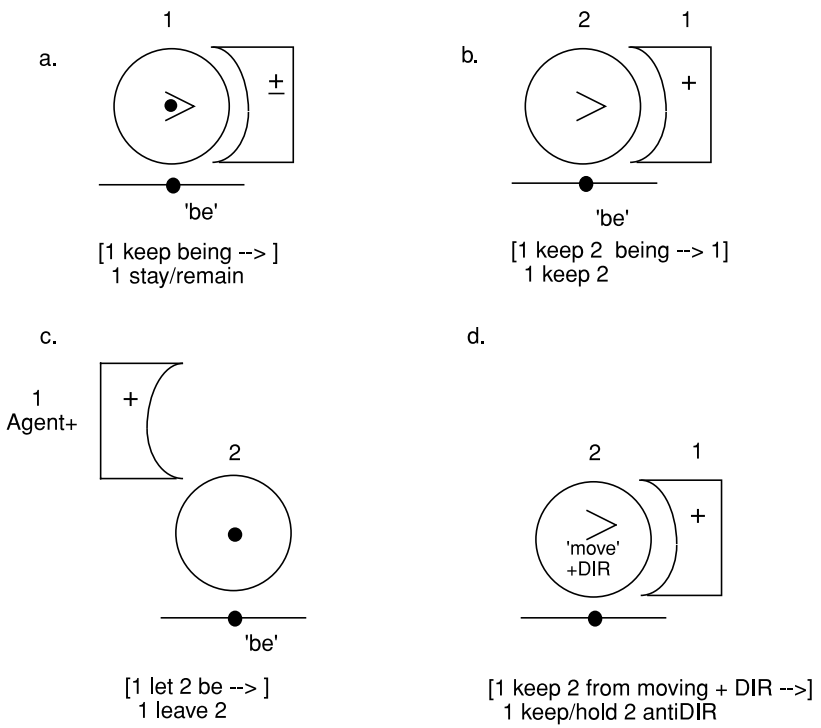
2.7 Particularized Factors in Force-Dynamic Patterns

In every force-dynamic pattern treated so far, the component factors have been at their most generic. Any element or event with the minimal requisite property called for by a factor can instantiate that factor and, accordingly, be expressed in the construction that represents the pattern. But this

system has an extension. Constructions exist that correspond to a force-dynamic pattern in which a particular factor has a specific identity. Where this identity involves a basic notion, say, where a pattern's VP factor is particularized as 'be' or 'move', the corresponding construction generally also includes some basic lexical item. In this way, we find more of the core lexicon and syntax brought under the force-dynamic aegis.

Thus, we find such prominent English lexical verbs as *stay/remain*, *leave*, *hold*, and, once again, *keep*, arising from the particularized patterns shown in (16). The depicted correspondences preserve certain syntactic properties as well. Thus, *be*, which particularizes the VP in the (16a,b,c) patterns, can normally occur with a nominal, an adjective, or a locative, as in *He was a doctor/rich/in Miami*. The same is true of the verbs in the corresponding constructions, as in *He remained a doctor/rich/in Miami., Events kept/left him a doctor/rich/in Miami*. In (16d), the *DIR* (Directional) element accompanying *'move'* has been left generic. But if it, too, is particularized, say, as *'down'* or *'out'*, then the pattern yields still further constructions. Thus, beside *1 keep 2 from moving down/out* is not only *1 hold 2 up/in*, but further *1 support 2* and *1 confine 2*.

(16)



a. [The log kept being on the incline (because of the ridge there). →]
The log stayed on the incline (because of the ridge there).
(tendency: >; Ant: +)
[The shed kept being on its foundation (despite the gale wind). →]
The shed remained on its foundation (despite the gale wind).
(tendency: •; Ant: −)
b. [The ridge kept the log being on the incline. →]
The ridge kept the log on the incline.
c. [Let the cake be (keep being) in the box! →]
Leave the cake in the box!
d. [The ridge kept the log from moving ahead. →]
The ridge held the log back.

3 FORCE DYNAMICS AS A GENERALIZATION OVER "CAUSATIVE"

Given this survey of the basic force-dynamic patterns and their linguistic expression, we are now in a position to view the whole system for its properties as an integrated framework. One main understanding that emerges is that force dynamics is a generalization over the traditional notion of "causative" in the linguistic literature. That tradition itself has a progression of treatments. The earlier ones, such as in McCawley 1968, abstracted an atomic and uniform notion of causation, often represented as "CAUSE," that countenanced no variants. Later treatments, such as those of Shibatani (1973) and Jackendoff (1976), perceived a finer complex of factors. Talmy (1976b, 1985b) has distinguished at least the following: resulting-event causation, causing-event causation, instrument causation, author causation, agent causation, self-agency, and inducive causation (caused agency). But even these treatments did not analyze far enough. While they revealed the factors that go into more complex forms of causativity, these were all still founded upon the same, unanalyzed notion of primitive causation. With the force-dynamic framework, now this too gives way. What had been viewed as an irreducible concept is now seen as a complex built up of novel primitive concepts. And because these finer primitives recombine in a system of different patterns, the idea of causation is now seen as just one notion within a related set.

I can now detail the generalization. First, the force-dynamic analysis provides a framework that accommodates, among the patterns with a stronger Antagonist, not only 'causing', but also 'letting'. Further, it

accommodates not only the prototypical forms of these, but also the nonprototypical, in the sense in which Lakoff (1987) characterizes prototypicality for a conceptual category. Thus, it accommodates not only the prototypical type of causing, 'onset causing of action', which all accounts treat, but also 'onset causing of rest'. The previous neglect of this latter pattern is evident in the very terminology that had been selected. Thus, Shibatani's (1973) term most closely corresponding to the present "onset" is "ballistic causation," a term that could never have been meant also to include causing to come to rest (see chapter I-8); "beginning-point causation" fares a bit better in this regard. The nonprototypical pattern 'extended causing of action' has had some prior recognition—for example, with Shibatani's "controlled causation" or my earlier "extent causation." But neither of these authors had envisioned the correlative pattern, 'extended causing of rest'. As for 'letting', this notion has in most treatments gone unmentioned beside discussion of causing. If mentioned, it is generally the prototypical type, 'onset letting of action', that is treated. Though Talmy (1976b) and Jackendoff (1976) did include analysis of several further types, it has remained for the present force-dynamic analysis to provide an adequate matrix for the inclusion of 'onset letting of rest' and 'extended letting of action/rest'.

The next major generalization in the force-dynamic framework is that it classes both causing and letting together as cases involving a stronger Antagonist and then counterposes to these the cases with a weaker Antagonist. This larger picture now contains a set of notions not normally considered in the same context with causation. Included among them are the general notions of 'despite' and 'although', and such particular notions as 'hindering', 'helping', 'leaving alone', and, as we will see below, 'trying'.

Finally, with the idea of alternative foregrounding, the force-dynamic framework is able to capture the concept not only of the causing of a result, but also of the *prevention* of a *tendency* (a factor also noted below for modals, in alternations of the type *He must go.* / *He may not stay.*). The provision for alternatives of foregrounding, furthermore, permits treating not only constructions with the affecting entity (the Antagonist) as subject. It also brings in on a par constructions with the affected entity (the Agonist) as subject and even as the only-mentioned participant, as with intransitive *keep* (and all modals, as seen below).[6]

The set of the force-dynamic framework's generalizations can be summed up as in (17). The important point to make here is that force dynamics does not simply *add* cases; rather, it *replaces* an earlier limited

conception, then taken as a primitive, with a more general and systematic matrix of concepts.

(17) Force dynamics provides a framework in which can be placed:
not only'causing', but also 'letting'
not only the prototypical cases of 'causing/letting', but also nonprototypical:
prototypical causing: 'onset causing of action' (5e)
seldom considered: 'onset causing of rest' (5f)
sometimes considered: 'extended causing of action' (3a)
seldom considered: 'extended causing of rest' (3d)
prototypical letting, sometimes considered: 'onset letting of action' (5g)
seldom considered: other three 'letting' types (5h) (7i) (7j)
not only the stronger-Antagonist types ('causing/letting'), but also the weaker-Antagonist types ('despite/although', 'hindering/helping/leaving alone', 'trying . . .')
not only cases with the result named, but also cases with the tendency named ('causing' vs. 'preventing')
not only the affecting entity (Antagonist) as subject, but also the affected entity (Agonist) as subject (e.g., with intransitive *keep* and modals)

4 EXTENSION OF FORCE DYNAMICS TO PSYCHOLOGICAL REFERENCE

The point of the preceding outline was to demonstrate the generality of the force-dynamic framework as compared with previous conceptions. But in the terms in which it was developed, that framework does have a particular limitation: its founding concepts are of the domain of *physical* force interactions. However, it becomes apparent that force dynamics has a yet more general role in language. Its concepts and distinctions are extended by languages to their semantic treatment of *psychological* elements and interactions. This linguistic *psychodynamics* thus generalizes notions of physical pushing, blocking, and the like to the framing of such concepts as wanting and refraining.

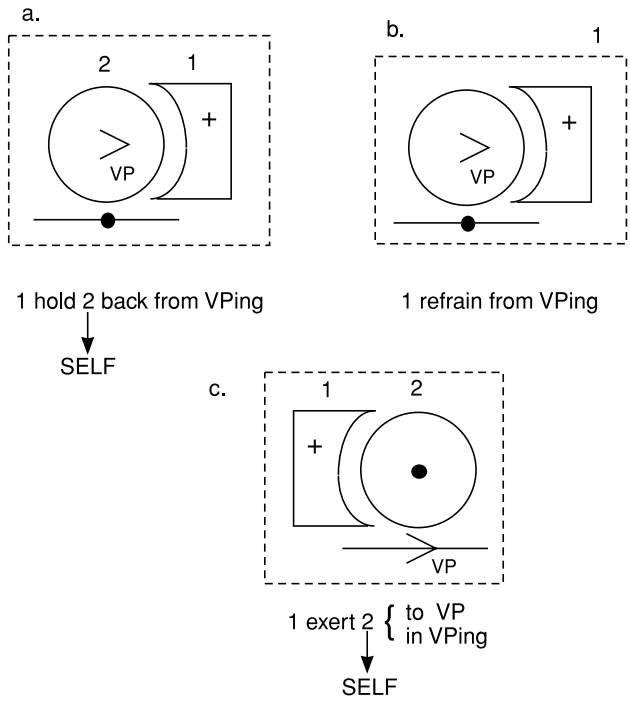
To take a particular example, 'wanting', as in *He wants to open the window*, seems to be conceived in terms of a kind of psychological "pressure," "pushing" toward the realization of some act or state. As a meta-

phoric extension, it can be well represented by the arrowhead within the Agonist in a force-dynamic diagram, symbolizing 'tendency toward action'.

4.1 The Self Divided

For the force-dynamic concept of two forces opposing, if we do not yet consider the social interrelation between two individuals but remain with a single psyche, we are led to a basic semantic configuration in language, the **divided self**. This notion is seen in such formulations as *I held myself back from responding* or, as conflated in a single lexical form, in *I refrained from responding*. The sense of these expressions is that there is one part of the self that wants to perform a certain act and another part that wants that not to happen, where that second part is stronger and so prevents the act's performance. This arrangement is by now, of course, immediately recognizable as a basic force-dynamic pattern, applied in this case to intrapsychological forcelike urges. It can be diagrammed as in (18a,b), with the new feature of a dotted box around the elements to indicate that they are parts of a single psyche.

(18)



a. He held himself back from responding.
b. He refrained from responding.
c. He exerted himself in pressing against the jammed door.

The construction diagrammed in (18a), *1 hold oneself back from VPing*, is an idiomatic extension of the construction in (16d), now without particularization of the force tendency. The force components of the diagram are individually labeled: the subject of the construction can be identified with the blocking part of the psyche, acting as Antagonist, and the reflexive direct object with the desiring part, acting as Agonist. In (18b) is diagrammed the corresponding *refrain* construction. All the elements are the same; the only difference is that they are not individually identified. Rather, the whole configuration is lexicalized in a single word with the subject identified as the psyche as a whole. This pattern can support still further lexicalization. If the VP in this diagram were particularized as 'be impolite', the pattern would underlie the expression *1 refrain from being impolite* or, alternatively, the conflated form *1 be civil*. This latter is the force-dynamic expression that was used in the introduction to show a contrast with the neutral '1 be polite'. That is, while both *civil* and *polite* indicate the same overt condition of nonrudeness, *civil* adds to this a whole intrapsychological force-dynamic complex involving blocked desire.

There is another intrapsychological pattern of force opposition that is the opposite of 'refraining': that for 'exertion', diagrammed in (18c). Here, one part of the psyche, taken as the Agonist, is characterized as wanting to be inactive (tending toward rest), while another part acting as Antagonist overcomes this resistance so as to bring about an overall generation of activity. As in (18a), the *exert oneself* construction is based on the individual labeling of the separate components of the psyche, so that the expression contains a reflexive direct object.

4.2 Central versus Peripheral within the Self

In all the patterns of (18), the self is not simply divided into equivalent parts, but rather into parts playing different roles within a structured whole. The Agonist is identified with the self's desires, reflecting an inner psychological state. It is being overcome by an Antagonist acting either as blockage—in this psychological context, one might say "suppression"—or as a spur. This Antagonist represents a sense of responsibility or propriety and appears as an internalization of external social values. In effect, perhaps, a force-dynamic opposition originating between the self and the

surroundings seems here to be introjected into an opposition between parts of the self. Correspondingly, the desiring part is understood as more *central* and the blocking or spurring part as more *peripheral*. This semantic arrangement is reflected syntactically in the transitive constructions of (18a,c): the peripheral part of the self is expressed as the subject Agent, which acts on the central part of the self appearing as the direct object Patient (the reflexive).

4.3 Psychological Origin of Force Properties in Sentient Entities

We have seen that language can ascribe intrinsic force properties to physical entities without sentience such as wind, a dam, or a rolling log. The overt force manifestations of sentient entities, however, are generally treated not as native to the physical body per se but, rather, as arising from underlying psychological force dynamics—in particular, from the psychological configuration of 'exertion'. Consider, for example, the semantics of the two sentences in (19).

(19) a. The new dam resisted the pressure of the water against it.
b. The man resisted the pressure of the crowd against him.

The nonsentient dam in (19a) is understood to continue in its tendency to stand in place due to its intrinsic properties of physical solidity and rootedness. This is not the case with the sentient man in (19b). If that entity were considered only for his physical body, without the psychological component, he would be viewed as a force-dynamically weaker Agonist that would be swept along by the crowd. But the psychological component is normally included and understood as the factor that renders the man a stronger Agonist able to withstand the crowd. It accomplishes this by *maintaining the expenditure of effort*, that is, by a continuously renewed *exertion*, in which a goal-oriented part of the psyche overcomes a repose-oriented part so as to generate the output of energy.

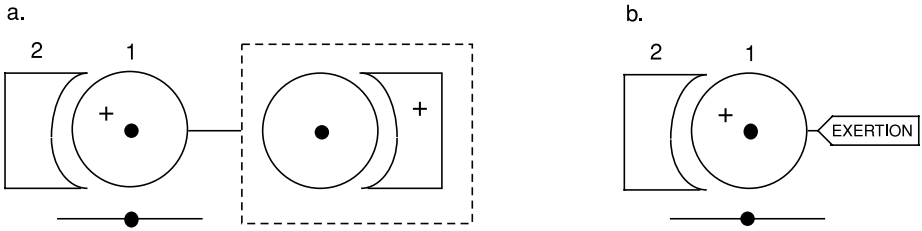
The psychological component not only can cause greater strength in the physical Agonist, but can set its force tendency. Thus, while the "man" in (19b) set his body for a tendency toward rest, the "patient" in (20) has set his body for a tendency toward motion, and is understood as *straining* against what holds him. (This example's verb, *restrain*, corresponds to the (3d) pattern with its force tendency particularized as 'move'.) If this patient were only a physical body, he would just lie there inert, uninvolved in any force interactions. But he also has a psyche that here generates his possession of an active force tendency, determining that he *tries*

to get free. This example also demonstrates further applicability of the psychological 'exertion' pattern. This pattern can attach not only to an Agonist, like the "man" or the "patient," but also to an Antagonist. Thus, the strap in (20a) manifests its Antagonistic force by virtue of its physical characteristics alone, whereas the attendant in (20b) does so only by the psychogenic expenditure of effort.

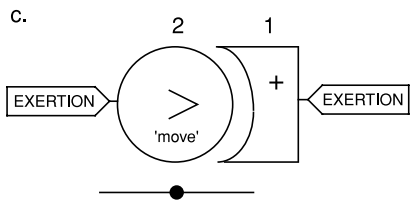
(20) a. A strap restrained the patient.
b. An attendant restrained the patient.

In diagramming these more complex force-dynamic relationships, I place a connecting line between the physical entity acting as Agonist or Antagonist and the psychological 'exertion' complex. An example of the resulting full pattern is shown in (21a), and examples with a symbolic shorthand that I will use are diagrammed in (21b,c).

(21)



1 [volitionally] resist 2 (The man resisted the pressure of the crowd against him.)



1 [volitionally] restrain 2
(The attendant restrained the patient.)

4.4 The Force-Dynamic Properties of Repose, Animation, and Generativity

Implicit in this analysis of the psyche's force-dynamic character are three further factors that bear on conceptual organization in language and

perhaps also more generally. The first is that one basic state of the central part of the psyche, perhaps its most basic (or "unmarked") state, is that of *repose*. In this state, the central force element of the psyche has an intrinsic tendency toward rest that must be overcome by a more peripheral part of the psyche for energy to be expended. Without such spurring, no effort would be exerted.

Second, the semantic component of language is so organized as to treat the physical aspect of a sentient entity as essentially inert, requiring *animation* by the psychological aspect. By itself, the body lacks an intrinsic force tendency and if placed in a force-dynamic situation would generally be a weaker Agonist. It is the psyche that imbues the body with force properties—that is, that animates it. In the diagrams, the line linking the psychological and the physical aspects can be treated as representing this semantic component of 'animation'.

Third, this very linking of a psychological with a physical force-dynamic pattern is an example of the more general capacity of force-dynamic patterns to concatenate or to embed. That is, there is the capacity for the Agonist or Antagonist of one pattern to serve in turn as a force entity in a further pattern. Complex combinations of this sort can be formed, as in a sentence like *Fear kept preventing the acrobat from letting the elephant hold up his tightrope*. The important point in this is that the force-dynamic system in language is not limited to a small inventory of simplex patterns but has the property of open-ended *generativity*.

From the preceding analysis, thus, it appears that language ascribes to the psychophysical nature of sentient entities the following particular force-dynamic concatenation: A more peripheral part of the psyche overcomes a more central part's intrinsic repose to animate the otherwise inert physical component into overt force manifestation against a further external force entity.

5 FORCE DYNAMICS WITH MORE COMPLEX ASPECTUAL PATTERNS

The shifting type of force-dynamic patterns discussed in section 1.1 involved simple changes through time, of an aspectual type basic enough to be represented on a single diagram with an arrow. But more complex patterns of force-dynamic change through time are also countenanced by language and underlie specific constructions and lexicalizations. To

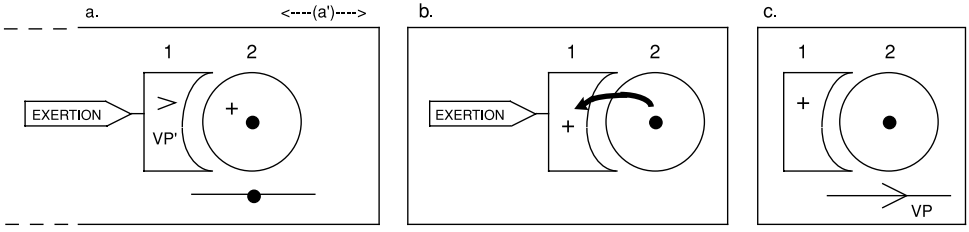
depict them, I resort to a strip of diagrams to represent the sequence of patterning.

I can point to a particular set of lexical items, within their respective constructions, that are all based on a single complex force-dynamic sequence. There are essentially two factors that distinguish the expressions within this set. The first is what I will call **phase**: the location along the temporal sequence at which focal attention is placed. The second is **factivity**: the occurrence or nonoccurrence of portions of the sequence and the speaker's knowledge about this.

The relevant diagram strip is shown in (22-diagram) with the "phase/factivity" patterns in (22-formulas). Here, the first phase, (a), is a stretch of time during which a sentient Antagonist, foregrounded as subject, impinges extendedly on a stronger Agonist, intending that this will make it act as shown in the subsequent phases. The Antagonist's force tendency is indicated here because it can be referred to explicitly in some of the constructions. The (a) phase may include a latter portion, (a′), during which the Agonist weakens or the Antagonist strengthens. In the punctual (b) phase, a criterial shift in relative strength takes place. Phase (c) is the aftermath of this shift, with the Agonist now forced to manifest the intended action.

We see in (22-formulas) that a range of constructions and construction types all refer to this same force-dynamic "script." The lexical verb *try* involves focus at the initial phase without knowledge of its outcome, while *succeed* and *fail* focus on a known occurrent or nonoccurrent outcome. And constructions with adverbial forms like *finally* and *in vain* take their place beside those with verbs. (Note that the subscript c on a VP indicates a causative lexicalization.)

(22)



(22-formulas) With (22-diagram)'s 1 and 2 as depicted; condition: the Antagonist intends that (a) cause (b–c)

Phase/factivity patterns	*Constructions*
i. focus at (a) (b–c)'s occurrence unknown	1 try to $\left\{\begin{matrix}\text{make 2 VP}\\ {}_{c}\text{VP 2}\end{matrix}\right\}$ by VP′ing
ii. focus at (c) (b–c) has occurred	1 $\left\{\begin{matrix}\text{succeed in }{}_{c}\text{VPing}\\ \text{manage to }{}_{c}\text{VP}\end{matrix}\right\}$ 2 1 finally ${}_{c}$VP 2
iii. focus at (c) (b–c) has not occurred	1 fail to ${}_{c}$VP 2 1 VP′ in vain/futilely/to no avail

i. He tried to open the window by pressing up on it.
ii. He succeeded in opening/managed to open the window.
He finally opened the window.
iii. He failed to open the window.
He pressed up on the window to no avail.

All the preceding constructions were based on the Antagonist's foregrounding as subject. But this same force-dynamic sequence underlies further expressions with the *Agonist* as subject. The force-dynamic analysis is here bringing together expressions with previously unanticipated relationships. For this new set, the same strip as in (22-diagram) holds, except that the 1 and 2 are reversed, and the "exertion" box is now optional and could be shown within parentheses. The corresponding constructions and examples are given in (23).

(23) With (22-diagram)'s 1 and 2 reversed, and its "exertion" box optional

i. focus at (a) (b–c)'s occurrence unknown	1 resist 2('s VP′ing)
ii. focus at (c) (b–c) has occurred	1 $\left\{\begin{matrix}\text{give way}\\ \text{yield}\end{matrix}\right\}$ (to 2) 1 finally VP
iii. focus at (c) (b–c) has not occurred	1 withstand 2('s VP′ing) 1 will not VP

i. The window resisted my pressing on it.
ii. The window gave way (to my pressing on it).
The window finally opened.
iii. The window withstood my pressing on it.
The window wouldn't open.

The reason that the "exertion" box is optional for (23) is that there all the constructions, which give nonsubject status to the Antagonist, do not

require that this Antagonist be sentient, as did the subject-Antagonist constructions of (22). Involved here, in fact, is a systematic gap in English expression. There are no simple locutions with a nonsentient Antagonist as subject for the (3b)-type pattern of a weaker Antagonist impinging on a stronger Agonist that is stably at rest.[7] What would be needed here is a locution that would function as *try* does for a sentient Antagonist subject but that could be predicated, say, of wind, as in some sentence like **The wind tried to overturn the hut*. The closest serviceable expressions here would seem to be *The wind blew on the hut with little/no effect/ineffectively*. It is not obvious why such a gap should exist. There is clearly no semantic barrier to it, since the same conception *is* expressed with nonsubject Antagonist forms, as shown by (23)-type expressions like *The hut resisted the wind*.

6 EXTENSION OF FORCE DYNAMICS TO SOCIAL REFERENCE

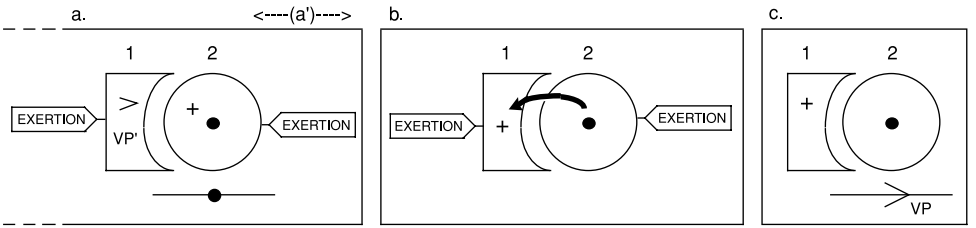
We have seen how our framework extends from physical force interactions to psychological ones, in particular to intrapsychological force interactions within sentient entities. Here we see that the framework extends still further to *inter*psychological force interactions *between* sentient entities. That is, it extends to *social* force interactions, or to *sociodynamics*. A basic metaphoric analogy is at work here that is seemingly built into semantic organization. The base of the metaphor is one object's direct imposition of physical force on another object toward the latter's manifesting a particular action. Conceptualized as analogous to this is one sentient entity's production of stimuli, including communication, that is perceived by another sentient entity and interpreted as reason for volitionally performing a particular action. This linguistic analogical extension from the physical to the interpreted is seen, for example, in the English use of words like *push* and *pressure* pertaining to sociodynamics, as in (24).[8]

(24) a. peer pressure/social pressure
b. He's under a lot of pressure to keep silent.
c. Our government exerted pressure on that country to toe our line.
d. Getting job security relieved the pressure on her to perform.
e. The gang pushed him to do things he didn't want to.

As testimony to the integration provided by the present framework, we now find that the *same* force-dynamic sequence treated in the last section—though now with the addition of "exertion" to the Agonist as well as the Antagonist—underlies a new set of lexical items and con-

structions with interpersonal reference. Among these, for example, is *1 urge 2 to VP*. Here, strictly, an Antagonist through communication aims to affect an Agonist's intention as to the performance of some action. But the semantic effect of the locution is to cast this social interaction as a form of force dynamism, with the Antagonist exerting pressure on the Agonist toward the particular action. The relevant diagram strip, with the additional "exertion" box, is shown in (25-diagram). As before, there are constructions corresponding to alternative foregroundings, with either the Antagonist or the Agonist as subject. These are indicated in (25-formulas), with (i)–(iii) representing the same phase/factivity patterns as earlier.

(25)



(25-formulas)

With 1 and 2 as depicted	*With 1 and 2 reversed*
i. 1 urge 2 to VP	1 be reluctant to VP
ii. 1 persuade/get 2 to VP	1 { relent / give in to 2 } (on VPing)
iii. ?[1 strike out with 2 (on VPing)]	1 { refuse to / will not } VP

i. She urged him to leave.
   He was reluctant to leave.
ii. She persuaded him to leave.
   He relented. / He gave in to her on leaving.
iii. (She struck out with him on his leaving.)
   He refused to leave. / He wouldn't leave.

The parallelism of our particular force-dynamic sequence's application both to psychophysical interactions and to interpersonal interactions allows us to place all the relevant constructions in a single table, as shown in (26). The table demonstrates graphically the way that force-dynamic concepts extend across semantic domains to reveal common patterns, some perhaps not noticed earlier for want of an adequate explanatory system.

