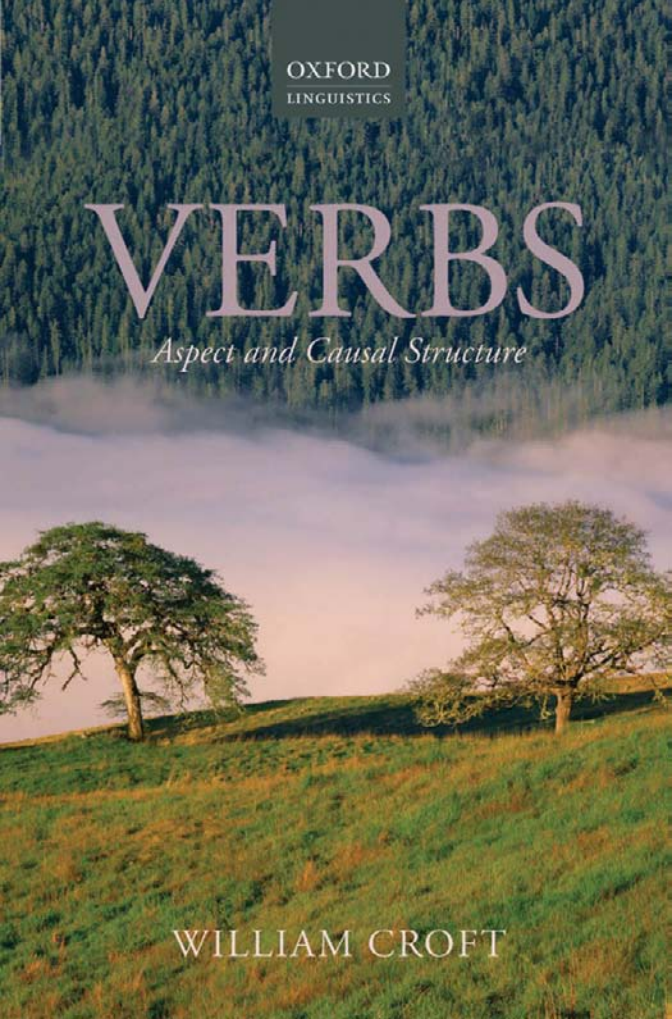
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WILLIAM CROFT

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To the memory of Melissa Bowerman
1942–2011
A great scholar; a greater friend

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Contents

Preface and Acknowledgements

For me, this book has been a long time coming. The analyses of verbal semantics and its role in clause structure presented here were begun in my graduate student days at Stanford over twenty-five years ago. The analysis of aspect began in collaboration with Jerry Hobbs, then at SRI International; I am grateful to Jerry for his ideas unfettered by attachment to any theoretical dogma, a liberating experience for a graduate student. Jerry and I presented the two-dimensional aspectual representations at the Summer Institute of the Linguistic Society of America at Stanford in 1987; I presented a later version at the III. Sommerschule der Deutschen Gesellschaft für Sprachwissenschaft in Hamburg in 1989. I continued to develop the ideas on my own after graduating from Stanford. Although they remained unpublished until recently (Croft 2009), they were continually tested as I taught them to linguistics students in courses on semantics at the Universities of Michigan, Manchester, and New Mexico; I am grateful to all of those students for their often penetrating questions and attempts to grapple with the geometric representations. I am also grateful to audiences for their attention and questions about earlier versions of this analysis presented at the Fifteenth Annual Meeting of the Cognitive Science Society, Boulder, Colorado; the Workshop on "Which Semantics?", Bolzano, Italy; the Department of Language and Information Sciences, University of Tokyo, Tokyo, Japan; the Linguistics Department, Max-Planck-Institut für evolutionäre Anthropologie, Leipzig, Germany; the Seventh International Cognitive Linguistics Conference, Santa Barbara, California; the Fifth Annual Meeting of the Japanese Cognitive Linguistics Association, Osaka, Japan; the Conference on English Language and Literature Studies: Interfaces and Integration, University of Beograd, Beograd, Yugoslavia; the Scuola Normale Superiore, Pisa, Italy; the Annual Conference of the Slavic Cognitive Linguistics Association, Chicago, Illinois; and the Second International Conference on Cognitive Semantics, Suzhou University, Suzhou, China.

The analysis of force dynamics and its role in argument linking originated in my PhD dissertation research, and was developed in my 1991 book *Syntactic Categories and Grammatical Relations*, and in a number of publications in the 1990s. I also represented the force-dynamic structure of events geometrically, and presented those representations to students in semantics (to whom I am again grateful) for many years. But I was long aware of the problems in the force-dynamic representations I used, and their lack of integration with the

aspectual representation, although aspect and force dynamics are both dimensions of verbal semantics relevant to grammatical structure. Nevertheless, I needed someone to push me to face the problems. That person was Chiaki Taoka, whose PhD research I was supervising in the late 1990s. She patiently but insistently asked me many questions about my analysis and raised many problems as she attempted to apply it to aspect and argument structure in Japanese. Her desire to use my analysis for Japanese forced me to figure out a way to integrate my aspectual and force-dynamic analyses in a single semantic representation. I was trying different diagrams one day in the spring of 1998; when I hit on the diagrams that are found in this book, it clicked. Chiaki completed her analysis of Japanese in 2000; her PhD dissertation sadly remains unpublished. With her permission, I have made available her dissertation at http://www.unm.edu/~wcroft.

Unfortunately I was unable to bring this project to fruition at the time. Toward the end of a sabbatical at the Linguistics Department of the Max Planck Institute for Evolutionary Anthropology in Leipzig in 1999–2000, I drafted several chapters which were posted on my website until this book was written; I am grateful to Bernard Comrie for his invitation to such a stimulating environment. I was then distracted by other projects and other events, including the death of Joseph Greenberg and my move from Manchester, UK to Albuquerque, New Mexico. I am grateful to both the Universities of Manchester and New Mexico, which supported me during the time that I honed the ideas presented here. I am also grateful to the University of Manchester and the Center for Advanced Study in the Behavioral Sciences in Stanford, California, for supporting a sabbatical in 2003–4 that allowed for further development of the ideas finally published here. I am also grateful to audiences for their attention and questions about versions of the integrated aspectual and force-dynamic analysis presented at the Institut für Anglistik und Amerikanistik, Universität Hamburg, Germany; the Linguistics Department, Max-Planck-Institut für evolutionäre Anthropologie, Leipzig, Germany; the Dipartimento di Linguistica, Università di Pavia, Pavia, Italy; the Workshop on the Construction of Meaning, Stanford, California, USA; the Department of Linguistics, University of Oregon, Eugene, Oregon, USA; the Department of Linguistics, University of New Mexico, Albuquerque, New Mexico, USA; the Department of Linguistics and Oriental Languages, San Diego State University, San Diego, California; the National Taiwan University Institute for Advanced Study in the Humanities and Sciences, National Taiwan University, Taipei, Taiwan; the Second International Conference on Cognitive Semantics, Suzhou University, Suzhou, China; the Workshop on Verb Concepts: Cognitive Science Perspectives on Verb Representation and Processing, Concordia University, Montréal, Québec,

Canada; the 35th Annual Meeting of the Berkeley Linguistics Society, Berkeley, California; the Department of Linguistics, University of Texas, Austin, Texas; and the Department of Linguistics, Melbourne University, Melbourne, Australia. Finally, I am grateful to students in my seminar on verbal semantics at the University of New Mexico in fall 2008, my first seminar on the topic in twenty-one years.

Of course, when one waits a long time to publish an analysis, the field does not wait for you. There has been much research on the analysis of aspect and verbal semantics and their role in argument realization in cognitive linguistics, generative linguistics, and formal semantics. I cannot claim to have mastered this literature by any means. But I was aided immeasurably by Beth Levin and Malka Rappaport Hovav's *Argument Realization* (2005), and I also thank Beth Levin for her comments and support. Despite the intellectual ideologies separating these three research traditions, I have found many insights and convergent ideas in all three. Some of the ideas parallel ideas of my own that I did not publish earlier; others I have found to be contributions to my own approach to the problems. I hope that linguists in all three traditions will find something of value in this book; my apologies to those whose theories and analyses I should have cited in this book but have not. I have tried here to present the ideas in a way that will be accessible to analysts regardless of theoretical orientation.

Finally, I thank the University of New Mexico for granting me a sabbatical in 2009–10 which allowed me to complete this work at last; the Research Centre for Linguistic Typology at La Trobe University, where the last revisions were made; John Davey at Oxford University Press, for waiting patiently for a decade to receive the manuscript; Willem Hollmann, who read and commented on the entire manuscript for Oxford University Press; and Jóhanna Barðdal and Yoshikata Shibuya, who read and commented on the manuscript as well.

While this book was in press, I learned of the death of Melissa Bowermen. Melissa was a brilliant and influential scholar in language acquistion, and a dear friend. She was unafraid to ask the most penetrating and challenging questions, in our conversations about our lives as well as in intellectual debate on the native of language and meaning. Those questions were always delivered in the friendiest and most unassuming way. Melissa had an infinite curiosity about everything, but her chief love remained the diversity of linguistic meaning, especially the meanings of verbs. This book owes a great debt to her. With love and respect, I dedicate this book to her memory.

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List of Abbreviations

1	first person
2	second person
3	third person
A	transitive agent
A.OBL	antecedent oblique
ABS	absolutive case
ACC	accusative
ADESS	adessive ('on')
ANTI	antipassive
APPL	applicative
ART	article
AV	actor voice
BEN	benefactive
CAUS	causative
CLN	noun class n
CO	coordinator
CONSEC	consecutive
CONV	converb
DAT	dative
DECL	declarative
DEF	definite
DEM	demonstrative
DIR	direct voice
DU	dual
ERG	ergative
FACT	factitive
FUT	future
GEN	genitive
GR 1	grade shift 1 (Hausa)
IMP	imperative
IMPF	imperfect(ive)
INCMPL	incompletive
INF	infinitive

INST	instrumental
INT	interrogative
INV	inverse
LOC	locative
M	masculine
N	neuter
NEG	negative
NFUT	nonfuture
NOM	nominative
OBJ	object
OBL	oblique
PASS	passive
PL	plural
POSS	possessive
PRF	perfective
PRS	present
PST	past
PV	patient voice
RECP	reciprocal
REFL	reflexive
RL	realis
RR	reflexive/reciprocal
S.OBL	subsequent oblique
SBJ	subject
SG	singular
SS	same subject
TNS	tense
TOP	topic
TR	transitive
VOL	volitional

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1

Introduction

1.1 Clause structure and meaning

A central part of the grammar of every human language is the encoding of events and their participants in a clause. The analysis of this aspect of grammar has gone under many names in just the recent history of linguistics: grammatical relations, syntactic functions, subcategorization frames, case roles, thematic roles, argument structure, argument structure constructions, argument linking, and argument realization, among others. As in every part of grammar, the basic problem is to get right the balance between uniformity of encoding and variability in encoding within and across languages.

Grammatical relations—Subject, Object, and Oblique—have often been assumed to be purely formal categories. The chief reason for assuming a purely formal definition of grammatical relations is that there is a great semantic diversity among events with a single participant, yet most one-participant events are encoded with a single grammatical relation, usually called Subject, in most (but not all) languages:

(1) a. We all danced.
b. God exists.
c. I fell.
d. They rejoiced.
e. The girls kissed.
f. The balloons popped.
g. Ira is unhappy.

Likewise there is a great semantic diversity among events with two participants, yet most two-participant events are encoded with the same two grammatical relations, usually called Subject and Object.

(2) a. She broke the vase.
b. She broke her arm.
c. I like fifteenth-century polyphony.
d. The pin attaches to the bottom of the shelf.
e. They received the letter.

f. My mother baked some brownies.
g. I ate the brownies.
h. These diodes emit infrared light.
i. She kissed her daughter.

There is relatively little variation in the encoding of the argument of a one-participant event or the two arguments of a two-participant event in English. Hence it does not appear that differences in the SEMANTIC ROLES of participants have much to do with the assignment of grammatical relations, at least in this language.

Even so, just the examples in (1)–(2) suggest that the assignment of grammatical relations is not completely arbitrary. In two-participant events, the choice of which argument is encoded as Subject and which as Object is remarkably uniform across languages for many different semantic event types. This consistent asymmetry in the choice of grammatical relation must be determined by some semantic feature, since that is what is available equally to speakers of different languages. The cases in which there is variability in Subject and Object realization also tend to be semantically regular: for example, the coding of experiencers of mental events such as the emotion event in (2c) tends to vary across languages (§6.2.3). Likewise, not all languages code the single argument of one-participant events in the same way, but there are significant semantic regularities regarding how such participant roles are encoded (§6.3.1).

Also, the variation in realization of the same participants in the same event that does occur, which is not inconsiderable, appears to be at least partly motivated semantically. We can illustrate this with two examples that date back to the earliest discussions of argument realization in generative linguistics (Fillmore 1968; Anderson 1971):

(3) a. John opened the door with a key.
b. The key opened the door (*by John).
c. The door opened (*by John).

(4) a. Janet sprayed paint on the wall.
b. Janet sprayed the wall with paint.

In (3a–c), different participants are encoded as Subject, but that choice limits the options for the encoding of the other participants, in particular the agent of the action (§§5.2.1, 5.2.3). In (4a–b), the LOCATIVE ALTERNATION, different participants are encoded as Object, but the alternation correlates with a systematic semantic difference (§7.4.3). The semantic details will be discussed in later chapters, but these examples indicated to linguists in the early days of generative grammar that semantics plays a role in accounting for variability as well as uniformity in argument realization.

Finally, it should be noted that the diversity of semantic roles coded in the sentences in (1)–(2) is chiefly a problem for a MONOSEMY analysis of the semantics of grammatical relations. It is true that a single general meaning comprising necessary and sufficient conditions for the Subject and Object categories in English appears to be impossible. But there is no doubt that the Subject and Object roles for each sentence in (1)–(2) indicate which referent plays which participant role in the specific event denoted by the predicate (Croft 2001: 132–3). That is, for each predicate (*break, like, attach, receive, bake*, etc.), the Subject and Object roles define the appropriate semantic participant role for each predicate: the Subject of *break* is the breaker and the Object is the thing broken, the Subject of *like* is the person experiencing the emotion and the Object is the thing stimulating the emotion, and so on. Taken together, the different participant roles coded by a single grammatical relation are semantically related, in ways that will be described in later chapters of this book, and English Subject and Object form polysemous categories.

In this respect, so-called core grammatical relations such as Subject and Object are no different from various Oblique grammatical relations, expressed by English prepositions such as *for, to*, and *with* and by case inflections such as Instrumental, Dative, and others in other languages. Adpositions and case inflections (together called CASE MARKING in this book) are also used for a wide range of participant roles that are nevertheless semantically related to each other (see, inter alia, Croft 1991, chapter 4; Vandeloise 1991; Haspelmath 2003; Levinson, Meira et al. 2003; Rice and Kabata 2007). Most analysts do not treat the two different functions of *with* in (5a–b) as identical, although many argue that they are semantically related (e.g. Croft 1991). Likewise, the two different functions of preverbal arguments in (6a–b) need not be treated as identical, although they are presumably related:

(5) a. The garden is swarming **with bees**.
b. Don't eat peas **with a knife**.

(6) a. **The books** fell.
b. **Hal** tapped the window.

Many theories about the role of meaning in argument realization have been proposed in the past forty years in American linguistics and beyond. This history is well covered in Levin and Rappaport Hovav (2005), to which the reader is directed (see also chapter 5). The most important trend, and the guiding light for the research presented here, is a general convergence on the idea that event structure is the primary semantic determinant of argument realization. Hence the focus of attention in argument realization

in recent analyses has been on verbal semantics, or EVENT LEXICALIZATION as it is called by Levin and Rappaport Hovav.

Given the focus on event structure, what dimensions of event structure are grammatically relevant? There are two major current contenders: aspectual structure and causal structure. Aspectual structure can be broadly described as how events unfold over time. Aspect is manifested in lexical semantics—predicates have different aspectual types—and in grammatical semantics—various grammatical constructions, such as the English Progressive, specify a particular aspectual structure. On the face of it, it is not obvious why aspectual structure should play a role in argument realization, although it is clearly relevant for other grammatical constructions, namely the tense–aspect systems found in the languages of the world. As a matter of fact, as will be seen in chapters 7–8, aspect does appear to play a role in argument realization. Aspect is, however, notoriously difficult to pin down, and a wide range of analyses of aspect are also found in the linguistic literature. Chapters 2–4 present a general analysis of aspect that will allow us to specify more precisely the role that aspect plays in argument realization.

The other dimension of verbal semantics that plays a role in argument realization is causal or FORCE-DYNAMIC structure (the latter term was introduced by Talmy 1988/2000). Causal structure can be broadly defined as the causal interactions between participants in events. Causal analyses are implicit in semantic roles such as agent and patient. In Croft (1991), I argue that causal structure is in fact the primary semantic determinant for argument realization; some of the major typological arguments for this position are summarized in chapter 6. However, the semantic representation in that work (and the attempt to improve it in Croft 1998*a*) is inadequate to the task of representing the role of causal structure and its interaction with aspectual structure in argument realization. One of the chief purposes of this book is to integrate the more fine-grained aspectual analysis described in chapters 2–4 with the causal analysis of Croft (1991, 1998*a*). This will allow us to develop analyses of which facets of aspectual and causal structure play a role in various grammatical phenomena, in a way that was not possible in the earlier representation. Those analyses will be the subject of the remaining chapters.

1.2 Approaches to semantics and semantic representations

The analysis of event structure and its role in grammar, particularly in argument realization but also in other constructions, has been one of the central concerns of linguistics in at least three different semantic frameworks: formal, generative, and cognitive. Since these research traditions tend to be

rather autonomous, there is little cross-reference between them, particularly between the cognitive and the other two research traditions. Nevertheless, there are basic analytical insights in each of the three research traditions, as well as in the work of linguists who do not identify with any of these traditions, that can be transferred from one tradition to another. Also, there is some degree of convergence across the three research traditions on the importance of certain semantic dimensions of event structure, i.e. aspectual and causal structure, for argument realization.

It is my hope that scholars in all three research traditions will find something of value in the analyses presented here. In this section, I will describe some salient features of the three approaches to semantics, and try to situate the analyses to be presented in this book in the context of those traditions. To some extent, these outlines will be caricatures that make the approaches look more different than they are in practice; my chief goal is to highlight the major differences as well as similarities, and to show how analyses of the same phenomenon in different traditions can be fruitfully compared.

Formal (or logical or model-theoretic) semantics is derived from the philosophical logical semantic tradition. In formal semantics, the meaning of a sentence is represented in a logical calculus of some sort, such as propositional logic, which is governed by a set of well-formedness rules and among other things is intended to eliminate ambiguities in natural language sentences. This semantic representation is then related to a model, such that rules of interpretation determine which conditions in the model a particular statement in the logical calculus actually describes. The model is usually understood to be a model of the world, in which case the rules of interpretation determine the truth conditions of the semantic representation, and this type of semantic theory is therefore a truth-conditional model-theoretic semantics. Early formal semantic theories used first-order propositional logic as the calculus and basic set theory and operations on sets as the model. As formal semantics has evolved, more complex logics and more complex mathematical objects have come to be employed for semantic representations and for the models in which they are interpreted.

Generative approaches to semantics are theories of the semantic component of a generative grammar, and hence of the mapping from syntax to semantics. Like formal semantics, the semantic component in a generative grammar is typically represented by a representation language that looks like a logic (or a language), and specific theories have particular inventories of semantic primitives and rules of combination. Unlike formal semantics, however, most semantic theorists allied to generative grammar argue that semantic structures are conceptual structures in the mind, rather than representations of truth conditions in the world. Hence there is room for a more

complex mapping between the semantic structures and the structures of the world, so that semantic structures represent a conceptualization of a real-world situation. In fact, however, most attention in generative approaches to semantics is paid to the mapping between syntax and semantic/conceptual structure, and less to the mapping between conceptual structure and the world.

Cognitive approaches to semantics are part of the cognitive linguistics paradigm. In the cognitive linguistics paradigm, form and meaning are not separated into self-contained components. Instead, syntactic structures of varying degrees of complexity and abstraction (schematicity) are paired with their corresponding semantic structures. These are constructions in the contemporary sense of construction grammar (see §1.5). Like generative approaches to semantics, the semantic representations in cognitive linguistics are intended to represent conceptual structure rather than truth conditions in the world. In practice, the mapping between syntactic structure and semantic structure tends to be more direct than in generative approaches (§5.5), and more attention is paid to the conceptualization processes that link conceptual structures to the situations in the world that they represent. Unlike both generative and formal approaches to semantics, semantic representations tend to be diagrammatic, although the diagrams (e.g. those used in Cognitive Grammar; Langacker 1987, 1991, 2008) are subject to well-formedness rules not unlike those found in the calculus-type representations in generative and formal approaches.

The semantic representations I present in this book look more like the diagrammatic representations of cognitive linguistics than the logic or logic-like representations found in formal semantic or generative semantic research. The similarities and differences between these representations can be discussed by comparing samples of each of these types of representations for the argument structure construction for *Max melted the ice*, given in Figure 1.1. Note that none of the representations given in Figure 1.1 are intended to represent the time reference encoded by the Past Tense form of *Max melted the ice*, although most of the theories have a means for doing so. The representations represent simply the lexical semantic structure of *melt* in the Transitive construction.

Figure 1.1a gives a predicate calculus representation. The semantic representation of the verb has no internal structure. Any inferences to be drawn from the semantics of *melt*, and any linguistic consequences from the semantics of *melt*, must be represented as ENTAILMENTS from Melt(*x,y*). This is the approach to verbal semantics taken by Dowty (1991). The remaining representations in Figure 1.1b–d are DECOMPOSITIONAL: that is, linguistically relevant inferences about the meaning of *melt* are to be drawn from structural

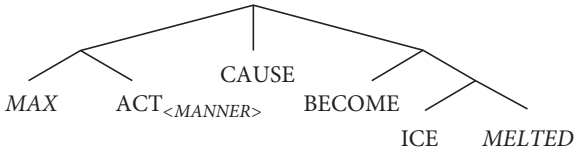
a. Predicate calculus notation

Melt(*Max,ice*)

b. Adapted from Rappaport Hovav and Levin 1998:116

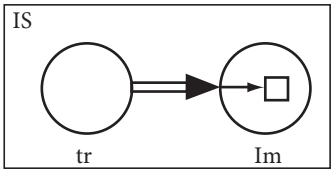
(i) Calculus [[*MAX* ACT$_{<MANNER>}$] CAUSE [BECOME [*ICE* <*MELTED*>]]]

(ii) Tree diagram

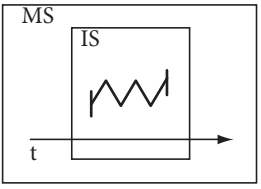


c. Adapted from Langacker 2008:357, Figure 11.2(b) and 153, Figure 5.8(d)

(i) Action chain



(ii) Perfective Verb (typical)



d. Adapted from this book, §7.3, example (6)

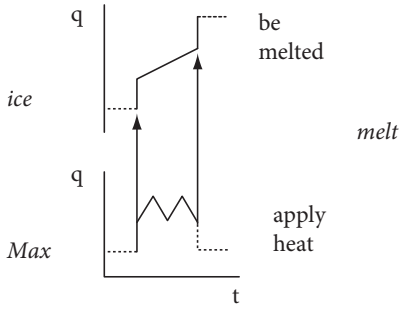


FIGURE 1.1. Four representations of *Max melted the ice.*

properties of the representation. The relationship between the predicate entailment and decompositional approaches to verbal semantics is discussed in §5.5. Here, we will focus our attention on comparing the decompositional representations.

Figure 1.1b gives a typical decompositional analysis found in generative grammar approaches to verbal semantics. The analyses of verbal semantics in

Role and Reference Grammar (Van Valin 2005) and by Jackendoff (1990, 2002) are quite similar (see §5.2). They all involve atomic primitive components such as CAUSE, <*MELTED*> and *MAX*, related to each other via predicate–argument or operator–operand notation. Figure 1.1b(i) gives a logical calculus version, and Figure 1.1b(ii) gives a tree diagram for the same structure. Figures 1.1b(i) and (ii) are notational variants—in other words, a logical calculus representation and diagrammatic representation can be equivalent. As is often the case, it is easier to perceive the relationships among the predicates, arguments, and operators in the diagrammatic representation in Figure 1.1b(ii) than in the calculus-type notation in Figure 1.1b(i).

Figure 1.1c gives two diagrams in Cognitive Grammar: one for representing the default coding of the canonical event model, of which *Max melted the ice* is an example, and one for the typical perfective process, of which *melt* is an example (Langacker does not give a diagram integrating these two representations). Figure 1.1c(i) gives only what Langacker calls the immediate scope (IS) of the predication, corresponding to the foregrounded part of the semantic frame or domain (Langacker 2008:63); the concept of a semantic frame is described in §1.3. The remaining part of the semantic frame/domain in Cognitive Grammar, the maximal scope (MS), is not relevant to our comparison here.

The diagrams in Cognitive Grammar are highly structured. Each part of the diagram represents a component of the semantic structure. For example, the circles in Figure 1.1c(i) correspond to the participants in the event, the double arrow to the force-dynamic relations between the participants, and the single arrow plus square to the process undergone by the second participant (the ice in this example). In Figure 1.1c(ii), the labeled arrow corresponds to the time dimension, the zigzag line to a dynamic (perfective) process, and the two short vertical segments to the temporal boundaries of the process. The heavier lines indicate the profiled portion of the entire semantic structure. The positions of each part of the diagram relative to certain other parts indicate their relationships. For example, the positions of the two circles at opposite ends of the double arrow in Figure 1.1c(i) indicate the agent–patient relationship.

Because each part of the Cognitive Grammar diagram is discrete and there are conventionalized spatial relations between parts of the diagram, the diagram could be translated into a calculus-type notation, such that each part of the diagram is a primitive element in the calculus and the spatial relationships are represented by predicate–argument or operator–operand relations in the calculus. The chief semantic difference between Figure 1.1c and Figure 1.1b is not calculus vs. diagram—after all, Figure 1.1b can be represented diagrammatically too. The chief difference lies in the frame-semantic distinction

between profiled concepts and the presupposed semantic frame/domain: Figure 1.1c includes the semantic frame but Figure 1.1b does not. In sum, a diagrammatic and a calculus-type representation may not be that different from one another, and the advocate of one type of representation should not reject the other type of representation before translating from one to the other.

Figure 1.1d gives a representation of the type used in this book for *Max melted the ice*. It looks superficially much like the Cognitive Grammar representations in Figure 1.1c(i)–(ii). Some of the similarities represent shared semantic theories. For example, both Figures 1.1c and 1.1d use the frame-semantic distinction between profiled concepts and the semantic frame/domain (in Figure 1.1d, the profiled part of the semantic structure is indicated by solid lines). Also, both consider the causal chain linking the two participants (indicated by the double arrow in Figure 1.1c(i) and the paired arrows in Figure 1.1d) to be a linguistically significant feature of the semantics of the event.

However, there are important differences between the two representations. The subevents for Max and the ice in Figure 1.1d are geometric, not diagrammatic, representations. They have two orthogonal dimensions, time (t) and the qualitative states that each participant goes through in the time course of the event (q), and the lines representing the subevents are trajectories through two-dimensional space. In Figure 1.1d, LINGUISTICALLY RELEVANT SEMANTIC PROPERTIES OF THE EVENT ARE REPRESENTED IN THE GEOMETRIC PROPERTIES OF THE REPRESENTATION. Thus, the subevents in Figure 1.1d cannot be translated into a logical calculus notation in the way that the Cognitive Grammar representation largely can be. For example, the zigzag line in Figure 1.1c(ii) contrasts with a straight horizontal line (not shown here) in Cognitive Grammar; the two diagrams contrast internally heterogeneous vs. internally homogeneous processes (Langacker 2008:153). One could translate the zigzag line in Figure 1.1c(ii) as a predicate HETEROGENEOUS, but one cannot do the same with the zigzag line in Figure 1.1d without losing the generalizations based on the geometry of Figure 1.1d, as will be seen in chapters 2–3 of this book.[1]

The same is true in a somewhat different way for the force-dynamic relationship between the two subevents in Figure 1.1d (chapters 6–8). Here the representational contrast is between Figures 1.1c–d and Figures 1.1a–b. In Figures 1.1c–d, the causal chain (called an 'action chain' by Langacker) imposes an ordering on the participants. In Figures 1.1a–b, the ordering of

[1] It is not clear to me whether Cognitive Grammar exploits the geometric structure of the temporal dimension represented by the time line in Figure 1.1c(ii).

participants is not a necessary part of the representation. The arguments of Melt(*Max,ice*) could be in the opposite order, and likewise for the arguments of CAUSE in Figure 1.1b. In Figures 1.1c–d, the relationship between participants is represented by a directed acyclic graph structure (a causal chain; see §6.2). In the theory developed in this book at least, the linguistically relevant force-dynamic properties of the event that determine argument realization are represented in the graph-structural properties of the representation in Figure 1.1d, including the sequence of "nodes" in the graph (the subevents for each participant, going from bottom to top) and the directionality of the graph, as will be seen in chapters 6–8.

Hence Figure 1.1d is not just a diagrammatic version of a logical calculus-type notation. It is a geometric-cum-graph structure representation of the semantic structure of events.[2] This has two consequences for comparing Figure 1.1d to the representations in Figures 1.1a–b (or Figure 1.1c, to the extent that it is translatable to a logical calculus representation).

First, Figure 1.1d is not really best compared directly to Figures 1.1a–b. Figures 1.1a–b are representations in a logical calculus, while Figure 1.1d resembles more the model into which a logical calculus is interpreted in a model-theoretic semantic approach (see §5.5 for further discussion).

Second, it is possible to develop a logical calculus to go with the type of model illustrated by the structure in Figure 1.1d. For example, a central concept in some contemporary analyses of event structure is the presence (or absence) of scalar change, or directed change as it is called here, in the time course of an event (see §3.1.1 and §7.4.3). Scalar change can be represented geometrically, as in this book, or algebraically, as in the work of various formal semanticists (e.g. Kennedy and McNally 2005; Beavers 2008). I find geometric representations, particularly of complex event structures, to be more accessible to a wider audience (including myself), and for this reason I continue to use them. I also assume direct interpretation from a linguistic expression—a verb and the constructions it occurs in—into the semantic structure in Figure 1.1d (§§5.4.2, 5.5). Hence I will not develop a logical calculus in this book for the geometric or graph-structural models that I will use for representing event structure.

An important issue that requires further discussion is the relationship between truth-conditional approaches and conceptual/cognitive approaches to semantics. Two significant theoretical constructs from cognitive linguistics play a central role in the semantic analyses in this book, both of which

[2] Some parts of the representations used in this book are not geometric or graph-structural; but much of the linguistic analysis depends on the parts that are.

distinguish it from truth-conditional approaches. These constructs are semantic frames and construal, discussed in the following sections.

1.3 Semantic frames

The notion of a SEMANTIC FRAME (Fillmore 1982, 1985; Croft and Cruse 2004, chapter 2) was already referred to in comparing Figures 1.1c–d to Figures 1.1a–b. In frame semantics, a semantic representation of a concept denoted by a word or construction must include also a presupposed, "background" semantic structure in which the concept is embedded. For example, the concept UNCLE denotes a person, but it can only be understood in a semantic frame that defines kinship relations between Ego and the person denoted by UNCLE (and moreover, the kinship relations defined by a particular culture: for example, many cultures make a sharp distinction, linguistic and cultural, between what English speakers would call a maternal uncle and a paternal uncle). A simple example from event structure is the complement-taking verb *start* (*to* VERB): *start to* VERB denotes the inception phase of an event but presupposes that the next phase is one of the event occurring (for at least a little while), and also that the preceding phase is one of the event not occurring. In Cognitive Grammar, the term PROFILE (n.) is used for the concept denoted in the semantic frame, and PROFILE (v.) for the denotation process or mapping (Langacker 1987: 183–9, 2008: 66–70). I will use this conveniently polysemous term as a synonym for 'concept' (n.) and 'denote' (v.).[3]

Fillmore argues that frame semantics is not truth-conditional. Two different words can denote the same referent in truth-conditional terms but differ semantically because the semantic frames invoked by the two words are different. For example, LAND and GROUND appear to denote (profile) the same thing, but against different frames: LAND profiles the dry surface of the earth in contrast with SEA, but GROUND profiles the same thing in contrast with AIR. So for example, a bird that *spends its life on land* does not go into the water, but a bird that *spends its life on the ground* does not fly (Fillmore 1982: 121). The reason that the meanings of LAND and GROUND are not truth-conditional is not because of what is presupposed for the two concepts, but what is left out. In a sense, what is presupposed for any landscape term such as LAND or GROUND is both SEA and SKY: all three form a semantic domain for basic terrestrial categories. What distinguishes LAND from

[3] The term 'domain' is also used for 'frame' in Cognitive Grammar and in cognitive linguistics in general (e.g. Lakoff 1987); Cognitive Grammar also uses the term 'base' for 'frame' in contrast with the 'profile'.

GROUND is the absence of SKY in the semantic frame of the former and the absence of SEA in the semantic frame of the latter.

Hence, being presupposed by a concept is not a sufficient condition for a semantic structure to be part of a semantic frame for the concept. It might be argued that nor is it a necessary condition. Lakoff (1987, chapter 4), following proposals in Fillmore (1975, 1977*b*, 1982), argues that many concepts are defined in terms of an 'idealized cognitive model' (ICM) which functions as the semantic frame for that concept. For example, the concept of 'bachelor' is best understood in terms of an ICM or semantic frame of an adult, unattached, unmarried, independently living, heterosexual male (Fillmore 1975: 128–9, 1977*b*: 68–70). Hence individuals who are difficult to categorize as bachelors—the Pope, Tarzan, a homosexual, someone living with his girlfriend, or a forty-something still living with his mother—are problematic not because they do not fit the concept of 'bachelor', but because the semantic frame of their social and/or sexual circumstances does not fit the ICM of 'bachelor'. One might argue that these additional properties of the ICM are not presupposed by the definition of 'bachelor'. But it can equally be argued that in fact the features in the definition of 'bachelor'—'unmarried', 'adult', and 'male (heterosexual)'—presuppose the sort of social and sexual assumptions in the ICM. The categorization problem is not with the concept and its frame, but in the "fit" of the semantic frame with reality: reality allows for more varied situations than the ICM assumes (Fillmore 1977*b*: 69, 1982: 117–18).

A similar point is made by Searle (1979). He discusses examples such as the directive *Give me a hamburger, medium rare, with ketchup and mustard, but easy on the relish*, and wonders:

> Suppose for example that the hamburger is brought to me encased in a cubic yard of solid lucite plastic so rigid that it takes a jack hammer to bust it open, or suppose the hamburger is a mile wide and is "delivered" to me by smashing down the wall of the restaurant and sliding the edge of it in. (Searle 1979: 127)[4]

In other words, we vastly underestimate how much semantic structure is actually presupposed in the semantic frame of concepts. It is more plausible to conclude that being presupposed for a concept is indeed a necessary condition for belonging in the semantic frame (though not a sufficient condition). Most seeming counterexamples are instances of a mismatch between the conceptualization presupposed by the semantic frame of a concept and the diversity in our actual experience of reality.

[4] For analogous, equally amusing examples, see Winograd (1980: 231) and Langacker (1988: 16).

One clear exception to the general observation that semantic structure in a semantic frame is presupposed by the profiled concept is evaluative components of meaning. For example, the antonym pair STINGY–GENEROUS has the opposite evaluation of the poles of the opposition as the antonym pair THRIFTY–WASTEFUL (Fillmore 1982: 125). At most one can argue that some value on an evaluative dimension, possibly just a neutral value, is presupposed for the concept profiled by a linguistic expression. The evaluative dimension is also not truth-conditional—it can vary under different conceptualizations of the same situation.

In sum, the deviation of frame semantics from truth-conditional semantics is the result of recognizing presuppositions in the semantic representation of concepts—but only selected presuppositions, for only an idealized conceptualization of actual human experience, occur in semantic frames. Nevertheless, this addition to semantic representations is necessary to characterize the full range of meaning and use of linguistic expressions.

1.4 The question of construal

The second important theoretical construct that takes us away from truth-conditional semantics is the notion of conceptualization or construal (Croft and Cruse 2004, chapter 3). The importance of conceptualization or construal (treated as synonyms here) is generally assumed in cognitive and other approaches to semantics (e.g. Croft and Cruse 2004: 40; Langacker 2008: 55) but rarely defined. A CONCEPTUALIZATION or CONSTRUAL is simply a semantic structure for an experience. I will take 'experience' to refer to some aspect of the real world, or more accurately our human apprehension of it, and 'meaning' or 'semantic structure' to refer to a way of representing that experience that is relevant to linguistic formulations for that experience. Of course, all of the terms used in the preceding sentence have centuries of philosophical discussion behind them. For the purposes of this book, which is about the relationship between linguistic form and meaning, I must simply leave those debates unresolved.

The most salient characteristic of construal is that the same experience may be construed in alternative ways. An extreme example of alternative construals that is relevant to the linguistic constructions discussed in this book is given in (7)–(8) (Croft 1991: 163):

(7) John was sick.

(8) The virus attacked John's throat, which became inflamed, resulting in laryngitis, until the immune system succeeded in destroying the infection.

Examples (7) and (8) can describe the same situation. Example (7) construes the situation as a transitory state attributed to a person. Example (8) construes the same situation as a sequence of dynamic events involving a range of entities, none of which is the person, although some entities constitute parts of the person. In other words, the very choice of participants and the aspectual character of the situation are subject to construal. It is this characteristic of construal that makes construal non-truth-conditional in the usual sense: the truth conditions of the semantic structure, e.g. whether the situation is stative or dynamic, is not a fixed, inherent property of the real-world experience.

A simpler example allows us to illuminate two other properties of construal:

(9) a. The rose window is above the main entrance.
b. The main entrance is below the rose window.

In (9a–b), the two sentences could be used to describe the same situation. They differ lexically in that (9a) uses *above* and (9b) uses *below*, and correspondingly, the subject of (9a) denotes the rose window and that of (9b) denotes the main entrance.

Sentences (9a–b) appear to be truth-conditionally equivalent but not equivalent in a conceptual semantic sense. Each sentence imposes a FIGURE–GROUND asymmetry on the objects in the spatial scene (Talmy 1974): one object is taken to be the object to be situated (the figure) and the other serves as the reference point (the ground). But the figure–ground orientation differs in the two sentences: in (9a) the window is the figure and in (9b) the entrance is the figure. This figure–ground reversal is a conceptual distinction that is encoded in the lexical and grammatical differences, and the two sentences would have different distributions in discourse. However, a speaker has no choice in the matter: she must choose (9a) or (9b), or some other construction which would impose a different conceptual construal; she cannot avoid the choice.

We can therefore characterize construal as a conceptual semantic structure with the following characteristics:

(10) a. There are multiple alternative construals of an experience available.
b. A speaker has to choose one construal or another; they are mutually exclusive.
c. No construal is the "best" or "right" one out of context.

The existence of alternative construals that are truth-conditionally equivalent, such as the figure–ground reversal in (9a–b), poses a challenge to truth-conditional formal semantic approaches. One can introduce elements into the model, and corresponding formulae in the logical calculus, that correspond to the conceptual distinction of figure–ground, or that correspond to differences

in discourse structure (information structure) that would differentiate (9a) and (9b). This would remain a formal, model-theoretic semantics, but it would no longer be truth-conditional in the usual sense of the term, since the conditions would now depend on conceptual (cognitive) or discourse differences.

The notion of alternative construals has also been extended to apply to examples like those in (11a–b):

(11) a. But reading to a **dog** isn't so scary. It won't judge, it won't get impatient, it won't laugh or correct if the child makes a mistake. [www.cnn.com/2009/LIVING/10/22/dogs.irpt/, accessed 1 June 2011]

b. When you're 6 or 7 years old, that's quite a lot of **dog** bearing down on you.

[Margaret W., on a dog that put its front legs on her shoulders, 2/16/94]

In (11a–b), the same word, *dog*, is used in two different grammatical constructions: (11a) uses a "count noun" construction with the indefinite article (*a* __) and (11b) a "mass noun" construction with a bare noun phrase (lacking an article). The first is thought of as the more typical construal of the noun, referring to an individual of the species. The second construal is less typical (but in fact rather common in spoken English), referring to an associated scalar property of the individual, in this context the dog's weight. In these examples, there is a subtle semantic shift that will lead to truth-conditional differences, but it appears that English *dog* is sufficiently semantically flexible (in spoken English at least) that either use is acceptable.

The reason that the contrast in (11a–b) is considered to be an example of construal is that the semantic difference between the two uses of *dog* is identical to the semantic difference between *leaves* and *foliage* in (12a–b):

(12) a. The **leaves** are pretty.
b. The **foliage** is pretty.

Sentences (12a) and (12b) can be used to describe the same scene, but they construe it differently: *leaves* in the Plural Counting construction in (12a) construes it as an aggregate, while *foliage* in the Bare Singular mass construction in (12b) construes it as a homogeneous mass. But the semantic contrast in (12a–b), using different words (*leaves* and *foliage*) is the same semantic alternation that is found in (11a–b), where the same word is used (*dog*). Thus the difference between at least some count and mass uses of *dog* is one of construal in the sense illustrated in (7)–(9) and characterized in (10).

In fact, *leaves* and *foliage* are not fully interchangeable across their range of uses. If one does a web image search on 'leaves', one finds many photos of

leaves detached from a tree and on the ground; if one does a web image search on 'foliage', one finds many photos of trees taken at such a distance that individual leaves are beyond perceptual acuity. However, this is true of *above* and *below* as well. There are also examples where *X is above Y* and *Y is below X* are not perfectly interchangeable either:

(13) a. The smudge is just below your left eye.
b. ??Your left eye is just above the smudge.

The differences in the distributional possibilities of the pairs of examples given above (*leaves* vs. *foliage*; *above* vs. *below*) provide evidence that there is indeed a conceptual semantic difference between the two constructions in the cases where they are applicable to the same situation in the world (or in our experience, if you prefer). For example, the web image searches support the introspective judgment that *leaves* construes the situation as a collection of discrete countable entities (hence *leaves* can be used for a collection of detached leaves on the ground), and that *foliage* construes the situation as a homogeneous mass (hence *foliage* can be used for scenes in which individual leaves are not perceptually distinguishable).

What is the relationship between a conceptualization/construal that is relevant to language, and "reality" (in a truth-conditional sense) or experience? The best analysis, in my opinion, is that human beings have a rich and detailed understanding of a fine-grained array of particular SITUATION TYPES in their experience, and that each situation type has AFFORDANCES (in the sense of Gibson 1979) or POTENTIAL for the alternative construals that are found in the words and constructions that are used for the scene (or are considered acceptable in introspective judgment; Croft 2011: 128). The particular words and constructions used to verbalize a particular scene highlight or draw out certain details over others in the rich understanding we have of those particular scenes. As analysts, we can exploit the range of situations that particular words or constructions are used for in order to infer the conceptual semantic difference between them.

Thus, the geometric representations that are found in this book represent a construal of the experience conveyed by a particular utterance. A formal semanticist could treat the geometric representation as the model, as suggested in §1.2 (and supply a logical calculus for the model). If so, then the model-theoretic semantics is not truth-conditional, since the model includes the construal operations that take one from the rich structure of the situation type to the structure found in the geometric representation.

In this approach, the linguistic semantic representation—the construal of a particular situation type for verbalization in a particular utterance—is distinct from a "general" conceptual representation, though derivable or at least

motivated by the latter. In this respect I follow linguists such as Langacker (1976, 1987, 2008), but not Jackendoff (1990).[5]

Morphologically, the examples of construal given above fall into two types. The first, represented by *above* vs. *below* and *leaves* vs. *foliage*, represents LEXICALIZED CONSTRUAL: distinct forms are associated with distinct conceptual semantic construals of a situation. The second, represented by the use of the single word *dog* in two different constructions, is an example of what has been called COERCION or CONVERSION: the same form (e.g. *dog*) is used in two different contexts (grammatical constructions in the case of (11a–b)) with the intended alternative construal required by the context. Coercion/conversion is a common phenomenon in English: English words are quite flexible grammatically. We will observe this phenomenon frequently in both aspectual and force-dynamic alternations of predicates in English.

Other languages do not allow the same degree of grammatical flexibility for their lexical items as English does (and English in turn is not as flexible as yet other languages). Instead, derivational morphology and/or a periphrastic construction is used to obtain the alternative construal. For example, to return to the alternative count/mass construals, Russian (14) and Turkana (15) use a singulative derivational suffix in a number of cases where the English translation equivalent undergoes conversion:

(14) soloma 'straw'/solom**ink**a 'a straw'

(15) **ŋi**-tùrkanà 'the Turkana'/**e**-turkanà-**ɪt** 'a Turkana'

As with lexicalized construal, the same conceptual semantic distinction is being made in those languages in which conversion is not grammatically acceptable. English also is quite variable in the constructions that are allowed: for example, *hair* occurs in either a mass construal or a count construal (*a hair*), but *grass* requires a part noun to occur in a count construction (*a blade of grass*). Even *hair* allows an option with a part noun (*a strand of hair*). Since the same conceptual semantic distinctions are involved, I include these examples of DERIVATIONAL CONSTRUAL as examples of construal.

The distribution of conversion, derivational construal, and lexicalized construal within and across languages is partially arbitrary but also partially semantically motivated. The focus of this work will be more on establishing the conceptual semantic distinctions and less on the distribution of the

[5] It may be more accurate to say that Jackendoff concerns himself solely with the already-construed linguistic semantic representation, and does not concern himself with the relationship between that representation and the "real world"; see, e.g., Jackendoff (1991: 10–12). However, this presupposes that the linguistic semantic representation is the sole one used for all types of cognition, not just language; see Slobin (1991) for an opposing view.

morphological reflexes of those distinctions, except where the latter help to define lexical semantic classes of events that are grammatically relevant across languages.

The scope of construal and constraints on construal can be described in three general principles (Croft 2007: 367). The first defines the scope of construal: construal serves THE INTERLOCUTORS' GOALS IN THE DISCOURSE. That is, speakers construe their experience according to their goals in the discourse. This principle allows a high degree of flexibility in construal, whether morphologically overtly coded or not. For example, as we have seen, even clearly discrete individuals such as dogs can be construed as a homogeneous mass if the speaker's goals in discourse demand it.

The second and third principles provide constraints on construal. The second is that the NATURE OF REALITY limits construal, or at least favors some construals over others. It is far easier to construe a dog as a discrete individual entity than as a homogeneous mass. The nature of reality is part of what gives us the introspective judgment out of context that *dog* is a count noun. It also determines that this DEFAULT CONSTRUAL is the most frequent in discourse. Finally, it plays an important role in determining the grammatical behavior of the word (for example, that *dog* does not require a unit noun in English). The fact of default construals, and the crosslinguistic universals about the grammatical encoding of discrete biological entities like dogs, is missed by analyses where the word *dog* is semantically neutral between a count and a mass construal (see also Croft 2001: 119–24; and §3.2.1).

The third and final principle is that construals associated with a lexical item are also limited by CULTURAL CONVENTIONS of the speech community: some construals and not others are grammatically conventionalized (this is called 'conventional imagery' in Langacker 1987: 39). This leads to the (partial) arbitrariness of the distribution of morphological reflexes of alternative construals. For example, it is true in English and many other languages that entities whose individual units commonly occur in an aggregate and are otherwise at the edge of perceptual acuity, such as rice, grain, grass, and hair, are grammatically mass and require a unit or piece noun to be construed as countable individuals. Nevertheless, some of such nouns can undergo conversion in a Counting construction in English, as in *a hair*; and in other languages the number of such nouns that can undergo conversion is larger. These are a result of conventions of the speech community. The conventions of the speech community are generally influenced by the nature of reality, hence the partial semantic motivation of such conventions; but they are also partly arbitrary, especially where the nature of reality does not strongly define a default construal, as with aggregates whose units are at the limits of perceptual acuity.

These three principles largely account for the variability of the grammatical expression of lexical concepts, both within and across languages (Croft 2007: 363–73).

1.5 Argument structure constructions and grammatical relations

The preceding sections, and the overall approach in this book, focus on the semantic representation of event structure. Of course, the linguistic point is that the particular semantic structures presented here are the ones necessary for understanding the grammar of clauses in human languages. Thus something has to be said about the approach to grammar taken in this book. In fact, the grammatical theory used in this book matters less for the analysis than the approach to so-called grammatical relations that will be taken here.

The general approach taken in this book is CONSTRUCTION GRAMMAR (Fillmore, Kay, and O'Connor 1988; Fillmore and Kay 1993; Kay and Fillmore 1999; Goldberg 1995, 2006; Croft 2001; Croft and Cruse 2004, chapters 9–11). In construction grammar, complex, "abstract" (SCHEMATIC) syntactic structures such as the Transitive construction as well as concrete lexical items such as *kiss* are pairings of form and meaning. Constructions are (possibly complex, i.e. syntactic) pairings of form and meaning that are autonomous entrenched units in a speaker's knowledge about her language. As noted in §1.2, in construction grammar the pairing of form and meaning of individual syntactic structures is taken as primary, rather than the strict division into syntactic and semantic components assumed in generative theories. (And in generative theories, linking rules, realization rules, and interfaces between components are necessary anyway to capture the same linguistic facts.)

The unpredictability of a formal or functional property of a construction from other grammatical units is sufficient to establish the autonomy of a particular construction (Goldberg 1995: 4; Croft 1998*b*). However, many construction grammarians argue that unpredictability is not a necessary condition for autonomy. An otherwise predictable grammatical structure may be entrenched if it is used frequently enough. This approach to construction grammar, and to grammatical representation in general, is called the USAGE-BASED approach (e.g. Bybee 1985, 2001, 2007; Langacker 1987).

The empirical linguistic generalizations that we offer explanations for in this book pertain chiefly to two families of constructions. The first are TENSE–ASPECT CONSTRUCTIONS, which range from inflectional affixes to periphrastic constructions such as the English Progressive as in *They were playing marbles*. The second family of constructions, ARGUMENT STRUCTURE CONSTRUCTIONS, are more complex and their analysis is more controversial. These

constructions encode the semantic participant roles of the event encoded by the predicate: case marking of the argument phrases, indexation of (agreement with) argument phrases, and, where used for this purpose, word order of argument phrases in simple Declarative clauses:

(16) a. **She** kissed **him**. [Subjective and Objective case forms of pronouns]
b. She loves birds. [indexation of *She* by the predicate]
c. **The boys** ate **the pizza**. [preverbal position of *The boys* vs. postverbal position of *the pizza*]

The constructions in (16a–c)—case marking, indexation, and word order of arguments—have been called CODING CONSTRUCTIONS for grammatical relations (Keenan 1976), because they directly encode the argument roles that are traditionally used to define grammatical relations: any time an argument role is realized, the coding construction(s) of the language must be employed. The coding constructions are the ones that are explicitly or implicitly assumed in most of the research on argument realization.

Most discussion of grammatical relations, both inside and outside of generative grammar, in addition make reference to other classes of constructions, including the constructions illustrated in (17):

(17) a. **She**$_i$ picked up the box and **Ø**$_i$ set it on the table. [null argument, and its coreference with preceding argument]
b. They wanted **Ø** to go to Santa Fe. [null argument of Infinitive]
c. **They**$_i$ congratulated **themselves**$_i$. [coreference of Reflexive argument]

The constructions illustrated in (17a–c), and others like them, have been called BEHAVIORAL CONSTRUCTIONS (Keenan 1976). Unlike the coding constructions, behavioral constructions perform other semantic and discourse functions than the encoding of arguments: for example, reference tracking, building a possible world or mental space, and coreference in (17a–c) respectively. Hence, the constructions in (17a–c) only indirectly categorize arguments into categories that are often labeled 'Subject', 'Object', etc., in terms of the restrictions on the range of fillers of the syntactic roles in these constructions. For example, the reference-tracking construction in (17a) is restricted to a single argument role in both the first and second clause, which in English is largely the same as the role encoded as Subject by the English coding constructions. Since behavioral constructions perform other functions than the encoding of arguments, the distributional facts about behavioral constructions, both within and across languages, are determined by other factors than those that determine the coding of arguments. This fact, discussed further immediately below, falls out naturally in the construction grammar framework, in which constructions are form–meaning pairings: a

morphosyntactic schema combined with its associated semantic/discourse interpretation.

Grammatical relations in the usual sense—Subject, Object, possibly Indirect Object, Oblique—are argued to be grammatical categories that cut across different construction types. In this view, grammatical relations are GLOBAL—cross-constructional—syntactic categories, and hence are independent of the constructions which refer to them. In this view, a variety of constructions, both coding constructions and behavioral constructions, have been used to justify the assignment of particular participant roles of particular predicates to a specific grammatical relation, both within and across languages. For example, an argument is said to be Subject in English not only because of its role in coding constructions (its coding properties), but also because the Subject is the null argument in the Coordination and Control constructions in (17a–b), and a Reflexive form cannot occur in the Subject role; see (17c).

The existence of grammatical relations has often been questioned for a number of reasons. Crosslinguistically, there is a huge degree of variability in which participant roles are grouped together, and which constructions group grammatical relations in which way. The best-known phenomenon is that of ERGATIVITY, in which the "intransitive Subject" is grouped with the "transitive Object" instead of with the "transitive Subject", by coding and/or behavioral constructions (see, e.g., Comrie 1978; Dixon 1979, 1994; Croft 1991, chapter 1; Croft 2001, chapter 4; §6.3.1). This crosslinguistic variability has led many typologists to avoid using the categories "Subject" and "Object" at least in practice, and has led some to deny that Subject and Object are UNIVERSAL categories—that is, valid for all languages, or at least valid across most languages.

Instead, typologists have analyzed the observed crosslinguistic variation and proposed a variety of universals constraining that variation. The analysis of variation requires the development of analytical tools that can capture that variation. For example, instead of referring to "transitive Subject" and so on, with the categorization implicit in using the term "Subject" for intransitive and transitive arguments, typologists use the labels S, A, and P (or O) for the cluster of participant roles for the single argument of intransitive predicates, the "first" argument of transitive predicates, and the "second" argument of transitive predicates respectively (Comrie 1978; Dixon 1979).

Further research showing that a significant number of languages split the coding of intransitive roles grammatically led to the terminology of ACTIVE (for the roles coded like A) and stative or INACTIVE (for the roles coded like P). Still other research demonstrating that "direct object" and "indirect object" roles of ditransitive predicates vary across languages as to which one is grouped with the P role of transitive predicates led to further labels splitting

the roles, so that ditransitive predicates have roles labeled T (for the "theme"-like role) and G or R (for the "goal" or "recipient"-like role; Croft 2003*a*: 143). Likewise, the variation in the ways in which different constructions group S, A, and P (or P, T, and G, or active and inactive), led to the categorization of constructions in terms of coding constructions and behavioral constructions referred to above.

These more fine-grained classifications of roles and constructions allow for the formulation of universals encoding these roles. For example, using the categories S, A, and P allows one to formulate the universal that in languages with ergative coding constructions (where S+P are grouped against A), the absolutive role (S+P) is typologically unmarked compared to the ergative role (A), in the same way that the nominative role (S+A) is typologically unmarked compared to the accusative role (P) in languages with accusative coding constructions (Croft 2001, chapter 4, 2003*a*, chapter 5). Moreover, both of these typological patterns have the same explanation: the category with the higher token frequency is typologically unmarked (Croft 2001, chapter 4, 2003*a*, chapter 5).

In fact, these standard operating practices among typologists are only the first step toward an ever more fine-grained analysis of both constructions and semantic participant roles that has emerged in research on semantic roles and in construction grammar. The somewhat more fine-grained classification of roles into S_{active}, $S_{inactive}$, A, P, T, and G is insufficient to capture the full range of grammatical diversity. For example, as noted above, the encoding of the participant roles in a mental event (emotion, cognition, and perception) is systematically variable across languages: the mental experiencer is often in a Dative or other Object-like form, while the external stimulus may or may not be encoded like a Subject (A or S; see §6.2.3). One might then add labels E for experiencer and S for stimulus. Yet in some languages, the special coding of experiencers is found only with emotion predicates, but in others for emotion, cognition, and perception predicates; or only with subclasses of these predicates. In other words, sooner or later one would have to define grammatical roles for very narrow classes of predicates, if not for each individual predicate.

Research on semantic roles points in the same direction. Highly general semantic roles such as agent, patient, theme, and goal (also known as THEMATIC ROLES) came to be seen as inadequate for providing an account of the semantic motivation for argument structure. The detailed analysis of the distribution of English predicates across different argument structure constructions in Levin (1993) gives a very fine-grained classification of predicate semantic classes. Yet close examination of Levin's categories shows that grammatical behavior is not entirely uniform even in her fine-grained classes.

Some scholars working on argument realization came to the conclusion that the best analysis was to start with semantic roles specific to individual predicates (see, e.g., Dowty 1991; Goldberg 1995), now generally called PARTICIPANT ROLES. Hence the analysis of both "grammatical" roles in typology—more precisely, groups of semantic roles that are useful for crosslinguistic generalization—and semantic roles in the analysis of argument realization have converged on the same conclusion: one must start from roles defined in terms of very narrow predicate semantic classes, possibly individual semantic predicates.

Meanwhile, the variation in categorization of "grammatical relations" by constructions that was observed across languages was also observed across different constructions in the same language. This fact challenges the still extremely widely accepted notion that grammatical theory must posit a theoretical notion of GRAMMATICAL RELATION/FUNCTION that is valid across all constructions of the language (i.e. is globally defined). This appears to be the case for a language like English, in which coding and behavioral constructions all appear to refer to the same categories, Subject (A+S) and Object (P), as in (16a–b); "minor" differences in distribution patterns are generally ignored. Yet positing global and/or universal grammatical relations obscures the real crosslinguistic universals that demand an explanation. For example, an approach that assumes a universal category of Subject (A+S) will miss the parallelism in typological unmarkedness between nominative and absolutive described above.

Despite the missed universals, the effort to posit global or universal grammatical relations continues. Languages with ergative coding constructions, such as case marking or indexation, appear to invalidate the hypothesis of universal grammatical relations. Closer investigation of many (but not all) of these ergative languages showed them to have behavioral constructions that defined roles in an accusative pattern. These languages were initially described as "morphologically" or "superficially" ergative, but "syntactically" or "deeply" accusative (Anderson 1976). At least one language, Dyirbal (Dixon 1972), has ergative patterning for behavioral constructions as well.

The universality of Subject (A+S) and Object (P) is still challenged by languages such as Dyirbal. Also, the "morphologically" ergative languages still pose a problem of their own: there is no globally defined grammatical relation in those languages, since the coding constructions pattern ergatively while the behavioral constructions pattern accusatively. The analysis that treats ergativity in these languages as merely "morphological" or "superficial" essentially ignores the conflicting data and retains the assumption that there exists a single global (cross-constructional) set of grammatical relations. Another approach recognizes the difference but reifies it by positing different levels or categories of "grammatical relations". For example, Dixon introduces the

category or level of 'syntactic pivot' for biclausal constructions such as Coordinate, Purpose, and Relative clauses (Dixon 1979, 1994). For Dixon, in "morphologically" ergative languages the syntactic pivot is A+S (vs. P), even when the arguments are coded ergatively (S+P vs. A). In "syntactically" ergative languages, the syntactic pivot is S+P, as is the argument coding.

However, there is more variation in the grouping of A, S, and P than can be handled by a simple division between syntactic pivot and argument coding. For example, in some languages (e.g. Warlpiri and Enga), case marking is ergative while indexation is accusative. Role and Reference Grammar posits another level, 'syntactic controller', to allow for this difference, analogous to using syntactic pivot for biclausal constructions (which they also adopt; Van Valin and LaPolla 1997: 274). But there are also different patterns in different biclausal constructions in the same language. One would eventually have to posit a separate set of "grammatical relations" (pivots, controllers, etc.) for each construction. In fact, more recently Van Valin allows for a language to have multiple 'privileged syntactic arguments' in Role and Reference Grammar, if different constructions in a language define different categories for the construction's "grammatical relations". He nevertheless treats 'privileged syntactic argument' as a construction-independent theoretical construct, which need not be unique in a language (Van Valin 2005: 99).

But positing more levels or more construction-independent categories is not a fruitful way to analyze the phenomenon or capture the empirical generalizations. A more fruitful way is to abandon the notion of global grammatical relations (or other syntactic categories), and accept that each construction defines its own category. Then one can ask the question: What generalizations are there constraining the variation in what seem to be the "same" type of category (e.g. categorization of A, S, and P) across constructions and across languages? This is the approach taken in much typological work and in Radical Construction Grammar, a model of grammar that is built on the results of typology (Croft 2001; see also Barðdal 2006).

By abandoning global as well as universal grammatical relations, one can find still more language universals. There are implicational universals that constrain the possible groupings of roles in particular constructions (Croft 1991, chapter 1, 2001, chapter 4, 2003*a*, chapter 7; Kazenin 1994). For example, if case marking follows an accusative pattern, so does reference tracking in Coordination (Croft 2001, chapter 4). Many of the constructions invoked to try to find global grammatical relations in fact conform to a Subject Construction Hierarchy: if a language has an accusative pattern for a construction on the hierarchy, then it has an accusative pattern for all constructions to the left of it on the hierarchy (Croft 2001: 155):

(18) *Subject Construction Hierarchy:*
Coordination < Purpose clause < Relative clause < Indexation < Case marking

In other words, grammatical categories must be defined one construction at a time: the same language may, and usually does, use two different categories for two different constructions. Crosslinguistic universals are found in the hierarchical relationship among constructions, not some global (cross-constructional) grammatical relations, pivots, controllers, or privileged syntactic arguments.

Since "grammatical relations" are construction-specific, this book is about the semantic factors underlying argument structure constructions—the constructions that encode participant roles for events—and not other types of constructions that make reference to some grouping or categorization of participant roles for other purposes such as reference tracking. The coding of participants in events is a large enough and central enough topic in itself. Every clause instantiates an argument structure construction, so these constructions are among the most frequently used in language. And there is a huge semantic range of predicate types, which leads to a complex and rich mapping between participant roles and the relatively small number of ways to encode those participant roles grammatically. The complexity of this mapping requires us to start from event-specific participant roles in order to develop a theory of how the semantics of those participant roles motivates the grammatical patterns in argument realization observed in human languages. Just as we must avoid reducing language-specific facts about predicate–argument relations to global "grammatical relations", we must avoid reducing crosslinguistic facts to universal "grammatical relations".

Again, there are important crosslinguistic generalizations about participant roles that are missed by trying to reduce typological diversity to global grammatical relations or functions. For example, the German verb *helfen* 'help' takes an "Object" in Dative case. *Helfen* can be passivized, but the Dative case remains on the argument phrase: *ihr* [DAT]/**sie* [NOM] *wird geholfen* 'she was helped' (Blume 1998: 254). Blume cites a generative analysis which treats the Dative argument phrase of *helfen* as an Object (in the Active voice) that simply has idiosyncratic case assignment which is preserved in the Passive voice. But as Blume notes, in many languages in her study (German, Hungarian, Polish, Romanian, Tongan, and Samoan), the translation equivalent of 'help' also takes a Dative "Object". This fact demands an explanation (see §6.4.1).

Haspelmath (2001) compares the behavior of Dative experiencer constructions in German and Lezgian. These are constructions in which the semantic

role of experiencer of a mental event (perception, cognition, and emotion) is encoded in the Dative case. Haspelmath observes that the Dative experiencer may be the implicit argument in Complement clauses in Lezgian, but not in German (Haspelmath 2001:69–70; however, contrast Eythórsson and Barðdal 2005: 853–60):

(19) gadadi -z [Ø ruš akwa -z] k'an -zawa
boy -DAT [Ø(DAT) girl(ABS) see -INF] want -IMPF
'The boy wants to see the girl.'

(20) *Frau Oberhuber möchte [Ø(DAT) ihr Schwiegersohn gefallen]
Ms O. wants [Ø(DAT) her son.in.law like:INF]
'Ms Oberhuber wants to like her son-in-law.'

Haspelmath writes, 'this is an argument in favor of the subject status of the experiencer in Lezgian, but against its subject status in [German]' (2001: 70). But in both languages (and many others), there is a recurrent pattern of the Dative case encoding the experiencer of mental events, regardless of how the experiencer behaves grammatically in other constructions. There is no global or universal category "Subject", but the crosslinguistically recurrent Dative experiencer demands an explanation (see Barðdal 2006; and §§6.2.3, 7.4.1).

Polinsky (1995) examines the Benefactive Applicative in Kinyarwanda, a construction in which a derived verb form (suffix *-i* in example (21)) takes two "Object" argument phrases after the verb: one is a beneficiary and the other is the patient of the base verb form. It had been argued that in terms of behavioral constructions, the Kinyarwanda Benefactive Applicative has two "Objects" (see Peterson 2007: 55). But Polinsky observes that only the patient can control a zero anaphor in the subsequent clause (Polinsky 1995: 151; Peterson 2007: 55):

(21) umutuuranyi y- a- zan -i -ye umugore umugabo
neighbor 3SG- PST- bring -APPL -PRF woman$_j$ man$_k$
Ø$_{k/*j}$ a- r- iishim -a
Ø$_{k/*j}$ 3SG- PRS- be.happy -IMPF
'The neighbor brought the man to the woman and the man/*woman is happy.'

On the basis of this construction, Polinsky argues that the patient and beneficiary have different grammatical relations (Direct Object and Indirect Object respectively). Yet this does not explain why consistently across many languages, both beneficiary and patient in Benefactive Applicative constructions are coded in the same way. (In fact, as Peterson observes, the Kinyarwanda pattern is not universal: beneficiary and patient differ in their

occurrence in various behavioral constructions across languages; Peterson 2007: 51–60, 145–51.) Again, this crosslinguistically recurrent pattern demands an explanation (see §§6.4.3, 7.4.3).

It is not the case that Complement constructions and cross-clausal reference-tracking constructions are uninteresting in themselves. But they are different constructions with different functions. Invoking behavioral constructions in order to posit global grammatical relations obscures the real crosslinguistic generalizations about coding constructions that are illustrated in the preceding paragraphs. The distribution patterns of behavioral constructions simply call for different explanations than the explanations required for the coding constructions that serve the function of argument realization.

The examples in the preceding paragraphs indicate that a primary semantic motivation for argument realization in coding constructions is event structure. However, it is not the only semantic determinant. In many languages, the animacy of the participant and/or its definiteness (referentiality) play a major role in the realization of arguments, especially "Object"-like arguments. Animacy and definiteness are most likely conventionalized construals of topicality, that is, referent prominence in discourse (Cooreman 1987; Thompson 1994; Croft 2001:314–19). These and other semantic and discourse-functional factors will not be discussed in this book, except as they interact with event-driven generalizations about coding constructions (see, e.g., §6.3.2).

One salient property of a constructional syntactic representation is that it provides a holistic syntactic structure. For example, the Caused-motion construction (Goldberg 1995) has the structure [Sbj MotionVerb Obj Path-Prep Obl], which includes a role for the predicate and for the combination of the three argument phrases. The semantic analysis presented here supports such a representation in at least two respects (see also Goldberg 1995; Fillmore and Kay 1993). It is argued here that argument structure is primarily determined by event structure and the roles of the participants in event structure. Events are, of course, encoded by the predicate. Furthermore, it is not the semantic role of each individual participant that determines its argument realization but the semantic relationship between participants in an event, chiefly their causal interactions. Hence one must look at the argument structure as a whole—not just which participant is coded as Subject but also its semantic relation to which participant is encoded as Object or Oblique—in order to understand why each participant is encoded in the way that it is. These properties of events and argument realization will be discussed in chapters 5–9 of this book.

The hypothesis that constructions exist and have meanings does not entail that the semantics of constructions drives the semantic construal of event

structure, however. The analyses to be presented in this book do not assume that events are neutral as to their causal or aspectual construals, or that those construals are entirely determined by the aspect and argument structure constructions they occur in. As was argued in §1.3, conceptual content has its basis in a rich representation of experience (or "reality") that gives rise to alternative construals for discourse goals, constrained by the conventions of the speech community (see chapter 9).

Nor do I assume that constructions lack meaning and simply reflect the meaning of polysemous predicates. The relationship between verbs and argument structures (and tense–aspect constructions) varies from verb to verb and from argument structure to argument structure. The one certain starting point for the linguistic analysis of verbs, aspect, and argument structure is that speakers do not encounter verbs outside of the constructions they occur in, nor do they encounter aspect or argument structure constructions without their being instantiated with a particular verb. On the basis of this exposure, and the context of communication, speakers develop more schematic representations of verbs and constructions, following the usage-based approach to language acquisition and grammatical organization (e.g. Tomasello 2003; Lieven and Tomasello 2008). How speakers form more schematic representations of verbs and constructions is a problem that requires psycholinguistic experimentation to fully resolve (Croft 1998*b*); it cannot be resolved purely by the crosslinguistic and language-internal syntactic analyses presented in this book. What we can hope to achieve is a model of the semantic structures of the verb-construction combinations that speakers use to communicate their experience of events.

1.6 Language form and language function

Baker (1997: 73–4) contrasts generative and nongenerative approaches to the argument realization problem as a difference in where the complexity is placed in the mapping between form and function. Although I will formulate the contrast here somewhat differently from Baker, much of the following is essentially in the same spirit.

The task is to understand how human beings go from their experience to an utterance that verbalizes that experience. Oversimplifying dramatically—in particular, setting aside interactional motivations for linguistic choices (but see §1.4 and below)—there is assumed to be some sort of linguistic representation between these two extremes, a representation that mediates the symbolic pairing of form and meaning or function. Baker suggests that generative grammar places the complexity between that mediating representation and the morphosyntactic structure of the utterance, that is, in formal syntactic

operations such as transformations. He contrasts the generative grammar approach to nontransformational (monostratal) grammars, in which there is a more direct mapping between the mediating representation and the morphosyntactic structure, and the complexity resides in the lexicon and/or the semantics.

Baker then suggests that in this respect, nontransformational theories 'shade into functionalist approaches, which downplay the existence of syntax as something distinct from semantics, discourse, pragmatics and diachrony' (Baker 1997: 74). Baker misrepresents functionalism here, in a way unfortunately common in formalist writings: virtually all functionalists recognize that morphosyntactic form is distinct from function—that is, semantics, discourse, and pragmatics (Croft 1995: 509–10; Langacker 2008: 5). Functionalists, like formalists, accept that there is arbitrariness in the form–meaning relationship of the linguistic sign.

Baker is however correct to say that for functionalists, like nontransformational grammarians, the complexity is placed at the other end, namely in the relationship between the structure of the experience being verbalized and the mediating representation (for an early presentation of this position, see Langacker 1976). In the particular version developed here, most of the complexity resides in the construal of experience into a linguistic semantic representation. The mapping between elements of a syntactic construction and components of the linguistic semantic representation is quite direct, as in most functionalist and cognitive linguistics approaches. For example, the argument realization rules presented in §5.3.2, mapping the linguistic semantic representation onto the morphosyntactic representation, are very simple. But the way in which experience is construed for verbalization is very complex (Croft 2010*a*). Construal is at the service of the goals of the discourse, but those goals compete with certain preferences in verbalization that are dictated by the nature of reality, and they are limited by the conventions of the speech community. The analytical task in this approach is to figure out which properties of the nature of reality and of human goals in discourse are those that shape grammar, in our case the grammar of aspect and argument structure.

The conventional resolution of competing functional motivations means that the mapping between form and meaning is partly arbitrary. A partly arbitrary mapping is not one that can be fully predicted from semantic and/or discourse structure. At a purely static synchronic level, partial arbitrariness is not much better than complete arbitrariness: everything has to be stipulated, because you cannot be sure what does not need to be stipulated. (Default mappings between form and meaning are really a notational variant of this problem.) So at one level, the constructions discussed in this book are

partly arbitrary pairings of form and meaning—hopefully a useful representation of their meaning—of varying degrees of generality (schematicity) or "abstraction".

But at another level the semantic analysis is not just that. The approach taken here and by most functionalists and especially typologists is to go beyond the purely static synchronic level. In this respect, Baker is again correct: functionalists do not want to separate language structure from its dynamic, diachronic matrix. Language continually evolves through usage; in other words, all of language is diachronic (Heine, Claudi, and Hünnemeyer 1991, chapter 9; Croft 2000; Bybee 2010; inter alia). The linguistic semantic structures and the construal operations that bring them about motivate not just synchronic structures but diachronic processes and their result, namely typological diversity. And typological diversity is still vastly underestimated in most linguistic theorizing, which is far too constrained to account for it. The typologist's objection to formal syntax is not so much that the explanations are "formal", but that those explanations—universal, general constraints on interactions between morphosyntactic structures—simply do not hold up across languages or even within languages for that matter (see, e.g., Croft 2001, 2009*b*). (Even some of the analyses presented in this book are probably too constrained, in part because the crosslinguistic data is not there to allow me to revise them.) Hence the use of quantitative as well as qualitative analyses in some chapters, where the crosslinguistic data is available. Although the generalizations that emerge from the data are not all-or-none, they do appear to be the forces driving the ongoing emergence of the grammatical structures that we observe in the verbalization of experience.

2

The aspectual structure of events

2.1 Introduction

The category of aspect is a notoriously vexing one for semantic analysis, and has a long history (for a general survey up to 1990, see Binnick 1991, and for a survey of more recent literature, see Sasse 2002). A widely quoted definition of aspect is found in Comrie's 1976 survey: Comrie defines aspect as presenting 'different ways of viewing the internal temporal constituency of a situation' (p. 3). This broad definition is essentially correct, in my opinion, but when we turn to specific manifestations of aspect, things get more complicated.

Aspect is manifested both grammatically and lexically. Grammatically, many languages possess inflectional or periphrastic distinctions that modify 'the internal temporal constituency of a situation', such as the distinction between Progressive and Simple Present in English, the distinction between Preterite (Aorist) and Imperfect in several Indo-European languages, and the distinction between Perfective and Imperfective in Russian. Grammatical aspect has been very difficult to define. One reason for this is that the semantic interpretation of the grammatical aspect categories often varies with the class of predicates (verbs and predicate adjectives and nominals) with which they are combined. This variation is generally attributed to differences in the LEXICAL ASPECT (sometimes also called Aktionsart) of different classes of predicates. Lexical aspect is usually taken to be the inherent temporal structure of a situation: some situations such as being Polish are 'naturally' enduring states, while others such as a window breaking are 'naturally' punctual processes, and so on.

Sasse notes that there are currently two broad approaches to aspect, which he calls unidimensional and bidimensional (Sasse 2002: 202–3; see also Michaelis 2004: 9–10). In unidimensional approaches, the semantics of grammatical aspect is the same as the semantics of lexical aspect: grammatical aspect interacts with lexical aspect, but the result is of the same semantic type as lexical aspect. In bidimensional approaches, grammatical aspect is

semantically distinct from lexical aspect; its semantic structure is of a different type (usually characterized as a 'viewpoint' semantics; Michaelis 2004:9).

The approach presented here is basically a unidimensional approach, but with an essential contribution from the bidimensional approach. Our primary interest is with the semantic structure of predicates. However, as noted at the end of chapter 1, predicates always occur in a tense–aspect construction, so the aspectual structure of events has to be inferred from the interpretations of predicates in different tense–aspect constructions. Michaelis argues for a unidimensional approach using an often-invoked analogy to the category of countability in nominal semantics. In analyzing the use of a mass noun such as *orange juice* in a count noun construction as in *I'd like an orange juice, please*, attending to the boundaries of the substance (a glass of orange juice) is achieved with the same construction that is used with lexically count nouns such as *book*, namely the [*a(n)* NOUN] count construction. To capture that generalization, a unidimensional account of countability is necessary (indeed, for countability no bidimensional account has been proposed). The same applies to verbal aspect.

Sasse argues that recent bidimensional approaches are in fact converging on unidimensional approaches: they make reference to boundaries of an event in viewpoint aspect, a semantic property also used in lexical aspect (Sasse 2002:205). But a bidimensional approach (e.g. Comrie 1976; Smith 1997) contributes an important element to the analysis of aspect that should not be overlooked. Events do not have just an inherent aspectual type, as assumed in some unidimensional approaches: the event may be viewed from different aspectual perspectives or viewpoints. This observation is represented in our approach by the phenomenon of construal (§1.4). Construal is a generalization of the idea of different viewpoints or perspectives, aspectual or otherwise, on a situation (see also §3.2.1). We argue in this and the following chapter that construal is pervasive in understanding aspect—in fact, the theory of aspectual construals presented here is more elaborate than the relatively small number of aspectual viewpoints proposed in bidimensional theories.

Our first task is to develop an analysis of lexical aspectual types. Analyses of lexical aspectual types are many and varied. In this chapter, three broad approaches to the analysis of lexical aspect are discussed. The first is the use of primitive predicates and operators such as DO and BECOME to capture aspectual differences. The second is the use of temporal phases (boundary phases and state phases) in different combinations. The third is the use of an interval semantics, that is, the evaluation of propositions (including the main verb) relative to time intervals.

All of these approaches, as they are described in the literature, suffer from the problem that they capture only a subset of the lexical aspectual types that

have been identified in the semantics literature. The number of lexical aspectual types identified in the literature, surveyed in §2.2, has gradually increased, but no general framework that would account for all and (ideally) only the lexical aspectual types that are found has been put forward. In §2.3, approaches using aspectual primitives and temporal phases are critically examined, and a two-dimensional geometric representation, based on time and qualitative states, is introduced. In §2.4, it is shown how the two-dimensional representation provides a general framework that covers all the attested aspectual types; it is compared to the interval semantics approach and recent work on scales in verbal semantics.

2.2 Lexical aspectual types (construals)

2.2.1 The Vendler classification and its problems

Most semantic analyses of lexical aspect take as their starting point a classification attributed ultimately to Aristotle but usually given in the form presented by Vendler (1967). Vendler distinguishes four categories of lexical aspect, presented in (1), with commonly given examples of each:

(1) States: *be Polish, be polite, love*
Activities: *sing, dance*
Achievements: *shatter, reach [the summit]*
Accomplishments: *cross [the street], read [the book]*

These categories are generally defined using three binary semantic features (Mourelatos 1981: 201–2): stative vs. dynamic (process), durative vs. punctual, and bounded vs. unbounded (or telic vs. atelic). Before describing the feature analysis of the Vendler categories, a few words must be said about terminology in the area of aspect.

The terminology for aspect is mired in confusion. Some conceptual properties are described by multiple more or less synonymous terms, e.g. bounded/unbounded, telic/atelic, perfective/imperfective. Since different scholars have different theories about the conceptual properties, the terms are not actually synonymous in different aspectual theories. Other terms are used ambiguously for clearly distinct categories. For example, 'event' is used to describe the superordinate category, as in the phrase 'event structure', but also for bounded processes in general (i.e. achievements and accomplishments in Vendler's categorization), or for achievements in particular.

On top of the synonymy and ambiguity of the terms for basic conceptual distinctions in aspect research is the pervasive confusion in virtually all linguistics discourse between the use of a term for a conceptual category

and use of the same term for a language-specific grammatical category. For example, perfective/imperfective is used to describe the conceptual distinction (bounded/unbounded), and to describe a grammatical category in a particular language such as Russian where that category encodes the semantic contrast in at least some circumstances. The problem arises, of course, when the grammatical category is used for some other purpose. For example, the English Simple Present tense is used not just for present time reference (*She loves Couperin*), but also for future time reference under certain circumstances (*I leave for Austin on Thursday*).

The problem of confusing conceptual and grammatical categories will be resolved here by avoiding the use of grammatical terms such as perfective/imperfective for conceptual semantic categories, and everywhere by using capitalized terms for language-specific grammatical categories, following Comrie (1976), Bybee, Perkins, and Pagliuca (1994), and Croft (2001). With respect to the synonymy and ambiguity of aspectual semantic terminology, terms will be chosen and defined explicitly (with apologies to those who use different terms, or the same terms with different meanings; the Glossary contains a list of all terms used in the analyses in this book). Perhaps the most contentious choice here will be to use EVENT as the superordinate term for all lexical aspectual categories. 'Event' is used in this sense in the generative and cognitive linguistics literature on event structure, but not in the formal semantics literature, where 'event' is most commonly used to refer to bounded processes. (Instead, the superordinate category is referred to with the terms 'eventuality' [e.g. Bach 1986: 6] or 'situation' [e.g. Comrie 1976: 13].) In fact, there is a good theoretical reason not to use 'event' for bounded processes: processes can be bounded in two different ways (§3.1.2). I will also use the four Vendler category terms for the aspectual classes as defined immediately below.

STATES describe situations that do not change over time, i.e. are STATIVE. The states that Vendler discusses are also extended in time, i.e. they are DURATIVE; and they do not have a 'natural' endpoint, i.e. they are UNBOUNDED; this feature will be discussed further in §3.1.2. ACTIVITIES describe situations that involve change over time, i.e. they are DYNAMIC events or PROCESSES. In addition, ACTIVITIES are durative (extended in time) and unbounded (they do not have a 'natural' endpoint). ACHIEVEMENTS also describe processes, but they describe a change of state that is instantaneous or at least conceptualized by the speaker as instantaneous, that is, occurring in just one point in time. That is, achievements are PUNCTUAL. The punctual change of state ends in a resulting state, e.g. the shattered object or being at the summit; hence they are also bounded. ACCOMPLISHMENTS are processes that are BOUNDED, that is, they lead to a

'natural' endpoint such as arriving at the other side of the street or the end of the book (see §3.1.2), Accomplishments are durative, but in the process they 'proceed toward a terminus' (Vendler 1967:101). Later work describes this procession as an incremental change (Dowty 1991); this description will be discussed further in §3.1.1. The Mourelatos features defining each Vendler category are given in (2):

(2)

States:	*stative*	*durative*	*unbounded*
Activities:	*dynamic*	*durative*	*unbounded*
Achievements:	*dynamic*	*punctual*	*bounded*
Accomplishments:	*dynamic*	*durative*	*bounded*

Vendler, like most linguists, uses the methodology of finding tests to classify predicates into his four categories. For example, Vendler uses the test of an answer to the question *What are you doing?* in the Present Progressive to distinguish states from processes (the stative/dynamic distinction):

(3) Q: What are you doing?
A: I am running/*I am knowing it.

The test distinguishes the process *run* from the state *know*.

Vendler uses the temporal questions *At what moment . . . ?* vs. *For how long . . . ?* to distinguish achievements from states (the punctual/durative distinction):

(4) a. At what moment did you spot the plane?
b. For how long did you believe in the stork?

(5) a. *For how long did you spot the plane?
b. *?At what moment did you believe in the stork?

The achievement *spot the plane* is perfectly acceptable with *At what moment . . . ?* in (4a), and the state *believe in the stork* is perfectly acceptable with *For how long . . . ?* in (4b). Using the "wrong" temporal question leads to ungrammaticality, or more precisely, semantic incoherence. However, (5b) is not as bad as it should be according to Vendler: it can be construed as asking for the moment in time when the addressee came to believe in the stork. This is the first hint here that not everything is clear-cut in the linguistic analysis of lexical aspect.

Vendler uses the constrast between temporal interval adverbials with *for* and *in* to differentiate activities and accomplishments (the unbounded/bounded distinction):

(6) a. He pushed the cart for half an hour.
b. He drew the circle in twenty seconds.

(7) a. ?*He pushed the cart in half an hour.
b. ?He drew the circle for half an hour.

The activity *push the cart* is perfectly acceptable with the *for* adverbial in (6a), also called the DURATIVE ADVERBIAL, to describe the length of time over which the event occurred. The accomplishment *draw the circle*, on the other hand, is perfectly acceptable with the *in* adverbial in (6b), also called the CONTAINER ADVERBIAL, to describe the length of time over which the event occurred. The Durative/Container adverbial contrast is still widely used to distinguish bounded and unbounded processes. In theory, use of the "wrong" temporal interval adverbial should lead to semantic incoherence. In fact, (7a–b) are not completely bad and in fact both are interpretable: (7a) can with some difficulty be construed as describing the time interval leading up to the beginning of the event, while (7b) can more easily be construed as describing an activity (in Vendler's sense) that ended in a half an hour without the full circle being drawn.

In still other instances, Vendler was aware that his "tests" did not produce the expected results. Vendler uses the test *It took NP TimeInterval to . . .* in order to distinguish accomplishments from other categories, but the construction is perfectly acceptable with achievements (Vendler 1967: 101, 104):

(8) It took him twenty seconds to draw the circle.
(9) It took him three hours to reach the summit.

Vendler writes, 'Even if one says that it took him three hours to reach the summit, one does not mean that the "reaching" of the summit went on during those hours' (Vendler 1967: 104). Sentence (9) is acceptable in the interpretation that three hours describes the time interval leading up to reaching the summit from some contextually determined starting point (e.g. setting out from the last camp, or after lunch, or something equivalent).

Vendler uses another test to distinguish states from processes, namely the Simple Present question in (10):

(10) Q: Do you know . . . ?
A: Yes, I do.

But this test also yields a perfectly acceptable result with at least some processes (Vendler 1967: 99):

(11) Q: Do you run?
A: Yes I do.

In a footnote, Vendler notes that the test rejects *run* as a state '[u]nless a very different meaning of *running* is involved' (Vendler 1967: 99, fn. 5). That meaning, of course, is the habitual activity of running, or the inherent ability to run.

The general problem is very well put by Dahl in his monograph on tense and aspect systems:

> . . . in addition to the fact that some aspectual notions are expressed by morphological means in some languages, it is also true for all languages that verbal lexemes differ in their 'aspectual potential'. . . As often happens, the theoretically nice distinction [between 'grammatical' and 'lexical' aspect] turns out to be rather difficult to apply in practice. To start with, we encounter the problem of separating out the 'inherent aspectual meaning' from contextual influences—after all, every occurrence of a verb is in a definite context, and there is no obvious way of determining what a 'neutral aspectual context' would be like. Also it turns out that there is an astonishing flexibility in how individual verbs may be used.
>
> (Dahl 1985: 26–7)

Dahl makes several important observations. First, a predicate does not inherently belong to a single aspectual type. Instead, it has the POTENTIAL to be conceptualized or construed in multiple aspectual types (see §1.4 on the interpretation of construal potential). Hence the aspectual types are also ASPECTUAL CONSTRUALS of predicates; I will refer to them as either aspectual types or construals in this book. This is a very important observation, which was made early on in the contemporary linguistic analysis of aspect (e.g. Dowty 1979: 61–2, 1986: 43; Mourelatos 1981: 196–7; see also Levin and Rappaport Hovav 2005: 90). Aspectual types may be, and have been, unnecessarily multiplied because a predicate that allows construals of two aspectual types is taken to represent a new aspectual type. The alternative construals may be induced by the grammatical context, e.g. the difference between *They reached the summit* and *It took them two hours to reach the summit.*

Moreover, one cannot automatically assume that one of the aspectual types or construals is the 'basic' one (see §1.3), although much discussion tends to assume this at least for convenience of exposition, and for many event types there does appear to be a fairly clear default construal (see §2.4). Finally, Vendler's four-way categorization of aspectual types—semantic types that are defined by the semantic features, independently of what predicates are construed as belonging to those types—is incomplete.

In the remainder of this section, we will examine the major alternative construals of predicates that have been observed in the literature, and the new aspectual types that have been added to Vendler's original four categories.

2.2.2 Alternative construals and new aspectual types

In addition to acknowledging that the sentences in (5b), (7), (9), and (11), which should be semantically incoherent according to the aspect tests, can be interpreted, Vendler also observes that certain stative predicates are perfectly

acceptable in non-stative contexts (Vendler 1967:113–19). Predicates such as *know, see*, or *remember* are construed as (transitory) states when they occur in the Simple Present:

(12) I know how to do this.

(13) I see Mount Tamalpais.

(14) I remember her.

But they can also be construed as achievements in the Past tense:

(15) I suddenly knew the answer.

(16) I reached the crest of the hill and saw Mount Tamalpais.

(17) I instantly remembered her.

Vendler describes *see* and *know* as having two senses (Vendler 1967: 113). However, the two 'senses' depend on the grammatical context (tense–aspect constructions such as Simple Present or Past, further supported by Punctual adverbials such as *suddenly* or *instantly*). The two senses correspond to two aspectual construals: *see* and *know*, and English perception and cognition predicates in general, have an aspectual potential to be construed as either a state or an achievement in the appropriate semantic and grammatical context. As noted above, state and achievement are not inherent aspectual types of predicates but aspectual types or construals that different predicates have the potential to possess. We will call the class of predicates that have the aspectual potential of states or achievements that result in the state INCEPTIVE STATES.

Another example of multiple aspectual potential is the category of DISPOSITION predicates such as *be polite* or *be friendly*. Dowty notes that *John is friendly* is a state, describing an inherent personality trait of John, whereas *John is being friendly* is an activity, describing a particular occasion of John behaving in a friendly manner (Dowty 1979: 114). In our terms, disposition predicates allow alternative construals as a state and as an activity.

In some cases, new aspectual types proposed in the literature also appear to be verbal semantic classes that allow alternative construals already recognized in the Vendler classification. For example, Role and Reference Grammar introduces an aspectual type, 'active accomplishments', for activity verbs that also have an accomplishment construal, e.g. *Erin ate* [activity] vs. *Erin ate the pie* [accomplishment] (Van Valin and LaPolla 1997: 99; see also Van Valin 2005: 32–3). Active accomplishments are described as 'the accomplishment use of activity verbs' (Van Valin and LaPolla 1997: 99), and they are distinguished from other accomplishments because their decompositional analysis in Role and Reference Grammar differs from that of other

accomplishments (see §2.3.1). In our analysis, *eat* has the potential for (at least) two construals, as activity and as accomplishment. There is no need to introduce a separate aspectual type; there is only a need to recognize that this verb class has a distinctive aspectual potential.

A more challenging case is represented by the sentences in (18)–(19):

(18) a. Jim is standing at the top of the stairs.
b. The box is lying on the bed.
c. Bats were hanging from the roof of the cave.

(19) a. He's holding the baby.
b. She's sleeping.
c. The flowers are blooming.

These predicates have been described as 'stative progressives' (Dowty 1979: 173), 'dynamic' (L. Carlson 1981: 39), 'dynamic states' (Bach 1986: 6), 'inactive actions' (Croft 1991: 97, 1998*c*: 72), and 'homogeneous activities' (Michaelis 2004: 10). All of them have in common that they appear to be semantically stative, but in English they take the Progressive. We will call the lexical classes that display this grammatical behavior INACTIVE ACTIONS.

The basic semantic problem is why a situation type that appears to be stative in the real world—no change is taking place, at least outwardly—is expressed grammatically by an English construction, the Progressive, which otherwise requires a process. Dowty's and Bach's analysis suggest that these are really states; Michaelis argues that they are really processes; and Carlson calls them intermediate between states and activities. Carlson and Michaelis introduce them as a new aspectual type. It does not appear that there is a new aspectual type here, however: there is instead a problem of what aspectual type, state or activity, the predicates in (18)–(19) should be assigned to, because of the conflict between our perception of the semantic type of the event and its grammatical expression in English. In fact, the predicates in (18) also occur in the Simple Present, so they actually do allow alternative aspectual construals. The class of predicates illustrated in (18)–(19) is discussed further in §§2.4, 3.2.2.

In other cases, alternative aspectual construals of predicates give rise to new aspectual types that do not fit into Vendler's four-way categorization. Smith (1991: 55–8) argues that a fifth aspectual type or construal should be added to Vendler's original four types, that describes the temporal structure of examples such as:

(20) Harriet coughed (once).

Example (20) denotes a punctual event that does not lead to a different resulting state: after emitting the cough, Harriet 'reverts' to her normal

uncoughing state. Smith calls this type 'semelfactive', a term now widely used. This aspectual type was also identified by L. Carlson (1981: 39), who calls them 'momentaneous', Talmy (1985: 77), who describes them as the 'full-cycle' class, and Jackendoff (1991: 40), who calls them 'point events'. I describe them as CYCLIC ACHIEVEMENTS (Croft 1998*c*: 74), and will use this last term here, synonymous with 'semelfactive' (see §2.4.1).

Smith also notes that the same predicate *cough* can be used to describe an activity, when combined with a Durative temporal adverbial or the Progressive (Smith 1991: 55):

(21) Harriet coughed for five minutes.

(22) Harriet was coughing.

In other words, *cough* has an aspectual potential to be construed as either a cyclic achievement (semelfactive) or as an activity. Which construal is found depends on the tense–aspect construction *cough* occurs in (Past tense, Durative adverbial, Progressive). Since we will make frequent reference to the semantic classes of predicates that have both the activity and cyclic achievement (semelfactive) construals, we will call these predicate classes CYCLIC ACTIONS.

Another alternative construal reveals yet another aspectual type. The Progressive is unacceptable for most predicates usually construed as achievements because the Progressive applies to a durative situation:

(23) ?*The window is shattering.

However, it is perfectly acceptable, under the right circumstances, to use the Progressive with some predicates typically considered to be achievements (Dowty 1979: 137):

(24) She's dying!

(25) He's falling asleep.

(26) They are reaching the summit.

In these cases, the Progressive form describes a runup process before the achievement of the change of state (and in fact, that change of state may not be achieved; see also Vendler 1967: 104). Again, there are two alternative construals of the aspectual type of the situation, depending on the grammatical aspectual context. With the Past tense and a Punctual adverbial, *She died* is an achievement. With the use of the predicates in the Progressive in (24)–(26), however, a new aspectual type must be recognized.

Although *He's falling asleep* is durative and bounded, it lacks an important semantic property of Vendler's accomplishment category. Vendler's

accomplishments consist of an incremental, measurable change over time that leads to the resulting state, as indicated by the acceptability of a Measure phrase:

(27) I have read a quarter of the way through the newspaper.

But the process leading up to falling asleep or dying is not an incremental, measurable process:

(28) *She has died/fallen asleep a quarter of the way.

In (28), the processes that end, or may end, in death or falling asleep cannot be described—more precisely, cannot be readily construed—in terms of an incrementally measurable degree of death or degree of asleepness. Also, one's progress toward the end state is not incremental: one can fluctuate back and forth between various states before the result state is achieved.

Rothstein (2004: 98–9) gives examples of predicates in which the runup process aspectual construal appears to be the default construal:

(29) a. Harry was repairing the computer.
b. John is painting a portrait of his cat.
c. Leave me alone—I'm solving Rubik's cube.

Rothstein writes, 'Repairing a computer, for example, does not usually involve affecting the computer gradually or incrementally, but rather fiddling around with it and trying various things until you hit on the cause of the problem and thus its solution' (Rothstein 2004: 98). Likewise, painting can involve painting out things and altering the composition in a nonincremental way until the painting is declared finished; and solving a puzzle (or proving a theorem), like repairing a computer, may involve going down several blind alleys and backing out of them before hitting on the solution (if ever).

This aspectual type was noted by Vendler (1967: 101, 104) and Dowty (1979: 137, who refers to 'achievements in the progressive'); it was subsequently referred to as 'progressive achievements' (e.g. Rothstein 2004). I originally named this aspectual construal a RUNUP ACHIEVEMENT (Croft 1998*c*: 74): a nonincremental process leading up to an instantaneous transition to a resulting state. It is unlike the other achievements in that it is not punctual. It is like an accomplishment in being extended as well as leading to a resulting state, but not in an incremental fashion. This category, and the name we will use for it, is discussed further in §2.4.1.

2.2.3 New aspectual subtypes

Further lexical aspectual distinctions have been proposed in the aspect literature. G. Carlson introduces a semantic distinction he describes as object-level vs. stage-level; it has also been called generic vs. episodic (G. Carlson 1979: 56–7;

Kratzer 1995; Chierchia 1995). An object-level predicate describes an event that is permanent for an entity (object), such as *be Polish*: one's ethnicity is a result of one's ancestry and cannot be changed. A stage-level predicate describes a transitory event (state or process), such as *be ill*, *be angry*, or instances of processes such as *(be) read(ing)*: one is not inherently ill, angry, or reading; these states and processes come and go in the lifetime of an entity.

One effect of introducing this distinction is to divide the Vendlerian category of states into transitory states, such as *be ill* or *be angry*, and permanent states such as *be Polish*. (All processes are transitory/stage-level.) Permanent states have been described as 'absolute states' by Comrie (1976: 104). Whether a state is transitory or permanent is subject to construal in certain cases: for example, the predicate *be dry* is transitory when attributed to clothes, but inherent when attributed to a desert (cf. Klein 1994: 82–3). We will use the terms PERMANENT and TRANSITORY to describe the two types of states (see §2.3 for further discussion and distinctions). The two types can be differentiated by Frequency adverbs—permanent states cannot occur multiple times:

(30) Jane is ill often.

(31) *Jane is American often.

There is another distinction among permanent states. A permanent state like *be Polish* is INHERENT: one is born Polish (by virtue of the ethnicity of one's parents), and one who is born Polish will remain (ethnically) Polish for the rest of their lives. Other permanent states are ACQUIRED: in *The vase is cracked*, the vase cannot be made intact again—it will always be cracked, even if the crack is repaired—but it was intact, i.e. not cracked, at some preceding time (cf. Klein 1994: 85).

The inactive action (stative progressive) predicates presented in the Progressive in (18), repeated below, are also allowed in the Simple Present, as in (32):

(18) a. Jim is standing at the top of the stairs.
b. The box is lying on the bed.
c. Bats were hanging from the roof of the cave.

(32) a. The statue of George Washington stands at the center of the square.
b. The Sandia mountains lie to the east of Albuquerque.
c. A large chandelier hangs from the dining room ceiling.

Goldsmith and Woisetschlaeger (1982) argue that the Progressive uses in (18) represent the situation as 'phenomenal': it is presented as an accidental property of the entity. In contrast, the Simple Present uses in (32) represent

the situation as 'structural': it is presented as an inherent property of the way the world is. We would describe this contrast as one between a transitory state construal and a permanent state construal (see §2.5; Langacker 2008: 149). Goldsmith and Woisetschlaeger's analysis also suggests that this category of predicates, posture predicates, does not constitute a new aspectual type but rather another predicate class with its own set of alternative construals, in English at least.

The Frequency adverb test also distinguishes two subtypes of achievements, which we will call REVERSIBLE and IRREVERSIBLE achievements:

(33) The door opened/closed twice.

(34) *The mouse died twice.