Table of Constructions for the Complex FD Sequence of (22) and (25)

Effect on Ago: *Physical*	Focus at (a): (b–c)'s occurrence unknown	Focus at (c): (b–c) has occurred	Focus at (c): (b–c) has not occurred
Ant = 1	1 try to $_c$VP 2	1 { manage to $_c$VP / succeed in $_c$VPing } 2 1 finally $_c$VP 2	1 fail to $_c$VP 2 1 VP′ in vain/futilely/ to no avail
Ago = 1	1 resist 2	1 { give way / yield } (to 2) 1 finally VP	1 withstand 2 1 will not VP
Communicative Ant = 1	1 urge 2 to VP	1 persuade 2 to VP	[1 strike out (with 2)]
Ago = 1	1 be reluctant to VP 1 resist VPing	1 relent 1 give in to 2 1 finally VP	1 { refuse to / will not } VP

7 MODALS AS A SYNTACTIC CATEGORY FOR THE EXPRESSION OF FORCE DYNAMICS

The progression of properties and their extensions adduced for the force-dynamic system to this point now permits treatment of modals in this light. Though modals have been investigated from many perspectives, there has been general inattention to what appears to lie at the core of their meanings, namely, force opposition. This force-dynamic perspective is presented here.

The English modals form a graduated grammatical category, with more core and more peripheral members, as characterized by the degree to which they show certain syntactic and morphological properties. Among these properties are lack of *to* for the infinitive form of the following verb, lack of *-s* for the third-person singular, postposed *not*, and inversion with the subject as in questions. Modals characterized by more or fewer of these properties are shown in (27a) in their historically corresponding present and past tense forms. The forms in (27b) are syntactically and morphologically regular, but their meanings and usage are so close to those of real modals that they are often considered in the same terms and

may be accorded "honorary" modal status. In the discussion that follows, the more colloquial *have to* will usually be used over *must*, being equivalent to it in the relevant factors. Also, the usages of *will, would,* and *shall* that express pure tense or mood will be disregarded.

(27)

a.	can	may	must	—	shall	will	need	dare	had better
	could	might	—	ought	should	would		(durst)	
b.	have to		be supposed to		be to		get to		

Before some deeper analyses, an immediate inspection reveals core force-dynamic reference by the modals in their basic ("deontic") usage, as exemplified in (28). Thus, *can* in the context of *not*, as originally described in the introduction, indicates that the subject has a tendency toward the action expressed by the following verb, that some factor opposes that tendency, and that the latter is stronger, blocking the event. *May* in the context of *not* expresses this same force-dynamic configuration, but as limited to an interpersonal context, one where the main force factor is an individual's desire to perform the indicated action and the opposing factor is an authority's denied permission. While *may not* indicates an authority's *blockage* to the expression of the subject's tendency, *must* and *had better* in the context of *not* suggest an active social *pressure* acting against the subject to maintain him in place. *Should* and *ought*, similar in their effect, pit the speaker's values as to what is good and his beliefs as to what is beneficial against the contrary behavior of the subject. *Will/would not* indicate refusal by the subject to yield to external pressure to perform the expressed action. *Need* in the context of *not* indicates the release from the subject of a socially based obligation, imposed from outside against the subject's desires, to perform the indicated action. And *dare* opposes the subject's courage or nerve against external threat. In all of these indications of force opposition, the subject of the modal represents the Agonist, while the Antagonist is usually only implicit in the referent situation, without explicit mention.

(28) John can/may/must/should/ought/would/need/dare/had better not leave the house.

A notable semantic characteristic of the modals in their basic usage is that they mostly refer to an Agonist that is sentient and to an interaction that is psychosocial, rather than physical, as a quick review can show. Only *can (not)* and *will not* appear to have regular physical reference, as

exemplified in (29a,b). *Must/have to* have limited physical usage as in (29d), primarily, I suspect, where the subject referent is confined to a minimal space.

(29) a. The knob wouldn't come off, no matter how hard I pulled.
b. The ball can't sail out of the ballpark with the new dome in place.
c. *The ball has to stay in the ballpark with the new dome in place.
d. An electron has to stay in a particular orbit around the nucleus.

Modals are involved in two further usages that do allow nonsentient subjects and so seem to contravene the idea of psychosocial reference. But these can be shown not to fault the main observation. The first of these usages is illustrated in (30).

(30) The cake can/may/must/should/need not/had better stay in the box.

The subject here is not really the Agonist of the situation. There is a real Agonist in the situation, and a sentient one, but it is not expressed. This Agonist acts as an Agent controlling as a Patient the item named by the subject. Thus, (30) can be identified as a distinct construction incorporating modals that allows the foregrounding of a Patient and the backgrounding of the sentient Agonist. An apt term for the process yielding this construction is **Agonist demotion**, and for the force element itself, the **demoted Agonist**. In particular, sentences with Agonist demotion, as in (30), are of the construction type represented in (31b), but refer to a situation more accurately represented by the corresponding construction in (31a).

(31) *Agonist demotion*
a. Agonist (= Agent) MODAL make/let/have Patient VP ⇒
b. Patient MODAL VP

Thus, *The cake must stay in the box* can be more accurately paraphrased as *People/You must make/let/have the cake stay in the box*. The only modal not allowing this additional usage is *dare*: **The cake dare not stay in the box*, a fact that demonstrates that here a genuinely distinct and distinguishable construction is involved, one that each modal individually either does or does not participate in.

The second modal usage allowing nonsentient subjects is the epistemic, illustrated in (32).

(32) The pear could/may/must/should/needn't be ripe by now.

Involved here is the application of modality to the domain of our *reasoning* processes about various propositions, not to the semantic contents of those propositions themselves. It is true that the modals in their epistemic usage do not in fact apply to sentient entities in social interaction, but to beliefs within an inferential matrix. But this is a specialized usage referring to the same domain in every case, not an open-ended application to any nonsentient element.

It is especially significant for the present analysis that epistemic senses are associated with modals at all. Historically, the English modals acquired epistemic usage *after* their root (deontic) usage. Sweetser (1984) has adopted the present force-dynamic framework for root modal usage; she has argued that the original reference to psychosocial interaction extended diachronically to the semantic domain of inference and is represented there synchronically as a metaphoric extension. That is, she sees force-dynamic concepts as extending from interpersonal impingements to the impingements of arguments on each other or on the reasoner, constraining him toward certain conclusions. Thus, she has argued that the present force-dynamic analysis has still further explanatory power, able to account for the semantics of epistemics as well as that of modality.

7.1 The "Greater Modal System"

In section 2.6, we noted that the verbs *make*/*let*/*have*/*help* form a syntactically definable category, on the basis of their taking a *to*-less infinitive complement, and that as a group they all have force-dynamic reference. In these respects, this group resembles that of the modals, which also take no *to* and have force-dynamic reference. Accordingly, these two categories together can be considered to form a single larger category, characterizable as the "greater modal system," with these same syntactic and semantic properties. The regular-verb members of this larger category all take the Antagonist as subject, while the modals all take the Agonist as subject, so that the two subcategories in this respect complement each other. Further evidence of analogizing between the two subcategories is that *help*, as in *I helped push the car*, may well be the only regular verb in English that can be directly followed by the bare form of another verb (without an intervening direct object NP), rendering it still closer to the

syntactic properties of the modals. With the greater modal system, English appears to have established a syntactic category to correspond, in part, to the semantic category of force dynamics. Note the parallelism in (33).

(33) He can/may/must/should/would not/need not/dare not/had better
I made him/let him/had him/helped (him)
—push the car to the garage.

An analysis gains validation if it can link phenomena not previously connected. Such is the case with the present combining of two syntactic categories and their joint association with a semantic category. Such syntactic-semantic linkage is especially significant since it attests to linguistic integration. Previously treated cases of such integration are the association of adpositions with geometric schematization, as described in Herskovits 1986 and chapter I-3, and the association of conjunctions with relations between events, as discussed in chapters I-5 and I-6. And the present example of the greater modal system's correlation with force dynamics is a substantive addition.

7.2 Force-Dynamic Matrix Combining Modals and Open-Class Lexical Forms

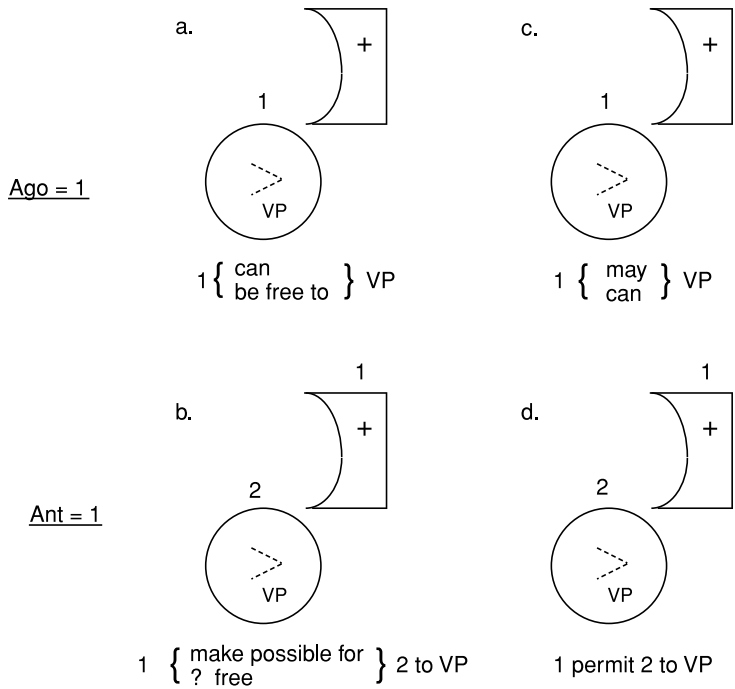
While modals are largely dedicated to the expression of force-dynamic concepts, especially of psychosocial character, they of course are not alone in this. Many of the notions they encode are expressed as well by open-class lexical forms, some of which have already been presented in this chapter. These two types of forms can complement each other in certain ways. The modals must take the Agonist as subject and offer no ready syntactic slot for the expression of the Antagonist, though this element is no less present in the total referent situation. A number of open-class verbs, on the other hand, do involve expression of the Antagonist, generally as subject, while expressing the Agonist as well, usually as direct object.

In characterizing the meanings of modals and their lexical compeers, one further factor needs to be added to the force-dynamic system. We have so far dealt with the Agonist's force tendency as an *abiding* property of that element. But this type of force tendency needs to be distinguished from one that is *contingent*. The latter type might be needed for physical force-dynamic reference to account for adventitious events, as suggested in (34a), although this is not clear. However, it is definitely needed for psychological force-dynamic reference to account for a sentient entity's *decisional* behavior, as indicated in (34b). Such contingent force tendency will be assumed to apply to much modal and related lexical reference, and will be indicated in the diagrams with a *dotted* marking of the force tendency.

(34) a. The ball can roll off the table (if it gets jostled).
b. Dad says that she may go to the playground (if she wants).

With this emendation, we can now apply the earlier diagramming conventions to represent the force-dynamic content of certain modals and related lexical forms. Shown first in (35) are secondary steady-state cases, where the Antagonist is out of the way of the Agonist. For simplicity, only the patterns with force tendency toward action are shown, though those with tendency toward rest are also possible. A parallelism is set up between forms with physical reference and ones with psychosocial reference, but the relative inadequacy of the physical in English, noted earlier for modals in general, appears here as well for open-class lexical forms, as seen in (35b).

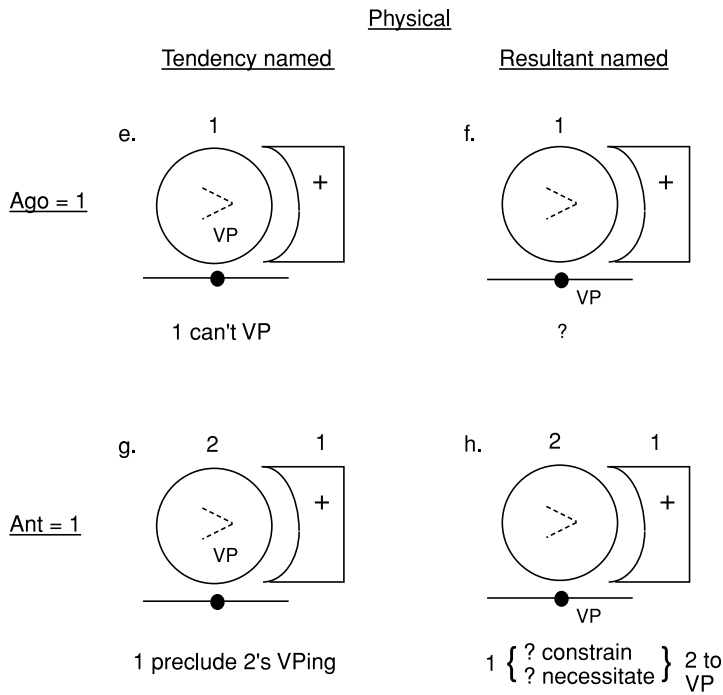
(35)

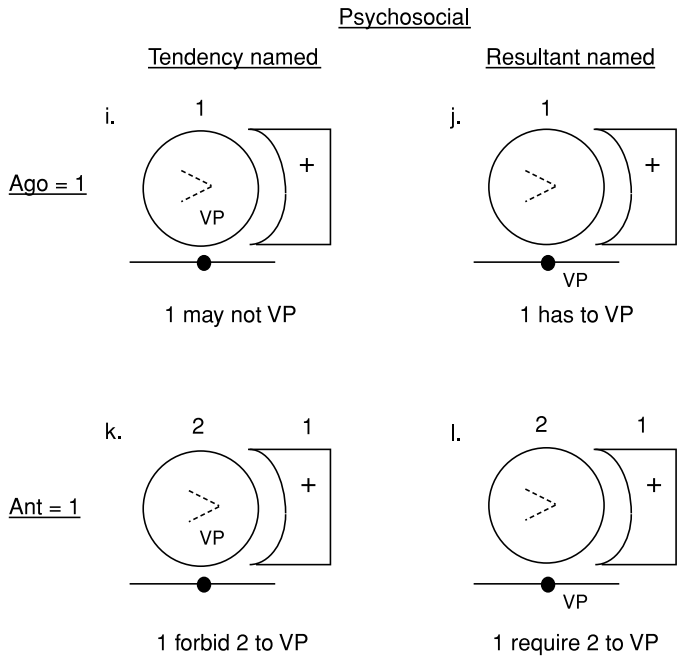


a. A flyball can sail out of this stadium.
b. The lack of a dome makes it possible for a flyball to sail out of this stadium.
c. You may go to the playground.
d. I permit you to go to the playground.

We can represent as in (36-diagram) the counterpart matrix, where the Antagonist now impinges on the Agonist. Since these patterns all have a stronger Antagonist, the Agonist's force tendency is now the opposite of the resultant. Accordingly, either the tendency or the resultant could be mentioned explicitly in alternative locutions, and the chart becomes doubled in size. Again, the patterns for the physical domain are poorly represented in English. The difficulty with the (36f) pattern was already discussed in connection with (29). The issue for the (36g,h) patterns is that any locution representing them must preserve the notion of the force tendency's "contingency." *Preclude* does this for (36g) but is not a common vocabulary item, whereas even that much is not available for (36h), since *constrain/necessitate* do not fully provide the needed meaning. It won't do to use *prevent* for (36g) and *make* for (36h)—as in *The dome prevented flyballs from sailing out of the stadium* or *The dome made flyballs stay in the stadium*—because, especially in past tense usage, these forms presuppose that the Agonist has in fact exerted force against the Antagonist, which is not the idea of contingency present in the other forms. By contrast, the patterns with psychosocial reference, both in (36) and in (35), are fully captured by modals and common lexical forms, the latter including such verbs as *permit, forbid,* and *require*.

(36)





(36-examples)

e. A flyball can't sail out of this stadium.
f. [*A flyball has to stay in this stadium.]
g. The dome precludes a flyball from sailing out of the stadium.
h. The dome ?constrains/?necessitates a flyball to stay in the stadium.
i. You may not leave the house.
j. You have to stay in the house.
k. I forbid you to leave the house.
l. I require you to stay in the house.

7.3 The Force Dynamics of *Should*

Given the analysis to this point, we are in a position to inspect some particular modals in greater depth for what their semantic organization reveals about force dynamics. *Should* is a good form to treat in this way because a strong sense of force opposition is part of its immediate semantic impact. Sample sentences to consider while examining its semantics are, say, those in (37). I analyze the general form of the *should* construction as shown in (38), and its semantic components as shown in

(39). Here, E and E′ stand for sentient entities, and VP for an action that E can perform volitionally.[9]

(37) a. She should lock her doors when she goes out.
b. He should spend more time with his children.

(38) E′ holds that E should VP.

(39) a. E does not VP or has not VPed.
b. In E's belief system, E's VPing would benefit E or others.
c. In E′'s value system, E would be a better person if she or he VPed.
d. Because of (b–c), E′ wants E to VP.

Explanation is needed for the presence of (38)'s first three words. Whether expressed or not, there is always some entity within *should*'s total reference that holds the implied beliefs and values noted. Usually, this entity is "I," the speaker, or alternatively perhaps, some conception of generalized societal authority. When this is the case, (38)'s initial phrase can be omitted from explicit expression, yielding the commonest overt form, bare *should* clauses of the kind seen in (37). But the evaluating entity must be named if it is not 'I/society', and it *can* be named even if it is, as in sentences like those of (40).

(40) a. (I think) she should lock her doors when she goes out.
b. Do you think he should spend more time with his children?
c. He feels I should return the lost money.

Note that of the semantic components in (39), (a) to (c) by themselves do not capture the force-dynamic import of *should*. Their contribution can be captured by a sentence like (41), corresponding to (37a).

(41) I think that she would be benefited and would be a better person if she locked her doors when she goes out.

But such a formulation lacks the force impact of the original *should* sentence. It is the component in (39d) that adds the crucial factor, rendering E′ into an Antagonist that in effect exerts pressure on E as an Agonist.

The *should* construction has several further noteworthy semantic properties, pertaining to the relationship between its two sentient entities. In one type of relationship, E′'s opinion is known to E. This must be the case where the subject of *should* is I or you—for example, in such Antagonist-Agonist pairings as I-you/he-you/you-I/he-I, as in *(I think) you should leave*. Here, in addition to the four factors in (39), a *should* sentence fur-

ther implies that (e) E (the Agonist) wishes not to VP, and that (f) E experiences direct social pressure from E′ (the Antagonist) counter to this wish. That is, the psyche of the Agonist is the experiential arena for force-dynamic opposition, the Antagonist's wishes against his own.

Where the E′ and the E are the same person, as in sentences like *(I think) I should leave* and *He thinks he should leave*, the force opposition is introjected into the self. As earlier, the self is then conceived as divided, with a central part representing the inner desires and a peripheral part representing the self's sense of responsibility.

There remains the peculiar circumstance in which E does not know of E′'s opinion, as in (37a,b). There is here *still* a sense of force impingement, and its character wants specifying. Clearly E cannot be an arena of opposing forces since he is aware only of his own wishes and behavior. Only E′ can be experiencing FD opposition, and its character is novel here. It pits E′'s desires against an actuality that does not accord with those desires. Until now, we have seen oppositions only between forces of the same kind within the same conceptual domain, whether the physical, the psychological, or the interpersonal. Here, however, forces of two different domains are nevertheless conceived as clashing. Given that the *should* construction has a single syntactic form, language here is clearly not distinguishing between these rather different semantic situations, the same-domain and the cross-domain cases.

Consider a different example of the same phenomenon. A sentence like (42a) is fully interpretable as a same-domain interpersonal Antagonist-Agonist interaction, as described in section 6: John relents under socio-psychological pressure. But the lizard in sentence (42b) knows nothing of outside social expectation and certainly has done no relenting. It has simply moved at its own wish. The *finally* pertains, instead, to a cross-domain clash between actuality and the speaker's desires. Specifically, the speaker had wanted the lizard to move; this wish was frustrated and built up in tension until finally relieved by the occurrence of the lizard's motion.

(42) a. John finally agreed.
b. The lizard finally moved.

7.4 The Force Dynamics of *Have To*

Offering further insights into force-dynamic properties is another modal, *must*, or its regular surrogate *have to*, as exemplified in (43). The sentences here are on a semantic continuum. In (43a), there is an implicit sentient

external authority that wants the boy to act in the way stated and that threatens to produce consequences unpleasant for him if he does not. In (43b), there is an implicit external authority that threatens consequences, but it is unaware of the fugitive's stated actions and would not want them if it were so aware. In (43c), there is no external authority at all, merely worldly exigencies.

(43) a. The boy had to stay in and do his homework (or else get punished).
b. The fugitive had to stay in hiding (or risk capture).
c. I had to get to the bank before 3:00 (or have no cash for the evening).

To capture the basic complex of meaning components present in such uses of *have to*, one might initially come up with the analysis presented in (44).

(44) a. E wants not to VP
b. Not VPing has consequences that E wants even less (the "or else" constituent)
c. E opts to VP as the lesser displeasure
(d. Some E′ wants E to VP, and would initiate the unpleasant consequences of E's not VPing)

The analysis in (44) is formulated largely in terms of an intrapsychological decision process, involving the weighing of two displeasures within the single psyche of the entity named in the subject. Some process of this sort, however conscious or unconscious, may in psychological actuality be what underlies a conceptualization of such a situation. If (44) sufficed, we would be able to paraphrase, say, (43b) as in (45).

(45) The fugitive chose the lesser displeasure of hiding over the greater displeasure of getting caught.

But this is clearly inadequate to the *have to* sentence in (43b), which suggests little deciding and a sense of externally imposed pressure. How must (44) be altered to render the right semantic result? A specific series of factors is involved in the reconceptualization.

The first thing to notice about the semantics of the sentences in (43) is that there is little sense of *internal* psychological disparity. Rather, there is a sense of opposition between the self and the outside. In particular, that component of the self that sought to avoid the greater displeasure of a

threatening consequence here recedes into the background. Its capacity to bring about an undesired action that is nevertheless the lesser of two displeasures is ascribed instead to an outside entity, to which is thereby attributed the power to coerce. This outside entity is the actual entity where one is present; otherwise, it is an abstract fictive one that is imputed to the situation. There thus emerges in the *have to* situation an *authority*, whether manifest or virtual. Further, in the place of a psychological process that is force neutral, there is now an authority that acts as an Antagonist exerting pressure on the self as an Agonist.

In this reconceptualization, the fact that the effect of one component in the psyche is attributed to an outside entity can be regarded as a form of psychological *projection*. In this respect, *have to* involves a conception opposite to that in, for example, *refrain* as treated in section 4.1. There, an originally external social pressure is *introjected* to form an additional component within the psyche. Accordingly, where the conceptual organization of language was previously seen to include a concept of the divided self, in which the psyche has componential structure, here we see as well the concept of a psychological *black box*, in which the self is without internal differentiation. That is, linguistic structure can also frame the concept of the psyche as a black box, one whose inner structure and processes are unknown and that is considered only as to its interactions as a unit with outside units.

In sum, the reconceptualization in the semantically corrected description of *have to* involves a shift from an internal division to a self-other distinction, from an autonomous decision process to a concept of an external authority, even if fictive, and from a force-neutral selection process to a force-dynamic coercive pressure. Further, it demonstrates that linguistic structure encompasses the concept not only of introjection resulting in a divided self, but also of projection resulting in a psychological black box.

To characterize the findings of the present section, we have seen that there is a syntactically definable category—conservatively, the modals proper, liberally, the "greater modal system"—that as a whole is dedicated to the expression of force-dynamic concepts. Some of the modals pattern together with each other and with open-class lexical items in semantically structured matrices. And some of the modals exhibit quite complex force-dynamic configurations that bring to light a number of additional semantic factors, ones that in turn shed light on how certain

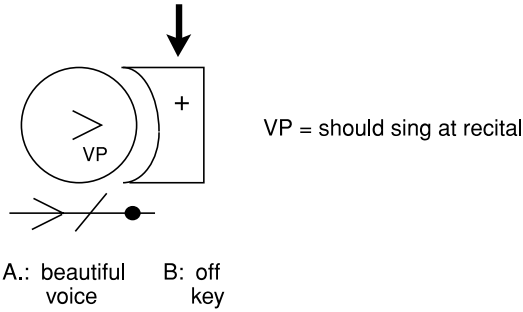
conceptual models of the psyche and of the world are embedded in semantic organization.

8 FORCE DYNAMICS IN DISCOURSE: ARGUMENTATION AND EXPECTATION

Force dynamics functions extensively in the domain of discourse, and preeminently so in the process of *argumentation*. This is the rhetoric of persuasion and includes efforts to exhort, to convince, and to logically demonstrate. The process involves the deployment of points to argue for and against conflicting positions. In a force-dynamic understanding of "argument space," each such point can in turn oppose or reinforce another point and overcome or be overcome by it; each successive resultant of these encounters can move the current argument state closer to or further from one of the opposing conclusions.

Crucial to this process, and specialized for it, is a particular class of closed-class expressions and constructions, present in some number in every language. As a class, these forms can be designated as force-dynamic **logic gaters**. Taken together through a portion of discourse, such forms can be seen to perform these functions: to limn out the rhetorical framework, to direct the illocutionary flow, and to specify the logical tissue. Included in the set of logic gaters for English are such forms as *yes but, besides, nevertheless, moreover, granted, instead, all the more so, whereas, on the contrary, after all, even so, okay*, and *well* (intoned as *weelll* with the meaning 'I grudgingly concede your point, though with a proviso'). To illustrate, the argumentational meaning of *yes but* can be characterized as: 'Your last point, arguing toward a particular conclusion, is true as far as it goes, but there is a more important issue at stake, one leading toward the opposite conclusion, and so the point I now make with this issue supersedes yours'. In the constructed example in (46), B's *yes but* thus acknowledges the truth of vocal beauty and of the force-dynamic push of that toward public performance, but then blocks that push with the point about tunefulness, presented as more important.

(46) **A:** You know, I think Eric should sing at a recital—he has a beautiful voice.
B: Yes, but he can't stay on key.

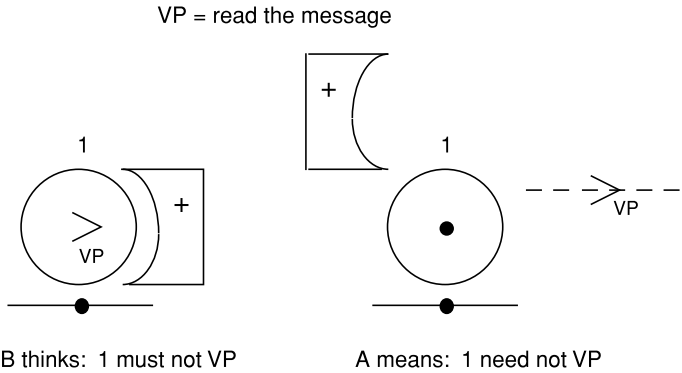


Other instances of argumentational meaning are *moreover* 'The point I am now making reinforces the preceding one in arguing toward the same overall conclusion', and *granted* 'Despite my prior objection, I concede that your last point refutes part of my total argument, but the remainder of my argument still holds and still prevails over your total argument'. In the meaning of *granted*, note the cluster of force-dynamic operations involved: 'despite', 'concede', 'refute', 'prevail'. The force-dynamic argumentation system is more extensive and important than can be described here, but future expositions are planned.

In addition to argumentation, force dynamics operates in other discourse functions, for example that of *discourse expectation*. This includes the moment-to-moment expectations of participants in a discourse as to the direction and content of succeeding turns. One type of discourse expectation—immediately recognizable to all but apparently without prior linguistic treatment—I will call **vector reversal**. It is the discourse situation in which the overtly observable resultant is agreed on, but one participant discovers that he has had one set of assumptions about the underlying direction of implication, while his interlocutor has had a converse set. Such an arrangement of semantic factors is immediately amenable to a force-dynamic analysis, and two examples are represented diagrammatically here.

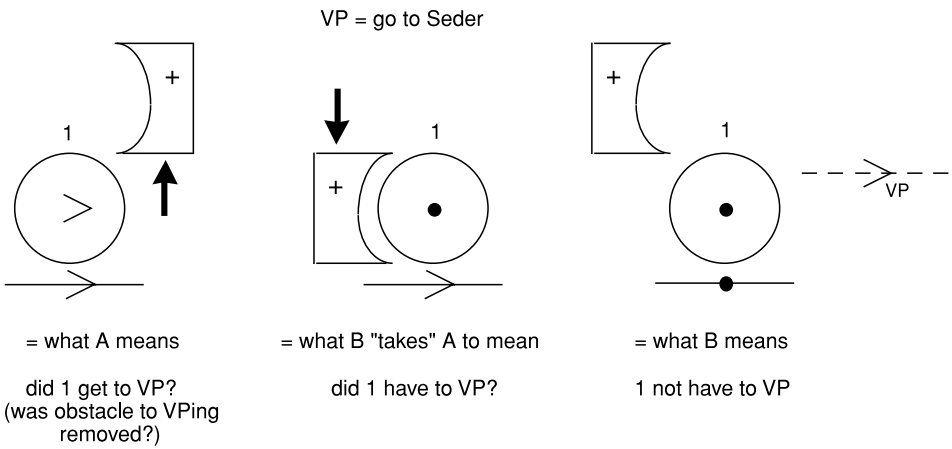
The first example, in (47), is an interchange taken from our campus e-mail system. Here, person B has interpreted a message in terms of a blockage, intended to prevent outsiders from performing an action they would want to (namely, read the message). Person A corrects this misimpression by noting that his assumption was that others would not want to perform that action and that he was sparing them the trouble. In the diagram, the dashed resultant line is a shorthand to indicate the action not undertaken, used here to avoid a diagram strip.

(47) **A** titles message: "For Chinese students only."
B protests that it is exclusionary.
A responds that the intent was: "Others need not bother to look."



Example (48), an overheard interchange, is more complex. It includes one interlocutor's use of disingenuousness for the purpose of humor. Note again that for the two examples, the resultant of action is the same under both interlocutors' interpretations; all that differs is their understanding of the underlying force vectors operative in the social situation. (A "Seder": a sometimes-trying family Passover ceremony.)

(48) **A**: Did you get invited to a Seder this year?
B: No. I was spared.



9 CONCEPTUAL MODELS OF PHYSICS AND PSYCHOLOGY IMPLICIT IN LINGUISTIC FORCE DYNAMICS

As our analysis of the linguistic force-dynamic system has revealed, conceptual models of certain physical and psychological phenomena are built into the semantic structure of language. These conceptual models can be compared with ones found in a cognitive system that I posit as existing apart from language, the **understanding system**. This putative understanding system generates mental models that one experiences as accounting for or explaining the structure and function of some domain of phenomena—at any level of consistency, elaboration, or sophistication, from idiosyncratic personal accounts, to folk cultural accounts, to scientific theories. The understanding system, thus, would underlie both our untutored "commonsense" conceptions, and the sophisticated reasoning providing the basis for the scientific and mathematical tradition. Now, it appears on the whole that the conceptual models within linguistic organization have a striking similarity to those evident in our naive world conceptions, as well as to historically earlier scientific models. These same basic conceptual structures are even much in evidence within contemporary science when it engages in casual thinking or expression. As to where a greater disparity can be found, however, these basic conceptual structures often diverge substantially from the fully rigorous conceptions of contemporary science.

Research to ascertain conceptual structure has a long tradition and has recently become an active agenda. Within linguistics, Whorf's (1956) work was among the earlier contributions, while more recent work has included that of Talmy (1978c, 1987), Jackendoff (1983), Langacker (1987), and Lakoff (1987), the last particularly with his idea of linguistic "ICM's": integrated cognitive models. Within other disciplines of cognitive science, recent work includes that of Gentner and Stevens (1982), who work within the framework of "mental models" using protocols from subjects asked about their conceptions of everyday phenomena, Hayes (1985), with a formal approach to "naive physics," and Hobbs and Moore (1985), working toward a theory of common sense within an artificial intelligence approach. The work of diSessa (1986, 1993, 1996) on "intuitive physics," also using protocols and abstracting the "phenomenological primitives" that individuals use in understanding physical situations, has shown striking parallels with the analyses of the present chapter.

The present findings in linguistic force dynamics can make a substantial contribution to this line of research. The concepts uncovered here offer insight into naive thought and provide a ready contrast with rigorous scientific thought. I now treat certain force-dynamic concepts in this respect, considering first ones with physical reference, and then ones with psychological reference.

9.1 Force Dynamics and Physics

Consider the following force-dynamic concepts with physical reference.

9.1.1 Conception of Privilege, Tendency, Stationariness, and Strength

In force dynamics, the "Agonist" concept confers on one object in an interaction a privileged status and special characteristics not shared by its opposite, the "Antagonist," even where these two are otherwise equivalent. While this imparity is so natural in language-based conceptualizing, it has no counterpart in physical theory. There, equivalent objects have the same properties: there is no physical principle for differentiating equivalent objects according to "privilege."

Further, in terms of the cognitive structure of language, an object in a given situation is conceptualized as having an intrinsic force tendency, either toward action or toward rest. This concept appears to correlate with historically earlier scientific theories involving an object's impetus in motion or a tendency to come to rest. The concept, however, is at considerable variance with modern physics. Objects have no internal impulsion toward some state of activity but, rather, continue at their current velocity unless externally affected. Moreover, stationariness is not a distinct state set apart from motion, but is simply zero velocity.

Next consider the linguistic force-dynamic concept of greater relative strength, represented in our diagrams with a plus sign. In one application of this conception, a *stronger* Antagonist is required so as to be able to block an Agonist with tendency toward motion and to hold it stationary in place. So natural is this linguistic, and perhaps also commonsense, conception that it may have escaped special attention during our exposition. Yet, it is at variance with one of the more familiar principles of physics, that two interacting objects—including two objects in contact at zero velocity—must be exerting *equal* force against each other. If one of the objects exerted a stronger force while in contact with the other object, the pair of objects would accelerate in the direction of the force.

9.1.2 Conception of Causality Another property of force-dynamic and related semantic patterns is that they comprise a severely limited selection from the causal actualities of referent situations. Two forms of this schematic reduction can be cited. First, the grammatical, constructional, and to some extent lexical structure of language presents an extremely simple representation of causality, one that marks few distinctions and lumps together ranges of diversity. This representation abstracts away, for example, from particularities of rate, scope of involvement, manner of spread, and the like. The disregard of such particularities is illustrated by the sentences in (49). The manner of breaking caused by heat, in (49a), would involve slow and gradual warping, spread of a tracework of cracks, and the like. On the other hand, that caused by a falling heavy object, in (49b), would involve sudden localized disruption. Though these situations involve very different causal particulars, they are treated together by a common grammatical structure and lexical item. Here, and generally, the kind of simplified schema in which linguistic constructions represent causation is a tripartite structure: a static prior state, a discrete state transition, and a static subsequent state. Linguistic structures, in effect, "chunk" the complexities and continuities of occurrence into this simplified schema and, in this, may well parallel conceptual patterns of naive physics. In scientific physics, by contrast, causation involves a continuum of interactions occurring at the finest scale of magnitude: there is no operative physical principle of "chunking."

(49) a. The heat broke the guitar.
b. A falling radio broke the guitar.

In a second form of schematic reduction to which language subjects causality, an "event"—that is, a portion conceptually partitioned out of the continuum of occurrence—can be represented as existing outside of causality altogether. Regular linguistic constructions, like those in (50a), can thus present an event as autonomous, without causal precursor or consequence, and without causal process during its occurrence. In such formulations, causality may be inferred, but it falls outside the represented scope or depth of attention. The length to which language can carry this perspective is evident in (50b). The sentence here can have no other interpretation than one in which an agent has physically searched through objects and then espied a missing item, yet that item is depicted as emerging into visibility on its own.

(50) a. The book toppled off the shelf. / The ball sailed through the window.
b. My cufflink finally turned up at the bottom of the clotheshamper.

With respect to the linguistic representation of causality seen in this section, the extrinsic partitioning (chunking), isolating, and decausativizing that language can conceptually impose on the stream of occurrence is in direct contrast with the perspective of physics, in which everything is an unbroken causal continuum.

9.1.3 Conception of Blocking, Letting, Resistance, and Overcoming Significantly, some of the most basic force-dynamic concepts—blocking and letting, resistance and overcoming—have no principled counterpart in physics. For their viability, these concepts depend on the ascription of entityhood to a conceptually delimited portion of the spatiotemporal continuum, and on the notion of an entity's having an intrinsic tendency toward motion or rest. For example, the plug in a tank of water can be seen as "blocking" flow, and its removal as "permitting" flow, only if one conceptualizes the water as a unified entity with tendency toward motion, the space below the plug as an entity that the water has the potential to occupy, and the plug as a unitary entity in between. These concepts of blocking and letting vanish, however, under physics' fine-structural perspective of individual particles and forces in local interaction.

The same can be demonstrated for the concepts of resistance and overcoming. Consider the following examples. The quotation in (51a) is taken from a *Scientific American* article on primitive evolutionary processes at the molecular level, and that in (51b) was noted down from a chemist speaking.

(51) a. "The variant [molecule] that is resistant to this degradation folds in a way that protects the site at which the cleavage would take place."
b. "To get the molecule to react, you have to add energy to overcome its resistance."

Both are examples of scientific discourse that frames its concepts in the very same force-dynamic terms that we have found built into language. But these terms can here be only a convenience for conceptualization: they have no operation in physical systems. Thus, for (51a), it is we as

thinkers that select a set of atoms with certain linkages between them (notions that can in turn be seen as constructs) for consideration together as a unitized concept, a molecule. There is no actual physical property of "entityhood" inhering in this set of atoms such that—as (51a) describes it—the set marshals itself as a unit to "resist" another such unit, or such that a particular spatial configuration constitutes "protection," or such that a separation between the atoms would constitute "degradation." All that can actually happen is the occurrence or nonoccurrence of a shift of linkages following on a juxtaposition of certain atoms with certain other atoms.[10]

9.2 Force Dynamics and Psychology

Consider the following force-dynamic concepts with psychological reference.

9.2.1 Physicalizing the Psyche and Animating the Body Turning now to how language structures conceptions about the mind as a form of "naive psychology," the main factor to note is that language largely extends its concepts of physical force interaction to behavior within the psyche and between psyches. That is, it largely *physicalizes* the psychosocial domain of reference. This phenomenon was treated at length in sections 4 and 6, which described conceptualizations like psychological desire as a force tendency, components of the psyche in force-dynamic opposition, and the social pressure of one psyche on another. To that discussion, we can here add the evidence seen in (52).

(52)

	Intransitive	*Transitive*
Physical	a. The drunk sailed out of the bar.	b. They threw the drunk out of the bar.
Volitional	c. The drunk went out of the bar.	d. They sent the drunk out of the bar.

The forms in (52a) and (52b), where the Patient is involved in purely physical interaction, are intransitive for the autonomous motion event and transitive for the direct causative motion event, respectively. But syntactically parallel to these are the forms in (52c) and (52d) with volitional Patient. Now, there is no a priori reason why a self-agentive event, like that in (52c), should be expressed in the same syntactic form as an autonomous event. Yet, this is regularly the case in English and most

other languages. Other constructions for the self-agentive do exist, ones that more closely reflect the underlying semantics—for example, the two-argument reflexive form *She dragged herself to work*. But the preponderant type of construction is the single-argument one, as in *She trudged to work*. Comparably, the complex psychosocial semantic situation of (52d), where one agent communicatively directs another to undertake volitional action, is framed syntactically like an event of direct physical causation, such as that in (52b). These syntactic parallelisms that language imposes reflect a conceptual analogy. The component of sentient volition can be treated as if it had no characteristics beyond physical ones. Thus, the contribution of volition in (52d) as an intermediary force-dynamic factor can be conceptually backgrounded, so that the Patient is regarded as propelled forth much as if physically moved.

A complementary conceptualization was also seen to be represented in language structure. Under this conceptualization, the physical body of a sentient entity, unlike other physical objects, is typically treated as a weaker Agonist or as force-dynamically neutral. It is the entity's psyche that must animate this body for it to exhibit stronger, or any, force-dynamic properties. Thus, while the preceding conceptualization physicalized the mind, the present one psychologizes the body.

9.2.2 Introjection and a Divided Self; Projection and a Unitary Self as Black Box Another feature of the linguistic model of psychology is that the self can be divided into separate components. This conceptualization was earlier treated at length for the situation in which the two components exert a force opposition against each other. One case of this was where the component with desires is treated as more central and the component opposing those desires is treated as more peripheral, and presumably as introjected from external social precepts. The former is syntactically realized as the reflexive direct object representing Patient status, while the latter is the Agent subject. That is, there is grammaticalization of the conception as to which psychological component does the affecting and which is affected. Consider the parallel between these concepts and Freud's notions of id and superego. The id is a deep component of the self that includes basic desires, the superego arises as an internalization of socially derived values, and the two are in conflict. Thus, there is an analogy between the Freudian id-superego conflict and the divided-self grammatical pattern. These Freudian concepts may in part have arisen as a theoretization of concepts already built into the semantic and syn-

tactic organization of language (as well as perhaps into everyday mental models). In effect, thus, the Freudian model of an id-superego conflict can be virtually read off from the semantic and syntactic pattern of a sentence like *I held myself back from responding*.

Linguistic representations of the divided-self conception also occur that do not involve force opposition. Thus, as contrasted with (53a), which represents the self as a unitary entity, in (53b) the self is conceptualized as encompassing two parts, one acting as if in the role of host and the other as if in the role of guest. These internal roles are introjected from the two distinct social roles of the dyadic situation normally referred to by *serve*, which is illustrated in (53c). (See the discussion of dyadic and monadic "personation" types in chapter II-1.)

(53) a. I went and got some dessert from the kitchen.
b. I served myself some dessert from the kitchen.
c. I served her/She served me some dessert from the kitchen.

Language structure also includes a conceptualization complementary to that of an external notion becoming introjected as a new component of the self in conflict with an original component of the self. In this complement, which is exhibited by modals like *have to*, an already-present component of the self that is in conflict with another self component is projected onto an external entity. This process removes the conflict from inside the psyche, which is then treated as a unitary black box, while the entity that receives the projection takes on the conflicting role with the psyche as a whole.[11]

10 FURTHER RESEARCH

In a way, it is remarkable that the semantic category of force dynamics had escaped notice until the present line of work, given the attention to concepts of force outside linguistics as well as their pervasiveness within language. Once recognized, however, it is widely evident, and in fact must be acknowledged as one of the preeminent conceptual organizing categories in language. Thus, we have here seen that the linguistic force-dynamic system operates in a common way over the physical, psychological, social, inferential, discourse, and mental-model domains of reference and conception. As a system, force dynamics warrants much additional investigation, and I now suggest several lines of further research.

10.1 Parameters of the Force-Dynamic System

While a number of parameters of the force-dynamic system have been presented during the exposition, still further distinctions appear to play a role. In (54) many of the distinctions we noted are summarized, and the final five name additional possibilities (discussed below).

(54) A force (or force-bearing object) is—

a.	present	absent	—i.e., a force-dynamic vs. a neutral situation
b.	focal	peripheral	—i.e., Agonist vs. Antagonist
c.	stronger	weaker	—i.e., realized or overcome
d.	toward action	toward rest	in its tendency
e.	action-yielding	rest-yielding	in the resultant
f.	steady-state	shifting	in pattern of impingement
g.	balance-maintaining	balance-switching	in the Agonist's and Antagonist's relative strengths
h.	impinging	nonimpinging	
i.	foregrounded	backgrounded	—as expressed by alternative constructions
j.	generic	particularized	—as expressed by specific constructions
k.	abiding	contingent	
l.	physical	psychological	
m.	in a different object from its opposite	in the same object with its opposite	—as for the divided self
n.	same-domain	cross-domain	in relation to its opposition
o.	simplex	concatenated	
p.	localized	distributed	
q.	pushing	pulling	
r.	contact-effective	distance-effective	
s.	compressing	stretching	
t.	uniform	changing (gradient/discrete)	

Of the new parameters in this list, the first, (54p), pertains to whether a force-exerting entity is localized or distributed with respect to space and force. The examples in the exposition mostly featured entities conceptualized as spatially localized and as manifesting their force at a single locus—for example, the log as Agonist and the ridge as Antagonist in (3d). But some of the examples had a spatially distributed Antagonist with a distributed delivery of its force. Thus, the "stiff grass" of (3c) that the ball as Agonist encounters as it rolls along is an Antagonist that manifests the effect of its oppositional force distributively. Likewise in (3b), it is distributively successive portions of the "wind" as Antagonist that impinge on the immovable shed as Agonist.

Next, parameter (54q) distinguishes the predominant pushing form of force exertion, the only type considered in this chapter, from the pulling form, which is evident in locutions like *pull (on), draw, attract*. The basis for the distinction between pushing and pulling can be characterized fairly straightforwardly. It depends on whether the main portion of the Antagonist exerts its force toward (pushing) or away from (pulling) the main portion of the Agonist. In this formulation and in the one below, the notion "main portion" can generally be replaced by an appropriate notion of "geometric center." For example, with my hand taken as the Antagonist and a mug as the Agonist, if my open hand presses against the back of the mug causing it to slide forward, I am 'pushing' the mug (*I pushed the mug along*) because the main portion of my hand exerts its force toward the main portion of the mug. But if I cause the mug to slide forward by hooking one finger through its handle and retracting my hand, I am 'pulling' the mug (*I pulled the mug along*) because the main portion of my hand is now exerting its force away from the main portion of the mug. True, a lesser portion of my hand, a finger, exerts force *toward* a lesser portion of the mug, its handle, but the "main portion" stipulation within the above formulation correctly ensures the 'pulling' interpretation. The formulation holds as well for a static situation as for a dynamic one. Thus, if the mug were stuck fast to the surface underneath, the basis for distinguishing between 'pushing' and 'pulling' remains the same, though English now requires the insertion of an *on*, as in *I pushed/pulled on the mug*. In an alternative formulation that is based on spatial relations rather than on force vectors, the distinction depends on whether the main portion of the Antagonist is behind (pushing) or ahead of (pulling) the main portion of the Agonist along the line of motion. But this formulation only applies to dynamic situations and, to extend to static situations, would

need to add the following phrase: "that would occur if the Antagonist caused the Agonist to move."

Now, in some situations, what constitutes the Antagonist or the Agonist, and hence what its main portion is—or, where its geometric center is located—is open to alternatives of construal. Accordingly, such situations permit alternatives of conceptualization as to whether the Agonist is being pushed or pulled. For example, say that I am seated with forearm resting on a table and extended away from my body, but with my hand bent back and, by pivoting at the wrist, sliding a paperweight toward my body. If the Antagonist here is treated as consisting of just my hand, whose center is behind the paperweight in its path of motion, then the concept of 'pushing' applies, and I can say *I pushed the paperweight toward myself*. But if the Antagonist is construed as consisting of my whole arm, whose center is now ahead of the paperweight in its path of motion, then the concept of 'pulling' applies, and I can now say *I pulled the paperweight toward myself*.

Note that, although often thought so at first, any direction of motion that an Antagonist and Agonist manifest away from or toward an Agent's body is not a principal determinant of the 'push/pull' distinction. This fact is demonstrated by the paperweight example, as well as by examples like *I pushed the two paperweights together* | *I pulled the two paperweights apart*, in referring to a situation in which I move both hands along a left-right line in front of me.

The next parameter, (54r), concerns whether the force of a force-bearing object can manifest its effect only through direct impingement of that object with its opposite, or can also do so at a distance. In the physical realm, only the type requiring direct contact has been considered so far. This includes the actions of pushing and pulling just discussed for parameter (54q). But as represented by the present parameter, we can also have concepts of actions analogous to pushing and pulling, except for working at a distance, without immediate contact. These are the concepts of repulsion and attraction (as with magnets). It is not clear whether social, or interpsychological, force dynamics is construed as involving direct impingement or action at a distance. Perhaps under one conceptualization the sphere fo one psyche can be conceived as abutting on the sphere of another's psyche in "psychological space." But surely the conceptualization in terms of psychological action at a distance—as with affective repulsion and attraction—is also available.

Parameter (54s) concerns whether the force exerted by an Antagonist on an Agonist results in the compression or the stretching of either object. Note that although compression of the Agonist is commonly associated with pushing and stretching with pulling, the present parameter is fully independent of parameter (54q). For example, one can compress a spring by either pushing or pulling on its free end, depending on where one stands in relation to it—say, behind its free end pushing it away from oneself, or in front of its anchored end, pulling the free end toward oneself. The same is true for stretching the spring.

The present parameter, however, does interact with parameter (54p). In the earlier discussion of that parameter, the quality of being distributed, as against localized, was seen able to apply to an Antagonist. Now, we can see that this quality can also apply to an Agonist. For an Agonist that undergoes compression or stretching, as in the referents of *I squeezed the rubber ball* or *I stretched the spring*, is not conceptualized as a simplex locus of resistance to the force of the Antagonist, but rather as a region over which the resistive force is cumulatively distributed.

Finally, parameter (54t) distinguishes the strength of the force exerted by an Agonist or by an Antagonist when it is uniform from when it is changing, where this change can be either gradient or discrete. Most of the examples in the text—for both the steady-state and the shifting force-dynamic patterns—assumed that the force exerted by an Agonist or an Antagonist when the two entities are in impingement is of a particular and constant strength. But we can cite here a form of force change of the gradient kind, the "rubber band" type, in which the further an Agonist or Antagonist is removed from its home position, the greater its resistance or force toward return. Thus, both the Agonist spring and my Antagonist hand in the sentence *The further I stretched the spring, the harder I had to pull* increase the strength of their force exertion along a gradient.

One type of force-dynamic pattern already presented—the one involving a shift in the balance of strength between an Agonist and an Antagonist, exemplified for *overcome* in section 2.2.2—does involve a change in an entity's degree of force. And, in fact, this change could be either gradual or a discrete jump. But, as the preceding "spring" example shows, a change of strength can occur without tipping the balance as to which entity prevails. Hence, parameter (g), which pertains solely to such a tipping of the balance, must be listed separately from the present parameter pertaining to strength shift alone.

It is clear that additional work on linguistic force dynamics will yield still further parameters, as well as an amplified system within which the new parameters interrelate.

10.2 The Prototype of Force Dynamics

Another line of research concerns the constraints that limit the linguistic force-dynamic system. The preceding parameters outline the system's degrees of freedom, but we can identify a number of options that the system does not exhibit, or exhibits only minimally, as indicated in (55).

(55) As encoded in language, force interactions preponderantly or exclusively involve
   a. two forces
      —not one, and not three or more
   b. two forces opposing each other 180° head on
      —not coming at each other at some other angle so as to yield a resultant off in a new direction
   c. two forces opposing each other
      —not acting in concert in the same direction
      (In-concert forms like *buttress/urge on/moreover* are few.)
   d. a stronger force overcoming a weaker one
      —not two equal forces in balance against each other
   e. a force acting along a straight line
      —not along a curved line
   f. a force acting straightforwardly along a line
      —not concentrically outward or inward
      (Closed-class forms able to refer to concentric force do exist, like the Latin verb prefix *con-* as in the precursors of English *confine/contain*, but they are rare.)
   g. a constant force tendency in the Agonist
      —not one that varies
   h. a two-valued force tendency in the Agonist, toward either action or rest
      —not one of multiple or continuous value
   i. a two-valued resultant state in the Agonist, either action or rest
      —not one of multiple or continuous value

An explanatory account can be provided for this pattern of what is included and what is excluded in the linguistic force-dynamic system. The

included factors are basically the ones consistent with a particular conceptual prototype of force interaction, that characterized in (56). It is deviations from this prototype that have minimal linguistic representation. The prototype itself, moreover, may turn out to be a significant conceptual template, playing a role both in cognitive development and in general conceptual organization.

(56) A stronger force opposing a weaker force head on, with all-or-none conditions

10.3 Force Dynamics among Other Schematic Systems

An additional line of research involves further explication of how the force-dynamic system relates to other semantic categories in language. Some progress has already been made here. I have so far identified in language at least four "schematic systems" for organizing a referent scene or the speech-event scene, each to some extent independent of the others (see chapter I-1). The first schematic system is that of "configurational structure," by which certain sentence elements specify for a scene a particular spatial and temporal structure. The second schematic system is "location of perspective point": given the specification of a structural framework for a scene, linguistic elements can direct that one imagistically view this framework from a particular perspective point, one that is fixed at a certain location or moving in a particular way over time. The third schematic system is "distribution of attention": given a structured schema viewed from a particular vantage point, linguistic expression can specify that one direct greatest attention to a particular selection of elements within the configuration. And, finally, force dynamics is a fourth schematic system: to the preceding basically pictorial complex, one now adds the forces that the elements of the structural framework exert on each other. While the first three schematic systems relate most directly to our system of visual perception, force dynamics relates most to the kinesthetic system. For this reason, in fact, the addition of force-dynamic considerations to many research agendas can serve to counterbalance a general bias toward the use of vision-based models in theoretical formulations. The linguistic task that remains here is to integrate these four and still further schematic systems into a unified account of conceptual structure in language (see the discussion in the introduction to this volume on the "overlapping systems model of cognitive organization").

10.4 Language among Other Cognitive Systems

Finally, we will need to explore further the relationships between the conceptual structuring in language and that in other cognitive domains. We have here seen how force dynamics pertains to this issue. The conceptualizations in language of physical and mental force interaction can correspond closely to the commonsense concepts of physical and psychological properties in our mental-model domain. Further structural parallels between language and other cognitive domains can be cited. Both Jackendoff (1987a) and Talmy (1988b) describe correspondences, as well as differences, between the structuring in linguistic schematic systems and that in visual perception. Language, further, incorporates a system that pertains to reasoning, not only in epistemic forms, but also in evidential forms, which grammatically mark such distinctions as 'known as fact', 'inferred', 'deduced', and 'considered probable', a system that appears to parallel much in our general cognitive domain of reasoning. And the linguistic system of discourse functions for marking such distinctions as 'given', 'new', and 'in focus' seem to parallel much in the system of "orienting responses" described in psychology, which includes such comparable factors as "familiar," "surprising," and "at the focus of attention." On the basis of observations like these, it appears that there may be a fundamental core of conceptual structure that is common across cognitive domains, though each domain will have features of structure not shared by others. The long-range goal, therefore, toward which the present study is intended to contribute, is the determination of the overall character of conceptual structure in human cognition—a goal requiring a cooperative venture among the cognitive disciplines.

Notes

1. This chapter is a modestly revised and expanded version of Talmy 1988a, which was itself a moderately revised version of Talmy 1985a.

My great thanks to Eric Pederson for assistance with the content, organization, editing, and diagramming in the original papers, as well as to Per Aage Brandt and Ray Jackendoff for our subsequent discussions on force dynamics.

2. As they function within language, I regard Agonist and Antagonist as semantic roles, on a par with, say, Agent. The roles that they represent for force interactions, moreover, are wholly parallel to those within spatial and temporal relations that I have designated "Figure" and "Ground" (Talmy 1975, 1978a).

3. For clarity, most illustrative sentences in this chapter contain explicit mention of both force elements. But more colloquial sentences mentioning only one element can equally represent the same force-dynamic patterns. Thus, *The shed kept*

standing can, in context, represent the same (3b) pattern that the fuller sentence given in illustration represents unambiguously.