(35) *The window shattered twice.

Achievements such as opening or closing a door can be reversed and therefore repeated. Achievements such as dying, shattering, and most predicates of destruction or disintegration cannot be reversed or repeated.[1] Talmy describes these two subtypes of achievements as resettable and nonresettable verbs (Talmy 1985: 77). As with transitory vs. permanent states, a predicate such as *break* may be construed as a reversible achievement, as when it is applied to a repairable machine such as a washing machine, or it may be construed as an irreversible achievement, as when it is applied to a window or a stick.

Mittwoch identifies a third subtype of state, POINT STATES (Mittwoch 1988: 234), which has been little discussed in the literature. Point states can be illustrated in the following examples:

(36) It is 5 o'clock.

(37) The sun is at its zenith.

(38) It is exactly one hour since she left.

(39) The train is on time.

Finally, Dowty (1979: 88–90) discusses a category that he calls 'degree achievements', such as *cool, sink, age*. Dowty treats them as ambivalent—i.e. allowing alternative construals as activities and accomplishments—since they occur with both Durative and Container adverbials, with different meanings (*The soup cooled for/in an hour*; Hay, Kennedy, and Levin 1999: 127). But Hay, Kennedy, and Levin (1999: 132) argue persuasively against an ambivalence

[1] We assume that in (35) *window* refers to the pane, and not the opening; in the latter sense of *window*, it can shatter each time the pane is replaced.

analysis. Instead they propose that the activity construal of degree achievements represents an unbounded but incremental directed change on a scale, i.e. an aspectual type distinct from (undirected) activities. In other words, Hay, Kennedy, and Levin argue for a distinct aspectual construal of an unbounded but incremental or measurable activity. Thus, the Vendlerian aspectual type of activities is divided into directed and undirected unbounded processes. This is another aspectual type that has been discovered and named several times: L. Carlson (1981: 39) describes directed activities as 'dynamic'; Talmy (1985: 77) describes them as 'gradient verbs', and Bertinetto and Squartini (1995) describe them as 'gradual completion verbs'. We will call them DIRECTED ACTIVITIES, in contrast to the UNDIRECTED ACTIVITIES that Vendler originally described.

2.2.4 Summary

Vendler's classification has undergone many alterations and additions. It has been recognized that predicates may be ambiguous over multiple aspectual types or, as we describe them here, they have alternative aspectual construals. Some of the alternative construals give rise to new aspectual types, such as cyclic achievements and undirected accomplishments. Other aspectual types split Vendlerian categories, such as transitory vs. permanent states and reversible vs. irreversible achievements. Still other aspectual types require redefinition of Vendler's categories, such as directed vs. undirected activities: Vendler's activities were undirected, and the directed (sub)type is different enough that it is commonly given a completely different name (e.g. degree achievements). These additions and modifications to Vendler's aspectual types have been made in parallel in the logical, generative, and cognitive semantic literatures, leading to a proliferation of different terms that makes it even more difficult to develop an exhaustive classification of aspectual types.

If we gather together the different aspectual types/construals that have been proposed to characterize the aspectual potential of predicates, we have the following revisions and extensions to the Aristotle/Vendler classification:

(40) a. Four types of states: inherent (permanent) states, acquired permanent states, transitory states, and point states; the last could be seen as a subtype of transitory states
b. Two types of activities: directed activities and undirected activities
c. Two types of achievements: reversible achievements and irreversible achievements
d. Accomplishments
e. Cyclic achievements (semelfactives)
f. Runup achievements—not punctual like other achievements, but not incremental like Vendlerian accomplishments

This classification is not systematic. That is, it is not clear why there are the aspectual types that there are in the classification. Nor is it clear whether this classification is exhaustive, or whether there are further aspectual types that happen not to have been observed in the aspectual literature. In the following section, I present an analysis of lexical aspect that provides a coherent framework for the aspectual types given above. In this analysis, the possible aspectual types can in principle be extended from the classification given above, but the types already observed in the literature do represent more or less the full range of the most basic aspectual types.

2.3 A two-dimensional geometric analysis of aspectual types/construals

The analysis of lexical aspect presented here relies on three crucial analytical concepts: the notion of temporal phase, the explicit modeling of a second dimension representing the unfolding of the event over time, and the addition of a semantic frame to the conceptual representation of an aspectual type/construal. After reviewing some alternative analyses of lexical aspect (§2.3.1), we present a two-dimensional geometric analysis of aspectual types/construals (§2.3.2).

2.3.1 Symbolic and phasal analyses of aspectual types

A widespread approach to analyzing lexical aspect is in terms of symbolic primitives. One example of such symbolic primitives are the three binary semantic features introduced in §2.2: stative/dynamic, durative/punctual, and bounded/unbounded. Many analyses use these three features, defined in different semantic models, in order to account for the Vendler classes in (2). However, as many scholars have noted, there are many other lexical aspect types, summarized above in (40). The three binary features are insufficient to distinguish all of these lexical aspect types, let alone explain their interrelationships.

The interrelationships between some lexical aspect types have been captured by decompositional analyses, so that some aspect types are analyzable as combinations of lexical aspect primitives. For example, processes that lead to a resulting state, such as achievements, can be analyzed as BECOME(STATE). These analyses usually include causal semantic primitives as well, since verbal semantics clearly involves causation as well as aspect.

Dowty (1979) represents the major early proposal of this type of representation. He presents a calculus for combining primitive state predicates with the primitives DO, BECOME, and CAUSE. This calculus allows Dowty to differentiate subtypes of the Vendler classes, for example different causal subtypes of

accomplishments such as the two illustrated in (41) (Dowty 1979: 124–5; π,ρ = unary states or stative n-ary relations; α,β = arguments of predicates):

(41) a. Non-intentional Agentive Accomplishments:
[[DO(α_1,[π_n(α_1, . . . , α_n)])]CAUSE[BECOME[ρ_m(β_1, . . . , β_m)]]]
(*John broke the window*).

b. Intentional Agentive Accomplishments:
DO(α_1,[DO(α_1,π_n(α_1, . . . , α_n))CAUSE ϕ]),
where ϕ may be any non-stative sentence (*John murdered Bill*).

The accomplishment verb meanings in (41) include state primitives (π,ρ) and the primitives DO and BECOME as well as CAUSE; DO is characteristic of (undirected) activities and BECOME of (directed) achievements.

Dowty's calculus allows for a variety of aspectual types, more than the Vendler classes, although the primitives do not distinguish punctual and durative, or different kinds of states. Dowty's calculus is also intended to include the periphrastic expression of events, such as *John began to build the house* and *The door's opening causes the lamp to fall down* (Dowty 1979:124).

The scholars that followed Dowty generally limit their attention to events that are lexicalized as simple verbs or predicates, and their event structures are therefore more limited (in fact, finite). Their analyses focus on decompositional analyses of the Vendler classes, usually supplemented with types that Vendler did not recognize. For example, Role and Reference Grammar uses an inventory of (stative) **predicate**, **do**, INGR, BECOME and SEML to distinguish the four Vendler classes plus semelfactives and what is called 'active accomplishments' (the accomplishment construal of activity verbs; see § 2.2.2), summarized below (Van Valin 2005: 45):

(42) a. State: **predicate**′ (x) or (x,y)

b. Activity: **do**′ (x, [**predicate**′ (x) or (x,y)])

c. Achievement: INGR **predicate**′ (x) or (x,y) *or*
INGR **do**′ (x, [**predicate**′ (x) or (x,y)])

d. Accomplishment: BECOME **predicate**′ (x) or (x,y) *or*
BECOME **do**′ (x, [**predicate**′ (x) or (x,y)])

e. Semelfactive: SEML (x) or (x,y) *or*
SEML **do**′ (x, [**predicate**′ (x) or (x,y)])

f. Active Accomplishment: **do**′ (x, [**predicate**′ (x) or (x,y)]) & INGR **predicate**′
(x) or (x,y)

Role and Reference Grammar's calculus apparently allows for only the types in (42), plus causative versions of each. (Van Valin and LaPolla [1997: 108–9] also allow the use of NOT for negative resulting states of predicates such as *remove, drain*, and *take (from)*.) However, there are an indefinite number of stative **predicate** types.

Rappaport Hovav and Levin (1998) introduce lexical semantic templates, which are decompositional symbolic analyses of the Vendler classes, including causal variants. Their basic templates are listed in (43):

(43) a. Activity: [x $ACT_{<MANNER>}$]
b. State: [x <*STATE*>]
c. Achievement: [BECOME [x <*STATE*>]]
d. Accomplishment: [[x $ACT_{<MANNER>}$] CAUSE [BECOME [y <*STATE*>]]] *or* [x CAUSE [BECOME [y <*STATE*>]]]

For Rappaport Hovav and Levin, like Van Valin, the set of event structure templates in (43) is fixed, though there are an indefinite number of *STATE* and *MANNER* symbolic primitives, which represent the semantic diversity of the verbal lexicon (Levin and Rappaport Hovav 1995: 23). Levin and Rappaport Hovav call the latter 'verbal constants', but later use the term ROOT, following others in the literature (Levin and Rappaport Hovav 2005: 71).

The symbolic decompositional analyses capture the composite form of certain aspectual types, and therefore allow certain relationships among the aspectual types to be captured. However, the relationships among the aspectual primitives themselves (STATE/predicate, DO/ACT, and BECOME) cannot be explicitly represented without some theory to analyze those primitives. Also, the semantic primitive CAUSE is completely different in ontological type from the aspectual primitives, but if all of these concepts are primitives, there is no way to represent this fact except by stipulation. Finally, these primitives are distinct from the lexical constant/root primitives, in that the former have more combinatorial possibilities than the latter. If possible, a theory that allows for the analysis of aspectual primitives as well as capturing the composite nature of some aspectual types would be desirable.

A first step in this direction is the introduction of temporal phases to the analysis of aspect. Binnick (1991: 194–207) argues that the notion of a temporal phase is essential for defining Aktionsart (which for him includes derivational morphology for aspect as well as lexical aspect):

> Since Streitberg there has been a great proliferation of schemes of *Aktionsarten* and of *Aktionsarten* themselves, too many to review here. Each scholar attempted to establish a logical taxonomy, a principled organization of the sundry *Aktionsarten* such that their various differences in meaning could be revealed and the set of all possible

Aktionsarten be logically defined and organized. In the absence of a clearly defined concept of phase, these efforts were doomed to failure.

(Binnick 1991: 202)

Phasal analyses of aspect have increased in popularity. Here we briefly describe and critique four different types of phasal analyses of aspect.

Woisetschlaeger (1982) is cited by Binnick as an early example of a phasal analysis. Woisetschlaeger uses a first-order predicate calculus semantic representation quantifying over subevents in time intervals, for example defining termination as the last subevent of the event (p. 22). However, Woisetschlaeger does not define qualitatively distinct subevents, apart from 'pause' (i.e. event does not take place), and so his analysis does not capture the wide range of aspectual types described in §2.2.

More recent phasal analyses largely fall into two types: analyses that model boundaries of temporal phases of events, and one analysis that models the phases themselves (but not the boundaries). Parsons (1990) presents a boundary-oriented phasal analysis of Vendlerian aspectual types (Jackendoff 1991:38–40 offers a similar model). Parsons uses three types of phases: development, culmination, and holding (Parsons 1990: 23–4; Parsons actually states that he recognizes 'two key technical notions', culminating and holding, but uses a development phase as well). States simply hold, without any culmination. Accomplishments have a culmination and a 'development portion'. Achievements have a culmination, but need not have a development portion. In their typical construal (the achievement construal, in our terms), a predicate like *win the race* in *Henry won the race* consists of only a culmination. But in the Present Progressive, a sentence like *Henry is winning the race* is semantically coherent, and describes a development portion (p. 24).

Parsons's analysis recognizes two phases in events such as accomplishments and achievements, namely that they include a culmination phase (or consist solely of a culmination phase, in the case of the achievement aspectual type/construal). States lack that phase; they only hold. Parsons appears to analyze the development portion of an accomplishment as a state that holds, because in English that phase is expressed by the Present Progressive, as in *Agatha was crossing the street*, and the Progressive construes the phase as a state (Parsons 1990: 171; he analyzes the development portion as an 'In-Progress' state). Parsons's analysis also does not easily handle activities. He argues that activities like *walk* are a series of iterated walking subevents (1990: 184), on the basis of the fact that if *Mary ran* is true of a time interval (say, 4pm to 5pm yesterday), then *Mary ran* is also true of a subinterval (say, 4:15pm to 4:30pm yesterday). Each subevent culminates, but the amalgamated whole event may not culminate (p. 184).

A family of more fine-grained phasal analyses uses boundaries at the beginning as well as the end of events (Breu 1994; Sasse 1991; Johanson 1996, 2000; Bickel 1997). These analyses distinguish three possible phases of an event: an initial (inceptive) boundary transition; a middle phase; and a final boundary transition. Aspectual types are defined as to whether they include the initial or final boundaries or both.

Breu (1994) uses a contrast between boundary and a middle phase. The combination is described as a 'state of affairs', which may or may not include initial and final boundaries; there is no explicit description of the middle phase independent of the presence or absence of boundaries. Breu recognizes the following aspectual types:

(44) a. Inherent states (*contain, weigh*) have no boundary.

b. Predicates such as *know* which have state and achievement (inceptive) construals (i.e. inceptive states) have an initial boundary—'before you *know something* you have to *come to know* it' (Breu 1994:26) but not a final one.

c. Activities have initial and final boundaries, because 'it is impossible for someone to *read* or *work* for a limitless period of time' (p. 26).

d. Accomplishments such as *write something* and *drown* (Breu's 'gradually terminative' predicates) have a final boundary, but one defined by the 'exhaustion of an inherent "quantity"' (p. 26).

e. Achievements such as *find, explode*, and *reach* (Breu's 'totally terminative' predicates) have beginning and ending boundaries that coincide; Sasse (1991: 36) and Bickel (1997: 116) include the result state as a second phase.

Thus, there are five aspectual types instead of Vendler's four: inceptive states are added to the list (Sasse 1991: 36), although they represent state vs. achievement construals of the same predicate.

Bickel (1997) has essentially the same model, representing the boundary phase as τ and the middle phase as ϕ. Thus inceptive states have the phasal representation $\tau\phi$, while predicates like *die* that allow a runup achievement construal (*He's dying!*) have the phasal representation $\phi\tau$. Johanson (1996: 233) describes the internal phase structure of an event, using the same primitives of a beginning boundary ('first limit'), middle ('course'), and an end ('second limit'). Johanson also distinguishes five aspectual types: achievements have a final boundary but no middle; accomplishments have a final boundary and a middle; inceptives have an initial boundary and a middle; activities have a middle but no boundaries and are dynamic (a feature not otherwise represented); and states have a middle but no boundaries and are static (p. 234).

Grammatical aspect results in semantic representations of the same semantic type as the lexical aspectual representations. Grammatical aspect semantically selects or highlights certain phases of an event; hence Bickel (1997) calls his theory a selection theory. For example, in Bickel's notation, English *die* has two phases [$\phi\tau$]: the runup process (ϕ) and the final transition to death (τ; p. 116). The Simple Past (*She died*) selects only τ and the Progressive (*She's dying!*), only ϕ. In contrast, the Belhare verb *misen nima* '(get to) know'—like the English *know* illustrated in examples (12) and (15)—has two phases [$\tau\phi$]: the inception (τ) and the resulting state (ϕ; compare Johanson's 'initiotransformatives'; Johanson 1996:236).

Languages can vary as to the aspectual type assigned to translationally equivalent predicates. For example, Bickel argues that English *die* and French *mourir* are of the type $\phi\tau$, since the English Progressive and French Imparfait can select the runup phase; but the Chinese equivalent *si* is of the type $\tau\phi$, since the Chinese aspectual constructions can only select the achievement or the (result) state of the event. Breu's analysis recognizes the existence of phases, and also recognizes that some event types have boundary phases that can be left unselected. For example, *John knows where you are* has an initial phase but it is not selected by the English Simple Present, and *Masha is writing a letter* has a final boundary phase but it is not selected by the English Present Progressive.

However, the boundary-based phasal analysis has difficulties in analyzing activities: they do come to an end (*She stopped dancing*), but not in the same way as accomplishments do (*She finished weaving the rug*). Sasse refers to this as two types of boundedness (Sasse 2002:221–2): in a paper using Breu's theory, Sasse characterizes the contrast as one between potential and inherent boundary (1991:34). Yet in some grammatical contexts as in the Russian Perfective verb form *porabotat'* 'work for a while' (Breu 1994:28), the termination of an activity is actual, not potential, and in the English Progressive *Masha is writing a letter*, the final boundary of the accomplishment is potential, not actual. Hence the existence of a simple boundary phase, otherwise left unanalyzed, is inadequate for capturing this difference in final boundaries. An adequate phasal analysis will need to differentiate these two boundary types (see §3.1.2).

Nor does the boundary-based phasal analysis capture the fact that transitory states such as *be open* and *know* have an end as well as a beginning: an open door can be closed, and one can forget what one has come to know. Hence transitory states will also have an initial and final boundary phase, like activities and accomplishments. Since Breu's middle phase does not distinguish between state and process, Breu's phasal model cannot capture the distinction between transitory states and activities. Sasse describes states as being 'conceived of as situations without regard to their boundaries' (Sasse 1991:35). Bickel refers to the possibility of differentiating stative and dynamic

phases (Bickel 1997:117, fn. 2), as does Johanson, as noted above; but the distinction is not explicitly incorporated into either Bickel's or Johanson's aspectual representations.

The boundary-based phasal analysis also fails to capture the distinction between accomplishments and runup achievements, namely that the former describe a measurable incremental change toward the final state while the latter do not. In both cases, e.g. *die* in Bickel's analysis [$\phi\tau$] and *write something* [$\tau\phi\tau$] (using Breu's and Sasse's analysis and Bickel's notation), an Imperfective or Progressive construction selects ϕ, but this does not differentiate between the incremental and nonincremental changes in *write the letter* vs. *die*.

Klein (1992, 1994) offers a phasal analysis based on the number of phases, rather than boundaries: in Klein's model, boundaries are implicitly represented in that events with more than one phase will have a boundary between the phases. Klein defines events in terms of the succession of possible states rather than the boundaries that hold between them. Klein distinguishes three aspectual types: 0-state, 1-state, and 2-state. A 0-state lexical content is always in that state, that is, there are no other states for the individual to which the lexical item is applied. An example would be the locative *be in* in the sentence *The Nile is in Africa*. A 0-state predicate corresponds to an inherent state in the description in §2.2. A 1-state lexical content denotes a particular 'state'—more precisely, phase, since the 'state' may be stative or dynamic—but the state can be preceded by a 'pretime' and followed by a 'posttime' in which the state (phase) does not hold (Klein 1994:84; this is similar to von Wright's logic of change, defined by successive states holding/not holding; see Dowty 1979:73–8). Finally, a 2-state lexical content denotes at least two distinct states, a source state and a target state (Klein 1994:86). The target state corresponds to the resulting state in an achievement or accomplishment aspectual type. Klein argues that transitions from one state to another—boundaries—may be punctual or durative, and he does not semantically distinguish between the two possibilities (p. 88).

Klein's analysis of aspectual types is embedded in a complex theory of time reference which we cannot do justice to here. Klein's analysis captures some elements of phases that the boundary-based analyses do not. For example, Klein's analysis recognizes that all aspectual types except the 0-state (inherent states) include both a pretime (preceding) phase and a posttime (following) phase in which the event denoted by the predicate does not hold. However, Klein's model does not distinguish between states and processes, or more accurately, the state–process contrast is a separate feature that is not captured by his categorization of events into 0-state, 1-state, and 2-state.

Klein's model also does not distinguish between a transition that is punctual, as in achievements like *snap*, and a transition that is durative, as in

accomplishments like *write a letter*. He argues that such distinctions are pragmatic (part of world knowledge), not semantic (Klein 1994:88): in the case of *Clive found a proof of Fermat's Last Theorem*, whether it happened in an instant or took a long period of time is not part of the lexical semantics of *find* (cf. Dowty 1986:43; and §2.4.2). The contrast here is between an achievement and a runup achievement—if Clive took a long time to find a proof, one cannot say that *Clive is a quarter of the way to finding a proof of Fermat's Last Theorem*. The punctual and durative construals of English *find* are part of the aspectual potential of that lexical item. One must also be able to contrast events such as finding, which may be punctual, from events such as writing a letter, which cannot be punctual (see also Mittwoch 1991 and Rothstein 2004:40–6 for arguments in favor of keeping achievements and accomplishments/runup achievements distinct).

Klein also has to accommodate certain aspectual types that require elaborations to his model. Klein observed the existence of what we described in §2.2 as acquired permanent states, such as *The quagga is extinct*; he analyzes it as a type in which there is a pretime (the quagga was extant) but no posttime (it will never come back again) (Klein 1994:85). Another problematic aspectual type is cyclic achievements (semelfactives) such as *The light blinked*, where there is a sequence of off–on–off states. Klein notes that the light 'returns' to its initial state, analyzing it not as a 3-state predicate but 'as [having a] 2-state lexical contents one of whose states is branching' (p. 86). These examples indicate that the classification of events into zero through two states (plus inferred transitions) is not sufficient in itself to capture all of the aspectual types observed in §2.2.

A fourth type of phasal analysis is offered by Timberlake (1985). Timberlake assumes an interval temporal semantics like Woisetschlaeger, and focuses on boundaries. But he argues that events must be described in terms of their 'histories', that is, how they unfold over time, and that aspectual types can select 'partial histories', not unlike the selection operation in boundary-based phasal analyses described above (Timberlake 1985:46). Timberlake also describes events as a function from time intervals to situations and suggests that qualitative changes in state form a second dimension after that of time (pp. 52–3). These important insights, not developed further by Timberlake to my knowledge, also form the basis of the analysis presented in the rest of this chapter.[2]

[2] The same insights were developed by Jerry Hobbs and myself independently of Timberlake and approximately at the same time. The present model was developed based on that model. Jackendoff (1996) offers a similar analysis of one aspectual type; see §2.3.2.

2.3.2 A two-dimensional phasal analysis of aspectual types

Our analysis of phase in lexical aspect, like Timberlake's, recognizes that aspectual phases involve not just one dimension, time, but two. In our approach, lexical aspect describes HOW EVENTS ARE CONSTRUED AS UNFOLDING OVER TIME. This definition of course requires a representation of the temporal dimension. Phasal analyses recognize that there must be a temporal dimension, although most phasal analyses do not represent a temporal scale: instead there is a temporally ordered sequence of phases which themselves are treated as atomic primitives of the semantic representation. Our use of a temporal dimension in verbal semantic representation is similar to the positing of an obligatory temporal profile to verbs in Cognitive Grammar (Langacker 1987:244–54, 2008:108–12; see also §1.2), though in Cognitive Grammar it is restricted to finite verb forms.

But 'unfolding' itself must be described. The unfolding of events is the sequence of qualitative states that characterize a particular event type. The second dimension for representing lexical aspect is therefore the set of qualitative states of the unfolding event. In this model, then, events are represented in two dimensions, time (t) and qualitative states (q; in the 2000 version of this book, and in Taoka 2000, the second dimension was described as a change dimension represented by Δ). We introduce the basic dimensions of the model and the example of the aspectual structure of a seeing event in Figure 2.1.

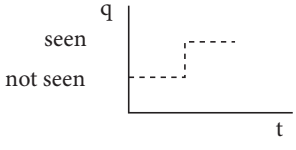


FIGURE 2.1. The two-dimensional representation of aspect.

The x axis is the time dimension (t), and the y axis is the qualitative state dimension (q). The time dimension is continuous. The qualitative state dimension may or may not be continuous, depending on what qualitative states are defined for the event (which, in turn, is dependent on how the lexical item construes the event). For example, seeing has only two defined states on q: not seeing something and seeing something. Thus, the q dimension for seeing actually consists of only two points. The two states are positioned far apart on q for visual convenience.

The q dimension is a representation of what might be considered to be the concrete, specific or 'idiosyncratic' (Levin and Rappaport Hovav 2005:71) properties of a predicate's meaning. These properties are what Levin and Rappaport Hovav call a lexical constant or root (§2.3.1). In the representations

of Levin and Rappaport Hovav and others, the root is taken to be a semantic primitive. The *q* dimension represents the lexical root as a complex semantic structure, made up of multiple states, and thus provides one way to analyze the lexical root. Some basic properties of lexical roots will be derived from the *q* dimension in this chapter.

Jackendoff (1996) presents a model of aspectual structure that is similar to the one given here, but not in geometric form as in Figure 2.1. He argues that time should be treated as a continuous dimension, and that physical space (as in motion events) should also be treated as a continuous dimension (pp. 316–17), and recognizes that some "spaces" (our *q* dimension) are not continuous, such as possession—objects do not gradually change ownership (p. 330). Jackendoff's article focuses on a particular aspectual type, gradual or incremental change (see §3.1.1), and does not exploit the geometric properties of his model in the way that is done in this and the following chapters. However, Jackendoff's model captures some of the same intuitions as behind our model.

The dotted contour in Figure 2.1 is how the seeing event unfolds over time. Seeing something is a transitory state, that is, one starts and stops seeing a particular object within one's lifetime; seeing a particular object is not a permanent state. Seeing has at least three phases: not seeing something; the transition from not seeing something to seeing it; and seeing that thing. The sequence of phases just described represents the ASPECTUAL CONTOUR of the event.[3] The TRANSITION phase is construed conceptually as an instantaneous jump from one state to the other. Just as only two points on the *q* dimension are defined for seeing, the transition is actually a quantum jump from the not-seeing state to the seeing state, and there are no intermediate states occupied by the participant in the event. For visual convenience, however, the transition is represented by a vertical line in the geometric representation.

The English verb *see* is an inceptive state: that is, it easily allows a transitory state construal and an achievement construal of the predicate without any morphological derivation. These alternative construals were illustrated in examples (13) and (16), repeated below:

(13) I see Mount Tamalpais.

(16) I reached the crest of the hill and saw Mount Tamalpais.

The alternative construals are of course a product of combining the English verb *see* with two different tense–aspect constructions of English, namely the Simple Present in (13) and the Simple Past in (16). The resulting aspectual

[3] The aspectual contour corresponds to Timberlake's maximal history.

construals for (13) and (16) are represented in Figures 2.2a and 2.2b respectively.

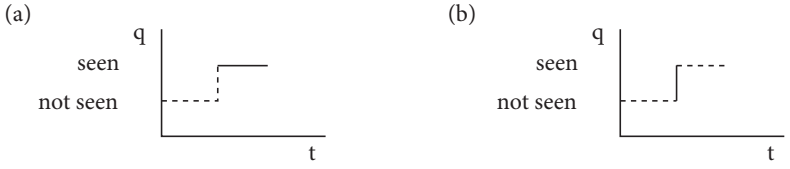


FIGURE 2.2. Alternative profiling of English *see*.

Figure 2.2a represents the transitory state construal by the solid line for the resulting state (seeing) phase: sentence (13) denotes that phase and not the other phases. Instead, sentence (13) presupposes the other phases, this being part of our conceptual knowledge of seeing (i.e. that seeing a particular object is something that comes and goes). Figure 2.2a is thus a FRAME-SEMANTIC representation of the meaning of (13). The resulting state phase is what is denoted or PROFILED by the Verb + Simple Present construction. The preceding phases (and of course the defined points on the *t* and *q* dimensions) are presupposed by (13) and are thus part of the semantic frame for seeing. Hence, the representation of the aspectual contour for seeing in Figure 2.1 simply IS the SEE semantic frame, or more precisely, the part of the semantic frame relevant for the aspectual behavior of SEE. Figure 2.2a designates or profiles one concept in that semantic frame, namely the resulting transitory state of the seeing event.

Figure 2.2b represents the achievement construal denoted by sentence (16). Recall that the vertical line is used for visual convenience; it actually is a quantum leap from a profiled point at the end of the not-seen state phase to a profiled point at the beginning of the seen state phase. Sentence (16) has the same semantic frame as (13), but a different phase is profiled by the Simple Past use in (16). The semantic similarities between the meanings of the two sentences is captured by the similarity (in fact, identity) of the semantic frames for the two sentences, and the semantic difference is captured by the differences in the profiled concept in the semantic frame.

The profiled phase of an event's aspectual contour is the phase asserted to hold in the world at a particular point in time, namely the time reference denoted by the tense of the construction. In Figure 2.2a, that is the moment of the speech act, and in Figure 2.2b, that is a moment that temporally precedes the moment of the speech act.[4]

[4] We will not discuss various construals of the English Present and Past tenses that allow the point in time to be defined as a more complex function of its relationship to the moment of the speech act.

There is of course an asymmetry between unprofiled phases in the semantic frame that precede and follow the profiled phase. Phases that precede the profiled phase are presupposed to have held or taken place in the time interval preceding the time of the profiled phase. What follows the profiled phase is in the future. In some cases, there is an entailment that a future phase will occur. For example, in the case of sentence (16), although it only denotes/profiles the quantum leap from not seeing to seeing, the fact that the change of state has occurred implies that the state of seeing will hold for at least a brief interval. That is why there is an unprofiled phase in Figure 2.2b following the profiled phase: it represents the entailment that if I have come to see Mount Tamalpais, then I will see Mount Tamalpais for at least a brief interval of time.

Thus, the only phases in principle that are represented as part of the semantic frame are those that are presupposed or entailed by the profiled phase in the semantic frame. For example, it is not entailed that I stop seeing Mount Tamalpais; I could suddenly drop dead of a heart attack such that the last thing I see is Mount Tamalpais. For this reason, there is no unprofiled transition from seeing to not seeing after the unprofiled seeing phase in the representation in Figure 2.2b (or in Figures 2.1 or 2.2a for that matter). However, the time scale continues beyond the end of the unprofiled phase of seeing, and the unprofiled phase of seeing does not continue indefinitely with the time scale. This represents the possibility (indeed, likelihood) that the transitory state will end before the end of the individual's lifetime.

An aspectual type or construal of a predicate is a representation of the kind found in Figure 2.2. An ASPECTUAL TYPE/CONSTRUAL consists of a particular profiled phase (or phases) on a particular aspectual contour, where the aspectual contour is defined by geometric properties of the defined points on the *q* dimension (e.g. that there are only two defined points on the *q* dimension), rather than specific values on that dimension (such as 'not seen' and 'seen').

Also, the aspectual properties used to define the Vendler aspect classes and other aspectual properties can be defined as geometric properties of the two-dimensional representation. For example, the punctual/durative contrast, one of the ways that sentences (13) and (16) contrast, is straightforwardly defined as profiling one point vs. an interval on the time dimension. The state/process contrast, another way that sentences (13) and (16) contrast, is defined as profiling one point vs. an interval on the qualitative state dimension. An INTERVAL is defined as consisting of more than one point on a dimension such that for all points *a* and *b* in the interval, there is no defined point *c* between *a* and *b* that is not in the interval. This definition includes the transition phase in the seeing event as an interval on *q*, because there is no

defined point between the two defined points of not seeing and seeing in the transition phase.

In this analysis, inceptive states such as English *know* and *see* do not represent a distinct aspectual type, as implied by the analyses of Breu and Bickel (see §2.3.1). Instead, English *know* and *see* have the aspectual potential of two alternative construals without morphological derivation, each of which is one of the aspectual types already found in the aspect literature and listed in (40) in §2.2. By separating the aspectual potential of specific language predicates from the aspectual type represented by each alternative construal of a predicate, we significantly reduce the number of 'lexical aspects' that have to be accounted for. As will be seen in chapter 4, there is in fact an indefinitely large number of predicate classes each having its own unique aspectual potential or range of possible aspectual construals. Finally, we represent the relationship between the inceptive and transitory state construals as the profiling of different phases on the same aspectual contour.

The two dimensions of the geometric representation of aspect—time and qualitative state—correspond to conceptual structures found in other representations of aspect, namely temporal phases (or temporal properties defined in some other way) and the idiosyncratic root of an event. The difference is that these two conceptual structures are represented geometrically. The implication is that the geometric properties of such a representation are better suited to capturing the relevant linguistic semantic patterns. I have already noted that aspectual semantic features such as punctual/durative and state/process can be defined straightforwardly in the geometric representation, as points vs. intervals on the *t* and *q* dimensions respectively. In the next two sections, we will describe how the geometric representation can account for the variety of aspectual types that have been observed in the literature, and the semantic construal processes that are found in alternative aspectual construals of particular predicates.

2.4 A general framework for aspectual types

2.4.1 Motivating the typology of aspectual types/construals

The *t/q* phase representations presented in §2.3.1 allow us to incorporate the aspectual construals and distinctions identified in the aspectual literature. It turns out that these aspectual types can be most easily grouped into four general categories corresponding to Vendler's original four-way classification.[5] The four kinds of states in (40a) are represented in Figure 2.3.

[5] Earlier versions of the taxonomy were presented in Croft '1998*c*, 2009*a*'.

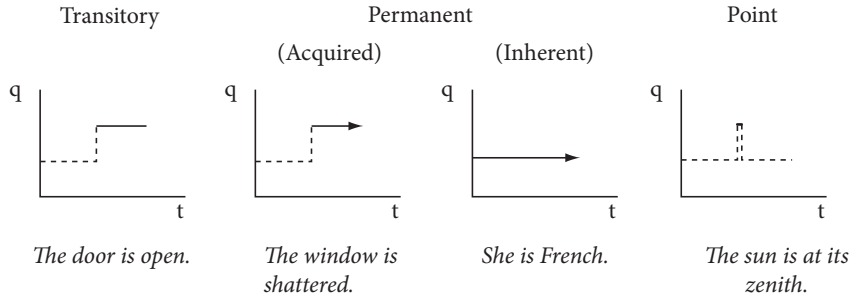


FIGURE 2.3. Four kinds of states.

The first type is a transitory (stage-level) state, while the second and third are permanent (object-level) states. Transitory states have a start and may have an end, represented by the ending of the transitory state before the end of the time dimension.

Permanent states hold for the (remaining) lifetime of the entity. Inherent states are true of the entity for its entire lifetime. Acquired permanent states are true of the entity for its entire lifetime once the state has been acquired. Permanent states are represented by a phase headed by an arrow, which is shorthand for a phase that extends as long as the timeline extends.

The timeline is defined relative to the lifetime of the entity; that is, the *t* dimension applies to that entity as long as it is taken to exist. Of course, an entity can cease to exist. For example, the Frenchwoman referred to in *She is French* in Figure 2.3 will not live forever. It will still be true that being French is an inherent state that held for the Frenchwoman, even after she has died, although our time perspective at that moment will generally require a speaker to use the English Past tense to describe that inherent state: *She was French* (see Mittwoch 2008 for an analysis of the use of Present and Past tense with inherent states of living and dead entities).

The lifetime of an object is also subject to construal. Sentences (45)–(46) each describe an acquired permanent state:

(45) Sweet William is dead.

(46) The window is shattered.

In (45)–(46), the *t* dimension construes the lifetime of the entity as going beyond biological life and physical integrity for at least some relevant period of time. The acquired permanent state lasts for that period of time. But the period of time is limited. It is odd to say *King Sargon II of Akkad is dead* (he died in 705 BC); the death must be recent and relevant in some way to the

present (e.g. *My grandparents are dead* is OK, but *My great-great-great grandparents are dead* is odd). Also, describing the acquired permanent state of a destroyed object as a present state tends not to be acceptable after the remnants are removed, scattered, thrown away, etc. Thus (46) would not be appropriate once I have swept up the shards and thrown them in the garbage can.

The last type of state in Figure 2.3 is a point state. Point states such as *(the sun) is at its zenith* profile a state that lasts only a point in time. What counts as a point in time is also subject to construal. In *It is 5 o'clock*, depending on how precise one wants to be, the point in time may last 60 seconds (from 5:00:00 to 5:00:59), before which it was 4:59 and after which it will be 5:01. But at a minute-sized level of precision, the 60 seconds is construed as a point in time. Punctual events in general are punctual only to a degree of precision that is relevant to the interlocutors' goals in the discourse. The same is true, incidentally, of qualitative states on the *q* dimension: *Russia and Georgia are at war* construes quite a lot of activity as being just a single point on the *q* dimension (being at war vs. not being at war).

Since the point state lasts for only a point in time, reversion to the initial state, which I will call the REST STATE (compare Woisetschlaeger's 'pause'), is entailed: since it is 5 o'clock for only a point in time, there will be a transition resulting in a return to the rest state. Thus there are two entailed phases beyond the profiled point state phase in the geometric representation in Figure 2.3. In this respect, point states differ from very short transitory states, such as *The light is on!* uttered at just the right moment of a flashing light—that utterance does not necessarily entail that the light will go off, whereas *The sun is at its zenith* does entail that it will no longer be at its zenith after that point in time.

What all STATES have in common is that their profiled phase is only a single point on the *q* dimension. The subtypes of states differ in their extension on the *t* dimension: a point or an interval, including intervals extending the whole of the relevant timeline.

To three kinds of states (excluding inherent states, where there is no change in the entity's lifetime), there correspond three kinds of achievements (see Figure 2.4 on p. 60).

Reversible achievements result in transitory, hence reversible, result states. Irreversible achievements result in permanent, hence irreversible, result states. Reversible and irreversible achievements are both DIRECTED achievements, which are defined in the geometry as profiled transitions in which the entailed (unprofiled) RESULT STATE phase is a state at a different point on the *q* dimension from the presupposed (unprofiled) initial rest state phase. I will conventionally place the result state higher on the *q* dimension than the rest

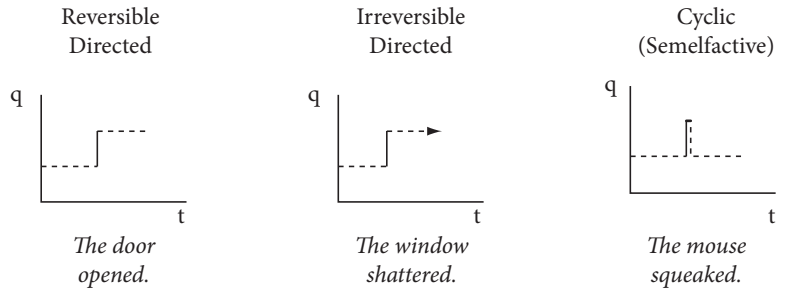


FIGURE 2.4. Three kinds of achievements.

state. So, for example, in *I removed the flowers from the table*, the result state of being not on the table is higher on the *q* dimension representation than the rest state of being on the table.

Directed achievements contrast in this property with cyclic achievements (semelfactives). Cyclic achievements result in point states, which then revert to the rest state. For example, the mouse emits a squeak, which is a pointlike sound, and then is silent again (until the next squeak). What is profiled is the transition from silence to squeak, not just the squeak: *squeaked* denotes a punctual change, not a point state. I will continue to call this aspectual type a cyclic achievement, although I will also use the widespread term 'semelfactive' as a synonym, in order to use the term 'achievement' to refer to all kinds of punctual changes of state.

This implies a broader definition of achievement than Vendler and his successors use; his achievements only included directed achievements. Our definition includes both directed and cyclic achievements. The latter can also be described as UNDIRECTED ACHIEVEMENTS; we will shortly see their close semantic relationship to undirected activities. ACHIEVEMENTS are geometrically defined as a transition from one state to another on the *q* dimension at a single point on the *t* dimension.

Likewise, our definition of activity is broader than Vendler's: his examples consisted solely of undirected activities, whereas our definition includes directed activities. ACTIVITIES in this broad sense are durative, unbounded processes. The two types of activities are represented in Figure 2.5 on p. 61.

Directed activities involve a continuous (or at least incremental) change along the *q* dimension, but without a transition to a result state representing a completed action (this will be described shortly with accomplishments). On the other hand, there is an inception phase from the rest state: the quantum leap from the rest state to the state representing the first state of the activity,

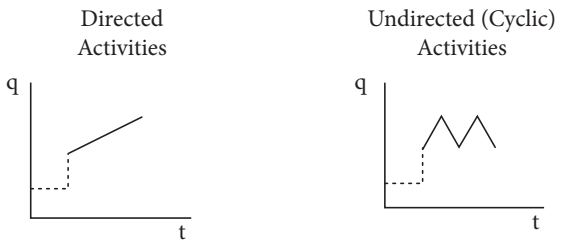


FIGURE 2.5. Two kinds of activities.

represented by a vertical line (see §2.3.2). These phases precede the profiled activity phase and so are presupposed by it.

The gradual change is associated with a particular participant, called the incremental theme (Dowty 1991); more recent work has treated the gradual change as a scale associated with the verbal meaning (Hay, Kennedy, and Levin 1999; Kennedy and Levin 2008). We will turn to the proper analysis of the incremental theme/verbal scale in §3.1.1 after defining all of the aspectual types; for now, we observe that the scalar nature of the gradual change is easily represented by a continuous interval on the *q* dimension. Directed activities are transitory, hence there is a rest state (when the soup is not cooling), as well as a transition from that rest state to the beginning of the directed activity. Also, no phases beyond the profiled directed change phase are included in the semantic frame for directed activities, because no change to a result state is entailed; but nor do directed activities extend for the entire lifetime of the entity.

Undirected activities do not involve a continuous directed change along qualitative states in the *q* dimension. I have represented undirected activities with a zigzag line on the *q* dimension. This is not an arbitrary choice. Undirected activities are typically construed as a succession of cyclic (undirected) achievements. For example, chanting (talking, singing, etc.) is a repeated emission of certain types of sounds; walking (running, dancing, etc.) is a repeated taking of steps of a certain type. Hence undirected activities could also be called CYCLIC ACTIVITIES. The defined states for undirected activities on the *q* dimension, apart from the rest state that represents its transitory character, are two (or perhaps more) states which the entity goes back and forth between. More generally, the defined states on the *q* dimension for undirected activities cannot be ordered such that there is an incremental directed change over the time course of the event. Thus, a more accurate representation of undirected activities in any particular case involves

transitions from one point to another on *q* but without incremental progress toward a result state (if any) on *q*.

Both directed and undirected activities are durative processes: their profiled phase is extended, not punctual, on both the *t* and *q* dimensions. In this respect they contrast both with states, which are punctual (a point) on the *q* dimension, and with achievements, which are punctual on the *t* dimension.

Vendler's category of activities included only undirected activities; conversely, Vendler's category of accomplishments consists of only bounded, directed durative processes. Complementing accomplishments are what I have called 'runup achievements', which are bounded, undirected durative processes (see Figure 2.6).

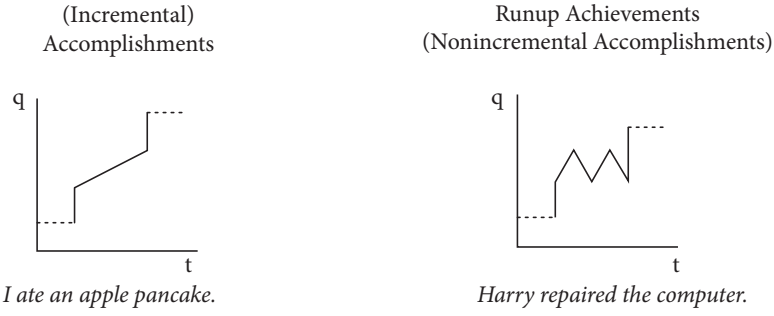


FIGURE 2.6. Two kinds of accomplishments.

Accomplishments differ from all of the other aspectual types represented so far in that three phases are profiled: the inception and completion phase as well as the directed change phase. This is because accomplishments are durative but bounded: the inception and completion phases bound the accomplishment. A TEMPORALLY BOUNDED (T-BOUNDED) event is one in which the transition phases (i.e. punctual changes) at the beginning and the end of the event are profiled. The beginning and end transition phases are the temporal boundaries of the event. Achievements are also bounded: in the case of achievements, the inception and completion phase are one and the same, namely the one profiled transition phase (there is no middle phase). Since accomplishments include a completion phase, there is also an implied (unprofiled) result state, as well as the rest state preceding the beginning of the event. Accomplishments such as *write a letter* are said to have a 'natural endpoint'; this natural endpoint is the result state on the *q* dimension, and progression toward the natural endpoint is defined by the points of the scale of the directed change. The relationship between a natural endpoint and temporal boundedness will be discussed in §3.1.2.

A runup achievement is represented as a bounded event with profiled beginning and end transition phases, but the middle profiled phase is an undirected activity. Runup achievements are distinguished from accomplishments in that there is no monotonic progression from the rest state to the result state. As we observed in §2.2.2, if someone is *dying* or *drowning*, they are construed as going from one unfortunate state to another, unless or until they go from one of those intermediate states to the result state of being dead or drowned. In particular, the non-dead states are all construed as being alive, not as being dead to some partial degree (despite the expression *half-dead*, which is either metaphorical or describes a nonincremental state that is neither normal life nor death). Obviously, if the runup process can be construed as a directed monotonic change on a scale ending with the result state, then such a predicate has an alternative construal as an (incremental) accomplishment available to speakers.

More often, however, a runup achievement is an alternative construal for a (punctual) directed achievement. For this reason, this aspectual type has been called a progressive achievement or runup achievement, although it is not punctual. A better term would be NONINCREMENTAL ACCOMPLISHMENT, avoiding the punctual implication of 'achievement'. We will adopt this admittedly cumbersome term so as to restrict 'achievement' to punctual events only. Vendlerian accomplishments should be renamed (INCREMENTAL) ACCOMPLISHMENTS; but we will generally continue to call them 'accomplishments' following tradition.

Whether an accomplishment is incremental or nonincremental (or for that matter, whether an activity is directed or undirected) is subject to construal depending on context. An accomplishment may be construed as incremental even if it is not perfectly incremental over time. For example, reading a linguistics article in an hour is usually construed as an incremental accomplishment even if the reader has to reread a paragraph every now and then in order to understand the article. Wechsler (2005:264–5) notes that *Mary hammered the metal flat* allows for Mary to occasionally hammer the metal in such a way that it becomes less flat, as long as the overall progression is toward flatness and flatness is reached. In addition to some backtracking along the *q* dimension, one can also take breaks: in the hour that I take to read the linguistics article, I can stop reading and have a cookie before going on to finish the article; and Mary can stop and take a drink of water before finishing hammering the metal flat. However, the extent to which backtracking and taking breaks is allowed depends on the event (see also §3.2.2). It is not clear that playing a musical work such as Chopin's *Polonaise-Fantaisie* is an incremental accomplishment if the pianist repeatedly stops and goes back twenty to thirty bars and resumes playing, even if the pianist does eventually reach the end of the work. One would probably say rather that *I got through*

the Polonaise-Fantaisie, a nonincremental accomplishment construal of the event.

Rothstein argues that since some degree of backtracking and breaks are allowed for at least some (incremental) accomplishments, then they are essentially no different from what we are calling nonincremental accomplishments (Rothstein 2004:91–122; see p. 115 for a succinct statement). Rothstein's analysis treats both aspectual types alike: there is an activity to which is associated a BECOME event which has a 'developmental structure' and culminates in the transition to the result state (p. 112). There is no inherent difference between the activity involved in reading a linguistics article and the activity involved in repairing a computer.

But Rothstein's analysis loses some important structure in incremental accomplishments (and also directed activities, which lack the culmination phase). Incremental accomplishments such as reading a linguistics article do have measurable progress even if some backtracking and breaks in the time course of the incremental accomplishment are allowed: at a certain point, I can say that I am three-quarters of the way through the linguistics article, even if I had a couple of cookies and took a break to answer the phone while I was reading it. This is true because of properties of the linguistics article, namely that it is defined as successive units of text, and properties of the reading process, namely that I more or less read through it from beginning to end (not counting backtracking and breaks). And as we have noted, some incremental accomplishments such as performing a piece of music are much stricter about disallowing backtracking and breaks. The measurability of the progress of the event is a property of the *q* dimension. In contrast, repairing a computer consists not just of possible backtracking and breaks, but of possible dead ends which appear to involve measurable progress but not measurable progress toward the result state. The *q* dimension for repairing a computer does not consist of a scale representing continuous measurable progress toward the result state in the way that the *q* dimension for reading something does. This difference in the structure of the *q* dimension holds even if our construal of an accomplishment as incremental allows for some backtracking and breaks in execution in some cases.

The result state of a bounded durative process may be a transitory state or a permanent one. Mowing the lawn has a transitory result state: the grass will grow back and it can be mowed again. A destructive transformation event such as grinding a stone into grit has a permanent result state: the stone can't be reconstituted. Repairing a computer is a nonincremental accomplishment that has a transitory result state: the computer can break again. Dying has a permanent result state, at least under the cultural assumption that we only live once.

The *t/q* phasal representation provides a framework for systematically capturing the range of aspectual types that have been documented in the aspectual literature. States are differentiated by differences in the duration of the profiled state on *t*: point, interval, entire scale. Inherent states are distinguished from all other aspectual types, states or otherwise, by lacking a prior rest state as well as lacking any other distinct phase; that is, only one point is defined on the *q* dimension.[6] Reversible achievements, irreversible achievements, and cyclic achievements (semelfactives) represent punctual transitions to each of the three types of states. There are two types of durative processes, depending on whether or not incremental change is involved, i.e. incremental vs. cyclic changes in the *q* dimension. (Incremental) accomplishments and nonincremental accomplishments represent temporally bounded versions of the two types of activities, directed and undirected respectively.

In principle, more complex profiles over more complex aspectual contours can be defined with the *t/q* phasal model. Some of these more complex contours will be necessary in order to define morphologically derived and periphrastic constructions including simple verb stems (e.g. *start to run* profiles the inception transition phase to the running undirected activity; see §3.2.3). The types presented above, however, are the simplest aspectual types definable: they profile only one phase (the different types of states, achievements, and activities), or a temporally bounded dynamic phase (process). Achievements are bounded processes in which the inceptive and completive transitions coincide. There is a constraint, presumably based on a human understanding of the real world, against permanent processes (i.e. all processes are stage-level), hence the absence of that aspectual type. In other words, simple predicates appear to have the aspectual potential to be construed in all and only these simple types. In this respect, the aspectual types reported in the aspectual literature do form a coherent class. In this respect also, the two-dimensional representation of aspect naturally captures this fact.

There is one exception to this generalization. The two-dimensional representation implies that a temporally bounded stative phase construal is just as simple as the temporally bounded processual construals, yet this has not been noted in the aspectual literature to my knowledge.

The bounded state construal is possibly the construal required for certain predicates modified by the Container adverbial *in X* TIMEUNIT. Sentences such as (47) and (48), where the Container adverbial is applied to accomplishments and to achievements that allow the nonincremental accomplishment

[6] The absence of distinct phases may account for why generics tend crosslinguistically to be expressed by the absence of any tense–aspect marking (Dahl 1995:425).

construal, have the same profiles as the incremental accomplishment and nonincremental accomplishment structures in Figure 2.6.

(47) I ate the pizza in ten minutes.

(48) He fell asleep in a few minutes.

However, not all uses of the Container adverbial with achievements may require a runup process. In other uses, all that the Container adverbial may denote is that a state lasting X time units holds from some reference point, such as the present moment, to the achievement or inception:[7]

(49) The TV show starts/is starting in five minutes.

(50) The lights will go off in five minutes.

If this analysis is correct, then the aspectual type found with the Container adverbial will be that found in Figure 2.7—the "missing" aspectual type.

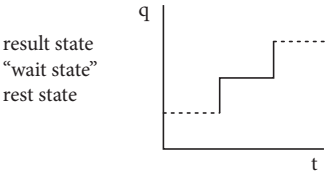


FIGURE 2.7. A bounded state aspectual type.

Figure 2.7 represents the aspectual structure of the sentences in (49)–(50) as containing a stative "waiting" phase (waiting for the TV show to start, or for the lights to go off). I am not certain that this is the correct analysis of the semantics of (49)–(50); note for example that (49) is acceptable in the Progressive, generally a characteristic of a profiled process (see §2.5 and §4.3.2). If the analysis in Figure 2.7 is correct, though, then this type completes the inventory of possible minimal aspectual types or construals, according to the *t/q* geometric representation.

2.4.2 The two-dimensional model and interval semantics

Having introduced the *t* and *q* dimensions and shown how the different aspectual types are represented in the two-dimensional model, we can return to an analysis of the relationship between events and time used in formal semantics, namely the analysis of aspectual types and intervals.

[7] I am grateful to Paul Kay for pointing these examples out to me, though he used them to make a different point.

Dowty (1979, following Bennett and Partee 1972) develops an analysis of aspectual types in terms of the truth of propositions over time intervals rather than moments of time. The basic observation is that while a state like *Oscar is happy* is true for any moment in the interval during which Oscar is happy, *John drew a circle* is not true for any moment in the interval during which John drew the circle; it is true only for the entire interval containing the progression and culmination of the circle-drawing event. States are defined as cases in which the proposition (say, Happy(Oscar)) is true for every proper subinterval of the interval during which Oscar is happy, all the way down to a single moment in time. Conversely, accomplishments fail this test: *John drew a circle* is true only for the entire interval culminating in the completion of the circle, not any (proper) subinterval.

The subinterval criterion essentially distinguishes bounded processes, which fail the criterion, from unbounded states, which pass it. But this is only a two-way distinction. Activities are unbounded, and therefore subintervals of activities (e.g. running) are also running; but the subinterval criterion eventually fails since activities involve change and therefore are not identical at each moment during the interval. Dowty's definition of activities qualifies the subinterval criterion 'down to a certain limit' (Dowty 1986:42). Conversely, achievements are (near-)punctual changes of state. Achievements, being bounded, should fail the subinterval criterion, but they do not have subintervals. Dowty argues that no change of state is truly punctual, and in fact sentences with achievement predicates may also describe a runup process (what we have called nonincremental accomplishments). However, in discourse any possible subintervals of achievements may be irrelevant: 'we do not normally understand [achievements] as entailing a sequence of subevents, given our usual every-day criteria for identifying the events named by the predicate' (1986:43). In other words, Dowty argues that achievements are really accomplishments, or at least are durative; but they are normally construed as punctual.

The subinterval criterion in this interval semantic analysis of aspectual properties succeeds in distinguishing accomplishments from states because it simultaneously distinguishes bounded and unbounded events and (internally homogeneous) states from (internally heterogeneous) processes on time intervals. It is problematic when applied to activities, which are unbounded yet processes (internally heterogeneous), and when applied to achievements, which are processes but are at least construed as punctual, i.e. lacking subintervals smaller than the instantaneous interval when the change of state occurs. The interval semantic analysis appears to reduce the Vendler categories to just two, bounded processes and unbounded states; achievement construals are attributed to pragmatics, and activities require an additional

qualification to the subinterval criterion. Interestingly, Cognitive Grammar has essentially the same analysis of what is called there the 'perfective'/'imperfective' contrast: the former is bounded and internally heterogeneous, and the latter is unbounded and internally homogeneous (Langacker 1987:254–62, 2008:147).

It is not clear how the subinterval criterion would distinguish point states, which are states true only for a point (i.e. they too lack subintervals), from extended states. The subinterval criterion also does not differentiate directed and undirected activities, or (incremental) accomplishments from nonincremental accomplishments. That requires the notion of progression along a qualitative scale.

The analysis presented in §2.4.1 introduces a qualitative dimension that allows for the representation of the scale in directed activities and incremental accomplishments. It also allows us to replace the subinterval criterion with a subtler representation of the semantic structure of the event over time. The reason that states hold for every time subinterval down to a single moment is that they are only defined at one point on the *q* dimension: their homogeneity is due to their lack of internal structure on the *q* dimension. This fact about the structure of states on the *q* dimension allows us to distinguish point states, transitory states, and permanent states on the *t* dimension in an intuitive manner.

Accomplishments are bounded on both the *t* and *q* dimensions. In the two-dimensional model, accomplishments include their inception and completion phases on the *t* dimension in their aspectual profile, and simultaneously include in their aspectual profile both the rest state (as the initial state of the inception phase) and the result state (as the final state of the completion phase) on the *q* dimension. Accomplishments fail the subinterval criterion because any proper subinterval will lack the rest and completion boundary states on the *q* dimension. By this definition of boundedness, nonincremental accomplishments are bounded as well, since their profiled inception and completion transitions include the rest state and result state. Further issues in aspectual boundedness are discussed in §3.1.2.

Activities do not profile their rest state, and there is no result state defined for them on the *q* dimension (let alone profiled by the activity). Activities will conditionally pass the subinterval criterion because they are not bounded, but only conditionally because a small enough subinterval will lack the oscillation between points on the *q* dimension (for undirected activities), or the incremental change on the *q* dimension (for directed activities). Despite being unbounded, activities are not states because they are defined over more than one point on the *q* dimension.

Finally, achievements are bounded because their rest state and result states exist on the *q* dimension and are profiled on their aspectual contour (in the quantum leap from one to the other); they are also bounded on the *t* dimension because their inception and completion phases are profiled. The inception and completion are in fact construed as one and the same, i.e. as a punctual event. The definition of boundedness in the two-dimensional model therefore applies even when there are no temporal subintervals to the event.

In sum, some of the properties of aspectual types that were taken to be properties of the events with respect to temporal intervals are better analyzed as properties of the events with respect to the qualitative changes, or both time and qualitative change (e.g. for boundedness). The structure of the event on the *q* dimension essentially takes the unitary qualitative description of an event in a proposition and analyzes it into component states and scales that allow us to capture many of the semantic distinctions among aspectual types.

2.5 Conclusion

In this chapter, we have presented the wide variety of lexical aspectual types that have been described in the aspect literature, going well beyond Vendler's four-way classification. We have surveyed some of the alternative approaches to the analysis of lexical aspect. The chief shortcoming of these approaches at the outset is that they cannot adequately represent the full variety of lexical aspectual types documented in this chapter. While the approaches capture some insights, such as the relationship among aspectual types and the importance of temporal phase in aspectual analysis, it is possible to develop a richer representation. We present a two-dimensional geometric representation, with a time dimension and a qualitative state dimension, which is rich enough to represent all and only the aspectual types that have been observed.

Like most other analysts of aspect, we recognize that predicates may belong to different aspectual types depending on the grammatical and discourse context in which they occur; each predicate has an aspectual potential of possible aspectual types or construals it allows. In the next chapter, we describe the relationships among the different aspectual construals of particular predicates.

3

Change, boundedness, and construal

3.1 Boundedness and change

3.1.1 Directed changes, incremental themes, and scales

The two-dimensional geometric representation presented in chapter 2 is rich enough to provide definitions of the Vendler aspect categories, the additional aspectual types that have been identified in the literature, and aspectual semantic features that are frequently invoked in linguistic analyses, such as punctual/durative, state/process, and bounded/unbounded. The geometric representation also allows us to identify other semantic properties that group together certain aspectual types.

In particular, directed achievements, directed activities, incremental accomplishments, and (arguably) nonincremental accomplishments form a coherent class, which will be called DIRECTED CHANGES here (essentially the same aspectual class was independently identified as 'scalar change' in Beavers 2008, 2011). In all of these aspectual types, the endpoint of the profiled phase(s) is higher on the q dimension than the starting point of the profiled phase(s). For all of these types except nonincremental accomplishments, every point in the profiled phase(s) is higher on the q dimension than every preceding point in the profiled phase(s), that is, the profiled phase(s) comprise a monotonic function from t to q. Including nonincremental accomplishments requires us to weaken this definition to require a monotonic function for only the beginning and end points of the profiled phase(s).

Directed changes include the aspectual types that contain incremental themes as defined by Dowty (1991). Dowty developed the notion of incremental theme in order to account for the aspectual structure and argument realization patterns of accomplishments (see §7.4.3). The classic type of incremental theme that Dowty presents can be characterized as MEREOLOGICAL (Krifka 1989; Dowty 1991):

(1) *Mereological incremental theme:*
Bill mowed the lawn.

With mereological incremental themes, the incremental progress of the action is manifested in the transformation of incremental parts of an argument, which is the incremental theme: mowing involves incrementally cutting parts of the lawn until the entire lawn is cut.

It is well known among aspectologists that the boundedness of a predicate with an incremental theme like *mow* depends on the boundedness of the incremental theme argument phrase. A sentence like (2), with an indefinite plural, or (3), with a mass noun, are directed activities, not accomplishments:

(2) Bill mowed lawns the whole weekend.

(3) We drank wine all afternoon.

Krifka uses the term 'cumulative' to describe the unbounded construal of objects, and QUANTIZED to describe the bounded construal of objects (Krifka 1989:75).[1] Like aspect, countability is not an inherent property of a noun (or the concept that the noun denotes). What are traditionally called Mass nouns are nouns whose default construal is unbounded, and which therefore normally occur in the Bare Singular (Zero Determiner) construction as in (3). However, they may be construed as bounded (quantized), either without overt grammatical marking—i.e. simply inserted in a Counting construction, as in (4)—or with an overt Measure construction, as in (5) (Krifka 1989:81–2):

(4) He drank five beers in fifteen minutes.

(5) I had a glass of wine.

Conversely, what are traditionally called Count nouns are nouns whose default construal is bounded, and which therefore normally occur in a Counting construction or Numeral construction, as in (6). However, they may be construed as unbounded (cumulative), either without overt grammatical marking, simply inserted in a Bare Singular construction as in (7), or with an overt construction such as the Bare Plural construction in (8):

(6) I read three books in one weekend.

(7) There was a huge Buick there; just acres of car
[overheard by Mary Ellen Ryder at the University of Manchester, April 30, 1997]

(8) The place was full of ants.

[1] The term 'cumulative' refers to a commonly used test for unboundedness: if you start with an amount of *rice*, and add more *rice*, the cumulative total is still *rice*. The term 'non-quantized' is now sometimes used; Beavers (2011).

Krifka (1989) provides a formal semantic analysis in which there is a homomorphism from objects to events such that the boundedness properties of the incremental theme object influence the boundedness property of the event as a whole. Krifka's analysis is mereological in that the boundedness of the incremental theme argument is defined in terms of the parts of the entity denoted by the argument phrase. Krifka's mereological analysis can easily be represented on the qualitative state dimension: the points on the *q* scale represent incremental parts of the incremental theme undergoing the event.[2]

An important question is: Which argument (if any) acts as a mereological incremental theme, whose boundedness determines the boundedness of the event? We will discuss this question in §7.4.3. Dowty singles out arguments which are incremental themes when singular as in example (1): the measurement of the performance of the event is determined by the part-by-part action on the (single) lawn. Dowty notes that in examples like (9b–d), one or both arguments appear to function as incremental themes (1991:570):

(9) a. John visited Atlanta.
b. John visited twenty-five cities (in two weeks).
c. 2,500 tourists visited Atlanta (in two weeks).
d. It took fifteen tourists a half an hour to visit all ten Photo Sites in the park.

The reason that the arguments of *visit* in (9b–d) appear to function as incremental themes is that (9b–d) refer to a set of events, and 'the meta-event combining all these individual events . . . has subparts corresponding to the individual entities picked out by the quantifier NP' (Dowty 1991:570). Dowty argues that only the arguments that function as incremental themes when singular, such as *lawn* in *mow the lawn*, play a role in argument selection (p. 570). We will describe the latter as BASIC incremental themes, and the scalar effect of quantified NPs as DERIVED incremental themes.

Hay, Kennedy, and Levin (1999; Kennedy and Levin 2008) identify another type of incremental theme, in which a gradual change in a property of the whole object defines the incremental progress of the action, as in expanding, cooling, etc. We will describe this type as a PROPERTY incremental theme:

(10) *Property incremental theme:*
The balloon expanded.

[2] Incidentally, Krifka offers a two-dimensional space-time diagram similar to our *t/q* representation to provide a 'visualization' of the relationship between parts of the incremental theme and the incremental unfolding of the event (Krifka 1989:91). Wechsler (2005:264, 267) also offers an informal geometric representation similar to that used in this book. They do not develop their informal proposals into a formal geometric model, however.

However, the incremental unfolding of the event cannot be represented in terms of parts of the balloon. Instead, it is the scalar property of the balloon's volume that incrementally changes over the unfolding of the event.[3]

Like predicates with mereological incremental themes, predicates with property incremental themes may be construed as bounded (accomplishment) or unbounded (directed activity), but the distinction is not as clear-cut (Kennedy and Levin 2008:157; cf. Dowty 1979:88, who discusses only the unbounded reading, and see also Hay et al. 1999):

(11) a. The soup cooled in ten minutes.
b. The soup cooled for ten minutes.

Although many predicates describing a scalar change in a property allow both accomplishment and directed activity construals, some favor one over the other. Kennedy and Levin note that the examples in (12) are almost always construed as accomplishments (requiring a Durative adverbial to be construed as directed activities), while the examples in (13) are almost always construed as directed activities (Kennedy and Levin 2008:159–60; acceptability judgments are theirs):

(12) a. The sky darkened (?but it didn't become dark).
b. The shirt dried (??but it didn't become dry).
c. The sink emptied (??but it didn't become empty).

(13) a. The gap between the boats widened for/??in a few minutes.
b. The recession deepened for/??in several years.

Kennedy and Levin argue that the predicates in (12) involve closed scales, which have a maximal degree (dark, dry, empty), and that maximal degree is construed as the result state (in our terms), leading to an overall construal as an achievement (roughly 'become dark/dry/empty').[4] The predicates in (13), on the other hand, involve open scales, lacking a maximal degree, and are interpreted as 'become wider/deeper/etc. than they were at the beginning of the event', which is a directed activity construal. *Cool* has a construal involving an open scale like *widen*, which gives rise to the undirected activity construal in (11b); but it also has a conventionalized meaning of 'come to a stabilized temperature' (e.g. room temperature), which provides a maximal element on

[3] We are using 'incremental' here in a broader sense than Dowty intended: for Dowty, 'incremental' refers to mereological themes only, while we are using 'incremental' for the gradual incremental progression of a durative directed change in any of several ways.

[4] Closed scales correspond to Cruse's privative antonyms (Cruse 1986:207-8), reanalyzed as hybrid anto-complementaries in Cruse and Togia (1995:117) and reanalyzed again as hybrid absolute-relative construals in Croft and Cruse (2004:185-9).

that scale and hence the accomplishment construal in (11a) (Kennedy and Levin 2008:178). It is possible, though difficult, to construe the predicates in (12) as 'become darker/drier/etc. than they were before', and it is possible to find a contextually determined maximal degree for a width/depth/etc. scale not unlike the conventionalized accomplishment construal of *cool* so that the predicates in (13) mean 'become the contextually specified maximal degree of width/depth'. So it appears that the type of scale (open or closed) favors rather than imposes one aspectual boundedness construal over the other.

In either case, it is clear that property incremental themes are easily represented by the scale on the *q* dimension. In this case, the points on the *q* dimension represent the degrees of the scalar property, and a maximal degree (if there is one) is the result state on the *q* dimension.

It is not possible to reduce mereology and scalar property semantics to one or the other. Mereology and scalar property are two different ways in which the progress of a directed change can take place. For example, in a *Peanuts* comic strip from July 16 1957 (Schulz 2005:85), Linus is instructed to "try blowing [a balloon] up only half-way", and he produces a hemispherical balloon. That is, Linus has blown up the balloon in a mereologically incremental way: each part of half of the to-be-inflated balloon is inflated to its full volume. Conversely, one can imagine mowing a lawn by engaging a giant Weed Eater with a trimming cord long enough to trim the entire lawn, and gradually lowering the Weed Eater so the that height of the grass of the entire lawn is gradually reduced. This would be an incremental change in the property of the height (of the grass) of the entire lawn. In other words, a mereological and a scalar property measurement of the incremental theme are not in complementary distribution across predicates. But the output of both incremental changes yields a scale, which we have represented on the *q* dimension. It is the *q* scale, no matter how it is derived from the semantics of the way the event acts on the incremental theme argument, that determines the aspectual potential of the predicate, and the aspectual construal of the predicate in specific contexts.

The *Peanuts* comic example and the alternative ways to mow a lawn demonstrate that the qualitative states on the *q* dimension are subject to construal. That is, the points on *q* will have a different definition for, say, the normal way of mowing the lawn (mereology of the lawn area) vs. the giant Weed Eater technique (property of grass height). Less dramatically, *cool* meaning 'become cooler than before' will have different definitions for the points on the *q* dimension from *cool* 'come to be at a stable/room temperature'; the two describe slightly different scales, and the latter will also have an endpoint lacking in the former. In other words, the 'constant' part of a verb's meaning is actually not that constant. The verb constant or root allows for

alternative construals in terms of the specific content of how the event unfolds or is carried out (hence, 'root' is a better term to refer to the semantic content on the *q* dimension than 'constant').

Dowty identifies two other types of themes in which the incremental progress of the action is indirectly associated with a particular argument of the predicate (Dowty 1991:568–70; as noted in footnote 3, unlike Dowty we will call these themes types of incremental themes). With holistic (Dowty's term) or PATH incremental themes, the incremental progress is change of location along a path (literal or metaphorical) which is not overtly expressed in the clause; the theme argument is the figure whose change of location is being charted.

(14) *Holistic/Path incremental themes:*
a. They walked across the park.
b. He grew into an adult.

With holistic/path incremental themes, the boundedness of the predicate is derivable from the boundedess of the path. Paths that do not have a specified endpoint will be construed as activities (directed or undirected):

(15) a. They strolled along the beach.
b. We walked around the park for a few hours.

The gradual incremental progression of an event with holistic/path incremental themes can also be straightforwardly represented on the qualitative dimension: points on *q* are successive positions of the holistic theme on the spatial or metaphorical path. Path incremental themes are thus more like property incremental themes: the entire object undergoes change along a scalar property, namely its spatial or metaphorical location.

With REPRESENTATION-SOURCE incremental themes, the incremental progress is in the incrementation of the representation of the source, either a mental or physical representation. The theme argument is the source whose representation is being created.

(16) *Representation-source themes:*
Jane read/scanned *War and Peace.*

Representation-source incremental themes are also mereological in character, measured out by the part-by-part transfer of the information from the representation source to the representation. Thus, they allow for bounded (accomplishment) or unbounded (directed activity) construals based on the boundedness of the representation-source argument: compare (16) to *Jane read magazines all afternoon.* The incrementation of the representation-source theme is also representable on the *q* dimension as incremental parts of

the representation source that have been represented in the target, in the same way that mereological incremental themes are. Thus, the scalar character of the points defined on the qualitative state dimension for predicates of the types illustrated in (1)–(8) and (10)–(16) captures the notion of 'measuring out' proposed by Tenny (1994:18); all of them involve a scale on the *q* dimension (see §7.4.3 for further discussion).

Directed changes include not only accomplishments and directed activities but also directed achievements. Directed achievements are sometimes excluded from consideration in more recent work because they do not involve an incremental scale (Dowty 1991:568); they have a scale only in a 'trivial sense' (p. 568), with only two points, the initial and result states. Beavers includes both directed processes (directed activities and accomplishments) and directed achievements in his category of scalar changes, like our category of directed changes (Beavers 2008:250–2; see also Wechsler 2005:262–8).

One interesting piece of evidence in favor of grouping directed achievements with other directed incremental processes is that all four types of incremental themes that have been identified in the literature also occur as punctual TRANSITION THEMES:

(17) *Mereological transition theme:*
The car exploded.

(18) *Property transition theme:*
The light turned green.

(19) *Path (holistic) transition theme:*
a. They reached the summit.
b. She became president of the company.

(20) *Representation-source transition theme:*
I saw/photographed Mount Tamalpais.

In (17), the object instantaneously changes—the whole acts as a single part whose state changes from intact to destroyed. In (18), the property associated with the object has only two defined values on the scale of color (red and green; in American traffic signals the yellow (amber) light is not used in the transition from red to green). In (19), the argument is indirectly associated with a literal (spatial) or metaphorical path that has only two points defined on *q* (not on the summit vs. on the summit; not president vs. president). Finally, in (20), the representation is created instantaneously from the source: Mount Tamalpais as a whole is instantly represented in perceptual cognition or on film or digital image.

The convergence in subtypes of themes for incremental themes—bounded (accomplishments) or unbounded (directed activities)—and directed achievements supports the linguistic relevance of the category of directed changes. Yet the category of directed change is not easily captured using the traditional semantic classes or semantic features for aspect. The category of directed change cuts across the Vendler classification. Directed changes include only some achievements, excluding cyclic achievements (although Vendler did not discuss cyclic achievements, his tests for achievements test for punctual dynamic construal). Directed changes include only some activities (Vendler did not discuss directed activities, but again, his tests for activities test for durative unbounded processes). Directed changes also cut across the commonly used semantic features that identify aspectual types: directed activities are incremental but unbounded, while directed achievements are bounded but not incremental (cf. Rappaport Hovav and Levin 2002:272). Nevertheless, directed change is straightforwardly definable in terms of properties of the defined points on the *q* dimension and the aspectual contour of events. Other linguistic consequences of directed changes will be discussed in §7.4.3 and §8.2.

3.1.2 Event boundaries and the imperfective paradox

As noted in §2.3.1, Sasse argues that there are two distinct notions of boundedness which have been described in the literature. The first type is associated with the Vendler category of accomplishments and achievements, and stands for what we have called the 'natural endpoint' of an action; Janda calls this a telos (Janda 2007:615). For instance, in *write a letter*, the natural endpoint is the completion of the letter, and in *dry* (of clothes), the natural endpoint is the maximal degree of dryness. The second type is associated with grammatical aspect, and simply refers to an action that is finished, whether it has a natural endpoint that has been reached, or simply terminates. An example of the latter is the Russian Perfective verb *porabotat'* 'work for a while' (Breu 1994:28): the prefix *po-* can be attached to many Imperfective activity predicates and denotes an activity that has been terminated (Janda 2007:609 calls these Complex Acts); no 'natural endpoint' is involved or even exists. The English Past tense *We worked yesterday* also strongly implicates if not outright entails that the activity was terminated before today (see §4.3.3).

The analytical problem here is that in the Vendler–Mourelatos sense of the boundedness feature, *work* is not bounded, but the Russian *po-* Perfectives and the English Past tense form *worked* (at least in some contexts) appear to be bounded in the sense that the activity has been terminated. The converse of this problem in defining boundedness is better known, at least in the

Anglo-American tradition. Dahl (1981) describes the converse problem with the following examples (p. 81):

(21) a. I was writing.
b. I was writing a letter.
c. I wrote a letter. [taken to imply that I finished it]

The problem is with (21b): it describes an event with a 'natural endpoint' (finishing the letter), but the English Progressive form, and its translation to the Russian Imperfective *Ja pisal pis'mo* (Dahl 1981:82), do not entail that the letter was actually completed. So the event in (21b) seems bounded in the sense of being an accomplishment, but is not bounded in the sense that the natural endpoint is not (necessarily) attained.

Dowty christened this problem the imperfective paradox: (21c), in the Simple Past, entails that the letter was written, but (21b), in the Past Progressive, does not entail that the letter was written (Dowty 1979:33). Two alternative proposals have been made to resolve the imperfective paradox. The first proposal is a modal one (Dowty 1977; 1979:133–54). It treats *write a letter* as being true of a time interval, but the latter part of the time interval (in which the endpoint is attained) extends into the future. Since the future is uncertain—I might be interrupted in writing the letter and never return to it—an expected course of events is assumed. Dowty represents this as an 'inertia world', i.e. a possible world that is like the actual world up to the present but includes the expected outcome of the event being described. This is a modal analysis in that the Progressive is analyzed as implicitly including reference to the future.

The modal analysis of the Progressive has proven popular. A number of problems and refinements to the modal analysis have been presented (for a survey, see Wulf 2009). It has been difficult to define exactly what the expected course of events is such that the Progressive will work, given a continuation clause that entails that the event did not proceed to its expected conclusion in the real world—i.e. the real world turns out not to be the inertial world, if for example I was writing a letter but then the phone rang and I never got back to it. Most accounts attempt to get around this problem by defining inertia worlds as lacking (reasonable) interruptions. Wulf argues however that sentence (22) is felicitous even though the obstacle exists from the outset, and hence the task is impossible:

(22) Shannon was making a pumpkin pie, but someone had already used the last can of pumpkin.

A possible worlds analysis will not allow (22), because the inertia world of Shannon completing the pumpkin pie (following on in time from the real world) is not a possible world.

The second proposal is a non-modal analysis based on the decomposition of events (Parsons 1989, 1990, chapter 9). Parsons decomposes accomplishments into a holding phase and a culmination (see §2.3.1). His analysis is simply that the Progressive denotes (in our terms, profiles) the holding phase but not the culmination phase. Parsons also notes the problems in characterizing what counts as an inertial world in the modal analysis. Parsons also argues that modal accounts are challenging because they reject the positing of events with parts (such as a culmination) as ontological entities.

Parsons discusses two objections to his analysis. Both problems are the consequence of decomposing an event into temporal phases, such that the first phase excludes the completion phase. The first is that it is difficult to specify the actual content of the process leading up to the culmination in a sentence like *John is making me a millionaire*. Parsons responds that it is not a problem with the Progressive, but that a result-oriented event predicate is vague as to the manner in which the result is attained (to put it in Levin and Rappaport Hovav's 2005 terms).

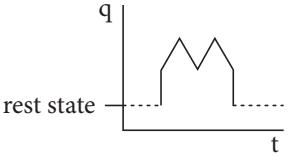
The second objection to Parsons's account is that it requires one to allow for reference to unfinished objects when the verb in question is a verb of creation: does the letter exist when I am still just writing it, especially if I am interrupted and it remains unfinished? Parsons responds that this is in fact ordinary language usage, and is not confined to the Progressive. In *Sam put the cake in the oven*, an ordinary Past tense is used to indicate a completed event, but the cake is not finished until after it has been baked. Yet no native speaker objects to using *the cake* to describe the object being put in the oven (Parsons 1990:176). Noun phrases can be used to describe unfinished objects of the relevant category. Likewise, verb phrases can be used to describe unfinished events of the relevant category. Of course this is a matter of construal: one speaker may describe a child as *piling up sticks* and another may describe the same child as *building a fort*.

The two-dimensional analysis allows us to straightforwardly distinguish the two types of boundedness and offer a version of Parsons's analysis of the imperfective paradox. The existence of a natural endpoint or telos of an event, illustrated by (21b–c), is the presence of a result state defined on the qualitative state dimension. We will call this Q-BOUNDEDNESS. It corresponds to many analysts' definition of TELICITY, and we will use 'telicity' in this meaning only. Of course, telicity—the existence of a result state on the *q* dimension—is a property of a construal of an event; for example, the mereological incremental theme of *write (a letter)* would not have a telic construal if it were in the Bare Plural construction (*write letters*).

The Russian Perfective *po-* 'do for a while' prefix illustrates boundedness on the time dimension, or *T*-BOUNDEDNESS: the Perfective form profiles the

inception transition and a termination transition as well (the example is from Forsyth 1970:24):

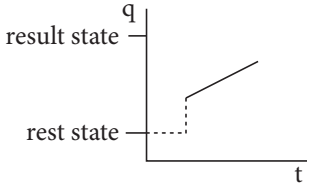
(23) Devočka **poplačet**, potom zabudet.
'The girl **will cry for a while** and then forget.'



In (23), the event is temporally bounded, in that the initial and final phases are profiled; but the final phase returns to the rest state, rather than transitioning to a result state, because there is no result state defined on the *q* dimension.

In contrast, a Progressive sentence describes an activity, that is, no boundary transition phases are profiled. This is true even of the Progressive of a *q*-bounded event such as (21b), the aspectual representation of which is given in (24). Although there is a result state defined on the *q* dimension, it is not part of the event profile.

(24) I was writing a letter.



The states defined on *q* taken together provide a characterization of the category that the speaker is asserting for the event she is describing. The representation of (24) is essentially the same as Parsons's non-modal analysis, in that both differentiate the result states from other states of the event. One could, incidentally, provide a modal analysis in the two-dimensional model by adding a transition and rest state phase that represent the inertia world that extends beyond the time reference of the profiled phases of the event. This would require adding a specification of an inertial profile as well as an actual profile which includes both the beginning and the ending transition phases of the inertial accomplishment. The non-modal analysis, however, can capture the fact that the event has a natural endpoint (it is on the *q* dimension), without the complications of inertial possible worlds and how they are to be defined. There is also no reason to think that the Progressive is a modal, in the way that the future and epistemic, deontic, and root modalities all require the evocation of non-real worlds or mental spaces (Fauconnier 1985): the

Progressive does not historically arise from a modal construction, nor does it evolve into a modal construction (Bybee, Perkins, and Pagliuca 1994).

Parsons is right that the objections to the non-modal analysis are actually more general phenomena that are not specifically problems about the Progressive (and plausible solutions exist for both problems, as Parsons notes). For example, Wulf presents a second problematic case, which he treats as a problem for both the modal and the non-modal account: the combination of the Progressive with an *unless* clause (Wulf 2009:213):

(25) Shannon is making a pumpkin pie, unless her neighbor pulls her away (again) to play bridge.

Wulf assumes, following Declerck and Reed (2000), that *Q, unless P* means '*Q* except if *P*'; that *Q, unless P* entails *Q* if not *P*; and that a pragmatic implicature leads to *Q* if and only if *P*. Hence if Shannon is pulled away to play bridge, then the sentence *Shannon is making a pumpkin pie* is false. That is, the *unless* clause renders the Progressive false, unlike example (22), in which the Progressive is true despite the obstacle that renders it impossible.

Parsons's decompositional analysis does not fully account for (25). I argue that (25) involves a recategorization of the event, not unlike the one required for the object in (26a–b):

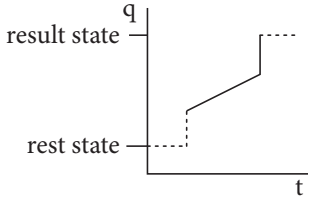
(26) a. I bought a Van Gogh drawing at the flea market, but it was a fake.
b. This Van Gogh drawing is a fake.

In (26a–b), the referring expression *a/this Van Gogh drawing* categorizes the referent as an instance of a certain type (a Van Gogh drawing), but the subsequent predicate requires us to recategorize the referent as not an instance of that type. The *q* dimension in the two-dimensional event representation is precisely a characterization of an event's type, so the recategorization of what Shannon is doing in (25) if she goes off to play bridge would involve redefining the states on the *q* dimension in such a way that the event is no longer one of making a pumpkin pie. The description of an event as well as of an object can be used in cases not only when the event or object is incomplete, but when its identity is subject to revision. Again, this is not a phenomenon restricted to the Progressive, although the Progressive allows for it because the event is incomplete.

In sum, the property of boundedness that is considered to be a part of the root of the verbal meaning, i.e. the existence of a natural endpoint or telos for the event, is represented by the states defined on the *q* dimension, while boundedness of a particular event in a particular occurrence is defined by the existence of profiled beginning and ending phases on the *t* dimension. The

end phrase may transition to the result state, as in (21c), represented in (27), or to the rest state, as in (23) above.

(27) I wrote a letter.



Another difference is that temporal boundedness is actual—that is, it is part of the aspectual profile of a particular predicate in a particular tense–aspect construction—while *q*-boundedness is potential, in the sense that the result state on the *q* dimension need not be profiled. Dahl also notes this difference, in that one analysis of the difference between the Progressive and the Simple Past in English is that the natural endpoint is potential in the Progressive, as in the representation for (24), but actual in the Simple Past, as in the representation for (27). He poses several examples as problems for the potential vs. actual difference, from English, German, Dutch, and Swedish, examples of which are given in (28)–(31) (Dahl 1981:84–8):

(28) John studied for a bachelor's degree (for two years).

(29) The submarine moved toward the North Pole (for two hours).

(30) a. Katinka breide aan een trui. [Dutch]
b. Katinka stickade på en tröja. [Swedish]
'Katinka was knitting a sweater.' [lit. 'Katinka knitted at/on a sweater']

(31) Er baute an einem Haus. [German]
'He is building a house.' [lit. 'He builds on a house']

All of these examples have in common the apparent presence of a potential *q*-boundary, in our terms. But as Dahl shows, they behave as if there is no *q*-boundary; for example, the English sentences in (28)–(29) take the Durative temporal adverbial with *for* characteristic of (qualitatively) unbounded events instead of the Container adverbial with *in*. All of the sentences, in English and the other languages, are characterized by the presence of an Oblique argument, even though the closest English translation equivalent for (30)–(31) has a Direct Object with the Progressive. Since these examples are sensitive to argument realization, we will defer discussion of them until §7.4.3.

Finally, the distinction between *q*-boundedness and *t*-boundedness means that there is no simple way to define 'event' as 'bounded process'. 'Event'

would have to be defined as either '*q*-bounded process' or '*t*-bounded process', and there is no a priori reason to choose one definition over the other. Since it is necessary to be clear about the type of boundedness being referred to, we do not use 'event' to mean 'bounded process' of either type, but instead use 'event' to refer to the superordinate category of aspectual types, as in cognitive linguistics and generative grammar.

3.2 Construal and aspectual potential

The semantic aspectual types described above are analyzed independently of predicates. More precisely, predicates have meanings that allow them to be interpreted as belonging to different aspectual types, depending on the grammatical and/or discourse context in which they are embedded. This is the primary reason for separating aspectual type—a single construal of a predicate's aspectual structure, as represented by a specific *t/q* representation—from predicate classes that are defined by their aspectual potential—ability to be construed in a range of aspectual types.

An example of a particularly flexible English predicate is *touch*. In the Simple Past tense, *touch* may be construed as a cyclic achievement, that is, an essentially instantaneous moment of contact:

(32) Denise touched the painting.

In the Past Progressive, *touch* may be construed as an undirected activity, not unlike other cyclic achievements, though this interpretation is easier to get with *keep* + Present Participle:

(33) Denise was touching the painting/Denise kept touching the painting.

More commonly, especially with inanimate Subjects, *touch* in the Progressive apparently has a transitory state construal (these are the inactive actions mentioned in §2.3.2, and will be discussed in §3.2.2):

(34) The chair is touching the painting.

Touch may also be used to describe a (reversible) directed achievement, namely the transition to the transitory state profiled in (34):

(35) She pushed the chair so far that it touched the painting.

Finally, *touch* may also be used in the Simple Present to denote an inherent state:

(36) The San Andreas Fault touches the east side of the campus.

Touch represents a particularly versatile English predicate with respect to aspectual construal, but most predicates have at least two or three construals. For example, any process or transitory state predicate has a habitual construal in the Simple Present, which describes an inherent property of the grammatical Subject's behavior:

(37) John hikes ten miles every week.

(38) Sandy writes every morning between 7 and 8 am.

(39) Timmy is sick every winter.

The fact of alternative construals of a predicate or class of predicates leads one to two questions: What is the contribution of the predicate semantics to the aspectual type of a sentence in a particular context? What are the allowable relationships among the alternative aspectual construals of a single predicate?

3.2.1 The contribution of predicate semantics to aspectual types

Three extreme positions are generally presented whenever an analysis is offered of the semantic contribution of two linguistic elements to the meaning of the whole, where the intuitive meanings of the two elements overlap: polysemy, derivation, and vagueness. Of these three, the one most fully developed for the analysis of aspect is derivation, though the other two analyses have also been suggested. I will argue that the reality is more complex, and that the truth is somewhere in between the three extreme positions.

The POLYSEMY analysis for the aspectual potential of predicates is that the verb has multiple senses corresponding to each of its available aspectual construals. For example, as noted in §2.2, Vendler analyzes *see* and *know* as having two senses, one being the (transitory) state and the other being the (directed, reversible) achievement (Vendler 1967:113). Dowty analyzes *walk* as having two senses, one being the activity (*walk for an hour*) and the other the accomplishment (*walk to the park*; Dowty 1979:60). The polysemy analysis, if assumed to apply to all aspectual construals, implies that all the alternative construals of a predicate are conventionalized.

The DERIVATION analysis for aspectual potential presupposes that each predicate has a basic aspectual type, and other aspectual construals are made available by derivational processes. A particular variant of this analysis, the COERCION analysis, has been developed in both the formal semantic and cognitive linguistics traditions. In the coercion analysis, a predicate that has a particular basic aspectual type is coerced into another aspectual type as a consequence of the grammatical or constructional context in which it occurs.

For example, in the coercion analysis, a predicate like *know* has a basic type of a (transitory) state, as found with the Simple Present tense in (40); but when it is combined with the Punctual adverb *suddenly*, as in sentence (41) (see §2.2.2), it is coerced into a (reversible directed) achievement type:

(40) I know how to do this.

(41) I suddenly knew the answer.

De Swart (1998) presents the coercion analysis in a formal semantic context. She introduces coercion operators that change the basic aspectual type of a predicate to another aspectual type. These are analogous to the coercion operators that change a Mass noun to a Count noun ('universal packager') and vice versa ('universal grinder'; Bach 1986:10; see also §3.1.1, examples (4)–(8)). De Swart does not concern herself with the representation of the grammatical context; she simply represents them as functions such as PROG (ressive), PERF(ect), and PAST.

De Swart argues that grammatical aspect constructions like PROG and PERF require a particular aspectual type as an input, and convert the input to another aspectual type. For example, PROG requires an event (bounded process) as an input, and converts it to a state. In *Mary was reading a book*, *read a book* is a bounded process and therefore can act as an input to the Progressive, but *be reading a book* is a state. Tense constructions, on the other hand, do not convert one aspectual type to another type, although they may require a particular aspectual type as an input. In De Swart's analysis, the English Past simply takes whatever aspectual type a predicate is and assigns a time reference to it. The French contrast between Passé Simple and Imparfait for past time reference is only a contrast in the required aspectual type: the Passé Simple requires a (temporally) bounded process, while the Imparfait requires an unbounded situation (homogeneous in De Swart's terms; De Swart 1998:369).

Normally, the aspectual specifications of the linguistic elements have to match, as in *I know how to do this* and *Mary was reading a book*. This matching process is like agreement (indexation), or more generally the process of unification, illustrated in (42):

(42) a. The boys are sleeping.
b. *The boys is sleeping.
c. The boys slept.

In (42a), the Subject phrase has the value Plural for its Number feature, and so does the verb. These two values are supposed to match, hence (42a) is acceptable but (42b) is not. Examples (42a–b) represent the traditional notion

of agreement: two linguistic elements express a value of a linguistic feature, and they must match. Example (42c) illustrates the generalization of traditional agreement to unification. The verb does not have a value for its Number feature, since English Past tense verbs do not inflect for Number; but the Subject phrase does, and so the verb's Number feature is unified with the value Plural when the Subject is combined with the verb.

Unification allows the combination of a linguistic element with an unspecified feature value and another element with a value for that feature. However, unification does not allow the combination of linguistic elements with clashing values for a shared feature. For example, since the English Progressive requires a bounded process but its output is a state, the Progressive cannot be applied to itself:

(43) *Mary was being reading a book.

Coercion is a process that can override a clash of values in a shared feature, by forcing a change in the value of the feature of one of the linguistic elements so that the two feature values match. In a sentence like (41), the aspectual type required by the adverb *Suddenly* is punctual, while the assumed basic aspectual type of *know* is durative (and stative). Instead of leading to unacceptability (semantic incoherence), however, (41) is fully acceptable—but the aspectual type of *know* has been coerced into a directed achievement, namely the inception of the state.

Michaelis (1998, 2004) develops an analysis very similar to that of De Swart in a construction grammar context. The 'grammatical context', such as *Suddenly* or the Progressive, is a construction with its own meaning. That meaning may impose semantic requirements for the 'input' to the construction—the predicate filling the relevant role in the construction. Michaelis also distinguishes between aspectual constructions, such as the Progressive, which require one aspectual type as an input but convert it to another aspectual type as the output (the meaning of the whole), and tense constructions, such as the English Past, which may or may not require a particular aspectual type as an input but do not convert it to a different aspectual type. Michaelis describes any semantic requirement on an input as implicit type-shifting, and any conversion of semantic type as explicit type-shifting (Michaelis 2004:28). Michaelis also proposes that coercion is one-way: the predicate's aspectual type shifts to the type required by the grammatical construction, not vice versa (her 'override principle'; 2004:25). The one-way hypothesis for coercion is also present, albeit implicitly, in De Swart's analysis.

Coercion is thus a special process in a model of semantic composition which otherwise requires that the values of shared features between linguistic elements that are combined must match, or at least unify. It assumes a basic

type and a derivational process that is triggered as a consequence of a mismatch between the values of the shared feature(s).

The third and final analysis is a VAGUENESS analysis. In a vagueness analysis of lexical aspect, a predicate does not have any aspectual type, either as basic or as alternative senses. Instead, its meaning is vague across the aspectual types available in its aspectual potential, and its aspectual type is determined by the grammatical context in which it occurs. In such an analysis, English *know* is vague as to its aspectual type. When *know* is combined with the Simple Present, then it takes on the stative aspectual type which is contributed by the semantics of the Simple Present. When *know* is combined with the Past tense and the adverb *suddenly*, then it takes on the achievement aspectual type contributed by those constructions. To my knowledge, a vagueness analysis has not been presented for the interaction of lexical and grammatical aspect. Traugott (2007:546) suggests a vagueness analysis for the parallel mass/count semantic distinction (bounded vs. unbounded), but does not pursue it. We mention it here because it is an equal contender with the polysemy and derivation analyses, and vagueness analyses are seriously entertained in other domains including argument structure (see §9.3).

The polysemy analysis presumes that all the aspectual construals are conventionalized senses of the predicates. While a polysemy analysis has not been developed in detail for aspect, it has been criticized in other domains for introducing redundancy and additional senses where a derivational analysis, if successful, could remove such redundancy.

The coercion analysis, being the most fully developed in the domain of aspect, has attracted criticism as well (Traugott 2007; Ziegeler 2007). Traugott focuses on the historical development of the parallel coercion analysis in the nominal domain: the coercion of countable to mass as in the invented example *There's rat all over the road* (Traugott 2007:528), while Ziegeler focuses directly on the aspectual analysis. Traugott questions whether the supposedly derived countable construal *a pudding* is actually derived when combined with the Indefinite article, since both mass *pudding* and countable *a pudding* have occurred for at least two centuries, and suggests a polysemy analysis in at least this case (Traugott 2007:528).

Both Traugott and Ziegeler examine the history of constructions that are said to require a particular semantic type as input. Traugott examines the Partitive construction as in *a piece of X*, which is supposed to require an unbounded nominal for the *X* role, and shows that both countable (bounded) and mass (unbounded) expressions occur in the *X* role. If anything, the Partitive construction had even less of a semantic "requirement" in earlier periods in the history of English. More recently, specific Partitive heads favor one construal over another: '*a shred of* favors unbounded complements in

either use, *a lot of* favors unbounded or plural bounded heads, *a bit of* favors an unbounded head as partitive' (Traugott 2007:547).

Ziegeler notes that early occurrences of the English Progressive, which is supposed to require a process in contemporary English, include the Progressive with stative predicates. The Middle English examples in (44)–(45) are from Ziegeler (1999:78–9):

(44) the flode is Into the grete See rennende
'the river runs [lit. 'is running'] into the great sea'
(Gower, *Confessio Amantis*, from Mustanoja 1960:595; translation by Ziegeler)

(45) ... we holden on the Crysten feyth and are bylevyng in Jhesu Cryste
'we hold to the Christian faith and believe in Jesus Christ'
(Caxton, *Blanchardyn and Eglantine*, from Mustanoja 1960:595)

(46) thou shalt be hauynge power on ten citees
'you shall be having power in ten cities'
(a1425 (*c.*1395) *WBible (2)* Luke 19,17; from Denison 1993:365–76)

As with the Partitive, if anything the Progressive is now more restrictive, in that its use in the modern translations of (44)–(46) would be unacceptable (note that in (45), the first clause is in the Simple Present while the second clause, apparently of the same aspectual type, is in the Progressive). The Progressive is still possible with inactive actions such as *lie, sleep*, and similar predicates, albeit not generally with *have, belong*, and stative *run* (as in (44)). Michaelis analyzes inactive actions as (homogeneous) activities, thereby preserving her hypothesis that the contemporary English Progressive requires processes. But one could also argue that the Progressive is becoming stricter in its semantic requirement, yet still is acceptable with inactive actions.

Nevertheless, it seems plausible that whatever the history of the English constructions is, the contemporary constructions favor if not require predicates of a certain aspectual type, and that some construals may be novel, rather than established senses in a polysemous representation. Traugott writes that '[n]o clear examples are attested in my data of coercion as illustrated by Michaelis's presumably constructed *Give me a shred of sheet*' (Traugott 2007:547). I heard the following example using *sheet* in a Partitive with *a lot*:

(47) "They give you more sheet. They give you a hell of a lot more sheet than the Americans do"
[Carol T., describing British queen size sheets, October 1, 1998]

But the question remains: Is this coercion? That is, is the semantic derivation specifically induced by a constructional mismatch with the predicate's

(or noun's) basic meaning? In fact, alternative construals are available even without a constructional mismatch. For example, there is a construal of mass nouns as countable nouns with a bounded variety construal:

(48) We will be tasting three wines tonight: Pinot Gris, White Riesling and Gewürztraminer.

In (48), the mass noun *wine* is construed as a countable noun in the Numeral construction, referring to the discrete (bounded) wine varieties being tasted. But the bounded variety construal is available as an alternative construal even for countable nouns in the Numeral construction:

(49) We planted three junipers in the back yard.

In (49), the countable noun *juniper* can be construed either as the basic individual, such that there are three juniper plants in the back yard, or as the variety, such that there are three varieties of juniper in the back yard (with possibly many more than three individual juniper plants).

Likewise, the examples of *touch* given above allow for alternative construals in the same construction:

(50) Denise was touching the painting.

In (50), *touch* may be construed as an activity (iterated contact events) or as a transitory state (her body was in contact with the painting). In other words, alternative construals occur in one and the same construction. The construction may require or favor a certain semantic type, in terms of aspect or countability; but it does not force a specific semantic type.

One could allow that the construction coerces a semantic type in that some construals are excluded for some constructions: *three X* does not allow an unbounded mass construal for *X*, even if it allows more than one bounded construal for *X*. Both De Swart (1998:359) and Michaelis (2004:33) allow this, offering the example in (51):

(51) My program ran in less than four minutes.

The English Past tense construction allows either a (runup) nonincremental accomplishment construal (after less than four minutes, the computer program ran), or an incremental accomplishment construal (the running of the program lasted less than four minutes).

But allowing multiple construals weakens the notion of coercion considerably. Multiple construals in a single construction imply that the semantic changes in construal are at least partly independent of the construction. In that case, construal is not a result of constructional coercion, but of a zero-coded word-formation process that derives the alternative aspectual types. In

that case, the semantic process is explainable in terms of general processes of semantic shift such as metonymy, as Ziegeler (2007) argues (see also §3.2.2). Such an account would also allow for cases in which the zero-derived alternative aspectual construals have become conventionalized.