4. Language is also able to represent starting and stopping as autonomous events, independent of force interactions, as in sentences like *The wind started to blow / It stopped raining*, and such cases join with the force-involved case of (5) to form the general 'start/stop' category.

5. A developing practice is the systematic use of schematic labeled diagrams to represent the meanings of linguistic forms. Perhaps with an origin in Whorf 1956, this practice is seen, among other contemporary writers, in Talmy 1972:413–420 (Talmy 1976b contains the first force-dynamic diagrams), Fillmore 1977, showing alternative labelings for the same diagram, and Langacker 1986, 1987, with the most elaborated system. Where I use different labelings for alternatives of foregrounding, Langacker draws with bold lines different "profiles" within a single "base."

6. Particularization is, of course, also a feature of the force-dynamic framework, but this, at least, has had ample parallel in traditional causative studies, with their discussions of the lexicalization of 'cause' together with other particular semantic material.

7. Other weaker-Antagonist patterns do underlie constructions with a nonsentient Antagonist as subject—for example, ones containing *hinder, help, leave alone,* as in *The grass hindered the rolling ball.*

8. The analogy extends to the sociodynamic domain from generally the whole complement of basic force-dynamic patterns. For example, a 'letting' pattern is seen in *He (finally) let her present her opinion,* in which blockage and release of blockage exist in a communicative and interpretive realm of convention-guided and volitionally initiated actions, not as physical impingements.

9. Chapter I-4 demonstrates that counterfactual propositions are interconvertible with factual causative propositions. For example, the sentence *I would have caught the ball if the car hadn't been in the way* is basically equivalent to *I didn't catch the ball because the car was in the way*. Accordingly, the (39) semantic analysis of *should* can be equally well rendered with its (b,c) counterfactual propositions replaced by causal forms as in:

b′. In E′'s belief system, E's not VPing is detrimental to E or others.
c′. In E′'s value system, E is a worse person because she or he does not VP.

(The counterfactual character of (39b) can be made explicit as in . . . *there would be benefit to E or others if E VPed*, and the causal character of (b′) can be made explicit as in . . . *there is detriment to E or others because E does not VP*.)

Force dynamics captures this kind of equivalence with its causative patterns, (3a,d; 5e,f). Here a stronger Antagonist, which can be represented by a *because*-clause, blocks an Agonist's force tendency, which can be represented as the unrealized factor in a counterfactual *would*-clause.

10. An issue that arises here, of course, is how one can use the conceptual models that language provides in thinking about domains with quite different properties.

One answer is that we are able to maintain more than one distinct conceptual system side by side and switch as necessary. Thus, an astronomer in an everyday context may well think of the sun as moving across the sky but can switch to thinking of the earth's rotation when the first model will lead to inconsistency (example from Edwin Hutchins).

11. Besides physics and psychology, other areas exhibit correspondences between naive and sophisticated conceptualization. Thus, built into language is a theory of topology, one in many respects parallel to that in mathematics (see chapter I-1). For example, most closed-class elements are *shape neutral*, as shown by *through* in (i), and most are *magnitude neutral*, as to both size and distance, as evidenced by *this/that* in (ii).

(i) I zigzagged/circled *through* the woods.
(ii) *This* speck/planet is smaller than *that* one.

Chapter 8

The Semantics of Causation

1 INTRODUCTION

This study demarcates and views as a whole the semantics of causation as it is characteristically represented in language.[1] It discerns within this whole a number of distinct types of causative situations of varying complexity. And it resolves the types into basic semantic elements and the ways these combine. This analysis is presented in the form of a step-by-step buildup in accordance with the way greater numbers of basic semantic elements combine in increasingly complex semantic causative situations.

In particular, section 2 aims to distinguish what is not linguistic causation from what is, and abstracts some of the latter's criterial characteristics. Section 3, in turn, abstracts out the apparently most basic causative situation, either available for representation by itself in a sentence or else involved in the semantics of all more complex situations. Section 4 presents causative situations of increasing complexity that are compounded of the basic causative situation together with other basic semantic components, except the one that is criterial to agency. Section 5 presents the agentive situation, from its simpler to its more complex forms, which crucially involves the concept of **intention**. And, finally, section 6 briefly presents some further factors in the semantics of causation that will need future exploration.

Although English is the main language tapped for examples, the semantic elements and situations dealt with are taken to be fundamental, figuring in the semantic basis of all languages—that is, taken to constitute a part of universal semantic organization, deeper than those respects in which individual languages differ from each other. For the semantic notions brought forth in this study, such differences would involve mainly where, how explicitly, and how necessarily the notions are expressed at the surface.

With this study broadly located within the framework of generative semantics and syntax, for each type of causative semantic situation I propose an underlying syntactic structure and subsequent derivation to provide a compact formulation in which a situation's semantic components and their interrelations are explicitly indicated, as well as to establish a step-by-step, unbroken relationship between each semantic configuration and observable causative surface sentences.

Note that the more colloquial example sentences tend to be dealt with later in the chapter. The reason is that the causative situations treated later, though they are more complex and combine many semantic factors, nevertheless can—like agency—constitute more everyday circumstances, whereas the simpler situations and the semantic factors themselves, established in the earlier portions of the chapter, occur in isolation often only in more special circumstances. An analogy from physics might be that an everyday event, like a feather wafting down through the air, intertwinedly involves several physical factors—here, for instance, friction, buoyancy, and gravity—of which one or another can be isolated from the rest often only in a special environment, such as in a vacuum.

As a guide to the contents of the chapter, the distinct types of semantic situation dealt with are listed here in the approximate order of their appearance in the exposition:

autonomous events	onset causation	Undergoer
basic causation	serial causation	self-agentive causation
event causation	enabling causation	"purpose"
instrument causation	Agent causation	caused agency
point-/extent-durational causation	Author causation	chain of agency

For immediate exemplification of these types, the following sets of sentences are presented, grouped to demonstrate particular causative distinctions:

Ordered according to complexity and differing as to the element foregrounded (appearing initially) are[2]

(1) a. The vase broke.
(autonomous event)
b. The vase broke from (as a result of) a ball('s) rolling into it.
(resulting-event causative (basic causative))
c. A ball's rolling into it broke the vase.
(causing-event causative)

d. A ball broke the vase in (by) rolling into it.
(Instrument causative)
e. I broke the vase in (with my/by) rolling a ball into it.
(Author causative—i.e., with unintended outcome)
f. I broke the vase by rolling a ball into it.
(Agent causative—i.e., with intended outcome)

Differing as to the number of links in a serial causative chain are

(2) a. i. The aerial toppled.
ii. The branch fell down on the aerial.
iii. The wind blew on the branch.
(autonomous events)
b. The branch's falling down on it toppled the aerial.
(2-event causative chain)
c. The wind's blowing the branch down on it toppled the aerial.
(3-event causative chain)

Differing as to the degree of continuity in a causal chain are

(3) a. I slid the plate across the table by pushing on it with a stick.
(continuous causative chain)
b. I made the plate slide across the table by throwing a stick at it.
(discontinuous causative chain)

Differing as to the coextensiveness of the causing event with the resulting event are

(4) a. I pushed the box across the ice (of the frozen pond).
[I kept it in motion, going along with it.]
(extended causation)
b. I pushed the box (off) across the ice.
[I set it in motion and stayed put.]
(onset causation)

Differing as to the overcoming of resistance versus the removal of blockage are

(5) a. I emptied the tub by dipping out the water
[I emptied the tub with a dipper.]
(effectuating causation)
b. I emptied the tub by pulling out the plug
[*I emptied the tub with a plug.]
(enabling causation)

Differing as to the scope of intention on the part of a sentient entity are

(6) a. I hid the pen somewhere in the kitchen.
(Agent causation)
b. I mislaid the pen somewhere in the kitchen.
(Author causation)
c. I lost the pen somewhere in the kitchen.
("Undergoer" situation (not causative))

Differing as to knowledge of outcome are

(7) a. I killed the snail by hitting it with my hand.
(Agent causation)
b. I hit the snail with my hand in order to kill it.
("purpose" situation)

Differing as to the presence of internal self-direction are

(8) a. The log rolled across the field.
(autonomous event)
b. The girl rolled across the field.
(self-agentive causation)

Differing as to the presence of self-directedness in mid-causal-chain are

(9) a. I threw him downstairs.
(Agent causation)
b. I sent him downstairs.
(inducive causation (caused agency))

Differing as to the number of occurrences of self-directedness along a causal chain are

(10) a. The king sent for his pipe.
(2-member chain of agency)
b. The king sent for his daughter (to come).
(3-member chain of agency)
c. The king had his daughter sent for.
(4-member chain of agency)

In consonance with this study's findings that there is no single situational notion of causation, as many linguistic treatments have it, but a number of types, there is accordingly no use made here of a single deep verb 'CAUSE', but, rather, of as many deep verbs as there are types. To provide an immediate idea of this, we can consider the main verbs of the

sentences in (1b) to (1f): the five appearances of *broke* are each taken to represent distinct causative types, being the homophonous product of conflation of the autonomous *break* of (1a) with five different deep causative verbs.

(11) a. ... RESULTed-to-break ⇒ ... $_{R}$broke
b. ... EVENTed-to-break ⇒ ... $_{E}$broke
c. ... INSTRUMENTed-to-break ⇒ ... $_{I}$broke
d. ... AUTHORed-to-break ⇒ ... $_{Au}$broke
e. ... AGENTed-to-break ⇒ ... $_{A}$broke

2 ZEROING IN ON CAUSATIVE

The term **causative** in a semantic analysis of language must first be distinguished from the scientific notion of causation in the physical world. For the latter, the totality of phenomena constitutes a causal continuum of which any conceptually delimited portion, an **event**, is understood as relating causally outside itself and containing causal relations within. For example, the event of water pouring from a tank is understood, grosso modo, as being caused by the gravitational attraction between the water and the earth, as carried forward by molecular collisions, and as causing pressure on the object the water falls on. By contrast, a linguistic entity such as a sentence can specify an event that is felt as taking place by itself without causal relations inside or out—as is the case in one language analog of the preceding physical event, the sentence

(12) Water poured from the tank.

In this study, such a sentence will, in fact, be said (to be noncausative in type and) to specify an **autonomous** event. And where some form of causality is felt to be present in the situation expressed by other sentence types, such as those of (1), typically it is as only an element contained within the situation. For example, in (13), causality is expressed as present only at the moment of interaction between two events, but not also throughout the events—for instance, how it is that the ball is in rolling motion and the vase goes through a breaking pattern.

(13) A ball rolling into it broke the vase.

The aim of the present study is to investigate the characteristics of this *semantic* causation and noncausation, where "semantic" refers to the organization of notions (including ones about the physical world) in

the mind pursuant to their expression by language (rather than, say, the organization of phenomena in the physical world).

The investigation begins by determining the existence and nature of a property that is common to all and only the types of situations deemed semantically causative. The procedure for doing this will be to analyze sets of situations in which all have mostly the same content, in which each differs from the next by one factor, and of which only one is felt to be causative—and then to do the same with other types of situation sets to see if the same findings result. The reliability of the procedure is greater in the case where there is an unambiguous surface-structure type—which expresses only the one select situation—that on wider grounds is fairly regularly associable with expressing a causative meaning.

Note that, in general, there is very little unambiguous correlation of surface form with either causative or noncausative meaning for complex sentences or complement-containing sentences, and there is virtually nothing over the length of a clause. This is demonstrated for English in (14) with sentences that have the same syntactic structure but whose meanings differ as to causativity.

(14)

No causality expressed	*Causality expressed*
The ice cream melted from the stick.	The ice cream melted from the heat.
The log rolled across the field.	The girl rolled across the field.
The book gathered dust.	The ball broke the vase.
I grew a wart in my ear.	I grew a wart in my pot.
I watched the ice cream melt.	I made the ice cream melt.

To begin the zeroing-in procedure, the situations in the first set to be considered will all have as part of their content (1) the event of all the water inside a tank coming out through a hole, (2) a person, namely, the speaker, and (3) some action by the person (in all but the first situation). For this set, there is a surface-structure form that only the true causative situation will be able to fill and that, indeed, is generally to be associated with a causative meaning. With a direct object, a *by*-clause, and a subject specifying a volitional entity, it can be represented, with some particulars added in, as in (15).

(15) I emptied the tank by VPing.

Now, if the person is present with the tank in the process of draining but bears no further relation to it, other than perhaps that of awareness—that is, the event is conceived as going on regardless of the person—she cannot later correctly say

(16) I emptied the tank.

but, at the most, only something like

(17) °I saw the tank empty.[3]

If she is present with the draining tank and also performs some action—such as writing a letter—that does not affect the otherwise ongoing event, she similarly cannot say

(18) *I emptied the tank by writing a letter.

but, at the most, indicating the temporal relation of concurrency between the event and the action, only something like

(19) °I accompanied the tank's emptying with poetry writing./writing poetry./the writing of poetry.

Even the situation in which an action by the person affects the event cannot be represented by the causative formulation if only the characteristics, but not the identity, of the event are altered. This is the case for an act of facilitation, where, for instance, one cannot say

(20) *I emptied the tank by enlarging the hole.

but, rather, only something like

(21) °I helped the tank empty by enlarging the hole.

and it is also the case for an act of part substitution

(22) *I emptied the tank by plugging the old hole and punching two new ones.

as compared with

(23) °I changed the way the tank emptied by plugging the old hole and punching two new ones.

Of course, what is incidental and what is essential in an event is relative, being specified, in fact, by the actual wording. For example, although quantity of flow is incidental to the fact of flowing, it is essential to gushing, so that beside the *flow* paradigm

(24) $\left\{ \begin{array}{l} {}^{*}\text{I made} \\ {}^{\circ}\text{I helped} \end{array} \right\}$ the water flow out by enlarging the hole.

the *gush* paradigm shows the reverse pattern of acceptability

(25) $\left\{ \begin{array}{l} {}^{\circ}\text{I made} \\ {}^{*}\text{I helped} \end{array} \right\}$ the water gush out by enlarging the hole.

What is common to all the preceding situations—and, hence, must be excluded from the semantic causative notion—is the circumstance that the event takes place in any case, *regardless* of the person or her action. That is, other things being equal, and aside from any modifications it may undergo, the essential event *would* still take place, even if there were no person or action involved.

Considering the matter from the other direction, the event in question must *at least* take place. For the circumstance in which it does not take place is also incapable of syntactic causative formulation. Thus, if the person performed the act of punching a hole in the tank, but no water drained from it, he could not say

(26) *I emptied the tank by punching a hole in it.

but, rather, could say

(27) °I failed to empty the tank by punching a hole in it.

In a third excluded circumstance, the person's action seems to correlate with the event's occurrence but in fact does not affect it. For example, if the person punches a hole in the tank through which no water comes, and at the same moment a cat steps on the tap from which water does come, she cannot say

(28) *I emptied the tank by punching a hole in it.

but, rather, might say

(29) °I had nothing to do with the tank's emptying in punching a hole in it.[4]

Finally, if the person performs an action as a result of which the event takes place, he can at last say, using the target causative formulation

(30) °I emptied the tank by punching a hole in it.

An aviso must be added even after this final success. A situation that is conceptualized as genuinely causative cannot simply be characterized by

any correlation of timing between the performance of an action and the occurrence of an event. Thus, consider the circumstance in which a person's action during a certain period of time does cause water to flow, but in which other actions during the immediately preceding and following periods also cause the water to flow without any break. Say, for example, on a tank with two taps, you held down your tap for one minute and released it, then I held down my tap for a minute and released it, and finally you once more held down your tap—all without a break in the flow of water. Here, I could still say something like *I emptied the tank partway by holding the tap down*, even though the period of my action does not coincide with the period of the tank's draining.

In sum, given a set of situations in which the relation of an event 1 to an event 2 varies through a succession of factors, only that situation is considered to be semantically causative in which the essential form of event 2 takes place and, ceteris paribus, would not take place if event 1 did not take place.

The previous procedure cannot be carried out here for many other choices of situation-set type, but at least one more can be sketched. While the preceding example involved complex causative issues (enablement and volitional agency) dealt with later in this study, the present example is an instance of what will be characterized as a basic causative situation. The illustrative situations will contain the event of a vaned wheel spinning about its axis and the event of a jet of water shooting through space. The syntactic structure that only the causative situation can have will consist of a simple main clause and a subordinate clause introduced by *as a result of*, as indicated in (31).

(31) The wheel turned as a result of NP's VPing.

In tabular form, then, the zeroing-in sequence parallels that of the preceding example; see (32).

(32) a. { *The wheel turned as a result of / °The wheel turned at the same time as } the water jet's shooting into the air.

b. { *The wheel turned / °The wheel turned faster } as a result of a stronger water jet's hitting it.

c. {*The wheel turned / °The wheel turned by a different means} as a result of the water jet's being replaced by an air jet hitting it.

d. {*The wheel turned / °The wheel failed to turn} as a result of the water jet's hitting it.

e. {*The wheel's turning resulted from / °The wheel's turning had nothing to do with} the water jet's hitting it.

f. °The wheel turned as a result of the water jet's hitting it.

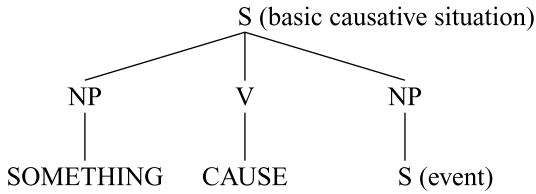
3 THE BASIC CAUSATIVE SITUATION

The two preceding examples have shown that the semantic content of sentences that meet the criterion of the last section may vary widely in kind and quantity. If all such contents have something in common, perhaps it is the irreducible basis for the criterion's holding over the whole of a content. Such a semantic component does seem to be educible from the examination of a range of instances. It can be called the **basic causative situation**. The remainder of this section will explore the characteristics of the basic causative situation. For the sake of simplicity and space, I will omit the stepwise abstraction of this from the range of instances and, in the rest of the chapter, present only the return process of building up to the various more complex causatives from this and other basics.

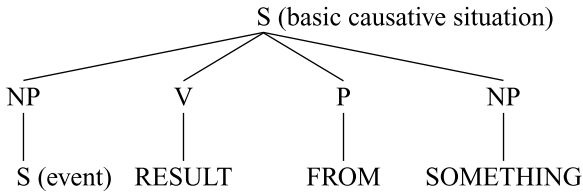
3.1 Basic Composition

The basic causative situation (already seen in (1b) and (32f)) consists of three main components: a simple event (that is, one that would otherwise be considered autonomous), something that immediately causes the event, and the causal relation between the two. This semantic entity, at this initial state of analysis of its characteristics, can be syntactically represented by one or the other of the underlying structures of (33). In these, deep morphemes are written in capital letters, and a parenthesized term after a constituent indicates the semantic element that the latter specifies.

(33) a.

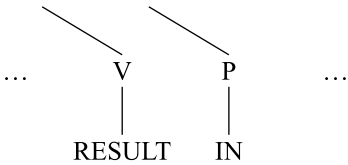


b.

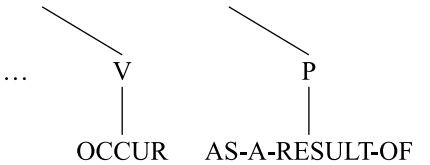


Alternate expressions that might be used here to represent the deep morphemes suggestively are shown in (34).

(34) a.



b.



The (a) forms of (33) and (34), as well as the (b) forms, will be used interchangeably in this study.

3.2 Caused Event and Causing Event

The next thing to note about the basic situation is that the cause of the simple event is itself also a simple event rather than, for instance, a (physical) object, as indicated by the anomaly of such sentences as

(35) *The window's breaking resulted from a ball.

beside

(36) °The window's breaking resulted from a ball's sailing into it.

and may also be seen in the complex-sentence forms, as in (37).

(37) The window broke as the result of { *a ball. / °a ball sailing into it. }

While it is true that, in a related construction type, the corresponding sentence

(38) A ball broke the window.

does not fare so badly beside

(39) °A ball's sailing into it broke the window.

such a sentence always seems to imply a larger form that includes a causal event.

(40) °A ball broke the window in/by sailing into it.[5]

There *are* nominals that, unlike *ball*, appear comfortably after *from* or *as a result of*—for example, *wind*, *rain*, *fire*—as in (41).

(41) The window cracked from the wind/the rain(fall)/a fire.

But these, representing what Fillmore (1971) calls "forces," can in some of their usages be considered to arise from the conflation of a deeper clause that specifies a whole event, as in (42).

(42) . . . from the air blowing on the Figure
. . . from the rain (water) falling on the Figure
. . . from flames acting on the Figure

The question raised by Fillmore as to whether a force is to be classed as an Agent or as an instrument is answered in this study: as neither, but rather as an event. Thus, for example, *The wind broke the window* is interpreted as coming from a structure like *The air's blowing on it broke the window*, an instance of **event causation**, as discussed in section 4.

Thus, as emended by the present consideration, the bottom line of the underlying structures diagrammed in (33) would now look like the forms in (43).

(43) a. S (event) CAUSE S (event)
b. S (event) RESULT FROM S (event)

Terminologically, in this work, the one event—that of the left-hand S in (43a)—will be called the **causing event** and the other—that of (43a)'s right-hand S—will be called the **caused** or **resulting event** (interchangeably).

3.3 Caused Event Specified Before Causing Event

There is evidence that of the two representations in (43), the (b) form is the more basic. Syntactic evidence for this is found in a whole array of causative sentences, where it can be observed that the representation of the caused event always appears in the main clause, where it may either remain in nominal form (below an NP node) or raise into the whole clause. On the other hand, the causing event is always represented in a subordinate clause and is always in a nominalized form. This is, of course, immediately obvious in a surface sentence directly arising from the (b) form, as in (44)

(44) The window's breaking occurred as a result of a ball's sailing into it.

where the caused event (the window breaking) is indeed specified in the main clause, and the causing event (the ball sailing) is indeed in nominalized form in the dependent clause. Moreover, the string specifying the caused event may indeed leave nominal status and raise into the main clause of the matrix sentence, as (45) suggests.

(45) The window broke as a result of a ball's sailing into it.

But it is also the case when the causal (physical) object appears as subject, as in

(46) A ball $\left\{\begin{array}{l}\text{caused the window's breaking}\\ \text{broke the window}\end{array}\right\}$ in sailing into it.

where the caused event is still specified in the main clause—optionally raised into it—and the causing event is still in nominalized form in a dependent clause. Even when the causing event is specified in the main clause (a dependent clause being absent), as in (47)

(47) A ball's sailing into it $\left\{\begin{array}{l}\text{caused the window's breaking.}\\ \text{broke the window.}\end{array}\right\}$

it appears there in nominalized form, while the string specifying the caused event is still (also) in the main clause and still has the option of raising out of nominal status. The seemingly strongest countervailing evidence is found in forms like

(48) A ball's sailing into it resulted in the window's breaking.

or, with the reverse pronominalization

(49) A ball's sailing into the window resulted in its breaking.

where the string specifying the caused event must remain nominal (and may even be considered located in a subordinate clause introduced by *in*). But even here the causing event must also remain nominal in form and cannot raise into the main clause. Thus, there is no form corresponding to (49′) with such a raising.

(50) *A ball sailed into the window in its breaking.

Nor, on the model of a sentence with caused-event first and raised, like (51), is there any corresponding surface form with the reverse embeddings and the inverse causal relation, as shown in (52).

(51) ◦The window broke *from* a ball's sailing into it.

(52) *A ball sailed into the window *to* its breaking.

The same findings are repeated in sentences with an Agent. The sentence

(53) I broke the window.

has the specifications within its single (main) clause of a final resulting event, and insofar as any additional event is implied or can be specified, it will be a causing event appearing in a subordinate clause.

(54) I broke the window by throwing a ball at it.

There is no comparable form with the reverse locations of specifications.

(55) *I threw a ball at the window $\left\{\begin{array}{l}\text{to}\\ \text{to the point of}\end{array}\right\}$ breaking it.

Further challenging forms like those in (56) are dismissed because they can optionally end with *thereby*, a pronominalization of a subordinate clause containing the causing event. Thus, the initial clause is an asserted duplicate of the causing event that pronominalizes its subsequent occurrence. Such sentences are treated in chapter I-6 under the term "copy-clefting."

(56) a. A ball sailed into the window $\left\{\begin{array}{l}\text{and it broke.}\\ \text{with the result of its breaking.}\end{array}\right\}$.

b. I threw a balll at the window $\left\{\begin{array}{l}\text{and broke it.}\\ \text{(with the result of) breaking it.}\end{array}\right\}$

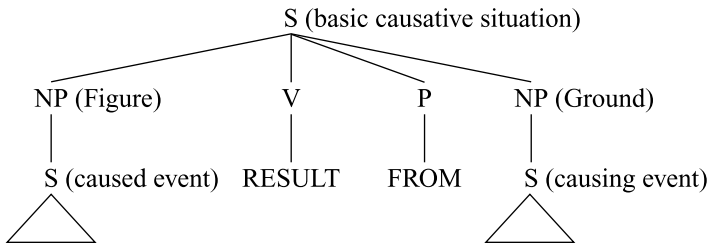
Thus, these sentences have a surface form that specifies the result before and in relation to the cause, while lacking a form specifying the reverse. This pattern is repeated in and reinforced by sentences expressing the causality of decision, as in (57).

(57) a. We stayed home *because* of the rain pouring down.
*The rain poured down *to-the-point-of-occasioning* our staying home.
b. We went out *despite* the rain pouring down.
*The rain poured down *in-futile-oppositiveness-to* our going out.

As treated in chapter I-5, a semantic concomitant of these syntactic facts is that there is no way within a standard complex sentence to *assert* the causing event—it can be represented only presuppositionally. For it to be asserted, a 'copy-cleft' sentence type must be resorted to.

These observations suggest that, of the alternative forms in (43), (b) is the more basic because there the caused event is represented in (the precursor of) the main clause (where it will later virtually always be); the causing event is represented in (the precursor of) the subordinate clause (where it will later usually be); and it is there already presuppositional (as it will later always be). (How a structure like (43a) might arise derivationally will be treated in section 4.) In the terms of chapter I-5, it can be said further that, within the (43b) form, the caused event functions as the Figure with respect to the causing event's function as the Ground. Thus, with the characteristics determined so far for the basic causative situation, it can be syntactically represented most closely by an underlying structure like (58).

(58)



3.4 Characteristics of the Causing Event

For a causal relationship to hold between two events, the causing event must have some elements in common with the caused event. There can be no notion of a causal relation where this is not the case, as in a sentence like (59).

(59) *The aerial toppled off the roof as a result of a ball's sailing into the pond.

But, further, the causing event cannot share just any element

(60) *The aerial plummeted through the air as a result of a ball's sailing through the air.

but must, in particular, share the caused event's Figure-functioning element.

(61) °The aerial$_i$ plummeted through the air as a result of a ball's sailing into it$_i$.

Further, within the causing event, that shared element must function as the Ground on which some other Figural element acts. It cannot itself be the Figure or it will have caused its own consequent motion.[6] The relation that the causing event's Figure bears to the Ground must be one of **impingement**. This must be interpreted appropriately for nonphysical events (section 5 touches on causation among mental events), but, for the physical, it entails the exertion of force through an initiated or maintained contact. Sentence (61) illustrated an initiated forceful contact, and the following sentences illustrate a maintained one.

(62) °The aerial (eventually) toppled off the roof as a result of { a branch pressing / a vine pulling } on it.

Excluded are cases of no contact

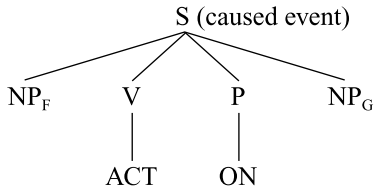
(63) *The aerial toppled off the roof as a result of a ball sailing past it.

as are cases of contact without force. And there are restrictions on cases involving the breaking of contact. Switching to agentive sentences to show this, it can be seen that while a *by*-clause can be used equally for expressing the making or breaking of contact (as in (64a) and (64b)), a *with*-phrase can express only the former (as in (64c)).

(64) a. °I toppled the display by throwing a can at it.
b. °I toppled the display by removing a can from its bottom tier.
c. I toppled the display with a can { that I threw at it. / *that I removed from its bottom tier. }

With impingement represented by the deep morpheme sequence ACT ON, the causing event with the characteristics determined for it above can be represented syntactically as in (65).

(65)

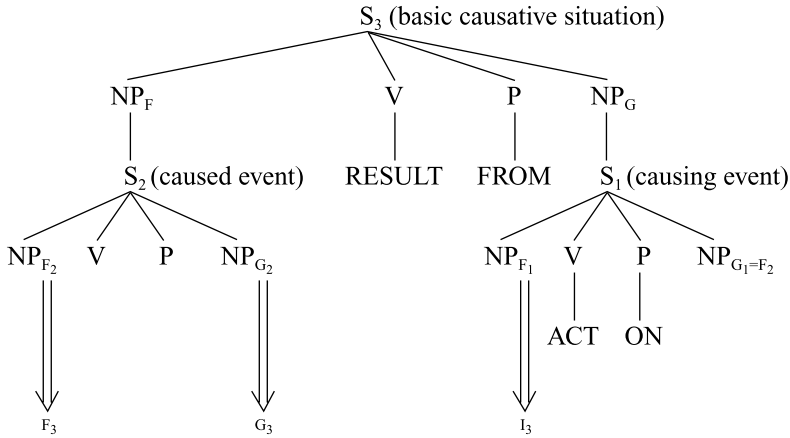


[= NP$_F$ of the S (caused event)]

3.5 Instrument

An important observation can be made when the whole basic causative situation is once again considered: the element that functions as the Figure within the causing event in turn functions as the **Instrument** with respect to the entire causative situation. It does so in most of the senses one would want for the term 'Instrument'. For example, the nominal that expresses this element is the one that appears, via regular derivational patterns, in the *with*-phrase of an agentive sentence. In addition, the elements that function as the Figure and Ground in the caused event also serve those functions in relation to the whole causative situation.[7] These hierarchical semantic relationships are indicated in the following, most detailed, syntactic representation of the basic causative situation. Here, the symbols for semantic relations (F, G, I) are given the subscript 1 if they pertain to the causing event, 2 if to the caused event, and 3 if to the entire causative situation (but also see chapter I-5, section 6).

(66)



The fact that the Figure in the causing event is also the Instrument in the whole causal situation is an instance of what can be considered a multi-relational embedding, or else the derivation of semantic relations. In later examples of this, (1) an entity that is the Author of a causative situation

and the intender in an intentional situation will function as the Agent in relation to the larger situation containing the other two; and (2) one entity (the Inducer) will function as an Agent with respect to another entity's (the Inducee) functioning as an Agent.

3.6 Dynamic Oppositions

The next semantic characteristic of basic causation to be noted here can be observed by contrasting examples (67) and (68).

(67) The golf ball rolled along the green.

The independent sentence in (67) depicts an autonomous event (comparable to one more clearly regarded as such, like that of *The satellite circled around the earth*). Compare this to the main clauses of causative sentences like those in (68), which depict a causally resultant event.

(68) a. The ball rolled along the green from the wind blowing on it.
b. The ball continued to roll along the green from the wind blowing on it.

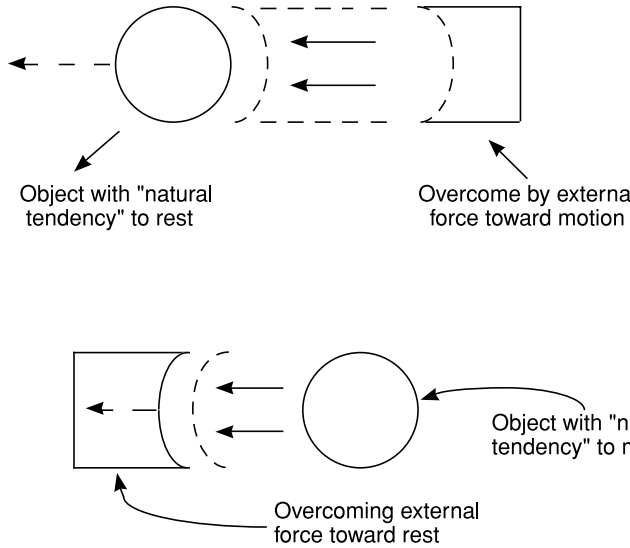
In (67), the event seems one that unresistingly goes on of its own nature; in (68), the same event seems one whose tendency would be not to take place, but whose occurrence is forced from outside itself. Such a characterization is, of course, consonant with section 2's formulation that causation is considered to be involved only where some occurrent event would not take place if it were not for another event. But beside this conditional abstraction, there seems to be semantic reality to a corresponding formulation in terms of dynamic oppositions. The Figure of the resulting event has a "natural tendency" to be in the state of motion opposite of that in the event, and the instrument of the causing event exerts a force on the Figure that "overcomes" this natural tendency. For the situation depicted in (68), a formulation in such terms would mean that the ball had a natural tendency to rest and the wind's blowing on it overcame this. A further possibility for this type of formulation is to see the dynamic opposition as a vector sum whose resultant is the Figure's motive state in the resulting event. For (68), this would mean that the ball's motion along its path is the vector resultant of the wind's vector of force and a smaller vector of force in the opposite direction, due—in accordance with physics versus folk conception—to "friction" or to "an object's tendency to come to a stop." As a third point of contrast beside (67) and (68b), which helps to clarify the foregoing issues, there is a

second, noncausative, usage of the surface verb *continue* (stemming, one must conclude, from a distinct underlying form), as in the main clause of (69).

(69) The ball continued to roll along the green (down the slope) despite the tall grass hindering it.

This specifies the exact reverse of the dynamic opposition specified in (68b), as diagrammatically depicted by (70).

(70)



That is, the ball's natural tendency is to move, and this overcomes the grass's exertion of force on it toward rest. Or, in vector terms, the ball's motion along its path is the vector resultant of a vector of force in that direction, due to the ball's kinetic momentum, and a smaller vector of force in the opposite direction, due to friction with the grass. Thus, the verb *continue* in a sentence like (71), when this has a meaning like that of (68), indicates true causation (as per section 2's criterion), albeit covertly.

(71) The ball continued to roll along the green.

But when this sentence has a meaning like that of (69), it does not indicate causation at all.

The preceding examples involved motion. But a locative event can also be felt to be occurring, either of its own nature, like the event represented by

(72) The wagon is standing on the platform.

or as the resultant of dynamic oppositions, as in the main clause of

(73) The wagon $\left\{\begin{array}{l}\text{is standing}\\ \text{is continuing to stand}\end{array}\right\}$ on the incline as a result of a brace pressing against it.

Here it can be taken that the wagon's natural tendency is to move, and that this tendency is being overcome by the force exerted by the brace. There is even at least one instance in which this distinction (i.e., between (72) and (73)) is indicated lexically. Consider an event in which, say, a suction-cup dart is securely affixed to a refrigerator. When this event is considered autonomous, it is specified using the verbal form *be stuck*, as in (74).

(74) The (suction-cup) dart is stuck to the refrigerator.

But when the same event is taken as largely caused—by the continued overcoming of the Figure's natural tendency to move—the verb *stick* is used, as in the sentence in (75), which could be exclaimed by a child after shooting.

(75) The dart is sticking to the refrigerator!

For a third event type like the nondurational one of transition from location to motion, fewer examples are easily readable as autonomous. But those that are taken to be caused, such as the one represented by the main clause of (76), are as open to a dynamic-oppositions interpretation as the preceding cases.

(76) The ball rolled off its spot from a gust of wind blowing on it.

How such dynamic oppositions might be explicitly represented in an underlying structure—aside from being implicitly a part of the meaning of RESULT FROM—is more unclear for this semantic notion than for any other treated here: Might specifications somehow be attached to the relevant clauses?

(77) [the ball rolled along the green] —*against its natural tendency to rest*
RESULTed FROM
[the wind was blowing on the ball] —*overcoming that tendency*

Or could we replace the specification for a simple causing event with that for a vector sum?

(78) [the ball rolled along the green] RESULTed FROM
[the force of [the wind blew on the ball] exceeded the force of [the ball's tendency to rest acted on the ball]]

There is as yet not enough syntactic evidence from which to infer any particular formulation, if, indeed, any at all.

3.7 Point-Durational and Extent-Durational Causation

As seen in the preceding discussion, the abstractability of a dynamic opposition from a causative situation is equally great whether the situation extends over a period of time (involving either motion or location) or is punctual. But this distinction divides basic causative situations into two types and deserves attention in its own right. Looking at the situations represented by a pair of sentences as in (79), which differ with respect to this distinction, several associated characteristics can be observed.

(79) a. The carton slid across the grass from the wind blowing on it.
b. The carton slid off its spot from a gust of wind blowing on it.

First, with regard to dynamic oppositions, in the (a) situation the Figure's tendency to rest is continuous through an extent of time, potentially realizable at any point thereof; and the instrumental force's overcoming of this tendency is also continuous through that extent of time, manifest at every point thereof. But in the (b) situation, the resistance to motion and its overcoming are manifest at a single point of time. Second, the caused event—that of the carton moving—in (a) is homogeneously occurrent throughout the extent of time considered in the sentence and, indeed, through any point thereof. But in (b), both its nonoccurrence and its occurrence are manifest in the point of time considered. It might even be concluded that the *transition* between these two, rather than the final motive state, is what is caused. Finally, here, the characteristics of the causation in any temporal point of the (a) situation differ from those of (b)'s single point. For, while both situations meet the causative criterion in that the carton's moving would not take place if it were not for the wind's blowing, the absence of a causing event in the (b) situation would entail the carton's *remaining* at rest. But in a point of the (a) situation, it would entail the carton's coming to rest.

These two types will here be called **point-durational** causation and **extent-durational** causation. It is not clear how these two types of causation might be explicitly specified in an underlying structure, nor how

point-durational causation might look in a partly derived structure. But extent-durational causation might well be represented by a deep morpheme CONTINUE at some mid-derivational stage, such as one renderable as in (80).

(80) The carton CONTINUEd (to) slide across the grass from the wind blowing on it.

The further derivational fate of the deep verb might then be deletion, giving rise to the form in which this sentence was first seen—that is,

(81) The carton slid across the grass from the wind blowing on it.

or it might be lexical insertion by such surface verbals as *continue to* or *keep on -ing*, thereby yielding

(82) The carton { continued to slide / kept on sliding } across the grass from the wind blowing on it.

The deep verb CONTINUE also participates in conflations with particular other morphemes—for example, with *be*

(83) NP $\underbrace{\text{CONTINUE to be}}_{\substack{\textit{stay},\\ \textit{remain}}}$ Adjectival

so that beside *the soup was hot* appear

(84) a. *The soup { continued to be / kept on being } hot.

b. °The soup { stayed / remained } hot.

and, as in a previous example, by stages with *be stuck*

(85) NP $\underbrace{\underbrace{\text{CONTINUE } \textit{to be}}_{\textit{stay}} \quad \underset{\downarrow}{\textit{stuck}}}_{\textit{stick}}$ *to* NP

as in

(86) a. *The dart continued to be stuck to the refrigerator.

b. ˣThe dart stayed stuck to the refrigerator.

c. °The dart stuck to the refrigerator.

Agentive structures show the following conflations:

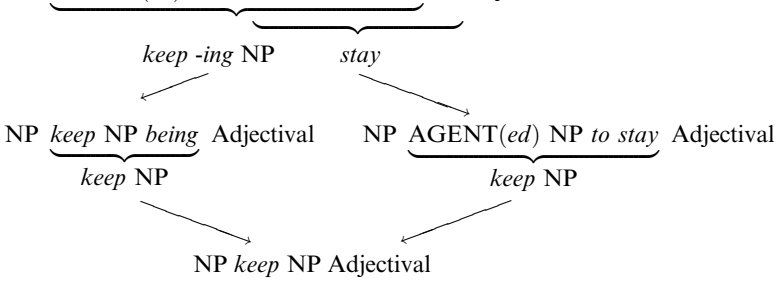
(87) NP $\underbrace{\text{AGENT}(ed)\ \text{NP}\ to\ \text{CONTINUE}}_{keep\ \text{-}ing\ \text{NP}}$ *to* Verb

as in

(88) a. [x]I'm making the ball continue to roll.
b. [°]I'm keeping the ball rolling.

and also

(89) NP $\underbrace{\text{AGENT}(ed)\ \text{NP}\ to\ \underbrace{\text{CONTINUE}\ to}_{stay}}_{keep\ \text{-}ing\ \text{NP}}$ *be* Adjectival



as in

(90) a. [x]I made the soup continue to be hot.
b. *I kept the soup being hot. / [x]I made the soup stay hot.
c. [°]I kept the soup hot.

3.8 Simultaneity

In the service of one final point, consider the following sentences.

(91) a. The carton slid (all the way) across the grass from a (single) gust of wind blowing on it.
b. The board cracked from the rod pressing into it.

Analysis reveals that the situations expressed by such sentences are more complex than the basic causative situation—that they include semantic material additional to the basic causative situation—and that the sentences, deceptively, merely have the same form as those specifying basic causation. For, in (91a), the carton's motion along its path can be seen as an autonomous event ensuing upon an actual causative situation, the point-durational one of the carton's being set in motion by the gust of wind (this more complex circumstance will be treated in section 4 under

the term **onset causation**). And, in (91b), the rod's pressing can be seen as an extended autonomous event of which only one midpoint's worth functions as a causing event in a point-durational causation that results in the cracking event. Thus, the evident noncontemporaneity of the events specified by the main clause and the subordinate clause in both (91a) and (91b) does not necessarily reflect any characteristics of the basic causative situation. On the contrary, the point-durational causations abstracted from these more complex situations, set beside the extent-durational causations represented by sentences like

(92) The carton slid across the grass from the wind blowing on it (steadily).

give evidence for one additional characteristic of the basic causative situation: the caused event takes place exactly during the duration of the causing event, whether this is a point or an extent of time.

3.9 Summary

The characteristics that have been abstracted for the basic causative situation can be summarized as follows:

1. The basic causative situation consists of three components: a simple event, that which causes the event, and the causal relation between the two.
2. That which causes the simple event is itself a simple event.
3. The caused event functions as the Figure and the causing event as the Ground of the whole situation (and so they are represented, respectively, earlier and later in an underlying structure); the causal relation is "result from."
4. The Ground component of the causing event is also the object that functions as the Figure of the caused event. The Figure of the causing event must have force-exertional contact with this object. This contact can be initiated or maintained (and may involve pushing or pulling), but it may not be broken. The deep form 'ACT ON' can be used to represent these characteristics.
5. The objects that function as the Figure and as the Ground of the caused event also have these same functions with respect to the entire causative situation. The object that functions as the Figure of the causing event has the function of Instrument with respect to the entire causative situation.

6. The caused event occurs, and it would not occur if the causing event did not occur. Or: The Figure of the caused event has a natural tendency to be in the state of motion that is opposite to the state that it is manifesting, and this natural tendency is being overcome by the force exerted by the Instrument of the causing event. Or: The caused event is the vector resultant of a sum of Figural and Instrumental vectors.
7. A causative situation can be a point or an extent of time in duration, with an associated difference of certain characteristics.
8. The caused event takes place exactly during the duration of the causing event.

4 COMPLEX CAUSATIVE SITUATIONS

Having explored the characteristics of the basic causative situation, we proceed now to investigate how various more complex causatives can be built up from this causative basic. In fact, under the analysis that follows, many of the more complex situations are particular embeddings and concatenations of just the two basic semantic entities already dealt with—the autonomous event and the basic causative situation—and the rest involve only one additional semantic factor: intention. Those complex situations without intention are treated in this section, and those with intention are treated in the next section.

4.1 With the Foregrounding of One Element

To begin the systematic investigation, we note that beside the basic causative situation specified by the sentence in (93), the situation represented by (94) does not contain any further information or any additional event.

(93) The vase broke from (as a result of) a ball rolling into it.

(94) A ball broke the vase in (by) rolling into it.

If (94) is more complex at all, it is by virtue of including a semantic component of emphasis in relation to one of the original semantic elements, namely, the instrument (the ball). In particular, there seems to be a singling out, or foregrounding, of the Instrument and of the relation it bears to the whole situation. This much can be explicitly represented syntactically as in the general underlying form in (95a), which employs the semantic function symbols I for instrument, R for resulting event, and C for causing event.

(95) a. NP_I $\underbrace{\text{WAS-the-}''\text{INSTRUMENT-IN}}_{'\text{INSTRUMENT}ed}$ [S_R RESULT*ed* FROM S_C]

b. ⇒ NP_I $'$INSTRUMENT*ed* [S_R RESULT*ed* FROM S_C]

c. ⇒ NP_I $\underbrace{'\text{INSTRUMENT}ed\text{-TO-RESULT}}_{\text{INSTRUMENT}ed}$ S_R $WITH_c$ S_C

d. ⇒ NP_I INSTRUMENT*ed* S_R $WITH_c$ S_C

Here, an underlying verbal phrase BE-THE $''$INSTRUMENT-IN in (a) conflates into a deep verb (to) $'$INSTRUMENT in (b) (primes distinguish those homographic forms that designate distinct deep morphemes). The embedded causative structure, shown bracketed in (b), "predicate"-raises in (c), its main verb Chomsky-adjoining that of the matrix sentence; this adjunction conflates in (d) into a new deep verb, (to) INSTRUMENT, which can be read like other treatments' "CAUSE". And $WITH_c$ is a deep subordinating conjunction (written with a subscript c for "conjunction" to mark it as distinct from deep prepositional WITH) that replaces FROM in the present circumstance. With particular forms plugged in, the derivation continues.

d′. ⇒ a ball INSTRUMENTed [the vase broke] $WITH_c$ [a ball rolled into the vase]

e_1. ⇒ a ball $\underbrace{\text{INSTRUMENTed}}_{\text{caused}}$ the vase to break $\underbrace{WITH_c}_{\text{with, in, by}}$ its rolling into it.

(A ball caused the vase to break $\left\{\begin{array}{l}\text{with its}\\ \text{in}\\ \text{by}\end{array}\right\}$ rolling into it.)

e_2. ⇒ a ball $\underbrace{\text{INSTRUMENTed-TO-break}}_{\text{I broke}}$ the vase $\underbrace{WITH_c}_{\text{with, in, by}}$ its rolling into it.

(A ball broke the vase $\left\{\begin{array}{l}\text{with its}\\ \text{in}\\ \text{by}\end{array}\right\}$ rolling into it.)

As seen in (e), the surface forms of the WITH subordinate clause all happen to be clumsy in English. Of the three likeliest surface conjunctions that can be inserted onto the deep one, two are bookish: *with* (which, it

might be noted, does not permit Equi-NP Deletion) and *in*. The third, *by*, is (for the author) somewhat too associated with its use in sentences of volitional agency to quite fit in an instrumental sentence.

A sentence like (96), which lacks a surface clause specifying the causing event, can be accounted for as arising by deletion from a deeper structure with the generic form of such a clause.

(96) A ball broke the vase.

(96′) e_2'. a ball $\underbrace{\text{INSTRUMENTed-TO-break}}_{\text{I}}$ the vase broke

$\underbrace{\text{WITH}_c \text{ its ACTing ON it}}_{\varnothing}$

Recall from the previous section that a form specifying the causing event before the resulting event, like (97), is less basic than one with the reverse order of specifications.

(97) A ball's rolling into it broke the vase.

Since it can also be considered to foreground the causing event, such a form might be seen as arising in a way similar to that of the preceding one of instrument causative, as indicated in the following derivation.

(98) a. S_C $\underbrace{\text{WAS-the-CAUSING-EVENT-IN}}_{\text{EVENTed}}$ [S_R RESULTed FROM S_C]

b. $\Rightarrow$ S_C ′EVENTed [S_R RESULTed FROM$_c$ S_C]

c. $\Rightarrow$ S_C $\underbrace{\text{EVENTed-TO-RESULT}}_{\text{EVENTed}}$ S_R $\underbrace{\text{WITH}_c\ S_C}_{\varnothing}$

d. $\Rightarrow$ S_C EVENTed S_R

which, with particular forms plugged in at (d), continues.

d′. $\Rightarrow$ [a ball rolled into the vase] EVENTed [the vase broke]

e_1. $\Rightarrow$ a ball's rolling into the vase $\underbrace{\text{EVENTed}}_{\text{caused}}$ the vase $\underbrace{\text{TO}}_{\text{to}}$ break

(A ball's rolling into it caused the vase to break.)

e_2. $\Rightarrow$ a ball's rolling into the vase $\underbrace{\text{EVENTed-TO-break}}_{\text{E}}$ the vase broke

(A ball's rolling into it broke the vase.)

Such a derivational origin accounts for some of the characteristics noted earlier for the (97) sentence type: the clause specifying the causing event, in remaining nominal without the option of raising, parallels the other preposed, singled-out elements, namely, those specifying instrument and Agent. And this removes the sole exception to the observation that the causing event's specification comes last, for the absence of such specification at the end of (97) is now seen as due to its deletion by a preposed replica.

4.2 Onset Causation

Consider again the two different situations represented by the ambiguous sentence in (99)

(99) I pushed the box across the ice.

—that is, (a) where I keep the box in motion, going along with it, and (b) where I set the box in motion and stay put. A disambiguating pair of partial paraphrases is given in (100).

(100) a. I { slid / brought } the box across the ice by pushing on it (steadily).

b. I { slid / sent } the box across the ice by giving it a push.

Compare the corresponding two nonagentive situations represented by (101).

(101) a. The box slid across the ice from the wind blowing on it (steadily).

b. The box slid across the ice from a gust of wind blowing on it.

It is once more to be noted that in the (a) situations the Figure continues in motion as the ongoing result of an extended force impingement without which it would stop, and, hence, involves causation throughout ("extent-durational causation"). But, in the (b) situations, the Figure describes a path along the length (and during the duration) of which its motion is to be taken not as caused but as autonomous. In the (b) situations, the only actually causative portion is the point-durational situation of a force setting the Figure in motion, which is comparable to the point-causative situation unaccompaniedly specified by sentences like the following.

(102) a. I { slid / got } the box off the spot it was resting on by giving it a push.

b. The box slid off the spot it was resting on from a gust of wind blowing on it.

Thus, each (b) situation must be considered more complex than a basic causative situation, since it contains a point-durational instance of this together with an autonomous event. Such a complex situation has particular relevance to language study because, when the autonomous event ensues upon the contained point-durational causative situation, with the same object as Figure, as exemplified in (103a), (all?) languages have the transformational options for deriving a simply structured surface sentence like that in (103b), which specifies the complex situation.

(103) a. The box CAME INTO MOTION from a gust of wind blowing on it $\left\{ \begin{matrix} \text{and then} \\ \text{whereupon} \end{matrix} \right\}$ it slid across the ice

b. $\Rightarrow\Rightarrow$ The box slid across the ice from a gust of wind blowing on it.

It should be noted that, in an underlying structure like (103a), the non-Figure portion of the caused event cannot be represented as to its specific details, as is done in the phrase *slid off the spot it was resting on* in the sentences in (102), but only generically by some deep morphemic phrase like COME INTO MOTION, since that much will be deleted in the derivation to the simpler surface sentence. Or alternatively, by one syntactic interpretation, that very deep morphemic phrase can, instead of deleting, give rise to the verb particle *off*, which can appear in the earlier (b) forms with a disambiguating effect.

(104) a. I pushed the box off across the ice.

b. I $\left\{ \begin{matrix} \text{slid} \\ \text{sent} \end{matrix} \right\}$ the box off across the ice ...

c. The box slid off across the ice ...[8]

The exact nature of the relation between the caused event and the autonomous event is a matter for further investigation. It has been casually indicated by the expressions *ensuing*, *and then*, and *whereupon*, but a finer analysis might reveal it to involve the relation that the initial boundary point of an ordered linear extent bears to the whole extent, as might be represented in an underlying structure something in the manner of (105).

(105) The box CAME TO the BEGINNING POINT of [the box slid across the ice] from a gust of wind blowing on it.

This consideration that the complex situation involves the notion of a beginning point, together with the fact that its underlying representation conflates into a causative-resembling surface sentence, suggests that it might well be dubbed **onset causation** (Shibatani's 'ballistic causative'), even though one can strictly speak only of extent-durational causation and point-durational causation as true causatives.

4.3 Serial Causation

In section 3, we discussed how, when one event causes another, the object that functions as the Figure within the first event is considered to function as the instrument in relation to the Figure object of the second. Now, if this second event causes a third, its Figure object can, in turn, function as the instrument to this last event's Figure object, and so on with further events in what may be called **serial causation**. Such a causative chain is a more complex situation than one of basic causation. It can be regarded as a generalization of the latter, with *n* events instead of two, as indicated by the top brace in (106), or it can be regarded as consisting of overlapped "links" of basic causative situations, as indicated by the bottom braces in (106).

(106)

It is a whole investigation in its own right to see how long and what sort of a chain can be specified by surface sentences, and, hence, to determine the complex situation's best underlying representation (particularly as regards bracketing) and subsequent derivational patterns. What can be done here, though, is to illustrate the matter by selecting three serially causative events for representation in an underlying structure like the discursively sketched one that follows.

(107) a. [the aerial toppled] RESULTed FROM
b. [the branches came down upon the aerial] RESULTed FROM
c. [the wind blew on the branches]

Note that of the surface sentences that one might think are derivable from this, only a couple are viable, as in (108).

(108) ⇒ ⇒ The aerial toppled from

a. *the branches coming down upon it from the wind blowing on them. [*basic causative*]

b. ° the branches blowing down upon it. [*basic causative with clause conflation*]

c. [x] the wind bringing the branches down upon it with its blowing on them. [*instrument causative*]

d. [x] the wind's blowing on them bringing the branches down upon it. [*event causative*]

e. ° the wind blowing the branches down upon it. [*instrument causative with clause conflation*]

Note further that if we create an instrument-causative construction by foregrounding the immediate instrument (based on (108a) and (108b), where *the branches* is subject), we get results of similarly mixed acceptability.

(109) The branches $_{I}$toppled the aerial

a. *in coming down upon it from the wind blowing on them.

b. ° in blowing down upon it from the wind.

It should also be noted that a generalization of this last instrumental construction is available for serial causation, since the foregrounding of an earlier instrument—here, 'the wind'—also has syntactic representation. This representation is based on the (c)–(e) forms of (108), where *the wind* is the subject.[9]

(110) The wind $_{I}$toppled the aerial

c. *in bringing the branches down upon it with its blowing on them.

e. ° in blowing the branches down upon it.

A generalization of the event-causative construction is also available for serial causation, since a whole earlier portion of the causal chain can be foregrounded in this way.

(111) a. *The branches coming down upon it from the wind blowing on them—

b. ° The branches blowing down upon it from the wind—

$_{E}$toppled the aerial.

d. *The wind's blowing on them bringing the branches down upon it—
e. °The wind's blowing the branches down upon it—
$_{E}$toppled the aerial.

all, again, with mixed acceptability.