Another problem with coercion as a mechanism that overrides matching is how to constrain the process. Why does coercion happen with the Progressive in examples like (50), but not in examples like (43), where the Progressive is applied to a state, namely the output of the Progressive? Why does coercion not happen with a Singular/Plural mismatch between Subject and verb in (42b)? One would have to limit the scope of Michaelis's override principle to countability and aspect; but then there would seem to be less justification for positing a special semantic mechanism. Moreover, if construal were independent of constructional contexts, then there is a natural explanation for when coercion happens and when it does not: it happens when the word-formation process permits a construal, and it does not when there is no word-formation process permitting it.

Zero-derivation of aspectual types is also a language-specific phenomenon. For example, English allows for either a cyclic achievement or an undirected activity construal of certain predicates:

(52) a. The girl shrieked (once). [cyclic achievement]
b. The girl shrieked (for several minutes). [undirected activity]

In Russian, however, this aspectual contrast is encoded not by zero-derivation but by an overt Semelfactive suffix, deriving the cyclic achievement meaning from the undirected activity meaning: *stučat'* 'knock, hammer, etc.' vs. *stuknu-t'* 'give a single knock' (Forsyth 1970:26). Hence the coercion process is language-specific, which makes it more plausible to analyze it as a language-specific word-formation process.

The example of *touch* illustrates another problem with the coercion analysis, and derivational analyses in general. Derivational analyses, including coercion, presuppose that a predicate has a basic aspectual type, from which other aspectual construals are derived or coerced. But for some predicates such as *touch*, it is not obvious what the basic aspectual type would be. Intuition is not always a reliable guide. What is the basic aspectual type of *remember, forget*, and *realize*? Most English-speaking linguists consider the cyclic achievement construal of predicates like *shriek* as the basic one, with the undirected activity construal derived, being coerced by use of the Progressive (*The girl was shrieking*). But in Russian, the morphologically basic verb form denotes the undirected activity, and the cyclic achievement construal is derived by an overt suffix.

A polysemy or vagueness analysis avoids the need to assume a basic aspectual type for each predicate. The polysemy account in its extreme form assumes that all aspectual types available for each predicate are conventionalized, which is unlikely. The vagueness analysis implies that all predicates will behave in a similar fashion. But in fact there are differences in the aspectual potential for different classes of predicates. For example, sound emission predicates generally have cyclic achievement and undirected activity construals. Moreover, the same semantic classes of predicates display similar semantic behavior across languages, allowing the same set of construals via zero or overt derivation. The potential for cyclic achievement and undirected activity (iterated) construal recurs for predicates of sound emission (*squeak, beep, cough*), light emission (*flash*), contact (*tap, slap, hit*), and bodily motion (*flap, twitch, wave*) in English, Russian, and other languages. The potential for transitory state and directed achievement (inceptive) construals recurs for predicates of cognition and perception in English, Japanese, and other languages. These observations suggest that there is something about the nature of these events and how humans experience these events that gives them their aspectual potential. The aspectual potential of different classes of predicates will be explored in greater detail in the next chapter.

A usage-based, encyclopedic semantic model of predicates and their meanings provides an account of the contribution of predicate meaning to the aspectual type of a sentence that avoids the problems of the polysemy, derivational, and vagueness accounts. In a usage-based model, the mental representation of linguistic structures is influenced by their usage patterns, including frequency and entrenchment (e.g. Bybee 1985, 2007). In the usage-based model, the alternative aspectual construals may or may not be conventionalized, that is, whether an aspectual construal is a "sense" of the predicate varies depending on usage patterns. For example, English *beer* is almost certainly also conventionalized as a count noun as well as a mass noun, since the count noun use is frequent and long established. Similarly, English *tap* almost certainly has both the cyclic achievement and undirected activity construals as part of its conventions of use. In some cases, a schematic alternate-construal pattern may become entrenched, leading to a productive pattern, such as the iterative construal of cyclic achievements. But this is a language-specific development; the same semantic alternation may require overt morphological derivation in another language.

The usage-based model also allows for some predicates to have a default aspectual construal, or at least a preferred aspectual construal, as a result of asymmetries in the frequency of use of one aspectual construal over another. For example, *dog* has a default construal as a count noun (bounded object), because the frequency of use of *dog* with a bounded construal is much greater

than the frequency of use of *dog* with an unbounded construal (§1.4). Analysts can infer the strength of a default aspectual construal by comparing the frequency of use of the alternative construals of a predicate. In some cases, there may not be a default construal, if no one construal dominates in usage frequency. Thus, in a usage-based model, the conventionalization of an aspectual construal, and the existence of a basic (default) aspectual construal, is an empirical question whose answer varies depending on usage patterns, rather than being an a priori assumption about lexical semantic representation.

The range of aspectual construals found with any given predicate or semantic class of predicates, that is, the aspectual potential of the predicate (class), is a function of speakers' encyclopedic semantic representation of the situation type, and the construal operations that allow for alternative aspectual construals. For example, part of our knowledge of sound emission, light emission, contact, and bodily motion events is that they frequently occur only once and frequently occur repeatedly in succession. This fact about the world is manifested grammatically in either a zero-coded alternation between cyclic achievement and undirected activity construals, or a special derivational morphology such as the Russian Semelfactive suffix that singles out these semantic classes.

The tremendous diversity in aspectual potential of different predicates, which will be described in greater detail in chapter 4, reflects the sensitivity of speakers' encyclopedic knowledge of those situation types, as well as the knowledge of intricate language-specific conventional patterns of usage. The next section focuses on the construal operations, that is, the semantic processes that relate alternative aspectual construals of a predicate. The construal operations required to account for the alternative construals of particular situation types are easily and naturally represented as operating on the two-dimensional geometric model of aspectual types presented in chapter 2.

3.2.2 Mechanisms of aspectual construal

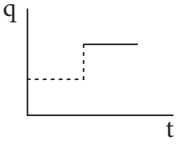
Linguists, particularly in the cognitive linguistics tradition, have identified a number of conceptualization processes or construal operations that are relevant to linguistic semantic analysis. A number of classifications of construal operations exist; Croft and Cruse (2004, chapter 3) bring together and synthesize most if not all of the construal operations proposed in the literature. Croft and Cruse classify construal operations under four major headings, all of which have a cognitive psychological basis: attention, comparison, perspective, and Gestalt. The construal operations responsible for alternative aspectual construals are instances of construal operations observed in other

linguistic semantic domains. Although construal operations are amenable to formal representation, it is not always easy to get from the experiential reality to the conceptualization represented by the construal.

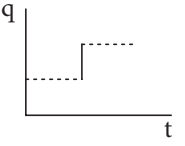
One common construal operation of attention is SELECTION (Langacker 1987) or metonymy (as analyzed in Croft 1993/2002): a word may be used to describe two or more concepts associated in a semantic frame. For example, when one says *There's a purple finch in that tree*, one is normally asserting that the bird is in the space outlined by the branches of the tree, not that the bird is embedded in the trunk (Herskovits 1985). That is, *that tree* is metonymically shifted to the associated concept of the space defined by the branches of the tree. In the terms of a semantic frame analysis, the concept profile has shifted. Herskovits's detailed analyses of the selection processes in spatial relations expressed by English *at, on*, and *in* demonstrate how rich this cognitive realm is, as well as the need to constrain it by pragmatic principles in addition to idiosyncratic linguistic conventions.

Aspectual selection/metonymy is found with those predicates that allow either a directed achievement construal or a transitory (resulting) state construal, described in §2.3.2 and illustrated again in the aspectual representations in (53):

(53) Transitory state — *I remember how to do this.*



Directed achievement — *I remembered the answer.*



The aspectual semantic frame is provided by the aspectual contour of the event (and the values defined on the two dimensions). The two uses of *remember* share the same aspectual contour and the same values on the *q* dimension, but different phases are profiled in the different uses. As argued in §3.2.1, there is no a priori assumption that one construal or the other is basic, although empirical evidence of relative token frequency or of typological patterns of morphological marking may lead us to conclude that one or the other construal is the default.

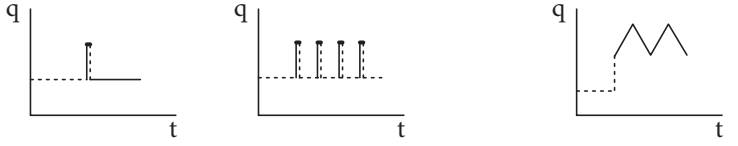
A construal operation of the Gestalt type that plays an important role in both countability of objects and aspect in events is described by Talmy (1985) as STRUCTURAL SCHEMATIZATION: alternative ways to construe the structure of an object. An example from the countability domain is the alternative count and mass interpretations of *hair*: *a hair* profiles a single ('uniplex'—Talmy) object whereas *hair* profiles a plural ('multiplex') collection. The fact that

English allows *hair* to have either construal without morphological marking is motivated by the fact that hairs frequently occur together in experience, and the association is strengthened by the fact that *hair* is usually used for a collection of strands from a common source (e.g. one person's head; §3.2.1).

The same phenomenon is found with the cyclic achievement and undirected activity construals of cyclic action predicates such as *flash*, as Talmy himself observes (Talmy 1985:77):

(54)

Cyclic achievement	Iterated cyclic achievement	Undirected activity
The light flashed.	*The light flashed four times.*	*The light flashed for five minutes.*



The alternative construals are of a single flash as a cyclic achievement, and iterated flashes as an undirected activity. How does one get from one construal to the other? Presumably the motivation for such verbs to have either construal is that light emission (as well as sound emission, bodily motions, and contact) tend to occur either singly or in temporally contiguous groups (§3.2.1). The middle representation in (54) represents the experience of an iterated sequence of cyclic achievements that is alternatively construed as an undirected activity in the right-hand representation in (54).

The process of structural schematization is an instance of what Gestalt psychologists have described as the principles of good form (*Gestalt*) or continuation (Wertheimer 1923/1950:83–4): the mind construes a single complex object from seemingly fragmented perceptual sensations. In this case, a series of discrete punctual flashes separated by brief rest states (the light is off) is construed as a durative undirected activity oscillating between off and on, as in the right-hand representation in (54). The construal here requires that the unprofiled phases in the middle representation in (54) are now profiled and the "off" state is now part of the oscillating undirected activity.

Another example of good continuation is the fact that events do not have to hold for every moment in the temporal interval in which they are described to occur. For example, *I read* The Lord of the Rings *in a week* is normally taken to be a truthful statement as long as I finished the trilogy in seven days, even though in that time I also ate, slept, and did other things than read the books (see §2.3.2). There is good continuation in that I was engaged in reading the trilogy in the relevant available time, and that I presumably progressed through the work in the usual incremental fashion (*read* has a representation-source incremental theme).

The Gestalt analysis of the distribution of an event over a time interval implies that the structure of the time dimension for an event is a speaker's conceptualization of "real" time: the conceptualized time dimension "leaves out" pauses in the progress of an event in those cases (such as reading a book) where such pauses are irrelevant to construing the event as a unity.

The preceding discussion has described the construal operation of structural schematization or good continuation as if it derives the undirected activity construal from the (iterated) cyclic achievement construal. But the construal in principle can also go in the other direction (and indeed, the fact that the Russian Semelfactive is morphologically derived from the activity verb root suggests that it does). Looking at the construal alternation the other way brings out another aspect of the cognitive processes relating the cyclic achievement and undirected activity construals. This is the construal operation of SCALAR ADJUSTMENT (Croft and Cruse 2004:51–3), also described as 'granularity' in the computational linguistics and formal semantics literature (Hobbs 1985; Krifka 1989:80).

An example of scalar adjustment on spatial dimensions is given in (55) and (56) (Croft and Cruse 2004:52, adapted from Talmy):

(55) A squirrel ran across the road.

(56) The construction workers dug through the road.

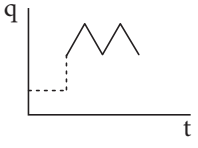
In (55), the road is construed as a two-dimensional surface, as required by *across*; the actual third dimension of the thickness of the roadbed is ignored. This can be characterized as a COARSE-GRAINED spatial conceptualization: one turns down the magnification, so to speak, so that the much thinner third dimension of the road shrinks to an infinitesimal thickness and the road is therefore conceptualized as having only two spatial dimensions. Example (56) is a FINE-GRAINED conceptualization: one turns up the magnification, so to speak, so that the third dimension has extent and the road is now construed as a three-dimensional object.

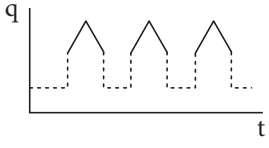
The alternation between the (iterated) cyclic achievement construal and the undirected activity construal is a function of scalar adjustment, as well as good continuation for the undirected activity construal. The iterated cyclic achievement construal represents a fine-grained scalar adjustment of the activity, in effect taking each oscillation of the flashing activity as a discrete cyclic achievement. Conversely, the undirected activity construal is a coarse-grained scalar adjustment that, combined with good continuation, mashes together the individual cyclic achievements into the oscillations of the flashing events as an undirected activity.

Scalar adjustment plays a major role for several of the alternative aspectual construals described in §2.2.2. The two-dimensional geometric representation of aspectual structure allows for a direct representation of scalar adjustment as changes in the granularity of the *t* and *q* dimensions. Moreover, scalar adjustment operates on both the *t* and *q* dimensions at once. This fact further motivates the use of the two-dimensional representation of lexical aspect: both dimensions are simultaneously necessary to characterize the construal operation.

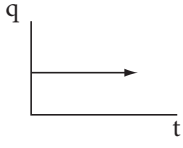
Disposition predicates typically have two alternative construals. One construal is as a transitory undirected activity describing a person's behavior on one occasion, expressed by the Progressive (*He's being polite*). The other construal is as an inherent state, that is, a personality trait of the person, expressed by the Simple Present, used in English to express states in general (*He is polite*). The relationship between these two construals is given in (57):

(57) FINE-GRAINED
Activity
He's being polite.





COARSE-GRAINED
Inherent state
He is polite.

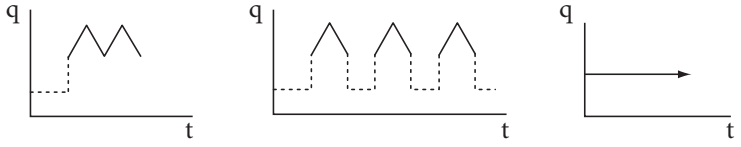


The left-hand representation represents the single-occasion construal: a process which is extended on the *q* dimension and with a relatively short extension on the *t* dimension, compatible with the Progressive. The right-hand representation represents the personality-trait construal: an inherent state, which is a point on the *q* dimension but is extended for the entirety of the *t* dimension, compatible with the Simple Present. The middle representation represents the actual behavior of a polite person: on those occasions in which politeness is called for, the person behaves in a polite fashion. That is, the person engages in regular, repeated acts of politeness. If one turns down the magnification on this person's actions, then the events will no longer be extended on *q*. But at the same time the granularity of *t* will change as well. If the person really is polite regularly, the pointlike polite behavior events will extend through the person's lifetime—the scope of the coarse-grained, low-magnification construal on *t*. The pointlike polite behavior events will be reconceptualized via good continuation as durative, extending through the length of *t*—and this is the inherent state construal.

The same process can be described for the habitual construal of transitory processes and states:

(58)

FINE-GRAINED		COARSE-GRAINED
Activity		Inherent state
She is hiking through the woods.		*She hikes every weekend.*

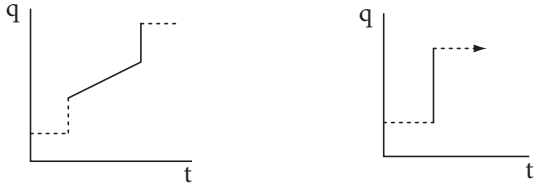


If a person regularly and repeatedly performs an action or enters into a state, then a coarse-grained, low-magnification construal will reduce the individual actions/states to points on both *q* and *t* and also change the granularity of *t*. Again, if the points are repeated regularly over the person's lifetime—the definition of a habitual activity—then via good continuation the string of points will be reconceptualized as an extended line, that is, an inherent state, compatible with the Simple Present expression in English.

A similar sort of scalar adjustment is found with those directed achievements that can be construed as incremental accomplishments:

(59)

FINE-GRAINED	COARSE-GRAINED
Incremental accomplishment	Directed achievement
The bridge is collapsing.	*The bridge collapsed at 9:15am.*

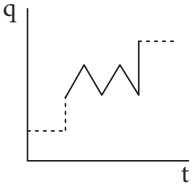


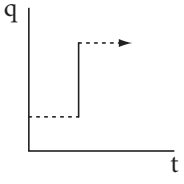
In the fine-grained scalar adjustment, the achievement is extended in *t*, but the increase in magnification also reveals the intermediate states on *q* that represent the incremental process from the intact bridge to the collapsed bridge.

Likewise, for directed achievements that can be construed as nonincremental accomplishments, the fine-grained scalar adjustment both extends the event in time and reveals the intermediate states on *q* that represent the runup process:

(60)

FINE-GRAINED	COARSE-GRAINED
Nonincremental accomplishment	Directed achievement
He's dying/He died in three hours.	*Jerry Garcia died on August 9, 1995.*

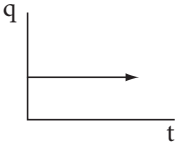


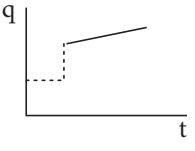


In the preceding examples, the fine-grained construal is expressed by the Progressive, because the fine-grained construal reveals a process extended in time. In the next example of alternative construals, the Progressive invokes a coarse-grained construal, since it reveals a process not perceivable at a more fine-grained temporal scale:

(61)

FINE-GRAINED	COARSE-GRAINED
Inherent state	Directed activity
She resembles her mother.	*She is resembling her mother more and more every year.*



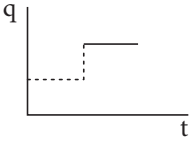


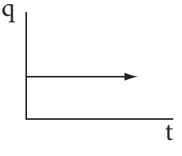
The fine-grained temporal construal describes a seemingly inherent state. A more coarse-grained temporal construal, extended over a significant part of the lifetime of the individual, reveals an incremental change of state, that is, a directed activity. There is a spatial analog to the granularity shift in this example: the earth appears to be flat at a close range, but its curvature is revealed at the much more distant (coarse-grained) range of the ocean's horizon.

The last example is the problematic case of the analysis of inactive actions (see §§2.2.2, 2.2.3). One analysis of the difference in the use of posture verbs in the Simple Present and the Progressive is presented in (62):

(62)

FINE-GRAINED	COARSE-GRAINED
Transitory state	Inherent state
Bill is lying on the bed.	*The forest lies to the east.*





This is the contrast that Goldsmith and Woisetschlaeger describe as phenomenal versus structural, and we analyzed as 'construed as transitory' versus 'construed as inherent'. The scalar adjustment analysis holds for the *t* dimension. When discussing topographical, geological, or other relatively permanent features, the natural time scale is very coarse-grained, and if the relevant state persists over that time scale, then an inherent state construal is invoked. In contrast, transitory lying events occur over a more fine-grained time scale.

Goldsmith and Woisetschlaeger actually argue against a simple, real-world representation of the Progressive as transitory and the Simple Present as permanent (inherent), on the basis of the following examples (Goldsmith and Woisetschlaeger 1982:84):

(63) a. The statue of Tom Paine now stands at the corner of Kirkland and College, but everybody expects the new Administration to move it.

b. The statue of Tom Paine is standing at the corner of Kirkland and College, and nobody thinks the deadlocked City Council will ever find a proper place for it.

Examples (63a–b) would seem to have the same extension on the time dimension, yet they differ in their grammar and meaning. We would analyze the difference in terms of the construal of the extension of the conceptualized time dimension relative to the "real world". In (63a), the time dimension is from the perspective of the old Administration, which established the permanent position of the statue for its lifetime at least. A more general instance of this conceptualization are past habituals, which are frequently grammaticalized in the languages of the world, including English (*He used to smoke, but he stopped after his brother died of emphysema*). These seem to be examples of time dimension lifetimes that do not last the real-world lifetime of the entity involved, just as the inherent position of the statue in (63a) will apparently change in the statue's real-world lifetime. In (63b), on the contrary, the time dimension is construed as extending well beyond the current perspective on the event. Our analysis, then, is that construal as transitory vs. inherent is a construal of the relationship between the profiled state and the time dimension; but that this relationship can be reconceptualized by adjusting the relationship of the conceived time dimension to "real" time as well as by adjusting the relationship of the profiled state and the time dimension.

Although the difference in scalar adjustment in (62) can lead to a difference in the nature of the state (transitory vs. inherent), there is no obvious difference in the *q* dimension, unlike the other examples of scalar adjustment described above. Nothing changes on the *q* dimension because, in this analysis, the Progressive use describes a state. Hence a coarser-grained

adjustment on the *q* dimension cannot reduce the extent of the aspectual contour any further. If the Progressive uses of posture verbs such as *lie*, and the other inactive action verbs described in §2.2.2, are analyzed as processes (the analysis proposed by Michaelis), the granularity analysis does imply a change in the coarser-grained adjustment on the *q* dimension: a shift from a process to a state.

What is the best aspectual analysis of inactive actions? It is an unusual feature of this semantic class that it allows the Progressive to seemingly construe an event as a transitory state in English. These semantic classes include body posture verbs, some contact verbs, and mechanical operation verbs, as well as certain mental and physiological process verbs:

(64) a. Jim is standing at the top of the stairs.
b. The box is lying on the bed.
c. Johnny is touching my nose.

(65) a. I'm thinking.
b. She's sleeping.
c. The cherry trees are blooming.
d. The washing machine is working.
e. The sun is shining.

The Progressive appears to construe the events in (64) and (65) as transitory states. The Simple Present construes the events in (64) as inherent states directly (as properties of the arguments), while the Simple Present for the events in (65) construes the events as inherent states only as a construal of habitual behavior.

All of these situation types display an outward appearance of a transitory state, but seem to involve an internal or invisible process. Examples (64a) and (64c) involve the maintenance of a body posture, which requires some internal process (compare the neutral *Jim is at the top of the stairs*). In (64b), this process is reduced to the force of gravity and the support of the underlying object (the bed). Example (65a) reflects some outwardly invisible internal mental activity, while (65b–c) reflect some internal physiological process. Example (65d) involves an internal mechanical operation that is minimally outwardly apparent. Example (65e) involves an internal physical process that also is minimally outwardly apparent.

It is possible that the fine-grained construal represented by the Progressive invokes some extendedness of the event on the *q* dimension, particularly for mental and physiological processes. That is, the *q* dimension is registering a construed internal process in these classes. This would preserve the analysis of the Progressive as monosemous, always requiring a process in contemporary

English. Or it could simply be that the Progressive is polysemous, allowing a transitory state construal, but only if some sort of internal process gives rise to the externally observable transitory state. One argument against the monosemy analysis is that it is difficult to distinguish those transitory states which do not involve an invisible process from those that do, apart from invoking the English Simple Present/Progressive grammatical difference. For example, earlier in this paragraph I wrote 'the *q* dimension is registering a construed internal process': does *register* involve an invisible internal process?

Also, in some other languages, these semantic classes of predicates are construed as states. In Limbu, a language in the Kiranti subgroup of Sino-Tibetan, stative verbs do not take any suffix for the Imperfective, whereas dynamic verbs take the suffix *-pa* (van Driem 1987:106). Stative verbs in Limbu include the meanings 'love' and 'know', whose English equivalents are stative, and 'think', 'shine', and 'sleep', whose English equivalents are inactive actions ('sleep' however may take *-pa* in the Preterite). In Dumi, another Kiranti language which has a similar system in which stative verbs take no suffix while dynamic predicates do, the stative verbs include 'ache' (van Driem 1993:178), whose English equivalent is construable as a state or an inactive action. Even in English, instead of (65b–c) one may use the stative constructions *She's asleep* and *The cherry trees are in bloom*. In Mupun, a language in the Chadic subgroup of Afroasiatic, there is a Progressive formed with the preposition *pə̃* (Frajzyngier 1993:328). The Progressive is used with mental state verbs such as 'want' but not for posture verbs (pp. 329–30). The Limbu and Mupun facts further indicate that the division of mental predicates into states and processes based on the aspectual behavior of the English predicates may require reassessment. In the analyses in chapter 4, we will assume that the Progressive allows a transitory state construal for the semantic classes of predicates we have called inactive actions, and leave the aspectual behavior of inactive actions and mental predicates for future research.

3.2.3 Aspectual construal in English adverbial and auxiliary verb constructions

English has a variety of constructions that either construe an event to be of a particular aspectual type, alter the aspectual contour or profile, or both. Following De Swart (1998) and Michaelis (2004), we adopt the distinction between constructions which actually alter the aspectual structure of an event and those which merely require that the event is construed to be of a particular aspectual type. As De Swart and Michaelis both note, constructions which alter the aspectual structure of an event also usually require the event to be construed as a particular aspectual type, which is then altered when combined with the aspect-altering construction.

English aspectual constructions include aspectual auxiliary or complement-taking verbs, aspectual adverbs, and of course the basic tense–aspect constructions, Simple Present, Simple Past, and the Progressive. We have surveyed some of the construals of the basic tense–aspect constructions in §3.2.2; a more complete survey will be offered in §4.3. In this section, we will survey some aspectual adverbial and auxiliary constructions, their interaction with aspectual construals of predicates, and the semantic analysis of the adverbial and auxiliary constructions that they imply.

English Locative temporal adverbials interact with the lexical aspect of the predicates with which they combine. English Punctual temporal adverbials require that the events they combine with are punctual. This is of course straightforward for achievements (66) and point states (67). Atelic (*q*-unbounded) processes may be construable as achievements by shifting their profiles to their inceptive phase, as in (68). Accomplishments can only be construed as punctual by a coarse-grained scalar adjustment to an achievement, which may not always be plausible; compare (69a–b).

(66) a. At 1:15pm the siren sounded.
b. He died at 6:15am.

(67) At 3:45am, the moon was at its zenith.

(68) At 5:00 they danced.

(69) a. At 5:15 she read my message.
b. *At 5:15 she read *War and Peace*.

States are more problematic. Some states can be construed as punctual achievements with Punctual temporal adverbials:

(70) At 6:20pm the clouds parted and we saw Mt. Denali.

However, states (apart from inherent states) are also possible with Punctual temporal adverbials, though somewhat marginal in my judgment, in an interpretation in which the state phase includes the temporal point denoted by the adverbial (supporting adverbials suggested by Jóhanna Barðdal improve (71a–b)):

(71) a. ?At 4:30, when I looked out the window, the sky was red.
b. ?At 6:00, the first chance I had to check on him, he was dead.
c. *At 5:00, she was Polish.

If (71a–b) are acceptable, then one must conclude that there is a second sense for the combination of English Punctual temporal adverbials, one of temporal inclusion, restricted to non-inherent states.

English Locative adverbials have been described as having the opposite temporal relationship to bounded events and unbounded ones: bounded events are contained in the temporal interval, while unbounded events contain the temporal interval:

(72) I wrote the letter on Tuesday.

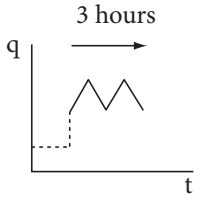
(73) I was ill on Tuesday.

Example (72) is true only if the entire letter-writing from inception to completion occurred on Tuesday. Example (73) is true even if I fell ill on Monday and did not recover until Wednesday. In fact, (73) is also true under a *t*-bounded interpretation (I had a brief illness, e.g. from food poisoning, that began and ended on Tuesday); compare also *On Tuesday she danced and on Wednesday she went hiking*, in which the (*q*-unbounded) activities are *t*-bounded and contained in each day. Conversely, the *t*-unbounded interpretation of (73) implicates that the illness started before Tuesday and ended after Tuesday, even if it does not profile the event outside of what happens on Tuesday. So the only actual restriction is that events that are *q*-bounded and *t*-bounded must be contained (possibly properly contained) in the time interval designated by the Locative adverbial. Otherwise, *t*-unbounded events contain the temporal interval, and *t*-bounded events are contained in the temporal interval. As a consequence, there does not appear to be a monosemous analysis of the semantics of the English Locative temporal adverbial construction: a special case must be made for containment of events that are *q*-bounded and *t*-bounded. This resembles the situation for Punctual Locative adverbials, but is defined in terms of boundedness (on *t* and *q*), rather than (non-inherent) stativity.

A widely used test for identifying telic (*q*-bounded) and atelic (*q*-unbounded) predicates (or verb phrases) are the Container adverbial (*in* TIMEINTERVAL) and the Durative adverbial (*for* TIMEINTERVAL) respectively. In §2.2, we noted that even Vendler, who introduced this and other tests for lexical aspect, observed that Durative adverbials are possible with putatively telic predicates and Container adverbials are possible with putatively atelic predicates. It is possible to construct a monosemous definition of the English Durative and Container adverbial constructions, in combination with aspectual construals of the events with which those adverbial constructions combine (the construals themselves may be language-specific conventions in English).

A Durative adverbial measures a profiled time interval from the inception of the event:

(74) She danced for three hours.



It is generally assumed that, like other numerical scalar expressions, *for three hours* only implicates 'exactly three hours'; for example, it is true that she danced for three hours if in fact she danced for four hours in full. In the geometric representation, nothing is specified beyond the time interval designated by the Durative adverbial—in particular, no termination phase is introduced or profiled. The semantic representation of the Durative adverbial construction in (74) is therefore compatible with a continuation of the activity beyond the profiled phase.

Further evidence that this is the correct analysis is the incompatibility of the Durative adverbial with inherent states:

(75) *She was tall for six months.

An inherent state endures for the full length of the relevant time scale; hence its profile necessarily extends for the full length of the time scale, and for this reason is incompatible with an adverbial that profiles only a finite subinterval of the time scale, leaving unspecified what follows.[5]

The Durative adverbial is compatible with any unbounded event construal, stative or dynamic. Hence (76a) is acceptable, and (76b) as well, since English regularly construes cyclic actions as (iterated) undirected activities. However, (76c) is extremely difficult to construe, since *shatter* resists a fine-grained scalar adjustment that stretches the event out in time:

(76) a. She was ill for two weeks.
b. The mouse squeaked for thirty seconds, then ran away.
c. *The glass shattered for five minutes.

The Durative adverbial is also compatible with some telic processes:

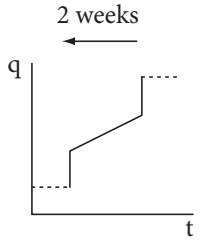
(77) a. I read *War and Peace* for a couple of hours and then fell asleep.
b. They were winning for the first half of the game.

[5] Of course, one can construe *be tall* as a transitory state in a context in which a potion can make you tall, but you shrink after it wears off. But that is an alternative construal of *be tall* such that it is no longer an inherent state.

Example (77a) only profiles part of the directed change phase of *read War and Peace*; its profile cannot include the termination phase. Hence the interpretation of (77a) is that I did not finish *War and Peace*. Example (77b) construes the directed achievement as a (durative) nonincremental accomplishment; the punctual achievement construal is incompatible with the Durative adverbial. However, example (77b) only profiles (part of) the undirected runup activity: the team may end up losing. Not all telic processes allow for a *t*-unbounded construal: *He read three books for an hour and then had a coffee* seems quite odd (at best, there is a construal of simultaneously reading three books and then going off for coffee before finishing any or all of them). The exact constraints on the use of the Durative adverbial with telic processes is left for future research. However, the use of the Durative adverbial with telic processes demonstrates that the profiled time interval is measured from the first transition phase in the aspectual contour in the event's semantic frame, which is always the inception phase.

The analysis of the Container adverbial presented here is that it measures a profiled time interval BACK FROM THE LAST TRANSITION PHASE of the event. In the typical case, with a telic process as in (78), the transition phase back from which the time interval is measured is the completion phase:

(78) I read *War and Peace* in two weeks.



It is thus probably not an accident that the Russian preposition used for the Russian Container adverbial is *za* 'behind'.

As with the scalar time interval of Durative adverbials, the exact time interval is only implicated: if I finished *War and Peace* in two weeks, then it is also true that I finished *War and Peace* in three weeks. For this reason, the analysis of the Container adverbial has been proposed to be just as it is named: the entire telic process is contained in the time interval designated by the adverbial, possibly properly contained in that interval. However, the behavior of the Container adverbial with other aspectual types suggests that this might not be the best analysis.

Achievements have only one transition phase, the achievement phase itself; likewise, atelic (*q*-unbounded) states and processes have only one transition phase, the normally unprofiled inception phase. In these cases, the Container

adverbial measures a time interval back from that transition phase, and therefore requires a construal of a runup process culminating in the achievement (79a–b) or inception (79c–d):

(79) a. The patient died in two hours.
b. The train arrived in fifteen minutes.
c. In two years, she was president of the company.
d. ??In a few seconds, the deer bounded away.

The Container adverbial specifies the endpoint of the measured time interval. The starting point has to be provided by context: for (79a), when the patient arrived at the hospital or after the surgery; for (79b), when we got to the platform; for (79c), when she was hired; and for (79d), when we first caught a glimpse of the deer. Since the starting point must be provided by the context, it is much more difficult to block the implicature to the exact time interval: in what sense is it true that if the patient died in two hours, it is also true that the patient died in three hours? The behavior illustrated in (79a–d) demonstrates that the profiled time interval is measured backwards from the (last) transition phase in the aspectual contour of the event's semantic frame; in at least some cases, that profiled phase may be properly contained in the time interval specified by the Container adverbial.

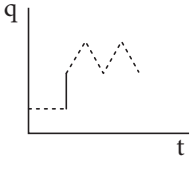
English employs a number of phasal verbs that profile one of the boundaries of an event. As such, these constructions alter the aspectual structure, by shifting the profile to the boundary transition phase, and/or adding a transition phase.

Inceptive constructions such as *start/begin to* VERB or *become* VERB profile the inception of the event. *Become* is used with Nonverbal predicates (those that require the Copula *be* in English). There appear to be subtle semantic differences between *start* and *begin*; I will not attempt to identify those differences here. Inherent permanent states are generally not construable with Inceptive constructions, since they lack transitions:

(80) *She started/began to be Ukrainian.

Inceptive constructions profile the inception transition phase. They imply that the following state or process occurs, at least briefly, as indicated by the unprofiled activity following the transition phase in (81):

(81) She started to dance.



Like the Progressive, Inceptive constructions do not entail the completion of the event. The same is true of certain other constructions that "retract" the aspectual profile along the aspectual contour. Three such constructions are illustrated in (82):

(82) a. Sarah almost crossed the river.
b. Sarah was about to cross the river.
c. Sarah tried to cross the river.

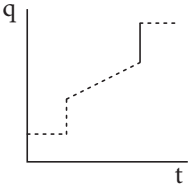
The adverb *almost*, the Prospective construction *be about to* VERB, and the Conative construction *try to* VERB all shift the profile back before a transition phase (so that the transition phase is not profiled, if the event would otherwise profile it). In the case of an event with both inception and completion phases, the profiled phase may precede either phase: the phase profiled in (82a–c) may be the phase in which Sarah is in the river, or a runup phase preceding Sarah's entering the river. If there is only one transition phase, then these three constructions can profile only the preceding runup phase:

(83) a. He almost jumped off the bridge.
b. She was about to be president of the company when they brought in the chairman's nephew and quickly promoted him.
c. They tried to run but were too exhausted.

Thus these three constructions differ in their relationship to transition phases in the aspectual contour of the event's semantic frame from both the Durative adverbial, which only measures (forward) from the first transition phase, and the Container adverbial, which only measures (back) from the last transition phase.

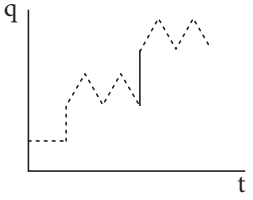
Finally, there are English auxiliary or verbal constructions which shift the aspectual profile to an ending transition phase, either completion or termination. Completive constructions such as *succeed in* VERB*-ing* or *manage to* VERB profile only the completion phase; again, the rest of the aspectual contour is in the base. Example (84) illustrates the Completive of a reversible incremental accomplishment construal:

(84) I managed to wash the floor.



Completive constructions are compatible with all predicates construed as telic processes. For at least some normally unbounded situation types, the inception phase can be construed as the completion of a runup process:

(85) She finally succeeded in singing.



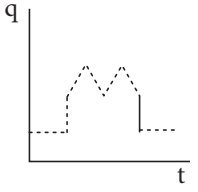
The Completive constructions also require a Subject that is construed as responsible for the outcome:

(86) a. I succeeded in losing my umbrella.
b. ?The ball managed to slip out of his hands.

This is of course not an aspectual constraint on the occurrence of the Completive construction.

Terminative constructions, such as *stop/quit* VERB*-ing*, add and profile a termination phase:

(87) She stopped dancing.



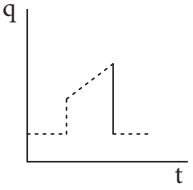
The construction *finish* VERB*-ing* profiles a completion phase in the verb stem's aspectual contour if there is one; if there is no completion phase, it adds a termination phase:

(88) a. I finished reading the book.
b. I finished singing.

Completive and Terminative constructions require the event to be durative; that is, they specify that there is a phase other than the rest phase prior to the profiled completion or termination transition phase.

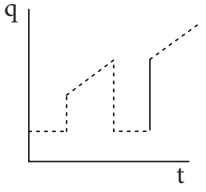
If a Terminative construction is applied to an accomplishment aspectual type, then it substitutes a termination for the completion. The participant returns to the rest state. The resulting aspectual contour represents a directed activity rather than an accomplishment:

(89) I stopped reading the book.



One might wonder what happens to the aspectual contour after the termination. There is nothing preventing me from eventually taking up the book again from where I left off, and finishing it. This would require a new inception phase up to the point where I left off. Such a new inception would be profiled by a Resumptive construction, as in (90):

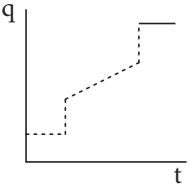
(90) I resumed reading the book.



One can also use a Resumptive construction with activities (unbounded processes) as well as accomplishments: *I resumed exercising*. The difference between the two is that when one resumes an accomplishment, one can continue where one left off, because even a terminated accomplishment is a directed activity; but when one resumes an undirected activity, there is no measurable scale on *q* to designate "where one left off".

Finally, the English Resultative Adjective construction (also called the Stative Passive construction), as in *be broken, be terrified, be purified*, etc., profiles the result state phase alone, as in (91):

(91) This water is purified.



In sum, a phasal analysis of lexical aspect, combined with qualitatively distinct types of phases, the profile-semantic frame model, and profile shift,

provides a natural representation for a variety of constructions that alter the aspectual structure of events.

3.3 Some observations on aspect in Russian

Aspect in Russian and other Slavic languages is notoriously complex. As such, it provides a challenging test to any model of aspectual semantics. Russian aspect forms a rich system that appears to sit in the middle of the derivational–inflectional continuum. Much of the system is manifested in overt morphological form, unlike English. Yet the morphology does not neatly divide itself into distinct inflectional categories. Nevertheless, Russian aspect is amenable to analysis in the model developed here, at least in the interaction of the morphological aspect distinctions with the aspectual construal of predicates. We will first analyze a distinction found in the basic, small set of Russian verbs of motion, traditionally called the Determinate/Indeterminate distinction. We argue that the distinction is essentially between directed and undirected activity, and the Russian distinction sheds light on the manner of motion vs. directed motion uses of English motion verbs (see §7.4.1). Then we turn to the much more complex behavior of the Perfective/Imperfective distinction. Here we will also restrict our attention to the interaction of Perfective/Imperfective with the aspectual construal of predicates. Our analysis supports the general view that the Perfective/Imperfective distinction involves a (temporally) bounded/unbounded construal of predicates. It also demonstrates that the alternative aspectual construals of Russian predicates are similar to those of their English translation equivalents.

3.3.1 Determinate and Indeterminate verbs of motion

In this section, we analyze a lexical/morphological contrast between two sets of motion verbs in Russian and the range of uses of the contrasting forms, using the data in Foote (1967), in terms of the geometric model developed in this book.

Russian and some other Slavic languages differ from English in the lexicalization of verbs of motion. In Russian, several common verbs of motion come in morphologically related pairs, described traditionally as Determinate and Indeterminate. These differ from the morphologically related Perfective and Imperfective pairs found for nearly all Russian verbs. The motion verb pairs are given in (92) (Foote 1967:4); they occur only in the Imperfective form:

(92)

Determinate	*Indeterminate*	
bežat'	begat'	to run
bresti	brodit'	to wander
vezti	vozit'	to convey
vesti	vodit'	to lead
gnat'	gonjat'	to drive
exat'	ezdit'	to ride, go (not on foot)
idti	xodit'	to go (on foot)
katit'	katat'	to roll
lezt'	lazit'	to climb
letet'	letat'	to fly
nesti	nosit'	to carry
plyt'	plavat'	to swim, sail
polzti	polzat'	to crawl
taščit'	taskat'	to drag

The Determinate and the Indeterminate verbs both have a range of uses, some of which represent rather subtle semantic differences. We argue here that the distinction between Determinate and Indeterminate motion verbs in Russian is essentially a lexicalized construal of motion as a directed activity/incremental accomplishment (Determinate) vs. an undirected activity (Indeterminate). The range of uses represent construals of various sorts of situations as either directed or undirected.

The Determinate form is normally described as representing a single motion in a single direction (Foote 1967:7; Forsyth 1970:320). A simple example of this use of the Determinate form is given by Foote (1967:13):

(93) (Kuda idëte?) Idëm v kino.
(Where are you going?) We're going to the cinema.

This use is straightforwardly represented as a (bounded) accomplishment. Example (94) gives a use of the Determinate verb form in an unbounded directed activity (Forsyth 1970:320):

(94) Ivan Ivanyč vyšel naružu, brosilsja v vodu s šumom i **poplyl** pod doždëm, široko vzmaxivaja rukami, i ot nego šli volny.
'Ivan Ivanych went outside, jumped into the water with a loud splash and **swam off** in the rain with wide strokes, sending out ripples.'
(Chekhov: *Kryžovnik*)

The Indeterminate form has a wider range of uses, but it can be argued that all of them involve a construal of the motion event as an undirected activity in contrast to the Determinate form. The use that appears to have a default construal of an undirected activity is pure reference to manner of motion (Foote 1967:31):

(95) Vrači veljat pobol'še **xodit'**. Vot i **xožu**.
'The doctors say I must **walk** more, so here I am **walking**.'
(Nekrasov, *V rodnom gorode*)

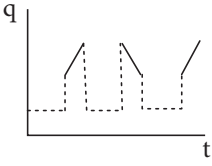
No direction is implied in (95). The same is true of general statements about the manner of motion (Foote 1967:28):

(96) Ja ljublju samolëty . . . Ja xoču **letat'**.
'I love airplanes. I want to **fly**.'
(Chukovsky, *Baltijskoe nebo*)

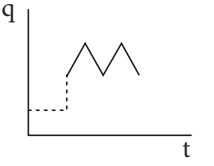
The Indeterminate is also used for motion in multiple directions (Foote 1967:23):

(97) Teper' oni vmeste sobirajut griby, **polzajut** po trave.
'Now they gather mushrooms together, crawling about in the grass.'
(Aksyonov, *Pora, moj drug, pora*)

FINE-GRAINED



COARSE-GRAINED

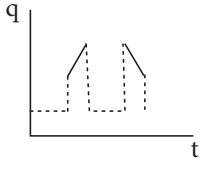


As the representations indicate, the undirected activity is a result of movement in multiple directions united via the construal operation of good continuation. Random movement can include moving to a location already visited in the movement, hence it is not directed motion. A more accurate representation of the the *q* dimension would be multiple points, with the path moving back and forth among the points that are revisited.

Another use of the Indeterminate form is to describe a round trip: going to a place and returning. The round trip is construed as a single undirected activity, since the moving figure returns to the starting point. Example (98) illustrates the undirected round trip with the Indeterminate form (Foote 1967:24):

(98) Včera my **xodili** v kino.
Yesterday we **went** to the cinema.

FINE-GRAINED



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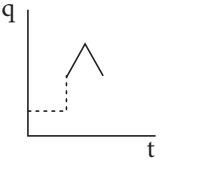
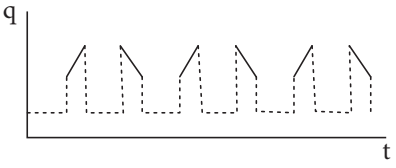


The Indeterminate verb describes going from home to the cinema and back home again. Good continuation links the profile of going to the cinema and returning from the cinema into an undirected activity construed as oscillating (just once) between two locations on the *q* dimension—home and the cinema (including points occupied in between). As an undirected activity, the round trip can be expressed by the Indeterminate verb.

The Indeterminate verb form is also used for repeated motion, which is construed as multiple oscillations of an undirected activity (Foote 1967:27), in part because the movement includes a return to a "base" location in order to be repeated:

(99) 17 raz v den' v ataku **xodili**.
'They **went** into the attack 17 times in a day.'
(Ostrovsky, *Kak zakaljalas' stal'*)

FINE-GRAINED



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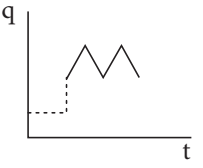

The most complex cases are the habitual and generic reference. Both Indeterminate and Determinate forms are used for habitual and generic reference. An example of the Indeterminate used for habitual meaning is (100) (Foote 1967:27):

(100) Uvarov **letaet** na «U-2».
'Uvarov **flies** a U-2.'
(Chukovsky, *Baltijskoe nebo*)

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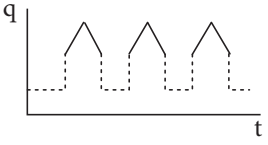

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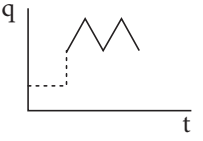


Foote describes the Indeterminate habitual as construing the multiple, regular iterations of the habitual event as indeterminate (undirected) motion. In fact, many of Foote's examples of Indeterminate verbs in habitual meaning include Frequency adverbs such as 'often', 'twice a week', etc.

The use of the Indeterminate motion verb for habitual meaning indicates that habitual events are construed differently for Russian verbs of motion than they are in English. Like English, Russian has a coarse-grained scalar adjustment, and good continuation links the regularly repeated individual

events into a single aspectual profile; but the result is not as coarse-grained as the English habitual, which construes habitual activity as an inherent state.

The use of the Determinate form in habitual function is illustrated in (101) (Foote 1967:18):

(101) Esli slučalis' zatrudnenija, [on] **bežal** ko mne.
'If any difficulties arose, he would come **running** to me.'
(Tendryakov, *Črezvyčajnoe*)

In (101), according to Foote, the sentence describes an exemplary instance of the habitual activity. Foote notes that this exemplary conceptualization is typical when the habitual motion event is conditional or contingent on another event, such as the event introduced by the Conditional clause in (101). We may also think of the action sequence setting up a sort of distributive reading: each time difficulties arose, he would run to the narrator. The individual exemplary action is directed motion, so the Determinate is used.

The Determinate habitual contrasts with the Indeterminate habitual, which construes the multiplicity of habitual events directly (and often explicitly with a Frequency adverb). The Determinate habitual appears to have a similar conceptualization of habitual events to the use of Singular noun phrases for generic meaning in English:

(102) a. An owl hunts at night.
b. Owls hunt at night.

In (102a), a single referent is acting as an example of the species for the habitual behavior described by the predicate. In contrast, the indefinite plural in (102b) attributes the habitual behavior to the collective population of the species. The difference in conceptualizing generic referents in (102a–b) parallels quite closely the difference in conceptualizing habitual actions by the Determinate and Indeterminate forms respectively: the former is exemplary, while the latter is collective. The exemplary construal represents a mapping of a typical event, represented by the *t/q* structure as a whole, onto a range of instantiations in the real world, namely the habitual recurring instances of the typical event.

Both Determinate and Indeterminate forms are used to describe generic actions, illustrated in (103) and (104) respectively (Foote 1967:16, 28):

(103) Gončij pës roždaetsja, čtoby **gnat'** zverja-vraga.
'A hound is born to **chase** its enemy, the wild animal.'
(Kazakov, *Arktur—gončij pës*)

(104) Tol'ko sumčatye životnye **nosjat** detënyšej v sumke na živote.
'Only marsupials **carry** their young in a pouch on their stomachs.'
(Slevich, *Čerez dva okeana*)

The difference in choice of motion verb appears to be directly related to the directed–undirected motion contrast found in sentences describing specific events. The generic meaning appears to be a consequence of the larger context, in particular the Imperfective form of the verb in both sentences, the typical expression of habitual or generic meaning (Forsyth 1970:172; see § 3.3.2). The Russian construals contrast with English, in which all such sentences are construed as inherent states, expressed by the English Simple Present. It is perhaps not an accident in Foote's examples that the Determinate form in (103) has a singular Subject, while the Indeterminate from in (104) has a plural Subject, similar to the English contrast in (102a–b).

3.3.2 Remarks on the Russian Perfective/Imperfective distinction

In this section, we will make a few remarks on the Perfective/Imperfective distinction in Russian. We focus on those cases in which the Perfective/Imperfective alternation results in a different construal of the aspectual type of the predicate in positive declarative sentences. Many other factors, including negation, modality, and subordination also play a role in the Perfective/Imperfective contrast.

A widely accepted analysis of Russian aspect in both theoretical and pedagogical work is the notion that Russian aspect is essentially a binary inflectional distinction: it is argued that almost all Russian verbs come in pairs consisting of an Imperfective form and a Perfective form, albeit morphologically related in many different ways (e.g. Forsyth 1970). The widely accepted analysis acknowledges that there are some unpaired verb forms: that is, there is only a Perfective or only an Imperfective form.

A number of scholars have rejected this approach, as Forsyth notes (Forsyth 1970:36–8), and argue that verbs are not paired. In contrast, Janda (2007) goes in the other direction: she argues for a more derivational analysis, in which Russian verb roots are organized into clusters of morphologically related forms with different aspectual functions. The clusters vary in their size but there is an implicational hierarchy that restricts the aspectual types found in a single cluster.

For almost all clusters, the Imperfective form is the nearest to a basic root form, and corresponds to an activity construal (directed or undirected; Janda calls this distinction completable vs. non-completable; Janda 2007:615). For example, *pisat'* 'write' is a basic Imperfective root. Janda identifies four types of Perfective forms (p. 609): Natural Perfective, which appears to be closest to the Imperfective basic form in meaning, apart from the difference in aspectual construal; Specialized Perfective, which differs in its lexical semantics from the Imperfective; Complex Acts, which in our terms

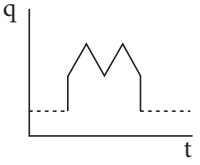
profiles temporal boundaries of the Imperfective (these correspond to Forsyth's Inceptive, Terminative, and Durative Procedural verb derivations); and Single Acts, which are the semelfactive (cyclic achievement) construal of undirected activity Imperfectives (and also constitute one of Forsyth's Procedural categories). For example, *napisat'* is the Natural Perfective for 'write'; the Specialized Perfectives include *perepisat'* 'rewrite'; and there is a Complex Act *popisat'* 'write (for a while)' (p. 609).

Janda observes that Specialized Perfectives can form Imperfectives, e.g. *perepisat'* 'rewrite' has an Imperfective counterpart *perepisyvat'* (Janda 2007:609; see also Forsyth 1970:41). This fact may make it appear that there is indeed a binary system, such that for almost every Perfective with a lexically distinct meaning there is a corresponding Imperfective. But this would seriously underestimate the derivational potential of a Russian verb root. The Imperfective of a Special Perfective can also form a derived Complex Act: for the base Imperfective *ščipat'* 'pinch/pluck', there is a Special Perfective *otščipat'* 'pluck out'; from that there is an Imperfective *otščipyvat'* 'pluck out'; and from that there is a Complex Act *pootščipyvat'* 'pluck out (for a while)'. Also, from a Complex Act an Imperfective form can also be derived, so for the Complex Act *poščipat'* 'pinch/pluck (for a little while)', there is a derived Imperfective *poščipyvat'*, which has an iterative meaning ('pinch/pluck for a little while repeatedly'; Janda 2007:621). Even Forsyth argues that it is difficult to distinguish Natural and Specialized Perfectives in some contexts, so it would be difficult to split Janda's clusters by removing the Specialized Perfectives and their derivatives. Forsyth can only preserve the binary analysis by separating out his Procedural derivations from the other forms. Forsyth's Procedural derivation includes Janda's Complex Acts and Single Acts and also further types of Procedurals that are included in Janda's clusters in at least some cases (compare Forsyth 1970:20–9 to Janda 2008). Janda does acknowledge that for many verb meanings, there are corresponding Imperfective/Perfective pairs: 'There is no denying the existence of aspectual partnerships, but such partnerships are usually embedded in larger clusters' (Janda 2007:609).

The basic semantic distinction between Russian Perfective and Imperfective appears to be a construal of the event as (temporally) bounded and unbounded respectively. This generalization accounts for the aspect value of many of the derived verb forms. Janda's Simple Acts are the morphologically overt semelfactive (cyclic achievements) construal of certain classes of predicates. Semelfactives are temporally bounded in that they are achievements: the profiled phase is the transition from rest state to a point state, although they revert to the rest state after the profiled phase. Janda's Complex Acts include inceptives, usually with the prefix *za-*, such as *zapet'* 'start to sing' (Janda 2008). Inceptives profile only the inceptive transition phase, and hence are achievements, and therefore temporally bounded.

Janda's other Complex Acts, which correspond to Forsyth's Durative and Terminative Procedurals, are activities that are bounded by inception and termination (transition to the rest state). An example is the delimitative prefix *po-* in example (23) from §3.1.2, repeated below:

(23) Devočka **poplačet**, potom zabudet.
'The girl **will cry for a while** and then forget.'



Other examples include the Perdurative prefix *pro-* as in *prorabotat'* 'work for a certain duration' (Janda 2008), which require a Durative adverbial (Janda 2004:500); and *ot-* in *otrabotat'* 'work and stop after a certain duration' (Janda 2008; this is an example of Forsyth's Terminative Procedural).

Many verbs that appear to form pairs—Janda's Imperfective/Natural Perfective and Specialized Perfective/(derived) Imperfective—involve some sort of change in the construal of the aspectual type of the event. Forsyth divides the paired predicates into five broad groups based on the differences in their aspectual semantic alternations.

The first group consists of what Forsyth considers to be unpaired Perfectives. Janda lists fourteen such Perfectives (Janda 2007:629, 644, fn. 16; some of the verbs Forsyth lists are Inceptives in a cluster in Janda 2008; but Janda's list contains Perfective verbs without any cluster):

(105)

vosprjanut'	'cheer up, take heart'
vstrepenut'sja	'rouse oneself'
grjanut'	'burst, crash out'
naskučit'	'bore'
opomnit'sja	'come to one's senses'
očnut'sja	'regain consciousness'
očutit'sja	'find oneself in a location'
poskol'znut'sja	'slip'
ruxnut'	'collapse'
skončat'sja	'die' [lit. 'end oneself']
sostojat'sja	'happen'
uliznut'	'slip away'
učelet'	'survive'
xlynut'	'gush'

Forsyth observes that these are all achievements: they denote 'the instant of performance and the "leap" into a new state' (Forsyth 1970:47); this is largely

true of Janda's list as well. This construal is temporally bounded, hence these verbs are Perfective. For some reason, they resist alternative construals to the point that no Imperfective form is found. Janda observes that most of these verb forms contain prefixes that suggest that they were derived from a lost basic form; that is, they are relics of clusters whose other members have been lost (Janda 2007:629).

Forsyth's second group consists of Perfectives that are also achievements but have Imperfective counterparts (Forsyth 1970:48; the Imperfective is listed first):

(106)

naxodit'/najti	'find'
terjat'/poterjat'	'lose'
slučat'sja/slučit'sja	'happen'
vključat'/vključit'	'switch on'
vyključat'/vyključit'	'switch off'
prixodit'/prijti	'come, arrive (on foot)'
prinosit'/prinesti	'bring'
priezžat'/priexat'	'come, arrive (not on foot)'
[other motion compounds with *pri-* meaning 'come, arrive']	

The Imperfective forms of these verbs are used in certain constructions which generally require or allow an Imperfective form for semantic reasons other than aspectual type of the event per se: the Historical Present, the Imperative, and the Negative. The Imperfective of the second group also is used for two aspectual construals of the event: repeated action and a 'two-way' action (where the result of the action is 'undone'; Forsyth 1970:48). Both of these are more general construals available for the Imperfective and will be discussed below.

Forsyth's third group has both Imperfective and Perfective forms that can refer to a single action. In the third group, the Imperfective construes the event as an undirected activity with a result state (the event is *q*-bounded). That is, the Imperfective profiles the undirected activity phase of a nonincremental accomplishment: 'the imperfective, in itself not indicating any real performance, can express the tendency towards, and gradual approach to, the critical point at which the action takes place' (Forsyth 1970:49). The Perfective construes the event as an achievement or a nonincremental accomplishment: Forsyth's lengthy list includes many verbs whose translation equivalents in English allow a Progressive that profiles the undirected activity phase of a nonincremental accomplishment, e.g. *on* ***umiral*** *. . . nakonec on umer* 'he **was dying** . . . at last he died' (p. 49). Forsyth observes that the English translation of the Imperfective sometimes requires a different predicate than the translation of the Perfective, or a paraphrase with *try* (pp. 49, 71–3):

(107)

Imperfective		*Perfective*	
lovit' rybu	'fish'	pojmat' rybu	'catch fish'
ubeždat'	'try to convince'	ubedit'	'convince'
sdavat' èkzamen	'sit/take an exam'	sdat' èkzamen	'pass an exam'
otgovarivat'	'try to dissuade'	otgovorit'	'dissuade'
otpravdyvat'	'try to justify'	otpravdat'	'justify'
dokazyvat'	'try to prove, argue'	dokazat'	'prove'
spasat'	'try to save'	spasti	'save'

In other words, the English verbs in (107) that translate the Russian Perfective verbs with an achievement construal do not allow an undirected activity construal. We will return to this phenomenon later.

Forsyth's fourth group falls into two subgroups, which aspectually do not have that much in common. The first subgroup consist of predicates which are construed as activities in the Imperfective, either undirected or directed, and are construed as (incremental) accomplishments in the Perfective (Forsyth 1970:51). Examples of this large group include the verbs in (108):

(108)

varit'/svarit'	'boil, cook'
pit'/vypit'	'drink'
goret'/sgoret'	'burn'
zamerzat'/zamërznut'	'freeze'
rasti/vyrasti	'grow'
stroit'/postroit'	'build'
čitat'/pročitat'	'read'
[etc.]	

In this group, the Perfective form adds a result state and construes the event as an incremental accomplishment.

Forsyth notes that some Perfectives add a result state that changes the meaning and requires a different English translation, as in (109):

(109)

Imperfective		*Perfective*	
bit'	'beat'	ubit'	'kill'
		razbit'	'smash, break'
rezat'	'cut'	razrezat'	'cut up'
		zarezat'	'kill, stab to death'

These Perfectives would be classified as Specialized Perfectives by Janda. But Forsyth observes that in contexts where an Imperfective is normally called for by the construction, such as the Negative Imperative, the simple Imperfective is sometimes used (Forsyth 1970:44):

(110) a. Razbej okno! 'Break the window!'
b. Ne bej okno! 'Don't break the window!'

While it is also possible to use a derived Imperfective for (110b) (p. 44), these examples suggest that the line between Natural and Specialized Perfectives is not sharp (and further supports Janda's decision to include all derived verb forms in a single aspectual cluster). These examples suggest that many Perfectives in Forsyth's fourth group add a result state to the *q* dimension of the Imperfective counterpart; but the result state varies depending on the Perfective form, and may add meaning elements (including some restructuring of the qualitative states on the *q* dimension) that may lead to lexicalization as a different verb (or as a verb–particle combination) in English.

The second subgroup of Forsyth's fourth group consists mainly of mental events of cognition, perception, and emotion. The English translation equivalents are usually construed as states, inactive actions (see §3.2.2) or undirected activities. In Russian, the Imperfective denotes that phase (state or activity). Many Perfectives profile the inceptive phases, e.g. *radovat'sja* 'rejoice' [Imperfective]/*obradovat'sja* '(begin to) rejoice' [Perfective] (Forsyth 1970:53), not unlike the inceptive achievement construal of English stative verbs of perception and cognition like *see* and *know*. Other Perfectives in this subgroup 'essentially express the totality of the manifestation of the state or process on a given occasion' (p. 53). The examples Forsyth gives suggest that these are construed as accomplishments: *podumat'* 'think (a specific thought)', *poprobovat'* 'try (to do a specific action)'.

Forsyth's fifth group consists of unpaired Imperfectives. These include mental states; Forsyth notes that some of these might have Perfective pairs that would associate them with the immediately preceding group. Another subgroup are the undirected activities with semelfactive counterparts. Forsyth does not consider the semelfactives to form pairs because of the semantic difference, but as we have seen, there is a natural construal process relating the semelfactive and (undirected activity) iterative aspectual types. Yet another subgroup are the Indeterminate verbs of motion and other undirected motion verbs (see §3.3.1).

A final subgroup in Forsyth's fifth group are 'miscellaneous activities'. Janda (2008) includes these in her larger clusters with Specialized Perfectives but lacking Natural Perfectives, though some of Forsyth's verbs in this group are associated with Natural Perfectives in Janda's database (e.g. *bit'* has a Natural Perfective of *pobit'*). Janda's clusters without Natural Perfectives include one group with semelfactives/Single Acts (*dut'* 'blow', *kašljat'* 'cough', and *čixat'* 'sneeze'). The rest are mostly inactive actions or mental states (in (111), also

having Complex Act forms), but include some activities (see (112), without Complex Act forms; Janda 2008):

(111)

ždat'	'wait, expect'
žit'	'live'
ležat'	'lie'
sidet'	'sit'
stojat'	'stand'
spat'	'sleep, be asleep'
bolet' (1)	'ache'
bolet' (2)	'be ill'
ljubit'	'love'
sočuvstvovat'	'sympathize with'
voevat'	'be at war with'
gostit'	'stay with, be on a visit to'
deržat'	'hold, support, keep'
plakat'	'cry, weep'
rabotat'	'work for, run, function'
iskat'	'look for, try to obtain'
lečit'	'treat'
lit'	'pour'

(112)

znat'	'know'
pomnit'	'remember'
interesovat'	'be interested in'
sudit'	'judge, form an opinion'
vinit'	'accuse, blame'
xranit'	'keep, preserve'
pravit'	'rule, govern, drive'
glasit'	'say'
žat'	'press, squeeze out, pinch'
vpeč'	'draw, drag, attract'
krepit'	'fasten, strengthen'
sypat'	'pour'
grančit'	'cut, facet'

Across the Russian lexicon, we find a distribution of verb forms, paired and unpaired, across Imperfective and Perfective that fit their semantics (temporally bounded vs. unbounded). Unpaired Perfectives denote events that are default achievements, while unpaired Imperfectives denote events that are default states or activities (particularly inactive actions, which are state-like if not stative). Of the paired Perfectives, we find Perfective achievements

construed iteratively in the Imperfective (Forsyth's second group), Perfective nonincremental accomplishments construed as the undirected runup activity in the Imperfective (the third group), Imperfective activities that are construed as accomplishments in the Perfective (the fourth group, first subgroup), and Imperfective mental states/inactive actions that are construed as the inceptive achievement in the Perfective (the fourth group, second subgroup). We also observed that the addition of a result state in the *q* dimension may lead to a semantic shift that leads to the formation of a Specialized Perfective. In addition, Perfective Semelfactive verbs are construed iteratively in their Imperfective base forms, although Forsyth does not consider them to form aspectual pairs.

All of these alternative construals are familiar from the English data discussed in §3.2. In fact, they involve the same semantic classes of events: mental states allow inceptive construals; certain achievements allow runup activity construals; events with incremental theme arguments alternate between directed activity and accomplishment construals; and emission, contact, and bodily movement events alternate between semelfactive and activity construals. Finally, Russian allows morphological derivation of bounded undirected activities (Forsyth's Durative Procedural, and one of Janda's Complex Acts), which is implicit in English Past tense uses of undirected activities.

Forsyth describes other alternative aspectual construals of events besides those with the verb pairs that he recognizes. They are mostly compatible with the general semantic description of the Perfective/Imperfective contrast as a temporally bounded/unbounded construal, and also the absence in Russian of a distinct construction equivalent to the English Perfect.

The Imperfective can be used for a 'two-way' action, as mentioned above with respect to Forsyth's second group of verbs. For example, in response to a comment 'How stuffy it is in here! You might at least have opened the window!', the addressee may respond (Forsyth 1970:78):

(113) Da ja ego nedavno **otkryval**.
'But I did **open** it (have it open) not long ago.'

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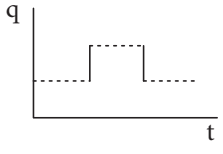

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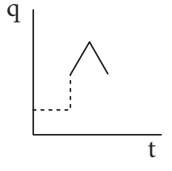

The open-and-close sequence is construed as a shift from one state to another and back again, instead of being construed as a transition to a result state as with a simple directed achievement. Good continuation combined with a coarser-grained scalar adjustment leads to an undirected activity construal, which is also unbounded.

Forsyth notes that the two-way interpretation of this use of the Imperfective contrasts with the Perfective:

> Although one cannot say that the imperfective verb *otkryval* explicitly *expresses* this sequence of events, nevertheless it clearly implies it because of its opposition to the unambiguous meaning of the perfective: *Ja ego nedavno otkryl* could mean only 'I opened it not long ago', implying that so far as the speaker is concerned the window is still open, or that if it is not, it is not *he* who closed it again.
>
> (Forsyth 1970:78)

The Perfective can be used to convey that the resulting state from a bounded process is still going on, to the point that in English, the best translation equivalent is the Present Perfect, or in the case of states, the Simple Present (Forsyth 1970:74):

(114) Moroz snova krepkij—**podul** severnyj veter.
'It's hard frost again (because) the north wind **has got up**.'
(Erenburg, *Ottepel'*)

(115) On **poljubil** eë.
'He **likes** her/He **is in love** with her.' (Or: 'He **has fallen in love** with her.')

Forsyth writes, 'In such sentences in fact a perfective verb is being used to express, or rather imply, not the action or event as such, but the continuous state which has resulted from the action denoted' (Forsyth 1970:74). In both (113) and (114)–(115), Forsyth suggests that the verb form does not denote (in our terms, profile) the return event and the result state respectively. It is just that the Imperfective does not implicate that the result state holds, while the Perfective does. Hence it is perhaps inaccurate to have the termination phase profiled in the unconstrued (fine-grained) aspectual representation of (113), as I have done; and it would be inaccurate to have the result phase profiled for the aspectual representation of (114)–(115), instead of just the achievement/inception phase.

Yet at least for the result state implicature of the Perfective, Forsyth indicates that it is widely used, e.g. in descriptions, even of inherent natural phenomena (Forsyth 1970:75):

(116) Daleko na severe, okolo xolodnyx morej, **raskinulas'** tundra.
'In the far north near the cold seas **extends** the tundra.'

It is possible that a shift in the aspectual profile is taking place for the Perfective and the Imperfective in these contexts. If so, then the Perfective is coming to be used for a resulting state, which is *t*-unbounded, unlike other uses of the Perfective (see §4.4).

The final usage we will examine here is for multiple events. We noted that for motion verbs, repeated and habitual events are construed as undirected activities, and therefore take the Indeterminate motion verbs. A similar phenomenon appears to hold for repeated and habitual events in general. The Imperfective is generally used, especially in the Past tense (Forsyth 1970:155):

(117) Vasilij izredka **brosal** vzgljady v storonu . . .
'Occasionally Vasiliy **would cast** glances to the side.'
(Tendryakov, *Uxaby*)

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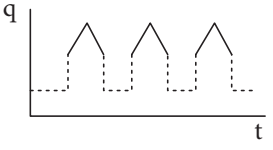

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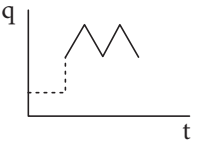
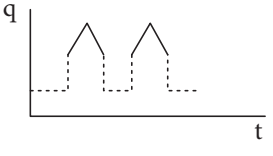


It appears that in general in Russian, repeated and habitual events are construed as unbounded, undirected activities via a coarse-grained construal and good continuation linking together the individual events, as with the habitual Indeterminate motion verb in example (100) in §3.3.1.

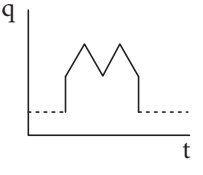
The Perfective can be used to describe an iterated event in the Past tense (Forsyth 1970:160):

(118) Zelënin dvaždy **postučal** i, ne doždavšis' priglašenija, vošël.
'Zelyonin **knocked** twice and without waiting for an invitation, walked in.'
(Aksyonov, *Kollegi*)

FINE-GRAINED



COARSE-GRAINED



Forsyth analyzes (118) as construing the complex event as a single bounded event made up of identical parts, and notes that it is most typically found when 'the same action is performed several times on a single occasion', usually

a small number of times, especially in ritual contexts (crossing oneself, etc.; Forsyth 1970:160). In other words, the complex event is construed as an undirected but bounded activity, like the Durative Procedural/Complex Act illustrated in example (23) from §3.1.2.

The Perfective is also used in habitual contexts (in the Present tense, at least) under similar circumstances that the Determinate motion verb is used for habitual contexts. For instance, the Perfective is used in a habitual meaning when its occurrence is conditional or contingent on another event, either explicitly or implicitly, as in the proverb *Kto iščet, tot vsegda* ***najdët*** 'He who seeks always **finds**' (Forsyth 1970:173). Forsyth, like Foote, argues that this use of the Perfective in habituals is based on an exemplary use. This is only one of several conditions under which the Perfective form is used for habitual function. While it seems reasonable that the Imperfective use is basically a construal of the habitual as an unbounded series of repeated events, in a number of different circumstances, the habitual can be construed in a way that is compatible with the semantics of the Perfective.

It appears that one can analyze the Russian Perfective/Imperfective distinction as basically one of temporal boundedness/unboundedness. The range of variation in the Russian Perfective and Imperfective has partly to do with the differing aspectual potential of different semantic classes of predicates, and partly to do with conventionalized construals of certain real-world event types, in particular the habitual and generic. In addition, the Russian Perfective and Imperfective overlap in use in various discourse contexts. While it would take us beyond the scope of this book to discuss these, we expect that the contrast between Perfective and Imperfective in discourse contexts can be analyzed in terms of the alternative construal of events in discourse.

3.4 Conclusion

In this chapter, we have described how alternative aspectual construals of the same predicate emerge from conceptualization processes (construal operations) that are found in other linguistic semantic domains. The conceptualization processes are most naturally represented by the two-dimensional geometric frame-semantic model of lexical aspect. Selection/metonymy is best understood by recognizing that a verbal aspectual meaning consists of a profiled phase of an overall aspectual contour, because selection involves shifting the profile (what is denoted) from one phase in the event frame to another. The various scalar adjustment processes make sense most naturally by recognizing that the representation of lexical aspect involves two dimensions, time and qualitative states. All of the scalar adjustment processes

involve conceptually simultaneous scalar adjustment of both the time scale and the qualitative state scale. This is one respect in which the geometry of the representation allows for a deeper understanding the linguistic aspectual behavior of verbs. A one-dimensional representation in terms of temporal phases, such as those referred to at the beginning of §2.3, cannot capture these two-dimensional construal operations.

4

The interaction of grammatical and lexical semantics: quantitative and qualitative analyses

4.1 Introduction

Like all grammatical categories, grammatical aspect categories tend to be polysemous within a language and differ in their uses across languages. In §3.3, we saw examples of both phenomena in Russian. The Russian Perfective and Imperfective have a range of uses which cannot be reduced to a single semantic feature, even if most if not all uses involve a semantic construal of the event as temporally bounded/unbounded in some way or another. Likewise, the grammatical expression of habitual events differs in Russian and English, leading to the use of different constructions for habitual and generic events (Russian Imperfective and English Simple Present), for different semantic reasons.

A further complicating factor with grammatical aspect is its interaction with lexical aspect. In this chapter, we will examine the interaction of aspectual grammatical constructions and lexical aspect in order to illuminate the relationship between the two. In order to do so, however, we will have to have some idea of what to look for in grammatical aspect. Our starting point for that process will be a reanalysis of the data from a large-scale crosslinguistic survey of tense and aspect constructions analyzed by Dahl (1985). In this chapter, we will introduce a mathematical technique, multidimensional scaling (MDS), to reveal another perspective on this data (Croft and Poole 2008). We will compare the results of the MDS analysis to Dahl's original analysis of the same data, and to Bybee, Perkins, and Pagliuca's (1994) analysis of the typology and diachrony of aspect systems. Then we will describe the interaction of lexical aspect with various English aspectual constructions, including verb-complement constructions, adverbial phrases, and the basic tense–aspect categories of English. Finally, we will use the

tense–aspect category data from English and from a parallel study of Japanese in Taoka (2000) to construct another MDS analysis of lexical and grammatical aspect.

4.2 A multidimensional scaling analysis of Dahl's crosslinguistic tense–aspect data

4.2.1 Multidimensional scaling as an extension of the semantic map model in typology

Multidimensional scaling is a technique for statistical analysis that constructs a geometric model of the conceptual structure of a particular domain of study. Croft and Poole (2008) show how multidimensional scaling can be used to analyze complex variation in crosslinguistic data. Multidimensional scaling provides a technique to extend the semantic map model of typology to more complex datasets than the semantic map model has been applied to so far. The semantic map model is also a technique to reveal the conceptual structure that constrains the morphosyntactic variation in the expression of a particular linguistic domain. In this section, we briefly describe the semantic map model and multidimensional scaling; for a fuller description of the semantic map model, see Haspelmath (2003) and Croft (2003*a*, chapter 5), and for a fuller description of multidimensional scaling, see Poole (2000, 2001, 2005) and Croft and Poole (2008).

A universal problem in typological analysis—in linguistic analysis in general—is crosslinguistic variation in grammatical categories. The category called 'Noun' or 'Perfect' in one language is simply not the same as the category called 'Noun' or 'Perfect' in another language. Indeed, the grammatical patterns in another language may be so different from those of familiar languages that one may not want even to use the label 'Noun' or 'Perfect' for the putatively parallel category in the other language—that is, one may not want even to say such a category exists in the other language.

One widely appealed-to solution is to declare that categories such as 'Noun' or 'Perfect' exist across languages; that is, all languages have the same categories, and it is just that linguists have to find a grammatical 'test' that will identify them. This approach presupposes what we should be trying to determine empirically, namely whether languages have the same categories. In fact they do not, yet the desire to find universal linguistic categories has led to the use of arbitrarily chosen 'test' constructions, differing from one language to the next. This is methodological opportunism (Croft 2001), and is methodologically inconsistent: one should apply the same test constructions across all languages (assuming the constructions themselves are crosslinguistically comparable; Croft 2009*b*).

A common refinement of the universal-category approach is to allow that crosslinguistically valid linguistic categories exist, but they are absent in some languages (e.g. some languages lack 'Adjectives' or 'Subjects'). However, methodological opportunism is still employed to identify the crosslinguistic category in a language, and the option of allowing the category to be absent leads to further inconsistencies in the approach. Its weakness is revealed when linguists differ in their ideas of what categories exist crosslinguistically. Examples of categories whose crosslinguistic validity, or existence in particular languages, is a matter of contention are 'Subject', 'Adjective', and 'Passive'.

Another refinement which attempts to preserve the notion of crosslinguistically valid categories is to treat the category as having a prototype structure, that is, there is a core to the linguistic category which is identical across languages, but the extension of the category to peripheral members can vary across languages. This refinement may be valid for some categories, but that is a matter of empirical judgment and, again, crosslinguistically valid categories must be identified consistently using the same test constructions across languages.

Another approach is simply to abandon any presupposition about universal linguistic categories or category prototypes, and investigate the question of the crosslinguistic comparison of categories empirically. The crosslinguistic comparison is ultimately based on meaning, that is, what meanings are expressed by the words, grammatical inflections, or constructions in question. One can compare the linguistic categorization of meanings across a number of languages for a set of meanings or uses in a particular semantic domain, and examine the semantic coherence and consistency of the resulting classification of the meanings in a large number of languages.

The type of analysis described in the preceding paragraph is the semantic map model in typology. This type of analysis is essentially distributional analysis, but done across meanings and across languages. Semantic, crosslinguistic distributional analysis is in fact the essence of the typological method.

For example, Haspelmath's semantic map analysis of indefinite pronouns looks at nine different meanings that are expressed by indefinite pronoun forms across forty languages. The semantic, crosslinguistic distributional data for two languages in Haspelmath's sample, Romanian and Kazakh, are given in Table 4.1 on p. 130.

If there are universal constraints on the conceptual domain, the crosslinguistic data form a regular pattern. In this particular case, and others like it, the regular pattern can be represented as a CONCEPTUAL SPACE. The conceptual space for indefinite pronouns proposed by Haspelmath is given in Figure 4.1 on p. 130.

TABLE 4.1. Romanian indefinite pronouns (data from Haspelmath 1997:264–5)

	Romanian:				Kazakh:			
	va-	*vre- -un*	*ori-*	*ni-*	*älde-*	*bir*	*bolsa da*	*eš*
Specific known	Y	N	N	N	Y	Y	N	N
Specific unknown	Y	N	N	N	Y	Y	N	N
Irrealis nonspecific	Y	N	N	N	N	Y	N	N
Question	Y	Y	N	N	N	Y	Y	N
Conditional	Y	Y	N	N	N	Y	Y	N
Comparative	N	N	Y	N	N	N	Y	N
Free choice	N	N	Y	N	N	N	Y	N
Indirect negation	N	Y	N	Y	N	Y	N	N
Direct negation	N	N	N	Y	N	N	N	Y

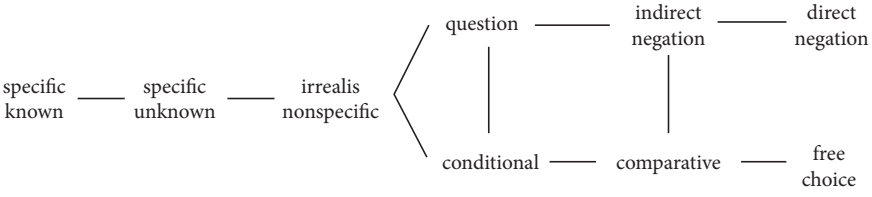


FIGURE 4.1. Conceptual space for indefinite pronoun functions.

The conceptual space is an arrangement of the meanings into a graph (network) structure such that any language-specific form, such as the indefinite pronouns of Romanian and Kazakh, can be mapped onto a single, connected subgraph of the total graph (the Semantic Map Connectivity Hypothesis; Croft 2001:96). The subgraph representing the denotation of the language-specific form is that form's SEMANTIC MAP. The semantic maps for the Romanian and Kazakh pronouns are given in Figure 4.2 on p. 131, using a bounded shape to pick out the relevant subgraph (Haspelmath 1997:264, 288).

The semantic map model offers a novel way to separate the language-specific from the language-universal. The categories defined by linguistic forms—the semantic maps in Figure 4.2—are language-specific. The structure of the conceptual space—the meanings and the relationships between them represented by the graph structure in Figure 4.1—is universal: it is the foundation on which speakers of any language form their linguistic categories. As far as the semantic map model is concerned, the formal linguistic categories can vary indefinitely otherwise. In other words, the

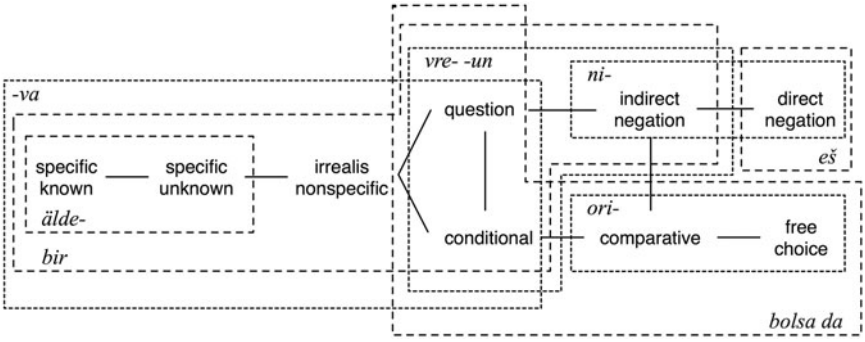


FIGURE 4.2. Semantic maps of Romanian and Kazakh indefinite pronouns.

semantic map model does not presuppose the existence of crosslinguistically valid formal linguistic categories; it only presupposes the comparability of semantic situation types that form the nodes in the network (graph) structure in Figure 4.1.

The semantic map model provides information on conceptual structures relevant to linguistic expression on the assumption that linguistic categorization provides evidence of conceptual similarity of situations. If a speaker of a language expresses two different situations with the same linguistic form (e.g. the same indefinite pronoun), then the speaker is construing the two situation types as similar in some way and to some degree. By comparing the categorizations of multiple linguistic forms in each of a large number of languages, a rich model of conceptual relations between situation types can be constructed. This may not be the entire story behind the categories defined by linguistic forms and constructions, of course. It may turn out that there are further constraints on the formal linguistic categories than the Semantic Map Connectivity Hypothesis, which would limit categories to certain prototypes or even universals. These constraints would be on top of those imposed by the graph structure of the conceptual space in Figure 4.1. While it is of course ultimately desirable to capture these additional constraints where they exist, the structure of conceptual space is a good starting point for finding universals of linguistic categories such as grammatical aspect.

While the theory and method behind the semantic map model is valid, the practical use of it is limited. There is no measure of goodness of fit for a semantic map model. Instead, typologists generally allow for no exceptions: if any language in the sample subsumes two meanings under one form, then those meanings must be linked in such a way that the network satisfies the Semantic Map Connectivity Hypothesis for all languages in the sample. Also, there is no interpretation of the spatial dimensions of the model. The spatial

arrangement in Figure 4.1 is just a matter of visual convenience; all that matters is the links between meanings (the lines in Figure 4.1). A semantic map is usually constructed by hand, and therefore is constructible for only a small number of meanings, such as the nine meanings in Figure 4.1; if the data are less clean, then even that is impossible. Finally, there is no mathematically well-understood and computationally tractable technique to construct a conceptual space automatically.

Multidimensional scaling allows one to construct conceptual spaces automatically, without the problems of the semantic map model (Croft and Poole 2008). MDS constructs a spatial model, so that similarity, more precisely dissimilarity, is modeled as distance in a low-dimensional space. The spatial dimensions are therefore semantically interpretable. Lower-dimensional spatial models are superior because they constrain the analysis further: the more dimensions are added, the easier it is to make every point close to every other point with which it shares a linguistic form. Hence there is a tradeoff between minimizing spatial dimensions and maximizing goodness of fit. Measures of goodness of fit allow one to analyze noisy data and indicate how many spatial dimensions are suitable for analysis. Semantic maps—language-specific formal categories—are modeled as linear bisections of the conceptual space (called 'cutting lines' when the space is two-dimensional). MDS is mathematically well understood and computationally tractable, so the data analysis can be easily run on a personal computer. Finally, Poole has developed a nonparametric unfolding algorithm, Optimal Classification (Poole 2000, 2005), which maximizes correct classification of the data (i.e. accuracy of the cutting lines/semantic maps), and can directly analyze distributional data of the sort that is presented in Table 4.1.

4.2.2 Reanalyzing Dahl's tense–aspect data

Croft and Poole (2008) applied multidimensional scaling to the tense–aspect data in Dahl (1985).[1] In the remainder of this section, I will present Croft and Poole's coarse-grained analysis of Dahl's data, and a more refined analysis of the conceptual space.

Dahl designed a questionnaire with 197 sentence contexts in order to elicit tense and aspect constructions by a linguist working with a native consultant (in some cases, linguist and consultant were one and the same). An example of a questionnaire sentence is given in (1) (the full questionnaire is given in Dahl 1985:198–206):

[1] Keith Poole and I are grateful to Östen Dahl for generously providing us with the original data files, answering many questions about format and coding, and in checking data against the original questionnaires, collected over two decades ago, for our 2008 article.

(1) 79. If you PUT a stone in this bag, it BREAK.

The verb(s) in capital letters are the ones whose tense–aspect construction was to be elicited. Some contexts included two or three different verbs whose tense–aspect construction was coded. Dahl coded the verbs in a single context with an additional digit, so that, for example, context 792 represents the second verb coded for sentence 79.

There was a total of 250 contexts or situation types. Dahl obtained questionnaire results for sixty-four languages, collected by native speakers or field workers (for the list of languages and sources, see Dahl 1985:39–42). The data were coded by the construction employed in each language (that is, the construction codes are specific to the particular language). If more than one construction was considered acceptable or common, then all constructions were considered options for that verb context.

The codes represent the combination of tense–aspect constructions for a particular language. For example, a Modern Arabic Copula combined with Imperfective is coded 'K1', while the Imperfective found in any verb is coded '1'. Thus, Copula + Imperfective is treated as a completely distinct construction from Imperfective. It is in principle possible to split the codes, so that for example a code '1' would cover Imperfective with or without Copula, and a code 'K' would represent the Copula. However, splitting the codes would be an extremely time-consuming and complex task, and the data file includes codes for constructions other than those discussed in Dahl (1985), such as negation and voice, whose identity would not be easily recoverable after two decades (Dahl, pers. comm.). Fortunately, it turned out that the results with the combination codes were sufficiently robust that splitting the codes became unnecessary for the purposes of this analysis.

The goodness of fit statistics for Croft and Poole's MDS analysis of Dahl's tense–aspect data are given in (2):

(2)

Dimensions	Classification	APRE
1	94.4%	.272
2	96.6%	.396
3	97.0%	.462

The first fitness measure, (Correct) Classification, is percentage of sentences correctly classified according to each tense–aspect form. The algorithm maximizes this value. The second fitness measure, Aggregate Proportional Reduction of Error (APRE), basically describes how much the spatial model improves on a null model where all sentences are classified alike. The APRE

values are low here because of the lopsidedness of the data; that is, many tense–aspect forms are used for only a small number of sentences.

The matrix of data is 250 × 1,107 (i.e. 250 contexts and 1,107 distinct constructions across the sixty-four languages). Croft and Poole used a threshhold of 0.5 per cent, that is, a construction had to be used for a minimum of two contexts in order to be included. This is as low a threshhold as can be used, since a construction used in one context only is uninformative. Even so, 726 constructions of a total of 1,833 were not used. The data are extremely lopsided: the average MAJORITY MARGIN (the proportion of points on the majority side of any cutting line) is 94.4 per cent. Because of the high majority margin, there is a high proportion of correct classification of this data even with a relatively low APRE.

The best analysis for the data is a two-dimensional configuration. There is a tradeoff between adding dimensions and fitting the results (correct classification). Adding dimensions will always improve the fitness statistics, because every time a dimension is added, there is another dimension in which two points in the space (two semantic situation types) can be similar in ways compatible with the data. In fact, there will be 100 per cent accuracy when there are as many dimensions as data points: each point can be close to every other point on its own dimension. But at that point the spatial model has long lost any explanatory value; there are no constraints on the possible closeness/similarity relations. This phenomenon is called overfitting a model to the data. Conversely, the fewer the dimensions, the more constraints on the spatial model of the conceptual relations. The balance between a highly constrained model and accuracy in fitting is generally considered to be best at the point when the improvement in goodness of fit by adding a dimension reaches the point of diminishing returns. For the statistics in (2), this point is at two dimensions: the improvement in accuracy from two to three dimensions is negligible.

Croft and Poole compare the results of the MDS analysis with Dahl's original analysis. Dahl's analysis differs from Croft and Poole's in that he sought to identify crosslinguistically valid prototype tense–aspect categories, allowing for a family resemblance in the range of contexts/situation types between language-specific instances of the same tense–aspect category (Dahl 2008). Dahl posited a series of crosslinguistic prototypes of semantic tense–aspect categories, defined by a cluster of verb contexts; he used a clustering program to confirm the prototypes (disconfirmed prototypes were abandoned) and to identify the clusters of contexts and the language-specific categories associated with each cluster. Dahl's prototypes are listed in Table 4.2, with the one-letter codes used by Croft and Poole, and the total number of contexts that Dahl identified as belonging to the cluster.

TABLE 4.2. Dahl's tense-aspect prototype clusters

Tense-Aspect Prototype	Code	Cluster size
Experiential	X	10
Future	U	45
Habitual	H	13
Habitual Past	S	5
Habitual-Generic	G	14
Past Imperfect	R	43
Perfect	F	67
Perfective	V	135
Pluperfect	L	29
Predictive	D	7
Progressive	O	35
Quotative	Q	10

Dahl did not propose crosslinguistic prototypes for Present or Past tense or for Imperfective aspect, although he did propose a prototype for Past Imperfect. Dahl argued that these categories commonly function as '"default" categories in the sense that their application depends on the non-application of some other category or categories' (Dahl 1985:63). As a result, a number of contexts that semantically are Present (or at least Nonpast) and/or Imperfective did not fall into any of Dahl's prototypes. Croft and Poole label these contexts with an asterisk (*).

Dahl ranked verb contexts for each prototype category according to how many language-specific categories of the type (e.g. PROGRESSIVE) included that verb context. If the crosslinguistic prototype were valid, then certain contexts would recur in many constructions across languages. For example, a sample of the contexts for PROGRESSIVE is given in (3) (Dahl 1985:91):

(3)

Rank no.	No. of categories	Examples
1	26	831
2	24	51
3	23	61
4	22	91 101 111
7	21	71 121 1551
...		
32	5	131 141 282 981

That is, twenty-six languages used a Progressive for context 831, twenty-four languages used a Progressive for context 51, and so on; there is a three-way tie at rank 4 for contexts 91, 101, 111, and the lowest-ranked contexts were those where a Progressive is used for those contexts in only five languages.

Croft and Poole assigned each situation type or context—each a single data point in the MDS display—the one-letter code in Table 4.2 reflecting Dahl's crosslinguistic prototypes. The contexts were divided into two groups, core (at or above the median rank in the prototype) and peripheral (below the median rank). Core and peripheral contexts are indicated by upper- and lower-case letters respectively.

Many contexts occurred in multiple prototypes. This is due to the fact that some contexts are combination categories, for example a sentence context such as Future Perfect would belong to both the Future and Perfect prototypes; or that some contexts represent categories often included in other prototypes, e.g. a context in the Habitual–Generic prototype is frequently also included in the Habitual prototype. Contexts listed in multiple prototypes in Dahl (1985) were assigned to a single prototype by Croft and Poole using the following algorithm:

(i) If the context is included in the core group of one prototype and the peripheral group of another, it was assigned to the prototype of the core group; we assume that core contexts are more central to the crosslinguistic category.

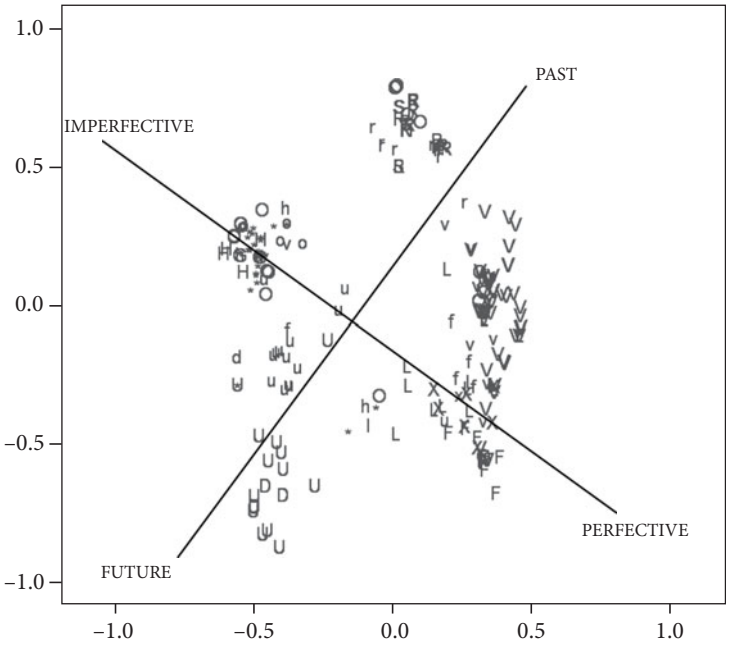


FIGURE 4.3. Spatial model of tense and aspect with Dahl's prototypes.

(ii) If the context is included in the core groups of more than one prototype, it was assigned to the prototype with the fewest number of contexts; thus narrowly defined prototypes survive, while more broadly defined prototypes can be defined as supersets including the more narrowly defined prototypes.

As noted above, contexts which were not assigned to any prototype by Dahl were coded with an asterisk. These codes are displayed in the two-dimensional MDS model in Figure 4.3 on p. 136.

The codes cluster extraordinarily well from a semantic point of view, even though the dataset is extremely lopsided. The following discussion of the spatial model is based on an analysis of the spatial distribution of all of Dahl's individual situation types (i.e. not just in terms of Dahl's prototype category labels as used in Croft and Poole 2008).

4.2.3 The temporal dimension

The most striking result is the clear separation of two dimensions in the spatial model of tense and aspect, one corresponding to tense and the other to aspect. The two dimensions are superimposed on the spatial model in Figure 4.3.[2] The traditional semantic and grammatical division between tense (deictic time reference) and aspect (how events unfold over time) is empirically valid, despite the fact that some languages combine tense and aspectual semantics in a single grammatical marker or construction. This division emerges despite the fact that the input data to the MDS analysis did not separate those tense–aspect combinations.

The tense dimension ranges from past at the upper right of Figure 4.3 to future at the lower left. The cluster at the top of Figure 4.3 consists of past imperfective situations, and the upper end of the cluster to the right, at a similar point on the tense dimension, consists of past perfective situations. The cluster at the upper left consists of present imperfective situations, and its counterpart on the tense dimension, the lower end of the right cluster, consists of perfect and pluperfect situations (the aspectual contrasts will be discussed in more detail in §4.2.4).

The two clusters at the lower left are at the future end of the temporal dimension. The upper cluster, closer to the present point on the temporal dimension, consists of hypothetical situations: the Antecedent clause of *if, when*, and *whenever* sentences (e.g. PUT in example (1) above). Generic antecedent

[2] In MDS, unlike the otherwise similar factor analysis and principal components analysis, the spatial model is invariant under translation and rotation, so one can identify the dimensions and the point of origin based on what emerges from the spatial distribution of the data.

situations (*whenever*) are closer to the present point than nongeneric antecedent situations. The lower cluster, further in the future direction on the temporal dimension, consists of planned or expected future events, and the Consequent clause of *if, when*, and *whenever* sentences (e.g. BREAK in example (1)). Consequent clause situations are clearly more future than their antecedent hypothetical clauses. Again, Consequent clauses of generic sentences are closer to the present point (in fact, they overlap on the time dimension with nongeneric future antecedent situations). The situation types distributed in the future end of the temporal dimension clearly indicate that the future's modal meaning, denoting unrealized events, is conceptually as important for linguistic expression as its future time reference: 'when we talk about the future, we are either talking about someone's plans, intentions or obligations, or we are making a prediction or extrapolation from the present state of the world' (Dahl 1985:103).

The temporal dimension largely follows Dahl's analysis except in the area of the future. There, the spatial model makes a fairly sharp separation between hypothetical and future situations (the latter including situations that have a future time reference relative to a hypothetical antecedent as well as the actual present). Dahl does not differentiate future and hypothetical, and instead posits a Predictive prototype (D/d in Figure 4.3). The difference between Dahl's analysis and the spatial model may be a result of the difference between trying to identify crosslinguistically valid prototype formal categories (Dahl) and trying to identify conceptual relationships among situation types (Croft and Poole). Dahl's aim will identify a cluster representing a crosslinguistic prototype category (if one exists), while Croft and Poole's will identify conceptual similarity without assuming the existence of a particular category. We will use lower-case labels for Croft and Poole's clusters, since they are conceptual categories, and capitalized labels for Dahl's prototype categories, since they are formal linguistic categories (albeit claimed to be crosslinguistic, not just language-specific).

It is possible, for example, that the hypothetical was not identified as a distinct category by Dahl because it is not a distinct linguistic category in many languages. It may be assimilated to the Present Imperfective by some languages and to the Future by other languages. The separate cluster for hypothetical would be due to the fact that there are many languages separating hypothetical from the present imperfective (i.e. those that assimilate hypothetical to the Future), and also many languages that separate the hypothetical from the future (i.e. those that assimilate it to the Present Imperfective). In fact, the hypothetical cluster corresponds closely to Dahl's peripheral Future situations (lower-case 'u' in Figure 4.3), and the future cluster to Dahl's core Future situations (upper-case 'U'). As for the Predictive,

it consists of so few contexts and so few languages express it (Dahl 1985:110–11) that it may have gotten lost in the statistical analysis; Dahl also notes that the number of future contexts in the questionnaire is not large enough for reliable identification of his category prototypes (p. 110).

4.2.4 *The aspectual dimension*

The grammatical aspect dimension is also mapped as a single dimension, perpendicular to the temporal dimension, in the spatial model. That is, like the temporal–modal dimension, the various semantic features associated with grammatical aspect are sufficiently correlated to be reducible to a single dimension with a high goodness of fit to the data. The aspectual dimension represents fairly accurately what is called imperfective from the upper left to perfective at the lower right. The overall clustering of situations is also quite striking in a number of respects.

First, at least for the situation types that Dahl included in his questionnaire, there is a strict separation of imperfective and perfective situation types. There is also a strict separation of present and past imperfective situation types, at least in the nonfuture end of the temporal dimension. The future end is less clear. Almost all of the event types in Dahl's future sentences are dynamic, and many of them are default achievements. Since the events are unrealized, the (*t*-)boundedness contrast of imperfective/perfective does not really apply. One might think that the antecedent hypothetical situation would be more likely to be bounded: it must be completed before the consequent action takes place. But the hypothetical antecedent situations seem to be more imperfective than the future situations including hypothetical consequents. This may be due to the discourse function of antecedent situations, as background for the consequents (Haiman 1978); background situations are usually imperfective (Hopper 1979; Smith 2003). Or it may simply be that future situations are aspectually neutral, hence their positioning near the zero point of the aspectual dimension.

The nonfuture situations fall into three clusters: present imperfective, past imperfective, and perfective/perfect. (The combination of perfective and perfect will be discussed below.) Thus, the spatial model supports Dahl's analysis of the relationship between "Present", "Aorist", and "Imperfect" in the traditional terminology (Dahl 1985:81–4). Dahl notes that Comrie's discussion of these categories (Comrie 1976:71) suggests a primary distinction of tense between Present (which is Imperfective by definition) and Past, and a secondary distinction in the Past between Aorist (perfective) and Imperfect (imperfective). Dahl argues that there is a primary distinction of aspect between Perfective and Imperfective, with a secondary distinction between

Present and Imperfect. He supports his view with the observation that sometimes Perfective is not specifically Past (as implied by the analysis attributed to Comrie), and with patterns of morphological similarity in tense–aspect paradigms of specific languages. There is a continuum in the spatial model from the perfective toward the present perfect. As noted above, most of the future examples are perfective (i.e. mostly achievements); they are separated from the perfective cluster however.

The existence of a strong cluster for present imperfective suggests that Dahl's rejection of a prototype for Present Imperfective is invalid. The sharp spatial separation of those situation types, and the clustering of those situation types, indicates that there are probably enough formal linguistic categories in the data to support a Present Imperfective prototype category. At any rate, it is conceptually as coherent a cluster as the past imperfective and the perfective clusters that Dahl identifies as his Past Imperfect and Perfective prototypes.

The two imperfective clusters combine habitual and nonhabitual contexts. Dahl, by contrast, distinguishes Habitual, Habitual–Generic and Habitual Past prototypes, the latter contrasting with the Past Imperfect (Dahl 1985:96–102). Like Dahl's Predictive category, all of these Habitual categories are small, and these prototype categories may simply have gotten lost in the statistical analysis. However, it is worth noting that all of the habitual situations are found on the imperfective side of the aspectual dimension. Hence it appears to be a crosslinguistically general phenomenon that habitual situations are construed as an imperfective or *t*-unbounded situation type, as they are in English and mostly are in Russian.

Within the past imperfective and present imperfective clusters, dynamic predicates are farther toward the imperfective end of the aspectual dimension than stative predicates. In the past imperfective, most of the stative predicates form a separate subcluster closer to the zero point of the aspectual dimension. The habitual situations tend to be in between stative and dynamic predicates. The present imperfective includes several situation types, and although the picture is less clear, there is an approximate distribution from "more imperfective" to "more aspectually neutral" as in (4):

(4) *more imperfective*
⇑
dynamic situations
habitual and stative situations
performatives ('I NAME this child X') and simultaneous report
continuing/persistent situation perfect (only one sentence; see below)
⇓
more aspectually neutral

The SIMULTANEOUS REPORT type reports events as they are happening (it is also known as the 'sports announcer present'). Simultaneous reports may include telic expressions; Dahl's simultaneous report narrative contains three telic (*q*-bounded) predicates. The performative type is also a simultaneous report. Hence it is not surprising that these are more aspectually neutral, since they may express atelic and telic events.

At least as striking as the sharp separation of past and present imperfective, from a theoretical point of view, is the lack of sharp separation of perfective and perfect (also known as anterior). The standard theoretical analysis makes a sharp semantic distinction between perfect and perfective, and between perfect and past, although there are well-documented grammaticalization paths that link all three categories (Bybee et al. 1994, chapter 3). The spatial model places all the perfective and perfect situation types at a similar level on the aspectual dimension identified in Figure 4.3. However, the situations are distributed quite widely along the temporal dimension. Also, the perfect (and related experiential and pluperfect) situations are all concentrated at the present region of the temporal dimension, while the perfective situations are ranged along the past end of the temporal dimension. We will discuss the perfective situations first and then turn to the continuum between perfective and the different functions of the perfect.

Dahl's sentences with bounded past time events fall into two broad categories: a narrative context and a question–answer context. Examples of the two are given in (5)–(7) (sentence 171 is in the past imperfective cluster, unsurprisingly):

(5) [Do you know what happened to my brother yesterday? I saw it myself.] (171) We WALK in the forest. (172) Suddenly he STEP on a snake. (173) It BITE him in the leg. (174) He TAKE a stone and THROW at the snake. (175) It DIE.

(6) (128) [Looking at a house] Who BUILD this house?

(7) (144) [Conversation takes place in the afternoon: Do you know my brother?] (Yes,) I MEET him here this morning.

The narrative context situations are broadly more toward the past end of the dimension than the question–answer context situations. Roughly, narrative situations with the contexts 'I'll tell you what happened to me when I was a child' and 'Once upon a time there was a man. This is what happened to him one day' are more past than narrative situations with the contexts, 'Do you know what happened to my brother yesterday?', 'Do you know what happened to me yesterday?', and 'Do you know what just happened to me?'. In other words, remote past is distinguished from recent past, although there is

some inconsistency in the location of narrative situations in the spatial model in Figure 4.3. There does not seem to be a clear and consistent difference between witnessed past events and reported past events on the temporal dimension. Among the question–answer contexts, hesternal (yesterday) events are more past than hodiernal (earlier today) events; but there are few examples in Dahl's questionnaire, and situations describing plausibly more remote past events such as his question 1281 ([Looking at a house] 'Who BUILD this house?') are not consistently placed further towards the past end of the temporal dimension. Finally, immediate past perfective situations are closest to the present point in the temporal dimension.

Before examining the conceptual continuum in the spatial model between perfective and perfect and its relatives, the semantic distinctions among the latter must be described. In an analysis dating back at least to McCawley (1971), four functions of the English Perfect are identified (see also Comrie 1976:56–61, from whom the definitions below are quoted; Dahl 1985:132–3; Bybee et al. 1994:61–3):

(i) Perfect of result (also 'stative perfect'): 'a present state is referred to as being the result of some past situation', e.g. *John has arrived.*
(ii) Experiential (also 'existential') perfect: 'a situation has held at least once during some time in the past leading up to the present', e.g. *I have been to Bulgaria.*
(iii) Persistent situation (also 'continuing') perfect: 'a situation that started in the past but continues (persists) into the present', e.g. *I've been waiting for hours.*
(iv) Perfect of recent past (also 'hot news'): *Bill has (just) arrived.*

Dahl reports that his linguistic prototype categories Perfect and Perfective are quite clearly distinguished (Dahl 1985:62, 138). One might expect that there would be a sharp separation of perfect and perfective situations in the spatial model; but there is not. This may be due to the gradual semantic change involved in the aforementioned well-trodden grammaticalization path from Perfect to Perfective (and Past; Dahl 1985:139; Bybee et al. 1994:81–7).

There is a pattern in the distribution of functions of the perfect that suggests how the grammaticalization path may proceed. One of the English Perfect functions does not occur in the perfective cluster: the persistent situation. As noted above in (4), the one persistent situation perfect situation type in Dahl's questionnaire is in the present imperfective cluster, albeit the aspectually most neutral member of that cluster. In many languages the persistent situation function is expressed by the Present (Comrie 1976:60). Of the other three functions, the spatial model indicates the following ranking from closer to the past to closer (or at) the present:

(8) *more past*
⇑
immediate past perfectives, perfect of recent past
experiential perfect
result/stative perfect
⇓
more present

This result is not surprising. The perfect of recent past and immediate past perfectives are very close in meaning; the so-called current relevance interpretation of the perfect is a very subtle difference here. Conversely, the perfect of result is closest to the present point (in fact, it pretty much is at the present point), because it denotes the present state as resulting from the occurrence of the past event—it is not really an instance of past time reference (see §4.3.4 for further discussion). The experiential perfect is intermediate in that it asserts only the occurrence of the event in the past, albeit as an existential statement about the present. Interestingly, several pluperfect situations are in the same region as the experiential perfect, though mostly closer to the aspectually neutral point on the aspectual dimension (see the L's in Figure 4.3). The pluperfect situations are 'past of a past', as in the Dahl example below:

(9) (90) [Q: Did you find your brother at home?] (No, we did not, we were very unlucky.) He LEAVE (just before we came)

The 'past of a past' uses of the pluperfect are in fact semantically very much like the experiential perfect: the prior occurrence of an event is relevant to the current (past) situation.

The spatial model suggests a grammaticalization path which begins with the resultative which denotes a resulting state from a directed change predicate (Bybee et al. 1994:68–74). The grammaticalization path is resultative > perfect of result > experiential perfect > perfect of recent past > perfective.

4.2.5 Grammatical and lexical aspect in Dahl's data

With respect to lexical aspect and the perfective–imperfective grammatical aspect dimension, the results in the spatial model are somewhat confusing. Table 4.3 on p. 144 presents an approximate distribution of the lexical aspect types along the aspectual dimension, assuming the dimension is exactly along the diagonal in Figure 4.3 (i.e. the slope of the aspectual dimension is –1). All of the past and present situations are included (the number of situations of each type are given in parentheses in Table 4.3). The perfect and pluperfect situations except for the recent past (hot news) perfect situations are excluded.

TABLE 4.3. Lexical aspectual types and the aspectual dimension

Verb (number of sentences)	Aspectual construal
more perfective ⇑	
COUGH (4)	**semelfactive, activity (iterative)**
MEET (4)	**achievement**
OPEN, MEET (3)	**achievement**
DIE, KILL (2)	**directed achievement**
BUILD, PAINT, BREAK, MEET, BUY, ENTER (10)	**accomplishment, achievement**
FEEL, BEAT, WRITE (1 each)	**durative (different types)**
BE COLD (3)	**transitory state**
COUGH, KICK (3)	**undirected activity (iterative)**
STEP ON, BITE, TAKE, THROW, DIE, COME, GET, BUY (40)	**achievement**
WRITE (2), COUGH (2)	**durative**
KICK (1), GO to bed (1)	**iterative, achievement**
COME home (1)	**achievement**
BUY (1)	**activity or accomplishment?**
BE COLD, KNOW, BELIEVE, THINK, BE BIG, BE WHITE (13)	*state (mostly transitory)*
WRITE (2), FEEL/THINK (3)	activity, transitory state
WRITE, WALK, COUGH (12)	*activity*
WRITE (4)	*activity*
SAY (3)	activity
BE COLD, BE BIG, THINK, SIT (15)	transitory state
HOPE, DOUBT, THINK, KNOW (4)	transitory state
WRITE, READ, DRINK, EAT, PLAY (9)	activity
⇓ *more imperfective*	

Boldface indicates perfective; italics indicates past (perfective and imperfective), and roman face is present (imperfective).

Atelic (*q*-unbounded) predicates may occur either in the imperfective, in which case they are also temporally unbounded, or the perfective, in which case they are temporally bounded (the predicate holds for a period of time and then terminates; see §3.1.2). The perfective situations in the database are overwhelmingly achievements, which do not occur in the imperfective (except for the iterative construal of the cyclic achievement COUGH). The durative atelic situation types in the perfective (transitory state and undirected activity) mostly appear in the middle of the perfective end of the aspectual dimension;

but four COUGH situations, including the one semelfactive (cyclic achievement) situation, occur toward the perfective end of the dimension.

On the imperfective side, as noted above, activities are more toward the imperfective end than states. However, if one aligns the present and past imperfective situations using the diagonal, then the present imperfective state situations are more imperfective than the past imperfective activity situations. This anomaly may mean that the aspectual dimension does not actually have a slope of –1 but rather a slope slightly greater than –1.

In fact, perhaps the most important observation is that the perfective and imperfective clusters are so tight along the aspectual dimension (of slope –1 or slightly greater) that the only secure generalization is the sharp difference between perfectives (mostly achievements) and imperfectives (unbounded predicates on both *t* and *q* dimensions). There may be a slight tendency such that achievements are "more perfective" than durative bounded situations, and activities are "more imperfective" than states, leading to the tentative ranking in (10):

(10) activities ?< states << durative *t*-bounded situations ?< achievements

Dahl's primary aim was not to investigate the interplay of grammatical and lexical aspect. Dahl used a relatively small number of predicates and varied the temporal, aspectual, hypothetical, and evidential values of the situations with those predicates. In the following sections, we will investigate the interaction of grammatical and lexical aspect in greater detail using a wider range of predicates, but only in English and Japanese.

4.3 The basic tense–aspect constructions of English

In this section, we describe the interaction of the basic tense–aspect (TA) constructions of English—the (Simple) Present, the Progressive, and the (Simple) Past—with forty-four verbs which have distinctive aspectual potential across these three constructions. The verbs were chosen for their diversity in aspectual potential. Although we will take the forty-four verbs to be representative of a class of semantically similar verbs, one should not assume that every verb in each of the classes has the same aspectual potential as the verb used for illustration below. Also, the construal and interpretability judgments are by the author, and there is likely to be variation across speakers as well. Nevertheless, the data presented in this section will provide a good sample of the range of variation in aspectual potential of English verbs across the basic TA constructions. On the basis of these interactions, we will propose semantic analyses of the basic TA constructions of English. (We will also make a few remarks about the analysis of the English Perfect.) In §4.4, we will

combine this data with data from Japanese on the aspectual potential of the translation equivalents of the forty-four verbs from Taoka (2000), and perform a multidimensional scaling analysis on the data from the two languages.

The forty-four verbs are mostly intransitive verbs, although some transitive verbs and ambitransitive (intransitive and transitive) verbs are included.[3] The verb classes that the verbs are intended to represent are named in the examples given in the following section. These are intended to be understood as narrowly defined semantic classes; in fact, only one or two predicates from each verb class were tested.

Certain principles were followed by which different uses of the Present, Progressive, and Past constructions are individuated. These principles are intended to focus on the basic tense–aspect uses of the Present, Progressive, and Past, and to maximize differences of aspectual potential across the verbs with which they are combined.

The Present tense uses considered here include fixed present time reference only. The Futurate Present, as in *The plane* ***leaves*** *at 10am on Tuesday*, is excluded because it has future time reference. The Historical Present, as in *I was in the park yesterday and this guy* ***comes*** *up to me and* ***says*** . . . , is excluded because it has past time reference. The immediate report ("Sportscaster") use, as in *He* ***runs*** *down the field . . . He* ***kicks*** *the ball . . . He* ***scores!***, is excluded because it involves a moving present time reference, proceeding with actions being described (it is somewhat like the Historical Present as the narrative unfolds).

All uses of the Progressive are considered. I have even included cases such as *His behavior is annoying*, since the "adjectival" *-ing* can be analyzed as an inherent state construal, and I have allowed differences in argument structure in calculating aspectual potential (cf. *His behavior annoyed me*). The Present and Past Progressive have the same delimitation as the Simple Present and Past tenses. Thus, for example, the Futurate Present Progressive use, as in *The plane* ***is leaving*** *at 10 o'clock*, is excluded.

The Past tense uses considered here include realis past time reference only. Thus, the Subjunctive Past, as in *He wishes he was in California*, is excluded because it is irrealis.

In the identification of acceptable construals of the predicate in a particular TA construction, referent specificity of the arguments is fixed, but argument structure, referent type, and adverbial support are allowed to vary.

The argument referent of each argument in the TA construction is allowed only to be a single, quantized referent. This excludes accomplishment

[3] Since multi-participant events involve causal as well as aspectual structure, their aspectual analysis is deferred until later chapters.

construals based on a derived incremental theme/verbal scale. For example, **We visited the fair in six days* does not allow the accomplishment construal, but the holistic theme may be quantified and thus allows an accomplishment construal, as in *Five million tourists visited the fair in six months*. This constraint also excludes directed activity readings of accomplishment verbs with indeterminate incremental theme arguments. For example, *?*I wrote a letter all afternoon* is only marginally acceptable, but *I wrote letters all afternoon* is perfectly fine, because of the indeterminate incremental theme. Finally, this constraint also excludes the habitual construal of irreversible directed processes with the "role" interpretation of an argument. For example, one could say that *My lemming drowns every week* is acceptable under an interpretation in which every week I buy a lemming from the pet shop and every week the lemming that I bought drowns (Bernard Comrie, pers. comm.). This is due to the fact that the noun phrase *my lemming* allows a "role" reading, i.e. 'whatever lemming fills the role of my pet at the time in question'. The specific referent reading requires that it be one and the same lemming, and under that reading, the habitual construal of *drown* is impossible.

The argument structure is allowed to vary for a given predicate, as long as the situation type (semantic frame) remains the same. Thus, I allow a generic construal for *sleep* because of sentences like *This sofa* SLEEPS *two*, even though it has a different argument structure than *I* SLEPT *on the sofa*, because the situation type is the same, namely a person engaged in sleeping at a location. On the other hand, *The cat* RAN *away* is distinguished from *This car* RUNS *perfectly*, since they describe different situations (animal locomotion vs. mechanical operation).

The referent type is allowed to vary for a given argument. Thus, I consider *be dry* to have both an inherent state and a transitory state construal, even though the inherent state construal is only possible when the Subject is a geographical region or climate (*The Mojave Desert is extremely dry*), and the transitory state construal is possible with a wider range of referent types (*The clothes are dry*).

Finally, if a construal is possible with a predicate only with ADVERBIAL SUPPORT, it is treated the same way as predicates that do not require adverbial support. Some aspectual construals are available for a predicate in a TA construction only with the support of an appropriate adverbial. For example, while one can give a generic construal to *I eat dairy products* without any adverbial phrase to coax the construal, a generic construal can be given to predicates like *read* as in *This book reads easily* only with the support of the adverb *easily* (cf. **This book reads*). Although construals that are available only with adverbial support have different grammatical status than construals

which do not require the adverbial support construction, we choose to treat them as equally possible construals of the predicate.

With these assumptions made explicit, we may now turn to the principles used to distinguish different senses of an English TA construction. If the construction interpretation represents a distinct aspectual type, then the interpretation is classified as a distinct constructional sense. For example, in the Past tense, some predicates such as *was ill* are construed as transitory states and others such as *danced* are construed as undirected activities; hence these are treated as two distinct senses of the Past. In the case of the Progressive, the aspectual type is defined by the required "input" to the Progressive, since the resulting construal is always a transitory state (i.e. being in the middle of a durative process).

On the whole, however, I did not differentiate the three types of resulting state phases of achievements and events—point state (cyclic), transitory state (reversible), and inherent state (irreversible). This is because, for the most part, the aspectual type of the resulting state phase is fixed for each predicate. If the state is not fixed for each predicate, as with states themselves, the types of state involved are distinguished.

If there are two apparent interpretations that have the same aspectual type, then they are differentiated only if their distributions partially overlap. For example, the generic and habitual senses of the Present are both inherent state construals, but their distributions (maps) partially overlap. That is, some but not all predicates are ambiguous between an inherent and a habitual reading. For example, *She is hungry every two hours* is acceptable, but *She is hungry* cannot be conventionally construed as an inherent state. This contrasts with *I eat dairy products* (*every day/I am not allergic to them*). So the habitual and generic interpretations are treated as distinct senses of the Present. For the same reason, inherent and transitory states are distinguished, because there is partial overlap in the Physical State situation type (*be dry, cool*, etc.; see above).

If there is perfect, complete overlap, the two senses are not distinguished. For example, if we had not assumed referent quantization, then every predicate that allows an accomplishment construal in the Past (*I wrote a letter*) would also allow a directed activity construal in the Past (*I wrote letters*), and vice versa. Hence the directed activity construal due to lack of referent quantization cannot be empirically differentiated from the accomplishment construal when the referent is quantized. For this reason, I do not differentiate these two senses (that is, I have assumed referent quantization).

If there is no overlap between two similar construals, then those construals are grouped as a single sense. For example, the iterative interpretation of the Progressive, as in *The light is flashing*, is an undirected activity construal, just

like the normal undirected activity construal of verbs such as *swim*, as in *She is swimming*. But these two undirected activity interpretations are in complementary distribution. The iterative interpretation is found only with those predicates that also have a cyclic achievement (semelfactive) interpretation in the past (*The light flashed once*). Hence the iterative interpretation of the Progressive is grouped under the undirected activity sense of the Progressive.

4.3.1 The English Present tense construction

The Present tense allows for four different construals, which define four different subtypes of the Present construction. The first construal is as an inherent or generic property of an individual. For some predicates, this is the most common construal of that predicate:

(11) a. *Natural Kinds*: The bracelet is silver.
b. *Biological Kinds*: That's a lizard.
c. *Ethnicity*: He is Persian.
d. *Physical Properties*: He is tall.
e. *Similarity*: She resembles her mother.
f. *Disposition*: Randy is nice.
g. *Physical State:* Death Valley is extremely dry.

For other predicates, the inherent property construal is not the prototypical construal. These are the generic interpretations of these predicates:

(12) a. *Manner of Motion*: He swims. [he has the ability and knowledge to be able to swim]
b. *Consumption*: I eat dairy products.
c. *Performance*: She sings beautifully.
d. *Disintegration*: This wood splits; This glass shatters.
e. *Opening*: The back door opens. [it is not nailed shut]
f. *Mechanical Operation*: This car runs.
g. *Physiological Processes*: A fish breathes through its gills.
h. *Increase/Decrease*: This material shrinks a lot.
i. *Posture*: The statue stands at the top of the square. [construed as its permanent location; see Goldsmith and Woisetschlaeger 1982 and §3.2.2]
j. *Blooming*: This tree blooms and then dies.
k. *Covering*: ?Conifers cover only the southern slopes of mountains in higher latitudes.

For still other predicates, the inherent property (generic) construal requires a different argument structure construction than the most common construal. These argument structure constructions are the patient Subject or so-called

"Middle" pattern in (13), the instrumental Subject pattern in (14), or the locative Subject pattern in (15):

(13) a. *Creation*: These muffins bake quickly.
b. *Consumption*: This book reads easily.
c. *Create Mark/Defect*: This paper tears easily.
d. *Fracture*: These toys break easily.
e. *Dismantling*: "The tent doesn't dismantle very well." [Mary Ellen R., 17 June, 2000]

(14) a. *Opening*: My key opens this door.
b. *Create Mark/Defect*: This thing punches holes in paper.
c. *Killing*: This stuff kills anything that moves and quite a few things that don't.

(15) a. *Physiological Process*: This sofa sleeps two.
b. *Posture*: This table seats six.

One might argue that the construals in (13)–(15) should be divided into subtypes based on the relation of the argument linking patterns in (13)–(15) to the construals of the predicates in other constructions. Nevertheless, for all of these classes, the Present tense construal is of an inherent property of the individual. However, there is a grammatical constraint in English that the individual to which the inherent property is attributed must be the Subject. The possibility of a participant being encoded as Subject in the Present is a consequence of being able to construe the predicate as pertaining to an inherent property of the participant in question.

A second construal associated with the Present tense is the transitory state construal. This is the commonest construal for certain predicates:

(16) a. *Bodily States*: I'm ill.
b. *Cognition*: I know the answer.
c. *Perception*: I see Mount Fuji.
d. *Social Role*: She is the mayor of San Rafael.
e. *Physical State*: The clothes are dry now.

A third construal associated with the Present tense is the habitual construal. The habitual construal is possible for an event which recurs on a regular basis over time. The habitual construal is available for events which in the real world occur regularly, particularly if the regularity is controlled by an agent:

(17) a. *Performance*: She dances every Tuesday.
b. *Manner of Motion*: I swim once a year.
c. *Creation*: He builds houses as a hobby.

d. *Light Emission*: The light flashes every hour.
e. *Sound Emission*: The hamster squeals when the cat comes by.
f. *Disposition*: Randy is nice only when he has to be.
g. *Blooming*: The cherry trees blossom every April.
h. *Dismantling*: Every morning we dismantled the tent before making breakfast.
i. *Covering*: Clouds cover the peaks every afternoon.
j. *Attachment*: This stuff sticks to your hands when the temperature is hot.
k. *Physiological Process*: You breathe through the whole exercise; don't hold your breath!
l. *Cause Emotion*: This sonata surprises me every time I hear it.

Many of the predicates that are construable as transitory states in the Present may also have a habitual construal in a context where the transitory state holds on a regular basis.

(18) a. *Bodily States*: She is ill whenever she has to take an exam.
b. *Social Roles*: He is master of ceremonies at the Christmas party every year.
c. *Perception*: I see bats every evening after sundown.
d. *Cognition*: I remember her whenever I go through the park.

This construal is available for these transitory state predicates only with adverbial support from adverbials such as *every year, whenever S*, and so on. This is in contrast to other predicates, which naturally have a habitual construal in the Present without any adverbial support.

The fourth "construal" of the English Present tense is actually uninterpretability of the Present tense. Certain predicates are uninterpretable, because they are irreversible achievements which cannot be repeated and hence cannot be given a habitual construal, nor can they be construed as inherent properties of the Subject referent:

(19) a. *Disintegration*: *The post office collapses.
b. *Dying*: *My lemming drowns every week.

This "construal" is included in order to allow us to code the fact that some predicates are uninterpretable in the MDS analysis to be presented in §4.4.

All of the Present construals have in common a requirement that the aspectual contour be a point on the *q* dimension. The contour may be a point, an interval, or the entire extent of the *t* dimension, corresponding to a point state, transitory state, and inherent permanent state construal respectively. As described in §3.2.2, the habitual construal is a coarse-grained scalar

adjustment on *t* and *q* which reconceptualizes the regularly recurring events as an inherent state. Thus, the English Present tense describes a situation that is not extended on *q* and whose aspectual profile includes the present moment.

4.3.2 The English Progressive construction

The Progressive construction, as widely accepted, alters the aspectual contour to a (transitory) state. The complexity is in what aspectual contour the Progressive requires as "input" and how it alters that contour to produce the transitory state contour. The Progressive requires one of five construals.

The first subtype is a Progressive derived from an undirected activity construal. For some predicates, the undirected activity construal is the normal construal:

(20) *Manner of Motion*: Look! It's flying!

Another class of predicates is construable as an undirected activity when intransitive:

(21) a. *Performance*: She's dancing.
b. *Consumption*: I'm eating right now.
c. *Creation*: She's baking at the moment. [i.e. engaged in the activity of baking]
d. *Creation:* He's been writing all afternoon.

The examples in (21a–d) represent an alternative construal of the situation type as an undirected activity rather than as an (incremental) accomplishment (as they would be construed with a Direct Object): dancing as repeated steps, rather than progress through the sequence of the dance; eating as repeated acts of ingestion, rather than progress through the meal; and so on.

Another undirected activity construal is to be currently acting in the way appropriate to someone who inherently possesses the disposition (see §3.2.2):

(22) *Disposition*: He's being a jerk again.

Yet another undirected activity construal of the Progressive is from an iterative interpretation of a cyclic achievement:

(23) a. *Light Emission*: The lights are flashing.
b. *Sound Emission*: The pigs are squealing again.
c. *Contact*: He was tapping his fingers on the table.
d. *Create Mark/Defect*: The cats were scratching the furniture.
e. *Bodily Motion*: It was flapping its wings but it couldn't fly.
f. *Cause Emotion*: The clown was amusing the children with his tricks.

The semantic classes in (23a–e) are cyclic actions. Cause Emotion verbs are not clearly cyclic, however (see below). It appears that Cause Emotion verbs in constructions such as (23f) can be best analyzed as repeated reversible achievements whose repetition maintains the emotional state or attitude of the Object referent.

A second construal of the Progressive is from a directed activity:

(24) *Increase/Decrease*: The crack in the ceiling is widening.

The Progressive construal as a directed activity is also found with verbs traditionally classified as accomplishments when a bounded Direct Object is present (see §3.1.2):

(25) a. *Consumption*: He's smoking a joint.
b. *Performance*: She's singing a Schubert song.
c. *Opening*: He's opening the window. [where 'open' is all the way open]
d. *Create Mark/Defect*: I'm punching a hole in the leather. [as in pounding on a metal punch which is gradually working its way through the leather]
e. *Cover*: The clouds are covering the sky.
f. *Dismantling*: The technical people are dismantling the stage.

Likewise, a directed activity construal is found with certain intransitive verbs when they take Result phrases:

(26) a. *Disintegration*: The board is splitting apart.
b. *Directed Motion*: John is swimming across the Channel.

A directed activity construal is also found with certain states that change gradually over time:

(27) a. *Similarity*: She is resembling her mother more and more every year.
b. *Cognition*: I'm understanding quantum mechanics better and better.

These construals are possible because there is a coarse-grained scalar adjustment on t and q that reveals directed change on q of an otherwise stative situation (see §3.2.2). This construal is available for these stative predicates only with adverbial support from degree adverbials such as *more and more* and *better and better*.

A third construal of the Progressive is from the process in a nonincremental accomplishment:

(28) a. *Dying*: Help! She's dying!
b. *Disintegration*: The building is collapsing.
c. *Fracture*: Look out! The branch is breaking!

d. *Killing*: Don't look; she's killing a chicken for dinner.
e. *Winning*: The Koreans are winning.
f. *Attainment*: They are reaching the summit just now.

The fourth construal is a transitory state construal. This is the most controversial analysis, and was discussed in §3.2.2 on the status of inactive actions. As stated in that section, for the purposes of this analysis, we will treat inactive actions in the Progressive as transitory states:

(29) a. *Mechanical Operation*: The car is running.
b. *Posture*: Mary's sitting on the sofa.
c. *Direct Attention*: I was thinking about you.
d. *Physiological Process*: He's breathing again; She's sleeping right now.
e. *Blooming*: The irises are blooming.
f. *Covering*: The fog is covering the valley.

These predicates have an inherent state construal in the Present (see above) but a transitory state construal in the Progressive.

The Emotional Affect verbs also have a transitory state construal in the Progressive:

(30) *Emotional Affect*: The movie was exciting (interesting, boring, fascinating, surprising, etc.).

The forms in (30) are usually analyzed as Deverbal Adjectives. However, they may also be analyzed as intransitive inactive action Progressives: the stimulus (the Subject referent) is able to maintain the emotional effect over time and across different experiencers (i.e. the Object/Oblique referent, when present as in *The movie was exciting to me*).

The analysis of the resulting state as transitory requires some justification. One could argue that a movie's being exciting is an inherent property of the movie, and hence Emotional Affect verbs violate the requirement that the output of the Progressive is a transitory state. However, a movie's being exciting is specific to the experiencer: an exciting movie to one viewer may be a boring one to another viewer. In fact, a movie may be exciting at the first viewing and boring at another viewing by the same person. The state characteristic of the stimulus does persist beyond the time of the experience: I can hand a book to you and say *This book is interesting*, even though I finished reading it the day before. However, another reading of the book could change its emotional affective character. It seems best to analyze the resulting state of Emotion Affect verbs in the Progressive as a transitory state lasting from one experience of the stimulus until the next experience of the stimulus.

Finally, some situations are uninterpretable in the Progressive. These fall into two classes. One class is uninterpretable because they are only construable as stative:

(31) a. *Natural Kinds*: *The ring is being silver.
b. *Biological Kinds*: *It's being a lizard.
c. *Ethnicity*: *I'm being Polish.
d. *Physical Properties*: *I'm being fat.
e. *Social Role*: *I'm being a professor.
f. *Bodily States*: *I'm being hot.
g. *Cognition*: *He is knowing the answer.
h. *Perception*: *They're seeing the Empire State Building.
i. *Physical States*: *The coffee is being cool.

Another class is uninterpretable because they are only construable as punctual:

(32) *Disintegration*: *The bomb is exploding.

The standard analysis of the Progressive is given on the basis of the first two construals in this section: the Progressive requires an event that is extended and unbounded on both the *t* and *q* dimensions. It then alters that construal to a transitory state—the state of being "in the middle" (on both *t* and *q*) of the profiled event. Inactive actions are problematic for a monosemous definition of the Progressive if they are interpreted as transitory states. In §3.2.1 we presented evidence that the English Progressive was previously used for stative predicates other than inactive actions which it is no longer acceptable with. As was noted in §3.2.2, inactive actions are not your ordinary default transitory state event type: they involve an invisible process. Hence the historical retreat of the English Progressive from states may be semantically orderly, being retained in the least state-like of the stative verbal semantic classes.

4.3.3 The English Past tense construction

The analysis of the English Past tense is the most complex analysis of the constructions considered so far. In part, this is due to the fact that it imposes the least conceptual requirements on the predicates which occur with it. I will begin with the least problematic uses of the English Past tense, the more perfective uses, and then turn to the other uses.

One construal allowed by the Past tense is as an accomplishment, with or without a Container adverbial supporting the accomplishment construal:

(33) a. *Performance*: They danced the kopanica in three minutes flat.
b. *Consumption*: I read *War and Peace* (in a week).

c. *Creation*: We built a shed (in a couple of days).
d. *Motion*: I walked to the store in five minutes.
e. *Disintegration*: The board split in half in a few seconds.
f. *Opening*: The door slowly opened all the way.
g. *Increase/Decrease*: The balloon shrank in a few minutes.
h. *Covering*: The fog covered the city in a couple of hours.
i. *Dismantling*: I dismantled the shed in two hours.
j. *Directed Motion*: They ascended the slope in an hour.

A second construal allowed by the Past tense is a (directed) achievement construal. The achievement construal is the prototypical construal for a number of situation types:

(34) a. *Disintegration*: The window shattered; The house of cards collapsed.
b. *Fracture*: The vase fell and broke.
c. *Winning*: The Koreans won the game.
d. *Attainment*: We reached the summit.
e. *Opening*: The door opened. [= became not shut]
f. *Cause Emotion*: The explosion frightened me.

An achievement construal profiling the inceptive phase is available to transitory states and some inactive actions. This construal is aided by adverbial support from *suddenly, at once, in an instant*, etc.:

(35) a. *Perception*: I went around the corner and saw John.
b. *Cognition*: I suddenly remembered the answer; I suddenly realized what the answer was.
c. *Posture*: The congregation stood at once when the bishop entered.
d. *Attachment*: The goo stuck to my hands in an instant.
e. *Blooming*: On Sunday the iris bloomed.
f. *Bodily State*: ?He suddenly was hungry.
g. *Physiological Process*: ?Suddenly he breathed again. [= began to breathe]
h. *Physical State*: In an instant, my clothes were thoroughly wet.

As noted in chapter 3, describing the achievement construal as a profile 'shift' to the inceptive phase of the aspectual contour is Anglocentric: in Japanese, the stative construal is marked by overt derivational morphology while the achievement construal is not so marked.

A third construal is a cyclic achievement (semelfactive) construal:

(36) a. *Light Emission*: A light on the tower flashed (once).
b. *Sound Emission*: The lion suddenly roared.
c. *Contact*: She slapped my knee (once); He touched the screen.

d. *Create Mark/Defect*: The cat instantly tore the curtain.
e. *Bodily Motion*: I snapped my fingers (once).
f. *Physiological Process*: He breathed deeply (once).

The semelfactive interpretation can be supported by Punctual temporal adverbials such as *suddenly* or the Singulative Unitizing adverb *once*.

A fourth construal found with the Past tense is a nonincremental accomplishment construal. This construal is found with those predicates that allow a nonincremental accomplishment construal in the Progressive:

(37) a. *Dying*: Without medical support, she died in an hour.
b. *Killing*: The snakebite killed him in minutes.
c. *Winning*: The Korean player won the match in thirty-five minutes.
d. *Attainment*: We reached the top of the mountain in four hours.

In addition, the nonincremental accomplishment construal is possible with many other classes of predicates, if a Container adverbial (particularly a preposed one) supports it:

(38) a. *Social Roles*: In three years, she was the chief financial officer.
b. *Bodily States*: In a few minutes, he was chilly.
c. *Cognition*: In a couple of minutes I understood what was going on.
d. *Perception*: ?He took his sunglasses off and in a couple of minutes he saw the animal in the bushes.
e. *Attachment*: In a couple of minutes, the leeches stuck to his calves.
f. *Physiological Processes*: In a few minutes, he breathed again; In a couple of hours he slept again.
g. *Create Mark/Defect*: In just a short time, the cat scratched the furniture again.
h. *Direct Attention*: In a couple of minutes, he thought about her again.
i. *Mechanical Operation*: He worked on the car and in a half an hour it ran again.
j. *Light Emission*: In a couple of minutes, the light flashed.
k. *Sound Emission*: ?In just a short time, she screamed.
l. *Contact*: ?In a couple of minutes, he slapped his thigh and laughed; ?In just a minute he touched the button.
m. *Bodily Motion*: ?In a few minutes, the children waved goodbye and disappeared.
n. *Blooming*: ?In less than a week, the tree blossomed.
o. *Physical State*: In a few minutes, the muffin was hot.
p. *Cause Emotion*: ?In a few minutes, the magician had thoroughly frightened the child.

Some of the examples in (38) are only marginally acceptable. This is particularly true of the inactive actions. These are much better in the Past Progressive; but this is because transitory states are easier to construe as nonincremental accomplishments ending in the transitory state.

A fifth construal of the Past construction is as an undirected activity. This is found in a narrower range of predicates than the undirected activity construal of the Progressive, and is helped considerably by support from the Durative adverbial:

(39) a. *Performance*: She sang for half an hour.
b. *Consumption*: I ate for about ten minutes, but then felt sick.
c. *Creation*: I wrote through the whole afternoon.
d. *Manner of Motion*: I hiked for nine hours.
e. *Mechanical Operation*: The car ran for a few days, but then broke down again.
f. *Physiological Processes*: She slept for an hour.
g. *Directed Attention*: I looked at the painting for a long time.

An undirected activity construal results from iteration for cyclic actions and also Cause Emotion predicates. In other words, this construal is available to cyclic actions in the Past as well as in the Progressive:

(40) a. *Light Emission*: The light flashed for seven days.
b. *Sound Emission*: The man yelled for half an hour.
c. *Contact*: She tapped the table for two whole minutes.
d. *Bodily Motion*: The bird flapped its wings for a minute or so and then soared out of sight.
e. *Create Mark/Defect*: The cats scratched the furniture all day.
f. *Cause Emotion*: The clown interested the children for about fifteen minutes.

The undirected activity construal in the Past has the same distribution as the undirected activity construal in the Progressive. A sixth construal of the Past, as a past time habitual, appears to have the same distribution as the Present habitual construal. The past time habitual construal is also expressed by the English Habitual Past construction with *used to*, which is not further discussed here.

A seventh construal of the Past construction is as a directed activity:

(41) *Expand/Contract*: The clothes shrank.

The directed activity construal in the Past is also allowed for some verbs usually thought of as accomplishments, if it is supported with a Durative adverbial:

(42) a. *Consumption*: I read *War and Peace* for two hours (and then fell asleep).
b. *Directed Motion*: They ascended the slope for half an hour (and then stopped).
c. *Performance*: She sang the aria for about a minute (and then stopped when someone booed).
d. *Dismantling*: I dismantled the shed for an hour (and then stopped because it was too hot).
e. *Opening*: The door opened for a few seconds (and then closed again). [opening all the way; see below for transitory state reading]

In these sentences, the Durative adverbial measures a profiled temporal interval that does not include the completion phase. (This profile shift—excluding the completion—is essentially the same found with Terminative constructions applied to accomplishments.) This construal is easily available for vertical Directed Motion predicates, but is only found in a restricted set of contexts for other situation types typically construed as accomplishments. The directed activity construal cannot occur with derived verbal scales:

(43) *Consumption*: *I read two books for an hour. [I intended to read them in sequence but only read, say, the first book and half of the second]

Nor can it be used with holistic themes of accomplishments that are measures of the event in (for instance) the spatial dimension:

(44) *Manner of Motion*: *I ran a mile for three minutes.

It appears that the directed activity construal of the Past tense is possible only with singular holistic themes without a measure meaning. Hay, Kennedy, and Levin (1999) argue that the accomplishment construal is an implicature, not an entailment, of verbs usually thought of as accomplishments. The implicature is cancelled by the use of the Durative adverbial. However, if there is an overt phrase expressing the completion point of the situation, such as a numerical measuring of the effect of the action on a participant (43) or the introduction of an explicit Measure phrase (44), then the accomplishment meaning is an entailment, and hence is not cancellable (Hay, Kennedy, and Levin 1999).

Hay, Kennedy, and Levin's analysis supports an analysis of the Past tense as including specification of a state phase containing the present moment (see below). However, we must allow for the fact that such a state phase may represent the state where a directed process left off (available to directed activities and incremental accomplishment construals, but not to nonincremental accomplishment construals), as well as the rest state (not available to

directed activity construals) and the completion state (only available to incremental and nonincremental accomplishment construals).

The eighth Past construal is the transitory state construal. Certain situation types are prototypically construed as transitory states in the Past:

(45) a. *Bodily States*: She was cold, and put another blanket on.
b. *Cognition*: I knew the answer once, but not any more.
c. *Perception*: I saw Ronald Reagan at his inauguration.
d. *Social Role*: She was mayor for six years.
e. *Physical State*: The soup was hot a few minutes ago, but not now.

The inactive actions and Cause Emotion class are also taken to be transitory states, as they were in the Progressive:

(46) a. *Disposition*: He was nice to her.
b. *Attachment*: The tape stuck to the paper.
c. *Posture*: Your student sat waiting for you.
d. *Contact*: The car touched the curb.
e. *Blooming*: The iris bloomed yesterday.
f. *Covering*: The fog covered the valley this morning.
g. *Cause Emotion*: The book excited me about linguistics.

The most complex example of those discussed so far is *open*. When *open* refers to the process of becoming wide open, it allows the accomplishment and directed motion senses. When *open* refers to the transition from closed to not closed, it allows the achievement and the transitory state senses (the latter is another construal of (42e)). If we take the achievement sense as "basic", then *open* would represent yet another construal of the Past tense, as referring to the result state. If we take the transitory state sense as "basic", then *open* represents another example of the inception construal. For reasons of simplicity, I use the latter analysis.

Finally, there is the category of predicates that are uninterpretable in the Past tense, because they are construed as inherent states only. Even in this case, however, it is not strictly true that the Past tense construction is uninterpretable. The Past tense can be used if the individual no longer exists (47), or the past tense is used for a distal perspectival construal (48):

(47) a. *Ethnicity*: My grandfather was Ukrainian. [he is dead now]
b. *Natural Kind*: The bracelet was silver. [it's lost/stolen now]

(48) a. *Ethnicity*: I met an interesting man last night. He was Persian.
b. *Natural Kind*: I found a bracelet in my office last week. It was silver.

However, this appears to be a special use of the English Past tense as a perspectival device (see §2.4.1), and we will treat inherent states as uninterpretable in the Past for our analysis.

The construals allowed by the English Past tense suggest that there is almost no aspectual requirement: the English Past simply describes an aspectual profile as including a point or interval that precedes the speech act time. However, there is some evidence that the English Past tense is aspectually slightly more complex.

Past situations construed as activities appear not to be interpretable as continuing through the present:

(49) *Performance*: She sang, (*and still is [singing]).

The same constraint is found with the undirected activity construal of cyclic actions (50), and the directed activity construal of the Past tense (51):

(50) a. *Light emission*: The light flashed, (*and still is [flashing]).
b. *Sound Emission*: She cried, (*and still is [crying]).
c. *Contact*: I tapped the table, (*and am still tapping it).
d. *Create Mark/Defect*: The cat tore the curtains, (*and still is).

(51) *Increase/Decrease*: The clothes shrank, (*and still are shrinking).

It is difficult to interpret the examples in (49)–(51) because the elliptical continuation has to be Progressive, since the Progressive is required to express activities ongoing in the present moment. Nevertheless, the undirected activity construal of the Past tense contrasts with the transitory state construal, which allows the state to continue into the present (with adverbial support):

(52) a. *Bodily States*: She was ill yesterday, and still is.
b. *Bodily States*: She was ill yesterday, but she's fine today.

This difference can be accounted for by the analysis of the Past tense as possessing an unprofiled state in the present tense. For directed achievement and transitory state construals, the state at the present moment may be the result state (52a) or the rest state (52b). Likewise, for an achievement construal, either the result state or the rest state may hold in the present:

(53) a. *Create Mark/Defect*: The curtain tore yesterday (and still is torn).
b. *Create Mark/Defect*: The curtain tore yesterday, but I sewed it up and it's fine now.

However, activities have no result state, and hence the present state can only be the rest state; that is, the activity must terminate before the present moment in order to fit the aspectual contour required by the Past tense.

The inactive actions and Cause Emotion class also may continue into the present:

(54) a. *Disposition*: He was nice to her (?and still is being nice to her).
b. *Attachment*: The tape stuck to the paper (and it's still sticking there).
c. *Posture*: Your student sat waiting for you (?and may still be sitting there).
d. *Contact*: The car touched the curb (?and still is there).
e. *Blooming*: The iris bloomed yesterday (and still is blooming today).
f. *Covering*: The fog covered the valley this morning (?and still is doing so now).
g. *Cause Emotion*: The book excited me about linguistics (?and I am still excited about it).

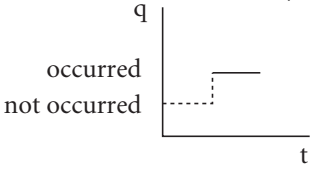
This may be too generous an interpretation. It is also possible that the acceptability of (54a–g), to the extent that they are acceptable, is due to an achievement construal of the situations expressed by the Past tense construction, and thus represent the result state of the achievement in an unremarkable way. If so, then it is difficult or impossible to use the data in (54a–g) as evidence supporting the transitory state analysis of inactive actions and the Cause Emotion class.

A second aspectual property of the English Past tense is its exclusion of inherent permanent states. Acquired permanent states are acceptable, as in *The vase was broken* (resultative reading). This property suggests that the English Past tense also requires a rest state preceding the profiled past time event, as well as an unprofiled state including the present moment. (We cannot require the unprofiled state including the present moment to be transitory only, since *The vase was broken, and still is*, is acceptable.)

4.3.4 Remarks on the English Perfect

The English Perfect, like the English Progressive, also alters the aspectual contour of an event, in an even more dramatic way. In the two-dimensional model presented here, the most plausible analysis of the Perfect is as a transitory state where the *q* dimension has two defined states: 'event not occurred' and 'event occurred', and the transition between the two states is the occurrence of the event. Thus, *I have eaten lunch already* profiles the resulting state from the occurrence of the event of my eating lunch:

(55) I have eaten lunch already.



The present relevance interpretation of the Present Perfect is a consequence of describing the Subject as being in the state of the situation having taken place: one would not describe the present state as such unless the occurrence of the event was relevant to it.

Relevance must pertain to the Subject of the English Present Perfect. Examples (56a–b) would be appropriate in different contexts:

(56) a. The dishes have been washed.
b. I have washed the dishes.

Sentence (56a) would be more appropriate if what is relevant is whether or not the dishes are ready to be put away. In other words, it is the state of the dishes that is relevant. Sentence (56b) would be less appropriate in that situation. Instead, (56b) would be more appropriate when what is relevant is whether or not I have carried out the tasks I am expected to carry out. Likewise, (57a) is more natural than (57b) because the place of the vase is defined with respect to it and not the person placing it.

(57) a. The vase has been put back where it belongs.
b. ?I have put the vase back where it belongs.

The preceding examples illustrate the result or stative use of the Perfect, which is the one most commonly described in grammars (Bybee et al. 1994:61). The experiential or existential use of the Perfect represents another way to construe occurrence of an event as a transition to a present resulting state. The experiential reading is an assertion that the present is such that the event occurred on at least one occasion in the past. That is the state profiled in the Present Perfect construal. It is illustrated in (58):

(58) I have been to Finland. [= there exists at least one past situation of my being in Finland]

However, in other languages (such as Japanese), the experiential construal of the Present Perfect construction is only possible with adverbial support. Hence, it cannot be concluded that the experiential construal follows automatically from the semantics of the Perfect. Instead, it represents a language-particular conventionalized construal of the existential situation. In fact, the experiential use of the Perfect may be analyzed as representing a shift of aspectual profile from the result state to the transition, i.e. it profiles the (prior) occurrence of the event. Evidence supporting this analysis of the experiential use of the Perfect is its cooccurrence with Iterative adverbials such as *three times*. These are perfectly natural with achievement predicates, referring to repeated occurrences of the achievement; but they only occur with a transitory state if the transitory state is construed as bounded and iterated.

In the latter case, only the last transitory state can include the present moment, which would have to be interpreted such that only the latest visit to Finland is currently relevant. In the former case, the occurrence(s) of the event are profiled, and the current relevance is a consequence of the result state being one in which the event occurred. Finally, it was proposed in §4.2 that the sequence leading from the perfect to the perfective and past is: perfect of result > experiential perfect > perfect of recent past > perfective, and that this sequence represents a shift on the temporal dimension from present to past time reference. In this scenario, the experiential perfect is a first step in shifting the profile of the event from the present to the past. The remaining step from the perfect to the perfective (and eventually to the past) is the loosening of the requirement on the aspectual contour of the event occurring from achievement (event occurred) to temporally bounded events of any type (perfective) and eventually unbounded events of any type (general past).

English also has a continuing result use of the Perfect (see also §4.2):

(59) I have lived in England for over six years. [I came to live in England in the past, and I am still living in England]

In the continuing result construal, the present state of the past event having occurred is profiled because the result state of the event continues into the present. However, other languages (such as Spanish) do not construe continuing results with the Present Perfect, using the Present instead; and in fact in the MDS analysis of Dahl's tense–aspect data, the continuing result situation type is separated from other perfect functions and clusters with other present imperfective functions (see §4.2.4). Hence the construal of continuing result as belonging to the Perfect aspectual type is another English-specific conventionalized construal.

The Perfect frequently has its origin in a Resultative construction (Bybee et al. 1994:68–9). The perfect function differs from the resultative function in that the resultative function requires the resulting state to be true at reference time (p. 63). This distinction can best be observed with situations normally construed as achievements, whose aspectual contour already possesses the aspectual contour required by the Present Perfect construction. For instance, the Resultative *The window is broken* is true only if the window is currently in a broken state. But the Present Perfect *The window has been broken* can be true even if the window has since been repaired; it simply reports that the present state is such that the window broke at some point in the past. In fact, the Perfect is likely to be used precisely when the window has been repaired, since if the window is still broken, an English speaker would use the simple Resultative construction.

4.4 A multidimensional scaling analysis of lexical aspectual potential and grammatical aspect

In this section we present a multidimensional scaling analysis of the lexical aspectual potential of the English verb classes described in §4.3 in the English Present, Progressive, and Past constructions. There was a total of fifteen different aspectual construals across the three English constructions (excluding the uninterpretable cases) described in §§4.3.1–4.3.3; they are given in Table 4.4. The forty-four verbs that were analyzed fall into twenty-seven distinct distribution classes in terms of their aspectual potential across the three English constructions.

A parallel analysis of Japanese predicates is found in Taoka (2000). Taoka analyzes aspectual construals of forty-eight predicates in three Japanese tense–aspect constructions: the Present, the *te-iru* construction, and the Past. The Japanese *te-iru* construction is quite different from the English constructions in that it includes the perfect, resultative, and the progressive functions; the last is formally distinct in English and in fact the perfect and progressive functions are widely separated in the conceptual space for tense and aspect based on Dahl's crosslinguistic data. Hence combining the English and Japanese data should represent significant crosslinguistic variation in aspectual constructions. Taoka codes the perfect as a distinct construal in her analysis of aspectual potential in Japanese (the perfect was not used in the English analysis). Taoka identifies forty distinct aspectual classes and a total of seventeen different aspectual construals across the three Japanese constructions.

A multidimensional scaling analysis of the data was performed, first of the English data only, then of the English and Japanese data.[4] There was a large

Table 4.4. Construals (senses) of the English Present, Progressive, and Past

Present	Progressive	Past
generic	*undirected activity*	*(incremental) accomplishment*
transitory	*directed activity*	*achievement*
habitual	*nonincremental accomplishment*	*nonincremental accomplishment*
	transitory state	*cyclic achievement*
		undirected activity
		directed activity
		habitual
		transitory state

[4] I am grateful to Chiaki Taoka for the use of her Japanese data, and to Keith Poole for performing the MDS analysis.

but not complete degree of overlap in the predicates used in the two studies. The resulting matrix mapped forty-four predicates across thirty-two constructions in the two languages. The data fit well in two dimensions, since the increase in accuracy from two to three dimensions is substantially less than the increase from one to two dimensions:

(60)

Dimensions	Classification	APRE
1	86.6%	.500
2	93.3%	.750
3	96.5%	.869

The two-dimensional display is presented in Figure 4.4. The data points are labeled with the English equivalent of a representative predicate for each distributionally distinct semantic class across the two languages.

The English–Japanese lexical aspect data are somewhat noisy; that is, there are several semantic anomalies. This is due in part to the small dataset, restricted to a total of only thirty-two constructions in two languages. Nevertheless, the general effect of multidimensional scaling is to detect broad patterns in complex and messy data, and the spatial model in Figure 4.4

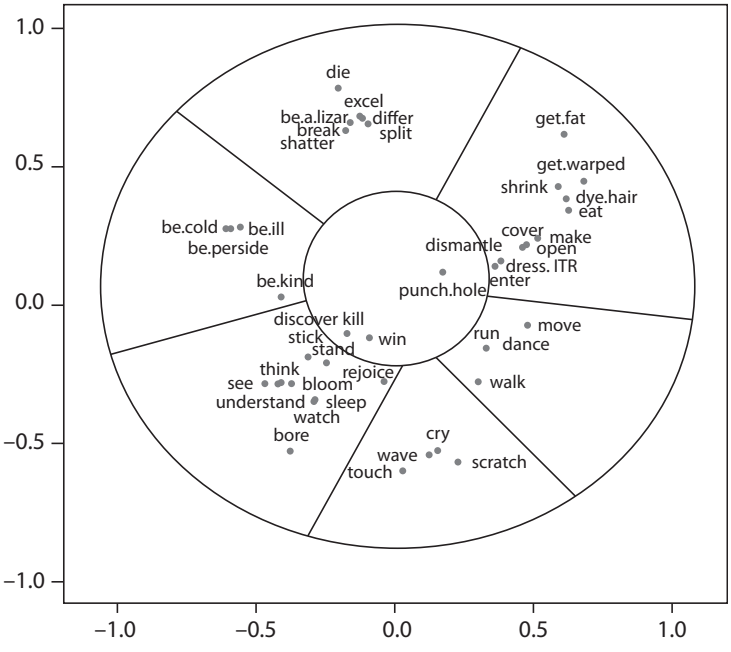


FIGURE 4.4. Spatial model of English/Japanese lexical aspect.

does reveal broad patterns that lead to insights in the analysis of the relationship between grammatical and lexical semantics.

The data can be interpreted as a set of clusters arranged in a circle, not unlike the color circle found in the psychology of perception (Ekman 1954). The clusters correspond to semantic classes of predicates that have similar aspectual potential. The circular arrangement of the clusters captures common alternative aspectual construals found with those semantic classes of predicates (named here for their traditional 'default' construal). The circle is summarized in (61), beginning at around 9 o'clock in Figure 4.4:

(61)

9:00	**12:00**	**2:00**	**4:00**	**6:00**	**7:00**	**9:00 . . .**
transitory states	directed achievements	directed activities	undirected activities	cyclic achievements	inactive actions	transitory . . . states
be ill, be president	*split, die*	*cover, shrink*	*dance, run*	*scratch, wave*	*touch, stand*	*be ill, be president*

We describe the construals below, following the order given above.

As we have noted, cognition and perception predicates allow both a transitory state construal and an achievement (inceptive) construal. (However, *see* and *understand* group with the inactive action cluster at 7 o'clock; see below.) This is also true of physical states and roles:

(62) a. In an instant, my clothes were thoroughly wet.
b. In three years, she was president of the company.

The sequence of phases for both the transitory state and directed achievement construals is the same: original state – transition – resulting state. The only difference between these two construals is whether the inception of the state is denoted or the resulting state is denoted.

The cluster at 12 o'clock contains semantic classes typically construed as directed achievements (the presence of inherent state predicates in this cluster will be discussed below). The next cluster, at 2 o'clock, consists of semantic classes typically construed as directed activities or incremental accomplishments (depending on whether the relevant argument is bounded or not). Many directed change (change-of-state) predicates allow for either a punctual directed achievement construal or a more gradual directed activity or accomplishment construal. For example, it is not unnatural in English to say *The iceberg gradually broke in half.* Conversely, *Frank entered the room at 2:15* is construed as punctual. The only difference between these two construals is whether the change of state is construed as punctual or extended in time.[5]

[5] I have no explanation as to why *kill, discover* and *win*, seemingly typical directed achievements, are in a separate cluster inside the circle at 7 o'clock. In the English pilot analysis, they clustered with the other typical directed achievements.

The next cluster, at 4 o'clock, contains semantic classes normally construed as undirected activities. In many languages, including English, many processes that are usually construed as undirected activities can also be construed as directed activities. This phenomenon is described as 'satellite-framing' by Talmy (1991/2000): a manner of motion predicate, normally construed as an undirected process, also can occur in a Directed Motion construction (see §7.4.1):

(63) a. Terry danced for two hours. [undirected manner of motion]
b. Terry danced across the room. [directed motion]

In fact, in the English-only pilot analysis, directed and undirected activities are clustered together; with the addition of Japanese, which does not allow the direct construal of manner of motion as directed motion, the two types of activities are clearly separated. The difference in the aspectual construal is more significant here, but these and other examples indicate that processes that are undirected activities when occurring by themselves are associated in language with the directed activities that they frequently accompany in experience.

The cluster at 6 o'clock consists of semantic classes that commonly possess a cyclic achievement (semelfactive) construal. As we noted above, these semantic classes—sound and light emission, contact, and bodily motion—commonly allow for both a cyclic achievement construal and an undirected activity construal. Conversely, undirected activities are iterations of cyclic achievement processes. The only difference in the aspectual construal is the iteration of the cyclic event.

The large cluster at 7 o'clock contains inactive actions. We have already discussed how inactive actions are semantically between transitory states and undirected activities: outwardly they are transitory states, but inwardly there is some invisible process producing or maintaining the outward state (§3.2.2).[6] The grammatical manifestation of this aspectual ambivalence in English is the use of the Progressive, otherwise used exclusively for processes, to denote what appears to be a transitory state. This, combined with the aspectual behavior of these situation types in other constructions, places them between cyclic achievements and undirected activities on the one hand, and transitory states on the other.

The one cluster of semantic classes that does not fit well with this semantic interpretation of the spatial model is that of inherent predicates such as *be silver, be a lizard, resemble*, and *differ*. Interestingly, this group of predicates is

[6] In the combined English-Japanese analysis, *see* and *understand* also cluster with *think*; in the English-only pilot analysis, they cluster with typical transitory states.

the one that shifted position dramatically comparing the English-only pilot analysis to the English–Japanese analysis (in the former, it clusters loosely with activities; in the latter, it clusters with directed achievements). It is also probably significant that two of the three construals that produced the most classification errors in the English–Japanese analysis were the inherent construals of the Present in English and Japanese. Also, the choice to allow differing argument structures in coding possible aspectual construals in English affected only the inherent state construal. Incorporating the inherent state aspectual construal to our analysis of the lexical aspect circle will require further empirical studies.

In sum, there is evidence from the English–Japanese MDS analysis that semantic classes of predicates form a circular pattern of clusters that represent common pairwise associated aspectual construals which are themselves related, either aspectually and/or in experience. The dataset is quite limited, consisting of only two languages. For this reason, there is a substantial amount of noise, and a number of anomalous clusters or positionings of clusters in the data. Nevertheless, the overall configuration remained the same in moving from the English-only pilot analysis to the English–Japanese analysis. Further analysis with a larger set of languages would be required to confirm the configuration. Even so, the spatial model of English–Japanese lexical aspect suggests a novel solution to the problem of the semantic interpretation of grammatical aspect.

The proposed solution is that the perfective/imperfective distinction in grammatical aspect corresponds to an opposition of aspectual construals characteristic of the 10–12 o'clock and 4–7 o'clock regions on the lexical aspect circle, which are approximately opposite each other on the circle. The evidence supporting this proposal is drawn from Bybee et al.'s (1994) typological study of tense, aspect, and mood in a sample of ninety languages, and also from the MDS analysis of Dahl's tense–aspect data presented in §4.2.

Bybee et al. identify two families of grammatical tense–aspect categories, based on grammaticalization processes that link together grammatical categories. The first family includes anterior (perfect) and perfective senses (Bybee et al. 1994, chapter 3). This corresponds to the lower right part of the tense–aspect space derived from Dahl's dataset. Dahl describes the perfective as denoting a bounded event, ideally punctual. The scale of lexical aspect derived from the MDS analysis in §4.2 also suggests, albeit weakly, that punctual events (achievements) are closest to the perfective end of the aspectual dimension. However, the perfective and anterior are in fact closely associated with stative predicates. In §4.3.4, the anterior is analyzed as representing a past event with current relevance. That is, in some sense both the past completed event and the current state are denoted by the anterior: we

suggested that the result perfect profiles the resulting state from the event occurring, while the experiential perfect profiles the transition representing the event's occurring. The anterior is closely related to resultatives (pp. 63–8), which are stative. Resultatives often originate in stative expressions (p. 67) and grammaticalize into anteriors (pp. 68–9). Dynamic verb sources for anteriors include typical directed achievements such as 'finish' or 'arrive' (pp. 70–1). When anteriors and completives are extended to typically stative predicates, they tend to express complete possession of the state, or a change of state; in the latter case, they may come to mean the resulting state again (pp. 74–7).

In other words, in the process of grammaticalization, grammatical forms in this family of meanings move back and forth between an achievement construal and a (resulting) state construal. This close relationship between achievement and state is puzzling from the perspective of perfectivity as completion or boundedness: states are unbounded. But the achievement–state ambivalence is exactly what we observed for semantic classes at the 10–12 o'clock region of the lexical aspect circle. It represents profiling of different phases in the aspectual contour given in Figure 4.5, which we call the DIRECTED ASPECTUAL CONTOUR.

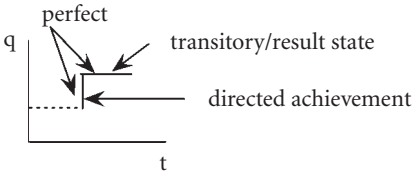


FIGURE 4.5. The directed aspectual contour.

The second family of grammatical tense–aspect categories include imperfective, progressive, present, and habituals (Bybee et al. 1994, chapter 5). This family corresponds to the cluster in the upper left of the tense–aspect space derived from Dahl's dataset. Dahl did not describe a prototype definition for these categories, apart from habitual; but we observed in §4.2.2 that the habitual clusters closely with the progressive and imperfective. Progressives grammaticalize into presents and imperfectives (pp. 140–9). Progressives frequently originate in posture verbs ('sit', 'stand', 'lie') as well as 'stay' and 'live', all of which fall into the category of inactive actions. Bybee et al. further identify another source for progressive meanings in reduplicative constructions (pp. 166–74). Verb reduplication begins with an iterative function. Bybee et al. suggest that if an iterative evolves into a continuous function ('keep on VERB-ing'), then it can grammaticalize into a progressive and then to an imperfective. If an iterative evolves into a frequentative function, then it can grammaticalize into a habitual and then to an imperfective.

This family of constructions is therefore associated with iteration of actions and also with typical inactive actions. But these aspectual construals are associated with the semantic classes at the 4–7 o'clock region of the lexical aspect circle, almost exactly opposite the perfective side of the circle. They represent aspectual construals of situations that can be captured by the aspectual contour given in Figure 4.6, which we call the UNDIRECTED ASPECTUAL CONTOUR.

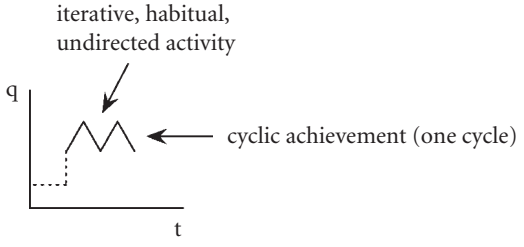


FIGURE 4.6. The undirected aspectual contour.

The analysis of lexical aspect in Dahl's tense–aspect data in §4.2 also suggests, albeit weakly, that undirected activities are closest to the imperfective end of the aspectual dimension. Thus the directed aspectual contour and the undirected aspectual contours appear to constitute the opposite ends of the grammatical perfective–imperfective aspectual dimension. These two aspectual contours are qualitatively very different in the *t/q* geometric analysis.

4.5 Conclusion

The multidimensional scaling analyses in this chapter are based on complex and highly variable data: the large-scale crosslinguistic study of tense–aspect constructions by Dahl (1985) analyzed in §4.2, and the fine-grained analysis of aspectual potential of a wide variety of predicates in English and Japanese in §§4.3–4.4. The use of a quantitative statistical technique, multidimensional scaling, allows us to find the most significant patterns in these complex datasets in order to identify the broadest patterns of the relationship between grammatical and lexical aspect. These patterns lent themselves to a qualitative analysis in terms of the two-dimensional model of aspect. Our conclusion is that the perfective/imperfective grammatical opposition represents two families of closely related aspectual construals that are characteristic of opposite sides of the lexical aspect circle of Figure 4.4. The opposing construals are

grounded not in a single binary feature opposition, but on opposing aspectual contours, the directed contour for perfective and the undirected contour for imperfective. This analysis accounts for the membership of the two families of related grammatical tense–aspect categories and the association of certain lexical aspectual types or construals with the grammatical aspectual categories. The analysis also explains why no single simple semantic opposition captures the perfective–imperfective distinction. The semantics of the opposition is based on a contrast between two complex, multiple phase aspectual contours. The wide range of event types in the real world is susceptible to construal in one or the other of these aspectual contours to differing degrees. The distinction between the two aspectual types also plays a role in argument realization, as will be seen in chapters 7 and 8. Finally, the analysis links grammatical and lexical aspect through a single qualitative phase-based representation of the unfolding of events through time.

5

Toward a force-dynamic theory of argument realization

5.1 Introduction

In chapters 2–4, I presented an analysis of lexical aspect that integrates the many lexical aspectual distinctions with grammatical consequences into a single model. The model analyzes the aspectual structure of events as a temporal sequence of qualitatively distinct phases. The phases are represented in two geometric dimensions, time and qualitative states.

In this and the following chapters, I will turn to the question of argument realization, that is: How are the participants in events expressed as grammatical arguments of a predicate? I will be concerned specifically with the grammatical encoding of arguments, in terms of case marking, indexation (agreement), and word order, for the reasons discussed in §1.4 (see also §5.2.2).

There is a huge literature on argument realization, with theories in all major approaches to grammar. An excellent recent summary of the major theories is found in Levin and Rappaport Hovav's *Argument Realization* (2005, henceforth AR). In §5.2, we will give an overview of theoretical constructs used in recent (and not so recent) approaches to argument realization, based on Croft (1998*a*) and AR, focusing on the contribution of event structure, the subject of this book, to argument realization.

5.2 Some approaches to argument realization

Theories of argument realization make greater or lesser use of a common set of theoretical constructs. This is reflected in the organization of the critique of argument realization theories in Croft (1998*a*) and in the organization of AR:

(1) a. *Event structure*: a representation of the semantic structure of events that is relevant to syntax (cf. AR, chapter 4).

b. *Participant roles*: a way of defining participant roles, usually based at least in principle on properties of event structure (cf. AR, chapter 2).

c. *Ranking of participant roles*: some way of ordering participant roles, which is used in argument realization (cf. AR, chapter 6).

d. *Role designation*: some way to designate a special status for certain participant roles, generally to link them to core (Subject or Object) argument roles (cf. AR, chapter 3).

e. *Mapping rules*: rules that map the participant roles into grammatical roles such as Subject and Object, based on properties defined in (a)–(d) (cf. AR, chapter 5).

All of these constructs are interconnected in various ways in each theory of argument realization. We will focus on the degree to which participant roles, ranking of participant roles, and role designation are defined independently of event structure. Before doing so, however, we will introduce some common representations of event structure in order to have a reference point for how roles, role rankings, and role designations are defined in the theories discussed in this chapter.

The most explicit representations of event structure found in the literature take the form of EVENT DECOMPOSITIONS into symbolic primitives. We have already encountered these in discussing the representation of the aspectual structure of events in §2.3.1. Decompositions into symbolic primitives include causal as well as aspectual primitives, in addition to atomic roots that are intended to represent "idiosyncratic" verb-specific aspects of meaning (see chapter 2). For example, Role and Reference Grammar includes not only the (stative) **predicate**, (dynamic) **do,** INGR, BECOME, and SEML, but also CAUSE, as in (2) (Van Valin 2005:47):

(2) a. Max melted the ice.
b. [**do´** (Max,Ø)] CAUSE [BECOME **melted´** (ice)]

Rappaport Hovav and Levin (1998:116) have a very similar decomposition of English Transitive *break*, including a CAUSE primitive:

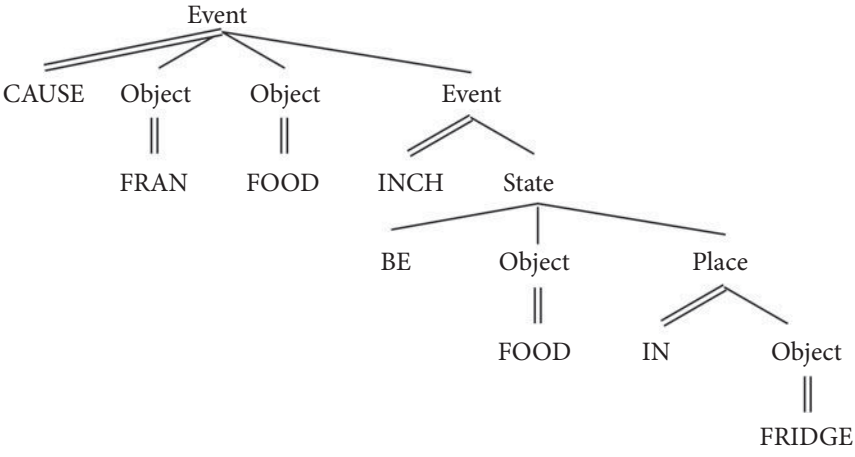
(3) [[X $ACT_{<MANNER>}$] CAUSE [BECOME [Y <*BROKEN*>]]]

Jackendoff (1990, 2002) uses a variety of primitives, including BE, STAY (for inactive actions), GO, and CAUSE. Jackendoff (1990) divides event structure into two distinct representational tiers. Tiers are parallel but distinct ways to link together elements in a structure. Jackendoff posits an action tier, which represents causal relations, and a thematic tier, which captures other properties of event structure. The separate representation of causal structure in an action can be found in the analysis of *The car hit the tree* in (4) (Jackendoff 1990:127):

(4) INCH [BE ([CAR], AT [TREE])]
AFF ([CAR], [TREE])

Although Jackendoff (2002) and Culicover and Jackendoff (2005) employ tiers to represent other syntactic and semantic facts, there is no reference to distinct verbal semantic tiers in Jackendoff's more recent work. Thus, Jackendoff's later representation for the conceptual structure of *Fran put the food in the fridge* more closely resembles those of Role and Reference Grammar and of Rappaport Hovav and Levin, albeit in tree form (Jackendoff 2002:366):

(5)



An alternative to decompositional analyses of event structure are entailment analyses such as Dowty (1991). Working in a formal semantic framework, Dowty treats the linguistically relevant semantic properties of events as entailments of the semantic predicate representing the event. Dowty's theory of argument realization is discussed in §5.2.3; the relationship between event decompositions and predicate entailments will be discussed in §5.5.

5.2.1 Thematic roles and thematic role hierarchies

Many linguists have not used decompositional event structures to represent the contribution of verbal semantics to argument realization. Instead, the event participants that are ultimately realized as syntactic arguments are associated with a role in the event, described variously in the literature as case roles, semantic roles, thematic roles, theta roles, or participant roles. Typical roles that have been proposed are agent, patient, theme, experiencer, recipient, beneficiary, locative, and instrument.

Although these roles are normally taken to be semantic constructs, this is not always the case. In generative grammar and Lexical-Functional Grammar

(LFG; Bresnan 2001), roles have a hybrid syntactic–semantic status at best. In generative grammar, a small list of theta roles is employed. Many generative grammarians adhere to Baker's Uniformity of Theta Assignment Hypothesis (UTAH): 'Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure' (Baker 1988:46). The consequence of UTAH is the syntacticization of roles in terms of constituent structure positions. These approaches generally do not attempt to define theta roles in terms of a model of event structure (see §5.2.3 for further discussion). In LFG, a level of a[rgument]-structure is posited in grammatical representation. Thematic roles found in LFG a-structure include those mentioned in the preceding paragraph. Bresnan describes a-structure as having 'two faces, semantic and syntactic' (Bresnan 2001:304), but then concludes that a-structure 'is . . . fundamentally a lexical syntactic construct, not a semantic one' (p. 304). Bresnan notes that some LFG researchers relate a-structure to Jackendoff's or Rappaport Hovav and Levin's event structures (Bresnan 2001:305), both of which will be discussed in §5.2.3.

Researchers in more functionalist traditions (e.g. Givón 2001:200; Van Valin 2005:53–5), as well as Jackendoff and Rappaport Hovav and Levin, treat thematic roles as indubitably semantic. Many of these theorists argue that thematic roles are not theoretical primitives but should be defined in terms of the position of the role in event structure (e.g. Rappaport and Levin 1988:10; Jackendoff 1990:47; Dowty 1991:552; Van Valin 1993:39; Goldberg 1995:49). For example, Jackendoff defines 'theme' as the first argument of his spatial event primitives GO, STAY, BE, ORIENT, and EXT; 'goal' as the argument of the path function TO, and 'agent' as the first argument of the event function CAUSE (Jackendoff 1990:46–7). In Role and Reference Grammar, all thematic roles are given definitions in terms of their position in Role and Reference Grammar event structures. For example, agents are volitional and original instigators as well as being effectors of events. Role and Reference Grammar introduces a primitive DO to represent agency in verbs such as *murder* that lexicalize it, and defines 'agent' as the role represented by *x* in the partially specified event structure 'DO (x, [**do**´ (x, [. . .' (Van Valin 2005:56). Van Valin's definitions of thematic roles in terms of event structure actually define supersets of thematic roles. For example, a 'location' role is defined as the first argument of '**pred**´ (x,y)'; this position includes the following roles: location, perceiver, cognizer, wanter, judger, possessor, experiencer, emoter, attributant, identified variable (p. 58).

Although many scholars argue that thematic roles are not theoretical primitives, they in fact use thematic roles as theoretical primitives in much the same way as scholars who do not attempt to define thematic roles in terms of event structure. All of these scholars posit a thematic role hierarchy to

account for the contribution of event semantics to argument realization. A thematic role hierarchy is a partially or fully ordered ranking of thematic roles. A typical thematic role hierarchy, from Jackendoff (1990:258), is given in (6):

(6) Actor > Patient/Beneficiary > Theme > Location/Source/Goal
(Experiencer, Instrument not included)

The thematic role hierarchy is used to motivate realization as Subject, Object, and/or Oblique in clauses, in ways to be described below. However, the thematic role hierarchy in (6) is not motivated by the event structure definitions of the thematic roles. For example, one cannot predict from the definitions of theme (as the first argument of GO, STAY, etc.) and of goal (as the argument of the PATH function) that theme outranks goal in the thematic role hierarchy in (6). Likewise, one cannot predict the ranking of thematic roles in the hierarchy in (7) from the event structure definitions given there (Van Valin 2005:61; thematic role labels from Van Valin 1993:75):

(7)

Arg. of DO	>	1st arg. of **do′** (x, . . .	>	1st arg. of **pred′** (x,y)	>	2nd arg. of **pred′** (x,y)	>	Arg. of state **pred′** (x)
Agent	>	Effector	>	Experiencer/ Location	>	Theme	>	Patient

In fact, neither Jackendoff nor Van Valin attempt to explain the rankings in their thematic role hierarchies in terms of the event structure definitions of the thematic roles. Thus, the thematic roles are treated as theoretical primitives for the purpose of argument realization. These theories are therefore not that different from theories that do not derive thematic roles from event structure, such as Bresnan and Kanerva (1989:23).

There is a second observation that indicates that thematic roles are independent constructs from event structure in most theories of argument realization. Thematic role hierarchies include thematic roles that do not cooccur in a single event, and therefore are never realized together in a single clause. For example, experiencers do not occur together with patients. An experiencer is a participant in a mental event (perception, cognition, etc.) and is generally paired with a stimulus (§6.2.2). In contrast, a patient undergoes a change of state which, if externally caused, is brought about by an agent or more generally an effector (Van Valin and Wilkins 1996; see §5.3.1). Thus the ranking of participants is not determined by event structure in the sense of participants in the same event. At best, it is determined by similar event structure positions in different events. But we have just seen that the scholars who define thematic roles in terms of event structure do not use the event structure to determine the thematic role hierarchy.

Positing a thematic role hierarchy independently of event structure appears to be useful in determining the argument realization (linking to Subject/Object/Oblique argument role) depending on the presence or absence of particular arguments. Rappaport Hovav and Levin call this CONTEXT DEPENDENCE (AR, 158). The classic exemplar is Fillmore's analysis of the paradigm in (8) (Fillmore 1968:27), with contrasting ungrammatical examples in (9) provided by Levin and Rappaport Hovav (AR, 159):

(8) a. The door opened.
b. John opened the door.
c. The wind opened the door.
d. John opened the door with a chisel.

(9) a. *The door opened with the wind.
b. *The door opened by John.
c. *The chisel opened the door by John.

Fillmore analyzes the paradigm in terms of a Subject Selection Hierarchy, Agent > Instrument/Natural Force > Patient, such that the highest thematic role in the hierarchy that is present in the clause is realized as Subject. In Fillmore's example, all three participant roles are found in the same event (opening). But the use of the thematic role hierarchy for determining argument realization based on the presence or absence of other arguments allows a thematic role hierarchy to mix roles that never cooccur in events. For example, in *Mary hates bananas*, the Experiencer *Mary* is realized as Subject because there is no role higher in the hierarchy, such as agent, expressed in the clause. This is true because there never is an agent in a hating event; but that is not a problem in this use of the thematic role hierarchy.

Nevertheless, the thematic role hierarchy has many problems as a theoretical construct. Some of these problems are actually problems in the definitions of thematic roles. We summarize the problems with thematic roles here; see Croft (1991:155–8) and Dowty (1991:553–9) for extended discussion.

On the face of it, thematic roles look like a poor candidate for an explanation of which participants are encoded as Subject, Object, or various types of Oblique Prepositional Phrases in English and other languages. The facts in (10)–(17) (from Croft 1998*c*:81–2), summarized in Table 5.1, show that the mapping from the standard thematic roles to grammatical roles is many-to-many:

(10) *Agent*:
a. **Tommy** drove the car.
b. The food was eaten **by raccoons**.

(11) *Natural Force*:
  a. **Lightning** struck the tree.
  b. The tree was struck **by lightning**.

(12) *Instrument*:
  a. Ellen cut the salami **with a knife**.
  b. **The key** opened the door.
  c. **This knife** can really cut through cardboard.

(13) *Patient*:
  a. The man cleaned **the car**.
  b. The authorities burned **the book**.
  c. **The book** was banned by the authorities.
  d. **This meat** cuts easily.

(14) *Experiencer*:
  a. **Buddy** smelled the flowers.
  b. The dog scared **me**.

(15) *Stimulus*:
  a. Buddy smelled **the flowers**.
  b. **The dog** scared me.

(16) *Beneficiary*:
  a. I sang the song **for Fred**.
  b. Mary bought **Bob** lunch.

(17) *Theme*:
  a. Bill rolled **the ball** across the floor.
  b. **The ball** rolled across the floor.
  c. The bus spattered the sidewalk **with mud**.

TABLE 5.1. Distribution of major thematic roles across grammatical roles

	GRAMMATICAL ROLE		
	Subject	Object	Oblique
THEMATIC ROLE			
Agent	✓		✓
Natural Force	✓		✓
Instrument	✓	✓	✓
Patient	✓	✓	
Experiencer	✓	✓	
Stimulus	✓	✓	
Beneficiary		✓	✓
Figure/Theme	✓	✓	✓

Moreover, it is generally assumed that thematic roles form a small, finite set. However, there is little or no agreement on what the small finite set of thematic roles should be, in part because of the complexity of the thematic role–grammatical role mapping. A coarse-grained approach to thematic roles, positing a small number of roles, fails to capture finer-grained variation in argument realization found within and across languages. A finer-grained approach that posits a larger number of roles conversely fails to capture similarities in grammatical behavior of distinct roles, such as instrument and comitative (accompaniment) vs. recipient and beneficiary. In fact, any level of granularity in defining thematic roles will fail to make some grammatically relevant semantic distinctions or fail to capture some grammatically relevant semantic generalizations.

Also, once one goes beyond the usual verbal semantic classes, new participant roles are revealed that do not fit with the common roles listed in Table 5.1. A sample of such thematic roles is given in (18). The first five are a selection from the long list of semantic roles in the Lingua Descriptive Studies questionnaire (Comrie and Smith 1977:29–33; Croft 1991:158). The others are selected from other discussions of argument realization rules.

(18)

Negative quality:	a man **without humor**
Function:	I used the stick **as a club**.
Reference:	We talked **about the war**.
Price:	I bought it **for five dollars**.
Extent:	He ran **(for) two miles**; This weighs **two ounces**.
Judicantis:	It's too warm **for me**. [Haspelmath 2003:213]
Purpose:	He made a manger **for the church play**. [Jackendoff 1990:184; Croft, Taoka, and Wood 2001:587–8; §6.2.3]
Substitution:	She delivered the papers **for me** (= in my stead) [Jackendoff 1990:183–4; Croft et al. 2001:588; §6.2.3]
Representation source:	I photocopied **the article**. [Dowty 1991:569]

The existence of a progressively larger set of thematic roles would lead to evermore unwieldy versions of the thematic role hierarchy, and possibly greater difficulty in ranking the roles in the hierarchy.

One solution is to treat thematic roles as semantically derived entities, e.g. defining a semantic role as a combination of values of different semantic features. This approach captures similarities and differences in the grammatical behavior of different thematic roles. However, Rappaport Hovav and Levin observe that it still suffers from two fundamental problems (AR, 46–7). The first is that the possible combinations

of feature values (or possible combinations of roles across tiers) far exceed the attested combinations. Hence, at best a decomposition of roles into features or tiers would need to be supplemented by constraints on combinations. Second, there is still no explanation of why thematic roles are associated with the verbs that they occur with. Of course, the solution to the latter problem is to treat thematic roles as semantically derived from event structure: that is, event structure provides the richer framework. The latter approach is generally adopted by those who define thematic roles in terms of event structure, in principle if not in practice.

Thematic role hierarchies suffer from similar problems. In addition to differences in what thematic roles exist (and consequently what thematic roles are represented in a hierarchy), scholars differ in the ranking of similar thematic roles in their hierarchies (Croft 1998*a*:28; AR, 162–3). Rappaport Hovav and Levin do a detailed study of the uses of thematic role hierarchies and argue that much of the variation depends on what grammatical phenomenon the researcher is attempting to explain with her/his hierarchy (AR, chapter 6). Other differences depend on how the hierarchy is used in the argument linking (realization) rules. For example, most hierarchies link the Direct Object syntactic role to the second highest argument in the hierarchy that is present in the clause, but Role and Reference Grammar links the undergoer macrorole (the second highest role at the next level in the Role and Reference Grammar model; see §5.2.2) to the lowest argument in the hierarchy in (7) that is present in the clause (Croft 1998*a*:27, 28; AR, 150). This is one reason why the Role and Reference Grammar hierarchy has patient/theme lower in the hierarchy than experiencer/location, while other hierarchies have the reverse order. Nevertheless, the variation in the ranking of thematic roles in hierarchies that is dependent on the empirical grammatical phenomena being analyzed indicates that there is no one general thematic role hierarchy. It may also be that some of these grammatical phenomena can be explained by other factors, i.e. other semantic properties or other grammatical conventions, than thematic roles and a thematic role hierarchy (see, for example, Davis and Koenig 2000:60–6).

However, even if one restricts oneself only to the grammatical phenomenon of coding of arguments—the central phenomenon discussed here—then there remains another widespread grammatical pattern that thematic role hierarchies fail to capture. These are argument structure alternations (Croft 1998*a*:29, 34; Davis and Koenig 2000:58–9). Widely discussed examples of differences in realization as Subject and Object are given in examples (19)–(20) (Croft 1998*a*:29) and (21)–(22) (Davis and Koenig 2000:58), and differences in realization as Object and Oblique in examples (23)–(24) (Croft 1998*a*:34):

(19) a. I like Josquin's masses. [experiencer realized as Subject]
b. Josquin's masses please me. [stimulus realized as Subject]

(20) a. The vase is on the table. [theme realized as Subject]
b. The table is supporting the vase. [location realized as Subject]

(21) a. Mary owns many books. [possessor realized as Subject]
b. This book belongs to Mary. [theme realized as Subject]

(22) a. Oak trees plague/grace/dot the hillsides. [theme realized as Subject]
b. The hillsides boast/sport/feature oak trees. [location realized as Subject]

(23) a. I cut the steak with our new knife. [instrument realized as Oblique]
b. Our new knife cuts steak like butter. [instrument realized as Subject]

(24) a. Bobby loaded hay on the wagon. [theme realized as Object]
b. Bobby loaded the wagon with hay. [location realized as Object]

In all of these examples, the (a) sentences support one ranking of thematic roles in the hierarchy, while the (b) sentences support the opposite ranking. Since all of these examples involve the realization of semantic participant roles as grammatical roles (Subject, Object, Oblique), one cannot attribute the difference in ranking to a different type of grammatical construction that might be sensitive to a different ranking of semantic participant roles (or to some other factor). Since the (a) and (b) sentences express the same semantic roles, one also cannot appeal to presence vs. absence of semantic roles to account for differences in argument realization.

Faced with examples (19)–(24), one can choose either to supplement thematic roles and thematic role hierarchies with another independently posited theoretical construct or constructs, or to abandon the multiplication of theoretical constructs altogether. In the following section, we will briefly summarize approaches that add one or more independently posited theoretical constructs to supplement thematic role hierarchies.

5.2.2 Role designation

The existence of alternations such as those illustrated in (19)–(24) has generally been interpreted as indicating that thematic roles (and a thematic role hierarchy) need to be supplemented—or possibly replaced—by another theoretical construct that will account for the alternations in argument realization. In Croft (1998*a*), I called the additional theoretical construct 'superroles', because they are usually defined as a type of role, albeit one that is

superordinate to thematic roles. Here I will describe the phenomenon as ROLE DESIGNATION—some way of labeling roles independent of thematic role and of event structure that helps in argument realization in some way.

There are two types of role designation that do not purport to be related to the semantic structure of events in any way. First, in some functionalist theories, designation of Subject and Object is treated as a discourse category, namely primary and secondary topic (e.g. Givón 2001:198–201).[1] Givón argues against reducing topicality to a 'semantic' or cognitive notion—or conversely, reducing semantics to discourse/communication (p. 198). I agree with Givón that topicality is independent of the semantics of events in argument realization, and that topicality plays a role in argument realization, not least in those argument realization patterns based on the animacy and definiteness of the participants filling the roles in the events (§§1.4, 6.3.2). Topicality is also clearly correlated with realization as Subject and Object, if it is not the motivating factor. Givón cites numerous studies demonstrating that operational criteria for topicality consistently associate the Subject with highest topicality and the Object with secondary topicality (Givón 1983, 1994, inter alia).

Nevertheless, topicality is not the entire explanation for argument realization, as Givón himself recognizes. For example, if a semantic patient argument is higher in topicality than the agent argument, then a Passive (or Inverse) voice construction is used. The effect of the Passive construction is to realize the patient as Subject—a clear indication that topicality drives Subject realization (see §6.3.1). However, the verb generally has a distinct morphological form in the Passive or Inverse voice. This grammatical difference indicates that there is an interaction between participant role semantics (and hence event structure) and topicality in determining the grammatical structure of clauses. We will return to the role of topicality in §6.3.2; for now, we acknowledge the role of topicality in argument realization, and focus on how best to represent the separate contribution of verbal semantics to the choice of Subject, Object, and Oblique.

The second type of role designation that does not make a claim to be related to the semantic structure of events is the theoretical construct of grammatical relation (function). Most of the theories discussed below use some notion of grammatical relation/function in addition to the role designations to be described. Grammatical relations have been posited for a number of reasons. First, as observed in §1.4, grammatical relations are posited to capture putative syntactic generalizations across a range of constructions, all of which make reference to some categorization of clausal

[1] Givón uses thematic roles to represent event semantic structure (Givón 2001:106–8).

syntactic roles represented by S, A, and P/O in the typological literature. These constructions are in fact not uniform in their categorization of clausal syntactic roles, either across languages or within them. Grammatical functions as global (cross-constructional) categories should not be posited for this reason. As also noted in §1.4, this book will not discuss the categorization of clausal syntactic roles except in the coding of participants (i.e. argument realization).

Grammatical relations/functions are also used for other theoretical purposes. One is to posit a level of syntactic dependencies distinct from syntactic constituency, as in Lexical Functional Grammar (Bresnan 2001). Again, this is an employment of grammatical relations for a representational purpose other than event structure and argument realization. Generative grammar, in contrast, simply defines grammatical relations in terms of constituent structure configuration. We will not concern ourselves with this issue here, assuming only that there exists grammatical coding of different participant roles (see Croft 2001, chapters 5–6 for a Radical Construction Grammar analysis of syntactic relations, including constituency and dependency).

Grammatical relations perform two other functions that are relevant to argument realization. Grammatical relations are the level at which rearrangements are hypothesized to occur that allow for voice alternations such as Active vs. Passive:

(25) a. Off-road vehicles destroyed the archaeological site.
b. The archaeological site was destroyed by off-road vehicles.

That is, in almost all theories of argument realization, sentence (25b), in which the patient participant is realized as Subject, is not the product of linking/realization rules, but of a syntactic process (a Passive movement rule) or a lexical process (a lexical rule that rearranges the relationship between semantic roles and grammatical relations). Of course, this is the same phenomenon that functionalists argue is motivated by topicality.

An essentially syntactic role designation found in some theories of argument realization is the designation of certain semantic participant roles as syntactic arguments. For example, Jackendoff (1990:252) uses a theoretical device, A-marking, to specify which semantic roles are syntactic arguments and which are not. A-marking picks out only certain roles (not adjuncts) to be linked to Subject and Object according to Jackendoff's thematic role hierarchy. Culicover and Jackendoff (2005) do not explicitly discuss A-marking, but they presuppose a designation of certain participant roles as arguments and explicitly restrict their thematic hierarchy to direct arguments (pp. 178–86).

Designation of arguments vs. nonarguments allows one to handle the alternations in (21)–(22) and (23)–(24), since they involve alternation between

an argument and a nonargument, according to Jackendoff's designations of arguments. For example, he analyzes the alternation in (24) such that in (24a) the theme participant role is A-marked but in (24b) the theme participant role is not A-marked (Jackendoff 1990:173, 252). Adding an argument–nonargument distinction to the thematic role hierarchy is independent of event structure; it is essentially a stipulation in the verb's lexical entry (Culicover and Jackendoff 2005:182). Also, designation of arguments vs. nonarguments will not account for alternations in which the two participants both have argument roles that change from one alternation to the other, as in (19) and (22). Culicover and Jackendoff also explicitly leave out the Subject/Object alternations in (19a–b) from their linking rule, stating that the stimulus and experiencer roles allow either linking pattern (pp. 183–4). However, the examples in (22a–b) presumably are examples of theme and location thematic roles, which Culicover and Jackendoff do include in their thematic role hierarchy, and yet they alternate in argument roles.

Role and Reference Grammar also designates certain participant roles ('semantic arguments' in their terms) as syntactic arguments ('core arguments').[2] Role and Reference Grammar in addition uses a semantic role designation: the semantic macroroles of actor and undergoer.

The macroroles are described as 'generalized semantic roles' that are generalizations of the agent and patient roles (Van Valin 2005:60). Role and Reference Grammar therefore uses two levels of granularity in defining thematic roles, with macroroles acting as more coarse-grained roles and the thematic roles as more fine-grained roles (recall also that the event-structure definitions of the thematic roles themselves subsume sets of even finer-grained thematic roles; see Van Valin 2005:54, Figure 2.2). However, the macroroles do not simply group together two large subsets of thematic roles. Actor and undergoer macroroles overlap: while agents and effectors can only be actors, and themes and patients can only be undergoers, experiencers/locations can be either actors or undergoers. Predicates with a single semantic argument are divided as to whether the argument is an actor or undergoer; unified grammatical behavior of such predicates (as 'intransitive subjects') is attributed to the level of grammatical relations (Van Valin and LaPolla 1997:143–4) or privileged syntactic arguments (Van Valin 2005:106).

Only the highest expressed thematic role on the thematic role hierarchy may be the actor; the paradigm in (8)–(9) in §5.2.1 is explained in essentially the same way as by Fillmore (Van Valin 2005:62). In events with more than one undergoer role, either undergoer may be chosen as undergoer unless one of the thematic

[2] Role and Reference Grammar also distinguishes between direct core arguments, which are not governed by adpositions, and oblique core arguments, which are.

roles is patient, in which case it is always chosen as undergoer (p. 62). The alternation between theme and location with *load* in (24a–b) is explained as a difference in choice of undergoer (Van Valin and LaPolla 1997:145). Roughly, Role and Reference Grammar does with the macrorole–nonmacrorole distinction what Jackendoff does with his argument–nonargument distinction.

Not every semantic argument of a predicate may be associated with a macrorole. Binary valence predicates may have just one macrorole, and ternary valence predicates may have no more than two macroroles (Van Valin 2005:63–4). Thus, the macrorole assignment of participant roles cannot be predicted from event structure, although the most common assignments are specified as defaults (p. 61). In other words, designation of macroroles is (partly) independent of event structure.

Role and Reference Grammar uses several other distinctions in order to account for argument realization patterns. There is a distinction between core argument and noncore argument. Core arguments are defined as positions in the nucleus of the semantic representation of the predicate (Van Valin 2005:57). However, Passive voice alters the arguments in the nucleus—the passive agent, realized as Oblique, occurs in the periphery (p. 57). Hence the core–noncore distinction is partly syntactic, partly semantic; in fact, Van Valin later describes core argumenthood as 'a syntactic status' (p. 94). There is also a direct–oblique argument distinction that crosscuts the core–noncore distinction. The direct–oblique contrast is, however, a language-specific morphosyntactic distinction (p. 65). No criteria are offered for how to identify which morphosyntactic distinction reflects the crosslinguistically valid direct–oblique distinction. Finally, there are privileged syntactic arguments, which function as the parallel theoretical construct in Role and Reference Grammar to grammatical relations in other theories. Privileged syntactic arguments are used to define the category of filler of a syntactic role in various constructions, such as Reflexives, Control constructions, and Coordination constructions, as well as constructions that encode participant roles such as indexation (agreement) and case marking. In the Passive and Antipassive voices, there is a marked assignment of privileged syntactic argument (p. 100), and one less core argument than in the Active voice, namely the actor in the case of the Passive and the undergoer in the case of the Antipassive (Van Valin and LaPolla 1997:173, 176).

Role and Reference Grammar has the most complex theory of argument realization in the literature. This is partly because it attempts to capture a broader crosslinguistic range of argument structure phenomena than other argument realization theories. It employs an event structure decomposition, thematic roles, a thematic role hierarchy, a semantic role designation (the two macroroles), a syntactic role designation (argument vs. nonargument,

divided into core vs. noncore and direct vs. oblique, which crosscut each other), not to mention the privileged syntactic arguments, of which there can be more than one in a language (Van Valin 2005:99; see §1.4). None of these are fully predictable from event structure or any other theoretical construct. Although they are not completely independent, as various default assignments and other constraints limit the range of theoretical possibilities, each level beyond event structure must be at least partly stipulated.

5.2.3 Event-based theories of argument realization

The theories of argument realization summarized in §§5.2.1–5.2.2 use theoretical constructs that are not predictable from event structure: a thematic role hierarchy and role designation which is independent of both event structure and the thematic role hierarchy. Although we criticized those theories, there is a germ of truth in the conception of both the thematic role hierarchy and role designation. The germs of truth are a ranking of participant roles and a special status of particular participant roles. Our criticism is that thematic roles, role ranking, and role designation should be derivable from event structure and should not have to be stipulated independently of event structure. As we have seen, independently posited role ranking and role designation cannot easily deal with the empirical variation in argument realization, within and across languages. In this section, we examine approaches to argument realization that purport to derive all the relevant properties for argument realization from event structure.

The first type of event-based approach is described by Levin and Rappaport Hovav as an absolute mapping approach (AR, 146), and is best exemplified by their own earlier work (Levin and Rappaport Hovav 1995; there are other absolute mapping approaches based on thematic role hierarchies rather than event structures; see AR, 146). In event-based absolute mapping approaches, some specific role definable by properties of event structure is linked to a particular syntactic argument role (in Levin and Rappaport Hovav's [1995] theory, syntactic argument roles are defined as positions in a phrase structure configuration). For example, their Immediate Cause Linking Rule is given in (26) (Levin and Rappaport Hovav 1995:135; AR, 146):

(26) Immediate Cause Linking Rule:
The argument of a verb that denotes the immediate cause of the eventuality described by that verb is its external argument.

Levin and Rappaport Hovav observe two significant drawbacks to absolute mapping approaches, event-based or otherwise (AR, 146–7). The first is that such approaches have difficulty with context dependence, where the realization of a semantic participant role in the syntax depends on the presence or

absence of the expression of other semantic participant roles, as in the paradigm in (8)–(9), repeated below:

(8) a. The door opened.
b. John opened the door.
c. The wind opened the door.
d. John opened the door with a chisel.

(9) a. *The door opened with the wind.
b. *The door opened by John.
c. *The chisel opened the door by John.

The second is that 'absolute mapping approaches . . . do not explain why any particular set of absolute mapping rules is possible' (AR, 147), that is, no constraints on what mappings of event structure to syntactic argument roles have been offered so far.

Theories that address the problem of context dependence include what Levin and Rappaport Hovav call relative mapping approaches: argument realization of one semantic participant role is dependent on its relation to other participant role(s) in the event (AR, 147–52).

Dowty's theory of proto-roles is an event-based example of a relative mapping approach. As noted in §5.2, Dowty eschews a decompositional semantic analysis of event in favor of the representation of event structure in terms of entailments of predicates. Dowty also abandons thematic roles in the sense of a smallish set of semantic roles. In its place, Dowty proposes a model in which certain properties of event participant roles are entailed from the semantic predicate, and these properties are grouped into two complementary sets, the Proto-Agent entailments and the Proto-Patient entailments (adapted from Dowty 1991:572):

TABLE 5.2. Contributing properties to Dowty's Agent and Patient proto-roles

Agent proto-role	*Patient proto-role*
volitional involvement in the event or state	undergoes change of state
sentience (and/or perception)	incremental theme
causing an event or change of state in another participant	causally affected by another participant
movement (relative to the position of another participant)	stationary relative to movement of another participant
(exists independently of the event named by the verb)	(does not exist independently of the event, or does not exist at all)

Dowty proposes the following Argument Selection Principle and corollaries (Dowty 1991:576):

(27) ARGUMENT SELECTION PRINCIPLE. In predicates with grammatical Subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the Subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the Direct Object.