4.4 Continuous and Discontinuous Serial Causation

The factor presented here pertains to the causal continuity throughout the occurrence of a serial-causative situation. We discuss the syntactic representation of this factor. The preceding example of three-event serial causation actually included a causal discontinuity. The wind's blowing on the branches caused them to break loose from a tree, and the branches hitting the aerial caused it to topple. But the middle event—consisting of the branches leaving the tree, falling through the air, and contacting the aerial—was an autonomous event, that is, an event conceptualized as taking place without accompanying causation. Autonomous events often involve an object in freely kinetic motion: free fall, in this case; or in the case of a hurled object, sailing through the air.

By contrast, continuous causation could be exhibited by a counterpart example, say, a situation in which some branches still attached to a tree are already in contact with an aerial. Here, the wind blowing on the branches causes them to press harder against the aerial, and this pressure in turn causes the aerial to topple. As it happens, these examples of discontinuous and continuous causation both permit syntactic representations either with conflated or periphrastic verb forms (Shibatani's (1976) "lexical" vs. "productive" forms), as seen in (112).

(112) The wind { toppled the aerial / made the aerial topple } in { blowing the branches down upon it. / pressing the branches harder against it. }

Agentive counterparts to these examples of discontinuous and continuous causation show the same indifference to the verb form.

(113) °I { toppled the aerial / made the aerial topple } in { throwing branches down upon it. / pressing branches against it. }

But just such a formal correlation does show up in other examples.

(114) a. I $\left\{ \begin{array}{l} {}^{\circ}\text{slid the dish} \\ {}^{x}\text{made the dish slide} \end{array} \right\}$ across the table by pushing on it with a stick.

b. I $\left\{ \begin{array}{l} {}^{*}\text{slid the dish} \\ {}^{\circ}\text{made the dish slide} \end{array} \right\}$ across the table by throwing a stick at it.

Though much more investigation is needed, examples like this do suggest that one of the semantic circumstances that prompt the use of *make* is the presence in a causal chain of (what is considered by the speaker to be) an autonomous event; and, conversely, one that prompts the use of a conflated form is a causal chain that is (taken by the speaker to be) continuously caused.

Another example where such tendencies hold is the situation in which a person acts as the agent in a gate's opening. If she does this by, say, cranking a winch that draws in a chain attached to the gate, she is likelier to say *I opened the gate*. But if she presses the button on a device that sends out radio signals that are considered to propagate through space *by themselves* before reaching a gate mechanism, she is likelier to say *I made the gate open*. In a similar situation, if a person hits a window with a hammer, *I broke the window* is likelier. But if he slams a door shut, and this sets up a wave of compression in the air that so-conceivedly spreads *on its own* to impinge on the glass, then *I made the window break* is likelier.

Isolating the factor that licenses the use of *make* here is difficult because of the number of semantic and syntactic circumstances that seem to affect the use of this word. Some of these neighboring circumstances can be noted to aid the isolating process. One semantic circumstance is that of overcoming a particularly strong resistance (especially when sharply getting something unstuck)—for example, when speaking of a stubborn bolt, as in (115).

(115) I made the bolt screw in by twisting it with a heavy wrench.

This *make* might be considered to arise by conflation from an underlying verbal that can be rendered as

(116) I countered its resistance sufficiently to AGENT (the bolt to screw in).

or as

(117) (I) succeeded in overcoming its resistance thereupon AGENTing (the bolt . . .)

Another semantic circumstance is that of foregrounding an Agent's method. The sentence in (115) serves equally well for this, but is now understood to mean something close to the paraphrase in (118)

(118) It was by twisting it with a heavy wrench that I made the bolt screw in.

so that this *make* might be considered to have been conflated from an underlying verbal renderable as

(119) (I) used the means specified in AGENTing (the bolt . . .)

Further factors might be whether or not there is an autonomously consequent event specified and how freely the lexical verb can be used as a conflated causative.

4.5 Enabling Causation

Compare the sentence

(120) The water drained from the tank as a result of the piston squeezing down [on it].

which specifies a basic causative situation (the situation may have to include something like a spring-shutting valve to serve as a workable example), with the sentence

(121) The water drained from the tank as a result of the plug coming loose.

The latter sentence has the same syntactic structure as the former sentence. And it also specifies some kind of causative situation inasmuch as the causative criterion applies: the water's draining would not take place if it were not for the plug's coming loose. But it is distinct in that the object specified on the right (the plug)—which seemingly corresponds to the instrument-functioning object (the piston) specified in (120)—does not cause the motion of the Figure object (the water) by ACTing ON it, that is, by exerting force on it via physical contact, which is one of the characteristics determined for the basic causative situation. Granted, the two situations are quite comparable from the standpoint of physics in that they equally involve molecules moving and colliding in accordance with the same principles. But our semantic system would seem to analyze the

situation in (121) as more complex than the basic causative situation in (120)—in fact, as consisting of something like the subparts identified in (122).

(122) a. An already-existent situation: the restraint of one entity by another
(the water being held in by the tank-cum-plug)
b. A newly occurrent event: the disruption of the restraining entity
(the plug coming loose)
c. A consequent circumstance: the release of the restraint
(the water becoming free to flow)
d. An ensuing event: the motion of the previously restrained entity
(the water draining from the tank)

In terms of surface structure, it is true that of these subparts only (b) and (d) are represented at the surface in the particular construction type of (121)—in the subordinate clause and main clause, respectively—too little, as it happens, to permit a formal reflection of this situation's distinctness from that of basic causation. However, the difference between these two situations is reflected at the surface in the construction that foregrounds the rightmost-specified events of (120) and (121). For, in the former case, the surface main verb can be *make* or a conflated form, as (123) suggests.

(123) °The piston squeezing down { made the water drain / drained the water } from the tank.

But, in the latter case, neither of these is possible, as (124) shows.

(124) *The plug coming loose { made the water drain / drained the water } from the tank.

Instead, only a verbal form like *let* or *allow* will serve.

(125) °The plug coming loose { let / allowed } the water (to) drain from the tank.

In these last verbal forms, it may be construed that the (122c) subpart is now also represented at the surface. The whole situation will be termed one of *enabling* causation because of this word's relation (characterized later) to words like *let*.

Starting with a core and building up to the whole, we now look portion by portion at the enabling situation and at how each stage might be rep-

resented syntactically. The causal core would seem to consist of the (a) and (b) subparts of (122), that is, of a basic causative situation and a simple event with the following particularities: The former is an already ongoing extent-durational causative situation—in which, by intrinsic property, the instrumental object is overcoming the Figural object's natural motive tendency.[10] The latter is a newly occurrent motion event whose Figural object is the same as, or part of, the former's instrumental object. This object moves away or disappears from its previous location (or, in deep morphemes, 'MOVEs ABSENT'). These two semantic entities should perhaps be represented within the whole underlying structure—for example, as in (126a) and (126b) for the situation in (121)—even though nothing of them shows up at the surface. So far, what does appear represented at the surface is the particular realization of the simple event—as in (126b′).

(126) a. [the water (F) REMAINed in the tank] RESULTed FROM [the tank [walls and plug] (I) pressed in on the water]
b. (PART of) the tank MOVEd ABSENT
b′. in particular: the plug came loose

Condensed and in a more suggestive form, these structures can also be represented as in (127).

(127) a. The water REMAINed in the tank as a result of the tank pressing in on it.
b′. The plug came loose.

Next beyond this causal core comprising a situation plus an event is the semantic significance of the two taken together: the circumstance that where there has been a blockage, this now disappears, and that what has been restrained is now released from that restraint as a consequence of the unblocking (in other words, subpart (122c)). The whole of this can be represented syntactically by embedding the structures of (126) in a matrix that specifies the just-noted embracing semantic circumstance, perhaps as in (128).

(128) [the water BECAME FREE FROM S (126a)] RESULTed FROM [S (126b or b′)]

which can be rendered more casually, as in (129).

(129) The water's BECOMing FREE $\left\{ \begin{array}{l} \text{FROM remaining} \\ \text{NOT to remain} \end{array} \right\}$ in the tank

as a result of the tank's pressing in on it RESULTed FROM a tank part's moving away (→ a plug's coming loose).

The deep morphemic expression BECOME FREE FROM/NOT *to* is intended to specify the release of restraint.[11] The structure in (128) gives rise to valid surface sentences of the type in (130)

(130) The water became free $\left\{\begin{array}{l}\text{not to remain in}\\ \text{to drain from}\end{array}\right\}$ the tank as a result of the plug coming loose.

and this fact indicates that the kind of semantic aggregation considered so far (i.e., where no further occurrent event is included, such as the water's draining out) is a viable entity in its own right, one that might be styled the **minimal** or **basic enabling situation**. Indeed, the corresponding semantic entity with the unblocking event foregrounded, which can be syntactically represented as in (131),

(131) a. [the plug came loose] EVENTed [the water BECAME FREE NOT to REMAIN . . .]

gives rise to sentences containing the word *enable*.

b. ⇒ [the plug came loose] $\underbrace{\text{EVENTed-TO-BECOME-FREE}}_{{}_{\text{E}}\text{FREEd/ENABLEd}}$ the water NOT to REMAIN . . .

c. ⇒ [the plug came loose] ENABLEd the water NOT to REMAIN in the tank

d. ⇒ The plug coming loose
$$\left\{\begin{array}{l}\left\{\begin{array}{l}\text{freed the water from remaining}\\ \text{enabled the water not to remain}\end{array}\right\}\text{ in the tank.}\\ \left\{\begin{array}{l}\text{freed}\\ \text{enabled}\end{array}\right\}\text{ the water to drain from the tank.}\end{array}\right\}$$

(The forms ${}_{\text{E}}$FREE and ENABLE in (131b) are offered simply as alternative, equally suggestive representations of the single relevant deep verb.)

Lastly, the final event in a fuller semantic situation like that in (121) may be regarded as having the same kind of incidental relation to the basic enabling situation as the "ensuing event" in a situation of onset causation. How such a relation should be thought of is not clear. Perhaps a final event should be understood as simply proceeding to take place by virtue of its own natural tendency to do so, or perhaps as being the caused event in an unspecified basic causative situation (where, for example,

gravity's acting on the water is the causing event). The relation, whatever the final understanding of it may be, can for now be represented by a deep morphemic expression like ENSUE UPON, so that the underlying structure for the original full enabling-causative situation introducing this section can finally be indicated as in (132).

(132) [the water drained from the tank] ENSUEd UPON [S (128)]

In derivation everything deletes except the initial bracketed S of (132) and the final bracketed S of (128) in leading to the surface sentence, repeated in (133).

(133) The water drained from the tank as a result of the plug's coming loose.

The corresponding full situation with the unblocking event foregrounded, seen in (125), can be represented in a comparable way.

(134) [S (131)] AND THEN [the water drained from the tank].

The derivation of this might be expected to parallel the preceding one, deleting everything but the initial bracketed S of (131c), plus ENABLE for the verbal, and the final bracketed S of (134). But the meaning of the resulting surface sentences must include the actual occurrence of an ensuing event, something not entailed in the usual reading of the *enable* verbs, and so in the derivation of (134) it may be supposed that the AND THEN remains for incorporation in a new deep verbal conflation that can be suggestively designated as LET

(135) [the plug came loose] $\underbrace{\text{ENABLEd .. } \varnothing \text{ .. AND THEN}}_{\text{LET}}$ [the water drained from the tank]

whence arise the sentences seen earlier and repeated in (136).

(136) The plug coming loose $\left\{ \begin{matrix} \text{let} \\ \text{allowed} \end{matrix} \right\}$ the water (to) drain from the tank.

The general thesis of this study is that causation in the first instance is a relation among events and only as an additional circumstance involves volitional agency. Accordingly, the presentation so far has demonstrated that the essence of the enabling causation situation—even to the appearance of words like *let*—comprises only agentless events. But this additional element can, of course, be included. Although the whole matter will

not be gone into here, it can be noted that only the event of blockage disappearance becomes involved in further causative chains, including ones involving agency, as seen in (137).

(137) I let the water drain from the tank **by pulling the plug loose**.[12]

5 AGENCY

The analysis of causativity to this point—even though it has progressed to quite complex structures—has still basically omitted the concept of agency. This is because agency is largely built on the preceding structures. We turn now to the analysis of agency and its interaction with the preceding structures.

5.1 Basic Components

The procedure followed in this section will be to start with a surface sentence of the simplest form representing what can be considered an agentive situation

(138) I killed the snail.

and, by judicious comparisons with neighboring forms and meanings, to isolate successively the components that make up that situation. It will become evident that the sentence's simplicity is only at the surface, masking the semantic complexity of the situation, and that this continues in the same line of incrementally more complex situations presented stepwise until now in this study.

Consider sentence (139) (where, for the sake of later examples, it is perhaps best to picture the snail clinging to a tree several feet up the trunk). It might at first be thought that there is an equal degree of semantic relation between the referents of *I* and *kill* as between those of *kill* and *the snail*. To see that this is not the case, inspect the situation to which such a sentence refers and notice that inevitably both the snail does something—namely dies—and I do something—for example, hit the snail with my hand. Now, it can be seen that the appropriateness of *kill* (i.e., the correctness with which it refers to the actual situation) depends on what the snail did, not on what I did.[13] I could have performed the same action of hitting it with my hand, but if the snail does not die, the word *kill* cannot appropriately be used. Moreover, more than simply determining the appropriateness of the main verb, the final event (the snail's

dying) is the sole one that is specified therein and not at all the immediately antecedent situation (my doing something). If the latter is to be referred to, a subordinate clause is where it must be expressed, either generically

(139) I killed the snail by doing something to it.

or as to its particular nature

(140) I killed the snail by hitting it with my hand.

This localization of the final and antecedent circumstances in the main and subordinate clause, respectively, is homologous with the pattern noted for the basic causative situation (in section 3). Indeed, in "my doing something," "what" I did can be considered in isolation as an independent event—for example, for (140), a motion event where my hand functions as Figure with respect to the snail as Ground—and can be seen to be related to the final event as "causing" to "caused." Thus, it can be concluded that an agentive sentence contains the specification of a basic causative situation for (140), one that can be represented in isolation as in (141).

(141) The snail died as a result of my hand hitting it.

Now, considered beside (140)—as another surface expansion and semantic particularization of (139)—the sentence in (142) may at first seem completely comparable.

(142) I killed the snail by hitting it with a stick.

It differs syntactically only as to the final noun phrase, and semantically it apparently contains the specification for a similar basic causative situation, isolatedly representable as in (143).

(143) The snail died as a result of a stick hitting it.

But, again, inspection of the situation to which such a sentence as (142) refers reveals that comparatively more is known about it than its containing a two-member causal sequence. Thus, we can note that the stick's motion is understood not as taking place by itself but, inevitably, as caused (immediately or mediately) in particular by something that I did—for example, manipulating the stick with my hand—so that the sentence can now be seen as containing the specification for a three-event causal chain, representable as in (144).

(144) The snail died
as a result of the stick hitting it
as a result of my hand manipulating the stick.[14]

Thus, investigation of (140), considered beside its expansion, shows that even such a simple-looking agentive sentence entails a causal chain of two or more events (of the kind discussed in section 4). And it further entails that, in this chain, the earliest physical event is one in which some body part(s) of mine functions as the Figure (hence, instrumentally ACTs ON some other object).

Note that the concept represented by our term "body part" is intended to extend equally well to the whole of an agent's body (an option necessary for the characterization of **self-agentive**, treated later). Furthermore, where necessary, as for imaginative speech, the notion can be taken broadly enough to include, for example, "telepathic force beams," as for a sentence like the one in (145).

(145) He bent the spoon (by exerting pressure on it) with his mind.

Moreover, for caused events that are psychological rather than physical, the definition of 'body parts' must be generalized to include various mental faculties such as concentration, as in (146).

(146) { I put her out of my thoughts / I turned my attention away from her } by concentrating on my work.

But still more than what has been observed so far is implied by an agentive sentence, say, that in (140). For if this much were the whole of its criterial characteristics, then the event with a body part as Figure could be taken to occur autonomously or to be caused in turn by *any* type of further causing event, such as an external one like a gust of wind blowing on the body part, as in (147)

(147) The snail died as a result of the wind blowing my hand against it.

or even by a body-internal one like a spasm, as in (148).

(148) The snail died as a result of my hand hitting it by a spasm.

But the meaning of (140) clearly cannot countenance such possibilities. The meaning, rather, entails the circumstance that the body part event is caused by an act of volition on the part of the entity to which the body part belongs, and, accordingly, that this entity is one possessed of the

faculty of will. While it is not clear what final semantic status this volitional act should be accorded, it can be provisionally regarded as a particular nonphysical variety of causing event. Accordingly, the causal chains entailed by the sentences in (140) and (142) can now be seen as lengthened by one additional, earlier event, shown in (149).

(149) a. The snail died as a result of
my hand hitting it as a result of
my willing on my hand.
b. The snail died as a result of
the stick hitting it as a result of
my hand manipulating the stick as a result of
my willing on my hand.

Here, the entity referred to by *my* is understood as a volitional entity.

Of course, neurophysiologically (the physically manifest correlate of) volition will probably be discovered to comprise one portion of an extensive causal chain of neural and muscular events culminating in the motion of a body part. But the exigencies of semantic organization in natural language would seem to call for a notion of volition as the (not physically manifest) only, and immediately, prior causing event to a body part's motion.

Now, even taken to this stage of analysis, the account is still inadequate to the criterial characterization of agency. True, in the serial-causative situation indicated in (149a), the addition of a volitional event has rendered the situation beyond the referential capacity of a sentence like the one in (150)

(150) The snail died as a result of my hand hitting it.

which simply represents a basic causative situation. But the same three-member causal chain in (149a) *is* implied equally by two different kinds of sentences. Both kinds of sentences represent the penultimate event, that of my hand hitting the snail, as involving agency. But the two kinds of sentence differ as to whether the final event, that of the snail dying, also involves agency. Thus, one kind of sentence specifies no agency for the final event—for example, (151).

(151) The snail died as a result of my hitting it with my hand.

The other kind of sentence does specify agency there, like (152).

(152) I killed the snail by hitting it with my hand.

(Here, of course, these sentences are each to be taken in the reading relevant to the discussion.)

Now, there is nothing strictly causal that distinguishes the situations specified by (151) and (152), inasmuch as both have the *same* set of causally related events (namely, those shown in (149a)). Rather, agency is understood to pertain to the latter's final event only because the entity (the one with will and body) *intends* that that event should result from the preceding event. Here, **intending**—or **intention**—is understood as a concomitant and independent mental event (state) with no causal effect on the chain of events initiated by the volitional act. Thus, finally, the notion of an **Agent** is criterially characterizable as an entity with body (parts), volition, *and* intention, where the body parts respond to volition, and intention applies to these responses and, optionally, to further consequent events.

The optionality just mentioned can be designated by the term **scope of intention**—that is, how much of a causal sequence it is that the entity intends. From an inspection of sentences that specify a causal chain with initial volitional event, it appears that intention always (by the nature at least of semantic, if not also psychological, organization) applies to the body-part event's resulting from the volitional event—this much, therefore, constituting an agentive situation in its own right, contained within a larger context—and that it may apply to progressively more of the succeeding causal sequence. In other terms, one end of the scope of intention is fixed at the beginning of the volitional event, and, without gaps, the other end can be located at the end of the body-part event or of any causally related event beyond that.

Taking for an example the causative sequence indicated in (149a), the scope of intention necessarily begins with the bottom line and extends through the middle line, and then may additionally extend through the top line. The smaller extent of scope is what applies to sentence (151): *The snail died as a result of my hitting it with my hand.* Here, I hit the snail with my hand intentionally (at least in the relevant reading), this much being taken as a contained agentive situation. But I did not intend that the snail should die as a consequence; this result is construed as accidental, "happenstantial," or the like.

The larger extent of scope is what applies to sentence (152): *I killed the snail by hitting it with my hand*, where I also intend that the snail die thereby (again, in the relevant reading). There appears to be no possibility for a sentence, or for a circumstance, where I, producing the means by

which the snail will die, can intend that the latter event result but not the former.

Variable scope of intention and its independence from observable causality is even more evident for a longer causal chain. Such a longer chain is present, for example, in the situation in which: I (will my arms to) swing a bat, the bat hits a book lying on the floor, the book slides along into collision with a French door, and the glass of the door breaks. Unfortunately for clarity of demonstration, English lacks straightforward syntactic means for expressing longer causal chains. Thus, in the following sentences, relative and coordinate clauses are used several times in lieu of specifically causative constructions. But the paradigm in (153) can still serve in a suggestive way to evidence the points about increasing scope of intention and its independence from "objectively" observable causality.

(153) a. I swung the bat and it hit a book, which slid into the French door and broke the glass.
b. I hit the book by swinging a bat toward it and it slid into the French door and broke the glass.
c. I slid the book into the French door by hitting it with a bat I'd swung toward it and it broke the glass.
d. I broke the glass of the French door by sliding into it a book, which I'd hit with a bat I'd swung toward it.

5.2 Author and Agent

In this section, we observe that a sentient entity represented as the subject of a syntactically causative construction can either intend the final caused event or not, and that this difference distinguishes the semantic concept of an 'Agent' from that of an 'Author'. In this regard, note first that there is another reading of (152), for which other subordinating forms than *by* are possible or more appropriate

(154) I killed the snail $\left\{ \begin{array}{l} \text{with my} \\ \text{in} \\ {}^{x}\text{by} \end{array} \right\}$ hitting it with my hand.

which shares with (151) the specification that the final event (the snail's death) is consequent from my intentional actions but is not itself intended. In relation to a situation like that of (151), a form like (154) may be considered to be essentially synonymous. Alternatively, it may be thought to single out the volitional entity and foreground the entity's relation to the

situation as a whole or to its final event. The relation in the latter interpretation can be expressed detailedly as in (155).

(155) "be the entity whose volitional act initiated the causal sequence (which led to the final event) in"

Or, using a term intended to designate most of this, we can more succinctly say, as in (156),

(156) "be the Author of."

In comparing a form like (154) with its agentive counterpart, or, more simply, in comparing the two distinctly read structures implicit in the ambiguous main clause form in (157)

(157) I killed the snail.

the initially specified sentient entity in the one functions as **Author** and is nonintentional with regard to the event specified, while that in the other functions as **Agent** and is intentional in that regard. These semantic properties make each distinctly read structure consonant or disconsonant with certain other syntactic constituents also having definite specifications as to intentionality, so that a construction combining two of these is accordingly either grammatical or ungrammatical. Such constituents include the following.

(158) a. *Constituents specifying nonintentionality: S must have initial Author*
S in/with . . .
S . . . too . . .
may S!
b. *Constituents specifying intentionality: S must have initial Agent*
(S by . . .)
S in order that . . .
NP intend to/refrain from S
NP′ persuade/force NP to S
S!

The functioning of such additional constituents can be illustrated for the main clause in (157) by forms like (159)

(159) I killed the snail by pressing on it *too* hard with my hand.

which can have *I* only as the nonintentional Author of the snail's death, and

(160) I killed the snail *in order* to protect the plant.

which can have *I* only as the intentional Agent of the snail's death.

But the best demonstration of intentionality correlation between a main clause and these further constituents is found where the main clause itself has a distinguishing element—for example, where, for the main verb, there exists a pair of lexical forms that specifically distinguish the intentional from its opposite (unlike the ambiguous *kill*) and are otherwise close in meaning. English affords few good examples,[15] but, for this demonstration, a serviceable enough pair is provided by *mislay* and *hide*, as in the main clause forms in (161).

(161) I { mislaid (unint.) / hid (int.) } the pen [somewhere in the kitchen].

These forms can be paraphrased as in (162), where the second braced portion in (a) isolates the semantic matter, other than intentionality, by which the two verbs differ from each other (and, thus, do not constitute an ideal example pair), and where the phrase in (b) is an attempt to capture the common portion of that semantic matter.

(162) a. I { put (unint.) / put (int.) } the pen in a place
{ which I can no longer remember or find. / which others cannot see or find. }
b. . . . which is obscure.

When substituted for the S in the constructions in (159), only one or the other clause of the pair in (161), as distinguished by their verbs, yields a grammatical sentence.

(163) a. *Structures specifying a nonintentional Author*
I *accidentally* °mislaid/*hid the pen somewhere in the kitchen.
I °mislaid/*hid the pen *in* putting it in some obscure place.
May you °mislay/*hide your pen so it's never seen again!
b. *Structures specifying an intentional Agent*
I *intentionally* *mislaid/°hid the pen somewhere in the kitchen.
I [x]mislaid/°hid the pen *by* putting it in some obscure place.
I *mislaid/°hid the pen *so that* it would never be seen again.
I *intend* to *mislay/°hide the pen somewhere in the kitchen.
I *refrained* from *mislaying/°hiding the pen in the kitchen.
He *persuaded/forced* me to *mislay/°hide the pen.
*Mislay/°Hide the pen somewhere in the kitchen!

5.2.1 Undergoer The notions of 'Agent' and 'Author', especially the latter, must be carefully distinguished from that of **Undergoer**, as in the following three-way contrasts.

(164) a. I_A hid
b. I_{Au} misplaced my pen (somewhere in the kitchen).
c. I_U lost

(165) a. The masochist (deliberately) $_A$broke his arm by hitting it with a hammer.
b. The careless kid (accidentally) $_{Au}$broke his arm in hitting it playfully with a hammer.
c. The hapless fellow (by misfortune) $_U$broke his arm when he fell.

Additional examples with the notion are shown in (166).

(166) a. I caught my sweater on a nail.
b. I developed a wart in my ear.

While an Undergoer, equally with an Author, does not intend the event mentioned, she also has not agentively undertaken actions that culminate in that event. Rather, the event is conceived as autonomously occurrent and as HAPPENING TO the Undergoer. In other words, it impinges on the personal state—that is, affects the subjective state—of a sentient entity. Although the construction involved is considered here because of its look-alike mistakability, it is not really interpreted as a causative at all. (Our term "Undergoer" is, of course, different from the "Undergoer" macrorole of Foley and Van Valin 1984.)

The semantics of the Undergoer construction prompts some comment on conceptual imposition by language. As already noted in contrasting our understanding of the *physical* world with *semantic* causation (section 2), enablement (section 4), and volition (section 5.1), a more rationalized interpretation of reality can be overlain, or preempted, by the "logic" of semantic organization. So again here, the semantic force of the Undergoer construction would seem to impose its sense of 'autonomous event affecting one's personal state' on circumstances that vary greatly as to one's actual causal involvement. For example, the construction classes together both the situation of 'a wart's growing on me', which clearly involves no initiating agency on my part, and the situation of 'my pen's getting lost'. But my pen's getting lost may have involved no agentive precursor sequence on my part—for instance, it could have been blown

away by the wind. Or it could have involved as much of an agentive precursor sequence as an Author situation—the pen could have fallen out as I intentionally withdrew my hand from my pocket.

Formally reflecting the noncausality of the Undergoer construction, there is indeed another surface construction whose sense is essentially the same, but in which the event appears as subject and the Undergoer (to the varying degree that this can be realized at the surface in English) appears in an oblique constituent. Thus, the previous examples have counterparts in the new construction shown in (167).

(167) a. i. I broke my arm (when I fell).
ii. My arm broke on me (when I fell).
b. i. I lost my pen (somewhere in the kitchen).
ii. [x]My pen got lost on me (somewhere in the kitchen).
c. i. My sweater caught on a nail/a wart developed in my ear (*on me).

A characteristic of the Undergoer situation is its tendency to imply that the contained event is unpleasant to the Undergoer, as seen in (168), so that, more specifically than "happen to," the event might be said to "mishap-pen to" or "befall" the Undergoer. For this reason, this type of construction is frequently termed the "adversative" in other treatments.

The term UNDERGO itself is apt in this regard, since it has both a more general meaning, the counterpart of "happen to," and a specialization of meaning in the negative direction, the counterpart of "befall."

(168) a. [x]My plants are flourishing on me.
b. °My plants are dying on me.