COROLLARY 1: If two arguments of a relation have (approximately) equal numbers of entailed Proto-Agent and Proto-Patient properties, then either or both may be lexicalized as the Subject (and similarly for Objects).
COROLLARY 2: With a three-place predicate, the non-Subject argument having the greater number of entailed Proto-Patient properties will be lexicalized as the Direct Object and the non-Subject argument having fewer entailed Proto-Patient properties will be lexicalized as an Oblique or Prepositional Object (and if two non-Subject arguments have approximately equal numbers of entailed P-Patient properties, either or both may be lexicalized as Direct Object).
NONDISCRETENESS: Proto-roles, obviously, do not classify arguments exhaustively (some arguments have neither role) or uniquely (some arguments may share the same role) or discretely (some arguments could qualify partially but equally for both proto-roles).

Dowty's proto-roles are therefore akin to prototype categories, in that there are no necessary and sufficient conditions for Proto-Agent or Proto-Patient, and there is no sharp boundary between the two categories. Also, Dowty's proto-roles are not 'reified' (AR, 64; cf. Davis and Koenig 2000:74). That is, Dowty's macroroles are not autonomous theoretical entities used for argument linking, in contrast with Role and Reference Grammar's macroroles; they are simply an epiphenomenon of the predicate entailments. Dowty also cautions that the lists of proto-role properties in Table 5.2 are not necessarily exhaustive, and may be subject to revision (Dowty 1991:572; AR, 62–3 describes some extensions of Dowty's proto-role properties by other scholars).

Since Dowty's proto-roles are defined in prototype terms, and also in terms of which arguments are chosen as Subject and Object, Dowty can handle the context dependence found in (8)–(9). If an agent and an instrument are present, as in (8c), the agent possesses more Proto-Agent entailments than the instrument (the agent is volitional whereas the instrument is not), and hence is selected (realized) as Subject. But the instrument also has fewer Proto-Patient entailments than the patient (the patient undergoes a change of state while instrument does not), so the patient, not the instrument, is selected as Direct Object.

Dowty's proto-roles allow for alternations where both arguments are expressed in two circumstances. First, the alternation may involve a semantic difference that leads to a difference in the number of proto-role properties associated with the arguments that alternate. For example, Dowty argues that the proper analysis of the Direct Object in the Locative alternation in (24a–b), repeated below, is as incremental theme:

(24) a. Bobby loaded hay on the wagon. [theme realized as Object]
b. Bobby loaded the wagon with hay. [location realized as Object]

That is, in (24a) the hay is the incremental theme: the measurement of the incremental progress of the directed activity is the amount of hay loaded on the wagon. On the other hand, in (24b), the wagon is the incremental theme: the measurement of the incremental progress of the directed activity is the gradual loading up of the wagon with the hay (Dowty 1991:587–92; see §7.4.2 for further discussion of Dowty's analysis of the Locative alternation). Since incremental theme is one of the Proto-Patient properties, entailment of that property for a non-Subject argument tips the balance so that it becomes the Direct Object.

A second way in which Dowty's proto-roles allow for an alternation is when the number of proto-role entailments is approximately equal: then either argument may be expressed in the syntactic argument role. Dowty argues that the alternation for mental predicates such as *like* and *please* in (19a–b), repeated below, occurs because the experiencer has one Proto-Agent entailment (it is sentient) and the stimulus has one Proto-Agent entailment (it causes an emotional reaction in the experiencer; Dowty 1991:579):

(19) a. I like Josquin's masses. [experiencer realized as Subject]
b. Josquin's masses please me. [stimulus realized as Subject]

Dowty's proto-role theory is attractive in many respects. All of the relevant properties are derived directly from the semantic structure of events. It allows for multiple properties of participants, like Jackendoff's tiers, but is not restricted to just two tiers, as Jackendoff's theory is. It is potentially open-ended in that other semantic properties of events may be discovered to bear on argument selection. It allows for the possibility that not all events will entail all the properties, which allows for the subsumption of a range of traditional thematic roles under the Subject and Object categories. It allows for participants to have properties of both Proto-Agent and Proto-Patient roles. Finally, it provides two simple mechanisms for alternations, semantic differences in the alternatives or equality in the number of proto-role properties.

Nevertheless, Dowty's proto-roles have a number of drawbacks. The initial condition of the Argument Selection Principle in (27) restricts the theory to predicates with grammatical Subject and Object. In other words, Dowty presupposes a role designation (not unlike Jackendoff's argument–nonargument role designation) independent of event structure that determines which semantic participants are eligible for proto-role selection (Croft 1998*a*:37; Davis and Koenig 2000:74; AR, 60). Davis and Koenig point out that in two argument predicates that are realized in English as syntactically Intransitive verbs with governed Oblique complements, such as *rely on, yearn for, suffice for, apply to, do without*, and *deal with*, the participant role with the greater number of proto-Agent properties is realized as Subject. However, if Dowty's principles are extended to include syntactic Intransitives with an Oblique argument, then it fails to allow for Agentive Passives such as *This tree was felled by a beaver* or sentences such as *The tank filled with water*, in which the argument with the greater number of Proto-Agent properties is Oblique (Davis and Koenig 2000:74–5).

Another serious problem is that the lists of proto-role properties are not independently motivated. In other words, Dowty's theory does not address the second objection that Levin and Rappaport Hovav present for absolute mapping approaches. That is, there is no a priori reason why the Proto-Agent and Proto-Patient properties are partitioned in the way that they are, apart from inductive generalization from the empirical facts that Dowty adduces in support of his theory (Croft 1998*a*:37; AR, 63). Many of the properties are complementary: volitionality–undergoer, causer–affected, moving–stationary. These pairings in effect replicate parts of a thematic role hierarchy (Agent > Patient, Effector > Patient, Theme > Location), albeit with more carefully defined roles, and allowing for participants to play multiple roles. What is lacking is a unified explanation, if one can be found, that accounts for why these mini-hierarchies are ranked in the way that they are, and why the other properties (sentience, incremental theme) are also associated with the proto-roles in the way that they are.

Finally, the proto-role properties are not equal in determining argument selection, as Dowty himself notes:

> . . . movement is apparently an agent property only when not caused by another participant in the event named by the verb (*The cloud passed the tree, Water filled the tank*), not when it is caused by something (*John threw the ball, The wall deflected the bullet*) or interrupted (*John caught the ball*); in this sense, causation has priority over movement for distinguishing agents from patients.
>
> (Dowty 1991:574)

This fact is also in need of an explanation.

The central problem with all approaches which ultimately represent event structure as thematic roles in a hierarchy, even a minimal ranking of Proto-Agent and Proto-Patient, is stated clearly by Fillmore and Kay:

> [A] hierarchy of isolated roles takes no account of their relational nature . . . The idea of an event notionally parsed into, say, a location and an experiencer is incoherent because 'experiencer' makes no sense without the presence of the cause or content of an experience and 'goal' makes no sense outside of the kind of scene in which some patient or theme (potentially) moves toward some intended destination.
>
> (Fillmore and Kay 1993:8.21)

In other words, a thematic role hierarchy does not respect event structure, since it mixes roles from incompatible event types.

A major drawback in Dowty's approach is that there is no means to represent the relationship BETWEEN participant roles. We now turn, or perhaps return, to approaches that use event structure decompositions to represent the relative ranking of participant roles within an event.

As we have seen in §2.3.1 and §5.2, in most approaches in the generative tradition as well as Role and Reference Grammar, semantic event decompositions take the form of a logical calculus; see examples (2)–(3), repeated below:

(2) a. Max melted the ice.
b. [**do**′ (Max,Ø)] CAUSE [BECOME **melted**′ (ice)]
(Van Valin 2005:47)

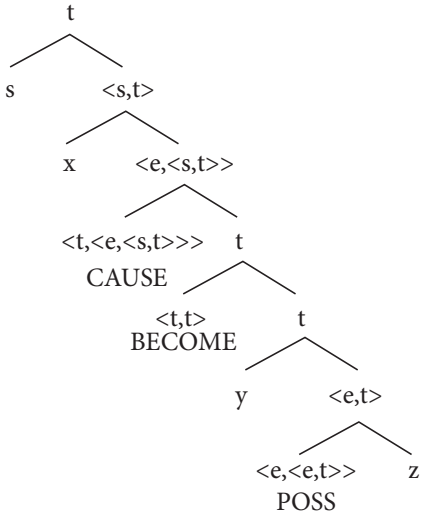
(3) Transitive *break:* [[X $ACT_{<MANNER>}$] CAUSE [BECOME [Y <*BROKEN*>]]]
(Rappaport Hovav and Levin 1998:116)

Intellectually, these and similar representations are all derived from the phrase structure representations of sublexical verbal structure in Generative Semantics (e.g. McCawley 1973). These representations have a number of common features. First, they make use of a similar set of primitive semantic predicates, including CAUSE, DO/ACT, BECOME, and verbal roots that usually (but not always) denote specific states such as *BROKEN*. Second, they allow a combination of entities and/or predicates to function as arguments of predicates. For example, in (2), CAUSE takes two predicates as arguments, [**do**′ (Max,Ø)] and [BECOME **melted**′ (ice)], while **melted**′ takes an entity as its argument (ice). In (3), BECOME has an entity Y and a predicate <*BROKEN*> as arguments. Third, an ordering of arguments can sometimes be derived via depth of embedding of predicates. Levin and Rappaport Hovav note that, as with thematic roles, there is no agreed-upon small set of primitive semantic

predicates (excluding lexical roots), and that the primitive semantic predicates tend to proliferate with efforts to account for a larger number of verbs and their grammatical behavior (AR, 74).

In fact, most analysts who employ event decompositions do not use them to define relative positions of arguments in predicates. Instead, absolute definitions of thematic roles are given based on positions in event decompositions (see §5.2). One exception is Wunderlich (1997*a*, *b*), who proposes a level of Semantic Form (SF) for argument realization. Wunderlich uses purely binary branching structures in a categorial grammar format (as indicated by the semantic types in angle brackets in the tree in (28)). Example (28) is Wunderlich's representation of *give* (Wunderlich 1997*b*:38–9):

(28) (s (x CAUSE (BECOME (y POSS z))))



One advantage of using a binary branching structure is that it provides an exhaustive ordering of argument positions in an event structure with embedding of predicates. Wunderlich uses this ordering of argument positions to provide a ranking of theta roles in Theta Structure (TS), which is derived from SF via successive lambda-abstraction of the participant roles in SF. There are at most three core argument positions that Wunderlich's linking theory accounts for (at most Subject, Object, and Indirect Object). Wunderlich defines these three positions using two binary features: [±hr] for "there is a/no higher role" and [±lr] for "there is a/no lower role". Accusative is assigned the feature [+lr], ergative the feature [+hr], and dative the feature [+hr, +lr] representing the intermediate role. Nominative/absolutive is unmarked (no value for either feature); in accusative case marking languages it is linked to the highest role and in ergative case marking languages it is linked to the lowest role.

Wunderlich's proposal handles the ranking of core arguments but requires additional stipulations for what he calls noncanonical argument linking patterns. For example, in German some verbs take Nominative and Dative arguments, with the Dative argument sometimes the lower one in the ranking (29) and sometimes the higher one (30) (Wunderlich 1997*b*:51):

(29) als ich ihm dankte/half
when I.NOM him.DAT thanked/helped
'when I thanked/helped him'

(30) weil mir der Roman gefällt
because me.DAT the.NOM novel.NOM pleases
'because the novel pleases me/I like the novel'

Wunderlich uses an exceptional lexical marking of the lower or higher theta role with Dative in order to account for these cases—again, a role designation not predictable from event structure or a lexical semantic representation.

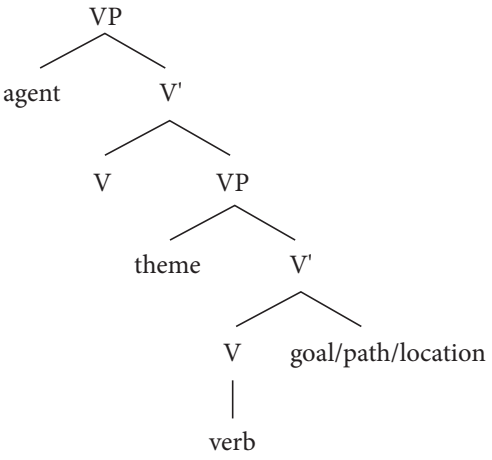
Rappaport Hovav and Levin note a more general problem with approaches using lexical decomposition of the sort used by Wunderlich and others in the post-Generative Semantics tradition. In some cases, particularly with certain roots, it appears that there are two arguments of the predicate in the decomposition. For example, Rappaport Hovav and Levin analyze *sweep* as [x $ACT_{<SWEEP>}$ y], with two arguments at the same level of embedding (Rappaport Hovav and Levin 1998:119). Thus, one cannot always rank participant roles in terms of depth of embedding, and therefore one cannot predict the argument selection in examples like *Randy swept the floor.*

Also, Wunderlich must additionally exclude certain arguments from 'structural linking', that is, linking to core argument positions. Among the excluded arguments are Oblique arguments and Passive agents (Wunderlich 1997*b*:46). In other words, Wunderlich must still rely on a role designation device that is independent of event structure.

Finally, generative grammar has come to employ syntactic structures that also resemble the syntactico–semantic decompositional structures of Generative Semantics (as noted by many authors, e.g. Culicover and Jackendoff 2005:95). In these syntactic representations, theta roles are defined as positions in a sublexical phrase structure configuration (Larson 1988; Baker 1997; Hale and Keyser 1993, 1997, 2002). For example, Baker defines the thematic roles of agent, theme, and goal as in (31) (Baker 1997:120–1, cited in AR, 139); the tree in (32) (from AR, 139) gives a rough illustration of those definitions:

(31) a. An agent is the specifier of the higher VP of a Larsonian structure.
b. A theme is the specifier of the lower VP.
c. A goal, path, or location is the complement of the lower VP.

(32)



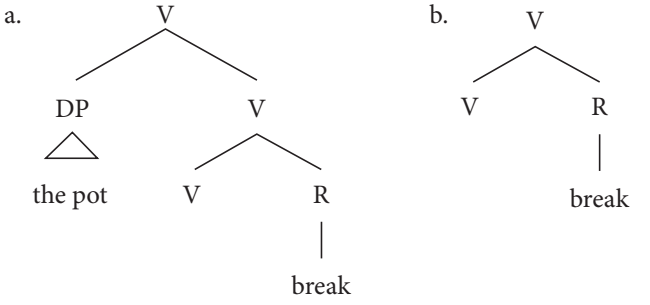
Baker notes that the aim of such representations is to 'constrain the interface between conceptual representations and syntactic representations in a particularly tight way', epitomized by his Uniformity of Theta Assignment Hypothesis (UTAH; §5.2.1). Baker suggests that sublexical structural configurations might even be the same as conceptual structure representations of events (Baker 1997:126–7; see also Baker 2001:46–9, 2003:77–8).

However, Baker does not develop the semantic analysis in any detail. In his 1997 paper, he argues for three highly general semantic roles ranked in a Thematic Hierarchy (Baker 1997: 105, 108), and appeals to Dowty's proto-roles (pp. 77–8, 86–7). In the later work, Baker gives some examples of decompositions but restricts his broad claims to the hypotheses that all transitive verbs have a CAUSE component and all verbs have an Adjective component (Baker 2003:77–88). Levin and Rappaport Hovav argue that the first hypothesis 'has never been seriously entertained by lexical semanticists' (AR, 168): Levin (1999) gives many examples of 'non-core transitive verbs' which do not plausibly have a CAUSE component, including *cross the bridge, see the bridge, hate the bridge*, and *avoid the bridge* (Levin 1999:224–5). Baker's latter hypothesis appears to claim that the root component of a verb's meaning is a stative predicate. This seems least plausible for intransitive undirected activities without any resulting state, such as *wobble, dance*, or *tinkle*.

Hale and Keyser make a very similar proposal for sublexical syntactic structure (Hale and Keyser 1993, 1997, 2002). Their primary motivation is to develop a theory of possible words (not just verbs), constraining them by constraints on syntactic structure. Hale and Keyser do not provide a theory or hypotheses on the relationship between event structure and the sublexical syntactic structures. In their examples of patterns that appear to be semantically motivated, semantic differences are represented sometimes by syntactic

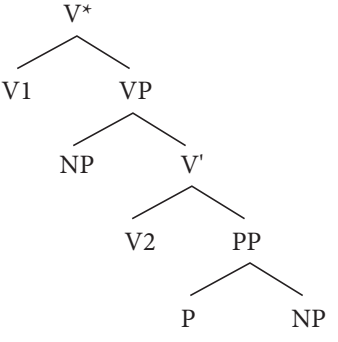
structure and sometimes not. For example, the difference between verbs that allow the Causative–Inchoative alternation is represented by a difference in sublexical syntactic structure in (33a–b) (Hale and Keyser 2002:1–2):

(33) a. The pot broke/I broke the pot.
b. The engine coughed/*I coughed the engine.



However, the difference between *splash* and *smear* verbs in the Transitive–Intransitive alternation is not represented by a difference in sublexical syntactic structure (Hale and Keyser 1997:53):

(34) a. We splashed mud on the wall./Mud splashed on the wall.
b. We smeared mud on the wall./*Mud smeared on the wall.



For the *splash* type verbs in (34a), Hale and Keyser suggest that there is a 'classificatory' semantic component in V2, whereas for the *smear* type verbs in (34b), there is a manner component in V1, and the latter fact requires the *smear* type verbs to be transitive (Hale and Keyser 1997:53–4; see §7.4.1). From these and other isolated examples, we cannot infer what is the general decompositional model of event structure intended by Hale and Keyser, although it would bear a family resemblance to the event structures of Role and Reference Grammar, Levin and Rappaport Hovav, Jackendoff, and Wunderlich described above. (For a critical evaluation of Hale and Keyser's theory, see Culicover and Jackendoff 2005:53–6, 94–103, and references cited therein.)

5.2.4 Summary

Many of the theories of argument realization examined here posit theoretical constructs to account for argument realization that are not predictable from event structure and thus are at least partially independent of event structure. The most widely used construct is a thematic role hierarchy. But thematic roles are a poor predictor of grammatical argument roles. The additional positing of a thematic role hierarchy solves some problems but not others. But the addition of semantic role designation such as macroroles or arguments (vs. adjuncts) still does not account for all alternations, particularly voice alternations. The additional positing of a syntactic role designation (argument vs. nonargument), not to mention the additional level of grammatical functions or privileged syntactic arguments, leads one to think that perhaps epicycles are being added onto epicycles. A new start seems desirable.

Event-based relative mapping approaches purport to eschew independently specified theoretical constructs, and provide a way to use properties of event structure to assign a ranking of participant roles for linking to grammatical argument roles. Nevertheless, they still have problems. The style of event decomposition ultimately inherited from Generative Semantics does not easily or completely capture the role ranking that is relevant for argument realization. The approaches still rely on a role designation mechanism that must be stipulated independently of event structure. A rarely noted problem is that none of these approaches are able to account for the grammatical behavior of Obliques. In fact, the purpose of the role designation mechanism is to exclude Obliques and use role ranking for the realization of core arguments only.

These problems can be resolved by a purely event-based relative mapping approach based on the causal (force-dynamic) structure of events.

5.3 A force-dynamic (causal) theory of argument realization

In this section, we present an event-based, force-dynamic theory of argument linking developed in Croft (1986, 1991, 1993, 1994*a*, *b*, 1998*a*, *c*). This theory, which was developed on the basis of earlier proposals in functional and cognitive linguistics, appears to capture many of the properties of event structure that motivate argument realization; evidence supporting this analysis will be presented in chapter 6. However, the verbal semantic representation used in the earlier publications has a number of shortcomings, chiefly due to its inability to represent details of aspectual structure. A new representational

model of event structure integrating causal and aspectual structure is presented in §5.4 (see also Croft 2009*a*).

5.3.1 The force-dynamic (causal) structure of events and role ranking

In the preceding sections, we have argued that ranking semantic participant roles for argument realization independently of event structure is unsatisfactory, and that participant roles must be defined relative to other participant roles in the same event. However, the event representations descended from Generative Semantics do not appear to be able to capture perspicuously the semantic properties that determine the ranking of participant roles for argument realization. These event representations must be supplemented by an independent role designation mechanism.

The fundamental semantic property that determines participant role ranking for argument realization is the causal structure of events, more specifically, the transmission of force relationships between participants. In the event decompositions described in the preceding sections, causation is defined in terms of one event causing another event, following traditional philosophical analysis. Transmission of force (Talmy 1976), later called FORCE-DYNAMIC relations (Talmy 1988/2000), represents causation in a different way, as the interaction between entities. Force-dynamic relations among entities are illustrated for the sentence in (35) below (adapted from Croft 1991:177):

(35) Sue broke the coconut for Greg with a hammer.

Sue ------► hammer ------► coconut ------► Greg

In the event described in (35), Sue acts on the hammer (she grasps it), the hammer acts on the coconut (it impacts it), and the coconut "acts on" Greg (its breaking benefits him in some way; this type of force-dynamic relation will be discussed shortly). The force-dynamic representation in (35) indicates transmission of force between participants with an arrow. Transmission of force is an asymmetric relation; we describe the first member of this relation as the INITIATOR and the second as the ENDPOINT (Croft 1991:166–7).

The representation in (35) illustrates the CAUSAL CHAIN linking the participants in the event (Langacker calls it the 'action chain'; Langacker 1991:283, 2008:355). The causal chain is a directed, acyclic and nonbranching structure. This appears to be a general construal of the force-dynamic relationships among participants in the lexicalized conceptualization of events, and has

consequences for the argument realization rules (§6.3.1) and the construal of events in lexicalization (see chapter 6).[3]

Force-dynamic relations among participants have been invoked in a number of works in the functional–typological and cognitive tradition, including DeLancey (1981, 1985), Talmy (1972, 1976, 1988), Lichtenberk (1985), Barber (1975), and Langacker (1991, 2008). Langacker describes transmission of force as the 'billiard-ball' model of causation (Langacker 1991:283, 2008:355). Of these authors, Talmy gives the most detailed semantic analysis of types of causation.

Talmy (1972, 1976) distinguishes four types of causation, illustrated in (36)–(39):

(36) *Physical causation: a physical object acts on another physical object*

The rock broke the window.

(37) *Volitional causation: a volitional entity intentionally acts on a physical object*

Johnny broke the window.

(38) *Affective causation: a physical object acts on an entity with mental capacity, affecting its mental state*

The dog frightened me.

(39) *Inducive causation: a volitional entity intentionally acts on an entity with mental capacity, affecting its mental state*

Sarah convinced me (to go to the party).

Physical causation is the prototypical case of billiard-ball causation or force-dynamic relations. All of the others involve entities with mental capacities, such as persons, higher animals, or other entities that may be construed by human speakers to have such mental capacities. These mental capacities include the ability to bring about some physical process, and the capacity to have a mental state that can be affected by some physical entity. The sentence in (35) illustrates three different types of causation in a single event structure: volitional causation (Sue acting on the hammer), physical causation (the hammer acting on the coconut), and affective causation (the broken coconut benefiting Greg).

[3] The representation of the causal chain in (35) differs from that in Croft (1991, 1998*a*), which includes the state–process aspectual distinction and thus more closely resembles the post-Generative Semantics representations discussed in §5.2.3; see §5.4. The representation in (35) gives solely the force-dynamic relationships among participants.

Human beings may participate in events either as physical or volitional entities, as either initiator or endpoint. For example, *I hit the table* may involve volitional causation (I purposefully brought my fist down on the table) or physical causation (I fell and struck or landed on the table). And while *The dog frightened me* is an example of affective causation (or inducive causation if the dog deliberately did it), *The dog bit me* is an example of volitional causation: the dog agentively acts on my flesh.

Croft (1991:166–7) provides a further analysis of Talmy's four types, in terms of whether an entity is involved in the action as a physical entity or a mental entity as either initiator or endpoint:

(40) *Physical causation*: physical initiator, physical endpoint
Volitional causation: mental initiator, physical endpoint
Affective causation: physical initiator, mental endpoint
Inducive causation: mental initiator, mental endpoint

In other words, Talmy's analysis of causation reflects a commonsense or folk theory of dualism. In addition, there is a general folk theory of "no telepathy and no telekinesis outside one's own body", such that volitional and inducive causation must always be mediated by a physical instrument, including one's own body part. This constraint licenses instruments, including body-part Instrumental phrases as in *I ate it with my fingers*. Figure 5.1 illustrates this analysis of Talmy's causation types (Croft 1991:167).

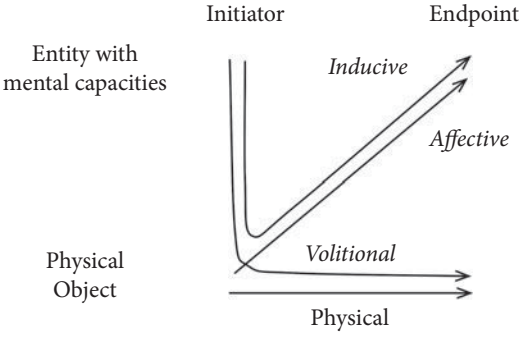


FIGURE 5.1. Croft's (1991) analysis of Talmy's (1976) causation types.

The contrast between volitional and physical causation requires more discussion, as its precise formulation has been questioned, and yet it is important for realization of a participant as Subject (see §6.4). For example, a classic paper by Cruse (1973) argues that four concepts of 'agency' are required to account for certain linguistic behavior. On the other extreme,

Van Valin and Wilkins (1996) argue against treating volitionality as a distinct category for realization of Subject.

Cruse's distinctions are based on a careful investigation of different "tests" for agency, such as the *What X did* vs. *what happened to X was*..., the imperative, and the adverb *carefully*. He demonstrates that the "tests" do not match (see §1.4), and concludes that (at least) four concepts of agency are required. Cruse's four concepts are all relevant to the grammar of causation; his paper anticipates many distinctions made in the recent semantics literature. His volitive feature corresponds most closely to volitional causation as defined here: 'an act of will is stated or implied' (Cruse 1973:18). The effective feature, 'something which exerts a force (literally or metaphorically), not by virtue of an internal energy source' (p. 19), is close to the general concept of transmission of force. The initiative feature is roughly defined as 'initiation of an action by giving a command' (p. 20), illustrated by *The warder marched the prisoners across the yard*. It corresponds to the initiator of inducive causation, in which the endpoint must also exercise some volition (see §6.4.2). Finally, Cruse's agentive feature applies to 'an action performed by an object which is regarded as using its own energy in carrying out the action' (p. 21). This feature corresponds to the notion of an internally caused action (Levin and Rappaport Hovav 1995), in which the initiator is construed as acting autonomously. Cruse includes natural forces and machines, hence physical as well as volitional causation. This distinction crosscuts Talmy's classification and will be discussed further in §6.4.1.

Van Valin and Wilkins, in contrast, argue that the contrast between volitional and physical causation is not a semantic property of most verbs; the contrast is merely a 'pragmatic implicature'. They argue that, for the great majority of verbs, volitionality is not required: one can perform an action accidentally or even without intentionality. However, they acknowledge that this is not true for some verbs and some constructions. For example, the Subject of English *murder* must be volitional: a person cannot accidentally murder his neighbor, nor can an explosion (Van Valin and Wilkins 1996:309). Natural forces are often dispreferred as Subjects (see §6.4.1). In Causative constructions in some languages, realization of the causee participant differs depending on the agency of the causee (Van Valin and Wilkins 1996:311; Cole 1983; §6.4.2).

Hence it appears that the contrast does matter for argument realization.[4] The question remains as to what precisely is the contrast between volitional

[4] Van Valin and Wilkins also argue against the distinction based on representational economy, but this argument is invalid in the usage-based approach advocated here; see Bybee 2001, 2007; Croft 1998*b*, §§1.4, 3.2.1; inter alia.

and physical causation, in particular with human beings and higher animates which can interact with other entities either as physical objects or as beings with mental capacities. We will examine this question first with an introspective example and then some experimental data.

Consider the sentences in (41) and the possible contexts provided in (42):

(41) a. Jim broke the fancy wine glass.
b. Jim accidentally broke the fancy wine glass.

(42) a. Jim, very upset, throws the wine glass against the wall, smashing it.
b. Jim taps the wine glass to hear the lead crystal ring, but it cracks.
c. Jim trips and falls near the dining table; his hand strikes the glass and it is broken.
d. Jim suffers a heart attack at dinner; his body slumps over, knocks the glass over and it breaks.

In (42a), Jim's intentions align with the outcome of his action; (41a) is acceptable but (41b) is not. This is the prototypical case of volitional causation. In (42b), the outcome of the action does not match Jim's intentions; (41a) and (41b) are both acceptable. In (42b), Jim's action is determined by his use of his mental capacities (the intended action), and therefore falls under the definition of volitional causation from Croft (1991) given above, although the term 'volitional' may be something of a misnomer in this definition. In (42c), the outcome does not match Jim's intentions, but Jim's action that brought about the outcome also does not appear to be intentional; (41a) is acceptable but (41b) is not as clearly acceptable as in context (42b). The question appears to be: How much responsibility for the action is Jim construed to have? Ought he be assumed to control his ability to walk sufficiently not to fall? It seems that Jim's control, and hence his mental capacities, may still be construed to operate (cf. van Oosten 1977, 1986; and §6.4.1). Finally, in (42d), Jim's body brings about the outcome; (41b) is unacceptable while (41a) is appropriate. In (42d), only physical causation is involved; *accidentally* is only acceptable in a situation where a person's mental capacity is being employed, or should be employable, in carrying out the action. Thus the definition of 'volitional' causation applies to (42a–b), physical causation to (42d), with the categorization of (42c) subject to construal.[5]

In actual language use linguistic choices, as usual, are not categorical. In Chafe's Pear Stories experiment, twenty speakers of English saw the Pear film and described it afterwards (Chafe 1980). In several scenes of the film, actions

[5] In context (42a), *The wall broke the glass* is unacceptable even though contact with the wall causes the glass to break, because the transmission of force is not from the wall to the glass.

occurred that were not intended by the human participant. Verbalization of the scenes varied as to whether the human participant was realized as Subject or not, by choosing a different verb or an Existential construction (Croft 2010*a*:29):

(43) [1.2 [.25] and [.65]] **his bike** hits into a rock,

(44) [.25] and **the pears** all [.45] spill on the ground,

(45) a--nd . . **there's a stone** in the way,
so his bicycle falls over,

Table 5.3 tabulates the verbalizations across the speakers for different scenes in the film that involve unintended human action (adapted from Croft 2010*a*:30, Table 11).

TABLE 5.3. The verbalization of unintended human events

	Exp/Und-Sbj	Other-Sbj	Exist	Other	*Total*
D8. Cyclist falls/bike falls	15	2	—	2	***19***
D7. Cyclist hits a rock/bike hits rock	14	5	3	—	***22***
A4. Pearpicker drops pears/ pears drop	1	2	—	—	***3***
D5. Cyclist loses hat/hat flies off	2	11	—	—	***13***
D9. Pearpicker spills pears/The pears spill	2	17	—	1	***20***
G4. Pearpicker is missing a basket/the basket is missing	2	12	5	—	***19***

The speakers are more likely to realize the human participant as Subject in scenes in which the person is expected to have more control over the action (operating a bicycle), and least likely in scenes in which the person is not expected to have much control over the action (pears spilling, basket going missing). The linguistic choices correspond to the intermediate context (42c) above. The empirical data here suggest that perhaps there is a continuum for the initiator between volitional and physical causation, depending in part on the assessment of expected control or responsibility for the event. Hence it may be better to conceive of the mental vs. physical contrast of Croft (1991) as a conceptual continuum. There is a somewhat different spectrum of possibilities for the endpoint of transmission of force, however. This will be discussed in greater detail in §6.4.

Talmy's 1976 analysis of causation generalizes the notion of causation beyond the physical billiard-ball model, and allows sentences such as those

in (37)–(39) to be subsumed under a transmission of force model. Talmy (1988/2000) generalizes the notion of causation in a different direction, in terms of the type of "act-upon" relationships that are found in causal relations.

In Talmy's (1988/2000) model of force-dynamics, the two participants are each associated with an intrinsic force tendency, either toward rest (stasis) or toward action (Talmy 1988/2000:414; in the 1988 original, the latter tendency is described as motion). The two participants act on each other, and the "stronger" one brings about the result, which may be action or stasis. Thus, Talmy's model assumes a pre-Newtonian folk theory of causation that includes both force and resistance. Talmy also adds a temporal dimension, ONSET CAUSATION and EXTENDED CAUSATION (Talmy 1988/2000:418; this distinction is also known as ballistic vs. entrainment causation). The examples in (36)–(39) all involve onset causation of action: the endpoint (Talmy's agonist) has a tendency toward stasis, the initiator (Talmy's antagonist) toward action, the initiator's tendency overcomes the endpoint's tendency at the onset of the event, and the result is action. Talmy illustrates the range of possibilities with examples of events causing events, as in *The ball's hitting it made the lamp topple from the table* (Talmy 1988/2000:418). But simple clause examples exist in English for all of Talmy's force-dynamic types (Croft 1998*c*:83):

(46) a. I kicked the ball.
b. I pushed the ball.
c. I held the ball.
d. I stopped the ball.
e. I dropped/released/let go of the ball.
f. I left the ball (in the house).

Example (46a) again illustrates onset causation of action: I overcome the ball's tendency to rest at the onset of the action. Extended causation of action is illustrated in (46b): I continually overcome the ball's tendency to rest. Example (46c) is extended causation of rest: the ball has a tendency to fall, but I overcome that tendency with my own tendency toward rest (that is, the hand holding the ball is stationary, at least relative to the ball's tendency to fall). Example (46c) represents a subset of inactive actions (§2.2.2, 3.2.2), the lexical semantic class in which outward stasis appears to be complemented by an internal process. In this case, as with most posture verbs, the outward stasis is not force-dynamically neutral, unlike *The ball is in my hand* (see §7.2 for further discussion). Example (46d) is onset causation of rest: the ball's moving is overcome by my tendency toward rest at the onset; I do not (necessarily) need to continually prevent the ball from further action.

Examples (46e–f) illustrate what Talmy calls letting causation. In letting causation, the initiator/antagonist has the power to overcome the endpoint/agonist's tendency toward action or stasis, but does not exercise it; the result is that the agonist's tendency is realized. In (46e), there is letting causation of action: I was holding the ball but I stop doing so, and that causes/allows the ball to fall. In (46f), there is letting causation of rest: I could cause the ball to move (i.e. I could take it with me), but I do not, and that causes/allows the ball to remain in its location. Letting causation is rarely expressed in a single lexical item, and examples like (46e–f) are rare in the verbal lexicon.

Talmy's force-dynamic model allows us to generalize the notion of causation beyond instances of an initiator forcibly causing an endpoint to undergo some process as in (46a–b), and therefore include causation of rest and letting causation as in (46c–f) as instances of transmission of force among participants. Talmy also recognizes helping and hindering force-dynamic relations in addition to causing and letting (Talmy 1988/2000:425–6), although these are usually lexicalized in complex predicate or complex sentence constructions, not in simple verbs.

In sum, the event structure in (35) represents the construal of participants in an event as constituting a causal chain defined by the force-dynamic relationship among their participants. Our hypothesis is that the ranking of roles in events is determined by their order in the causal chain. This is part of the Causal Order Hypothesis (Croft 1991:186), discussed in §6.2.1. In particular, for those participants that are expressed as Subject and Object, the Subject is antecedent to the Object in the causal chain.

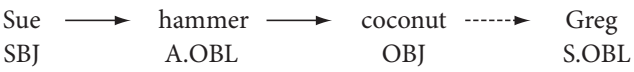
An important corollary to the Causal Order Hypothesis is that the ordering of roles in a causal chain representation is a matter of construal for at least some event types. Not all causal chains are linear and unidirectional. Also, some relationships among participants are not force-dynamic. Most commonly, some relations are spatial and possessive but force-dynamically neutral; there are other types of less common non-force-dynamic relationships among participants in events. Non-force-dynamic relations are often construed as being asymmetric for the ordering of participant roles in argument realization, though some are not. These construals, and the model of the causal chain that they imply, will be discussed in §6.2.

5.3.2 Role designation by the verbal profile, and the realization rules

In sentence (35), Sue is realized as the Subject and the coconut is realized as the Object. The reason for this is that the Verb *break* in the Transitive argument structure construction in (35) only profiles part of the causal chain, namely the (CAUSAL) SEGMENT from Sue to the coconut. The segment

of the causal chain profiled by the verb is indicated by the solid arrows in the revised representation for (35), given in (47); this is called the VERBAL PROFILE (the labels under the participants will be explained below):

(47) Sue broke the coconut for Greg with a hammer.



The preposition *for* profiles the last segment; segments profiled by nonverbal elements will be indicated by a dashed arrow.

The causal chain as a whole is the semantic frame for the event that is profiled by the verb. Just as with the representation of aspect (how events unfold over time), the representation of argument structure (how events unfold across participants) involves a semantic frame and a concept profile in that semantic frame. Just as a verb in a tense–aspect construction profiles certain contiguous phases of the aspectual contour of the event, a verb in an argument structure construction profiles certain contiguous segments of the causal chain of the event. Although I will continue to describe the profile as the verbal profile, it should be remembered that the profiled segment of the causal structure represents the semantics of a verb in a particular argument structure construction, just as a verb's aspectual profile represents the semantics of a verb in a particular tense–aspect construction. The relationship between verbs and argument structure constructions will be discussed in chapter 9.

The initiator and endpoint of the segment of the causal chain profiled by the verb are designated SUBJECT and OBJECT respectively. It might be objected that designation of the verbal profile in this way is as much a stipulation as A-marking, core argument designation, or macrorole designation in the theories described in §5.2.2. In order to demonstrate that the verbal profile is not idiosyncratically stipulated, differences in verbal profile on the same event frame (causal chain), which are reflected in argument structure alternations, must be shown to have a semantic motivation, and the verbal profile must be a reasonable locus for representing the semantic difference.

There is in fact semantic motivation for the assignment of participants as initiator and endpoint of the verbal profile, and hence as Subject and Object. Although the primary motivation is basically causal in nature, other factors, most notably aspect, also play a role in motivating or determining the verbal profile. The semantic motivation for the verbal profile, which offers an understanding of verbal semantics with respect to aspect and argument structure, will be explored in more detail in the following two chapters.

While the verbal profile is semantically motivated, motivation does not mean that it is entirely predictable. But representing role designation as part

of the verbal profile has several advantages over the alternatives. It places role designation in the semantic representation of verbs (or more precisely, verbs in particular argument structure constructions). It is a far simpler representation than the added layers of representation found in other theories. And above all, it places the arbitrariness of argument realization, to the extent that it is arbitrary, precisely where it belongs: in the signifier–signified relationship between form (verb + argument structure) and meaning (the event semantic frame with its verbal profile).

On the other hand, the realization of participant roles as Subject, Object, and Oblique argument phrases is simple and highly predictable both within and across languages for a given verbal profile on an event structure. The argument realization (linking) rules, given the causal chain and the verbal profile, are very simple and general (Croft 1998*a*:24):

(48) a. The verbal profile is delimited by Subject and Object (if any)

b. Subject is antecedent to Object in the causal chain:

SBJ → OBJ

c. An Antecedent Oblique is antecedent to the Object in the causal chain; a Subsequent Oblique is subsequent to the Object in the causal chain:

A.OBL → OBJ → S.OBL

d. Incorporated arguments are between Subject and Object in the causal chain:

SBJ → INCORP → OBJ

The argument realization rules have many advantages over those in other theories. There is a direct mapping from a single semantic representation (the causal chain with its verbal profile) to argument roles. The realization rules are completely general: they apply to any causal chain. There is no reference to semantic roles, either reified as separate semantic units or even defined as positions in event structure. All that matters is relative position in the causal chain—this theory is a strict relative mapping theory in this respect. The realization rules are also crosslinguistically applicable, applying to argument coding constructions in different languages in ways to be explicated in more detail in chapter 6. The realization rules are found in the vast majority of languages, though some languages appear to use a somewhat different set of rules for core arguments (see §6.3.2). Finally, and this is perhaps the most striking difference compared to other theories, the realization rules cover both core (direct) arguments and Obliques.

The realization rules distinguish two classes of Oblique syntactic arguments, defined by their position relative to the position of the Object in the causal chain. ANTECEDENT OBLIQUES are antecedent to the Object in the event causal chain. Antecedent Obliques may or may not also be antecedent to the Subject in the causal chain. An example of an Antecedent Oblique is the Instrumental phrase *with a hammer* in (47). SUBSEQUENT OBLIQUES are subsequent to the Object in the causal chain. An example of a Subsequent Oblique is the beneficiary phrase *for Greg* in (47). Typological evidence supporting the Antecedent–Subsequent Oblique distinction is presented in Croft (1991, chapter 5) and in chapter 6 of this book.

The event-based force-dynamic theory has a number of advantages over the theories of argument realization described in §5.2. It does not require appeal to additional levels of semantic or syntactic representation, such as thematic roles, a thematic role hierarchy, macroroles, and core argument designation. The force-dynamic ordering of participants in events captures the many event classes in which realization of participant roles as Subject and Object are uniform across languages.

The verbal profile designates the core argument roles while allowing the causal chain to rank the roles for linking to Subject and Object. The identification of the verbal profile is semantically motivated by causal and aspectual properties. To the extent that the verbal profile is a language-specific (or verb-specific) convention, that convention is localized in the (partially) arbitrary form–meaning mapping of the linguistic sign.

The event-based force-dynamic theory requires only a small set of simple, highly general and crosslinguistically universal set of argument realization (linking) rules. Finally, unlike any other major theory of argument realization, the theory includes Obliques in the realization rules; the same small set of realization rules cover all arguments, including Obliques and incorporated arguments as well as core arguments.

Unfortunately, some of the unique and novel characteristics of this theory of argument realization are obscured by a model of verbal semantic representation in Croft (1991) that depends too much on the post-Generative Semantics event decompositions that are still widely used. In particular, the aspectual distinctions described in chapters 2–4 above, some of which play an important role in argument realization (especially identification of the verbal profile), are not incorporated into the representation. In the next section, we integrate the aspectual representation presented in chapters 2–4 with the force-dynamic theory presented in this chapter.

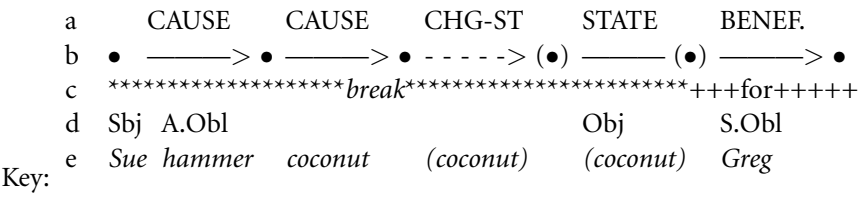
5.4 Integrating force-dynamic and aspectual representations of event structure

5.4.1 Shortcomings of the event structure representation in Croft (1991)

In §5.2, we examined a number of different approaches to the use of event structure in argument realization. We argued that those that added independent layers of structure (semantic or syntactic), such as thematic role hierarchies and various types of role designation, were empirically problematic, and adding further layers is unnecessary. Approaches using descendants of the Generative Semantics decomposition of event structure are unable to pick out the properties of event structure that motivate argument realization across languages. The two properties of event structure that motivate argument realization are the asymmetric force-dynamic relationships among participants in an event, and the profiling of part of the causal chain as the denotation of the verb or main predicate of the clause. In §5.3 we represented these two properties in a linear causal chain, some segments of which are profiled by a verb.

The force-dynamic analysis of argument realization presented in §5.3 is essentially the one presented in Croft (1986, 1991) and later publications. However, the causal chain representation used in §5.3, illustrated in example (47) in §5.3.2, is not the one found in those publications. Croft (1991) uses a more complex representation, illustrated in (49):

(49) *Event structure representation of example (47) based on* Croft (1991):



Key:
a = Event decomposition
b = Force-dynamic structure of the event
c = Verb/predicate profile
d = Linking to grammatical relations
e = Arguments

The rows on which the various parts of the semantic structure are placed in (49) have been rearranged from Croft (1991) in order to maximize the comparability between the model proposed here and the layers of semantic and syntactic representation used in other argument realization theories. The order here is: semantics of event segments (if indicated), force-dynamic structure, verb profile, linked arguments, and NPs filling argument roles.

The representation in (49) uses *** and +++ to represent the verbal and prepositional profiles respectively; this is just a notational variant to the causal chain representation of the verbal and prepositional profiles in (47). The chief difference is that the representation in (49) also captures the aspectual state–process distinction. Thus, some of the segments in (49) represent causal interactions (those labeled CAUSE and BENEF), while others represent only aspectual phases (CHG-ST and STATE). One consequence of the inclusion of aspectual structure is that a single participant is represented at the beginning and end of the purely aspectual phases: the coconut is represented three times in (49).

The representation in (49) is essentially another variant of the post-Generative Semantics event decompositions criticized in §5.2.3, with its primitive CAUSE, BECOME (CHG-ST), and STATE elements. It eschews a logical-calculus representation with embedded predicates and operators for a linear representation in order to capture the crosslinguistic universals about transmission of force and antecedent vs. subsequent roles documented in Croft (1991, 1993) and in chapter 6. As a consequence, however, it suffers from many of the same shortcomings of the other post-Generative Semantics event decompositions, as well as others of its own making.

In the representation in (49), only two types of subevents are distinguished: dynamic (arrow) and stative (no arrow). This distinction is an aspectual one, not a causal one. As a consequence, dynamic subevents conflate true force-dynamic subevents, such as the hammer acting on the coconut, and purely aspectual subevents, such as the coconut changing state from whole to broken. This defect is remedied in the revised representation in Croft (1998*a*), which distinguishes force-dynamic and (aspectually) dynamic subevents.[6] But the other problems to be described immediately below demonstrate that this revision is inadequate.

Second, the only aspectual distinction that is captured is state vs. process—less than Vendler proposed, let alone the additional aspectual types introduced by Vendler's successors (see chapter 2). The same is true of the other post-Generative Semantics event decompositions: although some of the other decompositions recognize more than the state–process aspectual distinction, none of them capture the full range of aspectual types introduced in chapter 2. Yet, as we will see, the grammatical behavior of verbs and argument structure constructions makes reference to many of those distinctions (see chapters 7 and 8).

[6] Langacker's action chain representation, which is very similar to the representation in (49), distinguishes force-dynamic and aspectually dynamic subevents with double arrows and single arrows respectively (see Langacker 2008:356, Figure 11.1).

Third, the one chief virtue of (49)—capturing the linearity of the causal chain, essential to capturing universals of argument realization—is significantly compromised by the need for the parenthesized (reëntrant) notation to describe the purely aspectual changes and states of a single participant. The notation is unmotivated, and moreover leads to a serious problem in specifying the verbal profile. For example, in (49), the endpoint of the verbal profile is the coconut. However, the coconut is the endpoint of three subevents: the transmission of force by the hammer, the change of state of the coconut, and the resulting state of the coconut. In principle the verbal profile could end with any one of those subevents. There is no motivated principle that specifies that the verbal profile ends with the last subevent in which the coconut is the endpoint. Yet a crucial aspect of the theory of argument linking represented in (49) is that differences in verbal profile lead to differences in argument linking. A representation that leads to indeterminacy in assigning a verbal profile does not provide a satisfactory representation of the role of the verbal profile in determining argument linking. The same is also true of the other post-Generative Semantics event decompositions: variables representing arguments are frequently represented multiple times in those decompositions.

All of these problems with the representation in (49), and most other post-Generative Semantics event decompositions, are due to the conflation of aspectual and causal structures in a "one-dimensional" (linear or nested) event structure. As a result, exclusively causal generalizations such as the Causal Order Hypothesis for argument linking cannot be easily represented. Also, as argued in chapter 2, the use of unanalyzed semantic primitives such as BECOME, ACT/DO, and BE misses important semantic properties and semantic generalizations about aspectual structure.

Finally, the causal representation itself does not represent events causing other events; it represents only participants acting on other participants. It could be argued that transmission of force is the only relevant model of causation for the grammatical generalizations for argument realization. Nevertheless, the philosophical position is that causation relates one event to another event. Some linguists using event decompositions (including Rappaport Hovav and Levin, and Role and Reference Grammar) represent subevents causing other subevents, not participants acting on other participants. Even Talmy (1988/2000) gives examples of force-dynamics in terms of events causing other events, although his diagrams represent transmission of force between participants. It would be desirable for an event structure representation to accommodate event causation if possible, not just transmission of force.

5.4.2 A three-dimensional representation of causal and aspectual structure in events

An adequate representation for the semantic structure of predicates must satisfy the following conditions. It must clearly distinguish between causal and aspectual structure. It must at least preserve the essential force-dynamic patterns that account for argument linking patterns, and yet capture causal relations between events. It must also provide an aspectual representation that can capture the distinctions and generalizations presented in chapters 2–4. Finally, it must offer a profile–frame semantic contrast that accurately represents both the verbal profile for argument realization and the profile relevant for aspectual generalizations.

All of these representational problems can be solved in a geometrically simple fashion. A complex verbal semantic structure can be decomposed into SUBEVENTS such that each subevent involves only one participant with its own aspectual contour; and the subevents are related to each other causally. Thus, each subevent is modeled by the two-dimensional representation introduced in chapter 2, and the causal chain linking the individual participant subevents is represented in a third dimension. The THREE-DIMENSIONAL REPRESENTATION is illustrated for the sentence *Jack broke the vase* in Figure 5.2.

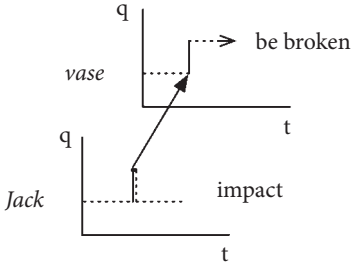


FIGURE 5.2. The three-dimensional representation of causal and aspectual structure.

The crucial feature of the three-dimensional representation is that each participant has its own subevent in the causal chain. Each causal subevent is the aspectual profile/contour for that participant, with its associated temporal and qualitative scales. Informally, this decomposition can be thought of as what each individual participant does or undergoes during the course of the event. Each participant's subevent then stands in a causal relation to the subevent of the next participant in the causal chain.

Three-dimensional representations are of course difficult to apprehend on a two-dimensional display. Hence I have adopted the representation in Figure 5.3,

which aligns both the causal and qualitative state dimensions onto the vertical dimension.

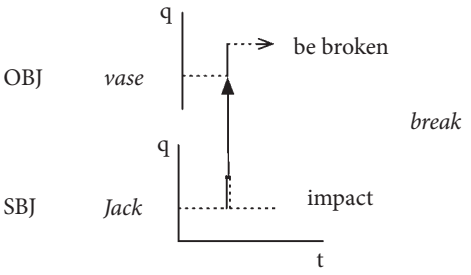


FIGURE 5.3. Three-dimensional representation modified for two-dimensional display.

The qualitative scale for each participant is kept distinct. Both causal subevents share the same temporal dimension. The causal chain proceeds from bottom to top on the vertical dimension. The advantage of this way of reducing the three-dimensional representation onto two dimensions is that the temporal alignment of the subevents is clearly indicated.

The representation in Figure 5.3 also keeps syntactic and semantic representations distinct, as shown in Figure 5.4.

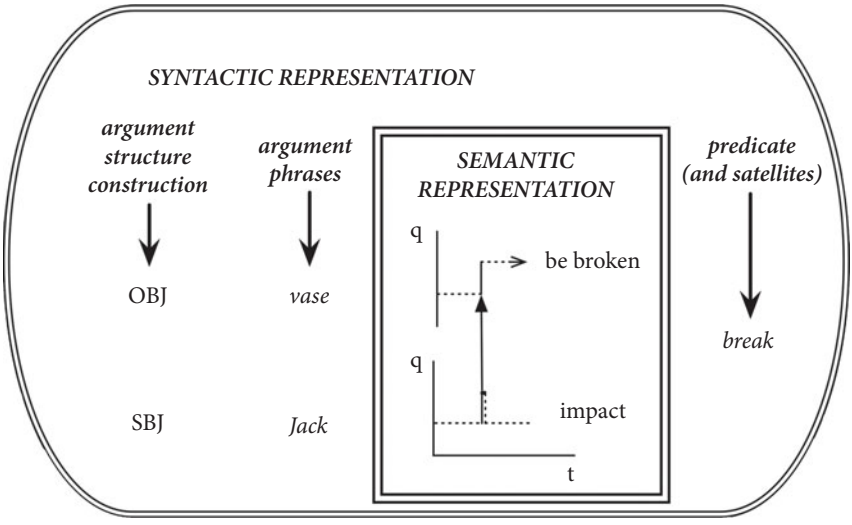


FIGURE 5.4. Syntactic and semantic representation of argument structure.

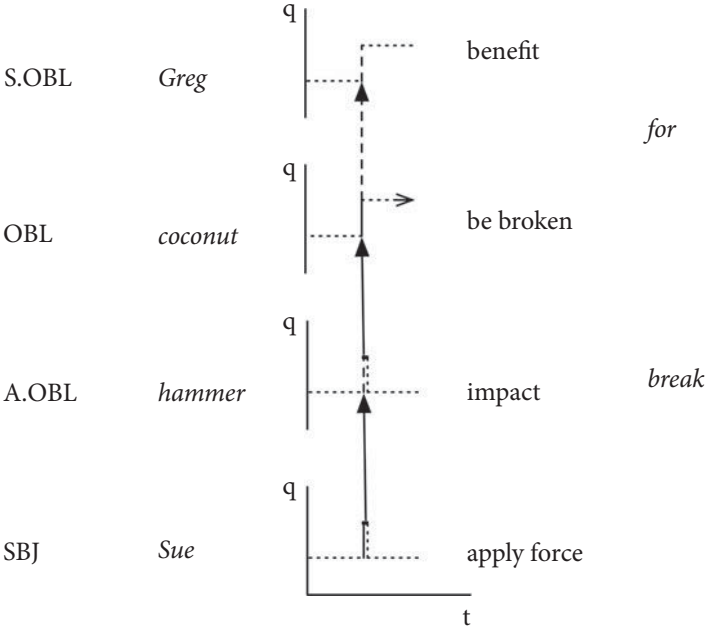
In addition to the spatial separation in Figure 5.4, the syntactic and semantic representations are distinguished orthographically: the semantic

representation uses roman face for the prose description of the qualitative scale points, as well as the labeling of the scales themselves, while the syntactic representation uses italics for the lexical items including the verb, and capitalization for the elements of the argument structure construction (SBJ, OBJ, etc.). Although this representation differs from the typical construction grammar box notation, placing the predicate+satellite realization to the right puts the predicate next to the (sub)event in the semantic representation that it denotes, and placing the arguments and argument structure construction to the left in turn puts the argument expressions next to the participants in the semantic representation that they denote.

The relationship between syntax and semantics is derivable from the argument realization rules. The argument phrases are linked to the denoted participant's subevent. The verb is linked to the verbal profile in the semantic representation, indicated as before by solid lines or arrows. The elements of the argument structure construction are linked to the participant subevents according to the realization rules that make reference to position of the participants relative to the verbal profile in the causal chain.

The three-dimensional representation for example (47) is given in (50):

(50) Sue broke the coconut for Greg with a hammer.



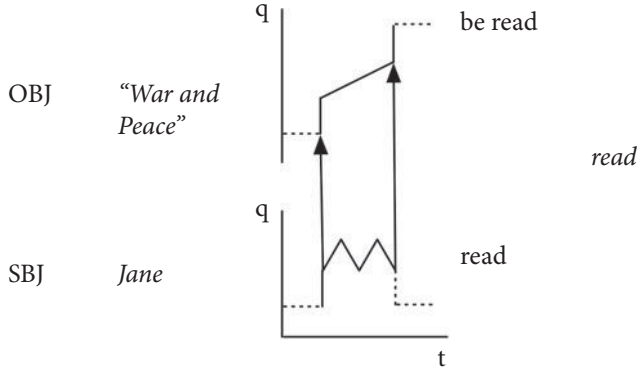
Each participant has its own subevent: Sue applies force to the hammer, the hammer makes impact with the coconut, the coconut undergoes an

irreversible change of state, and Greg comes to benefit from the outcome. All of the subevent profiles must be aligned temporally; the entire event is punctual. There is no longer any problem with defining the endpoint of the verbal profile: the coconut is involved in only one subevent. The dashed causal segment and dashed aspectual profile for Greg represents the profile of the Subsequent Oblique phrase *for Greg*.

The subevents for the participants realized as Subject and Object are profiled by the verb. The subevents for the participants realized as Obliques are profiled by their respective Oblique markers, the prepositions *with* and *for*. In the case of the instrument participant, which is between the Subject and Object participants in the causal chain, the transmission of force that "passes through it" is profiled by the verb. The verb profiles the causal chain from Subject to Object, even when there are intervening Oblique participants realized in the clause. If, for example, the instrument participant were not realized in the clause, then that subevent would not be present, and the verb would profile the same causal chain—from the Subject participant to the Object participant. This corresponds to our intuition that *break* denotes the same event (profiles the same segment of the causal chain) whether or not an instrument participant is actually realized in an Oblique phrase. On the other hand, representing the instrument participant's subevent as an Oblique profile (with a dashed line), rather than being 'overridden' by the verbal profile of the causal chain, reflects its secondary status with respect to the event denoted by the verb, and in particular its lower degree of topicality, since argument realization is a function of this discourse factor as well as the semantic factors we focus on here (see §§5.2.2, 6.3, 7.4.3).

An example of the three-dimensional representation of a durative event is given in (51):

(51) Jane read *War and Peace*.



The transmission of force takes place for the profiled temporal phase of the event. For visual convenience the transmission of force is represented by causal arrows only at the beginning and the end of the profiled durative phase.

The model presented here has several important advantages over the representation in Croft (1991) as well as the post-Generative Semantics, logical calculus type representations proposed by other authors. First, it clearly distinguishes the aspectual and the causal structure of events. Besides the semantic cleanness of this feature of the three-dimensional representation, it also allows us more clearly to recognize the distinct contributions that aspectual structure and causal structure make to the grammar of predicates and arguments. None of the other representations has this feature: all of them use unanalyzed semantic primitives for both causal and aspectual structure (CAUSE, DO/ACT, BECOME, etc.).

Second, the three-dimensional representation allows us to employ the fine-grained aspectual analysis presented in chapters 2–4 along with the causal structure analysis presented in this chapter. Again, none of the other representations make such fine-grained aspectual distinctions. In addition, most other event representations use atomic primitives (DO/ACT, BECOME, SEML, etc.) that prevent us from identifying the shared semantic properties of the different aspectual types, or easily representing superordinate aspectual types such as directed change.

Third, the three-dimensional representation is able to represent both analyses of causation: both the transmission of force relation—participants acting on other participants—and the traditional understanding of causation in terms of events causing other events. This is because in the representation, each participant has its own subevent in the causal structure of the overall event. As noted above, the causal subevents can be informally thought of as what each participant does or undergoes in the overall event. This feature is an essential one for analyzing the contribution of verbal semantics to grammatical universals: it is the transmission of force relationship (the causal chain) that makes the most significant and direct contribution to argument realization patterns across languages. Any event structure representation that lacks a clear way to identify the ordering of participants in the causal chain (including noncausal relations construed as ordered in the causal chain) will be inadequate as a linguistic semantic representation of verb meaning. This is why I chose a geometric representation in Croft (1986, 1991). However, by retaining too much of the post-Generative Semantics representation in prior publications, the causal chain was obscured, though not as much as in other representations. The three-dimensional representation resolves this problem.

The three-dimensional model demonstrates that events can be decomposed in three distinct ways: temporally, in terms of temporal phases;

qualitatively, in terms of the states defined on the qualitative dimension for each participant's subevent; and causally, in terms of the segments of the causal chain. These correspond of course to the three dimensions of the representation. In the case of the temporal and qualitative dimensions, a geometric representation is essential because both dimensions are continuous and grammatical behavior makes crucial reference to the possibility of scalar adjustment on both *t* and *q* dimensions (chapter 3). In the case of the causal dimension, what is essential is only a simple ordering of participants. Although a geometric representation is not the only way to represent a simple ordering, it is most easily represented by a linear dimension. The causal "dimension" is actually a directed, acyclic, nonbranching graph structure in which each node is the two-dimensional representation of each participant's subevent. It functions as a third "dimension" because the causal chain/graph structure is also nonbranching.[7] Also, a linear graph–structural representation of the causal chain is most easily combined with the geometric representation of time and qualitative states/change on the other two dimensions.

Finally, the three-dimensional analysis will allow us to extend the analyses presented in Croft (1991, 1993, 1994*a*, *b*, 1998*a*, *c*): both to refine or revise some analyses presented in that earlier work, and to use the force-dynamic theory to address questions not explored in the earlier work.

5.5 Event structure decomposition and predicate entailments

For the reasons given in the preceding section, the three-dimensional representation of event structure is preferred to other event decompositions proposed in the linguistics literature. One general representational question remains: what is the relationship between the three-dimensional representation and the predicate entailment analysis of verbal semantics proposed by Dowty (1991) and other formal semanticists?

In the predicate entailment analysis, a verb's meaning is denoted by a simple predicate in a logical calculus semantic representation, and the properties that are relevant to grammatical behavior such as argument realization are entailments from the predicate. More precisely, a semantic role is 'a set of entailments of a group of predicates with respect to one of the arguments of each' (Dowty 1991:552), namely the argument of the predicate possessing that semantic role. Dowty goes on to say that entailment is understood in 'the

[7] If branching causal chains are allowed, then the third "dimension" is no longer a simple linear dimension like the other two; the possibility of branching causal chains in verbal semantic structures is discussed in §7.4.2.

standard logical sense: one formula entails another if in every possible situation (in every model) in which the first is true, the second is true also' (p. 552).

The predicate entailment analysis of verb meaning and the decompositional representation of event structure presented here (the three-dimensional representation) are not necessarily incompatible.[8] If the decompositional representation of event structure is taken to be the model in which the formula of a logical calculus representation is interpreted, as suggested in § 1.2, then properties of the event structure model will ensure that the corresponding entailments in the logical calculus are valid. I believe that one of the reasons that decompositional event representations and predicate entailment analyses have appeared to be incompatible is that most decompositional event representations look like logical calculus formulas, not structures in a model. For this reason, decompositional event representations appear to be competing representations with atomic predicates that have entailments in the logical semantic representation. The three-dimensional geometric representations definitely do not look like logical calculus formulas. They also do not look like the model structures traditionally used in formal semantics, which are set-theoretic objects. Moreover, a predicate entailment approach only has substance to the extent that one can identify the entailments of a predicate, and that requires construction of the relevant model or set of models. It seems reasonable to consider the possibility that richer mathematical objects such as geometric structures with potentially continuous orthogonal dimensions may be more suitable model structures for the semantics of events in human languages.

Of course, the assumption remains that the properties of the three-dimensional geometric representation are sufficient to account for the grammatical patterns in argument realization that they are intended to explain. The predicate entailment analysis makes no assumptions as to what types of entailments may be relevant to argument realization (for example, Dowty's list of proto-role properties is not intended to be exhaustive). The question is: What is one's view about constraining possible linguistic structures (semantic and syntactic)? Many linguists aim towards a maximally constrained theory of possible linguistic structures. Unfortunately, this usually leads to a theory that is much too constrained, especially from a typological perspective (§1.5). Even formal semanticists have sometimes proposed excessively constrained theories, such as the interval-based analysis of aspect that tries to explain away achievements and activities (§2.4.2).

[8] Levin and Rappaport Hovav take a more critical view of predicate entailment (AR, 74–5).

However, I believe that we are at a point where we can propose a richer yet still constrained model of event structure relevant for grammatical aspect and argument realization. In aspect, we have argued for a richer model, yet it is still constrained to the aspectual types that have been identified so far (see §2.3). In argument structure, we argue here that adding a causal dimension, and the possibility of construing noncausal relations, will be sufficient to account for at least the major crosslinguistic universals of argument realization. The result is a rich model—the three-dimensional representation—but not a completely unconstrained one. The model itself will probably need further refinement. It only distinguishes causal and noncausal relations on the causal dimension (arrows vs. unheaded links). It does not differentiate Talmy's causal types—although we have seen that there is actually a continuum from mental-level to physical-level causation for both initiator and endpoint, and this dimension is relevant to argument realization (§5.3.1). Yet it is clear that affective and inducive causation, as well as letting causation, are typologically less prototypical event types among simple clauses, and are often realized with Oblique case marking of core arguments and/or complex predicates (§§6.2.2, 6.4.2).

The relation between human language and the three-dimensional geometric model given in Figure 5.4 actually lacks the intermediate layer of a logical calculus that is expected in formal semantic analyses. The realization rules make a direct connection between the linguistic expressions—predicate and satellites (if any), arguments, and argument structure construction—and the semantic structure or model. This is the usual practice in cognitive linguistics. It resembles for example Cognitive Grammar, in which grammatical structures are linked directly to semantic structures that are not formulas in a logical calculus. The direct link between grammatical constructions and a semantic structure that is more like a model than a logical calculus in model-theoretic semantics can be understood as an example of the ideal of 'direct interpretation' from a human language to a model that was advocated by Montague (1974, especially chapters 6–8). Of course, Montague intended to define a human language as a formal language in a way that most cognitive linguists would not accept, and the models into which he interpreted linguistic expressions were also structured in ways that most cognitive linguists would not construct them. But the distance between a model-theoretic semantic analysis and a cognitive semantic analysis is not as great as one might think.

6

Causal structure in verbal semantics and argument realization

6.1 Introduction

In this and the following chapters, the central question will be: What is the semantic structure of simple verbs? In terms of the analysis of verbal semantics presented in §§5.3–5.4, this question translates to: What are the constraints on causal chains of participants that are realized as the arguments of simple verbs? And what are the constraints on the verbal profile of simple verbs?

In §6.2, we examine the types of causal chains that are implied by argument realization patterns across languages. The evidence suggests that the events that are lexicalized as simple verbs are construed as directed, acyclic, and nonbranching causal chains. Events in which interactions among participants are noncausal are construed as directed (§6.2.2). Events in which interactions among participants are bidirectional or cyclic are construed as directed and acyclic (§6.2.3).

In §§6.3–6.4, we examine the types of verbal profiles that are found across languages. The method we use is to compare simple verbal expressions to complex verbal expressions. By examining what sorts of semantic structures are realized by complex verbal expressions, and comparing them to the semantic structures of simple verbal expressions, we can draw some conclusions about the types of semantic structures that are or are not encoded in simple verbal expressions.

These conclusions, however, are both probabilistic and highly tentative. They are highly tentative because there is relatively little typological research on the question. Many of the hypotheses presented here about simple verb semantics are based on patterns in English, albeit in the context of typological studies of complex verbal expressions, which are more numerous. They are probabilistic for at least two reasons. The first is that complex verbal expressions may grammaticalize into simple verbal expressions. As a result, some semantic structures that are more typical of complex verbal expressions may

end up being found in simple verbs. The second is that a significant factor that licenses realization as a simple verb is the cultural typicality or conventionality of an otherwise conceptually complex action. To give a simple example from English, expression of indirect causation (inducive causation plus an additional causal event) is normally complex: *We had a contractor remodel our kitchen*. But one can say *We remodeled our kitchen* with a simple verbal expression, when in fact we contracted someone else to do the work. This is because in contemporary American middle-class suburban culture, it is more typical to have someone else do such work than to do it ourselves. As a result, we cannot talk about possible and impossible verbal semantic structures, but only about more probable and less probable structures.

This chapter surveys an immense amount of typological data on argument structure across languages. The data are very complex, but on the whole provide evidence of the central role that causal structure plays in argument realization. In §6.5, we present a tentative conceptual space for participant roles that reflects the importance of the causal chain in the linguistic conceptualization of events.

6.2 The verbal causal chain: directed, acyclic, and nonbranching

The argument realization or linking rules given in (48) in §5.3.2 are repeated in (1) (Croft 1998*a*:24):

(1) a. The verbal profile is delimited by Subject and Object (if any)
b. Subject is antecedent to Object in the causal chain:
SBJ → OBJ
c. An Antecedent Oblique is antecedent to the Object in the causal chain; a Subsequent Oblique is subsequent to the Object in the causal chain:
A.OBL → OBJ → S.OBL
d. Incorporated arguments are between Subject and Object in the causal chain:
SBJ → INCORP → OBJ

The argument realization rules in (1) are a more precise formulation of what was called the Causal Order Hypothesis in Croft (1991:186). The Causal Order Hypothesis can be better described as a hypothesis about the structure of the causal chain implicit in the realization rules in (1). The hypothesis is presented in (2) (see also Croft 1990:53, 1991:269, 1994*b*:91):

(2) Causal Order Hypothesis: a simple verb in an argument structure construction construes the relationships among participants in the event it denotes as forming a directed, acyclic, and nonbranching causal chain.

The construal of the causal chain as directed and acyclic follows from the notion of transmission of force. Transmission of force is asymmetric: one participant applies force to another participant. Hence the force-dynamic relationship is directed. The causal chain implicit in the realization rules in (1) is also acyclic. If it were cyclic, then the antecedent–subsequent relationship would not make sense. If A acts on B, B acts on C, and then C acts on A, then any participant is both antecedent and subsequent to any other participant in the causal chain.

The causal asymmetry between Subject and Object is overwhelmingly confirmed, when causal relations are generalized to force-dynamic relations, as described in §5.3.1. This is what underlies most definitions of argument realization based on a thematic role hierarchy or on proto-roles (see §5.2). Evidence for the causal asymmetry between Antecedent and Subsequent Obliques, also quite robust, is presented in §§6.2.1–6.2.2 and §6.5.

The causal chain is also hypothesized to be nonbranching. A nonbranching, acyclic, directed causal chain functions as a third dimension in event structure, though it is really a graph structure rather than a continuous geometric dimension (§5.4.2).

6.2.1 The Causal Order Hypothesis and two types of Obliques

The realization rules in (1a) distinguish two classes of Oblique syntactic arguments, defined by their position relative to the position of the Object in the causal chain. These two classes of Oblique are illustrated in the causal chain representation of example (47) from §5.3.1, repeated as (3) below (in this chapter, causal chain representations will be used unless it is relevant to include the aspectual dimensions):

(3) Sue broke the coconut for Greg with a hammer.

Sue	⟶	hammer	⟶	coconut	- - - - ►	Greg
SBJ		A.OBL		OBJ		S.OBL

As noted in §5.3.2, Antecedent Obliques are antecedent to the Object in the event causal chain; Antecedent Obliques may or may not also be antecedent to the Subject in the causal chain. The Instrumental phrase *with a hammer* in (3) is an example of an Antecedent Oblique. Subsequent Obliques are subsequent to the Object in the causal chain. The beneficiary phrase *for Greg* in (3) is an example of a Subsequent Oblique.

English Antecedent Oblique expressions with some examples of typical semantic roles are illustrated in (4), and English Subsequent Oblique expressions are illustrated in (5):

(4) *with* (instrument, comitative, etc.):
  a. Sue broke the coconut with a hammer.
  b. I went to the park with Carol.
  by (means, passive agent, etc.):
  c. I went downtown by bus.
  d. The cat food was eaten by raccoons.
  of, metaphorical *from/out of* (cause)
  e. The rabbit died from/of thirst.
  f. He did it out of spite.

(5) *for* (beneficiary):
  a. Sue broke the coconut for Greg.
  metaphorical *to, into* (result):
  b. They smashed the statue to pieces.
  c. The boy carved the stick into a knife.

Although one cannot predict which participant roles a specific Oblique case marking will subsume—case markers are usually quite polysemous—one can predict that a specific Oblique case marking will subsume only antecedent roles or only subsequent roles. That is, one can generally categorize Oblique morphosyntactic markers as either Antecedent or Subsequent, as in (4)–(5).

This prediction is in fact a crosslinguistic generalization: language-specific Oblique adpositions or case markers will group together semantic roles antecedent to the Object, or roles subsequent to the Object, but not both together. A crosslinguistic study of Oblique adpositions and case markers in a forty-language sample broadly confirms this hypothesis (Croft 1991:187–8).

TABLE 6.1. Syncretisms among semantic roles in oblique adpositions and case markers

Syncretisms among antecedent thematic roles	39
Syncretisms among subsequent thematic roles	39
No directionality in the case marking system	5
Syncretisms across subsequent and antecedent roles	2

The examples of no directionality are languages in which there is one highly general Oblique adposition or case marker that does not differentiate antecedent and subsequent semantic roles, or it appears that a more highly differentiated Oblique system is breaking down and will end up as an undifferentiated system (Croft 1991:188). The two exceptions involve subsequent coding of the antecedent function of causee (Turkish) and cause (Turkish, Konda). These exceptions are not entirely random, as they are found in other languages as well. The coding of cause is discussed in §6.5, along with more

recent typological studies of syncretisms in case marking. The ambivalent role of causee is discussed in §6.4.2.

As noted in §5.3.2 and §6.2, realization of participant roles as Subject and Object is determined by the verbal profile. There are many regularities in verbal profiles across languages, particularly if voice alternations are left aside (see chapters 7–8 for further discussion). But even in the case of causal transmission of force, there are some crosslinguistic differences. For example, in English *beat* only occurs with the patient realized as Object, and the instrument/covering as an (Antecedent) Oblique:

(6) a. Father beats his son with a stick.

Father	⟶	stick	⟶	son
SBJ		A.OBL		OBJ

b. *Father beats a stick on/to his son.

In Chechen-Ingush, a small class of verbs of contact by impact require the instrument to be realized as Object; in this construction, the patient is realized as a Subsequent Oblique (Dative) case as expected from the Causal Order Hypothesis (Nichols 1984:188; see Croft 1991:190; on ergative Subjects, see §6.3.1):

(7) da:s wo?a: ɣam j-iett
father:ERG son:DAT stick beats
'(The) father beats (his) son with a stick.'

Father	⟶	stick	- - - ➝	son
SBJ		OBJ		S.OBL

The realization rule in (1d) states that incorporated nouns are antecedent to the Object participant but subsequent to the Subject participant in the causal chain. This generalization holds no matter what the thematic role of the participant is. Example (8) illustrates incorporation of the instrument in Huahtla Nahuatl (Mithun 1984:861, from Merlan 1976), and example (9) illustrates incorporation of the patient in Mohawk (Mithun 1984:868; see Croft 1991:191):

(8) ya'ki- kočillo- tete'ki panic
he(he)it- knife- cut bread
'He cut the bread with it (the knife).'

he	⟶	knife	⟶	bread
SBJ		INC		OBJ

(9) wa- hi- 'sereht- anv̓hsko
PST- he/me- car- steal
'He stole my car.' [Or: 'He stole my car on me.']

he ⟶ car ⟶ me
SBJ INC OBJ

In (4)–(5), we noted that metaphorical uses of spatial directional path markers, such as ablative (source) *from* and *out of* and allative (goal) *to* and *into*, function as Subsequent and Antecedent Obliques respectively. This is the result of a general metaphorical mapping of spatial directional path meaning into the direction of transmission of force (Croft 1991:192–8):

(10) *Space* ⇒ *Causation metaphor*:

Causation:	antecedent role	Object	subsequent role
	⇑	⇑	⇑
Space:	ablative/source	locative	allative/goal

The metaphorical mapping between spatial direction and direction of transmission of force is well attested in the same forty-language sample, as seen in Table 6.2 (Croft 1991:196; interestingly, the exceptions all involve the use of the allative for manner).

TABLE 6.2. Syncretisms among spatial and causal semantic roles in oblique adpositions and case markers

Syncretisms between ablative and antecedent roles	13
Syncretisms between locative and object marking	1
Syncretisms between allative and subsequent roles	15
Exceptional syncretisms	3

A closely related metaphorical mapping maps the locative instead to participant roles included in the verbal profile, such as locative–ergative and locative–instrumental (the event–location metaphor; Croft 1991:196). Luraghi argues that the locative and perlative ('through') map to what she calls CONCOMITANT participant roles, namely the roles included in the verbal profile: particularly instrumental but also comitative and manner (Luraghi 2001:38). As will be seen in §6.5, there is indeed a widespread polysemy specifically between instrumental and locative (Stolz 1996:164), which probably represents a metaphorical mapping from spatial location to location in the verbal profile. However, the evidence in Table 6.1 indicates that syncretisms are relatively common between roles in the verbal profile and roles antecedent to the verbal profile; so the sharper division in grammatical patterning still appears to be between antecedent and subsequent roles as defined in §5.3.2.

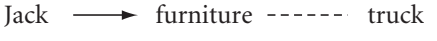
Since Croft (1991), a number of larger-scale typological studies have been conducted that give us a finer-grained picture of the conceptual space underlying participant roles. These studies, which broadly confirm the Causal Order Hypothesis, will be surveyed in §6.5, after we have discussed some of the more complex cases in which construal of the event into a directed, acyclic, nonbranching causal chain is not a simple or direct process.

The space–causation metaphor of (10) should not be taken literally. Spatial relations are not causal relations, and the two cannot be equated for argument realization. In fact, argument realization for noncausal spatial relations in an event functions quite differently, as is seen in the next section.

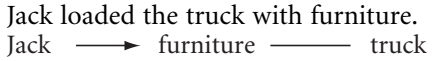
6.2.2 The construal of noncausal (causally undirected) relations: spatial, possessive, and other relations

The Causal Order Hypothesis in itself does not predict the argument realization of noncausal relations, such as the spatial relation between a FIGURE (the entity being located or which is moving) and a GROUND (the entity functioning as a reference point for the location/motion; Talmy 1974). Yet many event types, such as the application event type represented by *spray* and *load*, involve participants that are in a spatial, not causal relation. For example, in (11) an agent (Jack) causes a figure (the furniture) to move or end up being located with respect to a ground (the truck). The relationship between Jack and the other two participants is causal, but the relationship between the furniture and the truck is spatial.

(11) a. Jack loaded the furniture on the truck.



b. Jack loaded the truck with furniture.



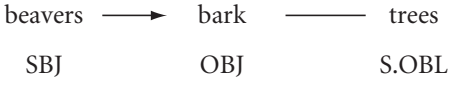
Of course, there is a well-known alternation in argument structure between (11a) and (11b), the Locative alternation (§5.2). Yet the causal and spatial relationships among the participants are the same (the semantic difference between the two will be discussed in §7.4.2, and the constructional alternation will be discussed in §9.2).

The difference in semantic representation and in Oblique adposition choice can be accounted for by two semantic properties of the event representation, illustrated by the causal chains in (11a–b). First is the difference in verbal profile, manifested in the difference in Object selection (see §7.4.2). Second is

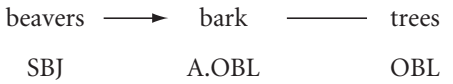
a construal of the spatial figure–ground relation as a causally asymmetric relation such that the figure antecedes the ground (Croft 1991:199, where it is called the figure-first coercion). The result of the FIGURE-FIRST CONSTRUAL is that when the figure is realized as Object, the ground is expressed by the normal Path preposition; but when the ground is realized as Object, the figure must be expressed by an antecedent case marking, in English the preposition *with*. The noncausal relation between participants is represented by the absence of an arrow on the noncausal segment of the event structure.

This pattern—Oblique ground with a Path case marking vs. Oblique figure with an Antecedent case marking—is found in the Locative alternation in general in English. It is also found in languages where the Locative alternation occurs (or at least is documented); Croft (1991:200–1) gives examples from Modern Irish, German, Russian, and Hungarian. The pattern implies that when spatial relations are integrated into an event structure, the ground is treated as subsequent, and hence all literal spatial path adpositions or cases—Ablative, Locative, and Allative—are subsequent roles relative to the figure. The figure-first construal holds even when the spatial relationship is movement away, not toward. In this case, an 'abstrument' Antecedent Preposition *of* is used instead of *with* (Hook 1983; Croft 1991:202):

(12) a. The beavers stripped the bark from the trees.



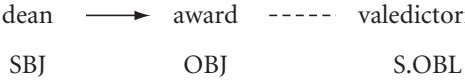
b. The beavers stripped the trees of bark.



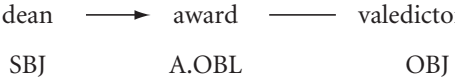
Thus, the literal spatial use of path case markings functions differently from the metaphorical use of Path case markings, where the Ablative is metaphorically antecedent.

A similar construal of possessum as antecedent to possessor, the POSSESSUM-FIRST CONSTRUAL, is also crosslinguistically valid (Croft 1991:207):

(13) a. The dean presented an award to the valedictorian.

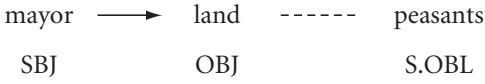


b. The dean presented the valedictorian with an award.

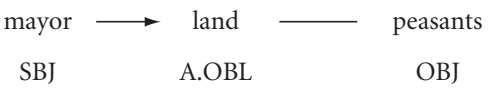


Again, when the possessor (recipient) is realized as an Oblique, a Subsequent Oblique is used (in English, *to*); when the possessum is realized as an Oblique, an Antecedent Oblique is used (in English, *with*), in conformity with the construal of the possessum as antecedent to the possessor. And again, the possessum-first construal applies when possession is lost as well as gained:

(14) a. The mayor stole the land from the peasants.

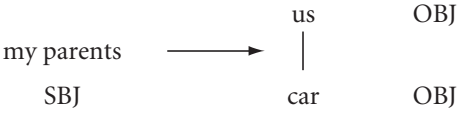


b. The mayor robbed the peasants of their land.



The possessum-first construal does not appear to be as crosslinguistically uniform as the figure-first construal. Transfer of possession also uses a Double Object (Ditransitive) construction, in which case neither possessum nor possessor appears to be construed as antecedent to the other. That is, the construal represents the agent acting on both possessor (recipient) and possessum, bringing about the (noncausal) possession relation that results from the event (Croft 1991:208):

(15) My parents gave us a car.



The representation of the causal structure of the Ditransitive construction in (15) may however be due to another argument realization pattern, discussed in §6.4.3.

The predication of possession is even more complex. It displays a great range of typological variation. Heine (1997) identifies seven types, while Stassen (2009) reduces them to four, based solely on the argument realization pattern. The following discussion is based on Stassen's typological classification, since we are concerned with argument realization.

Stassen identifies a Topic type, in which the possessor is some sort of nonargument Topic phrase, and the possessum is the Subject of a verb of existence. The Topic type is illustrated in (16) for Nomatsiguenga (Wise 1971:150, cited in Stassen 2009:61):

(16) ira hirainisati hiraira, teni ini kaniri
DEM ancient.ones long.ago NEG exist manioc
'The ancient ones long ago did not have manioc.'

Since this type does not express both participants as arguments, the argument realization rules in (1) do not apply (for argument realization with one-participant events, see §6.3.1).

Two of Stassen's other types conform to the possessum-first construal. The Locational type realizes the possessum as Subject and the possessor as a Subsequent Oblique (usually a Locative or Directional case marking). The With type realizes the possessor as Subject and the possessum is therefore realized as an Antecedent Oblique. The Locational type is illustrated by Lezgian in (17) (Haspelmath 1993:213, cited in Stassen 2009:51), and the With type is illustrated by Shipibo-Konibo in (18) (Tessmann 1929:252, cited in Stassen 2009:56):

(17) dusman -ri -w tup -ar gwa -c
enemy -PL -ADESS cannon -PL be.at -NEG
'The enemy does not have cannons.'

(18) ea pia ya i -birai
1SG arrow with be -FUT
'I will have an arrow.'

The fourth and last type, the Have type, does not conform to the possessum-first construal. In the Have type, the possessor is realized as Subject and the possessum as Object. This is of course the English type, seen in the translations of (16)–(18). However, most Have possessive constructions are historically derived from 'hold', 'carry', 'grasp', 'take', or 'get' meanings (Givón 1984:103; Heine 1997:48; Stassen 2009:63). These meanings do involve a transmission of force, but from the possessor to possessum (§§5.3.1, 7.2). Also, Stassen proposes a universal that Have possessives always include temporary possession as part of their use, which is a relic of their etymological origin in verbs of holding or obtaining (Stassen 2009:63–4).

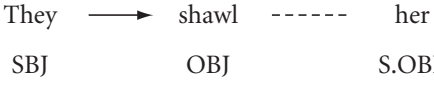
Nevertheless, when Have possessives grammaticalize to a stative possession relation, they do not change their argument realization. Stassen further notes that some of the other possessive types grammaticalize to a Transitive construction (e.g. 'SBJ/possessor be with A.OBL/possessum' develops into a Transitive 'SBJ/possessor be.with OBJ/possessum'), a process which he calls 'Have-drift' (Stassen 2009:64).

Stassen suggests two explanations for Have-drift (Stassen 2009:239–43). First, possessors are more topical, and topics are typically realized as Subjects. However, as Stassen notes, in the With possessive (not to mention the Topic possessive), the possessor already is a Subject (or Topic), and yet both these types undergo Have-drift. So Stassen suggests that coding the possessor as Subject and the possessum as Object expresses the relationship of control by

the possessor over the possessum. This explanation of course fits well with the causal model, since transmission of force implies relative control of the initiator over the endpoint. This leaves an apparent anomaly in that in transfer of possession, the possessum is always construed as antecedent to the possessor. But in transfer of possession, it is the agent (initiator) who has control and brings about the transfer of the possessum to the new possessor (see also §6.2.3). So perhaps the best analysis is that the possessum-first construal is clearly causally motivated in transfer of possession; it carries over to the predication of possession (as does the figure-first construal); but in the simple predication of possession, a competing construal of possessor control over the possessum motivates both the Have type and Have-drift.

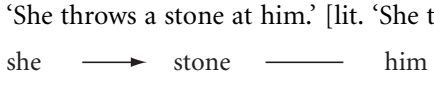
Languages which make different choices as to which participant in a noncausal relation is realized as Object nevertheless select the appropriate Subsequent or Antecedent Oblique for the non-Object participant. For example, Hausa, unlike English, allows the figure in a covering event to be realized as Object; the ground is therefore realized as a Subsequent Oblique (Newman 2000:287):

(19) an lullùɓā matà mayāfī
they cover.GR1 to.her shawl
'They covered her with a shawl.' [lit. 'They covered (a) shawl to her.']

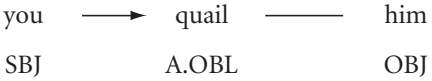


Central Sierra Miwok, on the other hand, lacks a Subsequent Oblique Dative-like form (Freeland 1951:24), hence all participant roles that are typically Dative (recipient, beneficiary, etc.) are realized as Object, and an antecedent is realized as an Antecedent Oblique (Freeland 1951:24, 121):

(20) haʔáṭnï šawà -š
she.threw.at.him stone -INST
'She throws a stone at him.' [lit. 'She throws him with (a) stone.']



(21) wél -ka -n -ṭokˈoŋ hekéˈkeˈ -š
hunt -BEN -VOL -2PL.VOL quail -INST
'All of you hunt quail for him!' [lit. 'All of you hunt him with quail!']



Likewise, incorporation with events containing spatial and possessive relations between participants conforms to the noncausal construals and the realization rule in (1d). Example (22) illustrates incorporation of the figure in Yukatek Maya (Mithun 1984:858, from Bricker 1978), and example (23) illustrates incorporation of the possessum in Chukchi (Mithun 1984:862, from Bogoras 1910; see Croft 1991:201, 208):

(22) ki- in- wek -ha'a -t -ik
INCMPL- I- spill -water -TR -IMPF
'I splash him [. . . with water].'

I ⟶ water ——— him

SBJ INC OBJ

(23) ġŭmnín ékık qä- kalê´tol- lpınrı -gın
my son you- money- give -him
'Give my son some money.'

you ⟶ money ——— my son

SBJ INC OBJ

Less widely discussed argument structure alternations also alternate between Antecedent and Subsequent Oblique forms in a way that implies a consistent construal. For example, English *replace* and *substitute* represent alternative verbal profiles of the same event with the new filler of the role construed as antecedent to the former filler of the role (Croft 1991:225–6):

(24) a. The director substituted Cindy for Jane in the part of the Virgin.

director ⟶ Cindy ——— Jane

SBJ OBJ S.OBL

b. The director replaced Jane with Cindy in the part of the Virgin.

director ⟶ Cindy ——— Jane

SBJ A.OBL OBJ

The construal of noncausal relations as if they possessed an asymmetric transmission of force is not a necessary consequence of the Causal Order Hypothesis. However, the systematic alternation between Subsequent and Antecedent Oblique case marking is a necessary consequence of the Causal Order Hypothesis. Moreover, spatial and possession relations are generally construed the same way across languages, with figure antecedent to ground and possessum antecedent to possessor. The explanation for this is probably that events typically involve manipulation of the figure or the possessum, and

therefore those participants are more clearly acted upon by an antecedent agent or other cause. (The situation is more complex with possession, because the possessor is also human and may initiate events involving possession and change of possession.) The fact that the most common noncausal relations to be lexicalized in verbs, space and possession, are generally construed as causally asymmetric, suggests that the causal organization of event structure is a powerful factor in the human conceptualization of events for linguistic expression.

The antecedent–subsequent semantic role distinction manifests itself in other grammatical domains in which event structure plays a role. In adnominal modification, the figure-first and possessum-first construals also dictate choice of preposition for the modifying noun: *the lid* [FIG] *for the jar* [GND] vs. *the jar* [GND] *with a lid* [FIG] and *the food* [PSM] *for the cats* [PSR] vs. *the man* [PSR] *with a knife* [PSM] (Croft 1991:228–31). In nominalization, there is a widely attested syncretism of agent and instrument nominalizations (e.g. English *writ-er* [agent] and *stapl-er* [instrument]), as well as syncretism of agent, instrument, and location nominalizations, based on the metaphorical mapping from locative to the verbal profile referred to above (p. 231).

In addition to the crosslinguistic evidence supporting the antecedent vs. subsequent force-dynamic distinction, there is developmental evidence indicating the psychological reality of the antecedent–subsequent distinction, at least in English (Croft 1998*a*:40). Children use an inappropriate Antecedent preposition for another antecedent function but not for a subsequent function, and vice versa, as in (25a–b):

(25) a. Substitution of *by* for *with* for instrumental NPs (Bowerman 1983:463–5)
'I just eat it *by* my spoon' [C 4;4]

b. Substitution of *from, of, with* for passive agent *by* (Bowerman 1989):
'Sometimes Eva needs to be feeded *with* you because she doesn't eat' [C 4;4]

Clark and Carpenter document examples of children acquiring English using *by* for natural forces and instruments as well as passive agents, *with* for agents, natural forces, and means as well as instrument, and ablative *from* metaphorically for agents and natural forces (Clark and Carpenter 1989:19, Table 10).

Even more striking, when overgeneralizing argument structure alternations, children choose an appropriate Antecedent or Subsequent preposition (Bowerman 1982:338–9):

(26) a. '…'cause I'm going to touch it [hand] *on* your pants' [E 3;0]
b. 'I don't want it because I spilled it [toast] *of* orange juice' [E 4;11]

In (26a), the child makes the figure (her hand) the Object of *touch*, which is unacceptable in adult English. Needing to realize the ground argument (pants) as an Oblique, she chooses a (Subsequent) Path preposition (as in *place my hand on your pants*), in conformity with the figure-first construal. In (26b), the child makes the ground the Object of *spill*, which again is unacceptable in adult English. Needing to realize the figure argument as an Oblique, she chooses an Antecedent preposition *of* (as in *strip the trees of bark*), again in conformity with the figure-first construal.

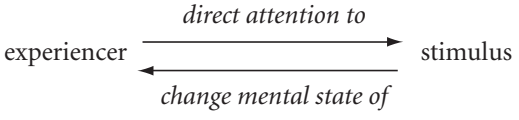
The examples in (25) and (26) indicate that the children have figured out the Antecedent Oblique–Subsequent Oblique distinction, but have not yet figured out which English Antecedent Oblique preposition goes with which antecedent role—an at least partly idiosyncratic fact of English—or which predicates can realize only the figure as Object or only the ground as Object.

6.2.3 The construal of noncanonical (cyclic) causal relations

The Causal Order Hypothesis construes the participants in an event as interacting in an asymmetric, nonbranching causal chain. Noncausal relations may be asymmetrically construed, and they also form part of the nonbranching causal chain. There are, however, also situations in human experience where the causal transmission of force is symmetrical and/or branching. In these cases, the transmission of force is construed one way or another—or the argument realization patterns found across languages reflect the lack of asymmetry.

6.2.3.1 Mental events In MENTAL EVENTS of emotion, cognition, and perception, there are two widely observed argument structure constructions. In the first, the experiencer is realized as Subject, and the stimulus is realized as Object or Subsequent Oblique (*I listened to the music, I heard the music*). In the second, the experiencer is realized as an Object or Subsequent Oblique, and the stimulus is realized as Subject (in terms of coding constructions; *The music sounds loud to me, The loud music frightened me*); compare the German examples (29)–(30) in §5.2.3. The reason for this variation in the argument realization of mental events is that there are two directions of transmission of force: the experiencer directs her mental attention to the stimulus, and the stimulus causes a change of (mental) state in the experiencer:

(27) *Bidirectional transmission of force in mental events:*



There is crosslinguistic variation in the argument realization of experiencer and stimulus because either may form the basis of the construal of the causal

structure of the mental event. Subtler patterns of variation in argument realization support this analysis (Croft 1991:213–25, 1993).

If the verb lexicalizes the cause of change of state, then the stimulus is consistently realized as Subject and the experiencer as Object (or Oblique, usually Dative). This lexicalization pattern is sometimes manifested morphologically by a causative verb form, e.g. Classical Nahuatl *mauh-tia* [fear-CAUS] 'frighten' (Croft 1993:56–7). This is because the causative verbs profile only the causal relation of the stimulus causing a mental change of state in the experiencer.

Second, if the verb lexicalizes the mental "activity" of attending to a stimulus such as thinking or watching—one of the types of inactive actions discussed in §§2.2.2–2.2.3—then the experiencer is consistently realized as Subject and the stimulus is realized as Object or Oblique (or not at all). Such verbs allow the Progressive in a language like English, contrasting with 'genuine' mental state predicates: *I am watching the goats/thinking about the problem* vs. **I am seeing the goats.* In Kannada, where stative mental verbs usually realize the experiencer in the Dative, mental activity on the part of the experiencer allows for realization as Nominative, because the experiencer has some control over the mental activity (Sridhar 1976:584):

(28) avanige hāḍu kēḷisitu
he:DAT music heard
'He heard the music.'

(29) avanu hāḍannu kēḷidanu
he.NOM music:ACC heard
'He listened to the music.'

The reason for this is that the mental activity verbs profile only the causal relation of the experiencer directing her/his attention to the stimulus.

Third, if the verb construes the experiencer–stimulus relation as a state, i.e. as force-dynamically neutral, then one really does observe that any realization pattern is found (Croft 1993:67–70). The experiencer is found realized as Subject (e.g. English), or stimulus as Subject (e.g. Kannada; Sridhar 1976:583) for at least some mental state predicates:

(30) nanage ī vicara gottu
I:DAT this fact know
'I [SBJ] know this fact.' (cf. 'This fact is known to me.')

These facts have been widely observed. Also, one finds languages in which both experiencer and stimulus are realized as Subject or as Object. In Japanese, both experiencer and stimulus are marked with Nominative *ga* when *ga* is not replaced by Topic *wa* (Croft 1993:67–8, from Kuno 1973:79–95):

(31) Dare ga eiga ga suki desu ka
who NOM movie NOM fond.of is INT
'Who likes movies?'

Conversely, in Eastern Pomo, pronominal experiencer and stimulus are both realized with Patient (Object) marking (Croft 1993:67, from McLendon 1978:3):

(32) bé:kal wí p^{h}i:lémka
3PL.PAT 1SG.PAT miss
'I miss them.'

The reason for this variation in the argument realization of stative mental verbs is that there is no causal directionality in a stative expression, and there is also no universal asymmetrical construal of experiencer and stimulus.

Finally, if argument realization is variable in the same language, then the experiencer-Subject realization is associated with more control on the part of the experiencer and the stimulus-Subject realization is associated with less control on the part of the experiencer or external cause (Croft 1993:65–7). For example, in Venezuelan Spanish, the three sentences in (33a–c) represent a decreasing degree of responsibility on the part of the experiencer for the forgetting, corresponding to the shift in coding of the experiencer from Subject only, Subject and Object (i.e. Reflexive), and Object only (Croft 1993:65–6, from Henry Andery, pers. comm.):

(33) a. Olvidé hacer -lo
forget:1SG.PST do.INF -3SG

b. Me olvidé de hacer -lo
1SG.REFL forget:1SG.PST of do.INF -3SG

c. Se me olvidó hacer -lo
3SG.REFL 1SG.DAT forget:3SG.PST do.INF -3SG
'I forgot to do it.'

The fact that some languages have a symmetric case marking for mental state predicates demonstrates that the semantic properties of the event that do not fit the general construal of participant relations as directed and acyclic may influence grammatical structure. Construal of participant relations as purely directed and acyclic is therefore not the only option in the case of event types that are not directed. Not only must we take into account alternative construals of an event type—its FORCE-DYNAMIC POTENTIAL—but we must also consider the possibility that alternative construals of the event are simultaneously present in a grammatical construction in a single language.

Moreover, the way in which alternative construals are manifested should tell us something about the semantic structure of the event that gives rise to its force-dynamic potential.

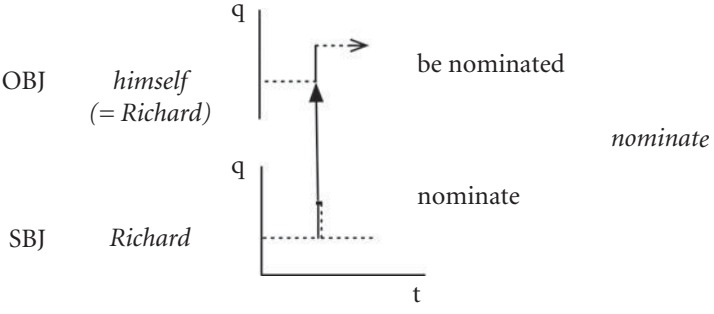
6.2.3.2 Reflexives, reciprocals, and comitatives This conclusion is reinforced by examining a different example of bidirectional transmission of force that leads to a different type of crosslinguistic variation in realization: reflexive and reciprocal relations. In a REFLEXIVE relation such as *He nominated himself*, a participant acts on him/herself: s/he is simultaneously initiator and endpoint. In a RECIPROCAL relation such as *They congratulated each other*, each participant plays the role of initiator and endpoint for the same event type (she congratulates him and he congratulates her). The reflexive and reciprocal relations are represented in (34):

(34) *reflexive:* *reciprocal:*

The reflexive and reciprocal relations do not fit the asymmetric, nonbranching causal chain, but for a different reason than for mental events. In mental events, the two directions of transmission of force are different event types. In reciprocal events, the two directions of transmission of force are the same event type (e.g. congratulating), and in reflexives, there is only one event and hence one event type.

Typologically, reflexive and reciprocal events are construed either transitively or intransitively, and also in between, due to the grammaticalization path from the former to the latter. Transitive construal differentiates the roles that the same participant(s) play in events. For reflexives, a transitive construal therefore requires overt realization of a second argument phrase that is coreferential with the Subject, "unwinding" the causal relation:

(35) Richard nominated himself.



In (35), the coreference relation between initiator and endpoint is expressed by the special Reflexive Object pronoun form (such forms are called Reflexive

markers by Kemmer 1993:44). In other languages, including Old English (before the grammaticalization of special Reflexive pronouns), an ordinary pronoun is used, as in (36)–(37) (Comrie 2003:203):

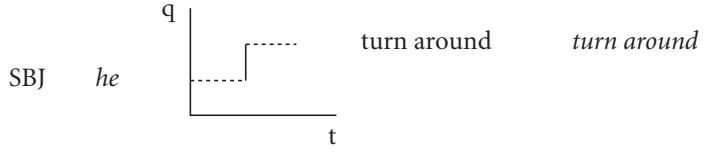
(36) Ic slōh mē
I hit me
'I hit myself.' [lit. 'I hit me.']

(37) Hē slōh hine
he hit him
'He hit him/himself.'

In this case, there is no special encoding of coreference; a semantically reflexive event is construed no differently from a causally directed two-participant event.

There is however an alternative construal of a reflexive event as a one-participant event, encoded with an Intransitive construction. This is possible in English with events that are typically performed on or by oneself:

(38) a. He shaved. [cf. The barber shaved him.]
b. He sat at the table. [cf. He sat his guests at the table.]
c. He turned around. [cf. He turned his blindfolded daughter around.]



The reflexive event, after all, has only a single participant, even if causally that participant seems to be both initiator and endpoint of the transmission of force in the event. But that causal analysis only applies to events construed as having two participants (including two coreferential participants) in the force-dynamic decompositional model presented in chapter 5. In this model, each subevent has only one participant, and causal (or noncausal) relations hold between the one-participant subevents. If an event such as shaving is construed as a one-participant event, then the event has only one subevent, namely the subevent performed or undergone by the single participant. In this construal, there is no force-dynamic relationship because there is only one subevent.

Reflexive events can be compared to the single subevent in "ordinary" one-participant events:

(39) a. Mary walked (around the park).
b. Mary grieved (over her loss).
c. Mary shivered.
d. Mary fell.

In (39a–d), something happens to Mary in all cases: translational motion (39a), emotion (39b), bodily motion (39c), and another kind of translational motion (39d). What differs in the four examples is the degree of control Mary exercises over her action. The degree of control is also manifested in differences in the grammatical realization of the participant across and within languages (ergativity and so-called split intransitivity); this will be discussed in §6.3.1.

However, even in the case of less controlled actions such as shivering and falling, the cause may be internal: some internal body state causes the shivering and the loss of balance causes the fall (even if the ultimate cause is external, e.g. someone pushing Mary). In other words, most if not all one-participant events have, or are construed as having, an INTERNAL CAUSE as well as bringing about an effect on the participant. The main difference among one-participant events is that the cause is (or is not) controlled by the participant to a greater or lesser degree (see §5.3.1 on the continuum from volitional to physical causation). In other words, the single subevent of a reflexive event construed intransitively differs at most in degree, not in kind, from other one-participant events; they are typically at the higher-control end of the intransitive event continuum. The precise force-dynamic character of different types of one-participant events is captured by characterization of the event on the *t* and *q* dimensions, since there is no force-dynamic interaction among participants in the one-participant construal.

In other languages, reflexive events construed intransitively have a special derived Reflexive verb form. This form is the result of grammaticalization, often from a former Reflexive pronoun or noun form (Kemmer 1993, chapter 5); the form is no longer an independent argument. Kemmer calls the grammaticalized reflexive marker a MIDDLE MARKER (Kemmer 1993:4). An example of a reflexive event realized with a Middle marker is found in (40) from Guugu Yimidhirr (Haviland 1979:122; the suffix *-gu* emphasizes the reflexive, as opposed to a reciprocal, meaning):

(40) ngayu -ugu gunda -adhi
1SG.NOM *-GU* hit -REFL.PST
'I hit myself.'

The Middle marker is used not only for events which require a translation with a Reflexive pronoun form in a language like English, but also for events which are normally translated as Intransitive in English. For example, the Russian suffix *-sja* is a Middle marker that is cognate with the Russian independent Reflexive pronoun *sebja*. In Russian, some verbs that translate as Intransitive in English take *-sja* (e.g. *prosypat'sja* 'wake up') while others do not (e.g. *guljat'* 'walk'). Thus, languages with Middle markers effectively divide the one-participant (construals of) events into two classes.

The crosslinguistic distribution of event classes coded by Middle markers can be represented in a conceptual space (Croft, Shyldkrot, and Kemmer 1987; Kemmer 1993:211). Kemmer represents the extension of Reflexive forms into "ordinary" one-participant event classes as a one-dimensional hierarchy in the conceptual space, given in (41) (Kemmer 1993:224):

(41) reflexive situation > nontranslational motion > change in body posture, body care >
translational motion > other one-participant events

Examples (42a–d) illustrate languages with predicates containing Middle markers for the nonreflexive event classes in (41) (Kemmer 1993:54–7; Middle markers are in boldface):

(42) a. *Nontranslational motion:* Lingala *bóngwa-**na*** 'turn around', Old Norse *hrista-**sk*** 'shake (the head)'

b. *Change in body posture:* Ayacucho Quechua *tiya-**ku**-y* 'sit down', Hungarian *emel-**ked**-* 'rise, get up'

c. *Body care:* Latin *orno-**r*** 'adorn (oneself)', Turkish *yık-**an*** 'wash'

d. *Translational motion:* Classical Greek *péte-**sthai*** 'fly', Guugu Yimidhirr *madha-**adhi*** 'climb up'

Not surprisingly, the "intransitive" event classes to which a grammaticalized Reflexive/Middle marker is most likely to be extended, at least at first, are one-participant event types which are under the control of the participant (unlike other internally caused events such as coughing, sneezing, etc.). The difference between Middle-marked Intransitives and plain Intransitives is a manifestation of the semantic nonuniformity of "ordinary" one-participant predicates; see also §6.3.1.

The decomposition of events into one-participant subevents allows us to capture the semantic variety of one-participant event types even though there are no force-dynamic relations (since there is only one subevent in the force-dynamic dimension of the representation). This analysis is even more suited to the indirect reflexive type (Kemmer 1993:74–81). The indirect reflexive type refers to events in which the initiator acts on an endpoint but the initiator her/himself is affected by the outcome (p. 75). In English, as with ordinary direct reflexives, the event is construed as a three-participant event with a Reflexive Subsequent Oblique as in (43a); but some predicates which describe events typically done for one's own benefit are simply realized as Transitive in English, as in (43b):

(43) a. John built a house for himself.
b. John bought a car.

Again, other languages use a derived verbal form with a Middle marker to express the indirect reflexive event type, such as Ayacucho Quechua *apa-**ku**-y* 'lift something for oneself' (Kemmer 1993:79). In these cases, unlike the direct reflexive, there is another participant which is indeed acted upon by the Subject participant; this other participant is realized as Object and the clause remains Transitive. The self-oriented action on the part of the Subject participant may be left unrealized, as in (43b), or be signaled by the Middle marker as in the Ayacucho Quechua example above, or indeed by the special Reflexive pronoun as in (43a). As in the case of the one-participant construal of the direct reflexive event type, the two-participant construal of the indirect event type represents the self-oriented nature of the event in the qualitative dimension of the Subject participant's subevent.

The typology of the realization of reflexive event types allows us to draw the following conclusions about argument realization. Reflexive event types are cyclic, but argument structure constructions require an acyclic construal of events. Hence reflexive event types are construed as acyclic directed event types, either by realizing the reflexive participant as two arguments in the appropriate positions in the causal chain, or just once as a single argument. The noncanonical, i.e. cyclic, reality of reflexive event types may be signaled grammatically, by a special Reflexive pronoun in the former case or by a Middle marker in the latter case. But it may also be left implicit, in languages without special Reflexive pronoun forms or for predicates which describe events that are typically reflexive. But the argument structure construction itself—the realization of participants with case marking and indexation—only encodes an acyclic event structure, with either two participants or one participant.

The same is essentially true of reciprocal events. Reciprocal events are unlike reflexive event types in that each participant in a reciprocal event acts on another participant, not on themselves. They are like reflexive events in that each participant participates in the event in two roles, and moreover each participant participates in the event in the same two roles.

The typology of reciprocals is correspondingly more complex. Several different typological classifications have been proposed (see the survey in König and Gast 2008). From the perspective of argument realization, the most useful classification is that of Maslova (2008). Maslova classifies Reciprocal constructions in terms of the number of argument roles realized for the predicate, namely, one (Unary) or two (Binary). With the binary realizations, Maslova further distinguishes Biclausal from Monoclausal constructions.

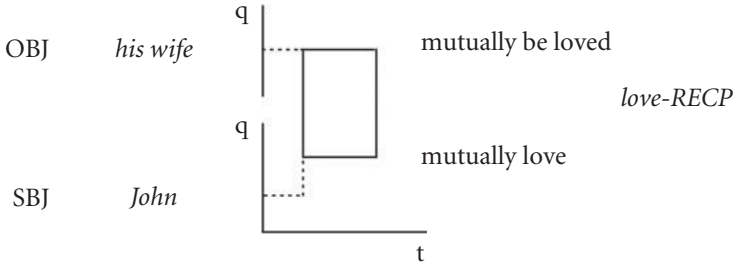
In a Biclausal construction, the distinctness of the reciprocal events may lead to realization as two separate clauses, as in (44) from colloquial Cantonese (Matthews and Yip 1994:87; cited in König and Kokutani 2006:299, footnote 8 and Maslova 2008:230):

(44) léih hóyíh bōng ngóh ngóh hóyíh bōng léih
you can help me I can help you
'We (you and I) can help each other.'

The Biclausal Reciprocal resolves the cyclic nature of the causal chain by simply decomposing the reciprocal event into two distinct acyclic causal chains. The second realization may use a special reduced form as in *Her friends do not like me and* **vice versa** (Maslova 2008:230).

The Monoclausal Binary construction retains one participant as initiator and the other as endpoint, and overtly codes on the verb the fact that the event is reciprocal, as in (45) from Tonga (Bantu; Collins 1962:74, cited in Maslova 2008:230; recall that mental states are noncausal relations, although they are construed as directed):

(45) Joni ba- la- yand -ana amukaintu wakwe
John 3PL- PRS- love -RECP wife his
'John and his wife love each other.' [lit.: 'John mutually-loves his wife.']



In this construction, the argument realization expresses one direction of the reciprocal event, and the verbal morphology encodes the fact that the reverse direction of transmission of force also holds.

In this respect, the Monoclausal Binary Reciprocal construction is not unlike the one-participant reflexive construal, in which the verb form encodes the fact that the initiator of the event is also the endpoint of the same event. The Binary construction may occur without verbal coding of reciprocity if the predicate denotes a necessarily or typically symmetric event:

(46) a. Mary met Susan.
b. Bob kissed Janet.

Thus, another way of interpreting (45) is that the Reciprocal suffix in Tonga derives a necessarily symmetric event, as defined on the *q* dimension, from a nonsymmetric event (in the mathematical sense of 'nonsymmetric'; see Wall 1972:112). Likewise, one may interpret a Reflexive verbal form, such as the Guugu Yimidhirr suffix in (40), as deriving a necessarily reflexive predicate from a nonreflexive predicate.

However, there is an asymmetry in the interpretation of the construal of the reciprocal event in (46). For event types that are typically but not necessarily symmetric, such as (46b), an asymmetric construal is possible (Janet did not kiss Bob). Even for the symmetric construal of (46b), which is necessarily true for (46a), the sentence 'may express an asymmetry of control, initiative or perspective' (König and Kokutani 2006:273). That is, the asymmetry of control or initiative manifests the force-dynamic asymmetry between Subject and Object. The asymmetry of perspective is a figure–ground asymmetry, as manifested more sharply in (47), which is construed as a force-dynamic asymmetry (§6.2.2):

(47) a. The car hit the curb.
b. *The curb hit the car.
c. *The car and the curb hit (each other).

The Binary constructions are far less common crosslinguistically than the Unary constructions (Maslova 2008:231). Maslova divides the Unary constructions into Bipartite and Simple expressions. The Bipartite expression is morphosyntactically a two-argument construction, but one of the expressions is fixed with a reciprocal meaning. This construction is therefore like the two-argument Reflexive construction with a Reflexive pronoun (e.g. *himself/herself*). However, the Reciprocal allows at least two options, a quantificational expression or a pronoun.

The quantificational Bipartite construction "packs" multiple events of a similar type into a single clause, as in (48) from Russian, and its English translation (König and Kokutani 2006:280):

(48) oni často vidjat drug drug -a
they often see one another-GEN
'They often see each other.'

This quantificational strategy can be compared to other quantificational strategies that also "pack" multiple events into a single clause, as in *Every contestant received a prize* or *I gave the trick-or-treaters two candies each.* The multiple events must be of the same type (seeing, receiving, giving—that is, the same three-dimensional event structure); and there must be a systematic way of permuting the participants across the events while preserving their

roles (the referents of 'they' in (48), the contestants, the trick-or-treaters). The reciprocal situation differs from the other quantificational situations in that the roles as well as the fillers are permuted.

The pronominal Bipartite construction realizes the reciprocal participants in two separate roles, once as a plural group argument phrase and once with a pronoun. The pronoun may be a special pronoun, often identical to the Reflexive pronoun, as in (49) from Somali (König and Kokutani 2006:279, from Saeed 1999:78), or—again like the two-participant reflexive construal—an ordinary pronoun as in (50) from Sa (Evans, Gaby, and Nordlinger 2007:548):

(49) wày (waa+ay) is arkeen
DECL-they REFL saw
'They saw each other/they saw themselves.'

(50) ir- ben -ir
3DU- shoot -3DU
'They shoot each other/they shoot themselves/they shoot them.'

In both the quantificational and pronominal strategies, the two (or more) participants in the reciprocal event are construed as a group. In this respect, these constructions are "unary" even if they are realized with two distinct argument phrases. As a group, they all participate in the reciprocal event as a whole as initiators and as endpoints. Hence they are not unlike the participant(s) in a reflexive event. It appears that Reflexive forms may be diachronically extended to reciprocal events and Reciprocal forms may be extended to reflexive events.

Finally, reciprocal events may also be construed as unary and simple in Maslova's terms, that is, as indubitably one-participant events. In this construal, the symmetrically interacting participants are a single group that is both acting upon and being acted upon as a whole, not unlike reflexives. In English, necessarily or typically reciprocal events may be construed as one-participant events and lexicalized as Intransitive verbs not needing an overt Reciprocal element (Kemmer 1993:102):

(51) a. Mary and Susan met.
b. Bob and Janet kissed.
c. The children fought.

In other languages, the reciprocal meaning may be signaled by a special verb form (again, frequently identical to a reflexive verbal derivation), or a verbal compound. Example (52) illustrates a special verb form in Swahili, and (53) illustrates a verbal compound in Mandarin Chinese (König and Kokutani 2006:276):

(52) Ali na Fatuma wa- na- pend -an -a
Ali and Fatuma 3PL- PRS- love -RECIP -(final vowel)
'Ali and Fatuma love each other.'

(53) tāmen dā -lái -dā -qù
3PL beat -come -beat -go
'They beat each other.'

The explanation for the one-participant construal of reciprocals is the same as for reflexives. The participants are collectively playing the same double-role and the event is construed as a (collective) one-participant event that is internally caused (within the group).

Evans et al. also describe a number of cases in which a Reciprocal construction exhibits morphosyntactic properties of both Intransitive and Transitive constructions. Most of their examples involve indirect behavioral properties of the Reciprocal construction, but they give at least one case of a combination of coding properties that are otherwise found in Transitive and Intransitive constructions, namely Wambaya.[1] In Wambaya, there is a Reflexive/Reciprocal form *-ngg-* (glossed RR), to which bound pronoun forms are attached. In the one context where Wambaya distinguishes Transitive Subject (A argument) and Intransitive Subject bound pronouns, third person, the Reciprocal construction uses the Transitive bound pronoun. However, an overt argument phrase occurs in the Nominative (i.e. Intransitive Subject) form (Nordlinger 1998:142; see Evans et al. 2007:565):

(54) alag -bulu wurlu- ngg -a nyurrunyurru
child -DU(NOM) 3DU.A- RR -NFUT chase
'The two children are chasing one another.'

Evans et al. suggest that the mixed one-/two-participant construal of reciprocal events is due to the joint character of the event: that is, in addition to X acting on Y and Y acting X, X and Y are acting jointly (Evans et al. 2007:542). Although reciprocal events are also joint events (see below), the same mixed grammatical behavior is found with reflexives, as they themselves note (p. 590; example from Nordlinger 1998:142):

(55) janji gini- ngg -a wagardbi
dog.CLI(NOM) 3SG.M.A- RR -NFUT wash
'The dog is washing himself.'

[1] Oddly, Evans et al. give this as an example of a "purely Intransitive" Reciprocal construction, despite acknowledging the Transitive marking (contrast Nordlinger 1998:141–2).

The joint event explanation will not account for the one-participant construal of reflexive events. Instead, the explanation given above—construal of both reflexive and reciprocal events as an internally caused one-participant event—accounts for the Intransitive behavior of both reflexive and reciprocal events. And as with mental state events, the alternative construals of reflexive and reciprocal events may be manifested in mixed grammatical constructions.

The joint character of reciprocal events, absent in reflexive events, is manifested in the relationship between reciprocal events and the comitative role. Reciprocal events are often expressed in two-argument construals with the comitative role instead of the Object:

(56) a. Susan met with Brian.
b. The children played/fought/talked with each other.

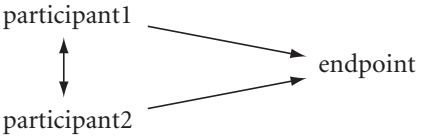
Reciprocals and nonreciprocal comitatives have in common the fact that the subevents for the two participants are of the same type:

(57) a. Jill went to the movies with Carol.
b. Howard wrote the textbook with Tim.

In (57a), Jill and Carol are both engaged in the same subevent, going to the movies. In (57b) Howard and Tim are both engaged in the same subevent, writing the textbook. However, there is an additional relationship between the two otherwise parallel participants. In (57a) the relationship is one of accompaniment, that is, a joint action rather than two separate individual actions. In (57b), the relationship is one of assistance, again a joint action. The assistance relationship may be symmetric or asymmetric to some degree—say, Howard is the senior author—but what appears to matter for the comitative role is the joint nature of the collaborative activity, not perfect equality of participation.

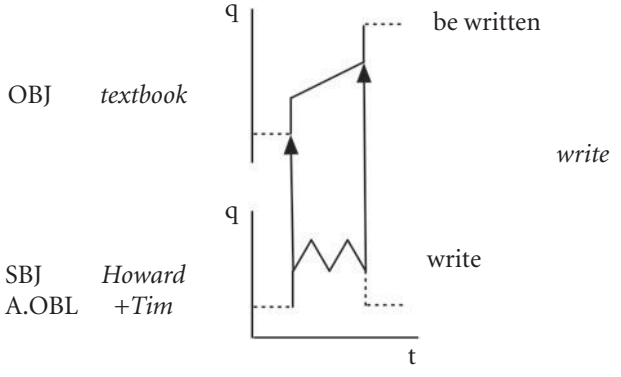
Thus, a comitative role in an event involves two different types of relationships among participants. First, two participants are engaged in the same type of activity, possibly directed toward a third participant (the movies, the textbook), though not necessarily so (cf. *Jill exercises with Carol*). (The comitative role typically, though not always, denotes a participant in the same role as the initiator of the verbal profile.) Second, the two participants are in a mutual relationship of collaboration, which may or may not be symmetrical. Thus, a joint action between two participants directed toward a third participant may lead to a cyclic causal chain, as in the (unconstrued) representation of event in (57b) in (58):

(58) *Cyclic causal chain for a collaborative event:*



The comitative role appears to lend itself to two alternative construals in a directed acyclic causal chain. In the first construal, the comitative participant and the Subject participant are construed as engaged in one and the same subevent. That is, the two participants share a single subevent, even though they are realized asymmetrically as Subject and Antecedent Oblique, as in the representation of (57b) in (59):

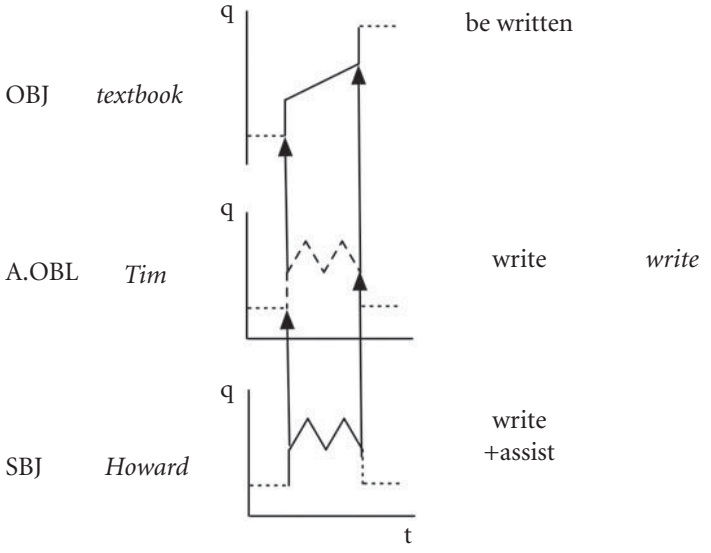
(59) *Construal of comitative in (57b) as sharing a single subevent:*



This construal represents a more symmetric relationship between the Subject and comitative participants, and leads to the widely attested grammaticalization of a comitative to (argument) coordination (Stolz 1996; Stassen 2000; Heine and Kuteva 2002:80–2).

In the second construal, the joint relationship between the Subject participant and the comitative is construed as leading to the outcome of the event. This construal represents a more asymmetric relationship between the Subject and comitative participants, and leads to the other widely attested grammaticalization path of a comitative to an instrumental role, with the extension to inanimate participants as the endpoint of the Subject's transmission of force (Schlesinger 1979; Heine and Kuteva 2002:84–6). The asymmetric construal is illustrated in (60), and is more directly manifested in languages that use an 'accompany' verb in a complex predicate construction, as in (61) from Keiese (Geurtjens 1921:59, cited in Stassen 2000:20; see also Talmy 2000*b*:252–60):

(60) *Construal of comitative in (57b) as assistive or accompanying:*



(61) jaw oe- hoev o
1SG.go 1SG- accompany 2SG
'I will go with you.'

Schlesinger demonstrates that there is a semantic continuum from symmetric to asymmetric roles corresponding to a comitative–instrumental continuum. He performed a rating experiment which led to the ranking of comitative/instrumental role types given in Table 6.3 (Schlesinger 1979:311; see also Heine, Claudi, and Hünnemeyer 1991:104):

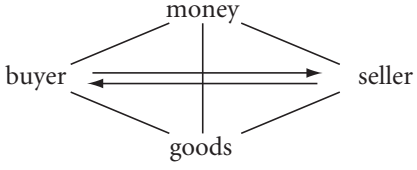
TABLE 6.3. Ranking of comitative/instrumental roles in ranking experiment (Schlesinger 1979)

Comitative/instrumental role	*Mean rating*
The pantomimist gave a show with the clown.	1.67
The engineer built the machine with an assistant.	2.90
The general captured the hill with a squad of paratroopers.	3.67
The acrobat performed an act with an elephant.	3.87
The blind man crossed the street with his dog.	4.67
The officer caught the smuggler with a police dog.	6.17
The prisoner won the appeal with a highly paid lawyer.	6.27
The Nobel Prize winner found the solution with a computer.	7.40
The sportsman hunted deer with a rifle.	9.00
The hoodlum broke the window with a stone.	9.40

The ranking largely follows the animacy hierarchy as expected. The animal participants are ranked according to their degree of independent activity or control (circus elephant, seeing-eye dog, police dog, and lawyer [sic]). The inanimate instrument-like participants are ranked to their degree of autonomous action (computer > rifle > stone).

6.2.3.3 The commercial event A particularly complex example of an event with many interactions among participants is the COMMERCIAL EVENT (Fillmore 1977*a*:72–4; Croft, Taoka, and Wood 2001). The commercial transaction event involves four participants: the buyer, the seller, the goods, and the money. The event involves two participants with the capacity to initiate the event, the buyer and the seller. In fact, buyer and seller jointly act to carry out the event, a sort of reciprocal relationship. The event also involves transfer of the money from the buyer to the seller, and transfer of the goods from the seller to the buyer. That is, there are possession relations between the buyer, the money, and the goods, and between the seller, the money, and the goods—possession relations which change over the course of the event. Finally, there is a relationship of equality of value between the money and goods, so that one substitutes for/replaces the other, for both the buyer and the seller. The relations are summarized in (62) (a modification of the diagram in Croft et al. 2001:592):

(62) *Interactions between participants in the commercial event:*



English and other languages have numerous verbs to profile parts of the interactions of participants in the commercial transaction event. Croft et al. (2001) compare English, Russian, and Japanese, and argue that the commercial transaction verbs construe (part of) the event as a directed, acyclic, nonbranching causal chain. A summary of the main patterns is given here; Croft et al. (2001) gives more detail, but the analysis given here differs in some respects.

Verbs in the commercial transaction frame may construe either the buyer or seller as the initiator of the event. Although the commercial event is reciprocal, the roles of buyer and seller are not the same: the buyer gives up money and receives goods, while the seller gives up the goods and receives money. Hence the commercial transaction verbs do not allow the collective or reflexive-like construals found in genuine reciprocal events.

Instead, the event is construed as transfer of possession: one participant giving or taking an item to or from the other participant. In a *give*-type verb, the non-Subject participant is construed as recipient, and therefore is subsequent to the item received (goods for the buyer as in *sell*, money for the seller as in *pay*). In English the recipient is realized as a Subsequent Oblique with *to*, following the possessum-first construal; Russian uses the Dative and Japanese *ni*. In a *take*-type verb the non-Subject participant is construed as a (soon to be former) recipient as well. In English, it is realized with *from* following the possessum-first construal as well (see §6.2.2); Russian uses *ot* and Japanese *kara* in the same way.[2]

The complexity in the argument realization of the commercial transaction event in a causal chain lies in the construal of the money and the goods. In English, one construal profiles the substitution relation, as with *substitute* and *replace* (see §6.2.2). English *buy* allows an alternation of the *substitute–replace* type, depending on whether the money is expressed as a monetary value or as a form of payment (Croft et al. 2001:592; Croft 2000:120):

(63) a. Bill bought a lawnmower from Harry for $25.

Bill	⟶	lawnmover	-------	$25	-------	Harry
SBJ		OBL		S.OBL		S.OBL
				[substitution *for*]		

b. Bill bought a bottle of port from the shopowner with his last Portuguese money.

Bill	⟶	Portuguese money	———	port	-----	shopowner
SBJ		A.OBL		OBJ		S.OBL

Japanese *kau* 'buy' also construes the causal chain with the substitution relationship between money and goods, but construes the money as antecedent to the goods, using the Antecedent *de* (Croft et al. 2001:599):

(64) Harry wa Bill kara hon o $5 de katta
Harry TOP Bill from book ACC $5 INST buy:PST
'Harry bought the book from Bill for $5.'

Harry	⟶	$5	———	book	------	Bill
SBJ		A.OBL		OBJ		S.OBL

[2] Croft et al. (2001) analyzed this role as a causally antecedent role, but the *take* type is parallel to *give* in the same way that *steal* is; see §6.2.2.

There is an important difference between Japanese and English in the causal chains in (63a) and (64), not noted in Croft et al. (2001). In English, the new filler of the possessum role for the Subject participant (i.e. the lawnmower) is construed as antecedent to the old filler of the role (the money), as in the *substitute–replace* alternation described in §6.2.2. In Japanese, it is the other way around: the old filler of the possessum role for the Subject participant (the money) is construed as antecedent to the new filler of the role (the book). This alternative old-first construal is consistently found in Japanese commercial event verbs.

English *get* and *receive* use the same construal for the commercial event, allowing either the seller or the buyer as the initiator. However, only substitution *for*, as in the verbal profile for (63a), is possible (Croft et al. 2001:593–4):

(65) a. Bill got/received $25 from Harry for his lawnmower.
b. Harry got a lawnmower from Bill for $25.

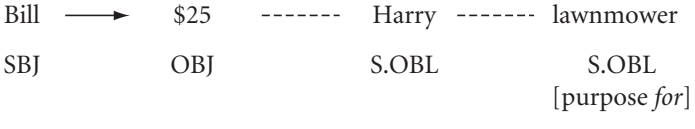
Japanese *eru* 'obtain, receive' also uses the same construal of the commercial event. As expected, *eru* only allows the verbal profile of (64) with the old-first construal. With *eru*, the Antecedent *de* or the special Antecedent exchange postpositions *daikin to shite* 'as a price for' or *to hikikae ni* 'in exchange for' are used (Croft et al. 2001:601):

(66) Bill wa hon no daikin to shite/to hikikae ni Harry kara
Bill TOP book as a price for/in exchange for Harry from
$5 o eta
$5 ACC get:PST
'Bill got $5 from Harry for the book.'

(67) Harry wa $5 de/to hikikae ni Bill kara hon o eta
Harry TOP $5 INST/in exchange for Bill from book ACC get:PST
'Harry got the book from Bill for $5.'

English *pay* and *sell*, however, construe the item to be possessed by the Subject participant (the goods for *pay*, and the money for *sell*) as the purpose of the event for the Subject participant (Croft et al. 2001:592–3). Hence the item is construed as a Subsequent Oblique with the *for* of purpose (pp. 587–8; this is the '*for* of benefit' of Jackendoff 1990:183):

(68) a. Bill paid $25 to Harry for a lawnmower.



b. Bill paid the shopkeeper for the port with his credit card.

Bill	⟶	credit card	-------	shopkeeper	-------	port
SBJ		A.OBL		OBJ		S.OBL [purpose *for*]

(69) Bill sold a lawnmower to Harry for $25.

Bill	⟶	lawnmower	-------	Harry	-------	S25
SBJ		OBJ		S.OBL		S.OBL [purpose *for*]

Purpose *for* and substitution *for* are distinct meanings. For example, the sentence *Randy obtained some food for his dog* is ambiguous between purpose *for* (Randy's purpose is to give the food to his dog) and substitution *for* (Randy traded his dog for some food; Croft et al. 2001:591).

In contrast, Japanese *uru* 'sell' and *harau* 'pay' construe the money and goods as substituting for each other—the same construal as found in (64), with the old-first construal. *Uru* uses the Antecedent *de*, while *harau* uses the Antecedent exchange postpositions (Croft et al. 2001:600).

(70) Bill wa Harry ni hon o $5 de utta
Bill TOP Harry DAT book ACC $5 INST sell:PST
'Bill sold the book to Harry for $5.'

Bill	⟶	$5	-------	book	-------	Harry
SBJ		A.OBL		OBJ		S.OBL

(71) Harry wa hon no daikin to shite/to hikikae ni Bill ni
Harry TOP book as a price for/in exchange for Bill DAT
$5 o haratta
$5 ACC pay:PST
'Harry paid $5 to Bill for the book.'

Harry	⟶	book	———	$5	-------	Bill
SBJ		A.OBL		OBJ		S.OBL

The commercial transaction event has many complex interactions among the participants, but each verb construes a portion of the event as a single causal chain. English and Japanese conform to the Causal Order Hypothesis (§6.2.1) and the possessum-first construal (§6.2.2). However, English consistently uses a new-first construal for the substitution/equivalence relation between money and goods, while Japanese equally consistently uses an old-first construal for the same noncausal relation. Also, English construes the item to be obtained as the purpose of the transaction in some constructions.

Obviously, further crosslinguistic data are necessary to uncover the range and limits in variation in construal of participant relations in commercial events.[3]

6.2.3.4 Summary The conflict between the cyclic force-dynamic relations and the directed acyclic requirements of argument structure constructions leads to alternative construals of certain event types that in turn gives rise to systematic patterns of crosslinguistic variation and diachronic change. The opposing but different types of force-dynamic relations between experiencer and stimulus lead to realization of one, the other, or even both as Subject or Object. The self-directed action of reflexive and reciprocal events leads to construal as either a two-participant event (Transitive construction) or a one-participant event (Intransitive construction), or even a mixture of the two. The argument structure constructions remain directed and acyclic, but there may be morphological coding of the self-directed nature of the event. The cyclic force-dynamic relations of an event with a comitative participant (and a third participant) give rise to alternative construals that in turn lead to two widely attested but different grammaticalizations of the comitative, to argument coordination and to instruments. Finally, the dense web of interactions of participants in the commercial event frame allows alternative construals with buyer and seller as initiator, and the items exchanged in a substitution or a purpose role.

6.3 Alignment, voice, and the verbal profile

6.3.1 Passive voice, ergativity, and alignment

Two common grammatical phenomena are generally considered to be problematic for the theories of argument realization described in §5.2. The first is the Passive voice and similar constructions, found in many languages. In the Passive voice, the Subject is a patient, theme, or other non-agent, non-effector thematic role. Moreover, in the English Passive, the agent may be expressed as an Oblique phrase: *The food was eaten by raccoons.* Since all of the theories of argument realization use agent or agent-like role semantics for realization as Subject, and a non-agent role is realized as Subject in the Passive despite the presence of an agent in the clause, thematic-role-based argument realization rules fail. As a consequence, all of the theories of argument realization that address Passive either stipulate a "marked" role designation device that makes

[3] Croft et al. (2001) also examine Russian, which has similar construals to English.

a non-agent role available for Subject realization, or treat Passive as a purely formal operation (lexical rule or syntactic movement rule).

This syntactic relation changing approach to the Passive does not capture the fact that in many languages, the Passive is much more restricted than the Active for verbal semantic reasons (Tsunoda 1981:397; Shibatani 2006:219), so that less affected Objects, in some sense of the term "affected", cannot be passivized. Even in English, some participants that are realized as Objects cannot occur in the Passive, as in **160 lb. is weighed by Fred* (denying that *160lb.* is the Object of *Fred weighs 160lb.* because it cannot be passivized begs the question).

Another serious problem with the special treatment of Passive in argument realization theories is the grammatical continuum between situations expressed by a Passive construction, such as *The window was broken (by vandals)*, and those expressed by an Intransitive or Anticausative construction, for the equivalent of *The window broke* in contrast to the Transitive *Vandals broke the window.* Passive situation types are given a special treatment because of the semantically required agent (which is grammatically optional or even prohibited); the special treatment suppresses the usual realization of the agent as Subject. Anticausative situation types, in which an agent is not semantically specified, is universally explained by the standard rules of the argument realization theory. However, in a number of languages a single construction is found for both passive and anticausative situation types. For example, Japanese has morphologically related Transitive/Intransitive pairs that fall into several classes depending on the morphological alternation (Jacobsen 1982:197–206). These pairs include both passive and anticausative intransitive situation types for the same alternation, such as *kudaku* 'smash'/*kudakeru* 'be smashed' and *oru* 'break (tr.)'/*oreru* 'break (intr.)' (for the *-e-*/*-Ø-* alternation; Jacobson 1987: 197). An even more serious problem (from the perspective of special treatment of passive situation types) is that in some languages, the same construction is used for both passive and anticausative situation types. In Bambara, most predicates may be Transitive or Intransitive; the Intransitive may denote a passive situation, as in *ò má fɔ́* [that not say] 'that wasn't said' or an anticausative one, as in *ŋɔ́*mi sìsira [fritter burn] 'the fritter burned' (Dumestre 2003:180–1). In Amharic, the prefix *tə-* is applied to verbs denoting transitive situations. The derived intransitive situation may be anticausative or passive, e.g., *gənəbba* 'build'/*tə-gənəbba* 'be built'; *səbbərə* 'break (tr.)'/*tə-səbbərə* 'break (intr.), be broken' (Amberber 2000:314–15). In such languages, there is no grammatical motivation to treat passive situations differently from anticausative situations. The only difference is the implied presence of an agent in a situation construed passively.

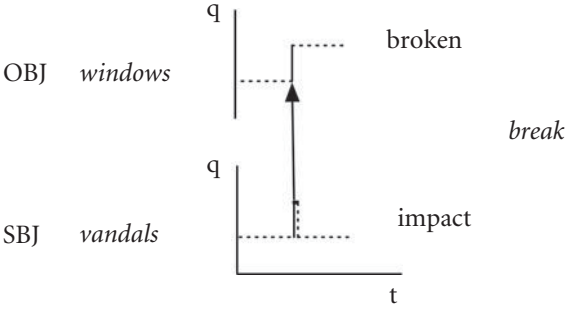
The second problem is the phenomenon of ergativity, in which the coding (case marking or indexation) of the transitive Subject (A argument) is distinct from that of the intransitive Subject (S), which in turn is identical to that of the transitive Object (P). Most attention has been focused on the languages in which so-called behavioral properties—that is, non-coding constructions such as Coordination and Relative clauses that make reference to a categorization of A, S, and P—also distinguish A from a category containing S and P. In §1.4, we argued that the distributional behavior of non-coding constructions is at best indirectly related to that of coding constructions, being sensitive to semantic and pragmatic factors particular to the non-coding constructions (e.g. pragmatic salience of participants in reference tracking; see also Croft 2001, chapter 4). This means that all languages with ergative case marking and indexation call for an explanation of their coding patterns. Since it appears that "Subject", qua A+S, does not apply to the coding pattern of such languages, then any argument realization theory that depends on Subject being defined as A+S will have difficulties accounting for ergative coding.

In fact, these two problems are interconnected, because Ergative coding systems in many cases (though not all; see Anderson 1977; Trask 1979; and §6.5) arise from Passive voice constructions (Hale 1970; Chung 1978; Trask 1979; Estival and Myhill 1988; Haspelmath 1990; for a dissenting view on Polynesian, see Kikusawa 2002). We begin with the origin of Passive constructions, and then their possible development into Ergative systems.

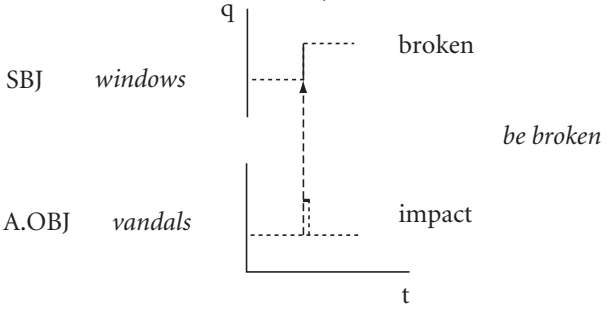
Haspelmath argues that the most common source of Passive is an "inactivizing" periphrastic construction combining a verb such as 'be' or 'become' with a participle that is generally resultative in meaning (Haspelmath 1990:38), such as *broken* in *a broken window* or *The window is broken.* Another common source is an Anticausative, that is, a verb form in which the agent is absent, and may not even be implied, as in *The window broke* (vs. *Vandals broke the window*; Haspelmath 1987). An Anticausative form may be derived in turn from a Reflexive form that has evolved to a Middle voice form (Haspelmath 1987; Kemmer 1993).

The grammaticalization process eventually allows the expression of an agent or external cause—Passive constructions in many languages prohibit expression of an agent, even if one is semantically presupposed. This grammaticalization process supports an analysis of the Passive as a change in the verbal profile of the causal chain, as in (72a–b):

(72) a. Vandals broke the windows.



b. The windows were broken by vandals.



In the Active sentence in (72a), the causal chain from agent to patient is profiled by the verb. In the Passive sentence in (72b), the causal chain is not profiled by the verb; the verb is Intransitive, and so only the patient participant is part of the verbal profile (Croft 1994*a*:56, 1998*a*:55–7). The agent is realized as an Antecedent Oblique, as expected since it is antecedent to the Subject in the causal chain (there is no Object of course), and the causal chain is only profiled by the Oblique case marking *by* (indicated by the dashed arrow).

The grammaticalization of an Ergative case marking is the extension of the verbal profile to the causal chain from agent to patient (or more generally, from initiator to endpoint), but the retention of the Ergative case marking distinguishes the Ergative Subject from a Nominative Subject found in a language like English. Ergative case marking is typically identical in form to the case marking encoding instrument or locative roles (the latter due to the space–causation metaphor; see §6.2.2). The Ergative, as a transitive "Subject" (A) role, is antecedent to the Object (Absolutive), and hence is an antecedent role, even if it has grammaticalized to encode the Subject role. The final step in the grammaticalization process is the loss of the former Oblique case marking.

The semantic changes in the entire process, going from an Inactivized Participle to Passive to Ergative to Nominative, is illustrated in (73) (cf. Croft 1998*a*:57; we represent only the causal chain for reasons of space):

(73) *Inactive > Passive > Ergative > Nominative grammaticalization: semantics*

Inactivized (resultative or anticausative)			patient
			SBJ
Agentless passive	agent	------►	patient
			SBJ
Agentive passive	agent	----►	patient
	A.OBL		SBJ
Ergative-absolutive pattern	agent	——►	patient
	ERG		ABS
Nominative-accusative pattern	agent	——►	patient
	NOM		ACC

The Passive voice can therefore be given a semantic characterization—the deprofiling of the causal segment from agent (initiator) to patient (endpoint). The grammaticalization process Passive > Ergative > Nominative can be interpreted as a gradual restoration of the causal chain from agent to patient: first in the semantic frame of the causal structure of the event, then to an Antecedent Oblique phrase, and finally to the causal chain as a whole when the Passive becomes the default Transitive construction and the case marking is construed as an Ergative Subject, in terms of the argument realization rules in (1) in §6.2.

The question remains, however, as to why a Passive would arise, and why it would then grammaticalize into an Ergative (and eventually, Nominative) construction. Many studies have demonstrated that the Passive is employed when the patient/endpoint is more topical in the discourse than the agent/initiator (e.g. the studies in Givón 1983). An inactivized construction deprofiles the agent and is then recruited for the topical endpoint discourse function. This process implies that the verbal profile of the causal chain is indeed partly determined by topicality (cf. Croft 1994*b*). Further evidence supporting this view is found in the evolution of Passive to Ergative. In this process, the Passive comes to be the "basic" Transitive construction of the language: the agent is realized most of the time, and the Passive comes to have the highest token frequency compared to other voice constructions. In other

words, the Passive construction has come to be used in circumstances where the agent has its usual highest-topicality discourse role. This is also represented as the profiling of the agent subevent and thus its force-dynamic relationship to the patient subevent. The contribution of discourse and event structure is mutual. Generally, the type of causal chain that is profiled dovetails with the choice of the most topical participants. We are interested in talking about persons and things not just for who they are but also for what kinds of things they do (or are done to them).

The analysis of the ergative pattern of coding arguments presented here integrates it into the argument realization rules in (1). The sense in which the realization rules refer to Subject and Object is only in terms of argument realization, not any non-coding construction or function (that is a matter for other analyses). The default Transitive construction defines the case marking and/or indexation pattern for the argument realization rules (compare the typological analysis of default voice in Croft 2001, chapter 8). What makes an ergative pattern different from the nominative pattern is the realization of the Intransitive Subject (S). If S is formally categorized with A, then the pattern is nominative; if S is formally categorized with P, then the pattern is ergative.

But this is not a problem for the argument realization rules in (1). The argument realization rules do not specify the realization of one-participant events: there is no profiled causal chain with one-participant (intransitive) predicates, as discussed in §6.2.3. Nor is this a defect in the realization rules. First, it accommodates both ergative–absolutive and nominative–accusative coding systems. Second, it predicts nonuniformity of the morphosyntactic coding of S arguments. And in fact that is what we find: not only do ergative systems exist in many parts of the world, so do active–inactive (or active–stative) systems of encoding arguments, in which some S arguments are coded like transitive Subjects (A) and some S arguments are coded like transitive Objects (P).

Unsurprisingly, there is significant crosslinguistic variation in which semantic classes of predicates resemble A or P in their coding. Croft (1998*a*) surveys the semantics of the active–inactive systems described in Holisky (1987), Gregores and Suárez (1967), and Mithun (1991), and identifies the following semantic classes of intransitive predicates that vary in argument realization (Croft 1998*a*:52):

(74) Controlled Activities: agentive processes, e.g. *run, dance, go out*, etc.
Inactive Actions (Holisky's 'locative statives'): *sit, stand, lie, hang, live, stay*, etc.

Bodily Actions: normally uncontrolled, e.g. *cough, sneeze, shiver, sweat*; some are more controllable e.g. *laugh, spit, urinate*

Other Uncontrolled Activities: e.g. *die, slip, grow, trip, get lost*, etc.

Dispositions: properties of actions that are also attributed to inherent traits of individuals: *proud, wise, evil, courageous, jealous*, etc.

Inherent Properties: construed as permanent unchanging properties of entities, e.g. *red, tall, round*, etc.

Inchoatives (of dispositions/properties): *become proud, wise, tall*, etc.

Transitory (Mithun's '+affect') States: stative properties that are temporary and thus have come about through some process, e.g. *sick, tired, old, cold*, etc.

The pattern of A vs. P coding of these semantic classes is quite variable. A multidimensional scaling analysis of the distribution of A-like and P-like coding of the S argument across these semantic classes yielded a good fit to a one-dimensional spatial model (93.5% correct classification and an APRE of 0.838; I am grateful to Keith Poole for carrying out the MDS analysis). The ranking is given in (75) (semantic classes on the same line were not ranked relative to each other by the MDS analysis):

(75) *most A-like*
Controlled Activities
Inactive Actions
Inherent Properties, Dispositions
Bodily Actions
Inchoatives
Uncontrolled Activities, Transitory States
most P-like

The MDS analysis indicates that the most important semantic factor determining realization as A-like or P-like is not aspectual: processes and states are scattered up and down the scale.[4] Instead, the major semantic factor is a causal one, namely control (Croft 1998*a*:53 arrives at the same conclusion without the MDS analysis). The event type over which the S participant has most control is controlled activities, followed by inactive actions. The event type over which the S participant has least control is uncontrolled activities and transitory states, which generally come about via an external cause or at least an internal cause not fully under the participant's control (e.g. being tired or old). The intermediate semantic classes are bodily actions, which vary in the degree of control that the S participant has over them, and inherent properties and dispositions (also construed as inherent), which are temporally stable and therefore neither externally caused nor controlled by the S participant.

[4] For this reason, I avoid the description of this alignment system as "active–stative".

Thus, alignment systems can be defined in terms of how intransitive arguments are grammatically assimilated to the causal structure found in events with more than one participant in their verbal profile (Croft 1998*a*:50–5). Active–inactive systems divide the participants according to degree of control over the event, so that S participants coded more like the A participant have more control, like a prototypical initiator of a causal chain, and S participants coded more like the P participant have less control, like a prototypical endpoint of a causal chain. The extreme case is coding all S participants like the A participant—a nominative–accusative system—or coding all S participants like the P participant—an ergative–absolutive system.

The causal model of argument realization provides a satisfactory account of the typological variation in alignment systems. However, it does not account for the differences in proportion of languages with each alignment system. The *World Atlas of Language Structures*, using unsystematic but worldwide samples, provides a picture of the relative frequency of the accusative, ergative, and active alignment systems. Data on case marking (Comrie 2005) and indexation (Siewierska 2005) are given in Table 6.4.

TABLE 6.4. Occurrence of alignment systems in the *World Atlas of Language Structures*

Alignment	Case marking of NPs		Case marking of pronouns		Indexation	
Neutral	98	53%	79	48%	84	25%
Accusative	52	28%	64	39%	212	62%
Ergative	32	17%	20	12%	19	6%
Active	4	2%	3	2%	26	8%
Total	*186*	*100%*	*166*	*100%*	*341*	*100%*

The predominant case marking of core arguments is in fact neutral—that is, no overt coding distinguishing the two arguments—while one quarter of languages lack indexation (the neutral role). A substantial proportion of the remaining languages display nominative–accusative alignment, with a significant minority of languages having ergative–absolutive alignment (more frequently manifested in case marking), and very few languages with active–inactive alignment (more frequently manifested in indexation). The predominance of nominative–accusative alignment, i.e. grouping S with A rather than P, probably derives from the conventionalization of typical topicality (see §5.2.2): A is most likely to be a human agent, and S is more likely to be a human participant than P. Since indexation is closely associated with topicality (Givón 1976; Croft 1988; inter alia), accusative indexation is more common than accusative case marking.

6.3.2 Voice systems, topicality, and the verbal profile

In §6.3.1, we presented a relatively clean view of voice and alignment systems. Passive voice constructions originate in an Intransitive construction which gradually (re)introduces an external initiator ("agent"), first as part of the event's semantic frame, then as part of the verbal profile of the event. The increasing prominence of the initiator role is interpreted as an increase in the topicality of the initiator and simultaneously an increase in the prominence of the initiator's subevent and its force-dynamic relation to the endpoint's subevent. If the initiator retains its Antecedent Oblique marking, then that marking is reinterpreted as an Ergative case marking. Finally, it was argued that one-participant event construals vary in terms of participant control, and that variation may be reflected in Subject-like vs. Object-like realization of the participant.

The reality of voice systems is far more messy, however. In addition to the "extreme" cases—an Active Transitive construction and an Intransitive Passive construction with an Antecedent Oblique initiator—there is a virtual syntactic continuum of construction types in between, with varying and mixed coding of initiator and endpoint as Subject, Object, or both. The range of this variation is documented in chapter 8 of Croft (2001). In this section, we will summarize the crosslinguistic variation in voice systems and its consequences for the force-dynamic model of argument realization.

Most of the voice constructions described in Croft (2001) contrast in the language with what is called there a basic voice construction. The primary criterion for defining a basic voice construction is text frequency and lowest degree of structural coding (i.e. the typologically unmarked construction type; see Croft 2003*a*:43–5, 87–101). Based on the parameters of crosslinguistic variation that are observed, the basic voice construction is also the one used in a situation in which a 1st and/or 2nd person initiator is acting on a 3rd person endpoint. This "animacy" orientation is a conventionalization of a topicality constraint such that the initiator is more topical than the endpoint in the prototypical situation type (see Croft 2001:315–18 and references cited therein). The reverse orientation, 3rd person initiator acting on 1st/2nd person endpoint, reverses the topicality of the two participants. The reverse orientation is characteristic of the use of Passive voice, in languages that have a Passive voice that fits the description in §6.3.1: the Passive voice is used when the initiator is lower in topicality than the endpoint (Givón 1983; Cooreman 1987; Thompson 1994).

The effect of "animacy", or at least person, is also associated with the so-called Inverse voice system. The canonical example of the Inverse voice is found in Algonquian languages. The Inverse voice is used when the inverse

orientation is found. However, the coding of the Algonquian Inverse voice differs from that of the Passive, in that the same core argument coding is used as in the basic voice (called Direct voice), but the role of initiator and endpoint are reversed. The examples in (76)–(77) are from Cree (from Wolfart and Carroll 1981:69; see Croft 2001:286):

(76) ni- wāpam -ā -wak
1- see -DIR -3PL
'I see them.'

(77) ni- wāpam -ikw -ak
1- see -INV -3PL
'They see me.'

Some so-called Philippine-type and Indonesian-type voice systems (Arka and Ross 2005:7) are structurally very similar to the Algonquian inverse in that the coding of initiator and endpoint are reversed in the two primary voice systems, as in the Cebuano examples in (78)–(79) (Shibatani 1988:88–9; AV = Actor Voice, GV = Goal Voice):

(78) ni- hatag si Juan sa libro sa bata
AV- give TOP Juan GEN book OBL child
'Juan gave the book to the child.'

(79) gi- hatag ni Juan ang libro sa bata
GV- give GEN Juan TOP book OBL child
'Juan gave the book to the child.'

The two voices illustrated in (78)–(79) are called Actor Voice/Focus/Topic and Goal/Patient Voice/Focus/Topic respectively. In the Actor Voice construction in (78), the initiator is coded as Topic and the endpoint as Genitive; in the Goal Voice construction in (79), the coding is reversed. Philippine-type voice systems also have other Voice forms that assign other participant roles to the Topic role. Indonesian-type systems are restricted to the two voices illustrated above, but usually have Applicative constructions (see §6.4.3) which realize other participant roles as Goal and thus topic (Algonquian languages also use Applicatives in the same way). The Goal Voice is generally required in Philippine-type voice systems if the endpoint is a definite, nonpronominal argument phrase (e.g. in Tagalog; Schachter 1977:281).[5] The Goal Voice is also typically more frequent and likely to have the initiator expressed, which

[5] Pronouns, though definite, do not override this constraint in Tagalog (*pace* Croft 2001:308, fn. 5).

makes it more like the basic voice of the language than the Actor Voice (Croft 2001:304–6).

Non-basic voice constructions vary across languages between the English Passive and Cree Inverse types. First, many voice constructions that are Passive-like (in that the endpoint is realized as Subject and the initiator as Antecedent Oblique) also have animacy constraints. Second, the endpoint retains some of its Object-like coding properties, and/or the initiator retains some of its Subject-like coding properties. In particular, the endpoint may retain Object-like case marking and the initiator may retain Subject-like case marking. Mixed coding also is attested: for example, in the Yurok Passive, the endpoint is case marked like an Object but triggers Subject indexation (Robins 1980:363; see Croft 2001:297):

(80) neto:ʔmar kelac nowkwoy -eʔm
my.friend 2SG.OBJ care.PASS -2SG.SBJ
'My friend cares for you.'

The greatest variation is in indexation patterns. The initiator often loses its indexation, and the endpoint often triggers Subject-like indexation, but in many languages the endpoint or (more rarely) the initiator triggers a special index marker different from both Subject and Object indexation (if any) in the basic voice.

The overall pattern of non-basic voice constructions across languages is that even in situations when the orientation of animacy or topicality to the transmission of force is inverted, the initiator does not always entirely lose its Subject realization, the endpoint does not always entirely lose its Object realization, and/or the participant is given a special coding (specifically, indexation) that is unlike either Subject or Object coding in the basic voice construction. One consequence of this is that realization rule (1b) in §6.2 cannot apply clearly to these voice constructions. There is no clear grammatical asymmetry in the coding of initiator and endpoint, except in cases where the initiator takes on Antecedent Oblique coding and/or the endpoint retains Object coding.

From the point of view of the realization rules, the most anomalous case is where the endpoint is coded at least partly like a Subject, e.g. in indexation or word order, but the initiator is not coded as an Antecedent Oblique—instead it retains its Subject coding, which is usually zero case marking (or Genitive marking in the anomalous Austronesian voice systems). The verb in the non-basic voice generally still profiles both initiator and endpoint subevents, and hence the force-dynamic relationship between them (so the Inverse-type constructions are generally considered to be grammatically Transitive). The

best analysis appears to be that realization rule (1b) is relaxed or even overridden by topicality considerations, including animacy and/or definiteness. That is, the force-dynamic asymmetry assumed in realization rule (1b) is not manifested directly in the coding of the two profiled participants in the non-basic voice construction, at least if it is assumed that the initiator is no longer the Subject in such constructions.

There is nevertheless evidence that the force-dynamic asymmetry between initiator and endpoint is indirectly manifested even in the languages with the most anomalous non-basic voice constructions. The notion of "direct" vs. "inverse" orientation of animacy and transmission of force presupposes that the force-dynamic relationship between the two participants is conceptualized as asymmetric, even if it is not overtly manifested in their case marking and indexation relative to each other. Also, there is evidence that the force-dynamic direction of initiator acting on endpoint is the typologically unmarked direction. Typological markedness refers to an asymmetric pattern of the coding of the values of a conceptual category. Two major grammatical properties are characteristic of typological markedness: structural coding and behavioral potential. In structural coding, the typologically marked value is encoded by at least as many morphemes as the typologically unmarked value, crosslinguistically. With behavioral potential, the typologically unmarked value exhibits at least as much grammatical behavior (typically, grammatical distinctions) as the typologically marked value, crosslinguistically. The basic voice form, reflecting the transmission of force relation from initiator to endpoint, is generally the typologically unmarked form (Croft 2001:318).[6] In this respect the force-dynamic asymmetry is only indirectly manifested in voice systems.

6.4 Causation type and diathesis (Causatives and Applicatives)

6.4.1 Causation type and the simple verb

In §5.3.1, we presented Talmy's (1976) classification of transmission of force into physical, volitional, affective, and inducive causation, and Croft's (1991) analysis of the four types of causation into physical or mental initiator and endpoint. We also argued in that section that there is not a sharp distinction

[6] Typological markedness is a typological universal for the encoding of conceptual structure that accommodates crosslinguistic variation, as with almost all typological universals. Typological markedness allows for languages in which structural coding or behavioral potential is equal. For example, in the Cree examples in (76)–(77), both Direct and Inverse voice forms are overtly coded.

between a physical initiator and an initiator exercising her/his mental capacity in the action. Instead, there is a spectrum from intentionally and deliberately exercising one's independent volition to bring about an effect on the endpoint, through actions under which an agent has varying degrees of control, to actions in which only physical causation is operating (e.g. *Jerry hit the table* meaning Jerry's body struck the table).

There is crosslinguistic evidence that volitional causation, or more precisely, an initiator using her/his mental capacities in carrying out the action—is the prototypical transmission of force type for simple verbs. Natural forces are often expressed by Antecedent Obliques. For example, in Russian, natural forces are normally expressed as Obliques in the Instrumental case, although it is not impossible for natural forces to be realized as Subjects (Maria Sotnikova, pers. comm.):

(81) Ego ubil -o molniej.
3SGM.ACC killed -3SGN lightning:INST
'Lightning killed him./He was killed by lightning.'

The verb form is in the Impersonal 3rd person Singular Neuter, while the endpoint of transmission of force is realized as Object.

In Guugu Yimidhirr, an accidental event caused by an inanimate object such as a knife also realizes the inanimate cause as an Antecedent Oblique (Haviland 1979:123):

(82) nganhi wagi -idhi naaybu -unh
1SG.ACC cut -RE.PST knife -INST
'I got cut on the knife.'

Unlike the English translation, the human endpoint of the event is realized as Object, though the verb form is Reflexive (construed as a one-participant event; see §6.2.3.2). Note that English prefers a *get*-Passive, or a Reflexive with an experiencer Subject as in *I cut myself on the knife* (the Guugu Yimidhirr direct translation of the latter would imply deliberate action on my part; Haviland 1979:123). The English simple Transitive *The knife cut me* sounds odd.

However, it appears that the problem in Guugu Yimidhirr (and possibly English) is not so much that the initiator is inanimate, but that a person, i.e. a being with mental capacities, is involved in the action but not controlling it. If the knife falls and strikes me, then the knife is realized as Ergative in a simple Transitive clause in Guugu Yimidhirr (Haviland 1979:125):

(83) nganhi wagi naaybu -unh
1SG.ACC cut.PST knife -ERG
'The knife cut me.'

DeLancey notes a similar phenomenon in Hare: if a person is involved in an action, even if not overtly mentioned, then an inanimate entity must be expressed using the Instrumental form: 'any degree of human involvement, however marginal, requires either [(84)] or a detailed description of exactly what happened' (DeLancey 1984:187):

(84) féku hé ye- wéhxį
gun with 3OBJ- killed
'S/he killed him/her/it with a gun.'

In other words, a person is assumed to be able to control an event in which s/he is involved, even if the event affects that person (as in the Guugu Yimidhirr example or its English translation).

Turning to endpoints, it appears that a physical endpoint, or at least an endpoint lacking control over the event, is the prototypical endpoint of a simple verb. The mental level endpoint of affective causation—the experiencer, in thematic role terms—is often realized in a Subsequent Oblique, typically Dative, case. This is common with mental state predicates: if there is a contrast in a language between experiencer realized as Subject and as non-Subject, the non-Subject realization is typically Dative, as in Punjabi (Onishi 2001:26; compare the Newari examples in DeLancey 1985:10):

(85) saa nüü gussaa aaiaa
we.OBL DAT anger.M come.PST.M
'We became angry.'

(86) asïï gussaa kiitaa
we.NOM anger.M do.PST.M
'We became angry (deliberately).'

As we observed in §6.2.3.1, in some languages realization of the experiencer in mental states varies depending on the control that the experiencer has over the situation, so that an experiencer with greater control is realized as Subject, and an experiencer with less control is not. But commonly (though not always), the experiencer with less control, or all experiencers, are realized as the Dative (Subsequent Oblique), not as Accusative (Object).

The case of inducive causation is more complex. In inducive causation, there are two participants with mental capacities. The mental level initiator is always realized as Subject. The role of the mental level "endpoint" is more complex. The mental level "endpoint" participant is affected by the initiator's action, but also may have control over the outcome to a greater or lesser extent. In other words, the transmission of force relation between mental initiator and mental endpoint is not as asymmetric as it is with a physical endpoint, and the two participants may be in near-symmetric causal roles.

The greatest extent of control, to the point of (near) symmetry with the initiator, is expressed by an antecedent comitative-like role, as was observed in §6.2.3.2. A lesser extent of control is realized by a Subsequent case marking such as Dative, as with situations of affective causation. For example, in Spanish, verbs of inducive causation generally express the endpoint in the Dative case (Butt and Benjamin 2004:255–6; Butt and Benjamin list many Spanish verbs of inducive causation which require Dative endpoints):

(87) Había ordenado retirarse a todas sus sirvientas
had.3SG ordered withdraw.REFL to all her ladies-in-waiting
'She had ordered all her ladies-in-waiting to withdraw.'
[A. Gala]

The English translation of (87), on the other hand, expresses the endpoint of inducive causation as an Object.

The Spanish example illustrates another aspect of relationship between transmission of force and realization of an event as a simple verb. Inducive causation is not typically realized as a simple verb. That is, the verb that realizes inducive causation does not actually describe the action that the endpoint of inducive causation performs. That action is expressed by another verb form—in an Infinitive, as in (87), or a Finite or Subjunctive Subordinate clause, or as a verb in a Serial Verb construction, and so on. Inducive causation—the subevents of both the initiator and the endpoint—is therefore less conducive to being realized as a simple verb.

The reason for this is that inducive causation is an example of indirect causation, and indirect causation is expressed by at least as complex a linguistic expression as direct causation (Haiman 1983:783–8). Direct causation involves a (relatively) direct interaction between initiator and endpoint, and that specifically excludes a mental level intermediary. Acting on a physical endpoint is the canonical example of direct causation. As we have seen, volitional causation is the prototypical transmission of force relation that is expressed as a simple verb, with participants encoded as Subject and Object.

Indirect causation also may lead to realization of the initiator as an Antecedent Oblique. For example, in Newari, (88) represents a more direct causation by Harsha and/or attribution of full responsibility to Harsha for the outcome of the event, whereas (89) would be used for an unintended and indirect act on Harsha's part (DeLancey 1984:195; see Croft 1991:154, 1998*a*:45–6):

(88) harsa -nɔ̃ wo misa -yatɔ siat -ɔ
Harsha -ERG the woman -DAT kill -PF
'Harsha killed the woman.'

(89) harsa -nɔ̃yana wo misa sit -ɔ
Harsha -"CAUSE" the woman die -PF
'Because of Harsha, the woman died.'

The English translations have the same grammatical difference for the same semantic purpose: in (88), Harsha is realized as Subject, and in (89), Harsha is realized as (Antecedent) Oblique. It seems plausible that a hierarchy of effectuation, with volitional agency at the top, would emerge from a more systematic crosslinguistic survey of Subject realization.

6.4.2 Causatives and inducive causation

The Spanish example in (87) is an example of a type of Periphrastic Causative construction. Periphrastic Causatives introduce another verb that profiles the causer's segment of the causal chain. The category of Periphrastic Causatives is usually restricted to a single general causative verb translated as 'make', but the range of inducive causation constructions represented by 'order', 'persuade', 'command', etc. are also causative, and they are also generally expressed periphrastically.

Morphological Causatives are morphologically complex but monoclausal expressions of an event which differs from the event denoted by base verb form by the addition of an antecedent causer to the chain. Morphological Causatives vary in the realization of the endpoint of inducive causation in ways familiar from the discussion in the preceding sections. When an Intransitive predicate is combined with a Morphological Causative form, a common argument realization is for the causer to be realized as Subject and the (former) Intransitive participant, the CAUSEE, is realized as Object. Example (90) illustrates this pattern for Turkish (Comrie 1989:175–6):

(90) a. Hasan öl -dü
H. die -PST
'Hasan died.'

Hasan
SBJ

b. Ali Hasan -t öl -dür -dü
A. H. -ACC die -CAUS -PST
'Ali killed Hasan.'

Ali ⟶ Hasan
SBJ OBJ

This pattern is straightforwardly accounted for in terms of the causal chain, as indicated by the causal chain representations in (90a–b): the causative verb profiles an asymmetrical relationship between the two participants, and the causer acts on the Intransitive participant.

However, this is not the only pattern observed for the Causative of Intransitive predicates. Cole (1983) provides a number of examples of languages in which Accusative (Object) realization of the Intransitive participant alternates

with Instrumental and/or Dative realization. In Hungarian, the causee is realized in Instrumental case if s/he has a greater degree of control over the action, but in the Accusative if the causer directly brings about the action of the causee (Cole 1983:124):

(91) Köhögtettem a gyerek -kel
cough:CAUS:1SG.PST the boy -INST
'I had the boy cough.'

(92) Köhögtettem a gyerek -et
cough:CAUS:1SG.PST the boy -ACC
'I made the boy cough.'

In Japanese, the causee is realized in the Dative case in 'agentive' situations (e.g. is willing to carry out the action), but in the Accusative case in 'non-agentive' situations (Cole 1983:125):

(93) Taroo ga Ziroo o ik-ase-ta
Taro NOM Jiro ACC caused.to.go
'Taro caused Jiro to go.'

(94) Taroo ga Ziroo ni ik-ase-ta
Taroo NOM Jiro DAT caused.to.go
'Taro caused Jiro to go.'

When a Causative construction is applied to a transitive predicate, two different verbal profiles are attested. In one type, the causee is realized as Object as in the Kinyarwanda example in (95) (Kimenyi 1980:164; see Croft 1991:242). The patient, formerly the Object, remains without Oblique case marking, a not uncommon result for derived three-argument clauses (see §6.4.3); it is glossed "OBJ" here.

(95) Umugabo a- ra- andik -iiš -a umugabo ibárúwa
man 3SG- PRS- write -CAUS -ASP man letter
'The man is making the man write a letter.'

man	⟶	man	⇢	letter
(causer)		(causee)		(patient)
SBJ		OBJ		"OBJ"

In the other type, the patient is realized as Object and the causee is realized as an Oblique. In some languages, the causee is realized as an Antecedent Oblique, with a case marker used for instrumental or agentive roles. This occurs in a number of languages, such as Hungarian (Cole 1983:123–4), Hua and Punjabi (Croft 1991:244), and Finnish (Comrie 1985:339). However, the

causee is also realized as a Subsequent Oblique, namely a Dative that is also used for the recipient function, as in Turkish and Chukchi (Comrie 1985:339). Still other languages vary in the realization of the causee, in the same way as described above for Hungarian and Japanese. Examples (96)–(97) are from Wanka Quechua (Cole 1983:118):

(96) nuqa Fan -ta rumi -ta apa -či -ni
I Juan -ACC rock -ACC carry -CAUS -1SG
'I made Juan carry the rock.'

(97) nuqa Fan -wan rumi -ta apa -či -ni
I Juan -INST rock -ACC carry -CAUS 1SG
'I had Juan carry the rock.'

In (96), both the causee and the patient (the rock) are realized as Accusative arguments.

Cole argues that the Oblique case choice for the causee depends on the degree of control of the causee over the outcome of the event: an Instrumental case represents a higher level of control, a Dative case an intermediate level of control, and an Accusative case little or no control (as is the usual situation for the Causatives of intransitive predicates). Most commonly, the Dative case is used for experiencer "causees", as in the following example from Wanka Quechua (Cole 1983:119):

(98) Nuqa runa -man rikhu -či -ni
I man -dat see -caus -1sg
'I showed it to the man.' [also *yaca-či* 'teach', *mikhu-či* 'feed', *yuya-či* 'remind']

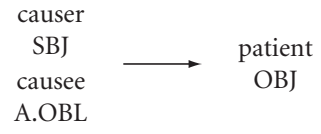
Thus, the expression of the causee is highly variable: in some languages it is an Antecedent Oblique, in some languages it is a Subsequent Oblique, and in some languages it varies in a semantically systematic way, sensitive to control. In particular, if a patient that the causee has acted on is present and realized as Object, realization of the causee as a Dative (Subsequent Oblique) challenges the Causal Order Hypothesis: the causee has acted on the patient but is realized as if it were subsequent to the patient. It can however be argued that in all cases, the variation is causally motivated.

The examples of Causatives of transitive predicates all involve an agentive causee. Hence the relationship of causer to causee is one of inducive causation. As we have seen, the causee/endpoint of inducive causation has an ambivalent position in the causal chain vis-à-vis the causer: the causee's control over the action may be greater or lesser.

If the causee is being more directly manipulated, so her/his role is construed as the endpoint of transmission of force, then an Accusative (Object) realization for the causee is semantically suitable where grammatically available. In some languages, such as Kinyarwanda, this is the only option for the realization of the causee.

Realization of the causee in an Antecedent Oblique form is most like the comitative antecedent role, especially for Causatives of one-participant events, as described in §6.2.3.2. Both causer and causee are volitionally involved in carrying out the action. Although the causer is the participant ultimately responsible for the outcome—and this is reflected in the causer's realization as Subject—the causee also shares in the execution of the action, as in (99) (compare (59) in §6.2.3, which gives the full three-dimensional representation):

(99) *Construal of causative event with causee realized as Antecedent Oblique:*



On this account, one would predict that where a semantic contrast is involved, a causee realized in an Antecedent Oblique case would exercise the greatest control over the outcome of the action. This is what Cole observes. In some languages, such as Hungarian, Hua, Punjabi, and Finnish mentioned above, this is the only option for the realization of the causee.

Realization of the causee in a Subsequent Oblique form causes an anomaly for the Causal Order Hypothesis if a patient is present. This construal appears to reflect the fact that the causee is less affected than the patient because it is the endpoint of inducive rather than physical causation, even if the causee is antecedent to the patient in the causal chain.

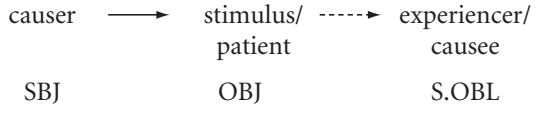
Kemmer and Verhagen (1994) propose an analysis in which Dative causee constructions are modeled on the donor–theme–recipient pattern of the transfer of possession, in contrast to Instrumental causee constructions which are based on the prototypical transitive agent–instrument–patient event. They argue that Dative realization of the causee represents its 'experiential affectedness', i.e. being the endpoint of affective or inducive causation (Kemmer and Verhagen 1994:135; see also Croft 1991:245).

An analysis that preserves the Causal Order Hypothesis, and also the nonbranching causal chain of lexicalized events, would be that the Dative causee construction represents a completely different construal of the causative event, such that the causer ultimately acts on the patient, and this causal event affects the causee. This appears to be the construal that Kemmer and

Verhagen argue for. Support for Kemmer and Verhagen's causee-as-affected analysis is the fact that Dative causees are most commonly found with experiencers of mental events that are being brought about by the causer, as in (98) and similar cases cited by Cole. Affective causation in a causal context generally construes the experiencer as subsequent to the stimulus, as described in §6.2.3. In these cases, the realization of the causee as Dative follows the prediction of the Causal Order Hypothesis, given the realization of stimulus as Object: experiencer is subsequent to the stimulus.

Then it must be argued that the causee may also be construed as subsequent to the patient or endpoint of the base verb event (if there is one) even in other types of events. This construal is partly motivated by the complexities of the causal interactions of causer, patient, and causee. The ultimate initiator of such an event is the causer. Although the causee is also the immediate initiator of the event acting on the patient, s/he is also affected by the fact that the event has been caused to take place by the causer. In other words, the causee is also the endpoint of affective causation by the outcome of the event (i.e. the subevent undergone by the patient). This alternative construal of the causal chain in a three-participant causative event is represented in (100):

(100) *Alternative construal of causative event with causee construed as affected by event:*



As noted above, this construal is straightforward for caused events with an experiencer causee. Realization of the causee as a Dative is also motivated since the causee is a mental-level endpoint of inducive causation, as argued in §6.4.1. The chief problem from the point of view of the Causal Order Hypothesis and the realization rules in (1) is the realization of the patient as Object. However, the realization of the patient as Object may actually be part of a more general anomalous pattern. This pattern is most clearly observed with applicatives and is described in the next section.

6.4.3 Applicatives and Base Object Inertia

An Applicative construction is generally defined as a morphologically complex verb form that realizes a participant role as Object that is not realized as Object in the base verb construction. By far the most common applicatives involve the subsequent roles of beneficiary and recipient (Peterson 2007:202), as in example (101) from Kinyarwanda (Kimenyi 1980:31; see Croft 1991:240):

(101) umukoôwa a- ra- som -er umuhuûngu igitabo
girl 3SG- PRS- read -BEN boy book
'The girl is reading the book for the boy.'

girl ⟶ book ⟶ boy
SBJ "OBJ" OBJ

As with the Kinyarwanda Causative example in (95), the argument formerly realized as Object in the basic verb form is left without overt coding in the Applicative form in (101). In many languages, the Applicative construction for beneficiaries and/or recipients is obligatory (Peterson 2007:46). In other words, the beneficiary/recipient is always realized as Object. The other endpoint participant, if there is one, is either also realized as Object in a Double Object construction, or realized with an Antecedent Oblique form, as would be predicted by the Causal Order Hypothesis (see the Central Sierra Miwok examples (20)–(21) in §6.2.2). These realization patterns are also found with verbs that inherently have a recipient participant role, such as transfer of possession verbs (§6.2.2), but do not have overt morphological coding of a recipient Applicative. This is another example of the common phenomenon that what is overtly coded with derivational morphology in one language is zero coded in another language.

Applicatives can also be formed that allow the realization of other roles as Object, including antecedent roles such as comitative and instrumental. Many languages have a single Applicative form no matter what the participant role is, or what the change in verbal profile is (Peterson 2007:43–5)—the Applicative and Causative are also often the same in such languages (pp. 64–6). This type of Applicative/Causative is similar to the type of case system in which there is a single Oblique case marking that covers both antecedent and subsequent participant roles.

In some languages, such as Kinyarwanda, Malay, and Dyirbal (Croft 1991:242), the Instrumental Applicative affix is identical to the Causative affix. This fact is not surprising in terms of the causal chain analysis. The verbal profile of the causal chain for the Kinyarwanda Instrumental Applicative in (102) is identical to that for the Kinyarwanda Causative in (95) in §6.4.2 (Croft 1991:242–3; example from Kimenyi 1980:164):

(102) Umugabo a- ra- andik -iiš -a ikárámu ibárúwa
man 3SG- PRS- write -INST -ASP pen letter
'The man is writing a letter with a pen.'

man ⟶ pen ⇢ letter
(agent) (instrument) (patient)
SBJ OBJ "OBJ"

Peterson suggests that Causatives grammaticalize into Comitative and Instrumental Applicatives (Peterson 2007:135–8). This corresponds to the shift in the construal of causee as symmetric participant in the event with the causer (like the comitative) to construal of causee as an asymmetric participant (like the instrument). Peterson also suggests that Causatives derived from 'give' verbs may grammaticalize into Beneficiary/Recipient Applicatives (pp. 133–5). This grammaticalization path, if it is correct, supports the Kemmer-Verhagen analysis of Dative causee constructions as an alternative construal of the causee as affected by the outcome of the causative event (see §6.4.2).

It was noted above that when an Applicative or a Causative is formed from a two-participant base verb whose endpoint participant is realized as Object, the base verb endpoint is often realized as Object. That is, the base verb endpoint has the case marking and sometimes the indexation of an Object. If the causee in a Causative construction is realized as Object as well, or as a Subsequent Oblique, then the argument coding does not follow the Causal Order Hypothesis, or at best represents an unusual construal of the causal structure of the event. If the subsequent participant is realized as Object in an Applicative construction, and the base verb endpoint is still realized as Object, then it is again unexpected based on the Causal Order Hypothesis. Peterson reviews the so-called object properties of base verb endpoints and Applicative Objects (Peterson 2007:51–60), and observes crosslinguistic variation even in which argument is indexed on the verb, which we have treated as part of argument realization. The most problematic examples from the point of view of the Causal Order Hypothesis is the Passive of an Applicative, such as the Chichewa example in (103) (p. 53, from Alsina and Mchombo 1993:23):

(103) atsikana a- na- gul -ir -idwa mphatso
cl2.girls 2sbj- pst- buy -appl -pass cl9.gift
'The girls were brought a gift.'

The possessor is realized as Subject and the possessum as Object, the opposite of what is predicted by the realization rule (1b) and the construal of possessum as antecedent to possessor (§6.2.2).

While all of these phenomena are problematic for the Causal Order Hypothesis to a greater or lesser extent, all of them may simply be instances of just a single general phenomenon. This phenomenon may be described as Base Object Inertia: no matter how the verb derivation adds participants to the causal chain, the participant realized as Object in the base verb argument structure construction remains realized as Object—in case marking, and sometimes also in indexation—in the argument structure of the derived construction. In some situations, this leads to Double Object coding in both Causatives and Applicatives, and sometimes a "reversal" of the causal

order of participants. But these anomalies arise simply because Object coding of the endpoint of the base verb is an independent phenomenon resistant to the changes in argument structure necessitated by the addition and profiling of new participants to the event denoted by the base verb.

Base Object Inertia does not follow the realization rules in (1). The realization rules in (1) are relative mapping rules (see §5.2.3): realization is relative to the verbal profile and the Object argument role that the verbal profile defines. Base Object Inertia is an absolute mapping rule: the endpoint of the base verb is realized as Object no matter what other arguments are introduced by morphological derivation, and no matter what changes to the verbal profile they imply. Base Object Inertia, however, is almost entirely restricted to derived verb forms. The only exception to this generalization is Ditransitive base verbs. For example, the same "reversal" of the causal order of Subject and Object participants in the Chichewa example (103) is found in its English translation. The occurrence of Base Object Inertia in underived Ditransitives is further evidence that underived Ditransitives are more like Applicatives than like simple verbs.

Although Base Object Inertia does not follow the realization rules of (1), it may be motivated by the simple verb prototype introduced in §6.4.1. In the simple verb prototype, the best examples of the endpoint of a verbal profile are physical endpoints. The participant realized as Object in the base verb argument structure is a physical endpoint. Hence it is at least as good an Object of the verb from the perspective of verbal semantics as the participants that usurp its Object status. It is certainly more prototypical than mental-level endpoints such as causees, comitatives, recipients, and beneficiaries (though see §7.4.2).

Base Object Inertia can be compared to what we observed in Inverse and Philippine-type voice systems. There, the agent (base verb initiator) participant is sometimes realized in the same way in the Inverse-like voice form—as a core argument in terms of case marking (or lack thereof)—and sometimes is even indexed as it would be in the basic voice form. Conversely, the endpoint retains some of the Object coding it would have had in the basic voice form. The result in both cases is that the argument structure is not always reorganized to reflect the causal chain implied by the profile shift that occurs in the voice, causative, or applicative derivation.

6.5 The typology and diachrony of case syncretisms: toward a conceptual space for participant roles

The metaphors and construals presented in the preceding sections allow us to present a more comprehensive analysis of the semantic roles that are subsumed under Antecedent and Subsequent roles in Table 6.5.

TABLE 6.5. Summary of major Antecedent Oblique and Subsequent Oblique semantic roles

	Causal roles	*Spatial metaphor*	*Noncausal roles*
Antecedent Oblique	passive agent, cause, comitative, instrument, manner, means	ablative	figure, possessum
Subsequent Oblique	result, beneficiary, "maleficiary"	allative	ground, possessor, recipient

Recent studies of the coding of subsequent semantic roles confirm this grouping and allow us to refine the relationships among subsequent roles. Haspelmath (1999, 2003) gives a conceptual space (called by him a semantic map) for 'dative functions' based on a crosslinguistic survey (the number of languages examined is not given). The argument role functions included are recipient, experiencer (see §6.2.3 for experiencer as a subsequent role), beneficiary, purpose (not a causal role; see next paragraph), and what he calls 'judicantis' (the role expressed by the *for* phrase in *That's too warm for me*; see §5.3). Haspelmath's 'dative functions' correspond to our Subsequent Oblique roles. On the plausible assumption that the allative spatial role is the diachronic source of the Subsequent case markers, Haspelmath's study indicates that purpose is a separate extension of the allative from the other functions, which cluster together.

Rice and Kabata (2007) survey polysemy patterns with the forms encoding the allative role in a sample of forty-four languages. They initially define thirty-three roles, including nonclausal functions such as subordinator. The case markers cover a wide range of roles, including antecedent as well as subsequent roles. However, the subsequent roles are found with the Allative case marker much more frequently than the antecedent roles, as seen in Table 6.6 on p. 276, where subsequent roles are in boldface, antecedent roles in italics, and other roles in roman (Rice and Kabata 2007:473–4; not all of their roles are listed).

Rice and Kabata also identify clusters of roles extended from the allative role that are themselves typically coded together—that is, roles that are likely to be extensions from the primary extensions to the allative role (see in particular Figures 19 and 21 and the discussion in Rice and Kabata 2007:490, 494). Like Haspelmath, they identify an extension from the allative to the recipient, addressee, and beneficiary. However, unlike Haspelmath, they identify a separate extension from the allative to experiencer and stimulus roles for cognition, perception, and emotion predicates (see also §6.2.3). Rice and Kabata identify a separate extension from the allative to the purpose role,

TABLE 6.6. Frequency of syncretism of participant roles with the allative role

Participant role	*Frequency*
purpose	46%
cognizer/stimulus	35% [see §6.2.3 for these roles as subsequent roles]
recipient	34%
Locative	32%
addressee	25%
perceiver/stimulus	22% [see §6.2.3 for these roles as subsequent roles]
Reason	21%
beneficiary	17%
possessor	15%
experiencer/ stimulus	12% [emotions; see §6.2.3 for these roles as subsequent roles]
ablative	11%
manner	11%
Result	9%
instrument	9%
Passive agent	8%
Human source	8%
Causee	7% [see §6.4.2 on the ambivalent status of this role]
comitative	2%
accusative	2%
ergative	2% [see §6.3.1 for this role as an antecedent role]

confirming Haspelmath's conceptual space in this regard, and further extensions from the purpose role to the result and reason roles.

Finally, Rice and Kabata identify an independent extension of purely spatial meaning from the allative to the locative and thence to the ablative role. In a typological survey of allative, locative, and ablative coding, Creissels states that the only common semantic maps for these three spatial roles are: all three distinct; allative paired with locative; all three the same (Creissels 2006:22). Creissels's typology is compatible with either a semantic change starting with allative and extending to locative and then ablative, as argued by Rice and Kabata, or starting with locative and extending to allative and (separately) ablative. We return to these paths of semantic change below.

The reason role provides an account for why the cause role is sometimes encoded with a Subsequent Oblique case marking. The purpose role is not a causal role: it represents an intention on the part of the agent of the verbal event (Croft 1991:190, fn. 6). On the intentional plane, though, the purpose role is a subsequent role. A purpose is an entity involved in an event

subsequent to the one profiled by the verb, which the verbal event is intended to bring about. The reason role is not causal either. But unlike the purpose role, the reason role can represent an antecedent cause (*I did it because I was angry*) or a subsequent purpose (*I did it because it would earn me frequent flyer miles*). Thus, the extension of a Subsequent Oblique marker to the purpose role may lead to further extension to the reason role due to semantic overlap (Heine 1990:133), and thence to the cause role, a causal antecedent role.

In Turkish and Konda, the two languages in the Croft (1991) sample that display this anomalous pattern, the Subsequent Oblique marker extended to the cause role also includes the purpose role in its meaning (Croft 1991:238, 239). The same is true of Ik and Kanuri, two Nilo-Saharan languages with this pattern discussed by Heine (1990). Heine also notes an extension of the Subsequent Obliques in these two languages, which originates in the spatial Allative marker, to the manner role via the reason role; this may account for the anomalous allative–manner syncretism noted in Table 6.2 in §6.2.1. The purpose–reason–manner grammaticalization path, via the noncausal purpose and reason roles, may be the cause of the breakdown of the Subsequent–Antecedent Oblique contrast in aging case marking systems. Luraghi concurs with this analysis of the syncretism of purpose to cause via the reason role but suggests that the direction of diachronic extension may also go from reason to purpose (Luraghi 2001:45–9).

Rice and Kabata analyze only the syncretisms of participant roles with the allative role. Therefore, their study excludes syncretisms among (mostly subsequent) roles that do not also include the allative. The same is true of Stolz's (1996, 2001) study of several antecedent and other roles in a 323-language sample. Stolz looks only at semantic extensions from a particular semantic role, or more precisely two roles, comitative and instrumental. Stolz focuses on a non-typological claim that comitative and instrumental are always expressed in the same way (Lakoff and Johnson 1980:135). Stolz shows that in fact only a minority of languages express comitative and instrumental with the same form.

Stolz uses this fact also to question the connection made between these two roles in Croft (1991). However, this is only because the comitative form and instrumental form rarely share in any polysemies among the roles Stolz examines in his sample in the majority of the languages. In the data in the appendix to Stolz (1996), the comitative does not participate in any polysemies in 49 per cent of the instances of case forms (some languages have more than one form for the roles examined), and the instrumental does not participate in any polysemies in 34 per cent of instances. For instance, among the much greater number of functions studied by Rice and Kabata, the most common polysemy occurs only 46 per cent of the time. Stolz does not

differentiate between Lakoff and Johnson's non-typological, narrowly-defined unrestricted universal—all languages use the same form for comitative and instrumental roles—and my typological, broadly defined implicational universal—if the form for an antecedent participant role is used for another participant role, the latter role will also be an antecedent role.

In fact, the most common roles to share a form in Stolz's sample are the comitative and instrumental (Stolz 1996:164–5; see Table 6.7), confirming the typological implicational universal.

TABLE 6.7. Frequency of syncretisms with the comitative and instrumental roles

Argument roles sharing	*Frequency form (pairs of roles only)*
comitative-instrumental	33%
instrumental-locative	24%
comitative-AND	15%
instrumental-ergative	8%
comitative-possession	8%
comitative-locative	3%
instrumental-possession	3%
instrumental-agentive	2%
instrumental-AND	2%
instrumental-benefactive	1%
comitative-benefactive	0.3%

Stolz includes the following functions in his analysis: comitative, instrumental, agentive, ergative, and causee, all but perhaps causee being antecedent roles (see §6.4.2 on the causee role); beneficiary, a subsequent role; locative, a spatial role; possessive; and the argument conjunction AND. The argument conjunction is not a causal participant role (for the grammaticalization of comitative to argument conjunction, see Stassen 2000 and §6.2.3). In discussing the possession role, Stolz does not distinguish between possessor and possessum roles. The possessor is coded with a Subsequent marker in the Locational type and the possessum is coded with an Antecedent marker in the With type. Stolz's data combines antecedent and subsequent roles, hence we must leave that function aside.

In Stolz's database, syncretisms are overwhelmingly found among the antecedent roles. In a count of all the polysemies involving the aforementioned antecedent and subsequent roles in the data appendix to Stolz (1996), case forms with syncretisms among only antecedent roles totaled 124. If we add syncretisms that include the locative spatial function, commonly extended to the instrumental role, the number of case forms with antecedent syncretisms rises to 238 (69 of which are of locative and instrumental only). In

contrast, case forms with syncretisms including the subsequent beneficiary role totaled 8.[7]

Stolz further observes that the agentive, ergative, and locative roles are associated more closely with the instrumental, while the argument conjunction is associated more closely with the comitative. Stolz (2001) formulates the relationship between locative, instrument, comitative, and predicative possession (of the With type; see §6.2.2) as essentially a linear conceptual space, with some roles acting as 'bridging functions' between other roles:

(104) *Stolz's 'bridging functions':* With possession – comitative – instrument – locative

Lehmann presents a general pattern of diachronic processes of grammaticalization of the case marking of antecedent and subsequent roles, given in Figure 6.1 (Lehmann 1982/1995/2002:99).

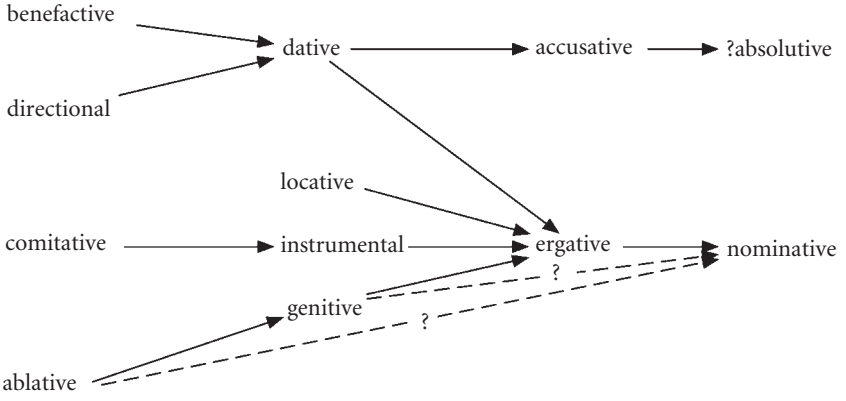


FIGURE 6.1. Grammaticalization paths of case marking among participant roles (based on Lehmann 1982/1995/2002:99).

The antecedent–subsequent semantic distinction is maintained in the grammaticalization of case markers. This fact should not be surprising since the synchronic polysemy (syncretisms) presented in Tables 6.1–6.2 in §6.2.1, and in the studies by Haspelmath, Rice, and Kabata, and Stolz in this section, is the result of diachronic processes. For example, we observe the Spaces⇒ Causation metaphor in Figure 6.1, with Directional (Allative) grammaticalizing into the subsequent dative role, and the Ablative grammaticalizing into the Genitive and then to the Ergative, which functions like an Antecedent case

[7] I presume that other subsequent roles were not represented in Stolz's survey because they rarely if ever occur with the comitative and instrumental roles.

marking because it is antecedent to the Object referent (see §6.3.1 on the Ergative and its grammaticalization to a Nominative).

The one exception to the sharp division between antecedent and subsequent roles is the Dative > Ergative pattern. This is the result of the grammaticalization of a Possessive construction (with Dative possessor construal) into a Perfective Ergative construction (Anderson 1977; Trask 1979; Lehmann 1982/1995/2002:98; Haig 2008), a process presumably related to Have-drift (§6.2.2). Subsequent Oblique forms may grammaticalize into Accusative (Object) forms, generally via a process by which Objects of higher animacy and/or definiteness take on Dative coding, presumably by semantic extension from the overwhelmingly human and definite recipient and beneficiary roles (Comrie 1979; Croft 1988; Lehmann 1982/1995/2002:97; inter alia; this pattern is now called 'differential object marking' or DOM).

Luraghi proposes a more general conceptual space (called by her a mental map) combining the spatial roles, the causal roles, and the intentional roles, based on data from Indo-European. Figure 6.2 presents Luraghi's conceptual space, along with additions and modifications based on the crosslinguistic research discussed in this section, and reorganized to make its semantic structure clearer (adapted and modified from Luraghi 2001:50, including the reason role she discusses on page 46 but leaving out the perlative).

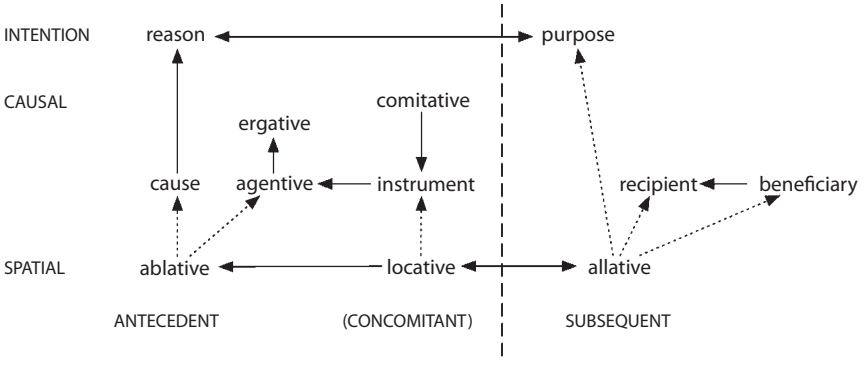


FIGURE 6.2. A tentative conceptual space for participant roles.

In Figure 6.2, the spatial, causal, and intention roles are separated on the vertical dimension. The horizontal dimension represents the direction of transmission of force (the causal chain). The Space⇒Causation Metaphor linking spatial roles to causal and intention roles is represented by dotted arrows. To Luraghi's conceptual space, we have added a connection from locative to ablative, observed by Rice and Kabata, and a connection from instrument to agentive and ergative, observed by Stolz. The conceptual space

in Figure 6.2 indicates two ways in which antecedent and subsequent roles may be combined in a single case form: via an allative–locative syncretism, also observed by Rice and Kabata, and via a purpose–reason syncretism, whose semantic motivation is discussed above. There is, however, no direct connection between antecedent and subsequent causal roles, in conformity with the Causal Order Hypothesis (however, see the Dative–Ergative path discussed above, and the ambivalent role of causee discussed in §6.4.2).

In sum, larger-scale crosslinguistic studies have confirmed the importance of the Antecedent–Subsequent Oblique distinction in case systems, thereby confirming the Causal Order Hypothesis. In addition, these larger-scale studies have specified the structure of the conceptual space of participant roles in finer-grained detail than is implied simply by the antecedent–subsequent role distinction. The conceptual space proposed in Figure 6.2 reflects the transmission of force (causal chain) model presented in this chapter. Nevertheless, the boundary between Antecedent and Subsequent Oblique forms is generally adhered to, although there are subtler patterns of syncretism among antecedent roles and among subsequent roles; and although there are paths of semantic change outside the causal domain (in the spatial and intentional domain) by which a case form may acquire functions across the antecedent–subsequent divide.

6.6 Conclusion

The verb or main predicate in an argument structure construction profiles interactions among the participants construed as a causal chain, that is, a directed, acyclic, and nonbranching graph structure. Languages with multiple Oblique case markings (case affixes or adpositions) generally divide them into Antecedent and Subsequent categories, respecting the relative position of the encoded participant role in the causal chain. Participant interactions that are undirected (i.e. noncausal) and cyclic (in various ways) are construed as directed and acyclic in conformity with the construal implied by argument structure constructions. Evidence from typology, language acquisition, and diachronic change supports the reality of the Antecedent–Subsequent Oblique distinction as a psychologically real language universal.

As with aspect, the construal of events plays a major role in shaping the grammatical patterns of argument realization across languages. Many events are causally undirected, cyclic, and/or branching. They are construed as directed, acyclic, and nonbranching in argument realization. Some patterns of construal, such as treating figure–ground and possessum–possessor as directed relations, are crosslinguistically widespread if not universal. Other event types, such as mental events and reflexive and reciprocal events are

construed in different ways (sometimes in a single language). The patterns of variation reflect the difference between our experience of the event type and the causal chain construal found in argument structure constructions.

The most prototypical transmission of force relationship that is profiled by a simple verb in a canonical Transitive argument structure construction is by an initiator with mental capacities exercising her/his control acting on a physical endpoint. Other types of transmission of force relationships may be encoded by an Oblique initiator and/or an Oblique endpoint, or by a morphologically complex predicate type. Inducive causation is least likely to be realized by a simple verb in a canonical Transitive construction, because both participants are controllers of the outcome to a greater or lesser extent. Instead, complex Causative constructions are used, with the endpoint of inducive causation expressed in a variety of grammatical roles depending in part on its construed degree of control. Other participants may also be realized as the verbal endpoint (Object), particularly mental-level roles such as recipient, beneficiary, and comitative. Again, though, these are usually realized with morphologically complex constructions such as Applicative constructions. Even so, the base verb endpoint is often still realized as Object, at least in case marking if not in indexation or word order, a phenomenon described here as Base Object Inertia.

The constraints on the verbal profile—and thus, realization of certain participants as Subject and Object—described in this chapter pertain mainly to the causal or force-dynamic structure of events. In the next chapter, we describe constraints on the verbal profile in which aspectual structure as well as causal structure plays a role.

7

The interaction of aspect and causal structure in verb meaning

7.1 Introduction

In chapter 6, we explored the complexities in the construal of force-dynamic interactions for realization in simple clauses. There it was argued that events are construed as causal chains for argument realization and that the prototypical simple verb profiles volitional causation.

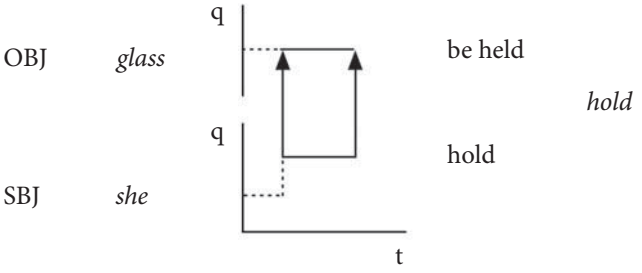
In this chapter, we bring aspectual structure back into the picture. Although the primary determinant of argument realization appears to be causal relations among participants, aspectual structure plays a significant role in determining the verbal profile. This is particularly important for the analysis of events with multiple participants and their subevents. The three-dimensional representation allows us to represent both the causal chain and the fine-grained aspectual structure presented in chapters 2–4, and their separate contribution to verb meaning and argument realization.