Syntactically, the situation's underlying structure can be represented as in (169).

(169) S HAPPENed TO NP_U

With specific forms plugged in, this can derive as in (170).

(170) [my arm broke] HAPPENed TO me_U
⇒ my arm $\underbrace{\text{HAPPENed-to-break}}_{\text{broke}}$ $\underbrace{\text{TO}}_{\text{on}}$ me_U

The structure in (169) may be universally available: many languages have (and some abound in) sentences of its type, like the Spanish ones in (171). Often in these, the Undergoer appears as a dative, so that the TO, which

gives rise to *on* in English, can also be taken to give rise to a morpheme marking that case.

(171) a. Se me perdió la pluma. 'I lost my pen.'
(Lit.: 'The pen lost itself [to] me.')
b. Se me quebró el brazo. 'I broke my arm.'
(Lit.: 'The arm broke itself [to] me.')

Either on a par with, or derivative from, (170) is the form

(172) NP_U WAS-the-UNDERGOER-IN [S HAPPENed TO NP_U]

which derives to the form in (173)

(173) NP_U UNDERWENT S

where this, with particular forms plugged in, derives *on* as in (174).

(174) I_U UNDERWENT [my arm broke]
⇒ I_U $\underbrace{\text{UNDERWENT-to-break}}_{\text{U}}$ my arm
broke

Besides becoming absorbed in a conflation, the deep UNDERGO verb of (174) can give rise to independent lexical forms, such as (obsolescent) *suffer*

(175) I suffered my arm's breaking.

or *have*

(176) If you lose your credit cards
or $\underbrace{\text{UNDERGO}}_{\text{have}}$ [they get stolen]
⇒ ... or have them (get) stolen ...

5.3 Syntax of Author and Agent

The preceding semantic distinctions have certain syntactic correlates.

5.3.1 Basic Components If the generic preterminal form of a sentence like (151) can be represented as in (177), where S_R specifies the resulting event (here, *the snail died*) and S_a specifies the contained agentive situation (here, *I hit the snail with my hand*—itself to be given a syntactic account later)

(177) S_R RESULTed FROM S_a

then the generic form of the derivation for an Author sentence like (154) may proceed as indicated in (178), where the portion outside the brackets in (a)—specifying the Author and his relation to the situation—can be considered either to be present in the original underlying structure or to arise transformationally from (177). Note that the derivation contains three distinct and successively more derived forms written as "AUTHOR." The first form, marked with a double prime, represents the semantic role of the subject referent as being that of "an Author." The second form, marked with a single prime, represents the exercise of this role as an activity. The third form, without a prime mark, represents the combination of this activity with the fact of an event's resulting therefrom.

(178) a. $\Rightarrow$ NP_{Au} WAS-the-AUTHOR″-OF [S_R RESULTed FROM S_a]

b. $\Rightarrow$ NP_{Au} AUTHORed′ [S_R RESULTed FROM S_a]

c. $\Rightarrow$ NP_{Au} AUTHORed′-TO-RESULT S_R $WITH_c$ S_a

d. $\Rightarrow$ NP_{Au} AUTHORed S_R $WITH_c$ S_a.

With particular forms plugged in at (d), the derivation proceeds as follows.

d′. I AUTHORed [the snail died] $WITH_c$ [I hit the snail with my hand]

e. $\Rightarrow$ I $\underbrace{\text{AUTHORed-TO-die}}_{\text{Au killed snail with my hand}}$ the snail $\underbrace{\text{WITH}}_{\text{with, in, by}}$ my hitting the

(I killed the snail $\left\{\begin{array}{l}\text{with my}\\ \text{in}\\ \text{by}\end{array}\right\}$ hitting it with my hand.)

Now, for a sentence like (152) in its fully agentive reading, a preterminal structure (as compared with that in (177) or that in (178a)) would, by the earlier analysis of agency, have to include in addition only a specification of the authoring entity's intention that the final event result. An amplified preterminal structure of this sort, in generic form, can be represented as in (179a) or (179b); the latter can be taken either to derive from the former or to supplant it as the earliest form of the derivational stretch shown. Since the specification of serial causation and the specification of intention in conjunction therewith are probably best taken as two distinct assertions, they are represented with "In" standing for

INTENDER in (a) and (b) by a pair of structures (presumably embedded in a matrix that specifies their relation, although none is indicated). The rationale for including in the agentive derivation a "(b)" stage, explicitly specifying the Author relation, is so that there will be a syntactic correspondence to the semantic conclusion that an Agent is an entity that both intends an event and initiates a causal chain leading to (i.e., "authors") the event.

This is another instance of the **derivation of semantic relations**, already seen in note 7. Here, an entity that has the relation of Author (Au) to a causative situation and the relation of intender (In) to an 'intentional' situation bears the derived relation of Agent (Au + In ⇒ A) to the more complex agentive situation compounded of the simpler two.

The preterminal agentive structure, then, together with its ensuing derivation, might appear as in (179)

(179) a. $[S_R$ RESULTed FROM $S_a]$
NP_{In} INTENDed $[S_R$ RESULTed FROM $S_a]$

b. (⇒) NP_{Au} 'AUTHORed $[S_R$ RESULTed FROM $S_a]$
NP_{In} INTENDed $[S_R$ RESULTed FROM $S_a]$

c. ⇒ NP_A 'AGENTed $[S_R]$
$[S_R$ RESULTed FROM $S_a]$

d. ⇒ NP_A 'AGENTed-TO-RESULT S_R BY S_a

e. ⇒ NP_A AGENTed S_R BY S_a

where, with particular forms plugged in at (e), the derivation continues as follows.

e′. I AGENTed [the snail died] BY [I hit the snail with my hand]

f. ⇒ I $\underbrace{\text{AGENTed-TO-die}}_{A\text{killed}}$ the snail $\underbrace{\text{BY}}_{\text{by}}$ my hitting the snail with my hand
(I killed the snail by hitting it with my hand.)

The observation that an Agent-specifying nominal regularly appears across languages as a sentence's subject (disregarding, of course, constructions like the passive and perhaps also ergative forms), while an Author-specifying nominal can appear either as subject or in other capacities in the sentence (e.g., as in English, in sentences (154) and (151)), still awaits semantic and cognitive explanation. But the surface manifestation does at least fall out in consequence from the way the derivational syntax has

been set up here. For, as in (179a), the nominal that specifies an entity as an **Intender** (the crucial additional factor that renders the entity an Agent) necessarily appears as subject to start with. But, as in (178a), the Author-specifying nominal, depending on the interpretation, either comes into subject function by optional transformation or appears in it as one of the options for underlying structuring.

5.3.2 Agentive Situation That Begins with a Volitional Event Turning now to the S_a contained in (179), this agentive situation is of the simplest and most basic sort. That is, it spans a causal sequence of volitional act plus body-part event that can stand by itself or else is involved in all more complex agentive situations. With S_V standing for the volitional event, its underlying structure can be represented as in (180).

(180) a. [S_R RESULTed FROM S_V]
NP_{In} INTENDed [S_R RESULTed FROM S_V]

This, it can be seen, is identical to the preterminal structure in (179a) except for the appearance of S_V for S_a. The derivation it undergoes is identical to that in (179), too, except for the deletion of the BY clause at the last stage.

e. (⇒) NP_A AGENTed S_R BY S_V.

With particular forms plugged in, the derivation continues.

e′. I AGENTed [my hand hit against the snail]
BY [I WILLed ON my hand].
∅

f. I AGENTed-TO-hit my hand against the snail
$_A$hit
(I hit my hand against the snail.
⇒ I hit the snail with my hand.)

Valence alternatives of the kind seen in this last stage are analyzed in chapter II-1, section 2.9. In the present case, the Figure nominal (my hand) has been "demoted" into a *with*-phrase, and the Ground nominal (the snail) has been "promoted." It is the demotional *with*-phrase, containing the original Figure nominal, that becomes interpreted as the instrumental *with*-phrase when its sentence, for example, that in (180f), is embedded in a larger agentive matrix and, accordingly, the old function of Figure derives into that of instrument.

(181) a. I killed the snail (new F) by hitting my hand (old F) against it.
b. I killed the snail (new F) by hitting it with my hand (old F ⇒ I).

5.3.3 Chaining of Agentive Situations The analysis of agentivity to this point leads to the consideration of a longer chain of agentive situations. Thus, since the derivation leading to the basic Agent structure type in (180f) (*I hit the snail with my hand*) is virtually the same as that leading to the next most complex Agent structure type in (179f) (*I killed the snail by hitting it with my hand*), it seems best to regard the derivation as specifically agentive and as cyclic, applying yet a third time—for example, for the next-again most complex Agent structure type—as exemplified by (182).

(182) I saved the plant by killing the snail on it with my hand.

5.3.4 Generic Causative Components Most of the discussion and illustration in this exposition on agency has involved sentences with a *by*-clause like that in (152), here repeated as (183).

(183) I killed the snail by hitting it with my hand.

How then is one to understand sentences with only an "instrumental" *with*-phrase—the illustrative matter of most other treatments of agency—such as (184)?

(184) I killed the snail with my hand.

Or, further, sentences with neither of these, like the one beginning this section?

(185) I killed the snail.

As compared with (183), which explicitly specifies that I performed an action of hitting the snail, with my hand functioning as Figure, sentence (184) appears rather nonspecific, seemingly asserting nothing more than that my hand was somehow involved. But closer semantic inspection reveals that (184) does not lay itself open to just *any* interpretation consonant with mere involvement, for it cannot refer to a situation in which, for example, my hand simply hung there, nor to one in which nothing more happened concerning my hand than that someone scratched it, and so on. In fact, the sentence specifies implicitly that I performed an action and that, in it, my hand functioned as Figure and was in force-exertional

contact with the snail, a specification that can be represented explicitly in deeper syntactic structures by a subsequently deleted *by*-clause containing the deep ACT ON verbal, like the one in (186).

(186) ... $\underbrace{\text{by ACTing ON it}}_{\varnothing}$ with my hand.

Such a deeper *by*-clause represents generically a portion of an agentive situation that the surface *by*-clause in (183) makes specific. It is just such portions of situations—ones whose generic characteristics are both frequent and standard in human experience—that are often not found explicitly expressed in surface sentences, yet, of course, are entailed in their referent situations. As for the syntactic treatment of such a situational portion, an underlying structure that represents only generic characteristics subsequently gets deleted, with the consequence that the resulting surface sentence winds up functionally, but misleadingly, short. A still shorter sentence like (185) leaves unexpressed at the surface an even greater portion of an agentive situation, for it is not known which body-part is involved nor how much of a causal chain intervenes between the body-part event and the final event. But what is not particularized in (185) is, nevertheless, as determinate as the explicit particulars of (183). The step-by-step analysis beginning this section shows that I volitionally directed *some* body part in an event causally prior to the final one, a generic situational stretch that *can* be represented in deeper structures—for example, by a constituent like the one in (187).

(187) ... $\underbrace{\text{by ACTing ON it ... with a BODY PART of mine.}}_{\varnothing}$

5.4 Self-Agentive

Beside the sentence

(188) The log rolled down the slope.

which by all our semantic assessments specifies a simple autonomous event, a sentence like

(189) The girl rolled across the field.

would, on the syntactic score, seem to be completely comparable. Yet, while (188) cannot occur in any of the agentive frames of (158b), as indeed befits an autonomous-event sentence, (189) *can* occur in all of them.

(190) The *log/°girl intentionally rolled. . . .
The *log/°girl rolled . . . in order to get dirty.
The *log/°girl intends to roll/refrained from rolling. . . .
I persuaded the *log/°girl to roll.
(You, *log/°girl,) roll . . . !

The same difference of behavior can be noticed for the sentence

(191) The man fell off the cliff.

which specifies a simple autonomous event (with "the man"—i.e., his body—as Figure), as compared with a sentence like

(192) The man jumped off the cliff.

The sentences in (189) and (192) apparently specify an Agent in the subject and imply intention—that is, are evidently agentive—but are distinct from agentive sentences encountered earlier (*I killed the snail, I hid the pen*) in having no direct object nominal nor any apparent other specification of some further physical object (such as a snail or a pen).

The key to understanding how this might be so may be provided by evidence like the following pairs of sentences. They are quite close in meaning, but where one sentence is of the preceding objectless type, the other has a direct object, the reflexive pronoun, as in (193).

(193) a. The man jumped off the cliff.
b. The man threw himself off the cliff.
a. I trudged to work.
b. I dragged myself to work.
a. Lie down!
b. Leyg zikh avek! (Yiddish)
Lay yourself down!

The reflexive direct object pronoun in the (b) sentences here *does* seem to specify a physical object, namely, the whole body of the Agent. It is, thus, homologous with the body-part nominal *my hand* in the basic agentive structure type derived in *I hit (swung) my hand against the snail*—that is, it specifies a body 'part' functioning as the Figure of a simple motion event caused immediately by a volitional event on the part of an Agent who intends all this. With the appropriate modifications of (180e′), the derivational syntax of **self-agentive** forms, as these might well be called, can be suggested as in (194).

(194) e′. I AGENTed [my BODY MOVEd to work]
BY [I WILLed ON my BODY]
f. ⇒ I $_{A}$MOVEd my BODY to work
⇒ ⇒ I dragged myself to work.
g. ⇒ I $\underbrace{_{A}\text{MOVEd my BODY}}_{\text{WENT}}$ to work
⇒ ⇒ I trudged to work.

Here, the symbol GO has been chosen to represent the (universal?) derived deep morpheme specifying self-agented motion. This morpheme in English subsequently in a derivation necessarily conflates with morphemes of direction and deixis to give the surface morphemes *go* and *come*, or with morphemes of manner and the like to give such surface morphemes as *trudge*.

Grammaticosemantically, a subject nominal (*I*, *the man*) referring to an entity in its cognitive capacity as willer and intender pronominalizes and reflexivizes a later nominal (my body) referring to that entity's corporeality. This might at first be thought to violate some notion of coreferentiality, but it is in fact the norm rather than a special case, for such disparity is found in most sentences with reflexives. It can be seen clearly, for example, in a sentence like (195).

(195) I saw a bug on myself.

Here, *I* refers to my faculty of perception and *myself* refers to my body. This can be indicated more explicitly in a paraphrase (which perhaps also reflects a deeper structural stage of (195)) like

(196) My consciousness experienced-the-image-of a bug on my body.

in which the true coreferential element is contained in the two occurrences of *my*, apparently specifying some not further resolvable notion of essential identity.

Much more investigation is needed to discover where it is, exactly, that a nominal referring to one part can pronominalize and reflexivize a nominal referring to another part of an entity's total self (which comprehends her psyche, her body, and perhaps even—it should not be ruled out beforehand, being possibly relevant for some languages—her possessions and her kin). For example, in the following series of sentences, where a successively smaller volitionally activated portion of the body effects the translational motion of a successively larger unactivated portion, only the last permits reflexivization.

(197) a. The dog dragged $\left\{ \begin{matrix} {}^{\circ}\text{his catch} \\ {}^{*}\text{himself} \end{matrix} \right\}$ along.

b. The dog dragged $\left\{ \begin{matrix} {}^{\circ}\text{his lame leg} \\ {}^{*}\text{himself} \end{matrix} \right\}$ along.

c. The (half-paralyzed) dog dragged $\left\{ \begin{matrix} {}^{\circ}\text{his rear half} \\ {}^{\circ}\text{himself} \end{matrix} \right\}$ along.

And similarly in the comparable series:

d. i. I lifted my infant son ($\neq$ *myself) off the floor with one hand.

ii. I lifted my numb leg ($\neq$ *myself) off the floor with one hand.

iii. I lifted myself (= °all of my body except the hand itself) off the floor with one hand (pushing down).

5.5 Purpose and Uncertain Fulfillment

Not usually considered in connection with agentive forms like the sentence

(198) I killed the snail by hitting it with my hand.

are **purpose** forms like

(199) I hit the snail with my hand (in order) to kill it.[16]

which can, in fact, be seen as closely related, given the components into which agency was earlier analyzed. For, in both, my hitting the snail with my hand is an intended event caused by a volitional act (i.e., is a simple agentive situation), and it is intended that the snail's death result from the blow. The only difference in substantive content (i.e., rather than in matters of emphasis and foregrounding) is that, in (198), it is asserted that the snail in fact died as a result, whereas, in (199), it is not known whether death resulted or not.

In fact, a three-way comparison can be made. In a sentence like *The snail died as a result of my hitting it with my hand*, the known extent of causation is greater than the scope of intention. And in an agentive sentence like (198), they are equal and coextensive. But in a purpose sentence like (199), it is the scope of intention that exceeds the known extent of causation.

As for syntactic representation, it accordingly follows that the underlying structure of (199) should differ from that of (198), as this was represented in (179a), only as to the quantity of causal sequence asserted as

actually having occurred. Hence, it would contain the following pair of constituent structures.

(200) S_a
NP_{In} INTENDed [S_R RESULTed FROM S_a]

To facilitate the further treatment of these structures, we will deal with purpose sentences that do not have agentive subordinate clauses, as in (199), but that have nonagentive ones, like (200) or the colloquial (201).

(201) I hit the snail with my hand so (that) it should die.

(202) I hung the clothes out $\left\{ \begin{array}{l} \text{so they would dry} \\ \text{to dry} \end{array} \right\}$.[17]

Now, the surface-syntactic fact that *as a result (of that)* or *thereby* can be added (with greater or lesser felicity) at the end of, say, (200) and (202) (such constituents being absent here presumably because they were deleted from earlier structures) suggests that the two embeddings in (200) are related in the underlying 'purpose' matrix structure as

(203) S_a WITH [NP_{In} INTENDed [S_R RESULTed FROM S_a]]

whose derivation to the surface can be illustrated, with particular forms plugged in, as

(204) a. I hung the clothes out
with [I INTENDed that they would dry as a result of that]

b_1. ⇒ . . .
$\underbrace{\text{WITH my}}_{\varnothing}$ $\underbrace{\text{INTENDing}}_{\text{intending}}$ that they would dry
$\underbrace{\text{as a result of that}}_{\text{thereby}}$

(I hung the clothes out, intending that they would dry thereby.)

b_2. ⇒ . . .
$\underbrace{\text{WITH the INTENTION}}_{\text{in order, so}}$ $\underbrace{\text{on my part}}_{\varnothing}$ that they would dry $\underbrace{\text{as a result of that}}_{\text{thereby}}$

(I hung the clothes out so that they should dry (thereby).)

Once isolated, the extension of intention past known effectuation can be discovered elsewhere—for example, incorporated in the meaning of verbs like *wash* and *rinse*, which in one sector of their usage are roughly characterizable as in (205).

(205) perform certain actions in order to remove the $\left\{ \begin{matrix} \text{dirt} \\ \text{soap} \end{matrix} \right\}$ from

Thus, it would be infelicitous to use these verbs in referring to a circumstance in conflict with the implicit intentions, as in

(206) *I washed the shirt in dirty ink.

whereas, by contrast, verbs like *soak* and *flush*, which imply no intentional component extending beyond the actualized physical one (which is close to that of the preceding verbs), can be used comfortably for the same circumstance.

(207) a. °I soaked the shirt in dirty ink.
b. °I flushed dirty ink through the shirt.

The *wash* type of verb can be contrasted in the other direction with verbs like *clean*, which go on to specify the actualization of what for the others is merely an intention.

(208) a. °I washed the shirt, but it came out dirty.
b. *I cleaned the shirt, but it came out dirty.

We have just seen that the verbs *soak, wash*, and *clean* in that order form a progressive series with respect to scope of intention and its realization. With many differences overlooked, something like this semantic progression is also evident in the series *throw toward*/*throw to*/*throw IND.OBJ*. For, *throw toward*, as in

(209) I threw the ball toward °him/°the tree.

specifies no intentions extending beyond the physical actuality of a missile's (course of) flight. But *throw to*, as in

(210) I threw the ball to °him/*the tree.

further specifies the Agent's intention that a second entity catch the missile in response to its approach (and, of course, also specifies that entity as an Agent as well, capable and desirous of catching the missile). This suggests that (210) arises by conflation from a structure resembling the paraphrase in (211).

(211) I threw the ball toward him for him to catch.

Finally, *throw* taking an indirect object, as compared with *throw to*, seems strongly, though perhaps not completely, to indicate that the intended capture of the missile in fact occurred.

(212) $\left\{ \begin{array}{l} {}^{\circ}\text{I threw the ball to him} \\ {}^{x}\text{I threw him the ball} \end{array} \right\}$ but he missed it.

This suggests that *I threw him the ball* derives by conflation from a structure resembling the following paraphrase.

(213) I threw the ball toward him for him to catch, which he did.[18]

Other example sets whose members differ as to whether or not the intended final event is specified to have in fact occurred but, unlike the pair in (198)–(199), are misleadingly similar in form (presumably as a result of having undergone special derivational routes), are the following.

(214) a. They beckoned me toward them. [*final occurrence unknown*]
They lured me toward them. [*final occurrence realized*]
b. I instructed the maid to clean the kitchen. [*final occurrence unknown*]
I had the maid clean the kitchen. [*final occurrence realized*]

To give an idea of underlying origins, the bottom sentence of (214a) might arise via a derivation (which borrows from the next section the use of (to) INDUCE in place of (to) AGENT for the case of a second agency) like

(215) a. they INDUCEd [I come toward them] by PRESENTing ALLUREMENTs to me
⇒ they $\underbrace{\text{by-PRESENTING-ALLUREMENTs, INDUCEd-to-come}}_{\text{lured}}$ me toward them

while the top sentence might arise via one like

b. they PRESENTed-BECKONs, INTENDing [I come toward them]
⇒ they $\underbrace{\text{PRESENTed-BECKONs, INTENDing-to-come}}_{\text{beckoned}}$ me toward them

5.6 Caused Agency

We have so far been analyzing out the semantic factors that comprise agency. In this section, the exercise of such agency is seen as an event, specifically, as a cognitive event, that can itself be caused. Accordingly, we here analyze out the semantic factors that pertain to cognitive events and their causation.

By way of preparing the ground for this section's topic, we note that, although the semantic analysis of causation in this study has been largely of its application to physical events, most of it seems to apply as well to mental events. This is partially illustrated by the following sentential paradigm of causative types (analogous to that in (1)), which involve the causing of the mental event of someone's becoming sad.

(216) a. I became sad as a result of news of his death coming to me.
b. News of his death coming to me $_{E}$saddened me/$_{E}$made me (feel) sad.
c. News of his death $_{I}$saddened me (in coming to me).
d. She $_{Au}$saddened me in giving me news of his death.
e. She $_{A}$saddened me by giving me news of his death.

Now, since an entity's volition and intention—the criterial components of agency—are also mental events, one might expect to encounter situations in which these, like sadness, are, in turn, caused. Here, that is, some event would (immediately or mediately) cause an entity's exertion of will on her body (parts) and her intention that certain events (at least the appropriate body (part) motions) result therefrom. Such a semantic phenomenon can be called **caused agency** or **inducive causation** (other treatments have used the term "instigative"). Indeed, something in the nature of this semantic phenomenon is evident in the situations specified by sentences like (217). As before, the causing event (smoke getting in the eyes) can be the earliest considered event, as in (a) and (b), or can in turn result from events initiated by an Agent, as in (c).

(217) a. The squirrel left its tree as a result of smoke getting in its eyes.
b. Smoke getting in its eyes $_{E}$made the squirrel leave its tree.
c. I $_{A}$made the squirrel leave its tree by fanning smoke in its eyes.

5.6.1 Structure of Psychological Causativity Earlier it was determined that the semantic organization of agency was so structured as to contain a fixed set of particular components, namely, the events involving intention,

volition, and body parts. Similarly, it is an issue to ascertain whether there are any determinate components in the mind-internal causal stretch leading to a final mood state or exercise of agency. Now, various mental events can be *taken* to occur along the way—for example, for (216), that the arrival of news of death leads to my hearing and understanding the news, that this (against a background of my feeling some bond with the deceased) causes a sense of loss, and that this, in turn, causes my feeling of sadness. And indeed, various mental events that are taken to occur along the way can be specified at the surface, as, for example, for (217b), in the following sentences (where, after the initial phrase, the remainder of the subject clause, recapping some prior causal events, can be omitted).

(218) a. Smoke getting in its eyes—
b. Feeling pain from smoke getting in its eyes—
c. Wanting to stop feeling pain from smoke getting in its eyes—
d. Deciding to move as a result of wanting to stop feeling pain from smoke getting in its eyes—made the squirrel leave its tree.

And, for its part, this last line involving 'decision' can be built up to in something like these three incremental stages.

(219) a. Weighing alternative courses of action as a result of wanting to stop feeling pain from smoke getting in its eyes—
b. Settling on moving as the best course of action as a result of weighing the alternatives because of wanting to stop feeling pain from smoke getting in its eyes—
c. Intending to move as a result of settling on that as the best course of action by weighing the alternatives because of wanting to stop feeling pain from smoke getting in its eyes—
—made the squirrel leave its tree.

But most of these semantic distinctions seem more to be expressive of the speaker's notions than to be structurally determinate in accordance with universal semantic organization.

Considering further, then, we do come up with two more likely candidates for playing a structural role. In the case where the causal sequence begins externally (by however many removes) to the sentient entity, there is one probable candidate for semantic-structural determinacy: an event of (sensory, informational, and so on) IMPINGEMENT on the entity (examples include news *coming to me*, smoke *getting in its eyes*). And one additional possible candidate is an internal event (perhaps the earliest

such) of COGNIZING or EXPERIENCING such an impinging event (e.g., my hearing and understanding the news that has come to me).

In the search for yet another candidate, we now look briefly at a set of situations related to caused agency for which a criterial, focal component is abstractable, and will then consider whether the component is imputable also to caused agency. This component is an event of what may be termed **intent**, to be distinguished from that of **intention**, the notion dealt with until now. Where the latter entails expectations for certain consequences of undertaken actions and is involved in constructions with a DIFFERENT-subject complement, especially taking *that*

(220) I intended that they would become politically independent as a result of my establishing a fund for their operation.

the former entails expectations of one's subsequently undertaking an action the idea for which one now has in mind, and it is involved in constructions with a SAME-subject complement, especially taking *to*.

(221) I intended to establish a fund for their operation later that week.

We have already looked at one of the situations that criterially involves this intent component. It is that of 'decision', wherein an entity enters a state of intent (to perform a subsequent action) as a result of weighing alternative courses of action and choosing one of these, as in (222).

(222) The squirrel decided to leave its tree as a result of smoke getting in its eyes.

Another such situation is that of 'persuasion', where the entity enters a state of intent (to perform a particular subsequent action) as a result of another entity's presenting arguments (or acting otherwise, in the more generic form of this situation type) for the course of action, as in (223).

(223) I persuaded him to leave the building.

To this speaker, *persuade* does not specify the actual carrying out of the intent, since it is possible to continue (223) with *but he later changed his mind and stayed*.

A third situation is that of 'intended persuasion' (which includes the imperative), where the entity's entering a state of intent (to perform a subsequent action) is intended (in our original sense) by another entity to result from the latter's arguments, directions, and so on, as in (224).

(224) a. I urged/instructed/ordered her to leave the building.
b. Leave the building!

The main verbs in (222) to (224) are understood here to arise by conflation from deeper constituents, roughly like the following forms. These contain the specification of 'intent', indicated here by the deep verb INTEND′, which is marked with a prime to distinguish it from the deep verb INTEND that represents the concept of 'intention'.