7.2 Inactive actions and noncanonical force dynamics

The combination of aspect and causal structure allows us to represent some of Talmy's less prototypical force-dynamic types. Verbs of holding (*hold, grasp, maintain, support, contain*, etc.) are examples of Talmy's extended causation of rest (§5.3.1): the initiator causes the endpoint not to move or undergo any other change of state. Extended causation of rest is an instance of an aspectually problematic category, inactive actions (§§2.3.2, 3.2.2). Inactive actions are events that intuitively are stative but allow the Progressive in English. Inactive actions have been analyzed sometimes as states and sometimes as processes; we have analyzed them as states.

Extended causation of rest can be represented as in (1):

(1) She held the glass.



In (1), the application of force by the initiator (she) results in the absence of any change in the endpoint (the glass). The event is stative but force-dynamically non-neutral.

Posture verbs (*sit, stand, lie, hang, lean, protrude*, etc.) are like verbs of holding in that they are also not force-dynamically neutral. However, they are not always construed as two-participant events. In some languages, posture verbs are grammatically Reflexive, with a second participant (see §6.2.3.2), in which case the event structure representation is identical to that in (1). In other languages, including English, posture verbs are construed as one-participant events, with or without a Middle marker indicating their self-affected semantic character (§6.2.3.2). This construal is common because it is the animate being itself that is maintaining its posture, or in the case of inanimates, the posture is maintained by an invisible force such as gravity or attachment to another object. If the posture verb is construed as a one-participant event, then there is no force-dynamic interaction. In §6.2.3.2, we argued that all one-participant events involve something happening to the one participant, construed as internally caused or at least not externally caused; one-participant events differ causally depending on the control of the participant over the event, which is sometimes reflected in split marking between Subject and Object encoding. We concluded there that the force-dynamic character of one-participant events must be captured by the specification of the qualitative states of the one-participant event in the *q* dimension.

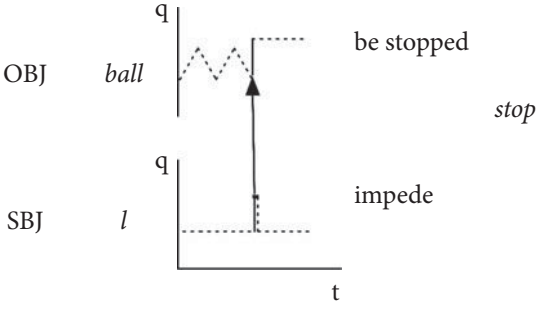
Although both holding verbs and posture verbs are not force-dynamically neutral, they frequently grammaticalize into force-dynamically neutral stative verbs, 'have' and locative 'be' respectively (see Stassen 2009:62–4 for hold/grasp verbs > 'have', and Stassen 1997:57, 60–1 for posture verbs > locative 'be'). These common grammaticalization paths suggest that the correct analysis for holding and posture verbs in at least some languages is with a stative, albeit force-dynamically non-neutral, aspectual construal.

The same analysis can be given for verbs of directing attention (*aim, guard, watch*) and certain other mental verbs. In §6.2.3.1, following Croft (1993), we argued that mental events involve two directions of transmission of force: the

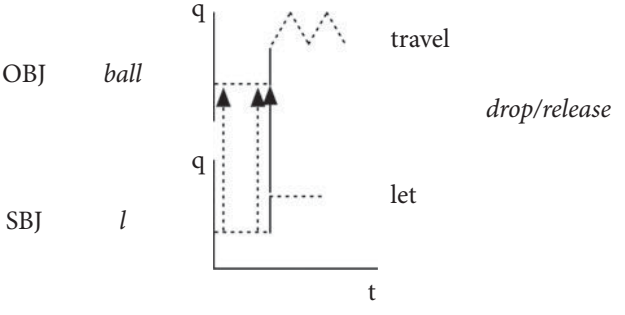
experiencer directs her/his attention to the stimulus, and the stimulus brings about a mental state in the experiencer. Verbs of attending and other mental processes (*look at, listen to, think about*, etc.) profile the directing of attention to a stimulus. The "action" is not physical, and arguably not a process, but it is consistently realized across languages with an experiencer Subject construction. Attending to something appears to be generally construed as transmission of force from the experiencer to the stimulus.

Talmy's other noncanonical force-dynamic types involve (in Talmy's terms) an Agonist with a tendency towards action, or letting causation, or both. The simple verb examples of these three types, examples (46d–f) in §5.3.1, are represented in (2)–(4):

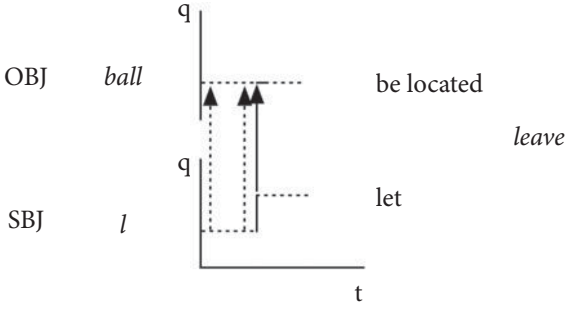
(2) I stopped the ball.



(3) I dropped/released the ball.



(4) I left the ball.



The event structure of (2) differs from the canonical event structures in that the unprofiled phase preceding the verbal profile for the endpoint (the ball) is not a rest state, but a "rest activity"—this is the Agonist's tendency to motion, in Talmy's terms. The event structures in (3) and (4) differ from the canonical event structures in that the rest state is actually extended causation of rest that then terminates on the instigation of the initiator. The profiled force-dynamic relation in (3)–(4) is different from the unprofiled force-dynamic relation that precedes it temporally: the profiled relation is letting causation, while the unprofiled relation is canonical force (albeit applied to prevent a change occurring in the endpoint).

As we noted in §6.5, the force-dynamic component of the three-dimensional representation does not differentiate different types of force-dynamic relations (canonical force, letting, helping, hindering). However, the difference in force-dynamic types is manifested in the semantic frame of the event, in the rest phase. In (2), the rest phase for the ball is not a state. In (3)–(4), the rest phases for the agent and the ball are states, but they are force-dynamically related. We can conclude that almost all typical simple verbs denote events in which the rest phases of the participant subevents are states and do not interact force-dynamically with each other. Very few simple verbs encode anything other than canonical "billiard-ball" force dynamics. As usual, it is only motion/location (in English) that allows the lexicalization of the noncanonical letting causation in a simple verb.

7.3 The aspectual type and temporal unity of simple verbal events

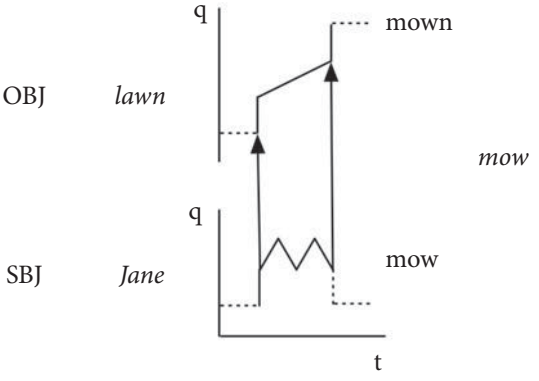
The three-dimensional representation introduced in chapter 5 decomposes the event into causal subevents along the third "dimension" (actually, a directed, acyclic, unbranching graph structure). Each subevent has its own aspectual profile, which is extended or not in the temporal or qualitative dimensions. In a complex event lexicalized by a simple verb, each participant has its own subevent, and each subevent has its own aspectual contour. However, the overall event has its own aspectual type, that is, the verb in a particular tense–aspect construction is construed as having a particular aspectual type. What is the relationship between the aspectual type of the verb + tense/aspect construction and the aspectual types of the subevents that make up the verbal profile?

The principle governing the aspectual behavior of the verbal segment appears to be that the aspectual type of the overall event is the type of the subevent that ranks highest in the hierarchy in (5):

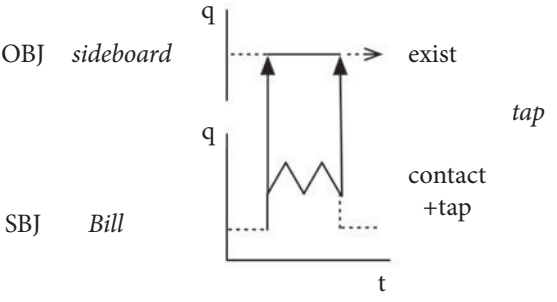
(5) *Verbal Aspectual Hierarchy*: directed change > undirected change > state

Examples of the aspectual hierarchy in operation are found in (6)–(8):[1]

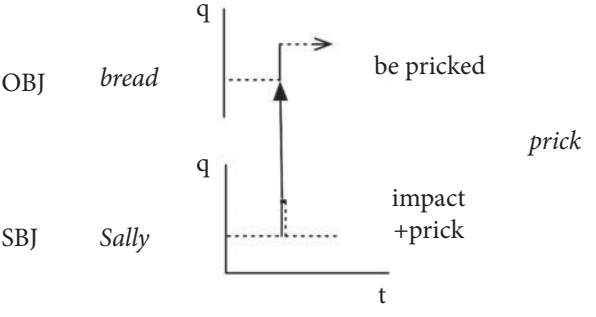
(6) Jane mowed the lawn. [(incremental) accomplishment]



(7) Bill tapped the sideboard. [undirected activity]



(8) Sally pricked the bread. [directed achievement]



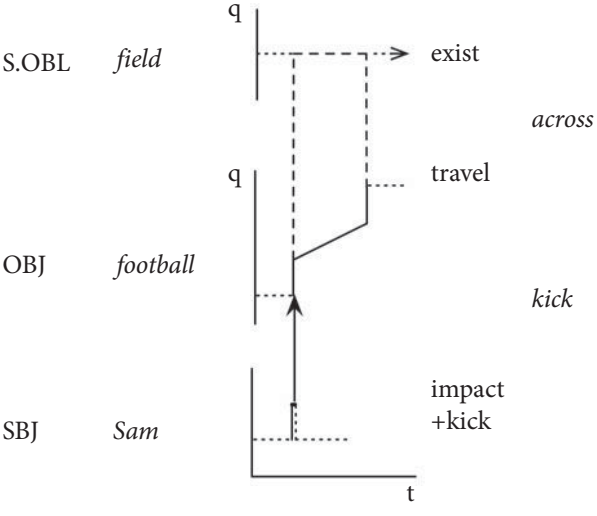
[1] The prose descriptions 'contact+tap' and 'impact+prick' for the *q* dimensions in (7) and (8) will be discussed in §7.4.

In (6), Jane engages in a mowing activity, an iterated, undirected cutting activity, while the lawn undergoes an incremental change of state leading to its being completely mown. The lawn subevent is an accomplishment, and so is the overall event. In (7), Bill is engaged in an iterated contact activity. Unlike (6), the construal here is that Bill is acting on the sideboard without the sideboard undergoing a directed change of state or even being affected at all. Hence the sideboard is not doing anything; its subevent is informally described as 'exist'. The aspectual type of the overall event is an undirected activity, following the aspectual type of the subevent involving Bill. In (8), Sally is engaged in an undirected cyclic achievement of impact, and the bread undergoes a punctual directed change. The overall event is a directed achievement, following the aspectual type of the bread subevent. The examples show that the aspectual type of the overall event may be derived from the aspectual type of either the initiator or endpoint of the verbal profile; it appears to depend solely on the Verbal Aspectual Hierarchy.

In all of the examples given so far, in this section and in preceding chapters, the aspectual profiles of each participant coincide on the temporal dimension. That is, the same point or interval in time is profiled for each event. We propose this as a second hypothesis, the temporal unity of a verbal event. If the temporal unity hypothesis is correct, then the temporal structure of the overall event is straightforward: it is durative if all the subevent profiles are durative, and it is punctual if all the subevent profiles are punctual.

The question now is: Does the temporal unity and aspectual hierarchy for the verbal aspectual behavior as a whole hold for all simple verbal lexicalizations of events? One potential counterexample is Talmy's category of onset causation of motion (§6.3.1). As defined by Talmy, onset causation would be represented by the verbal semantic structure in (9):

(9) Sam kicked the football across the field.



In onset causation of motion, the initiator (Sam) engages in the event only at a point in time—Sam's foot impacts the ball—while the endpoint (the ball) is involved in the event from that point onward in an interval of time—the time it takes for the ball to travel across the field. The onset causation analysis given below (9) lacks the temporal unity of the other examples of event structures we have discussed so far: the two subevents in the verbal profile are not temporally coextensive.

The aspectual behavior of *kick the football across the field* implies that it is punctual, however. The Progressive *Sam is kicking the football across the field* cannot be construed as describing the directed activity of the football flying toward the other end of the field, as one would expect if it were an (incremental) accomplishment. Instead, it can have only a nonincremental accomplishment construal (Sam's preparatory action to kicking the football) or an iterated construal (Sam is repeatedly kicking the ball across the field). This aspectual potential is characteristic of a punctual event. Yet *kick the football across the field* is a directed achievement, not a cyclic one. In other words, the aspectual structure of the overall verbal event is not the same as the aspectual structure of either of its subevents as represented in (9).

Not all cases of apparent onset causation behave in the same way as (9). The sentence *Carol ran the dishwasher* is another example of onset causation: Carol presses a button, and then the dishwasher runs. But it has a durative construal:

(10) Carol ran the dishwasher for ten minutes (and then had to stop it because it was leaking).

The difference between (9) and (10) appears to be due to the potential control on the part of the initiator of the event. In (10), Carol has potential control over the course of the dishwasher's activity, even if she is not actively doing anything; she can exercise it at any point in the duration of the dishwasher's process. In (9) on the other hand, once Sam has kicked the ball, its motion is out of Sam's control.

One possible analysis is that causal control leads to a different construal of the temporal unfolding of the events in (9) and (10). Sentence (9) is an instance of punctual causation, because Sam has control only while in contact with the ball, and the football's subevent is construed as punctual. On the other hand, (10) is an instance of extended causation, and Carol's causal control extends for the duration of the dishwasher's activity. This analysis would preserve the temporal unity of the event. Thus, some cases of onset causation (*kick the ball across the field*) are actually cases of punctual causation, while other cases of onset causation (*run the dishwasher*) are cases of

extended causation, where the notion of causation is broadened to include potential control of the outcome.

Another potential counterexample is suggested by Rappaport Hovav and Levin (2001), who propose an analysis of two types of Resultative constructions in English, one of which is claimed to be temporally discontinuous (see §8.2 for a fuller analysis of Resultatives). The first type includes Resultatives with the subcategorized-for Object (i.e. the Object realized in the simple Transitive construction), such as *They painted the garage white.* In this type of Resultative, there is temporal dependence between the participant subevents (as we would analyze this complex event): the activity of painting the garage and the accomplishment of it becoming white are temporally coextensive. This type of Resultative conforms to the temporal unity of the event.

The second type includes Resultatives with so-called Fake Object and Fake Reflexive Objects; they are called "fake" because they cannot occur in a simple Transitive construction:

(11) a. They ate themselves sick.
b. *They ate themselves. [with the same meaning as in (11a)]

Rappaport Hovav and Levin argue that there may be a temporal discontinuity between the verbal event and the event of attaining the resulting state for Reflexive/Fake NP resultatives. (This is part of their account of temporal independence for Fake NP/Reflexive resultatives; see §8.2.) They give the invented example in (12) and the attested example in (13) (Rappaport Hovav and Levin 2001:775):

(12) Sam sang enthusiastically during the class play. He woke up hoarse the next morning and said, 'Well, I guess I've sung myself hoarse.'

(13) Matt Leblanc has his Friends' co-stars worried he is about to party himself out of a job.

(*Sunday Mail*, January 19, 1997, p. 40)

Rappaport Hovav and Levin write of (12) that 'the hoarseness is achieved some time after the singing is over', and of (13) that 'it is most likely that the path to being out of a job did not start when the partying began' (p. 775). If Rappaport Hovav and Levin's analysis is correct, then the subevents of Sam becoming hoarse and Matt Leblanc losing his job were not completed (and may not even have begun) until after Sam's singing ended and Matt Leblanc's partying ended.

The aspectual behavior of (12) and (13), at least in my judgment, differ. The Resultative clause in (12) is in the Present Perfect. In §4.3.4, I argued that the Present Perfect describes the state resulting from the occurrence of the event

prior to the present moment. This would fit with an analysis in which Sam became hoarse immediately or shortly after singing, but did not realize it while asleep and did not notice it until he woke up. The Present Perfect then describes the state that Sam is in when he wakes up.

If we add a Container temporal adverbial to the Simple Past version of (12), I interpret it as delimiting the time of Sam's singing:

(14) Sam sang himself hoarse in three hours.

My intuition is that (14) involves Sam becoming hoarse at the end of the singing event—Sam's becoming hoarse is a nonincremental accomplishment that begins with the singing and appears to be completed at the end of the singing.

Similarly, I interpret adding a Container temporal adverbial to (13) as indicating the whole interval from the start of Leblanc's partying to his losing a job:

(15) Matt Leblanc partied himself out of a job in three weeks.

Again, however, I disagree with Rappaport Hovav and Levin's intuition. In (13), Leblanc's losing his job presumably would have been the cumulative effect of too much partying, not the last party and so that process—a nonincremental accomplishment—began when his partying began. On the other hand, (13) is quite compatible with a gap between Leblanc's last wild party (say, on a Saturday) and his being fired (on Monday). But here it is most plausible that the time interval between the last party and being fired is ignored, just as when one says *I read* War and Peace *in two weeks*, one ignores the times when one is asleep, eating, etc. (and as a matter of fact, in describing Leblanc's partying activity, one ignores the time between parties). Thus, I think that temporal unity may be preserved in these cases by appealing to plausible construals of the events in the temporal dimension.

However, an old philosophical chestnut presents a more seriously problematic example for temporal unity. If Sam shoots or poisons Harry on Monday, and Harry dies on Thursday, then *Sam killed Harry* is acceptable. The Container adverbial in (16) for the interval between Sam's act and Harry's death seems odd, so a construal as a durative event, as was suggested for (10) and (13), seems implausible (contrast *The poison killed Harry in four days*, in which the poison is continually acting on the victim):

(16) Sam killed Harry in four days.

On the other hand, the punctual locatives in (17a–b) are both odd, so a construal as a punctual event, as was suggested for (9), also seems implausible.

(17) a. Sam killed Harry on Monday.
b. Sam killed Harry on Thursday.

It may be that this is a genuine example of temporal disunity, for which no construal of agent control or adjustment on the temporal dimension is plausible. The aspectual construal of the overall event is also problematic, since neither the nonincremental accomplishment construal implied by (16) nor the directed achievement construal implied by (17) seems acceptable. Examples (16)–(17) differ in acceptability from (9)–(10) and (14)–(15), which implies that the latter do have temporal unity. Thus, there are cases of verbal events whose subevents do not display temporal unity, but then the aspectual construal is also incoherent. In general, the participant subevents of an event lexicalized by a simple verb exhibit temporal unity; in those rare cases where a verbal event lacks temporal unity, its temporal structure is indeterminate.

It is possible that the cultural seriousness of violent death and the importance of attributing responsibility for such a result sanctions the use of a simple verbal construction with *kill* for a temporally discontinuous event. The problem then is that the temporal scope of control and responsibility, both of which may determine realization as Subject and hence the verbal profile, do not match in these cases. Sam's action on Harry on Monday ultimately led to Harry's death on Thursday; Sam is responsible for Harry's death, but he had no control over what happened after what he did on Monday. On the other hand, this seems no different than the situations in (9)–(10), which do not have the same difficulties in combining with temporal adverbials.

While temporal unity is defensible in most cases, there are some cases in which temporal disunity of an event lexicalized as a simple verb appears to be possible. Temporal unity, or construal of temporal unity, may actually be a symptom of directness of causation/control over the outcome, and it is the latter that determines or at least motivates the lexicalization of the event as a simple verb, as was argued in chapter 6. However, in English at least, responsibility for the outcome is sufficient for Subject realization for some events; and responsibility for the outcome does not impose a requirement of temporal unity across the responsible initiator's subevent and the endpoint's subevent.

7.4 Two types of verbal semantic structure

7.4.1 Manner vs. result, verb-framing vs. satellite-framing, or directed change vs. undirected change

Levin and Rappaport Hovav open their survey of approaches to argument realization with a pair of examples derived from a pioneering article on the topic, Fillmore (1970) (AR, 1):

(18) a. The boy broke the window with a ball.
b. The boy hit the window with a ball.

(19) a. The window broke.
b. *The window hit.

The contrast between *break* and *hit* is taken by Levin and Rappaport Hovav to be characteristic of a wide-ranging contrast between two event structure types that are commonly lexicalized as simple verbs. The first type, exemplified by *break*, is described by them as a RESULT verb: these are verbs whose root describes the result of the event rather than the manner in which the result is brought about. The second type, exemplified by *hit*, is described by them as a MANNER verb: these are verbs whose root describes the manner in which the result, if any, is brought about.

The manner–result contrast can be found in verbs with the same causal decomposition. For example, *hit* and *break* have the same force-dynamic structure: boy → ball → window. Likewise, the pair of examples in (20a–b) have the same force-dynamic event decomposition but also differ in the ability to occur intransitively, as in (18a–b) (AR, 73, from Hale and Keyser 1997:53; see also §5.5):

(20) a. We splashed mud on the wall.
b. We smeared mud on the wall.

(21) a. Mud splashed on the wall.
b. *Mud smeared on the wall.

Levin and Rappaport Hovav argue, following Hale and Keyser (1997:53–4), that *splash* describes the resulting state of affairs in terms of the type of substance and its contact relation with the wall, while *smear* describes the manner of the process by which the mud is applied to the wall (AR, 73).

The manner–result contrast also forms the basis of Talmy's basic typology of motion events, later extended to events in general. Talmy's original typological classification was applied only to motion verb constructions (Talmy 1972, 1974, 1985). Talmy developed an analysis of motion events with five basic semantic components (Talmy 1985:61):

(22) a. *Figure*: the entity that is moving or located
b. *Ground*: the entity which acts as a spatial reference point for the motion/location of the figure
c. *Motion*: the fact of change in position of the figure
d. *Path*: the path of motion of the figure
e. *Manner*: the manner of motion by which the figure moves along the path

Talmy compared the grammatical encoding of the two semantic components of the motion event—manner and path—across languages. Talmy's original typological classification was defined in terms of what semantic component is expressed, or in his terms 'incorporated', in the main verb. Talmy distinguished three types: manner-incorporating, path-incorporating, and ground-incorporating.

The MANNER-INCORPORATING type, as its name indicates, expresses manner in the main verb. An example of a manner-incorporating language, according to Talmy's typological classification, is English:

(23) He **ran** *into* the cave.

(24) The bottle **floated** *into* the cave.

(25) They **rolled** the barrel *into* the cellar.

In (23)–(25), the manner is expressed by the main verb (in boldface), and the path is expressed by an element other than a verb (in italics), which Talmy calls a SATELLITE of the main verb (Talmy 1974:184, 1985:102).

The PATH-INCORPORATING type expresses path instead of manner in the main verb. An example of a path-incorporating language according to Talmy's typological classification is Spanish (Talmy 1985:111):

(26) **Entró** *corriendo* a la cueva
enter.3SG.PST *running* to the cave
'He ran into the cave.'

In (26), the path is expressed by the main verb (in boldface), while the manner is expressed optionally in a gerund form (in italics), i.e. not as a main verb. Talmy also describes the manner expression as a satellite of the verb (Talmy 1985:110–11).

The GROUND-INCORPORATING type expresses salient properties of the ground in the main verb, such as shape and consistency. An example of a ground-incorporating language according to Talmy's typology is Atsugewi (Talmy 1985:74; main verb in boldface):

(27) ′-w > uh- **st'aq'** -ik: < -[a]
<3SG.FACT> by.gravity **lie.runny.icky.material** -on.ground
'Runny icky material [e.g. guts] are lying on the ground.'

In more recent publications, Talmy broadens his original classification to include constructions denoting events with resulting states of all types, not just motion events describing motion on a path to a destination. Talmy also changes the basis of his typological classification. The more generalized

concept of a result state is called FRAMING in Talmy's later work: framing includes concepts such as path and telic aspect that delimit or otherwise frame the verbal event. The framing semantic component in Talmy's sense corresponds to Levin and Rappaport Hovav's result.

Talmy's newer classification leaves aside the ground-incorporating type of motion event:

> the world's languages generally seem to divide into a two-category typology on the basis of the characteristic pattern in which the conceptual structure of the macro-event is mapped onto syntactic structure. To characterize it initially in broad strokes, the typology consists of whether the core schema [framing event] is expressed by the main verb or by the satellite.
>
> (Talmy 2000*b*:221)

The framing semantic component corresponds to the path. English now represents a SATELLITE-FRAMING language, in that the framing component is expressed in a satellite, not the main verb. In addition to the motion examples given above, the Resultative examples in (28)–(31) show that English is a satellite-framing language according to Talmy (in these and following examples, the framing/result event is in boldface):

(28) She painted the wall **red**.

(29) He wiped the table **clean**.

(30) She pounded the dough **flat**.

(31) They shot him **dead/to death**.

Conversely, Spanish is a VERB-FRAMING language. The motion event example in (26) uses a path as the framing subevent, expressed in the verb. The examples describing events with resulting states in (32)–(34) also show that Spanish is a verb-framing language according to Talmy (Talmy 2000*b*:240, 243, 247; framing event in boldface—compare the satellite-framing English translations):

(32) Lo **mataron** quemándolo
him they.**killed** burning.him
'They burned him **to death**.'

(33) **Apagué** la vela soplándo -la
extinguish:1SG.PST the candle blowing.on -it
'I blew **out** the candle.'

(34) El perro **destrozó** el zapato mordiéndo -lo en 30 minutos
the dog **destroy**:3SG.PST the shoe biting -it in 30 minutes
'The dog chewed **up** the shoe in 30 minutes.'

Although Talmy and Levin and Rappaport home in on the same lexical semantic contrast, they formulate the contrast and the typology in slightly different ways (Croft, Barðdal, Hollmann, Sotirova, and Taoka 2010). First, Talmy formulates his typology as a classification of languages as whole types: either they are satellite-framing or they are verb-framing. Levin and Rappaport Hovav, in contrast, treat the contrast as a classification of different verbs in a single language, such as English. The empirical facts indicate that Talmy's whole-language typology is too strong (see also Beavers, Levin, and Tham 2010; Croft et al. 2010), and that the lexical semantic contrast is a characteristic of how specific verbs lexicalize events. For example, English, a satellite-framing language in Talmy's framework, has verb-framing (path-incorporating) motion verbs such as *enter, exit, ascend*, and *descend* as well as the manner of motion verbs illustrated in (23)–(25) above.

Second, Levin and Rappaport Hovav focus on the question of what is lexicalized as a simple verb. Levin and Rappaport Hovav's classification is essentially the same as Talmy's original classification, leaving out the ground-incorporating type. Talmy's newer classification, on the other hand, focuses on the lexicalization of the framing (result) components of the event. Therefore, Talmy's examples all involve events with results. In contrast, Levin and Rappaport Hovav include in their classification clauses which express manner but not result, such as *The bride and groom danced* or *Terry swept the floor.* Thus, the Levin and Rappaport Hovav analysis, like Talmy's original analysis, is broader in that it includes events that do not have a framing component.

Nevertheless, it is clear that Talmy and Levin and Rappaport Hovav are describing the same broad lexical semantic contrast in terms of the lexicalization of event structure in simple verbs. We will use the classification based on which semantic component is lexicalized in the simple verb, since that is the focus of this chapter. In other words, we will follow the original classification by Talmy, which is in essential respects identical to that of Levin and Rappaport Hovav. In this section, we analyze the manner–result contrast in the three-dimensional event representation, and examine Levin and Rappaport Hovav's hypothesis of manner–result complementarity.

Rappaport Hovav and Levin (1998) propose an explanation of the manner–result contrast in terms of the structural complexity of events (see also AR, 115–17). Manner verbs basically describe simple events, consisting of one subevent in their representation. Further subevents can be combined with a simple manner subevent, leading to more complex argument structures. In particular, manner subevents can be combined with subevents characterizing the resulting state, such as the prepositional phrases found in (23)–(25). The subevents combined with manner can vary even for a single manner subevent, as in the examples with *wipe* in (35)–(38) (adapted from Rappaport Hovav and Levin 1998:119–20):

(35) *Manner (of contact)*: Kay wiped the counter.
[[Kay ACT$_{<WIPE>}$] counter]

(36) *Resultative*: Kay wiped the counter clean.
[[Kay ACT$_{<WIPE>}$] CAUSE [BECOME [counter <*CLEAN*>]]]

(37) *Removal*: Kay wiped the fingerprints from the counter.
[[Kay ACT$_{<WIPE>}$] CAUSE [BECOME [fingerprints <*OFF COUNTER*>]]]

(38) *Application*: Kay wiped the polish onto the table.
[[KAY ACT$_{<WIPE>}$] CAUSE [BECOME [POLISH <*ON TABLE*>]]]

Example (35) is a single subevent for Rappaport Hovav and Levin, although it takes two arguments; it is a simple manner verb. Examples (36)–(38) represent the addition of different result state subevents to the manner subevent; the effect is to make *wipe* an instance of different event structure types (change of state, removal, and application respectively). The added subevents are lexicalized in English as resultative secondary predicates (*clean, from the counter*, and *onto the table*; see §8.2).

Result verbs form complex subevents, including among other things the result state. For the most part, further subevents cannot be combined with a complex result event. As a consequence, result verbs do not allow for as many argument structure alternations as manner verbs, in English at least (Rappaport Hovav and Levin 1998:116, 122; see also §8.2.1):

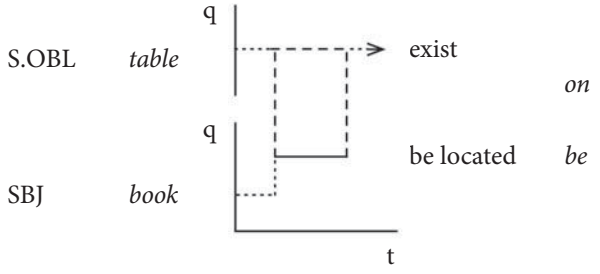
(39) Tracy broke the dishes.
[[Tracy ACT$_{<MANNER>}$] CAUSE [BECOME [dishes <*BROKEN*>]]]

(40) a. *Kelly broke the dishes off the table.
b. *Tracy broke the dishes valueless.

Rappaport Hovav and Levin's explanation is not based on specific semantic properties of the event or any of its subevents: it is based solely on the number of subevents of a simple verb. Their explanation is also sensitive to the way in which an event is decomposed in a semantic analysis. For example, in the three-dimensional model of event decomposition presented here, virtually every event is complex in at least one of the three dimensions (time, qualitative states, and causal chain). The only type of event that is simple—consists of only one subevent on all dimensions—is a one-participant inherent permanent state. For the three-dimensional representation, a more specific semantic property of events must be found that distinguishes manner and result verbs.

In order to identify this property, we return to spatial events of location and motion. Static spatial relations are typically lexicalized with intransitive verbs of position and a Locative Oblique phrase describing the spatial path relation (we follow Talmy in using the term 'path' to describe the spatial relation between figure and ground in location as well as motion). A typical locative predication is illustrated in (41):

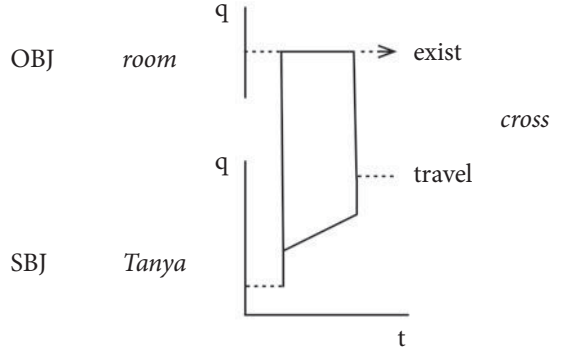
(41) The book is on the table.



A locative expression is a transitory state. The figure is the Subject and the ground a Subsequent Oblique governed by the preposition *on*. In the semantic representation of (41), the Oblique phrase is represented by a dashed line. The ground object (the table) serves as a reference point for the location of the figure (the book). Therefore, the only relevant defined state on the *q* dimension is 'exist', as indicated in the diagram; this is an inherent state of the table, holding over the table's lifetime.

English has result (path-incorporating or framing) verbs of motion such as *cross*, borrowed from Romance. Such a verb of motion is illustrated in (42):

(42) Tanya crossed the room.

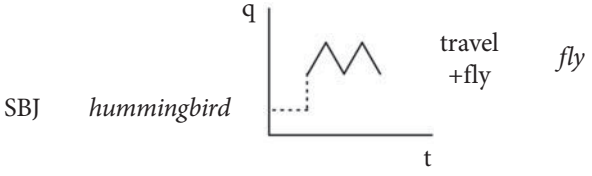


Path of motion verbs profile the path of motion that is otherwise expressed by a satellite (preposition) in English. As a consequence, the ground is realized

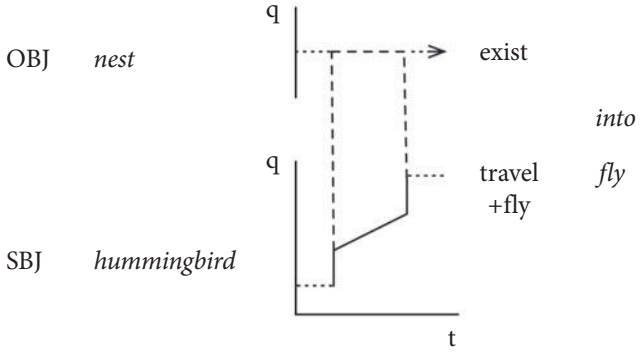
as Object. However, the relationship between figure and ground is still spatial, albeit involving directed motion on the part of the figure (Tanya). Hence the link between the two subevents is spatial; argument realization is determined by the figure-first construal. Last but not least, the motion subevent's *q* dimension is described as 'travel', that is, translational motion: motion from one point to another in space. This motion is directed motion in (42), as represented by the (incremental) accomplishment aspectual profile.

English also has manner of motion verbs, such as *fly*, from its inherited Germanic lexicon. These manner of motion verbs are used for undirected motion (without a result state), and for directed motion, in combination with a prepositional phrase describing the resulting location of the directed motion. Our analysis of the manner of motion verbs without a result and with a result are given in (43)–(44):

(43) The hummingbird flew (for a minute or so).



(44) The hummingbird flew into its nest.



In this analysis, the difference between the manner of motion in (43) and the motion + path in (44) is whether or not there is a directed change in the aspectual profile of the verb. In (43), there is no directed change, just an undirected activity of random or multidirectional motion. In (44), there is directed change towards a destination, whose path relative to the ground object (the nest) is described by the Subsequent Oblique prepositional phrase.

This analysis is supported by the comparison of English manner of motion verbs to the Russian manner of motion verbs discussed in §3.3.1. As discussed

in that section, Russian makes a morphological or lexical distinction between motion as directed activity and motion as undirected activity. In contrast, English uses the same verb form for both, as can be seen from (43)–(44).

The Russian Indeterminate motion verbs discussed in §3.3.1 do not describe just a manner of motion: they describe undirected translational motion—to and fro, out and back, iterated back and forth, and habitual back and forth. Verbs such as *walk, fly,* and *swim* and their Russian Indeterminate motion verb counterparts describe a manner of moving one's body that generates motion. If the English verb *fly* in (43) described only the manner of a motion, then it would describe just the repeated bodily movements characteristic of flying as an activity. In this respect, *fly* differs from *flap wings*, *walk* differs from *take steps*, and *swim* differs from *kick feet and move arms*. The latter verbs are bodily motion verbs that really do describe only a manner of moving certain body parts in a certain way. The former verbs, like the Russian Indeterminate motion verbs, are manner of motion verbs that combine both manner and motion.

The difference between Russian Indeterminate and Determinate motion verbs, and between the two uses of their English translation equivalents, is a difference between undirected motion (including its manner) and directed motion (including its manner). In the three-dimensional analysis, this implies that even for the undirected activity use, the points on the *q* dimension describe location AND movement from one location to another; it is just that the motion is not directed motion to a specific location that serves as the destination. Hence the manner of motion verbs combine translational motion (glossed as 'travel' in the representations) and manner of motion.

The same argument applies to the English non-motion Intransitive/Transitive verb pairs in the following examples:

(45) a. Brigitte sang (for a few minutes).
b. Brigitte sang the *Lamento d'Arianna*.

(46) a. I read (for a little while).
b. I read the article you gave me.

(47) a. She wrote (for the entire morning).
b. She wrote the article.

(48) a. He painted (during the afternoon).
b. He painted Jessica's portrait.

(49) a. They ate (all afternoon).
b. They ate the entire roast pig.

In all of these cases, the (a) sentences describe an undirected activity that involves repeated actions of emitting melodious sounds, moving eyes and

perceiving words, producing written characters, daubing paint on a canvas, and ingesting pieces of food; while the (b) sentences describe acting on a complex entity and proceeding to its completion. The (a) sentences appear to describe a manner of activity, but again, it is more accurate to describe them as undirected progression of the same type as in the (b) sentences. For example, one may stop singing one song and then start another one—but one is not simply randomly emitting melodious sounds; one is performing, albeit fragmentarily or with no specific end in sight. In other words, the qualitative states on the *q* dimension for (45) are not just the emission of melodious sounds (i.e. a succession of cyclic achievements, construed as an undirected activity), but an undirected musical performance.

The analysis of (43) as undirected motion and not pure manner of motion means that the alternative construals of the motion verb in (43) and (44), and the alternative construals that are lexically differentiated in Russian, are primarily a difference in the unfolding of the event over time, and not a difference in the qualitative states defined on the *q* dimension. In both undirected motion and directed motion, the manner of motion is incorporated into the qualitative states, but the points on the *q* dimension also specify location. The difference is whether or not the motion is directed (and hence has a result state, namely location at the destination), and that is a function of the nature of the motion. In other words, in our analysis, the difference between manner and result verbs is the presence of a directed change in the verbal profile, not a difference in the states defined on the *q* dimension.

The event structures in (43)–(44) do not express manner as a separate component or subevent in the semantic representation. Manner is instead part of the *q* dimension along with the translational motion (directed or undirected) that it accompanies. The "manner" associated with an event is not necessarily a causal component. In the case of manner of motion verbs where the manner is the means of locomotion, such as walking, running, and flying, then it appears to be an event that causes the translational motion to take place. But the "manner" may not be in such a direct causal relationship, as in the following example (Croft 1991:201, fn. 15; cf. Goldberg 1995:61–5):

(50) The car screeched around the corner.

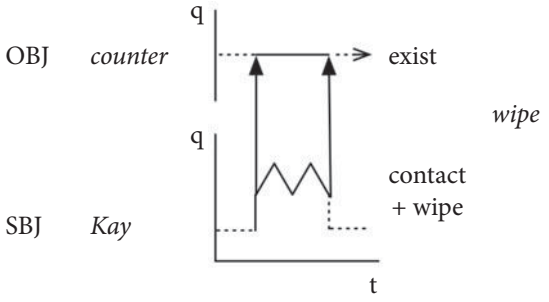
The semantic type of example (50) is one of several related types observed by Talmy, who treats the associated manner component as a type of CO-EVENT (Talmy 2000*b*:27). Possible manner/co-event components of simple verbs will be examined in greater detail in §7.4.2. For now, we simply observe that the manner (co-event) subevent is not in a force-dynamic relationship with the participant subevents. This observation supports the analysis of the manner

subevent/co-event as 'conflated' (p. 28) with motion in the representation of (44) and (50).

In sum, "manner" is incorporated as part of the specification of the points on the *q* dimension. The points on the *q* dimension are also defined in terms of the process that is also denoted by the verb, such as translational motion in most of the examples discussed so far.

Even the "manner" verb argument structure for *wipe*—the one lacking any Result phrase—involves conflation of manner with another component:

(51) Kay wiped the counter.



Wipe in (51) is not a simple manner verb; it is a contact verb conflated with a manner (so contrasting with other contact verbs such as *dust, tap*, etc.). Although the contact verb in this construction does not lead to a result state, it is still part of the definition of the verbal root for *wipe* in this argument structure construction.

7.4.2 Manner conflation in simple verbs

In §7.4.1, the manner component of an event is analyzed as conflated with the motion component, or with other change-of-state components, or also with contact as in (51). That is, the qualitative states defined on the *q* dimension for the relevant subevent must describe both the motion etc. and the manner. The reason for this is that the relationship between manner of motion and the motion itself varies. In the case of *walk, fly*, etc., the manner component describes the means of propulsion that brings about the motion. But in the case of *screech* in (50), it is the motion (including its manner) that brings about the sound emission. Hence the "causal relation" goes the other way.

Talmy (2000*b*:42–7) surveys a number of ways in which a motion event can be conflated with another co-event in English. Talmy's conflation types with some of his examples are given in (52):

(52) a. *Extended cause:* I squeezed the toothpaste out of the tube.
b. *Onset cause:* The napkin blew off the table.
c. *Precursion:* Glass splintered onto the carpet.

d. *Concurrent result:* The rocket splashed into the water.
e. *Subsequence:* They locked the prisoner into his cell.
f. *Enablement:* I scooped jellybeans up into her sack.
g. *Reverse enablement (German)*:

Ich habe den Hund losgekettet
I have the dog free-chained
'I set the dog free by unchaining it.'

In (52a), the co-event takes place through the temporal extent of the verbal profile of motion. In (52b), onset causation is better analyzed as punctual causation (see the discussion of example (9) in §7.3), and again, the co-event takes place in the punctual temporal profile. Talmy analyzes (52c) as an event preceding the motion event, but the example is compatible with the splintering taking place either at the initiation of motion or during the motion. Again, it is part of the verbal profile. Example (52d) is like *screech*: it is concurrent with the profiled motion, but the result of it, not the cause. Example (52e) is a placement verb (i.e. like *put*), and is punctual, so it is like the reverse of (52b): what is essential in the assertion is not just that the prisoner was put in his cell, but that he cannot go out. Talmy analyzes (52f) as an enablement relation: my scooping up the jellybeans allows me to put them into her sack. It is temporally similar to precursion in that the scooping is part of the initial moment of the profiled motion event, though here the event seems to be better analyzed as motion (i.e. durative) rather than placement (punctual).

Example (52g), from German, uses a verb root that describes the previous state, or process resulting in that state (the dog is chained), combined with a prefix that expresses the resulting state (the dog is free). The combination describes the change of state. Example (52g) differs from (52a–f) in that the verb is complex, not simple. Its nearest English equivalent would be *I unchained the dog*, with a complex verbal expression including the reversive prefix *un-*. In general, complex constructions are able to express a wider range of semantic relationships among event components than simple expressions (§6.1). The absence of a simple verb expression for reverse enablement suggests that reverse enablement is not a co-event type that can be conflated in a simple verb.

Talmy discusses another type of co-event relation which challenges a basic hypothesis about simple event verb structure:

(53) *Concomitance:* She wore a green dress to the party.

Example (53) is unusual in that the motion appears to be directly predicated of the Subject, not the Object. This type of construction has been called a Subject-Oriented Resultative construction (Rappaport Hovav and Levin

2001:770). Similar examples to (53) include those in (54)–(56) (p. 770; the examples in (54) are from Wechsler 1997, in (55) from David Dowty (pers. comm.), and in (56) from Verspoor 1997), and the examples in (57) (Richard Hudson, pers. comm.):

(54) a. The wise men followed the star out of Bethlehem.
b. The sailors managed to catch a breeze and ride it clear of the rocks.
c. He followed Lassie free of his captors.

(55) a. Fly American Airlines to Hawaii for your vacation!
b. We took the IRT [a subway line] from Grand Central to the Brooklyn Fine Arts Museum.

(56) a. John danced mazurkas across the room.
b. John swam laps to exhaustion.
c. The children played leapfrog across the park.

(57) a. I read *Harry Potter* from London to Edinburgh.
b. I knitted socks from London to Edinburgh.
c. I munched sandwiches from London to Edinburgh.

The examples in (54)–(55) are examples of correlated motion (Rappaport Hovav and Levin 2001:770, citing the 2000 version of this book): the motion of the Subject participant is correlated with that of the Object participant.[2] The examples in (56) involve a performance that is reified as a creation resulting from the performance (mazurkas, laps, leapfrog) and realized as the Object; the performance also involves motion (or in the case of (56b), a change of physiological state). The examples in (57), like that in (53), involve a concomitant activity not related to the act of movement. In all of these examples, the Subsequent Oblique expresses the ground for the motion event but the figure is the Subject participant, and only indirectly the Object participant.

The challenge to the event structure model presented by (54)–(57) is that it appears that a clause headed by a simple verb represents a branching causal chain: there is a causal relation from the Subject to the Object—wearing a dress, following someone, taking a means of conveyance, creating a performance, performing an action—and a separate construed causal relation from the Subject to the Subsequent Oblique—a figure moving relative to a ground.

One analysis is simply to allow clauses with simple verbs to denote branching causal chains. That is, co-events may include a causal chain separate from the main event (the motion event in most of the above examples). Evidence

[2] Example (54a) is somewhat different in that the star is not moving, but the star may be construed as moving in this context.

supporting this analysis is that Passives of the examples in (54)–(57) are unacceptable or marginally acceptable. Rappaport Hovav and Levin presented Passive versions of these sentences to speakers, and all were found ungrammatical, albeit to varying degrees (Rappaport Hovav and Levin 2001:771):

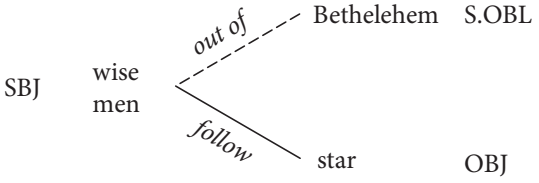
(58) a. *The star was followed out of Bethlehem.
b. *The breeze was ridden clear of the rocks.
c. *Lassie was followed free of his/the captors.
d. *Leapfrog was played across the park.
e. *American Airlines was flown to Hawaii.
f. ??The IRT subway line was taken to the Brooklyn Museum.

In contrast, the Passive forms of conveyance verbs, in which the motion is predicated of the Object, are completely acceptable:

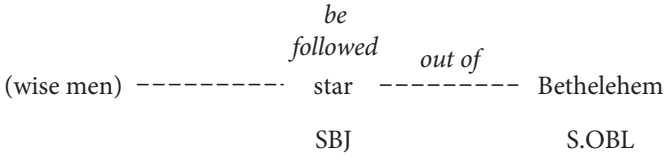
(59) a. The boys were led free of their captors (by Lassie).
b. The couple were brought to the Brooklyn Museum (by the train).
c. The boxes of books were taken to the department library (by some students).

In this analysis, the unacceptability of the Passive realizations in (58) would be due to the fact that the Passive Subject is not on the same causal chain as the Resultative path phrase (the Passive alters the verbal profile to exclude the segment between Subject and Object on the causal chain; see §6.3.1):

(60) a. The wise men followed the star out of Bethlehem.



b. *The star was followed out of Bethlehem.



The causal chain in (60b) does not correspond to the chain in (60a) and hence (60b) cannot realize a Passive version of (60a). Rappaport and Hovav Levin adopt this analysis, arguing that the nonbranching causal chain constraint applies only to actual transmission of force, not construed asymmetrical noncausal relations such as the spatial relation between the wise men and Bethlehem in (60a) (Rappaport Hovav and Levin 2001:788).

Alternative analyses that preserve the condition of a nonbranching causal chain essentially exclude the path from the set of participants for the simple verb. The path may be analyzed as a result event, rather than as an argument of the verb. This analysis is the one found in much recent work on Resultative constructions, where the path expression is analyzed as a result state (see §8.2 for discussion and references). If so, then we are no longer dealing with a simple verbal expression. As already noted, complex expressions allow for branching causal chains, such as the means Gerund construction in (61a–b):

(61) a. She whistled an aria from *Don Giovanni* (while) walking down the street.
b. She walked down the street, whistling an aria from *Don Giovanni*. [compare:]
c. *?She whistled an aria from *Don Giovanni* down the street.

The resultative analysis of paths would of course require a reanalysis of all events involving motion or location. The analysis of path expressions as result states will be discussed further in §8.2.2.

Another alternative analysis is to treat the path as a special kind of circumstantial expression. Many analysts differentiate between participants in an event and CIRCUMSTANTIAL "arguments" which most commonly describe the spatial (and temporal) location in which the event took place:

(62) a. Mary wore a green dress at the party.
b. The children played leapfrog in the park.
c. Jan and Maria danced mazurkas in the grand ballroom.
d. I knitted socks on the train.

Circumstantials are not considered to be (core) arguments, unlike, for example, spatial paths that are causally brought about by an external entity:

(63) a. I put the books back on the shelf.
b. I threw the board over the fence.
c. I piled the bricks on the patio.

In this analysis, the events, of riding the IRT, dancing mazurkas, knitting socks, and following Lassie and so on in (54)–(57) would occur not in a static location, but in a moving location along the spatial path evoked by the Path argument. Hence the Path argument is not part of the causal chain, not even a causal chain generalized to include the figure-first construal.[3]

[3] This analysis may not be necessary for correlated motion: following something or riding a means of conveyance may be analyzed as an extension of the accompaniment relation as analyzed in §6.2.3.

Evidence in support of a moving location analysis of the path expression is a restriction on the relationship between the co-events in (53)–(57): the co-event must occur throughout the motion event. This constraint indicates a closer relationship between the two co-events than a simple branching causal chain analysis implies. On the other hand, one would still have to account for the unacceptability of the Passive with moving location circumstantials, since the Passive of a static circumstantial is acceptable:

(64) a. Mazurkas were danced in the grand ballroom.
b. The books were put back on the shelf.
c. Bricks had been piled on the patio.

In other words, there is evidence in English to support both a branching causal chain analysis and a circumstantial analysis of Subject-Oriented Resultatives. Subject-Oriented Resultatives are the only examples that I am aware of in which the nonbranching causal chain constraint on simple verbs appears not to account for the event structure. This construction merits further crosslinguistic investigation.

7.4.3 Result verbs and directed change

We now turn to the other type of verbal semantic structure, result verbs. Result verbs are characterized most obviously in their aspectual behavior. An explicit hypothesis of the role of telicity in argument realization is Tenny's Aspectual Interface Hypothesis (Tenny 1994). Her formulation is a useful starting place for defining the contributions of aspect and causal structure in event lexicalization and argument realization.

The Aspectual Interface Hypothesis is presented in (65) (Tenny 1994:11, 68; see AR, 98):

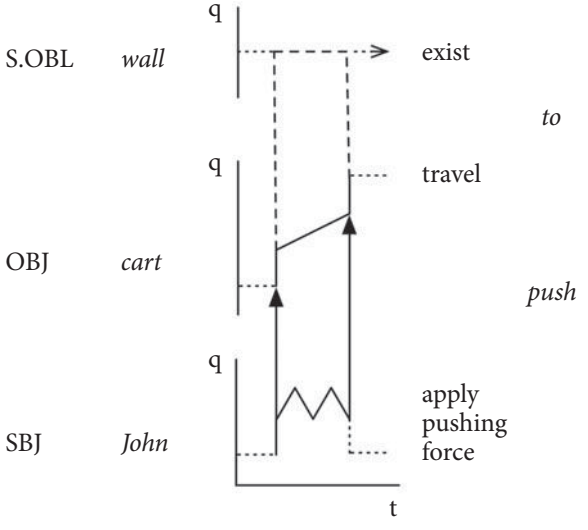
(65) *Measuring-Out Constraint on Direct Internal Arguments [Objects]*:
a. The direct internal argument of a simple verb is constrained so that it undergoes no necessary internal motion or change, unless it is motion or change which 'measures out the event' over time (where 'measuring out' entails that the direct argument plays a particular role in delimiting the event).
b. Direct internal arguments are the only overt arguments which can 'measure out the event'.
c. There can be no more than one measuring-out for any event described by a verb.

(66) *The Terminus Constraint on Indirect Internal Arguments [Obliques]*:
a. An indirect internal argument can only participate in aspectual structure by providing a terminus for the event described by the verb. The terminus causes the event to be delimited.
b. If the event has a terminus, it also has a path, either implicit or overt.
c. An event as described by a verb can have only one terminus.

The conditions in (65) are intended to cover mereological or scalar incremental themes (§3.1.1), as in *John mowed the lawn*. The conditions in (66) are intended to cover holistic (path) incremental themes, such as *John pushed the cart to the wall*. In the latter case, a path expression describes incremental progress along the path to a definite endpoint.

Tenny's original formulation is too strong. First, Tenny's formulation assumes that a *t*-bounded aspectual structure is required. This is not always the case, if for instance the Object is an unbounded entity (*They ate rice all afternoon*). Tenny's characterization can be generalized to directed changes (§3.1.1), both durative (incremental accomplishments, nonincremental accomplishments, and directed activities) and punctual (directed achievements). Moreover, the two conditions in (65)–(66) can be collapsed into one in the three-dimensional representation used here. Example (67) gives the representation of *John pushed the cart to the wall:*

(67) John pushed the cart to the wall.



Second, the directed change argument may be the Subject as well as the Object. This is true of any intransitive directed motion verb, including directed manner of motion verbs as in (44) in §7.4.1. Tenny can account for this by her formulation in (66), which makes reference only to the Oblique phrase describing the path and ground of motion; it does not specify that the figure of motion must be the Object. A non-motion example of an incremental theme Subject is given in (68a) (Jackendoff 1996:314); with a bounded Subject argument, the sentence is telic, as in (68b) (AR, 107):

(68) a. Water gradually filled the tank.
b. The ten milliliters of solution filled the vial in fifteen seconds.

More precisely, the directed change argument is realized in an absolutive pattern: it is realized as the Object if a causally antecedent participant is realized as Subject, but as (intransitive) Subject otherwise.

In the 2000 draft that preceded this book, I suggested a weaker version of Tenny's Aspectual Interface Hypothesis, applied to durative directed changes (which were called verbal scales in that draft):

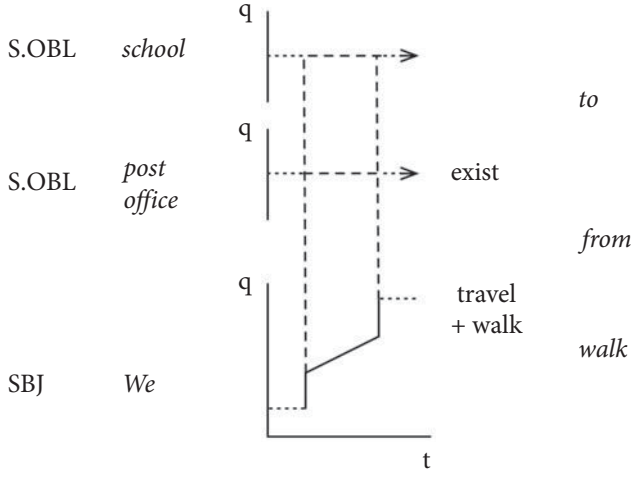
(69) a. *Verbal Scale Uniqueness*: there is only one verbal scale/holistic theme per situation encoded by a clause. [equivalent to (65b)–(65c)]

b. *Verbal Scale Profiling*: the verbal scale/holistic theme contour is always part of the verbal profile. [equivalent to a generalized version of (66b)]

The hypotheses in (69a–b) can be generalized to include punctual directed changes as well as durative directed changes. The hypothesis in (69a) is restricted only to basic incremental themes, not those associated with quantified arguments (Dowty 1991:570 and §3.1.1 above; Beavers 2011, discussed below, combines basic and derived incremental themes). We will discuss problematic cases for (69a–b) together, since they are interconnected: putative cases of a directed change that is not part of the verbal profile overlap with putative cases of multiple directed changes in an event.

First, there are two putative cases of multiple directed changes that have a straightforward analysis as a single directed change. Both involve paths of motion. The first is that some sentences have multiple path expressions, but they combine to describe just a single path (e.g. Dowty 1991:569):

(70) We walked from the post office to the school.

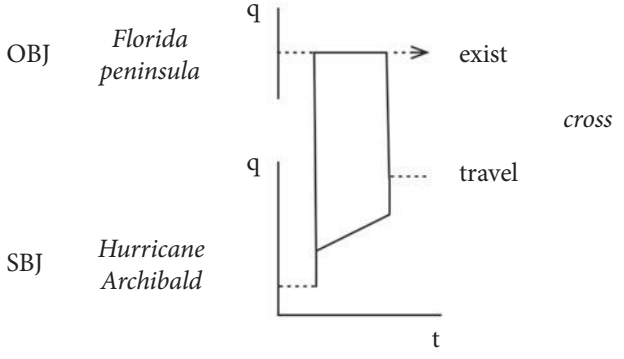


Even so, some languages do not allow expression of source and destination in a single clause, even if a single path is being described, including Tswana

(Creissels 2006:25–6) and the Mayan languages Tzeltal and Yukatek (Slobin 2004:240).

For some predicates, such as *cross* in (71), Dowty argues that both the figure (Hurricane Archibald) and the ground (the Florida peninsula) are incremental themes (Dowty 1991:571):

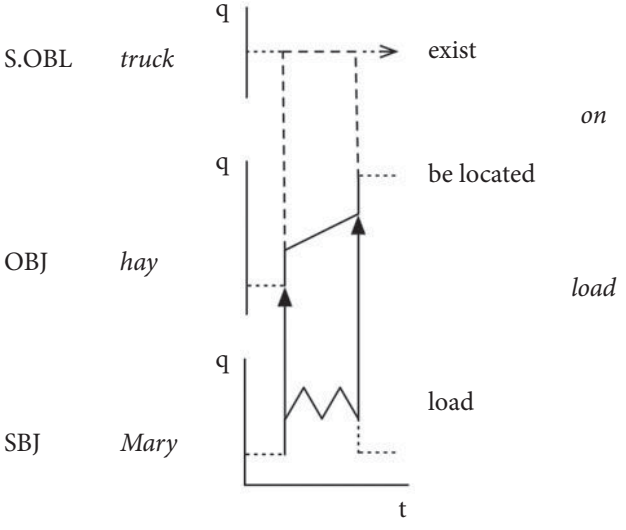
(71) It took Hurricane Archibald 31/2 hours to cross the Florida peninsula.



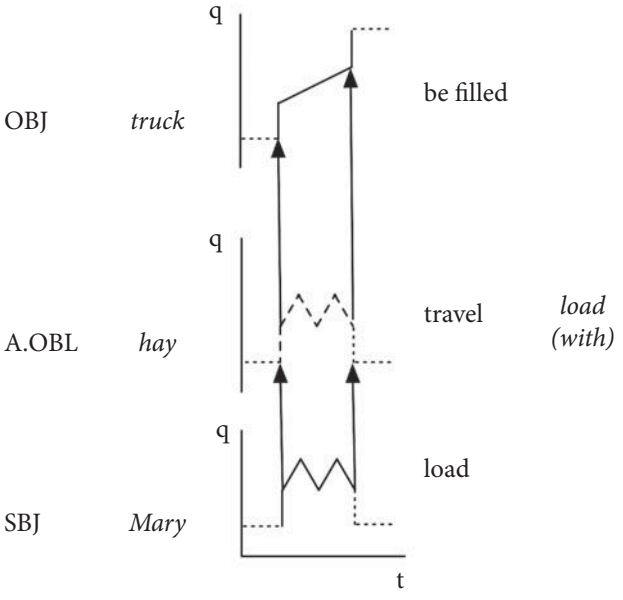
However, in our analysis, there is only one incremental theme, the moving object (Hurricane Archibald): its *q* dimension describes a spatial scale that begins when the leading edge of the hurricane touches one side of the Florida peninsula and ends when that trailing edge of the hurricane departs from the other side of the Florida peninsula.

Jackendoff also questions the incremental themehood of the Object in the Locative alternation. Dowty argues that incremental theme status best represents the semantic difference between (72a–b) (Dowty 1991:587–92; see §6.2.1):

(72) a. Mary loaded the hay on the truck.



b. Mary loaded the truck with the hay.



Dowty argues that in (72a), the incremental progression of the event, and its completion, is determined by the quantity of hay that moves onto the truck, whereas in (72b), it is determined by the volume of the truck that is filled up. In the three-dimensional representation, the directed change subevent involves the hay in (72a) but the truck in (72b). In each case, the directed change subevent belongs to the participant realized as Object, as would be predicted by the principle in (69b).

Jackendoff argues that in (73a–b), the Antecedent Oblique argument is the incremental theme (Jackendoff 1996:347; Rappaport Hovav and Levin 2002):

(73) a. Bill loaded the truck with three tons of dirt in an hour.
b. Bill sprayed the wall with thirty gallons of water in an hour.

I find (73a–b) marginally acceptable. Even Levin and Rappaport Hovav imply that (73a–b) may not be entirely grammatical (writing 'to the extent that the sentences in [(73)] are grammatical'; AR, 108). Also, it is not clear if (73a–b) have two incremental themes, or rather just one incremental theme that is not the Object.

In fact, Dowty himself notes that judgments of the *with*-variant vary (Dowty 1991:590). Some of Dowty's consultants considered the sentence in (74a) to be appropriate only if the hay exactly fills the truck; on the other

hand, all found (74b) to be fully acceptable, since only the Object participant could be construed as incremental theme.

(74) a. Mary completely filled the truck with the hay.
b. Mary completely filled the truck with hay.

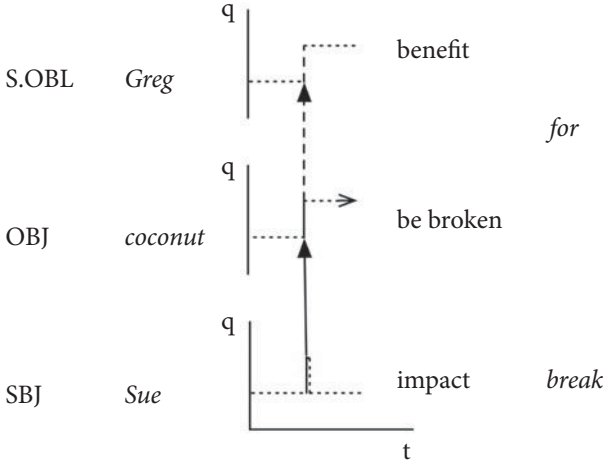
Dowty suggests that the problem with sentences like (73a) and (74a) is that we usually load stuff with the purpose of transporting the stuff, not to fill the vehicle. He notes that (75), in which the usual purpose of spraying paint on a wall is to cover the wall, is acceptable even if the paint in the can is not used up (Dowty 1991:590):

(75) Mary completely sprayed the wall with this can of paint.

Jackendoff's examples may not be instances of multiple directed changes. They may be examples of the directed change participant realized as an Antecedent Oblique rather than an Object. If that is true, they violate Tenny's hypothesis in (65b), but not the hypothesis in (69b), because the participant is still included in the verbal profile, though not its endpoint.

An indubitable example of multiple directed changes is found with beneficiaries and recipients. In example (76), adapted from example (35) from chapter 5, both the coconut and Greg undergo directed changes, and only the coconut is included in the verbal profile:

(76) Sue broke the coconut for Greg.



Problematic examples with recipients (in a broad sense of that role) are presented by Rappaport Hovav and Levin (2002; AR, 108). They argue that the theme argument (in the traditional sense) is the incremental theme whether or not it is the first Object:

(77) a. Dana read the story to her niece in an hour.
b. Dana read her niece the story in an hour.

Example (77b) does not violate the principles in (69a–b), under the analysis that both *her niece* and *the story* are Objects in coding terms (Croft 1991:208; §6.3.2). Of course, in languages that lack the Double Object construction, the translation equivalents of (77a–b) may be problematic.

Example (78) is more problematic under the interpretation that the recipients represent the incremental theme of the event (AR, 108, from Anita Mittwoch, pers. comm.):

(78) Sam distributed food to fifty senior citizens in three hours.

I also find (78) less than completely acceptable (it should also be noted that the theme and recipient in (78) are derived incremental themes). If the Object is made definite (*Sam distributed the food to fifty senior citizens in three hours*), then it is completely acceptable. This is because *the food* is quantized and may now be interpreted as the incremental theme. In example (78), one's default assumption is that the food is distributed equally among the recipients, so either theme or recipient participant could be interpreted as the incremental theme. A better example would be one in which distribution is typically unequal, as in the distribution of assets from an estate. Sentence (79) is an example of the latter, in a construction which measures out the process:

(79) By June 15, the executors were halfway through distributing the assets from Jones' estate to his heirs.

In a situation where, for example, the estate totals $2 million and the assets are unequally distributed among twelve heirs, my judgment is that (79) describes a situation in which $1 million has been distributed by the executors, not a situation in which six heirs have received their shares of the estate. In this interpretation, (79) suggests that the theme (realized as Object) is construed as the incremental theme in favor of the recipient (realized as a Subsequent Oblique).

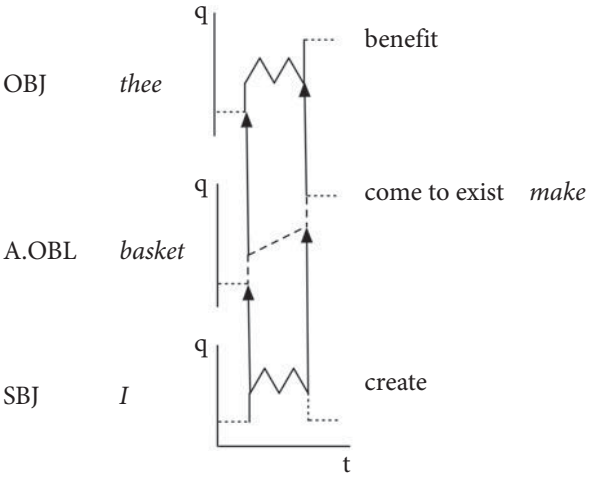
Beneficiaries and recipients are clearly arguments with directed change aspectual profiles. Beneficiaries and recipients undergo a directed change of state that cannot be attributed to another argument: breaking a coconut and benefiting Greg are completely different subevent types. If the beneficiary/recipient is encoded as a Subsequent Oblique, then (69b) is violated. If in addition there is another directed change argument, e.g. realized as Object as in (76), then (69a) is also violated. So (69a–b) are too strong as well. Nevertheless, there is suggestive evidence that at least (69a–b) represents the preferred event structure for simple events.

Crosslinguistic evidence indicates that beneficiaries and recipients are frequently, though not overwhelmingly, realized as Objects. Recipients often occur in Double Object constructions, as they do in English. The effect of Double Object realization is that both directed change arguments are coded as the endpoint of the verbal profile. In a survey of the argument realization of ‘give’ in 378 languages, Haspelmath (2005) observes that the recipient is realized as Object in a Double Object construction in 84 languages and in a Secondary Object construction (usually with the same realization of theme and recipient in case marking, but only indexation of the recipient) in 66 languages, with 39 languages exhibiting multiple constructions. Hence, coding of recipient as Object occurs in at least one construction in at least 50 per cent of the languages in Haspelmath’s sample (in fact, more that 50 per cent, because Haspelmath included languages with Subsequent Oblique case marking but indexation of the recipient as Indirect Object languages; Haspelmath 2005:427).

Also, many languages have an Applicative construction in which the beneficiary/recipient is realized as Object; this is by far the most common Applicative (Peterson 2007; §6.4.3). Moreover, among languages with a beneficiary/recipient Applicative construction, the Applicative is overwhelmingly obligatory. Finally, if there is a theme participant realized as Object in the base verb form, it often remains Object in the Applicative form (Base Object Inertia; §6.4.3). In other words, in the case when there are indubitably two directed change subevents, then there is a strong crosslinguistic tendency to encode both participants as Objects.

Nevertheless, there are examples from other languages that suggest that the participant involved in a directed change subevent is not always Object (or intransitive Subject), and hence does not delimit the verbal profile. A number of languages express ‘give’ and other transfer of possession verbs with Object realization of the recipient and Antecedent Oblique realization of the theme (Blansitt 1984; Croft 1991:207–9). In some languages, if there is a theme realized as Object in the base verb construction, then in a beneficiary/recipient Applicative the theme is realized as an Antecedent Oblique. For example, it was observed in §6.3.2 that in Sierra Miwok, there are no Subsequent Oblique case forms. Most three-participant events therefore realize the third participant in the causal chain of the event as the Object, and the second participant is realized as an Antecedent Oblique (Freeland 1951:121; the example is Southern Sierra Miwok):

(80) ʔenïh -na -y -niˑ -t̺èʔ pulákˑaˑ -s
make -BEN -FUT -2SG -1SG basket -INST
‘I will make thee a basket.’



If the event in (80) is construed as durative in Sierra Miwok, then the basket is likely to be construed as incrementally created. The benefit to the addressee only accrues when the basket is completed, hence it is a nonincremental accomplishment (see §7.3 on the unity of the temporal profiles of the subevents). The patient is therefore involved in a more prototypical directed change than the beneficiary. However, the patient is realized as an Antecedent Oblique, not as an additional Object. The Sierra Miwok and other examples do not violate (69b), because (69b) only requires a participant involved in a directed change subevent to be included in the verbal profile, but not necessarily as an endpoint (Object or intransitive Subject). Principle (69b) allows for Jackendoff's marginal English examples in (73a–b), as noted above, though not Levin and Rappaport Hovav's marginal English examples in (77a) or the many languages that realize the recipient of 'give' as a Subsequent Oblique.

In general, it appears that the occurrence of two directed changes in a single simple event is highly restricted, largely to beneficiaries and recipients of events that already have directed change arguments. Other cases of multiple directed changes are unattested. Thus, we may reformulate the principle relating directed change subevents and the verbal profile as strong tendencies in the lexicalization of events as simple verbs:

(81) a. There is only one participant involved in a directed change subevent in an event lexicalized as a simple verb. *Exception*: beneficiary/recipient participants in an event with another directed change participant. The beneficiary/recipient is often coded in the verb with an overtly derived Applicative form, in which case the verb form is not simple.

b. The participant involved in a directed change subevent is realized as Object, or as Subject if no antecedent participant is involved. *Qualification*: beneficiary/recipient participants are often also realized as Object, if there is another directed change participant realized as Object. *Exception/Weakening:* a second directed change participant (beneficiary/recipient) need not be the endpoint of the verbal profile.

The realization of a participant as Object, i.e. endpoint of the verbal profile, is often described in terms of affectedness rather than in the aspectual terms described above. Malchukov (2005) gives two crosslinguistic implicational hierarchies of Transitive encoding. Malchukov's first hierarchy applies to the type of verbs examined by Beavers, and the second applies to mental verbs. Malchukov's hierarchies are given in (82) (p. 81):

(82) a. Effective action > contact > pursuit > motion
b. Effective action > perception, cognition > emotion > physical sensation

Malchukov's category includes examples of path-incorporating verbs vs. manner verbs with Oblique destinations; it is not clear if the two should be combined in a single hierarchy. Malchukov's second hierarchy is more problematic, in that it combines mental state (*see, hear*) vs. activity (*look at, listen to*; but see pp. 81, 102), and the hierarchy involves Oblique experiencers as well as Oblique stimuli; we will set the second hierarchy; aside here.

Beavers (2011) argues for an Affectedness Hierarchy defined solely in terms of directed change (called 'scalar change' by Beavers; square brackets indicate terms used here, and examples are from Beavers):

(83) Affectedness Hierarchy (Beavers 2011:359), from most to least affected:
a. participant undergoing a quantized change [bounded directed change]
(*break, shatter, destroy, devour* x)

b. participant undergoing a non-quantized change [unbounded directed change]
(*widen, cool, lengthen, cut, slice* x)

c. participant has potential for change
(*wipe, scrub, rub, punch, hit, kick, slap* x)

d. participant is unspecified for change
(*see, laugh at, smell, follow, ponder, ogle* x)

In other words, Beavers argues that a force-dynamic notion of affectedness is unnecessary to characterize realization as Object.

The hierarchy in (83) includes completed vs. non-completed events with directed changes, which otherwise are of the same event type. In some languages, such as Finnish, the semantic difference leads to a difference in Object vs. Oblique realization of the endpoint (Ackerman and Moore 2001:84; see also the Dutch, Swedish, and German examples in (30)–(31) in §3.1):

(84) Terttu luki kirjaa (tunnin)
Terttu read:PST.3SG book:PART (hour:GEN)
'Terttu was reading the book (for an hour).'

(85) Terttu luki kirijan (tunnisaa)
Terttu read:PST.3SG book:PRTT (hour:INESS)
'Terttu read [all of] the book (in an hour).'

In English, the Conative alternation (Levin 1993:41–2) also gives rise to an Object–Oblique alternation (Croft 1998*a*:45; see also §8.2.2):

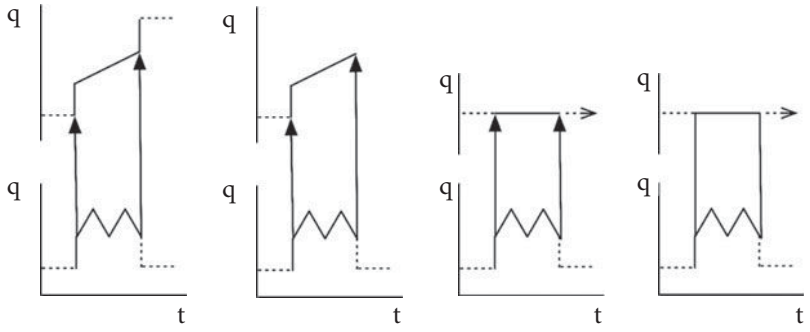
(86) a. Johnny chewed the bone.
b. Johnny chewed on the bone.

In (86a), the bone has been materially affected—broken in some way—but in (86b), only meat and gristle on the bone has been affected, and the bone remains intact.

It is not clear that the hierarchy of event classes for Transitive realization is best characterized solely in aspectual terms. Contact/impact verbs are described by Beavers as having a potential for (directed) change. These events may or may not involve a directed change, e.g. *wipe the table* [activity] vs. *wipe the table clean* [accomplishment] (§7.4.3), yet both are realized as Object in English. A seemingly more plausible explanation for the Object realization of the contacted/impacted participant is that there is a transmission of force relation between the agent and the contacted/impacted participant even when the latter does not undergo a directed change. Beavers's notion of affectedness is not necessarily connected to transitivity, since it may be applied to one-participant directed change events. However, contact events are necessarily two-participant events, so they cannot be included in a hierarchy of one-participant events.

The hierarchy of event structures in (83) and (82a), as analyzed in the three-dimensional representation, is given in (87):

(87) *Hierarchy of event types for affectedness:*



If this hierarchy is valid, then Object realization of the endpoint appears to involve at least the following causal and aspectual properties: completed vs. uncompleted directed change; directed change vs. absence of directed change; and transmission of force vs. absence of transmission of force. The prototypical simple verb lexicalization would then possess a single completed directed change that is the endpoint of genuine transmission of force. Deviation from the prototype leads to a greater likelihood of realization of the participant as a (Subsequent) Oblique rather than an Object, although Object realization remains possible for a participant lacking all of these properties.

7.5 Conclusion

In chapter 6, we argued that the causal chain of participants in event structures for simple verbs provides the basis for argument linking: the ranking of Subject and Object, and the division of Obliques into Subsequent and Antecedent Obliques. In this chapter, we have examined the contribution of temporal and aspectual structure to argument realization. The three-dimensional representation of event structure allows us to represent the different force-dynamic types described by Talmy, and to represent the temporal unity of the subevents of an event lexicalized by a simple verb. The aspectual analysis presented in chapters 2–4 also leads us to redefine the division of events proposed by Talmy and by Levin and Rappaport Hovav as a distinction between events with a directed change subevent ('result'/'path' verbs) and events lacking a directed change subevent ('manner' verbs). The presence of a directed change, and

whether the change is accomplished or not, plays a role in realization as Object: that is, it contributes to the hierarchy of affectedness that constrains the realization of an endpoint participant as Object or Oblique.

In the next chapter, we explore some properties of complex constructions denoting events, chiefly in order to see what light they shed on the semantics of simple verbs.

8

Complex predicate constructions and the semantics of simple verbs

8.1 Introduction

A number of the examples discussed in chapter 7, for example some of the co-event conflations described in §7.4.2, appear to be at the edge of semantic event structures that are lexicalized by simple verbs. The proposed constraints on the semantic structures of simple verbs—nonbranching causal chain, temporal unity, a single directed change subevent—fit most but not all event structures lexicalized by simple verbs. Those that violate the proposed constraints are at the boundary between event structures lexicalized as simple verbs and structures expressed as some type of morphosyntactically complex construction, ranging from derived verb forms (e.g. Causative and Applicative), to verbs with resultative or depictive secondary predicates, to Serial Verbs and main verb plus subordinate Converb constructions, or even independent clauses in a Coordinate construction.

Unfortunately there are no systematic crosslinguistic surveys of what types of co-events may be lexicalized as simple verbs. (Talmy 2000*b* provides a comparison of English and Atsugewi; most of the Atsugewi constructions involve morphologically complex verb stems in contrast to simple verbs + satellites in English.) Thus, we cannot say how typical or atypical are the apparently anomalous event lexicalizations described in the preceding chapters. However, we may examine some of the complex predicate constructions which have been described in some detail, both in English and in other languages, in order to determine their semantic range. Their range may reflect an image of what type of event structure is or is not lexicalized as a simple verb. We begin with the English Resultative constructions, which have been explored in great detail, and then turn to Depictive, Serial Verb, and Converb constructions, whose typology has been explored in recent work.

8.2 Two types of Resultatives

8.2.1 Temporally dependent vs. independent, adjunct vs. argument, or weak vs. strong

Just as Rappaport Hovav and Levin argue for two types of event structures for simple verbs, they argue for the existence of two types of Resultative constructions in English. The Resultative construction consists of a main verb plus a Result phrase (functioning as a secondary predicate), usually an Adjectival or Prepositional phrase (see §8.2.2). Rappaport Hovav and Levin also use their analysis of simple vs. complex events, presented in §7.4.1, to account for the two different types of Resultative constructions in English (Rappaport Hovav and Levin 2001; see also Iwata 2006*a* and Washio 1997, discussed below).

The two different types of Resultative constructions are illustrated in (1) (Iwata 2006*a*:453, 454) and (2) (Rappaport Hovav and Levin 2001:768, 769):

(1) a. They froze the ice cream solid.
b. The river froze solid.

(2) a. Miss Kitty Perkins, who talked seven warts off my hands . . .
b. the dog barked him awake . . .
c. poor Sam . . . had coughed himself into a haemorrhage . . .

The Resultative construction in (1a–b) occurs with the verb *freeze* combined with the Result phrase *solid*. The verb may occur in the same argument structure minus the Result phrase: *They froze the ice cream; The river froze*. This is a characteristic of the first type of Resultative (Iwata 2006*a*:457). Rappaport Hovav and Levin call this the Bare XP (Intransitive-Based) Resultative (Rappaport Hovav and Levin 2001:768), since the Transitive variant in (1a) is the lexical causative of the Intransitive variant in (1b). The Resultative construction in (2) occurs with an overtly realized Object preceding the Result phrase. The verbs in (2) cannot occur in the same argument structure minus the Result phrase: **Miss Kitty Perkins talked seven warts;* **The dog barked him;* **Poor Sam had coughed himself*. For this reason, the second type of Reflexive has sometimes been called a Fake NP or Fake Reflexive Resultative. In particular, the verb *cough* in (2c) normally occurs as an Intransitive verb, but here requires the Fake Reflexive, unlike the Intransitive *freeze* in (1b).

The Resultatives in (1)–(2) do not exhaust the full range of Resultative types. But they represent clear cases of the dichotomy proposed by Rappaport Hovav and Levin, and of essentially the same dichotomy (but with a different analysis) proposed by Iwata. We will introduce their analyses beginning with these types.

Rappaport Hovav and Levin argue that the Bare XP Resultative is characterized by temporal dependence: the event named by the verb and the

change to the result state named by the Result phrase necessarily occur simultaneously (see §7.3). For example, the process of freezing and the process of becoming solid necessarily occur simultaneously. Temporal dependence occurs because the event described in (1) is simple: there is only one subevent, which is both a freezing event and a becoming solid event. In contrast, in (2) there is no temporal dependence: the two events do not unfold simultaneously, certainly not necessarily simultaneously. For example, in (2b), the becoming awake event does not (necessarily) unfold simultaneously with the barking event. This analysis was questioned in §7.3, and we will return to this objection below; but we do not deny that there is a semantic difference here.

Rappaport Hovav and Levin show that the contrast in the structure and interpretation of the two Resultative constructions is not attributable to individual verbs. There are examples of the same verbs with either a Bare XP Resultative or a Reflexive Resultative, with different Result phrases (Rappaport Hovav and Levin 2001:773):

(3) a. They walked to the pavilion.

b. '. . . Walk yourself into a coma and see what your subconscious comes up with.'

[Mary Wesley, *The Camomile Lawn*, p. 213]

They even give attested examples of both Resultative constructions for same verb and same Result phrase (Levin and Rappaport Hovav 1999:201, Rappaport Hovav and Levin 2001:774):

(4) a. One woman gets up to leave, but Red-Eyes grabs her roughly by the arm and pulls her into his lap. SHE WRIGGLES FREE, but remains seated obediently beside him.

[*The Ottawa Citizen*, November 30, 1997, p. D10]

b. Mr Duggan became alarmed about being caught in the door of a lift which was about to begin its descent and WRIGGLED HIMSELF FREE.

[*The Irish Times*, December 2, 1994, p. D11]

Rappaport Hovav and Levin argue that the semantic difference between the two Resultative constructions is that in the Bare XP Resultative, the two subevents, wriggling and becoming free, unfold together, while in the Reflexive Resultative, the two subevents do not unfold together:

> A reflexive resultative is required whenever wiggling, wriggling, or kicking is used to bring about a state that is not incrementally brought about by moving in the designated manner since in such instances the events cannot unfold together.
>
> (Rappaport Hovav and Levin 2001:778)

Rappaport Hovav and Levin also observe that the difference may be a matter of construal (Levin and Rappaport Hovav 1999:217):

(5) a. A bantam chick kicks free from its shell. [Picture caption, *Chicago Tribune*, March 21, 1996, p. 8]

b. "... They... watched a duckling kick itself free of its shell..." read a newspaper report of the outing.

[*The Toronto Star*, August 8, 1991, p. N4]

They argue that the subevents (the chick's kicking and the chick's becoming free from its shell) are temporally dependent, hence the Bare XP Resultative construction is to be expected; but they note of (5b):

This example is taken from a description of the new experiences of some "city girls"—a group of Girl Guides from Toronto—on a visit to a farm. By using the reflexive resultative pattern, the writer highlights the two distinct subevents involved, conveying that the girls are witnessing a chick's hatching for the first time.

(Levin and Rappaport Hovav 1999:218)

Rappaport Hovav and Levin also examine Resultatives in which the Object argument does occur with the verb when the Result phrase as in *Kim wiped the table (clean)*. Rappaport Hovav and Levin make a distinction between what they call change-of-state (COS) verbs, incremental theme verbs and potential incremental theme verbs. COS verbs, such as *break*, denote a pure change of state and are construed almost exclusively as achievements or accomplishments. Change of state verbs tend to be restricted to the argument structures in (6) (Fillmore 1970:122; see §5.2.1):

(6) a. *Agentive causative*: John broke the stick (with a rock).
b. *Effector (instrument) causative*: The rock broke the stick.
c. *Anticausative*: The stick broke.

Incremental theme verbs may be construed as accomplishments, as in (7); but they may also occur in the Fake NP Resultative construction, as in (8), or in argument structure constructions that lack an Object entirely, as in (9)–(11) (Rappaport Hovav and Levin 2002:274):

(7) a. Jane read *War and Peace*.
b. Jane ate the entire pizza.
c. Jane wrote a novel.

(8) a. The teacher read us into a stupor.
b. My kids ate me into the poorhouse.
c. I wrote myself out of a job.

(9) Dana read/ate/wrote.

(10) a. Dana read from the book.
b. Chris ate from the apple

(11) a. Chris ate at the apple.
b. I wrote at my book.

Rappaport Hovav and Levin also consider a category of 'potential incremental theme verbs', such as many surface contact verbs, which are typically construed as either an undirected activity or an (incremental) accomplishment in the simple Transitive construction (Rappaport Hovav and Levin 2002:274):

(12) a. Lee scrubbed the tub for hours.
b. Lee scrubbed the tub in three minutes flat.

Potential incremental theme verbs may also occur in the Resultative construction, with its "true" Object, as in (13), or with other kinds of Objects, as in (14)–(15) (see §7.4.1):

(13) Kay wiped the counter clean.

(14) Kay wiped the fingerprints from the counter.

(15) Kay wiped the polish onto the table.

COS verbs are the canonical example of complex events for Rappaport Hovav and Levin. Incremental theme verbs, actual or potential, may be complex events—when the simple Transitive is construed as an accomplishment or directed activity—or simple events with two arguments, as in their analysis of *Kay wiped the counter*. In the latter case, subevents may be added, as in (13)–(15). However, the examples of potential incremental theme verbs in the Resultative constructions in (13)–(15) exhibit temporal dependence. For example, in (13), the counter's becoming clean unfolds at the same time as Kay's wiping activity, and in (14)–(15), the movement of the fingerprints off the counter or of the polish onto the table unfolds at the same time as Kay's wiping activity.

Iwata argues for essentially the same dichotomy in Resultative constructions as do Rappaport Hovav and Levin, but with a different analysis (Iwata 2006*a*; Iwata does not compare his analysis to that of Rappaport Hovav and Levin). Iwata argues that the salient feature of the Resultative construction in (1) is that the verb meaning (without the Result phrase) already entails the result state, and therefore the Result phrase is actually an "adjunct", further specifying the nature of that result state. For example, in (1) the freezing event entails that a result state, being frozen, is achieved (at least in the bounded construal of the Past tense–aspect construction of English), and the Result

phrase *solid* simply specifies more precisely the nature of that result state. Iwata calls this type the Adjunct Resultative (or Type B Resultative); this type is the focus of his article. In contrast, the examples in (2) are Argument Resultatives (Type A Resultatives): they typically add an argument, and therefore add a result state that is not present in the verb's meaning when the verb occurs in a construction without the argument and its accompanying Result phrase.

Iwata's analysis of the Adjunct Resultative accounts for the restrictions on the Result phrase found with it. In particular, the Adjunct Resultative usually allows only a highly restricted set of Result phrases (*The puddle froze solid/ *worthless*; Iwata 2006*a*:468). This is because the result state is already partially specified by the verb, which thus semantically selects for the type of Result phrase. Wechsler further argues that this type of Resultative takes only Adjectival Result phrases that denote closed scales (see §3.1.1), such as *He wiped it clean/dry/smooth* (Wechsler 2005:265). This is because the upper bound of the closed scale corresponds to the result state when combined with a verb in the Adjunct Resultative construction. However, Boas notes that even open-scale adjectives can be construed as resultative, as in *Dip a soft cloth in the solution, wring it damp and wipe furniture with it* (Boas 2005:459, fn. 38).

Iwata has to allow for a relatively unspecified result state for some Adjunct Resultatives, however. For example, he considers *The front door was painted a shiny black* to be an instance of an Adjunct Resultative (Iwata 2006*a*:454), because painting something entails that it is painted some color, though *paint* does not specify what the color is. In fact, Iwata's prototypical example *freeze* is similar. A pond can freeze solid or it can freeze over (i.e. only the surface is frozen); *freeze* entails that some of the body of water is frozen, but the Result phrase specifies whether part or all of it is.

Iwata extends his analysis of Adjunct Resultatives to the following examples:

(16) The door opened wide.

(17) He cut the meat thin.

(18) I closed my eyes tight.

(19) The fuselage broke open.

(20) He tore Adam's tie loose.

(21) Sheila . . . fell flat on her hands and face on the path.

In these examples, the Result phrase cannot always be directly predicated of the relevant argument to denote the state that results from the event: *the meat is thin* [in the intended meaning], *my eyes are tight, the fuselage is open, Adam's tie is loose* [in the intended meaning], *Sheila is flat*. This is not always a reliable test.

Iwata analyzes the semantic difference as one in which the event involves some transformation or rearrangement of the object, sometimes with respect to another unmentioned object: the door (barrier object) has moved away from the door (aperture), the meat is transformed into slices, my eyelids are shut tight over my eyes, the fuselage is in two pieces, the tie is untied or removed, and Sheila's position is prone on the ground. In all of these cases, the structural integrity or configuration of the object changes over the course of the event.

In addition, Iwata observes that the types in (16)–(21) also do not entail the result state, at least not obviously. In (16)–(21), the event denoted by the verb entails movement of the object, or part of the object, that leads to a resulting state, which may be further specified by the Result phrase (tight, open, loose; Iwata 2006*a*:475–6). Iwata acknowledges that the *flat* type does not really entail a result state of the type expressed by the Result phrase.

Iwata argues that his dichotomy of Resultative constructions accounts for observations made by Washio (1997) about a contrast between English and Japanese Resultatives. Washio observes that the Japanese translation equivalents of the English Resultatives in (22)–(23) are grammatical, but the Japanese equivalents of the English Resultatives in (24)–(25) are ungrammatical:

(22) boku -wa aisu kuriimu -o katikati-ni koorase -ta.
I -TOP ice cream -ACC solid freeze -PST
'I froze the ice cream solid.'

(23) kare -wa teeburu -o kirei-ni hui -ta.
he -TOP table -ACC clean wipe -PST
'He wiped the table clean.'

(24) *uma -ga maruta -o subesube-ni hikizut -ta.
horse -NOM log -ACC smooth drag -PST
Intended meaning: 'The horses dragged the logs smooth.'

(25) *karera -wa kutu -no soko -o boroboro-ni hasit -ta.
they -TOP shoe -GEN sole -ACC threadbare pull -PST
Intended meaning: 'They ran the soles of their shoes threadbare.'

Washio argues that the four examples represent four different semantic classes of predicates, and the semantic differences between them account for the differences in grammaticality between the English and Japanese Resultative constructions.

Washio proposes that in the class represented by (22), *freeze X solid*, the verb specifies a change of state, hence the patient undergoes the change of state. The resulting state can therefore be expressed in the Resultative construction in either English or Japanese. In the class represented by (23), *wipe X clean*, the

verb specifies that the patient is affected. A change of state is not necessary, but change is specified in a certain direction. This type is also acceptable in either English or Japanese. Washio describes these two types as 'weak resultatives'.

The next two classes that Washio describes do not have equivalent Resultative expressions in Japanese that are grammatical. Washio proposes that in the class represented by (24), *drag logs smooth*, the verb specifies that the patient is affected, but the change of state is not necessary, nor is it specified to occur in a certain direction. Finally, Washio proposes that in the class represented by (25), *run soles threadbare*, the verb specifies neither a patient nor a change of state in any direction. Washio describes these two types as 'strong resultatives'. In other words, Washio overall identifies two types of resultatives, like Rappaport Hovav and Levin, and Iwata (among others).

Iwata argues that the Resultatives allowed in Japanese are only Adjunct Resultatives (Washio's weak resultatives), that is, Resultative expressions that specify a result state entailed by the verb. Argument Resultatives (Washio's strong resultatives) are unacceptable in Japanese. Again, not all verbs that occur with Adjunct Resultatives actually entail a result state. As both Washio and Rappaport Hovav and Levin note, verbs such as *wipe* have two interpretations, only one of which entails a result state.

Iwata also argues that a category identified by Washio as 'spurious resultatives' (Washio 1997:18) are Adjunct Resultatives:

(26) kare -wa kutu -no himo -o kataku/yuruku musun -da.
he -TOP shoe -GEN lace -ACC tight/loose tie -PST
'He tied his shoes tight/loose.'

(27) kare -wa niku -o atuku/usuku kit -ta.
he -TOP meat -ACC thick/thin cut -PST
'He cut the meat thick/thin.'

Examples (26)–(27) belong to the subtypes of Adjunct Resultatives in which the result state is not simply predicated of the Object argument (see examples (16)–(21) above).

The analyses of Rappaport Hovav and Levin and Iwata are quite similar. Iwata's observation that the result state is already entailed for Adjunct Resultatives is accounted for by Rappaport Hovav and Levin's simple event analysis: there is only one subevent, which has a result state. One could say that Iwata focuses his analysis on the result state, while Rappaport Hovav and Levin focus on the unfolding process. Likewise, Iwata assumes that Argument Resultatives add an argument, namely the Fake NP or Fake Reflexive argument. It is this added argument that is found in the added subevent in

Rappaport Hovav and Levin's complex event analysis of the resultatives that lack temporal dependence.

Iwata's analysis runs into problems in the cases where there appears to be an Adjunct Resultative, at least with the tests that he employs, but the verb does not in itself entail a result state. This occurs in two general cases. The first case is those verbs which may be construed as undirected activities or as incremental accomplishments (or directed activities), such as *wipe*, or for that matter *paint*. Since the verb has the aspectual potential to be undirected, one cannot say that a result state is entailed in all of its aspectual construals, even if a result state is entailed in one of its construals (obviously, the construal that occurs with the Resultative). The second case is the minimal pairs observed by Rappaport Hovav and Levin, such as *wriggle* and *kick* cited above, where the same verb occurs in either Resultative construction in English.

Another difference between Iwata's and Rappaport Hovav and Levin's analyses is found in their treatment of (28), adapted from Levin and Rappaport Hovav (1999:204; Iwata 2006*a*:453):

(28) a. The kettle boiled dry.
b. The clothes steamed dry.

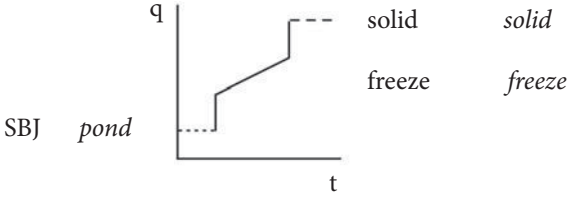
Iwata analyzes (28a–b) as Argument (Type A) resultatives, because the verbs do not entail the result state, and they may be paraphrased as, e.g., 'the clothes became dry by steaming'. However, (28a–b) appear to be examples of the Bare XP Resultative construction: the form is not **The kettle boiled itself dry*. Rappaport Hovav and Levin argue that there is temporal dependence between the clothes steaming and becoming dry (Rappaport Hovav and Levin 2001:781). They consider the paraphrase to justify the positing of two subevents, but argue that the two subevents are actually a simple event structure: the steaming and becoming dry are 'event descriptions compositionally derived from the verb and the result XP' (p. 781, fn. 13).

8.2.2 An aspectual analysis, with a digression on unspecified Objects and related constructions

Rappaport Hovav and Levin's analysis of the two types of resultatives in terms of simple vs. complex events, just like their analysis of manner vs. result verbs (§7.4.1), depends on what counts as a simple or a complex event in the decompositional analysis. Again, a different analysis must be provided in the three-dimensional model, since virtually all events are complex on at least one dimension in the model. And again, directed change plays a significant role, though not the only role, in distinguishing the two types of resultatives.

The prototypical Bare XP Resultative/Adjunct Resultative denotes an incremental accomplishment, that is, an incremental process that leads (in a bounded aspectual construal) to a result state.[1] This analysis is presented for *The pond froze solid* in (29):

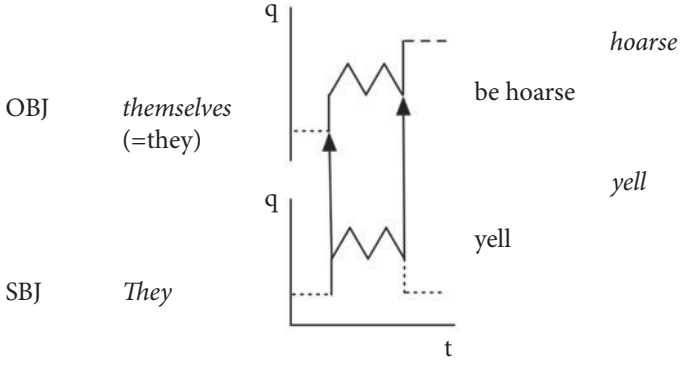
(29) The pond froze solid.



Temporal dependence exists in (29) because there is indeed only one (causal) subevent involving the participant that undergoes the change. Likewise, the aspectual construal of *freeze* in the simple Intransitive is also a directed change, with a similar result state.

The prototypical Fake NP/Reflexive Resultative, on the other hand, denotes a nonincremental accomplishment, that is, an undirected activity phase that ends in a directed achievement to the result state (in a bounded aspectual construal). This analysis is presented for *They yelled themselves hoarse* in (30):

(30) They yelled themselves hoarse.



A nonincremental accomplishment is a marginal member of the directed change category (see §3.1.1). A nonincremental accomplishment has features of both an undirected change—the core activity phase is nonincremental—and a directed change—it ends in a directed achievement to a result state.

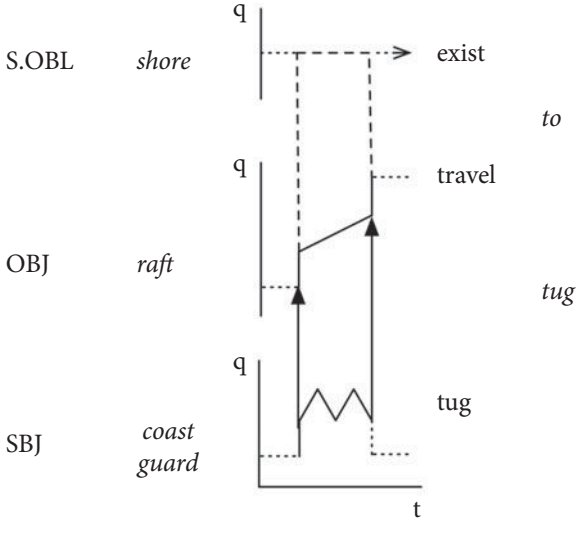
[1] Rappaport Hovav and Levin also note the incremental process condition, which they describe as a scale, on Bare XP Resultatives (Rappaport Hovav & Levin 2001:781–2); but they treat it as a contingent rather than a necessary feature of the meaning of this construction.

Since resultatives are telic (*q*-bounded), the contrast between Bare XP and Fake NP/Reflexive Resultatives is, in our analysis, a difference in the aspectual type of the event phase between the event boundaries: directed and undirected, respectively.