(225) a. (for NP1) by CHOOSing this ALTERNATIVE, (to) COME-to-INTEND′
(to . . .) decide
b. (for NP2) by-PRESENTing-ARGUMENTs, (to)AGENT-to-INTEND′
(NP1 to . . .) persuade
c. (for NP2) (to) GIVE-DIRECTIONs, INTENDing-to-AGENT-to-INTEND′
(NP1 to . . .) order

Caused agency differs from these situations in that it includes the actual undertaking of the final action. But possibly it incorporates the meaning of one or another of these situations within itself. In that case it, too, would have the event of 'intent' (to perform the final action) as a fixed structural component. Among the evidence for such an incorporation are the following two observations: The prompting event in a situation of 'decision' can be introduced in a sentence not only by *as a result of*, but also—in fact, par excellence—by *because (of)*. But the same is true for a situation of caused agency.

(226) The squirrel { decided to leave / left } its tree { as a result of / because of } smoke getting in its eyes.

This suggests that the whole 'decision' situation, along with its 'intent' component, is incorporated therein. And a comparison of their meaning suggests that the situation of 'intended persuasion' represented by

(227) I instructed the maid to clean the kitchen.

is contained whole—perhaps along with the structuralness of its 'intent' component—in the caused-agency situation represented by

(228) I had the maid clean the kitchen.

which seems, in addition, to specify only that the maid was in fact 'persuaded' and that she actually carried out the instructions.

Among the situations just treated, we can discern a rough series of three types, each of which is expressed by certain surface verbs. For the situation of 'intended persuasion', which does not entail the acquiring of intent, there are the verbs *urge*, *instruct*, *order*, and so on. For that of 'persuasion', which entails the acquiring of intent but not necessarily performance, there are the verbs *persuade*, *convince*, *talk into*, *decide* (someone to . . .), *determine* (someone to . . .), and so forth. And for that of 'caused agency', which, in addition, entails performance, there are the verbs *induce*, *cause*, *get*, *have*, *make*, *force*, and so on.

5.6.2 Differences among Particular Caused-Agency Verbs Of this last group of English verbs, none (though *induce* is perhaps among the closest) seems to specify the causation of agency relatively "purely"—that is, without further strong specifications as to the causation's type, means, and so forth. But we can here look briefly at some of these verbs' additional idiosyncratic specifications.

The verb *get* generally can follow an Agent but not a causing event, while, at least for some speakers, *cause* generally exhibits the reverse pattern.

(229) a. Smoke getting in its eyes { induced / *got / caused } the squirrel to leave its tree.

b. I { induced / got / *caused } the squirrel to leave its tree by fanning smoke in its eyes.

More accurately, *get* properly occurs when in the total situation there is some entity—an initial Agent is just one case of this—who considers the caused action proper or desirable. For instance, in

(230) The forecast of rain for the following week finally got him to fix the roof.

the so-considering entity could be the speaker (I, e.g., thinking it was shameful how he let his house go unrepaired) or, indeed, the influenced Agent (he, e.g., needing and wanting the excuse that the forecast afforded him).

The verb *have*, likewise, must follow an Agent, but it is there incompatible with a *by*-clause.

(231) a. *My giving her instructions had the maid clean the kitchen.
b. °I had the maid clean the kitchen (*by giving her instructions).

Moreover, *have* specifies that the causing is done by means of giving instructions that are to be followed (i.e., specifies a circumstance where ideas are communicated and comprehended), so that, accordingly, it is not appropriately used where the influenced Agent is not a sentient entity (e.g., an infant or animal).

(232) *I had the squirrel leave its tree.

As a verb expressing the causing of agency, *have* of course also requires that the complement subject and verb be agentive (and, so, can be added to the list of similar constituents in (158b)).

(233) I had him { *misplace / °hide } the pen somewhere in the kitchen.

The other verbs expressing caused agency have this requirement too, but they cannot be used in a demonstration like (233) because they also have other usages without the requirement (as in °I induced/made/got him to misplace the pen). The verb *make* seems to specify that the causing is done by means of threats (i.e., contingent assurances of causing pain).

(234) a. I { °got / °made } him (to) clean the garage by threatening to cut his allowance (if he didn't).
b. I { °got / *made } him (to) him (to) clean the garage by promising to raise his allowance (if he did).

In general, each causative verb or inflection in a language has its own pattern of requirements for the type of causative situation in which it can be used. Such causative types differ from each other with respect to the particular structural factors that they comprehend. The list in (235) provides a heuristic example of the kind of array of such factors that might be developed for ascertaining a particular causative element's requirements.

(235) a. INSTRUMENT/EVENT-CAUSED PHYSICAL (i)/
MENTAL (ii) EVENT

i. A rock (flying into it) broke the window.
ii. A knife (flying at him) scared the spy.

b. AGENT-CAUSED PHYSICAL (i)/MENTAL (ii) EVENT
i. Pat broke the window by throwing a rock into it.
ii. Pat scared the spy by throwing a knife at him.

c. INSTRUMENT/EVENT-CAUSED AGENCY OVER A PHYSICAL (i)/MENTAL (ii) EVENT
i. Money (offered to her) induced Pat to break the window.
ii. Money (offered to her) induced Pat to scare the spy.

d. AGENT-CAUSED AGENCY OVER A PHYSICAL (i)/MENTAL (ii) EVENT
i. I induced Pat to break the window by offering her money.
ii. I induced Pat to scare the spy by offering her money.

Here, *have*, as already noted, can be used only for type (d). *Make* can be used for all the types, though with rather different meanings in each (note, e.g., its difference in *The rock made*—vs. *John made the window break*). The Turkish causative verb inflection, as observed by Zimmer (1976), can be used for all but (c), leading some—for example, Givón (1975) and Brennenstuhl and Wachowicz (1976)—to abstract a notion of hierarchical "control," common to the ones but not the other.

5.6.3 Inducing Syntactically, caused agency can in the first instance be represented by an embedding of an agentive structure in any causative matrix—for instance, preceding RESULT FROM or following (to) EVENT or (to) AGENT, as illustrated by (236a). However, we might want the combined specification of the caused-agency situation's defining semantic elements—presumably corresponding to a clustering of similar elements in human cognition, a clustering that might be called (the concept of) 'inducing'—to occur at a single locus. Accordingly, a later stage of syntactic representation may be derived containing the conflation of the earlier matrix causative verb—for example, EVENT or AGENT, with a copy of the embedded structure's AGENT verb, a conflation that can be represented by $_{E}$INDUCE (for *to* EVENT *to* AGENT) or by $_{A}$INDUCE (for *to* AGENT *to* AGENT), as in (236b). The ensuing derivation after this stage might proceed as indicated in the remainder of (236).

(236) a. I AGENTed [he AGENTed [the snail died]] by . . .
-ing . . .

b. ⇒ $_{A}$INDUCEd [he AGENTed [the snail died]] by . . . -ing . . .

c_1. ⇒ I $\underbrace{\text{by-MAKing-THREATs, }{}_{A}\text{INDUCEd}}_{\text{made}}$ [he $_{A}$killed the snail]

c_2. ⇒ I $\underbrace{\text{by-GIVing-INSTRUCTIONs, }{}_{A}\text{INDUCEd}}_{\text{had}}$ [he killed the snail]

$d_{1,2}$. ⇒ I made/had him kill the snail.[19]

In the course of this derivation, two nominals—each of which in its own clause originally specified an entity in the Agent relation to a situation—come to stand together in a single clause, where it is presumably to be construed that one or the other of them now specifies its entity as bearing a new, derived relation (as this notion was discussed in note 8 and section 5.3.1) with respect to the total caused-agency situation. The affected nominal might be the one specifying the inducing Agent—here, *I*—changing this now to the **Inducer**: *I* (A ⇒ I-er). Or it might be the one specifying the induced Agent—here, *him*—changing this now to the **Inducee**: *him* (A ⇒ I-ee). The second change seems the likelier, for the grammatical evidence from various languages shows the Inducer nominal to be treated syntactically in the same way as the Agent nominal of a one-Agent situation: The Inducer nominal is the one that functions as subject, while the Inducee nominal is "demoted" to a lower case function (see Comrie 1976). The Inducer nominal is the one that, in Atsugewi, receives that language's special enclitic marker for Agents, while the Inducee nominal would receive this if it were alone in its own clause. And the Inducer nominal is the one that remains present at the surface, while, in many cases, the Inducee nominal is deleted, as in the English construction *I had a shirt made*, or in the Yiddish one *ikh hob gelozn makhn a hemd* ('I had [another/others] (to)-make a shirt').

It should be observed, in the light of the distinctions made in this study, that the causative phenomena discussed in the literature in terms of case hierarchy have involved solely the caused-agency situation, as in the paradigmatic French example in (237).

(237) a. *Jean* mangera la pomme.
John will-eat the apple
"John will eat the apple."

b. Je ferai manger la pomme *à Jean*
I will-make to-eat the apple to John
"I will make/have John eat the apple."

But examples for other types of causation also exist—for instance, for the plain agentive situation, in French

c. *La flèche* traversera l'air
the arrow will-go-through the air
"The arrow will go through the air."
d. Je ferai traverser l'air *à la flèche*
I will-make to-go-through the air to the arrow
"I will make the arrow go through the air."

and in Chinese (given here in translation, except for the special "prepositional" morpheme *ba*):

e. ball enter box
"The ball entered the box."
f. I 'ba' ball kick-enter box
"I kicked the ball into the box."

5.6.4 Further Conflation within Caused-Agency Verbs Beside the series of verbs already discussed (*get*, *make*, *have*, and so on, which conflatedly specify both the *fact* of inducing and the *means* or *manner* of inducing an Agent to perform a particular action), there are a number of surface verbs in English with a further degree of conflation, specifying in addition the particular action that is induced. One such verb is *send*, whose conflated specifications for the fact and the means of inducing happen to match those of *have* very closely. But it specifies in addition that the influenced Agent 'goes' (a self-agentive action). This specification can be accounted for syntactically by the predicate raising of the embedded S's verb.

(238) a. I $\underbrace{\text{by-GIVing-INSTRUCTIONs-}_{\text{A}}\text{INDUCEd}}_{\text{HAD}}$ [the maid go to the store for cigarettes]
b. ⇒ I HAD [the maid go to the store for cigarettes]
⇒ (I had the maid go to the store for cigarettes.)
c. ⇒ I $\underbrace{\text{HAD-go}}_{\text{sent}}$ the maid to the store for cigarettes
⇒ (I sent the maid to the store for cigarettes.)

Other verbs of this nature in English are *drive*, *chase*, *smoke (out)*, *scare (away)*, *lure*, *attract*, *repel*. Most of these, unlike *send*, specify an idiosyncratic means or manner of inducing. One such, *lure*, was analyzed earlier. Another example is *drive*

(239) $\underbrace{\text{by-CREATing-UNPLEASANTNESS-(for—), (to) }_{\text{A}}\text{INDUCE-to-go-(THENCE)}}_{{}_{\text{A}}\text{drive}}$

as in the following sentence, which has, externally to the main verb, additional concurrent specifications of direction and means.

(240) I drove the squirrel from its tree by fanning smoke in its eyes.

In terms of a table of factors like that in (235), the present verbs have different use patterns. Some, like *drive*, can have an Agent, Author, Instrument, or causing event as subject (thus paralleling *make*)—for example,

(241) $\underbrace{\text{in-BEing-UNPLEASANTNESS-(for—), (to }_{\text{I}}\text{INDUCE-to-go-(THENCE)}}_{{}_{\text{I}}\text{drive}}$

as in (242).

(242) The smoke drove the squirrel from its tree.

Others, like *send* (just like the *have* that it incorporates), require an Agent as subject.

(243) My need for cigarettes $\left\{ \begin{array}{l} {}^{\circ}\text{made/}{}^{*}\text{had the maid go} \\ {}^{*}\text{sent the maid} \end{array} \right\}$ to the store for a pack.

Still others, like *attract* and *repel*, seem intrinsically to require an instrument or causing event as subject, as in sentences like (244)

(244) (The inclusion of) the rodeo attracted crowds to the fair.

since, in sentences with an Agent, a *by*-clause seems best to construe with an implicit verbal notion of "managing (to)" or "succeeding (in)" (hence, to construct with a deleted deep verb specifying this).

(245) The owner attracted [< MANAGEd TO/SUCCEEDed IN (attracting)] crowds to the fair by including a rodeo.

There is a still further degree of conflation for caused agency than that manifest in the preceding cases. Here—in addition to (a) the fact of

inducing, (b) the means or manner of inducing, and (c) what is induced—(d) the Inducee (i.e., the influenced Agent) is conflatedly specified. Examples of this are common in the older English of the King James Bible in sentences like

(246) The king built walls around the city.

whose verb can be taken to arise by conflation from a deeper constituent like

(247) (b) (a) (d) (c)
by-INSTRUCTing, INDUCEd-ENTITIES-to-build
built
or HAD-ENTITIES-build
built

More modern examples are found in sentences like

(248) a. She took all her furniture with her when she moved to New York.
[*that is, where professional movers did the actual transporting*]
b. I cleaned my suit (at the cleaner's).

5.6.5 Chains of Caused Agency Where, as in the situations of the foregoing discussion, it is one intentional Agent's actions that cause another intentional Agent's actions, one can speak of a **chain of agency**. The preceding situations have been instances of two-member chains. But chains with more than two links also exist. One example of a conflatedly represented three-member chain is the sentence in (249)

(249) I had a specialist examine her.

which has a reading more fully represented by a sentence like

(250) I had the hospital staff have a specialist examine her.[20]

and whose verb can, accordingly, be taken to arise from a deeper constituent like

(251) HAD-ENTITIES-HAVE
had

A chain of agency, as represented conflatedly in a sentence, can be partly actual and partly purposive, as in the following sentence

(252) The king sent for his daughter (from the garden).

which can be interpreted as a three- or four-member chain of which only the first two agentive situations are specified to have in fact occurred, as seen in the following expansion of the sentence.

(253) (1) (2) (3)
The king had his aides go instruct (the governess to instruct)
(4)
his daughter to come to him (from the garden).

This sentence has a successor, which is offered as a finale to this study's presentation of increasingly complex causative situations, and which flamboyantly testifies to language's capacity for conflation

(254) The king had his son sent for from the front.

which has a reading amplifiable as

(255) (1) (2) (3)
The king had his aides have a messenger (riding to the front) go
(4) (5)
instruct the general to instruct his son to come to him from the front.

6 FURTHER CAUSATIVE FACTORS

The issues in the semantics of causation that remain to be (first perceived and then) addressed are great in number and vary over a range of significance and complexity. Instances of phenomena at the simpler end are the use of *in* instead of *as a result of* in (256a) and the use of the passive with no apparent nominal candidate for a *by*-phrase in (256b).

(256) a. He died in an auto accident.
b. He was killed in an auto accident.

And at the more intricate end is the complex of component causal subevents and intercoordinated agencies referred to (and structurally specified?) by sentences like

(257) a. I helped the wounded soldier through the debris.
b. I sat the guests around the table.
c. I fed the baby.

An idea of what is involved in such complexes might be gained by

resolving the situation of this last example into some of its components and interactions, as is attempted in (258).

(258) I, at various times partly determined by my monitoring of the shifting stage in the baby's eating process during a sitting, conveyed food to and into the baby's mouth, using physical stimulation to induce it to open this when kept closed, and the baby opened its mouth each time in response to visual or tactile cues, otherwise "mouthing" and swallowing the food irregularly, during the sitting.

Another issue to investigate pertains to situations that are represented by agentive syntax, but in which an event proceeds autonomously once it is initiated by an Agent. Two types of such situations are illustrated by the following sentences.

(259) a. i. I'm drying the clothes.
ii. I'm thawing the meat.
iii. I'm burning a candle in his memory.
iv. I'm boiling the water.
v. I'm growing corn in that field.
b. i. We're cooling down the blast furnace.
ii. I'm draining the water from the tank.

Here, for example, the clothes dry on their own once I have hung them up, the meat thaws on its own once I remove it from the refrigerator, the candle continues burning once I have lit it, the water comes to a boil once set on the burner, and the corn grows by itself once planted. This post-initiation autonomy is expressed by a syntactic structure, as in (260a), that is the same as that used for the more expected reference to a continuous causal input, as in (260b).

(260) a. I'm drying the shirt outside on the clothesline.
b. I'm drying the shirt by flapping it in the air.

Needing explanation is the fact that the (b) sentences of (261) can be reformulated in an enabling construction with *let*, while the (a) sentences cannot.

(261) a. *I let the candle burn by lighting it.
*I let the water boil by setting it on the fire.
*I let the corn grow by planting it.

b. °We let the blast furnace cool down by extinguishing the fire.
°I let the water drain from the tank by pulling the plug.

One of the more significant issues wanting attention pertains to the existence of gradience in causative concepts. Thus, there is an apparent continuum in the degree and quality of the causality expressed by surface sentences, from the rigorously causative to the sovereignly autonomous, as suggested by the (b) forms in the following series.

(262) a. i. I became sad *as a result of* hearing news of his death.
ii. Hearing news of his death *caused* my becoming sad.
b. i. I became sad *in response to* hearing news of his death.
ii. Hearing news of his death *occasioned* my becoming sad.
c. I became sad.

Such a continuum goes in the face of this chapter's theoretical treatment of the semantics and syntax of causation in terms of discrete all-or-none factors. One approach, which faults neither the observations of gradience nor of discreteness, would conclude that a sentence located along the continuum is conflated from a deeper sequence of interleaved causative and autonomous structures containing (adverbial, etc.) specifications of various attendant circumstances. Thus, for example, the (b) sentences of (262) well might be taken as compactions of (1) a strictly causative structure specifying that my hearing the news of his death created (caused to come into being) in my mind a particular Ground, or basis ('occasion'), and (2) a strictly autonomous structure specifying that my mood of sadness grew of its own accord on (as a "response" to) that Ground. This approach gains some support from the evidence of sentences that as a whole express a particularistic, mediate notion of causality, like the preceding (b) sentences, but that also explicitly set forth causative and autonomous subparts containing additional "adverbial" specifications—for example,

(263) Poverty $\left\{\begin{array}{l}\text{brings about}\\\text{leads to}\end{array}\right\}$ the conditions that $\left\{\begin{array}{l}\text{allow}\\\text{favor}\\\text{foster}\end{array}\right\}$ the growth of delinquency.

Here, the two verbal expressions in the first set of braces both specify actual causation, with *lead to* also indicating that this is of a continuing, incremental, and cumulative sort. And the verbs in the second set of braces all specify an event of true autonomy, ensuing amid a break in direct causation—an almost placental interface. Further, the succession of the

verbs within the second set of braces indicate an increasing provision of the "materials" needed by the ensuing event to carry on.

Another significant matter for investigation is the variation within and across languages as to which portion of the (causal) circumstances surrounding an isolably simple event must (or need not) be expressed at the surface. For example, in an English sentence referring to the situation of a customer asking a store owner the price he has set on an item, there is the open option of mentioning neither role, either role, or both roles played by the two human participants.

(264) a. How much is this?
b. i. How much do you charge for this?
ii. How much do I pay for this?
c. i. How much are you charging me for this?
ii. How much do I pay you for this?

Similarly free as to the mention or lack of mention of the human participant are sentences with the verb *turn up*

(265) a. The cufflink I'd been looking for for a week finally turned up at the bottom of the clotheshamper.
b. I finally turned up the cufflink I'd been looking for for a week at the bottom of the clotheshamper.

even though the situation referred to by a sentence without such mention, like (265a), necessarily and clearly involves the activities of a volitional and perceiving entity. On the side of required mention, English sentences with the verb *find*—otherwise quite comparable to those with *turn up*—can be cast only in the (265b) form, specifying the involved entity. In the same vein, in reference to a situation where a glass that has been in my grasp falls to the floor, a normal (rather than philosophical, scientific, humorous, or child's) English sentence must make mention of my involvement

(266) a. *The glass fell.
b. °The glass fell out of my hand /°I dropped the glass.

in contrast with Hindi, for one, which colloquially says the equivalent of (266a).

The obverse of the preceding issue is the matter of how distant a portion of the circumstances surrounding an event *can* be expressed at the surface as directly involved. At least the notion of responsibility, for one

case, can be attributed to an entity even at many removes. For example, in one science fiction film, a person was held responsible for the sinking of a ship (in as many words) in that he had abducted two natives of a mystic island whose inhabitants called forth a giant creature that swam the ocean in pursuit of its charges and ran into the ship.

Notes

1. This chapter is a moderately revised version of Talmy 1976b, but it leaves much of the original paper unchanged. Thus, it still shows in precursor form some of the ideas that became more developed in subsequent work (and that can be read here in other chapters)—for example, ideas of force dynamics. And it also retains some features of then-current linguistic approaches—for instance, of transformational grammar and of generative semantics. Apart from these historical retentions, though, its analysis of the semantic factors that comprise causativity and that distinguish types therein remains valid. More specifically, the main objective of this chapter has been, by following a stepwise procedure, to analyze out component after component of the semantic complex that constitutes linguistic causativity, and to show the relationships of these components to each other. And while these interrelationships of semantic components are here represented in a derivational format, they can also be readily understood in other terms—for example, in terms of conceptual structure and of lexical semantic structure.

Most of the original paper's terminology has been updated to accord with my current usage and with the other chapters in this volume. But the material pertaining to force-dynamic concepts has been left intact to serve as a record of its precursor form.

2. With respect to the example in (1b), my dialect of English permits the use of *from* to introduce a clause expressing cause. Readers to whom this is not acceptable can substitute the phrase *as a result of*.

In everyday speech, a possessive *-'s* form need not be present in a nominalized clause. Since no causative issues are affected, it will in fact usually be omitted for greater colloquial effect in the examples.

As for this last matter, many example sentences will still be bookish, which may be felt to detract from the force of the argument. They are used, however, because they often reflect at the surface the form inferred for certain deeper structures more closely than do colloquial forms, which on the contrary often seem to arise as the result of further derivation.

3. The following are the symbols I use in this chapter to indicate sentences' "acceptability." The asterisk (*), as in standard practice, marks an ungrammatical or otherwise unacceptable sentence; a raised x (^{x}) marks a marginal sentence; and an acceptable sentence is optionally marked with a raised circle ($^{\circ}$), a mnemonic for "okay."

4. This circumstance is basically a case of the earlier "poetry-writing" situation, but it is considered separately here because its event by turns both does and does not take place.

5. Similarly, as will be explicitly treated later, an Agent causative sentence like

(i) I broke the window with a hammer.

which specifies only the causally involved object, always at least implies a causal event

(ii) I broke the window by ACTing ON it with a hammer.

and can always, in addition, supply the specifications for one, as in (iii).

(iii) I broke the window, by hitting it with a hammer.

6. Examples that seem to contradict this principle—for example,

(i) The aerial$_i$ toppled off the roof as a result of its$_i$ wobbling.

can always be seen to imply a form expressing action on the element—for instance,

(ii) The aerial$_i$ toppled off the roof as a result of its$_i$ wobbling's acting on it$_i$.

or, with more specifics added in,

(iii) The aerial toppled off the roof as a result of the wobbling it underwent (from the wind) loosening it.

7. In derivational terms, it may be deemed that there exist at least the following four types of derivational process: (i) derivation of syntactic structures, (ii) derivation of lexical forms, (iii) derivation of syntactic relations, (iv) derivation of semantic relations. Of these, only the first three have been recognized in the literature, and only the first two have received comprehensive treatment. The fourth is what is instantiated here and below.

8. How the *off* might arise, as well as how the whole derivation from (103a) to (103b) might proceed transformationally, is gone into in Talmy 1975b under the term "clause conflation."

9. The underlying structure for this should perhaps have some other matrix verbal than BE-the-INSTRUMENT-IN (or, BE-the-IMMEDIATE-INSTRUMENT-IN), maybe something like BE-a-MEDIATE-INSTRUMENT-IN.

10. Usually, as in (114), this will be a case of overcoming a natural tendency to move—that is, keeping the Figure in place. However, the reverse dynamic opposition—that is, keeping the Figure moving—is also possible, as in the situation represented by (i).

(i) The stirring rods breaking let the ingredients settle (thereby ruining the experiment).

11. We posit that the release of restraint is a distinct semantic circumstance. This poses a problem, it should be noted, for the thesis that complex causative situations consist only of simple events and basic causative situations. This is because the circumstance, as specified in (128)'s subject clause, is not a bona fide instance of either.

12. The *let* appearing here, which takes a *by*-clause specifying the enabling event and which is kin to the *let* of (125), which takes a subject clause with the same specification, is to be distinguished from a homophonous form. This further *let′*

takes only an Agent as subject and indicates that he refrains from or does not think to prevent an already ongoing event.

(i) I let′ the water drain from the tank
... because I didn't care if it ruined the rug.
... because my attention was turned elsewhere.

It has difficulty taking a *by*-clause, which would have to specify the mode of refraining.

(ii) I let′ the water drain from the tank [x]by not putting the plug back in.

13. Of course, the use of *kill* over *die* requires *that* I did something, but even this much relation between *I* and the verb is absent where there is but one lexical form involved, as in *The snow melted*/*I melted the snow*.

14. As for surface representation, the further antecedent event, unspecified in (142), cannot be expressed in an additional subordinate clause

(i) *I killed the snail by hitting it with a stick by manipulating the stick with my hand.

nor in the reduced phrasal form of such a clause where this results in a sequence of two *with*'s,

(ii) *I killed the snail by hitting it with a stick with my hand.

but otherwise it *can* be expressed in the following reduced phrase.

(iii) °I killed the snail by hitting (swinging) a stick against it with my hand.

15. Another candidate for an Author/Agent verb pair is that in

(i) I spilled/poured water over the embers.

This pair is not ideal, though, because *pour* may permit an Author reading for some speakers, while *spill* does not necessarily require an intended causal sequence before the final unintended event, as *mislay* does.

By contrast with English, verbs in Singhalese (apparently all except the one meaning 'to fall') have two forms, one specifying nonintentionality and the other specifying intentionality.

16. Not to be confused here is a nonpurpose reading of this form—especially evoked where *in order* is lacking and the *to*-clause has a low intonation—that is paraphrasable as (and presumably derivable from something resembling)

(i) I hit the snail with my hand as the method *by which I killed it*.

17. The perhaps full surface set of standard English purpose clause introducers (i.e., excluding special expressions like *for the aim of*) running from the bookish to the colloquial, is, for the agentive

(i) I hung the clothes out $\left\{\begin{array}{l}\text{(in order) that I might}\\ \text{(in order) to}\\ \text{so (that) I might}\\ \text{so as to}\end{array}\right\}$ dry them (thereby).

and for the nonagentive

(ii) I hung the clothes out $\left\{\begin{array}{l}\text{(in order) that they would}\\ \text{so (that) they would}\\ \text{(for them) to}\end{array}\right\}$ dry (thereby).

18. Alternatively, on the model of the following surface-sentence pair

(i) a. I threw the ball to go into the basket at the other end of the court.
b. I threw the ball into the basket at the other end of the court.

which differ as to whether or not the intended final event is specified to have occurred, the sentence *I threw the ball to him* could be thought to arise from a deeper structure resembling

(ii) I threw the ball to go into his GRASP.

and *I threw him the ball* from one resembling

(iii) I threw the ball into his GRASP.

where the deep noun GRASP would be understood to represent the conflation of complex structures yet to be determined.

19. Such indications of semantic notions as MAKE THREATs and GIVE INSTRUCTIONs appearing here, or PRESENT ARGUMENTs, and so on appearing earlier, are intended merely as discursive counters, not seriously to be taken as deep morphemes, each specifying a discretely distinguishable notion (as, surely, MAKE, GIVE, and PRESENT here cannot be taken to do, being used, rather, to reflect surface usage).

20. The increase in conflatedness from (250) to (249) would be shown to greater effect if there were an intervening stage. The comparable sentences in (i) do constitute a three-stage series.

(i) a. I arranged with the hospital staff to have a specialist examine her.
b. I arranged to have a specialist examine her.
c. I arranged a specialist's examining her.

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