The aspectual contrast between the two types of resultatives is largely matched by a contrast in aspectual potential of the verb in the simple Intransitive or Transitive construction. If the verb occurs in the English Bare XP Resultative construction and is therefore construed as an incremental accomplishment, then the same verb has an accomplishment (or directed activity) construal in the simple argument structure construction. In some cases, the directed change construal in the simple argument structure construction alternates with an undirected activity construal. In other words, in the English Bare XP Resultative, the construction employs the directed change aspectual construal and adds and/or specifies the result state on the *q* dimension. In contrast, if the verb occurs in the English Fake NP/Reflexive Resultative construction and is therefore construed as a nonincremental accomplishment, then the same verb has an undirected activity construal in the simple argument structure construction. The result state is part of a second subevent introduced by the Fake NP/Reflexive NP Resultative construction, which is construed as a nonincremental accomplishment.

This aspectual analysis of the difference between the two types of Resultative constructions extends naturally to Resultatives with Transitive verbs. Rappaport Hovav and Levin describe the examples in (31a–b) as temporally dependent (Rappaport Hovav and Levin 2001:793):

(31) a. We all pulled the crate out of the water.
b. The coast guard tugged the raft back to shore.



Rappaport Hovav and Levin describe these as 'transitive-based resultatives' under their category 'resultatives with temporally dependent coidentified subevents (simple event structure)' (p. 793). However, the event structure is complex (in Rappaport and Levin's analysis), because the agent (we, or the coast guard) is in another subevent which causes the temporally dependent subevents to take place. This is morphosyntactically manifested in the Transitive argument structure of (31a–b), just like the Fake NP/Reflexive Resultative. Yet the former exhibit temporal dependence while the latter exhibit temporal independence, in Rappaport Hovav and Levin's terms. The simple vs. complex event structure distinction captures the distinction between the two types of Resultative constructions for events whose default realization is as a one-participant event in the Intransitive argument structure construction. But it does not do so for events whose default realization is as a two-participant event in the Transitive construction. On the other hand, the 'temporally dependent' Resultatives, both Intransitive and Transitive, are incremental accomplishments, while the 'temporally independent' Resultatives are non-incremental accomplishments.

In §7.3, we argued that temporal dependence/independence is not quite the right analysis of the semantic difference between the two English Resultative constructions. Here, we have argued that the Bare XP Resultative construes the event as an incremental accomplishment, while the Fake NP/Reflexive Resultative construes the event as a nonincremental accomplishment. One effect of the nonincremental accomplishment construal is to give the appearance of temporal independence. The initiator's activity is clearly durative, but the directed achievement that ends the nonincremental accomplishment in the endpoint subevent occurs immediately following the activity phase. Although the transition to the result state occurs at the end of the temporal interval profiled by the causing subevent, the process that leads to the result state begins with the causing subevent. For example, in (2b) in §8.2.1, the series of barks, not just the last bark, leads to the waking up of the person, and in (2c) the series of coughs leads to the hemorrhage. In §8.2.1, we also argued that even if the transition of the caused subevent occurs not exactly at the end of the causing subevent, the granularity of the scalar adjustment on the time dimension is probably coarse enough to treat them as about the same time. But the crucial semantic distinction is not when the result state is achieved relative to the causing subevent—they may indeed coincide—but whether the accomplishment is incremental or nonincremental.

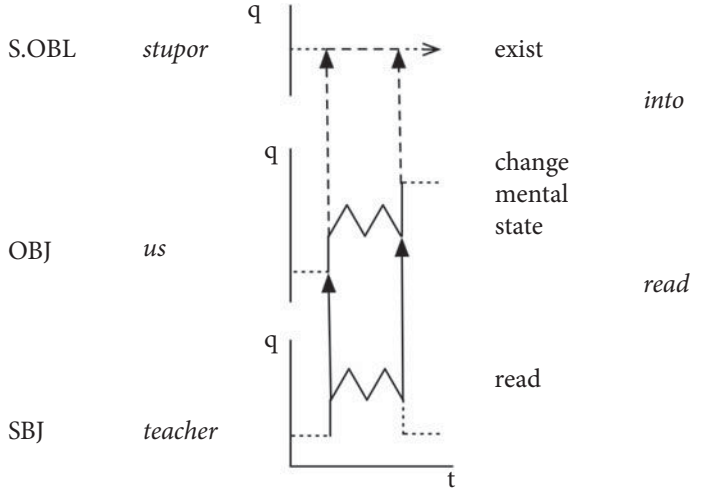
The examples with *walk* in (3a–b) in §8.2.1 also illustrate the aspectual contrast. The Bare XP Resultative is an incremental accomplishment: the walking progresses incrementally along the path. The Fake Reflexive Resultative is a nonincremental accomplishment: the walking causes an unmeasured process

that ends in falling into a coma. The examples with *wriggle free* and *kick free* in (4)–(5) show that alternative construals of the same event type are possible. *Kick* may be punctual in its construal, and so the difference between (5a) and (5b) is a difference between a simple directed achievement and a cyclic achievement causing a directed achievement. In some cases, a default cyclic achievement may be construed as a directed achievement, as in Rappaport Hovav and Levin's example *The line clicked dead* (Rappaport Hovav and Levin 2001:778).

Rappaport Hovav and Levin also note that Fake NP Resultatives occur with incremental theme verbs and potential incremental theme verbs (see §8.2.1). The directed activity construal is available for these verbs when their endpoint participants are realized as Objects—the representation-source theme for *read*, the food mereological theme for *eat*, and the created object mereological theme for *write*. The directed activity construal of *read, eat*, and *write* behave like COS verbs. The difference is that incremental theme verbs such as *read* may also occur in the Intransitive argument structure construction without overt Object participants, as in (9) in §8.2.1, or *The teacher was reading*. In this construction, the event is construed as an undirected activity (Mittwoch 1982). If the endpoint is realized as an Oblique, using a Partitive or Conative construction as in (10) or (11) respectively, the activity is still undirected—there is no sense of an ordering of states on the *q* dimension for the processes in (10)–(11) in the way that there is in (7).

The Fake NP Resultative of incremental theme verbs also lacks the Object participant found in the Transitive argument structure construction with these verbs. Instead, it realizes a new participant as Object, such that the undirected activity subevent of the participant in the one-participant construal causes the (nonincremental) accomplishment subevent of the Object participant to come about, as in (32):

(32) The teacher read us into a stupor.



The Fake NP Resultative construal in (32) is licensed by the construal of *read* in the Intransitive construction: *read* is a one-participant undirected activity, and like other one-participant undirected activities, may combine with another participant to be expressed in a Fake NP Resultative construction. The analysis in (32) implies that the endpoint of Transitive *read*, the thing being read, simply is not construed as part of the causal chain profiled by the clause. Is this the best analysis? In order to answer this question, we examine the status of the absent participant in (32) and compare the Object-less construction in English to related constructions found in other languages.

In this case the absent participant is interpreted as necessarily indefinite. This phenomenon is called the unspecified object (Levin 1993:33 and references cited therein); Indefinite Null Instantiation (INI: Fillmore and Kay 1993; Lambrecht and Lemoine 2005; see also Fillmore 1986) or a-definites (Koenig and Mauner 2000). We will use INI to describe the phenomenon. INI contrasts with Definite Null Instantiation (DNI: Fillmore and Kay 1993; Lambrecht and Lemoine 2005), i.e. null but definite reference to a highly accessible referent in the discourse context. DNI is restricted in English to specific constructions with specific verbs, such as *He won/lost* [the contest] (Fillmore 1986:100), but it occurs freely in many languages in which case it is known as null anaphora (for more examples of DNI in English, see §9.2).

INI may occur to describe specific events for certain classes of verbs, listed in Levin (1993:33), including incremental theme verbs. INI also occurs in the description of generic or habitual events. Even events denoted by COS verbs, i.e. two-participant causative events that are construed as accomplishments or directed achievements, allow INI if construed generically, and in some cases even specifically (Goldberg 2001:507):

(33) a. Tigers never kill at night.
b. Scarface killed again.

Finally, as noted above, many verbs that allow INI in specific event contexts may allow the participant to be realized as an Oblique that is less completely affected (see (86) in §7.4.3, and the Conative alternation in Levin 1993:41–2).

These three contexts—unspecified object, generic, and less-affected participant—are exactly the most common functions of the Antipassive construction in many languages (Cooreman 1994; Polinsky 2005). The Antipassive construction is a detransitivizing construction that is overtly coded, usually by a verbal affix. In many languages, the former Object participant is prohibited from occurring in the construction; in other languages, it may be realized as an Oblique with the less-affected or generic interpretation (Cooreman 1994:52–6; Polinsky 2005:438). Cooreman provides an example of an Antipassive in Tzutujil which is translated with an INI COS verb (Dayley 1985:346, cited in Cooreman 1994:58):

(34) ja d'oktoor ja xuuli qas utz nq'omaani
the doctor who arrived.here very well 3SG.ABS:cure:ANTI
'The doctor who arrived here cures very well.'

Antipassives and INI share another property, namely the lowered topicality or discourse availability of the participant. Both Cooreman (1987:76) and Thompson (1994:48) argue on the basis of text analyses that the Antipassive participant is much lower in topicality than the same participant realized as an Object of a Transitive construction. Koenig and Mauner (2000) observe that a-definites (which include INI participants) generally cannot serve as antecedents for later reference. These similarities suggest that INI is analyzable as an Antipassive lacking overt derivation; as noted elsewhere in this book (e.g. §§6.2.3, 6.4.3), English frequently lacks overt derivation for verbal alternations where other languages require it.

Another construction found across languages that is functionally similar and may cast light on the best analysis for INI (and Antipassives) is Noun Incorporation. As with Antipassives, Noun Incorporation is used for a range of functions that differs from language to language, but certain functions are found in most or all languages that have some sort of Noun Incorporation, and there is a hierarchy of the occurrence of those functions in a language (Mithun 1984). The more widely occurring, core functions of Noun Incorporation—Mithun's Type I and Type II Incorporation—involve detransitivization and, at least for Type I Incorporation, an indefinite or generic function for the incorporated "participant" (in quotes here, because it is not clear to what extent it is a participant). The incorporated participant is not realized as an argument phrase. The incorporated participant may not be available as an antecedent for future reference, or it is less topical than a participant realized as an argument in the case of Mithun's Type III Incorporation.[2]

Another similarity between Noun Incorporation and INI can be found in the semantic restrictions implicit in some INI constructions, as in (35)

[2] In some languages, Incorporated Nouns do not have this reduced discourse status. Mithun calls this Type IV Incorporation; it is the least common type of Incorporation, and languages that have Type IV Incorporation also have Type I–III incorporation. Type IV Incorporation does resemble INI and Antipassive in some languages in that an external argument is also allowed, as in this Caddo example (Mihun 1984:865):

(i) Kas- sah- kú- n- dân- na- 'na' kiswah
should- 2.AG- 1.BEN- DAT- granular.substance- PL- make parched.corn
'You should make me some parched corn.'

This is similar to languages in which INI and/or Antipassive alternate with Oblique realization of the same argument. It is not clear whether the function of overt arguments in Type IV Incorporation is similar to that in INI/Oblique and Antipassive/Oblique alternations.

(Lambrecht and Lemoine 2005:21, 23) and the semantic restriction encoded by an Incorporated noun (Mithun 1984):

(35) a. Mom is busy; she's ironing. [clothes]
b. Are they hiring at the Renault plant? [workers]
c. My throat hurt so much that I couldn't eat or drink. [food/potable liquid]

(36) Chukchi [Mithun 1984:861, from Bogoras 1910]
ni- ré'w- qin
he- whale- hunted
'He hunted.' [whales] or 'He whale-hunted.'

(37) Mokilese [Harrison 1976:163; cf. Mithun 1984:849]
Ngoah ko oaring -a
I grind coconut -PRF
'I finished grinding.' [coconut] or 'I finished coconut grinding.'

The semantic restrictions in (35a–c) are similar to those overtly expressed by an Incorporated noun in (36)–(37). INI is more limited in that it restricts its absent participant's semantic type to the typical filler of that role. But even in the case of INI, variation is possible: *He drinks* may imply either potable liquid or alcoholic beverage depending on the context (Fillmore and Kay 1993:7.4).

INI, Antipassive, and Noun Incorporation (Type I–II and possibly Type III) are similar in function and therefore should have a similar semantic representation in terms of the status of the grammatically absent (or Incorporated) participant. The participant is clearly lower in topicality and is not realized as Subject or Object, nor even as an Oblique in many cases. Hence it is not part of the verbal profile. The question is whether it is even part of the causal chain.

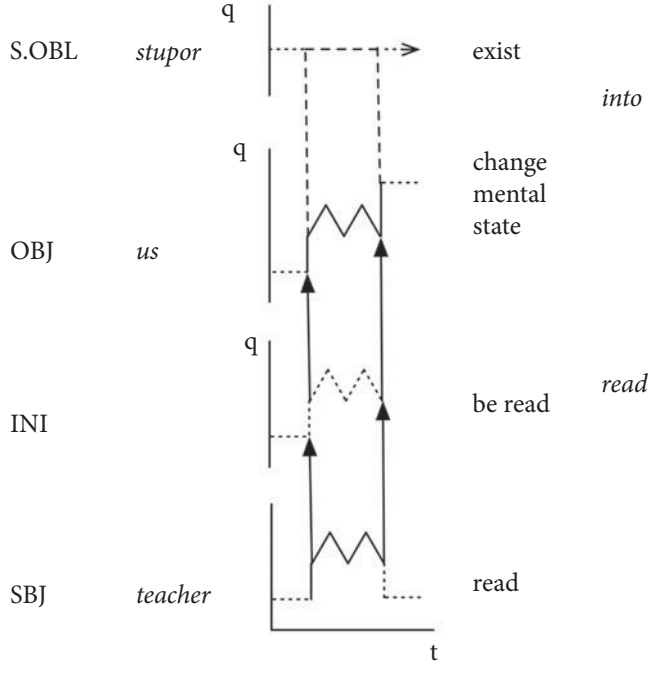
There is one piece of evidence for one type of INI that suggests that the absent participant should at least be part of semantic frame of the event, if not in the causal chain profiled by the verb. Verbs of substance emission such as *spit, sneeze*, and *leak* in English allow INI; in fact, they are more common in the Intransitive construction. They also allow a Result phrase describing the spatial path traversed by the absent participant, not the realized one. Goldberg calls these Implicit Argument Resultatives (Goldberg 2005*b*:20–1; Goldberg and Jackendoff 2004:537):

(38) a. Pat sneezed onto the computer screen.
b. Don't spit into the wind.
c. The toilet leaked through the floor into the kitchen below.
d. Bill drank from the hose.

Implicit Argument Resultatives imply that the INI participant is present in the causal chain, since the figure–ground relationship holds between the INI participant and the path expression; but it is unrealized in (38a–d). As Goldberg notes, the INI participant may be realized in the Implicit Argument Resultative construction, e.g. *Bill drank water from the hose.* However, in the Fake NP Resultative construction, the INI participant is obligatorily unrealized, not unlike the Antipassive endpoint participant or the participant corresponding to the Incorporated noun in Type I and Type II Noun Incorporation.

In this analysis, unlike the analysis represented in (32), the semantic structure of a verb in the Fake NP Resultative construction would be represented as below:

(39) The teacher read us into a stupor.

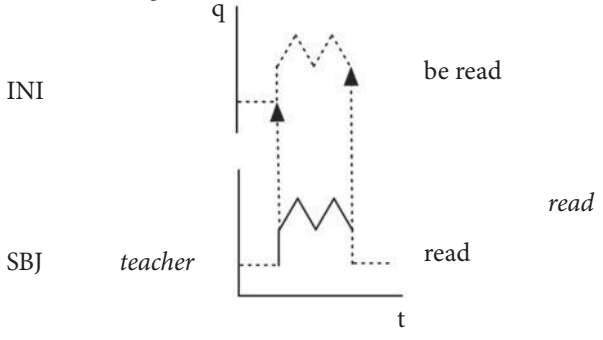


This semantic structure of the Fake NP Resultative with a verb like *read* resembles that of the realization of Oblique instruments, in that there is a subevent between the Subject and Object participant subevents that is not profiled by the verb. However, in INI the intermediate participant is unrealized, and sometimes obligatorily unrealized. Of course, unrealized participants are part of the semantic frame of the event, as they are represented in FrameNet for example (see §9.2). But unrealized participants are not

necessarily part of the causal chain profiled by the verb, and so they have not been represented in the event structures in this book. Nevertheless, in at least this case, it appears that the unrealized but semantically presupposed participant must be represented.

It may also be that the unrealized participant should be represented as part of the causal chain that includes the verbal profile in INI and Antipassive constructions as well, as in the event structure representation in (40):

(40) The teacher is reading.



We have of course represented the corresponding participant in Type I–II Noun Incorporation constructions, but in that case, there is a lexical realization, albeit not as a syntactic argument phrase.

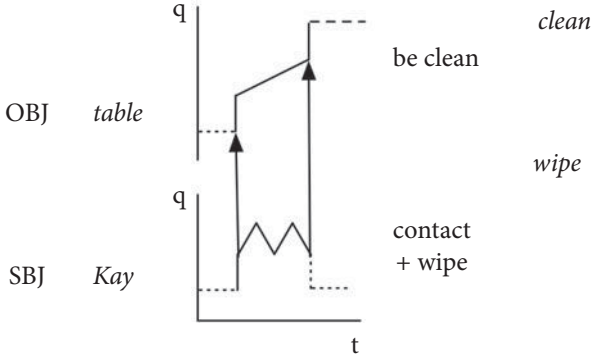
The INI role is represented as part of the argument structure construction in (39)–(40). In Croft (2001:275–80), I argue that Definite Null Instantiation is represented as part of the argument structure construction, but suggested that INI may not need to be represented as part of the argument structure construction.[3] The evidence presented here implies that at least in the case of Implicit Argument Resultatives and Fake NP Resultatives with incremental theme verbs (in Rappaport and Levin's sense), the INI role must be part of the argument structure construction.

The situation with *wipe*, and presumably other potential incremental theme verbs, is somewhat different. English *wipe* denotes a two-participant event, with a wiper and a surface, and may be construed as a directed or undirected activity in the Transitive argument structure construction. A sentence such as *Kay is wiping the table* can either describe an undirected

[3] Free Null Instantiation (FNI) participants are not represented as participants in the argument structure construction, although they occur in the semantic frame of the events; see §9.2.

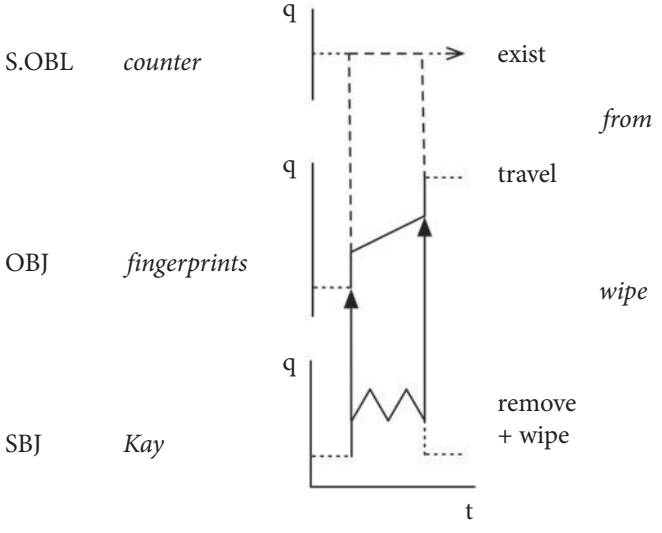
wiping process or a gradual cleaning of the surface of the table that has not yet reached its end state. If *wipe* is construed as a directed activity, it may take a Result phrase describing the (typical) result state of that activity:

(41) Kay wiped the table clean.

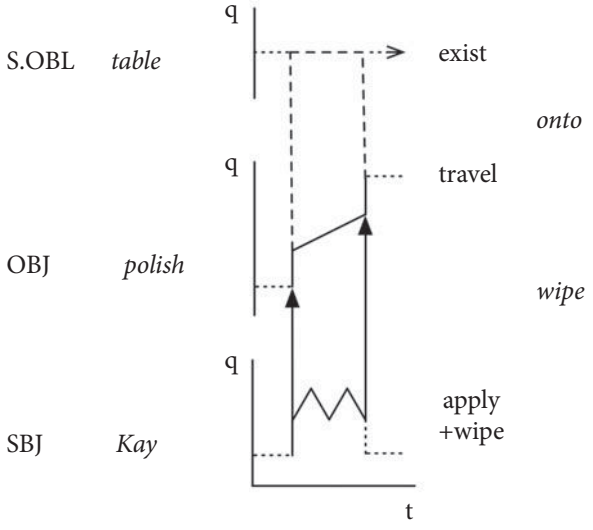


English *wipe* may also be construed as a verb of application or of removal of a substance to/from the surface, without any overt derivation, as in (42)–(43):

(42) Kay wiped the fingerprints from the counter.



(43) Kay wiped the polish onto the table.



Examples (41)–(43) are all accomplishments, albeit with different participants as the incremental theme (the table, the fingerprints, and the polish respectively).

The aspectual difference between the two types of Resultative construction also accounts for the difference between Japanese and English described by Washio (1997; see above). In the class represented by (22) in §8.2.1, *freeze X solid*, the verb in its lowest valency can only be construed as a directed activity (i.e. these are Rappaport Hovav and Levin's change of state verbs). Putting a verb of this class into the Resultative construction construes the directed change as an accomplishment; the Result phrase specifies the result state.

In the class represented by (23) in §8.2.1, *wipe X clean*, the verb in its lowest valency can be construed as either a directed or an undirected activity, as described above. When such a verb is put into the Resultative construction, it takes on the directed change construal and profiles an accomplishment, with the Result phrase specifying the result state of the accomplishment.[4]

In fact, in this class, there are some restrictions in Japanese, depending on the ability to construe the verb as a directed activity or to construe the result as a typical outcome of the event. For example, the contact verb *huku* 'wipe' is acceptable with the Result phrase *kirei-ni* 'clean', but 'hammer' is not acceptable with a Result phrase (Washio 1997:5):

[4] Washio (1997:21–3) questions an aspectual analysis because the verb in the simple argument structure construction can be construed as an undirected activity, but does not consider the possibility that both construals are available.

(44) kare -wa teeburu -o kirei-ni hui -ta
he -TOP table -ACC clean wipe -PST
'He wiped the table clean.'

(45) ??John -ga kinzoku -o petyanko-ni tatai -ta
John -TOP metal -ACC flat pound -PST
'John pounded the metal flat.'

On the other hand, *huku* 'wipe' cannot be construed as a verb of removal or application by itself. *Huku*, along with *nuguwu* 'wipe' and *kosuru* 'rub, scrub, scrape, etc.' may be compounded with *toru* 'take off' to create a removal verb that allows a Result phrase (Washio 1997:15):

(46) John -wa kao -kara yogore -o huki-tot -ta
John -TOP face -from dirt -ACC wipe-take.off -PST
'John wiped the dirt from his face.'

However, *huku* and *nuguwu* cannot be compounded with *tukeru* 'put' to form an application verb, although *kosuru* can (p. 15):

(47) *John -wa kao -ni yogore -o huki-tuke -ta
John -TOP face -to dirt -ACC wipe-put -PST
'John wiped the dirt onto his face.'

(48) John -wa kao -ni yogore -o kosuri-tuke -ta
John -TOP face -to dirt -ACC rub-put -PST
'John rubbed the dirt onto his face.'

In the class represented by (24) in §8.2.1, *drag logs smooth*, the verb in its lowest valency (*drag logs*) is construed only or chiefly as an undirected activity. There is no (easily) available construal as a directed activity. It is possible to take such a verb and place it into a Resultative construction in English. The outcome is a nonincremental accomplishment. There are three possible reasons that the Japanese counterpart is unacceptable, not necessarily mutually exclusive. Japanese may not allow such a radically different construal of the default aspectual type of the lowest valency version of the predicate. The Japanese Resultative construction may not denote a nonincremental accomplishment. Or, the redefinition of the states on the *q* dimension required by the construal may be more drastic than is allowed by productive lexical semantic processes in Japanese.

Finally, in the class represented by (25) in §8.2.1, *run soles threadbare*, the verb in its basic, lowest valency form is construed only or chiefly as an intransitive undirected activity. Placing such a verb in a Resultative construction adds a participant as well as a result state. As with the class exemplified by

(24), the event is construed as a nonincremental accomplishment. The reason that the Japanese translation equivalent is ungrammatical is basically the same as for (24).

The alternative analysis presented here captures at least the spirit of Washio's explanation. But it dispenses with the need to make reference to a participant role such as patient, and it makes more precise the aspectual notions that Washio appeals to in the phrase 'change of state in a certain direction'.

There appears to be a significant division in Resultatives, manifested linguistically by the contrast between basic Resultatives and Fake NP/Reflexive Resultatives in English, and by the absence of a grammatical equivalent of the latter in Japanese. We have argued in this section that it is best analyzed as a fundamentally aspectual distinction, between a result of an incremental accomplishment and the result of a nonincremental accomplishment. The acceptability of a resultative construal also depends in part on the aspectual potential of the same verb in a non-Resultative simple Intransitive, or Transitive argument structure construction. The aspectual potential is more of a continuum, from verbs denoting events that are almost always construed as (incremental) accomplishments or directed achievements, through verbs which allow alternative construal as directed or undirected processes to varying degrees, to verbs which are almost always construed as undirected activities. The varying aspectual potential is reflected to some extent in the varying acceptability of the corresponding Resultative construction. In particular, the directed activity construal is sensitive to the typicality or naturalness of the event leading to the result state that may be lexicalized in a Result phrase. Finally, there remains a substantial amount of idiosyncrasy in the occurrence of verbs and Result phrases in the Resultative construction, particularly the simple Resultative construction. We will return to this idiosyncrasy in §9.4.

One final matter is the relationship between the two types of Result phrase commonly found in Resultatives, the Adjective phrase and the Oblique phrase. We have analyzed the Adjective phrase as denoting the result state of the directed change subevent in the Resultative construction, but the Oblique phrase as a separate subevent, often in a spatial (noncausal) relation to the directed change subevent in the Resultative construction. These are two quite different representations of the Result phrase. In fact, there is a grammaticalization path from the Oblique to the Adjective (or at least nonargument) phrase, as illustrated in part by the examples in (49):

(49) a. I cut the watermelon into two/five/several pieces.
b. I cut the watermelon in half/*fifth.
c. I cut the watermelon open/I cut open the watermelon.

In (49a), the Result phrase is an Oblique phrase that describes the new identity of the affected participant as multiple parts, describable in a productive fashion. In (49b), the phrase *in half* is a fixed phrase; smaller fractions cannot be used in that construction. Actually, the facts are more gradient. Smaller fractions can be used in the Plural: *in thirds, in fifths*. Smaller fractions may use *into*, as with the (49a) construction, as well as *in*; *into* seems to be preferred as the fraction gets smaller. In other words, the smaller fractions behave more like argument phrases. But **in halves* or **?into halves* are marginally acceptable at best; and vague numerals such as *several* cannot be used in the (49b) constructions. Finally, in (49c) the Result phrase is Adjectival in form. It may also occur next to the verb, similar to many English particles (on the relation between particles and incremental accomplishment ['Adjunct'] Resultatives, see Iwata 2006*a*:477–83).

Also, the Japanese Result phrases in Washio's examples (22)–(25) in §8.2.1 are actually a form combined with the case marker *-ni*, which has Dative uses; they also represent a degree of grammaticalization of a result participant to specification of a result state. In other cases, Adjectival and Oblique Result phrases are virtual synonyms, such as English *to death* and *dead* (although their usage differs; see Boas 2003 and §9.4). In particular, Result phrases in Oblique form that denote states such as *death*, or *stupor* as in (39), are more like Adjectival Result phrases that also denote states.

One could uniformly treat Result phrases as properties describing the result state of the directed change subevent. However, this would not capture their frequent origin as Oblique argument phrases or their grammaticalization path from Oblique phrase to Adjectival or other fixed form. The effect is the reduction of the specification of the result state by the Result phrase from an autonomous subevent—usually just an 'exists' subevent in a noncausal relation to the directed change subevent—to a simple elaboration of the result state of the directed change subevent.[5]

[5] The grammaticalization of result participants to specifications of the result state of the directed change participant may also shed light on the analysis of path expressions. In §7.4.2, in discussing examples such as *I knitted socks from London to Edinburgh*, I noted that one could analyze the path expression as a Result phrase instead of as a Subsequent Oblique (and that would be a way of avoiding the branching causal chain analysis). Many recent analyses of Resultative constructions, including Rappaport Hovav and Levin, include path expressions of directed motion verbs as instances of the Resultative construction. The grammaticalization process implies that result expressions often begin as Subsequent Oblique phrases and then evolve into Result phrases specifying the result state of the directed change participant. However, it appears that most path of motion expressions are not grammaticalized: they are productive and largely unrestricted in syntactic form. Hence they are mostly better analyzed as Subsequent Oblique expressions.

8.3 The typology of complex constructions and simple events

A Resultative such as *She pushed the door open* is a complex predicate construction, consisting of a main verb (*pushed*) and a Result phrase (*open*). But the two predicates are more tightly integrated grammatically than they would be in a Coordinate construction such as *She pushed the door and it opened*. There are several other complex predicate constructions which, like the English Resultative secondary predicate construction, are morphosyntactically and semantically more integrated than Coordinate constructions or a simple sequence of clauses without overt grammatical linkage.

Most of the complex constructions discussed in this section are generally analyzed as single clauses, often with a single tense–aspect–modality, sharing of participants, and inability of each predicate to be negated separately. Nevertheless such complex constructions express a wider range of semantic relations between their subevents than simple verbs. By comparing the kinds of semantic relations that are expressed in complex constructions but not in simple verbs, we may infer further constraints on the subevents and subevent relations that may be lexicalized in simple verbs.

8.3.1 Depictive constructions

Schultze-Berndt and Himmelmann present a typology of depictive secondary predication that sheds some light on the kind of "manner" co-events that are lexicalized in verbs (see §7.4.2; Schultze-Berndt and Himmelmann 2004; Himmelmann and Schultze-Berndt 2005). A depictive secondary predicate, as its name implies, is part of a complex expression with a primary predicate (a verb). The Depictive construction is a morphosyntactic structure that encodes a prototypical depictive predicate. The Depictive construction is sometimes difficult to distinguish from other constructions that overlap with it functionally, e.g. Adverbial modifiers but also other types of secondary predicates or complex predicates (Schultze-Berndt and Himmelmann do not always distinguish clearly between the Depictive construction and the depictive predicate function).

Examples of morphosyntactically and semantically prototypical Depictives are illustrated from Russian in (50) (Nichols 1978:115) and Martuthunira in (51) (Dench 1995:182; both cited in Schultze-Berndt and Himmelmann 2004:63–4):

(50) on vypil čaj xolodnym
he drink:PST.3SG tea cold.M.SG.INST
'He drank the tea cold.'

(51) nhula miyu mungka -rnuru wajupi -i wanka -a =l
near.you cat eat -PRS grasshopper -ACC alive -ACC =THEN
'That cat eats grasshoppers alive.'

Morphosyntactically, a Depictive phrase is obligatorily controlled by an argument, manifested in indexation (agreement) of the controller argument (Masculine Singular in Russian, Accusative in Martuthunira). A Depictive is also sometimes placed in a special case marking, typically the case marking used for comitative, instrumental (as in Russian), or locative participants. This pattern is of course expected since depictives are antecedent, indeed concomitant (§6.2.2), in function. A Depictive form also sometimes has a cotemporal marking relating it to the main predicate, such as the clitic glossed 'then' in (51) (a detailed typological classification is given in Schultze-Berndt and Himmelmann 2004:80–94).

The functional range of Depictive constructions is quite wide and covers regions of conceptual space that are typically associated with other constructions, notably Adverbial constructions (Himmelmann and Schultze-Berndt 2005:27–50; they perform a great service to semantics by providing a classification of and conceptual space for "adverbial" functions). Examples (50)–(51) illustrate their prototypical function. Depictive predicates are participant-oriented rather than event-oriented. Event-oriented secondary predicates denote a property of the event itself: the prototypical examples are manner adverbs such as *quickly*. A participant-oriented predicate denotes a property of a participant that is true for at least the time interval of the event denoted by the main predicate; in Talmy's terms (§7.4.2), it is a concomitant property with the event.

The distinction between event-oriented pure manner adverbial function and participant-oriented depictive function is not always clear, and intermediate cases exist (Himmelmann and Schultze-Berndt 2005:6, 8):

(52) a. John shouted at them angrily.
b. John angrily read the review.
c. John left the party angry.

Example (52a) is pure manner: it describes the way that the shouting occurred. However, by virtue of the manner, one can infer something about John's emotional state, albeit indirectly. Example (52c) in contrast is a depictive: it asserts something about John's emotional state at the time of leaving, but not about the manner in which the leaving was done. Example (52b) is an intermediate type: it is also participant-oriented, but it implies a closer link between the secondary predicate and the main predicate event, e.g. John

becomes angry because of reading the review (Himmelmann and Schultze-Berndt 2005:9).

Himmelmann and Schultze-Berndt identify other semantic relations that hold between a depictive secondary predicate and the main predicate event. For example, in (53) a conditional relationship holds between the main predicate event and the depictive predicate—the food is not supposed to be nice when it is cold (Himmelmann and Schultze-Berndt 2005:16):

(53) This food is not supposed to be nice cold. [overheard utterance]

Even from this very brief sketch of some of the salient features of the typology of depictive secondary predication, some proposals can be made about the sort of "manner" components that are more likely to be lexicalized in a simple verb. First, a simple verb is more likely to lexicalize an event-oriented rather than participant-oriented co-event of the main event. Second, depictives and pure manner adverbials usually denote stative predicates (this is true of almost all of their examples). The lexicalized co-events that Talmy and others have observed are processes (walking, flying, dancing mazurkas, knitting socks). We may propose that the event-oriented characteristics of events lexicalized in simple verbs are more likely to be dynamic than stative. Third, a simple verb is unlikely to lexicalize a "manner" co-event in a conditional relation to the event, as in the depictive predicate in (53), and is most likely to lexicalize a "manner" co-event that has a causal or other intimate relation to the main event (in either direction). Co-events that have only a cotemporal or concomitant event may be lexicalized in a simple verb, but probably not as generally or productively. Cotemporality is a prototypical characteristic of depictive secondary predication, but a near-necessary condition of simple verb lexicalization (the temporal unity of subevents; §7.3).

In sum, a simple verb is most likely to lexicalize a "manner" co-event that is event-oriented, dynamic, and in a causal (or at least temporal) relation to the main event. Simple verbs may, however, lexicalize events that do not always fit the prototype. For example, Himmelman and Schultze-Berndt report an example of a simple predicate lexicalizing a stative, cotemporal co-event in Ilokano (Himmelmann and Schultze-Berndt 2005:53, from C. Rubino, pers. comm.; PV = Patient Voice):

(54) kinilaw =da ti sida
RL.PV:raw =3PL.POSS ART fish
'They ate the fish raw.' [lit. 'They "rawed" the fish.']

They note that this lexicalization is restricted to a few predicates where 'a conventionalized, culturally well-established practice is being referred to' (p. 53)—a factor that often allows for simple or reduced lexicalization of otherwise conceptually complex semantic structures.

8.3.2 Serial Verb constructions and Converb constructions

Two other complex constructions that have been surveyed typologically are Serial Verb constructions (e.g. Foley and Olson 1985; Durie 1997; Aikhenvald 2006) and Converb constructions (Haspelmath 1995; König 1995). Serial Verb constructions are diverse but are generally defined as having in common two or more verbs, each of which can function as a main verb on its own (Aikhenvald 2006:1). Serial Verbs function as a single predicate (p. 1), and are conceptualized as a 'single event' (Durie 1997:291; Aikhenvald 2006:10). In these respects, Serial Verb constructions differ from multiclausal constructions. Converb constructions include a main verb form and an overtly coded, nonfinite Converb which is analyzed as an adverbial verb form (Haspelmath 1995:3–8). The Converb form and its dependents exhibit the characteristic behavior of a Subordinate clause (pp. 12–17).

Serial Verb constructions and Converb constructions are therefore morphosyntactically quite different: the former has parallel predicates with no clear indication of subordination, while the latter has a clear asymmetry in predicate form which reflects the subordinate status of the Converb form. Yet the range of functions of Serial Verb constructions and Converb constructions is remarkably similar (Bisang 1995).

Bisang defines Serial Verb constructions broadly, to include chains of verbs as in the Khmer example in (55) (Bisang 1995:139):

(55) pdɤy kɔː kraok laəŋ daə(r) tɤu lɤːk tɯk mùːəy
husband thus get.up go.up go/walk lift/raise water one

khtɛ̀ah nùh yɔːk tɤu sraoc lɤː saːhaːy nɤu
bucket DEM take go pour on lover live/be.at

knoŋ pìːəŋ nùh slap tɤu
in pitcher DEM die go

'The husband got up, went away, raised the one bucket of [boiling] water, and poured it over the lover [of his wife] in the pitcher [where he tried to hide], who died.'

This construction is similar to the use of the Converb construction for narrative sequence, found widely in Eurasia, as in the Tamil example in (56) (Steever 1987:11, cited in Bisang 1995:156):

(56) maẓai pey -tu veyil aṭi -ttu vā<u>n</u>avil
rain:NOM rain -CONV sun:NOM beat -CONV rainbow:NOM
tōnr -iy -atu
appear -PST -3SGN
'It rained, the sun shined, and a rainbow appeared.'

Even in a narrow interpretation of Serial Verb constructions that excludes examples like (55)—the one taken by Aikhenvald and Durie—the range of functions of Serial Verb and Converb constructions is very similar (Bisang 1995). These include conditional, concessive, causal, and temporal relations between the subevents; adverbial functions (i.e. these two constructions overlap with the Depictive constructions described in §8.3.1); result and directional (path) subevents; expression of tense, aspect, and mood; expression of Oblique participants; complements; causatives, and more lexicalized, idiomatic combinations which are not productive and whose meaning is not predictable from the meanings of the individual predicates.

The Serial Verb and Converb constructions, like the Depictive construction, are used to express a wider range of semantic relations between subevents than is found with simple verbs, even though they are more restricted than Coordinate constructions. Converb constructions, like Depictive constructions (but apparently unlike Serial Verb constructions), allow conditional and concessive relations, as with the French examples of the *gérondif* (Converb) form in (57)–(58) (König 1995:68, 69–70; they cite example (58) from Halmøy 1982:377):

(57) Vous réussiriez mieux en procédent avec plus de méthode
you would.succeed better CONV proceed:CONV with more of method
'You would be more successful if you proceeded more methodically.'

(58) Mais tout en accusant ma nature, je me savais
but still CONV accuse:CONV my temperament I myself knew
incapable de la dompter.
incapable of it control
'But even though I accused my temperament, I knew that I was incapable of controlling it.'

Serial Verb constructions and Converb constructions allow for manner expressions and other semantic depictive relations. Example (59) presents a depictive relation expressed as a Serial Verb constructions in Thai (Bisang 1995:147–8). Example (60) presents a depictive relation in a Converb construction in Tamil (p. 157, from Lehmann 1989:196–7).

(59) kháw wíŋ rew
he Run quick
'He runs quickly.'

(60) kumaar naarkaali.y -il nimir -ntu uṭkaar -nt -aan
Kumar chair -LOC be.upright -CONV Sit -PST -3SGM
'Kumar was sitting upright on the chair.'

These examples provide further negative evidence for the constraints on event lexicalization as a simple verb proposed in §8.3.1, namely that a co-event is event-oriented, dynamic and in a causal (or at least temporal) relation to the main event. Also, both Serial Verb and Converb constructions in the broad sense described by Bisang are used for narrative sequence, unlike Depictive constructions. This use contrasts with the temporally unified subevents of a single event as lexicalized by a simple verb (as well as many Serial Verb and Converb + Main Verb constructions in the narrow sense).

Converb and especially Serial Verb constructions also present positive evidence for the temporal and causal constraints on events lexicalized as simple verbs. It was noted above that Serial Verb constructions (in the narrow sense) are asserted to conceptualize the situation as a 'single event'. Examples contrasting a Serial Verb to a Coordinate construction put more content on the notion 'single event'. For example, the Taba Serial Verb construction in (61) implies that the pig's death is a 'direct and immediate consequence of the pig's being bitten'. But in the Coordinate construction in (62) (with a pause between clauses), the pig's death may have occurred after a 'considerable period of time', and may have been 'a quite indirect consequence of having been bitten' (Bowden 2001:297; cf. Aikhenvald 2006:2, 7):

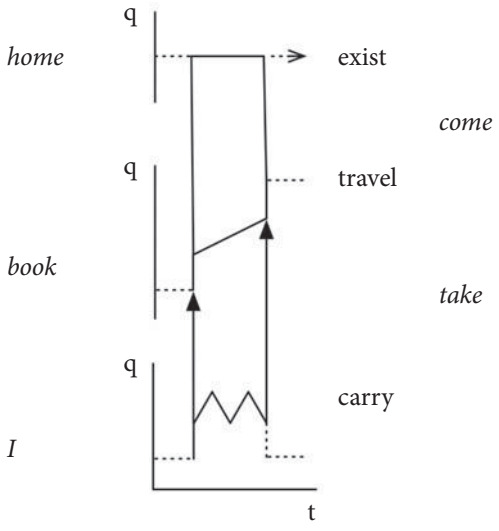
(61) n= babas welik n= mot do
3SG= bite pig 3SG= die RL
'It bit the pig dead.'

(62) n= babas welik, n= ha- mot i
3SG= bite pig 3SG= CAUS- die 3SG
'It bit the pig and killed it.'

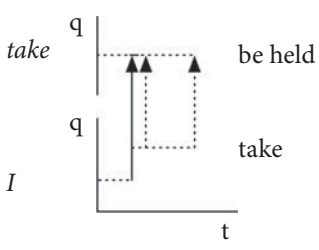
This contrast implies that a single event is characterized by direct causation and temporal unity, as argued in this and the preceding chapters.

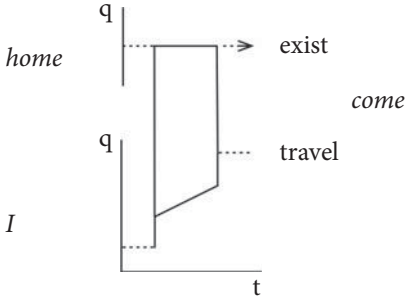
The following examples imply that a single event involves a single causal relation between each participant's subevents. The Yoruba Serial Verb construction in (63) entails that the book arrived at home along with the speaker and because of the speaker. On the other hand, the Coordinate construction in (64) denotes two events, and is compatible with an interpretation that the book was not brought home by the speaker (Stahlke 1970:61, 78; cf. Foley and Olson 1985:18–19).

(63) mo mú ìwé wá ilé
I took book come home
'I brought a book home.'



(64) mo mú ìwé, mo sì wá ilé
I took book, I and came home
'I took the book and I came home.'

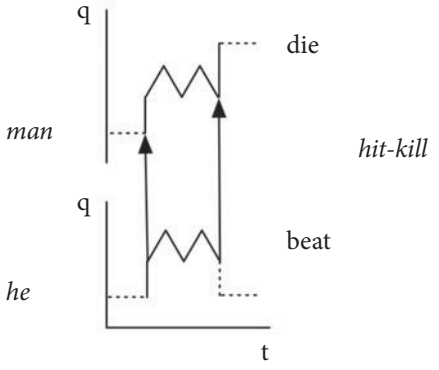




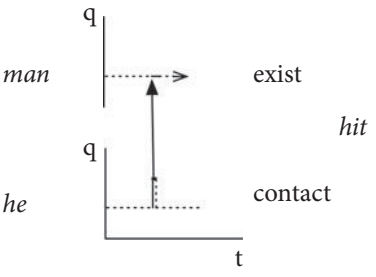
That is, the Serial Verb construction construes the speaker's action as causing the directed motion of the book, whereas the Coordinate construction does not, as indicated by the representations in (63) and (64).

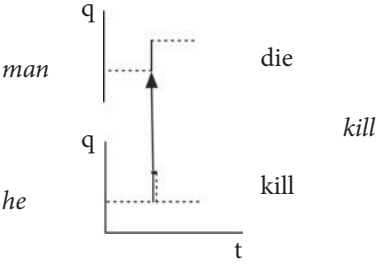
Likewise, the Igbo Serial Verb construction in (65) entails that the death of the man is a direct result of the beating, whereas the Coordinate construction in (66) may mean that the man's death was due to another cause (Lord 1975:28; cf. Foley and Olson 1985:19):

(65) ó ti'- -gbù -rù nwóké áhụ̀
he hit- -kill -TNS man that
'He beat that man to death.'



(66) ó tì -rì nwóké áhụ̀ ọ̀kpọ́, gbú -é yà
he hit -TNS man that blow kill -CONSEC him
'He hit that man and killed him.'





That is, the Serial Verb construction construes a single action (subevent) on the part of the initiator, which brings about the result state, whereas the Coordinate construction does not—the identity of the initiator's subevent in the two events must be inferred from the discourse context, and in fact may not hold.

Both Serial Verb and Converb constructions provide evidence that single events involve nonbranching causal chains. Both constructions are used for Oblique participants of events. For example, the Serial Verb construction is used for the instrument role in Barai in (67) (Foley and Olson 1985:44) and beneficiary role in Akan in (68) (Schachter 1974:254, cited in Foley and Olson 1985:24).

(67) fu burede ije sime abe ufu
he bread DEF knife take cut
'He cut the bread with the knife.'

(68) Kofi yɛɛ adwuma maa Amma
Kofi did work give Amma
'Kofi worked for Amma.'

The Converb construction is used for the instrument role in Chickasaw in (69) (Munro 1983:234, cited in Haspelmath 1995:42), and the beneficiary role in Khalkha Mongolian in (70) (Street 1963:151; see Bisang 1995:170):

(69) tali' ish -li -t isso -li -tok
rock take -1SG.I -CO.SS hit -1SG.I -PST
'I hit him with a rock.'

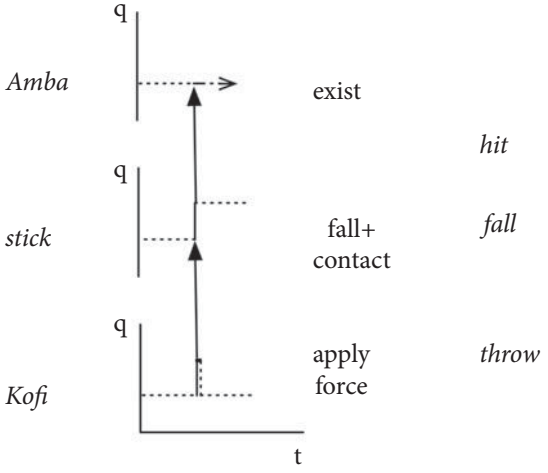
(70) ta nad xaa -ž ög -öörej
you.PL me show -CONV give -IMP
'Please show me [the way].'

The Serial Verb construction in (66) entails that the person, the knife, and the bread are in an unbranching causal chain. In contrast, a Coordinate construction such as *He took the knife and cut the bread* does not entail that causal chain: it could be that his cutting the bread does not involve using the knife. The difference in causal relations between a Serial Verb construction (or a simple verb) and a Coordinate construction is given in (71):

(71) a. *Serial Verb construction:* "He take knife cut bread"
b. *Coordinate construction* "He take knife and cut bread"

Durie argues that Serial Verbs (in the narrow sense) construe the situation as a single event in that there is only one argument structure for the Serial Verb construction (Durie 1997:340–8). For example, the Sranan sentence in (72) represents a single event in that the roles of Kofi, the stick, and Amba in each individual predicate (throw, fall, hit) are fused into a single argument structure (Durie 1997:344, from Sebba 1987:129):

(72) kofi fringi a tiki fadon naki amba
Kofi throw the stick fall hit Amba
'Kofi threw the stick at Amba.'



Durie describes this phenomenon as problematic for thematic role approaches to argument realization, since the participants play multiple roles simultaneously. But the semantics of the Serial Verb construction is easily captured in an event-based approach such as the one presented here, illustrated by the event structure in (72).[6]

Finally, Serial Verb constructions also provide evidence that construal as a simple event involves a degree of (often culture-specific) typicality or conventionality of the particular combination of subevents. Durie provides the following examples from White Hmong to illustrate this point (Durie 1997:329, from Jarkey 1991:170):

(73) a. nws dhia tshov qeej
3SG dance blow bamboo.pipes
'He dances playing the pipes.'

b. *nws dhia mloog nkauj
3SG dance listen song
Intended meaning: 'He dances and listens to music.'

c. nws dhia thiab mloog nkauj
3SG dance and listen song
'He dances and listens to music.'

Durie quotes Jarkey on (73a): 'whenever the *qeej* "bamboo pipe" is played, the performer's feet and body move and sway in time to the music. Playing and dancing are not two events but one' (Jarkey 1991:170). But dancing and listening are two distinct events, and can only be described by the Coordinate construction in (73c).[7]

In sum, the evidence from Serial Verb and Converb constructions indicates that to be construed as a single event, subevents must be causally linked via direct causation; be temporally unified; form a nonbranching causal chain, and co-events are construed as conventional and/or typical in the culture. The same constraints apply to the events lexicalized by simple verbs.

[6] Space prevents us from discussing the relationship between the argument structure of the individual predicates and the complex predicate; see, e.g., Taoka (2000); Schultze-Berndt (2000).

[7] See also Bruce (1988) for a discussion of the role of conventionality in Alamblak Serial Verb constructions.

8.4 Conclusion: simple verbs as maximally individuated events

In chapters 6–8, we began to explore the typology of simple verb meanings. Much of the evidence is drawn from English, and it remains to be seen how well it will extend to other languages. For this reason, the explanations to be offered here in this concluding section should be treated as tentative.

A simple verb in a particular argument structure construction represents a construal of an event as having a particular structure on the temporal, qualitative, and force-dynamic dimensions. The construal represented by a simple verb is flexible to some extent; the constraints we observed are only near universals, even just for English.

The force-dynamic dimension for almost all simple verbal events is a directed, acyclic, nonbranching causal chain. Undirectedness, as in mental states, is manifested by typological and language-internal variation in argument realization, and rarely in symmetrical coding. Cyclicity, as in reflexives and reciprocals and "middle" event types, may be overtly coded morphologically but is not manifested in a special argument structure construction. Causal chains are normally nonbranching, but in some cases, some co-events lexicalized in simple verbs may be best analyzed as branching causal chains. Simple verbal events almost always involve "billiard-ball" causation in their force dynamics; one symptom of this is that the participant subevent rest phases are almost always states without any force-dynamic interaction. Simple verbal events also almost always exhibit temporal unity of their participant subevents.

Co-events may be conflated in the specification of the qualitative dimension. Based on the event structures lexicalized by complex Depictive constructions, co-event conflation is most likely to involve event-oriented processes that are causally (not conditionally) related to the main event and temporally coextensive. The conflation of co-events into simple verbs has hardly been investigated and co-events that deviate from this prototype may be conflated.

For events construed as having multiple participants, unity of the aspectual profiles of subevents on the temporal dimension generally holds. Some apparent examples of temporal disunity (or proper inclusion) can be plausibly construed as temporally unified, but others less so.

Aspect is a function of two dimensions, temporal and qualitative. In the analysis of aspect, we argued that the fundamental division of aspectual types is between the construal of an event with a directed aspectual contour and an undirected aspectual contour. This division emerges from the multidimensional scaling analyses of lexical aspect in §4.4. This division is basically a

division between aspectual construals with a directed change and construals with an undirected change.

In chapter 7 and this chapter, we have argued that the presence of a directed change plays a major role in the analysis of event construals. We have argued that the long-observed basic contrast in event semantic types is best characterized in terms of the presence or absence of a directed change in the event structure, rather than the manner–result contrast proposed by Levin and Rappaport Hovav, or the satellite framing–verb framing contrast proposed by Talmy. In an event construed as having multiple participants, it is generally the case that only one of them undergoes a directed change, and that participant is generally realized as the endpoint (Object). A second directed-change subevent may occur in events with a beneficiary/recipient, and the verbal profile is generally extended to include that subsequent participant (with either an obligatory Applicative construction, a Double Object construction, or a Primary Object construction, at least with argument indexation).

Several of these properties of simple events constitute the long-proposed prototypical transitive or two-participant event type (Lakoff 1977; Hopper and Thompson 1980; Rice 1987; Croft 1990; inter alia). The idea behind the two-participant event prototype is that the prototypical two-participant event defines the canonical realization of Subject and Object (and also the basic voice form of the verb). Events that deviate semantically from the two-participant event prototype in one or more respects may also deviate grammatically from the canonical Transitive argument structure construction.

The usual characterization of the prototypical two-participant event is that a volitional agent acts on a patient such that the patient is fully affected by the action. Hopper and Thompson (1980) provide a more elaborate set of transitivity properties, including inherent properties of the participants as well as causal, aspectual, and modal properties of the event. Our categorization of Hopper and Thompson's transitivity properties is given in (74) (based on Hopper and Thompson 1980:252; affectedness is both a causal and aspectual property, as argued in §7.4.3):

(74) a. *Causal*: two participants; volitional, highly agentive initiator,[8] affected endpoint

b. *Aspectual*: process, bounded, punctual, affected, and highly individuated endpoint (proper name; human/animate, concrete, singular, countable, referential/definite; Hopper and Thompson 1980:253)

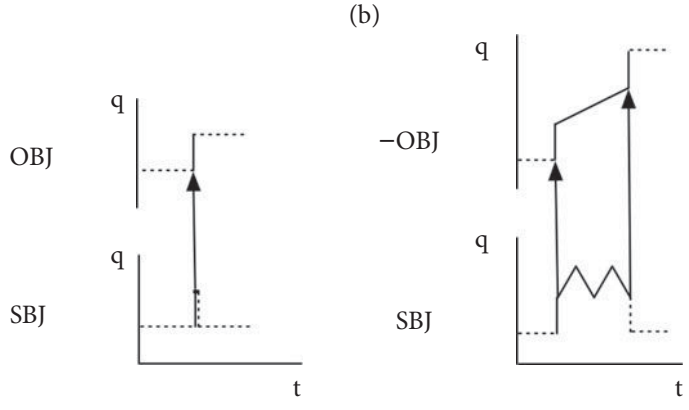
[8] Hopper and Thompson treat agentivity as a property of the initiator, but it is a consequence of the fact that an initiator engaged in volitional causation must be human or animal.

c. *Modal*: realis, affirmative (positive polarity)

Hopper and Thompson provide substantial crosslinguistic evidence that the factors listed in (74) do in fact define universals of the coding of two-participant events, in particular their argument structure (Croft 2003*a*:175–6): if an event lacking any one of the transitive prototype properties in (74) is coded with a Transitive argument structure construction, then events that are otherwise identical but possess the transitive prototype property in question will also be coded with the Transitive construction (Hopper and Thompson 1980, 1982).

In the three-dimensional model, which is intended to capture the causal and aspectual properties of events, the prototypical two-participant event is represented by the structure in (75a); (75b) is a durative counterpart, which according to Hopper and Thompson is not as prototypical but is widely treated as another instance of the transitive event prototype.

(75) *Transitive event prototype:*



The prototypical transitive structure needs to be annotated to indicate that the causal relationship is one of volitional causation. The representation also indicates that the initiator is engaged in an undirected change in bringing about the directed change on the endpoint.

The transitive event prototype appears to be broadly agreed on, even if the typological evidence needed to refine it remains to be obtained. The question remains, however, of why this event type is the prototype. It is not intuitively clear that it is the most frequent type. I know of no frequency studies of verbal semantic classes in language use, but data in Bowerman (1990) on the earliest stages of acquisition of her two children indicate that nonprototypical event types are at least as numerous as prototypical transitive events in first language acquisition, at least in production. More generally, what principles

appear to motivate the semantic types of event classes other than the prototypical transitive event types?

I suggest that the best perspective on this question is the individuation of events to be verbalized from experience. The major question for the verbalization of experience is: How do human beings individuate events? Cognitively, it appears to be a far more challenging conceptual process than the individuation of most objects. Objects, particularly physical objects, are spatiotemporally discrete, can be manipulated, and can be categorized into qualitatively discrete types (up to a point; I do not want to discount the complexities of object categorization). Events are, on the whole, causally connected to other events or interactions between entities, to a greater or lesser extent. The segment of the causal chain that is profiled by a lexical item (verb or other predicate) is only a piece of the vast network of causal (and noncausal) relations that describe the relationships and interactions of entities in the world. We encounter only haphazard sections of this causal network; we cannot physically manipulate events; and events are mostly temporally transitory (Croft 1990:48). How do human beings individuate events out of this causal network, at least for the purpose of linguistic communication?

In Croft (1994*a*, *b*), I argue that the prototypical (two-participant) event type is the event type that is most easily individuated in the causal network. As described above, this event type is one that is initiated by an agent/initiator using her/his own volition to bring about a complete change of state in a patient/endpoint in the relevant *q* dimension. An agent under her/his own volition is construed as using her/his free choice to initiate a causal transmission of force. That is, the agent is construed as not acting as the result of an external force antecedent to it. In this respect, the beginning of the causal chain is separated from the rest of the causal network. If the agent is construed as acting as the result of an external force, then a causative form is used, and the agent is no longer realized as Subject. Instead, the causer, who is construed as the ultimate cause, is realized as Subject. If the agent is not directly bringing about the change of state in the patient, such that intermediate participants play a significant role, then the event loses its unity, only the patient's change of state is profiled, and the agent's subevent is realized in an Antecedent Oblique phrase (see §6.4.1).

Conversely, if the outcome of the action is construed to be the responsibility of some other entity in the causal chain than the agent, then it may be realized as Subject, at least in English and other languages that are more flexible in construing initiators as autonomous (van Oosten 1977, 1986):

(76) This knife cuts steak like butter.

(77) This tent sleeps four.

In (76), the cutting ability is attributable to properties of the knife (its sharpness), rather than the skill of an agent in wielding the knife. In (77), the ability of four people to sleep in the tent is attributable to properties of the tent (its size), rather than properties of the persons who will sleep in it.

A patient that is completely changed in the relevant dimension is not going to undergo any further change in that dimension. Hence no other external cause can act further on the patient. The patient is also unlikely to bring about any further changes in another entity. That is, the patient is unlikely to be causally linked to a subsequent entity. In this respect, the end of the causal chain is separated from the rest of the causal network. If another participant subsequent to the patient, namely a beneficiary or recipient, also undergoes a directed change, then it is frequently realized as Object.

One-participant events appear to span the range of subevents characteristic of initiators and endpoints of transitive events. Most one-participant events that have a cyclic aspectual contour (undirected activities and semelfactives) are internally caused events in the sense of Levin and Rappaport Hovav (1995). They are thus like initiators of two-participant events in that they are separated from antecedent causal interactions. However, they do not transmit force onto another entity. Most one-participant events that have a transition aspectual contour (directed activities, achievements, and transitory states) approach or attain a resulting state. They are thus like endpoints of two-participant events in that they are less likely to cause a subsequent event. However, the change is not brought about by an external entity, or at least is not construed to be so brought about. Finally, default inherent states, mostly intransitive, are generally autonomous from the causal network because they do not undergo change, and therefore do not bring about change.

At this point, the typology of simple verb meanings badly needs further investigation across languages. For instance, it is unknown whether English is more liberal in the simple verbal lexicalization of events, or whether other languages will further weaken those constraints. Exploration of these questions will have to await the future.

9

Verb meaning and argument structure constructions

9.1 The semantic interaction of verbs and constructions revisited

In §3.2.1, the relationship between verb meaning and the tense–aspect constructions in which verbs occur was examined. It was pointed out there that three extreme positions are proposed regarding the semantic contribution of two linguistic elements to the meaning of the whole, where the intuitive meanings of the two elements overlap: polysemy, derivation, and vagueness. The issue for argument structure has been framed differently: as one contrasting lexical rules and constructions. But the similarities between the constructional analysis most often cited, that of Goldberg (1995), and the lexical rule analysis are greater than one might expect (Croft 2003*b*), and the debate also involves a contrast between polysemy, derivation, and vagueness analyses. Again, the reality is more complex, and the truth is somewhere in between the lexical rule and constructional analyses, and in between the polysemy, derivation, and vagueness analyses.

I will use as a reference point two different examples of verbs in argument structure constructions, both of which play a central role in the debate:

(1) a. Karen baked a cake.
b. Karen baked Sam a cake.
c. Karen baked a cake for Sam.

(2) a. Jill sprayed water on the flowers.
b. Jill sprayed the flowers with water.

Example (1b) illustrates the DITRANSITIVE CONSTRUCTION, an English construction with three participants—the agent, the possessum, and the possessor. In the English Ditransitive construction, both participants are expressed as Objects, but the possessor always precedes the possessum. It is contrasted with (1a), in which the same verb, *bake*, is used in the Transitive construction and only two participants are presupposed to participate in the

event (there is no possessor). It also contrasts with (1c), in which the possessor is realized as an Oblique.

Examples (2a–b) illustrate the LOCATIVE ALTERNATION. In both (2a) and (2b), the same participants are expressed, which we will call the agent, the figure, and ground (using the terms for these roles from chapter 7). However, the argument realized as Object differs in the two constructions: in (2a), the figure is Object, but in (2b), the ground is Object. The two constructions occurring in the Locative alternative go under several names; here I will call the construction in (2a) the *onto* locative construction, and the construction in (2b) the *with* locative construction.

The lexical rule analysis is developed by Pinker (1989) and Rappaport Hovav and Levin (e.g. Rappaport Hovav and Levin 1988, 1998; see Boas 2006:120–2; Iwata 2008:11–16). In the lexical rule analysis, *bake* and *spray* have distinct senses in the (a) and (b) sentences. For example, *bake* has a creation sense in (1a) but a transfer of possession (as well as creation) sense in (1b). Each sense of *bake* is therefore compatible with the argument structure construction in which it occurs. This is a general requirement of the so-called projectionist approach to verbs and argument structure constructions (Levin and Rappaport Hovav 2005:189–93). In the projectionist approach, argument structure constructions do not exist per se. Instead, there are general syntactic rules specifying grammatical functions such as Subject, Object, and Oblique phrases and their permissible combinations (e.g. the possibility of two Objects in the Ditransitive construction). Hence, all the information about the semantics of the event expressed in a sentence such as (1b) or (2b), including how many participants it has, is solely attributed to the verb. In order for the verb to fit into the argument structure construction, it must already be compatible with the syntactic and semantic requirements of the argument structure construction, so to speak (in the projectionist approach, 'construction' is used informally and does not refer to a theoretical construct).

As described so far, the lexical rule analysis resembles a polysemy analysis: each verb has multiple meanings, as required to account for the verb's occurrence in multiple argument structure constructions. However, the lexical rule analysis also posits one of those meanings as basic, like the derivational analysis.

Rappaport Hovav and Levin (1998) develop a theory of verbal derivation based on their decompositional analysis of verb meanings or verb templates. The templates are the causal–aspectual structures illustrated in §5.2. Each sense of a verb has its own template. For example, Rappaport Hovav and Levin give the following examples of two templates for *sweep* (adapted from Rappaport Hovav and Levin 1998:114–15, 119):

(3) a. Phil swept the floor.
b. [X $ACT_{<SWEEP>}$ Y]

(4) a. Phil swept the floor clean.
b. [[X $ACT_{<SWEEP>}$] CAUSE [BECOME [Y <*CLEAN*>]]]

Rappaport Hovav and Levin argue that the basic meaning of *sweep* is found in the construction in (3a), and is represented by the template in (3b). The meaning of *sweep* in the Resultative construction in (4a), represented by the template in (4b), is derived from (3b) by a process of template augmentation (Rappaport Hovav and Levin 1998:111). Template augmentation generally adds participants or at least additional event components such as the Resultative predicate in (4). Although Rappaport Hovav and Levin do not analyze the Ditransitive example in (1b), the meaning of *bake* in (1b) is straightforwardly derived from the meaning of *bake* in (1a) by template augmentation. What stays constant in meaning across different senses of *sweep* or *bake* is the lexical root, namely the sweeping manner of contact in *sweep* and the act of creation by baking in *bake*.

In the Locative alternation in (2a–b), there is no difference in the number of participants from one construction to the other. Rappaport and Levin (1988:26) present distinct decompositional structures for the two variants of *load* in (5), using an earlier version of their templates (e.g. manner is indicated by /LOAD); Pinker (1989:228–9) has essentially the same analysis in a tree diagram:

(5) a. *onto* locative:
[*x* cause [*y* to come to be at *z*]/LOAD]

b. *with* locative:
[[*x* cause [*z* to come to be in STATE]] BY MEANS OF [*x* cause [*y* to come to be at *z*]]/LOAD]

By their principle of template augmentation, then, the verb meaning in the *onto* locative is basic, and the meaning of the verb in the *with* locative is derived by subordinating the *onto* locative's semantic representation into a means clause, such that the *with* locative describes 'an event in which a change of state is brought about by means of a change of location' (Rappaport and Levin 1988:26–7).

Rappaport and Levin's analysis determines basicness on the basis of their decompositional analysis of the two locative constructions, rather than an independent empirical criterion. Iwata expresses doubt as to the plausibility of the paraphrase for the *with* locative, since any change of state can be construed as involving some sort of means (2005*a*:402, fn. 1); Iwata cites

Marantz, who argues that any verb with a manner component can be paraphrased with a means clause (Marantz 1992:187).

Pinker (1989) argues that either variant can be the basic meaning, and the basic meaning can be inferred based on the verbal semantic class. Pinker notes that not all semantically similar verbs occur in both constructions. *Spray* is semantically similar to other 'content-oriented *into/onto* verbs', some of which alternate like *spray* (*rub, stack, scatter*) and some of which allow only the *in(to)/on(to)* construction in (2a) (*drizzle, twist, exude*). *Spray* contrasts with verbs like *stuff*, which are 'container-oriented *with* verbs', which are semantically similar to verbs that occur only in the *with* construction in (2b) (*smother, adorn, interleave, plug, dapple*).

For evidence of basicness, Pinker uses the ability of the verb to occur in the simple Transitive construction with just the Direct Object of the basic variant. For example, the basic meaning of *pile* is the one found in the *onto* locative because only the figure can be realized as Object in the simple Transitive (Pinker 1989:125):

(6) a. He piled the books (on the shelf).
b. *He piled the shelf.

Conversely, *stuff*'s basic meaning must be the one found in the *with* variant (p. 125):

(7) a. He stuffed the turkey (with breadcrumbs).
b. *He stuffed the breadcrumbs.

However, as Pinker himself notes, some verbs allow either figure or ground to be realized in the simple Transitive, and others prohibit either (Pinker 1989:38–9):

(8) a. John packed the books.
b. John packed the box.

(9) a. *?John heaped the books.
b. *John heaped the box.

Pinker acknowledges that some verbs could have either form as basic, and sets aside the ones where the simple Transitive is unacceptable, implying that neither is basic (Pinker 1989:125; see also Iwata 2005*a*:359–60). In effect, Pinker's criterion for which verb meaning is basic is his semantic classification into 'content-oriented' and 'container-oriented' verbs. Hence there remains no criterion for basicness other than semantic intuition—and the intuitions differ from Pinker to Rappaport and Levin. Thus, a polysemy rather than derivational analysis appears to be the one best justified by the lexical rule approach.

The constructional analysis of Goldberg (1995) appears at first to be very different from the lexical rule analysis. In the constructional analysis, argument structure constructions are independent syntactic entities in their own right. In particular, argument structure constructions have their own meaning, unlike syntactic rules specifying grammatical functions. For example, the Ditransitive construction illustrated in (1b) exists as an independent syntactic structure and possesses the meaning of transfer of possession (this is a simplification; see §9.3 for discussion). Goldberg's representation of the form and meaning of the Ditransitive construction is given in (10) (Goldberg 1995:50):

(10)	Sem:	CAUSE-RECEIVE	<	**agt**	**rec**	**pat**	>
	R[elation]	PRED	<				>
	Syn:	V		SBJ	OBJ	OBJ_2	

The first row of the representation in (10) is the meaning of the Ditransitive construction, namely transfer of possession (CAUSE-RECEIVE), and the three participants in a transfer of possession event (agent, recipient, patient). The last row is the syntactic realization of the CAUSE-RECEIVE meaning as the verb (such as *bake*) and the argument roles of the three participants.

The intermediate row in (10) is used to specify how the verb is used in the Ditransitive construction. Each verb has a meaning (R or 'relation'), schematically represented here as PRED. The verb's participants have verb-specific participant roles, e.g. 'baker' and 'baked-good' for BAKE. But the process of combining verb meanings and construction meanings is not a simple matching process as in the lexical rule approach. First, the construction's argument roles are not verb-specific roles; they are more general roles. Goldberg argues that a verb can be used in an argument structure construction if the participant roles of the verb can be construed as instances of the argument roles of the construction (her Semantic Coherence Principle; Goldberg 1995:50–1, 2006:39–40). For example, the baker of BAKE can be construed as an instance of an agent, and the baked-good of BAKE can be construed as an instance of a patient. Second, the construction may also contribute to the meaning of the verb + argument structure combination. For example, a construction such as the Ditransitive can contribute the recipient to an event such as a baking event that otherwise lacks a recipient.

Thus, Goldberg's analysis of the occurrence of verbs such as *bake* in the Ditransitive construction is an instance of a coercion analysis (§3.2.1): the basic meaning of a verb is required to change in order to fit the semantic requirements of the construction in which it occurs. A coercion analysis is a derivational analysis where the derivation is coerced by the construction. The verb has only its basic meaning, and the derived meaning is derived only when it is combined with the relevant construction.

The Locative alternation in (2a–b) lends itself to a slightly different analysis. Goldberg assumes a unitary meaning for verbs like *spray* or *load*. That is, *spray* or *load* have their verb-specific participant roles: SPRAY <sprayer, **target**, [**liquid**]> and LOAD <**loader, container,** [**loaded-theme**]> (Goldberg 1995:178, 2006:41).[1] The representation of the two constructions is given in (11)–(12) (Goldberg 2006:41):

(11) Caused motion (SBJ V OBJ PP):
CAUSE-MOVE <**cause theme** path/location>

(12) Causative (SBJ V OBJ *with* NP)
CAUSE <cause patient> +INTERMEDIARY <instrument>

Spray occurs in both constructions because the liquid role of SPRAY is compatible with either the theme role of CAUSE-MOVE or the instrument role of CAUSE, and the target role of SPRAY is compatible with either the path/location role of CAUSE-MOVE or the patient role of CAUSE.[2]

Goldberg's analysis of the Locative alternation is more like a vagueness analysis. A verb's participant roles do not in themselves specify which constructions the verb may occur in, because a verb's participant roles are distinct from the argument roles of constructions. A verb has a unitary meaning and its occurrence in a construction is limited only by the degree of compatibility of its participant roles with the corresponding argument roles of the construction (there is another constraint based on obligatory expression of participant roles; see §9.2). The construction contributes its argument structure when a verb is combined with it. In some cases, the construction may add an argument, such as the recipient added to *bake*, and construing *bake* as a transfer of possession verb is a substantial change in meaning to *bake*. Likewise, the meaning of *wipe* as a contact verb in the Transitive construction changes significantly in the examples of *wipe* that add arguments discussed in §7.4.1 and §8.2.2 and repeated below:

(13) a. *Transitive*: Kay wiped the counter.
[surface contact meaning]

b. *Removal*: Kay wiped the fingerprints from the counter.
[remove by means of surface contact]

c. *Application*: Kay wiped the polish onto the table.
[apply by means of surface contact]

[1] Goldberg uses boldface and square brackets to differentiate the syntactic behavior of certain participants. This notation will be discussed in §9.2.

[2] Again, Goldberg uses boldface for a syntactic purpose, and uses the angle bracket notation to differentiate arguments from adjuncts. This notation will also be discussed in §9.2.

The main difference between the lexical rule analysis and Goldberg's constructional analysis is whether the semantic shifts in the type of event are derived independently of the argument structure construction (lexical rule analysis) or not (constructional analysis). That difference in turn is largely dependent on whether constructions are assumed to exist (constructional analysis) or not (lexical rule analysis). If the existence of constructions is denied, then one is committed to a derivational (lexical rule) or a polysemy analysis. There are many strong arguments that constructions exist, that is, there are complex syntactic structures with syntactic properties and semantic interpretations that are not predictable from more general rules of syntactic combination and semantic interpretation (Fillmore, Kay, and O'Connor 1988; Kay and Fillmore 1999; Goldberg 1995, 2006; Goldberg and Jackendoff 2004; Croft 2001; Croft and Cruse 2004; inter alia). If constructions are posited, then the question arises as to the contribution that a construction's meaning and a verb's meaning makes to the meaning of the verb + constructional analysis; and a wider range of analytical possibilities are available, including the coercion variant of a derivational analysis and a vagueness analysis, as well as various intermediate possibilities. These different possibilities will be explored in this chapter.

9.2 The conceptual structure of events in argument structure constructions

Before probing further the relationship between verbal semantics and the semantics of argument structure constructions, we must look more closely at the semantics of events as they are found in linguistic expressions that combine verbs with argument structure constructions. This section will bring together recent hypotheses about event semantics that are also implicit in the event semantic representations presented in chapters 5–8.

Our starting point will be a device in a verb's semantic representation used by Goldberg to attribute occurrence of a verb in certain argument structure constructions. Goldberg allows verbs to occur in any argument construction in which the verb-specific participant roles are compatible with the argument roles of the construction. However, Goldberg limits the verb's ability to combine with certain argument structure constructions by means of role profiling (Goldberg 1995:44–9, 2005*b*:24).

The idea of a profiled concept in a semantic frame originates in frame semantics and Cognitive Grammar. A profiled concept is the part of a semantic frame that is denoted by a linguistic expression. The event structure representations in this book, being frame-semantic, crucially rely on concept profiling (see §§1.2, 2.3.2, 6.2). However, Goldberg uses profiling of semantic

roles for two distinct purposes, syntactic obligatoriness and core argument status, neither of which corresponds to the general cognitive linguistics notion of profile (Croft 1998*a*:41).

A lexical entry for a verb profiles some roles but not others; profiled roles are in boldface in Goldberg's representation. The roles that are profiled in the verb's lexical entry are normally syntactically obligatory (Goldberg 1995:45). Goldberg allows for participants in lexically profiled roles to be unexpressed if they are contextually identifiable, that is, they represent definite null instantiation (DNI; see §8.2.2). For example, consider the examples in (14)–(15) (pp. 177–8):

(14) a. She loaded the wagon with the hay.
b. She loaded the hay onto the wagon.

(15) a. *The hay loaded onto the truck.
b. ??Sam loaded the hay. [Goldberg's judgment]
c. Sam loaded the truck.

Example (15a), without the loader expressed, is ungrammatical; hence the agent is lexically profiled (called non-null instantiation [NNI] in Croft 2001:277). Example (15b) is questionable according to Goldberg, but Iwata notes that it is acceptable in a context in which the identity of the container is known (Iwata 2005*a*:383; cf. Pinker 1989:125, cited by Iwata). Hence the container is lexically profiled but allows DNI, which Goldberg notates with square brackets. Example (15c) is acceptable, without identification of what is being loaded in the truck (*pace* Goldberg, but following Iwata and Pinker). Hence the loaded-theme is an example of free null instantiation (FNI), and is not lexically profiled. Iwata's lexical entry for *load*—different from Goldberg's entry given in §9.1—is given in (16) (Iwata 2005*a*:383):

(16) load < **loader** [**container**] loaded-theme >

Constructions have a distinct set of roles from verbs in Goldberg's model, as we saw in §9.1. Constructional roles may also be profiled or unprofiled, but in constructions profiling is used by Goldberg to distinguish core arguments from peripheral arguments. All constructional arguments are obligatory; nonobligatory "arguments" are expressed outside of the brackets used for the argument list (Goldberg 2006:41):

(17) Pat loaded the truck (with the hay).

CAUSE < **cause patient** > + INTERMEDIARY < instrument >

Profiling in verbs and profiling in constructions is used in different and contradictory ways in Goldberg's model. For example, nonprofiled roles in a

construction are syntactically obligatory, but nonprofiled roles in a verb are syntactically optional. Although Goldberg notes the difference (Goldberg 1995:49), no explanation is given for the different and contradictory use of profiling in verbal and constructional representations. Since 'participant roles are instances of the more general argument roles' (p. 43), they should be represented in the same way.

Moreover, neither usage corresponds to semantic profiling in Cognitive Grammar. As described above, concept profiles indicate which element in the base/frame the concept refers to (Langacker 1987:116, 118). Profiling of participants in the verbal semantic representation would mean that the verb denoted those arguments; likewise for profiling of core arguments in the construction semantics. Although Cognitive Grammar profiles the trajector and landmark of processes and relations as well as the process/relation itself, it does not follow that they have syntactically obligatory expression (p. 219).

Goldberg's "profiling" of constructional roles is a different theoretical construct—core vs. noncore arguments—and should be treated as such. It plays a role in argument realization in that the participant roles linked to core argument roles are obligatorily realized. However, it does not determine which verbs occur in which argument structure constructions. If the verb has more participant roles than there are core argument roles in the argument structure construction, then the additional participant roles can be expressed as Oblique phrases, as in (17). If the construction has more core argument roles than the verb's roles, as in the Ditransitive of *bake* in (1b), then the additional argument roles add a participant to the event. Hence the number of verbal roles may be greater than, equal to, or less than the number of constructional roles.

Verbal profiling does play a role in constraining the distribution of verbs in argument structure constructions in Goldberg's theory. Goldberg's Correspondence Principle requires that every role profiled in the verb entry must be realized by an argument role in the argument structure construction. This is why (15a) is ungrammatical: the agent role is not realized by any argument role in the [SBJ V PP] construction.

In essence, then, verbal profiling excludes lower valency argument structures for some verbs, such as the Intransitive construction with *load* in (15a), since some obligatory (profiled) event participants are not realized in those constructions. However, the distribution of verbal profiling is not predictable from the semantics of the event denoted by the verb. For example, three verbs in the *cram* class, all of which occur in both constructions in the Locative alternation, behave differently in the Transitive construction (Iwata 2005*a*:385; I find (19a) acceptable as definite null instantiation, but DNI keeps the verbal role profiled in Goldberg's analysis):

(18) a. *Pat crammed the pennies.
b. *Pat crammed the jar.

(19) a. *He stuffed the breadcrumbs.
b. He stuffed the turkey.

(20) a. John packed the books.
b. John packed the box.

Iwata also notes that Goldberg is required to posit two lexical entries with different roles profiled for *lease* and *rent*, since these verbs allow either tenant or landlord to be realized as Subject (Goldberg 1995:56; Iwata 2005*a*:386):

(21) Cecile leased the apartment (from Ernest).
lease_1 < **tenant property** landlord >

(22) Ernest leased the apartment (to Cecile).
lease_2 < tenant **property landlord** >

Goldberg acknowledges that positing two lexical entries for *lease* is not desirable but argues that the two senses belong to the same semantic frame (Goldberg 1995:56).

In sum, Goldberg's use of lexical profiling to specify which argument structure constructions a verb may or may not occur in does not appear to provide a motivation for the occurrence of the verb in other argument structure constructions (such as the *into/onto* or *with* locative argument structures), and it does not always reduce verb senses, as Goldberg desires. Goldberg's analysis also precludes the possibility of a semantic explanation for the occurrence or nonoccurrence of a verb in lower valency argument structure constructions, since verb profiling is a purely language-specific syntactic phenomenon (syntactic obligatoriness), not a property of verb meaning.

For example, some verbs in the *spray* class occur in the Transitive construction with the liquid realized as Object (Croft 1998*a*:43):

(23) a. The broken fire hydrant sprayed water all afternoon.
b. The mudpots spattered mud just as we arrived.
c. The guests scattered rice as the bride and groom left the church.

These examples contradict Goldberg's analysis of *spray*, which profiles the liquid role: if so, then (23a–c) violate the Correspondence Principle (Iwata 2005*a*:389). Of course this can be accommodated in Goldberg's theory by changing the lexical entry of *spray* so that the liquid role is not profiled. But this change would cause other problems. *Spray* may also occur in the Transitive construction with only the target, or in the Intransitive construction with only the liquid (Goldberg 1995:178):

(24) a. Water sprayed onto the lawn.
b. The men sprayed the lawn.

Goldberg argues that (24b) is DNI, but it is not clear to me that the liquid must be identifiable in the context for (24b) to be used. If we accept Goldberg's judgment, then the lexical entry for *spray* would be (25) in Goldberg's representation:

(25) spray < sprayer target [**liquid**] >

But now the problem is that the Correspondence Principle allows argument realizations that are unacceptable:

(26) *The lawn sprayed with water. [cf. The lawn gleamed with dew.]

The [SBJ V *with* OBL] construction in (26) has a location role as the Subject, and the target is compatible with the location role. The liquid is compatible with the *with* phrase argument role, which must be an unquantified entity (Dowty 2000, 2001; see §9.4 for Dowty's analysis of this construction). Yet (26) is unacceptable. The basic problem is that even verbs that intuitively have multiple participants are acceptable in enough Transitive and Intransitive constructions that the verb roles must be left unprofiled; but they are also unacceptable in other lower-valency constructions that their roles are compatible with, and the unprofiled verb roles cannot account for that.

More significantly, the stipulation of profiled/unprofiled verb roles deprives us of the opportunity to explain the acceptability of (23a–c) in contrast to other *spray* type verbs which do not occur in the Transitive construction. Examples (23a–b) are acceptable because in those contexts, the event can be construed as a substance emission event. Example (23c) is acceptable because in that context the event can be construed as a throwing event. The substance emission and throwing event types are realized in a simple Transitive construction, and so (23a–c) are acceptable: 'other verbs in the *spray/load* class do not occur in the simple Transitive construction, but that is due to the semantic unnaturalness of their construal as a substance emission event or a throwing event' (Croft 1998*a*:43).

This is not to say that all occurrences and nonoccurrences of verbs in argument structure constructions are amenable to semantic explanation (see §9.4). But if the mapping from verbs to argument structure constructions is made explicit, as will be done in §9.3, rather than implicit in notations such as verb role profiling, then we can examine all the mappings and determine which are motivated and which are idiosyncratic.

Croft's (1998*a*) hypothesis that (non)occurrence of verbs in an argument structure construction is due to their (in)ability to be construed as events of the type allowed by the construction is more fully developed in the theories advocated by Iwata (2005*a*, *b*, 2008), Nemoto (2005), and Boas (2006). All of these theories argue that argument structure alternations are not licensed by

particular lexical semantic classes such as the *spray* or *load* classes. Instead, particular verbs, or the events that they denote, have the ability to be construed as instances of different semantic frames, and that ability determines their occurrence in argument structure constructions.

Boas's theory is based on the frame semantics model implemented in FrameNet (Fillmore, Johnson, and Petruck 2003). In FrameNet, there are two basic semantic units. The first is a verb sense, called a lexical unit (LU) following Cruse (1986:77; Fillmore, Johnson, and Petruck 2003:235). The second is a semantic frame: a complex semantic structure consisting of a set of frame elements (FEs) which are related to one another in a complex way; the relationships are expressed in FrameNet with a prose description. For example, the Reasoning frame, evoked by the sense (LU) of *argue* in *You can argue these wars were corrective*, includes the frame elements Arguer, Content, Support, and Addressee, and their relationship is described in FrameNet as follows:

> An **Arguer** presents a **Content**, along with **Support**, to an **Addressee**. The Content may refer elliptically to a course of action or it may refer to a proposition that the Addressee is to believe. Some lexical units (e.g. "prove") indicate the speaker's belief about the Content.
>
> (Atkins, Fillmore, and Johnson 2003:262)

In addition, there are prose descriptions associated with each frame element in FrameNet that further describe the role of the frame element in the overall situation type specified by the semantic frame.

A semantic frame is evoked by multiple LUs. For example, the Reasoning frame includes the English verbs *argue, demonstrate, disprove, prove, reason*, and *show* (Atkins, Fillmore, and Johnson 2003:262). A semantic frame differs from Levin's (1993) semantically based verb classes in that Levin's verb classes are defined by argument structure alternations—i.e. pairs of argument structure constructions such as the Locative alternation—while FrameNet frames are defined purely semantically (Baker and Ruppenhofer 2002:28). Levin's classes and FrameNet frame classes may turn out to be similar, of course, to the extent that verbal semantic class is correlated with patterns of argument realization.

However, at least some argument structure alternations are analyzed in FrameNet as instances of a single verb having distinct senses (LUs) that evoke different semantic frames (Boas 2006). An example of this is the Locative alternation. An event like loading may be construed in two different ways, accounting for its occurrence in the Locative "alternation". Loading may be construed as an instance of the Filling frame (associated with the *with* locative construction) or an instance of the Placing frame (associated with the *onto*

locative construction; p. 135). Hence the argument structure "alternation" is due to alternative senses of the verb *load*; it is not a property of the verbal semantic class of *load*.

Iwata's analysis bridges the gap between the Levin (1993) verb classes and the FrameNet frame analysis. Iwata argues that the meaning of a verb such as *spray* should be represented at two levels. The first level is a rich semantic structure which Iwata represents pictorially (e.g. Iwata 2005*a*:361). Iwata calls this the L[exical Head Level]-meaning (p. 362). The second level represents the construal of the spraying event in one or more ways, e.g. spraying can be construed as a putting event type, a covering event type, an autonomous directed motion event type, and a substance emission event type, inter alia (p. 389):

(27) a. Jack sprayed paint on the wall. [putting event]
b. Jack sprayed the wall (with paint). [covering event]
c. Water sprayed onto the lawn. [directed motion event]
d. The broken fire hydrant sprayed water all day. [substance emission event]

The semantic construal is found when the verb occurs in a particular argument structure construction. When spraying is construed as a putting event, it occurs in the *onto* locative construction in (27a); when construed as a covering event, it occurs in the *with* locative construction or the Transitive construction in (27b); when construed as an autonomous directed motion event, it occurs in the "anticausative" Intransitive construction in (27c); and when construed as a substance emission event, it occurs in the Transitive construction in (27d). Iwata analyzes the meaning as construed in a semantic frame as the P[hrase Level]-meaning (Iwata 2005*a*:362).

Similarly, Nemoto argues that *trim* can be construed as an instance of the Decorating frame or as an instance of the Clearing frame (Nemoto 2005:125):

(28) a. John trimmed the tree with lights.
b. John trimmed the tree of overgrown branches.

The FrameNet analysis provides the semantics of a single verb sense (LU) and its relationship to a particular argument structure construction. Iwata presents a second semantic analysis of the verb's meaning as a whole, namely its L-meaning, and treats FrameNet's LU sense as a P-meaning derived from the L-meaning by a construal process (although he does not compare his analysis to the FrameNet analysis in his article).

Dang, Kipper, Palmer, and Rosenweig (1998) reanalyze Levin's verb classes and offer a similar explanation to Iwata's. As noted above, Levin's classification is based on the occurrence (or nonoccurrence) of verbs in argument structure alternations, that is, just pairs of semantically related argument

structure constructions such as the *onto* and *with* locative constructions. Dang et al. observe that Levin's classification includes many verbs that occur in more than one of her alternation-based classes. Dang et al. reanalyze Levin's verb classes into a more fine-grained set of classes defined by intersections of verbs occurring in multiple Levin classes. For example, the intersection of Levin's Carry, Push/Pull (exerting force), and Cut (*split*) classes consists of *push, pull, kick, draw, yank, shove*, and *tug*. The overall argument realization behavior includes elements of all these classes (Dang et al. 1998:295–6):

(29) a. Nora pushed the package to Pamela.
(*carry* verb implies causation of accompanied motion, no separation)

b. Nora pushed at/against the package.
(verb of exerting force, no separation or causation of accompanied motion implied)

c. Nora pushed the branches apart.
(*split* verb implies separation, no causation of accompanied motion)

d. Nora pushed the package.
(verb of exerting force; no separation implied, but causation of accompanied motion possible)

e. *Nora pushed at the package to Pamela.
(attempted action and directed motion cannot cooccur)

Dang et al. argue that the range of uses of *push*, etc. is motivated by a force component in *push*: this semantic property allows for possible 'extensions' of *push* to causation of accompanied motion (Carry) and separation (Cut). Dang et al.'s explanation is essentially the same as saying the L-meaning of the verbs in the intersective class (*push*, etc.) allows construal to P-meanings (senses in frames) of exerting force, separation, and caused accompanied motion.

All of these theories can be adapted to the model of semantic construal described in §1.4. Iwata's L-meaning corresponds to something like our human experience of spraying, loading, etc. The lexical meaning has a FORCE-DYNAMIC POTENTIAL to be construed in different frames—using 'force-dynamic' broadly to encompass the interactions between frame elements—just as the lexical meaning of a verb has an aspectual potential to be construed in different aspectual types (i.e. aspectual frames). The FORCE-DYNAMIC CONSTRUAL found in a particular verb + argument structure construction combination corresponds to Iwata's P-meaning. Examples of force-dynamic construals are application/putting, removal/clearing, decorating, covering, emission, contact, separation, and force exertion, all seen in

examples (27)–(29) above. These force-dynamic construals correspond roughly to the higher-level verb classes in Part Two of Levin (1993). But as noted above by Dang et al., individual verbs occur in multiple Levin classes: in our terms, most verbs have a potential for multiple force-dynamic construals.

The force-dynamic construal is a semantic structure, representable by the three-dimensional event representations argued for in this book. In fact, the one-word descriptions of the *q* dimension for each participant in the three-dimensional representations in chapters 5–8 should be thought of as a shorthand for the semantic frame of the verb sense in the argument structure construction represented thereby. The hypothesis advocated in chapters 5–8 is essentially that the event structure described in informal prose in FrameNet requires (at least) the temporal, causal, and qualitative structure implied by the three-dimensional representation in order to account for the linguistic facts.[3]

The semantic potential/construal analysis can even be extended to constructions that have only an indirect relationship to verbal semantics. Levin and Rappaport Hovav argue that the English Locative Inversion and There-constructions do not have directly to do with verbal semantics (Levin and Rappaport Hovav 1995, chapter 6). Instead, they are used for discourse functions such as introducing a participant into discourse, as in (30) (Baker and Ruppenhofer 2002:36, from the British National Corpus):

(30) a. From the speakers drones the voice of Max Von Sydow.
b. Out of this blur there stares a single set of eyes.

Baker and Ruppenhofer write, 'we assume that the semantics of verbs belonging to frames such as Perception_noise (*drone*), Perception_active (*stare*), and Self_motion (*come*) is compatible with the discourse-pragmatic function of introducing new referents' (2002:36). In fact, however, this analysis is no different from the construal analysis given above. Here, the verb is construed to fit in the Locative Inversion or There-construction for a pragmatic function, rather than being construed into an argument structure construction that expresses a semantic frame describing a particular way that participants (frame elements) interact in an event.

[3] Actually, the force-dynamic construal manifested in a verb + argument structure construction usually has only a subset of the frame elements of a semantic frame. A semantic structure that corresponds more closely to the force-dynamic construal in a particular argument structure construction would be the 'schemas' for subtypes of risk in the analysis of the Risk frame in Fillmore and Atkins (1994:366–7); frames that function as subframes of other frames in Baker, Fillmore, and Cronin (2003:286–7); or the causative and inchoative frame subtypes in Petruck et al. (2004).

The semantic potential/construal model of the occurrence of verbs in argument structure constructions, based directly on Boas, Iwata, and Nemoto's frame-construal theories, can also be interpreted as a natural progression from Goldberg's and Levin's model. Goldberg posits two different types of semantic roles, participant roles for verbs and argument roles for argument structure constructions (see §9.1). These roughly correspond to the verbal experience and the semantic frames respectively. Iwata recognizes the similarity between his approach and Goldberg's (Iwata 2005*a*:379): 'the list of participant roles which Goldberg employs is nothing more than shorthand for a scene rich with world knowledge' (Iwata 2005*b*:116). Even Levin's (1993:5–11) analysis of the differences in argument realization of *touch, hit, cut*, and *break* can be interpreted in a similar spirit. Levin argues that specific semantic components in the lexical semantic structure of each of these verbs license their occurrence in certain argument structure constructions, and the absence of the relevant semantic component renders them unacceptable in other argument structure constructions. In other words, in Levin's theory the semantics of a verb in a particular argument structure construction selects or requires particular semantic components in the verb's meaning.

The chief development of the theories of Boas, Iwata, and Nemoto in comparison to the theories of Levin and Goldberg is in the semantic representation. Levin's template augmentation model implies an additive approach to alternative construals of a verb meaning for an argument structure construction. The construal model allows for a more complex and flexible relationship between verb meaning and its construal into an argument structure construction. The construals may also be mutually incompatible, as seen with *push* in (29e). Finally, the semantic representations of event structure used by FrameNet, Boas, Iwata, Nemoto, and myself are richer than the ones employed by Levin and Goldberg.

There is another important difference between Goldberg's theory and the other theories, however, which takes us back to the issue of verb vs. constructional meaning. Boas, Iwata, and Nemoto all assume that the force-dynamic construal of an event (as it is characterized here) is a verb meaning. That is, Boas, Iwata, and Nemoto all assume the polysemy analysis (§§3.2.1, 9.1). Boas, and FrameNet generally, treats the semantic frames a verb can be construed into as different senses of the verb. The title of Iwata (2005*a*) refers to 'two levels of verb meaning'. Nemoto points out that the simple Transitive construction is possible for *trim*, but that it may represent either the Decorating frame Construal or the clearing frame construal (Nemoto 2005:125):

(31) John trimmed the tree.

Nemoto argues that 'although in [(28)] the same verb is used in different constructions to describe different types of events, the difference in meaning cannot be attributed to the constructions involved since the two senses are available in a simple transitive sentence like [(31)]' (p. 125).

But Nemoto's conclusion does not follow necessarily from the facts. The simple Transitive construction could be analyzed as polysemous between a decorating sense and a clearing sense—not to mention a substance emission sense as in (23a–b), and so on. In other words, the semantic frame (or P-meaning in Iwata's theory) could be the meaning denoted or evoked by the argument structure construction. In this constructional meaning approach, the compatibility of a verb with an argument structure construction depends on whether its L-meaning can be construed in the appropriate semantic frame/P-meaning corresponding to the construction's meaning.

In the constructional meaning approach to the semantic frame/P-meaning, some argument structure constructions would have a relatively narrow range of senses. This is especially true if those argument structure constructions with Oblique phrases specify the adposition used, such as [SBJ V OBJ *around* OBL] as in *He wrapped shiny paper around the present*, which calls for an enveloping or an encircling semantic frame (cf. Iwata 2005*a*:372–3). Other constructions, above all the simple Transitive and Intransitive constructions, would have a very wide range of constructional polysemy. These constructions allow alternative construals in many different frames, depending on the force-dynamic potential of the verb that is put in the construction.[4]

This brings us back to the analysis of the relative contribution of verb meaning and constructional meaning to the meaning of a verb + argument structure construction combination. We return to Goldberg's analysis of the Ditransitive construction from this perspective.

9.3 The semantic contributions of verbs and constructions

The syntax of the English Ditransitive construction is usually described as [SBJ VERB OBJ1 OBJ2], as in (10), and is illustrated in its most common form in (32):

(32) Julie gave Simon a book.

Goldberg argues that the Ditransitive construction contributes the meaning that 'the agent . . . acts to cause transfer of an object to a recipient'

[4] The polysemy of argument structure constructions such as the Transitive does not undermine the constructional meaning approach, but it does undermine the constructional coercion analysis because the construction does not require a single construal of the event; compare the arguments against constructional coercion in §3.2.1.

(Goldberg 1995:32). As we saw with *bake* in (1b) above, this meaning is not necessarily part of the meaning of the verb. The "basic" meaning of *bake* does not involve transfer of possession; this semantic component is present only when *bake* occurs in the Ditransitive construction.

Goldberg observes that in the case of *bake* and other verbs of creation, it is in fact intended, not actual, transfer of possession that is contributed by the Ditransitive construction. Whereas it is an entailment of (32) that Simon comes into possession of the book, it is possible in (1b) (*Karen baked Sam a cake*) that Sam does not receive the cake; Karen could drop it or decide not to give it to Sam after all. Hence the contribution of the Ditransitive construction is slightly different for *give* and for *bake*.

Goldberg resolves this problem by proposing that constructions can be polysemous. That is, the construction has more than one meaning, and the meanings are semantically related. In this case, the Ditransitive construction has two related constructional meanings: actual transfer of possession and intended transfer of possession. The former is found with *give*, the latter with *bake*. The two meanings are clearly semantically related.

In fact, Goldberg lays out an analysis in which there are not two but six related constructional meanings for the Ditransitive, five of which are extensions of the first, central sense (Goldberg 1995:38, Figure 2.2). These meanings are associated with verb classes as given in (33):

(33) A. Central Sense: agent successfully causes recipient to receive patient
   1. Verbs that inherently signify acts of giving:
      give, pass, hand, serve, feed, . . .
   2. Verbs of instantaneous causation of ballistic motion:
      throw, toss, slap, kick, poke, fling, shoot, . . .
   3. Verbs of continuous causation in a deictically specified direction:
      bring, take, . . .

   B. Conditions of satisfaction imply that agent causes recipient to receive patient
   1. Verbs of giving with associated satisfaction conditions:
      guarantee, promise, owe, . . .

   C. Agent causes recipient not to receive patient
   1. Verbs of refusal:
      refuse, deny

   D. Agent acts to cause recipient to receive patient at some future point in time
   1. Verbs of future transfer:
      leave, bequeath, allocate, reserve, grant, . . .

E. Agent enables recipient to receive patient
   1. Verbs of permission:
      permit, allow
F. Agent intends to cause recipient to receive patient
   1. Verbs involved in scenes of creation:
      bake, make, build, cook, sew, knit, . . .
   2. Verbs of obtaining:
      get, grab, win, earn, . . .

A polysemy representation of the Ditransitive construction would have a single representation of the construction's morphosyntactic structure, linked to the range of meanings found in (33). Such a representation is given in (34) (XPoss = transfer of possession):

(34) Ditransitive construction:

Form:	*Meaning:*
[SBJ VERB OBJ1 OBJ2]	actual XPoss
	conditional XPoss
	negative XPoss
	future XPoss
	enabling XPoss
	intended XPoss

However, the variation in the Ditransitive construction's meaning does not appear to be true polysemy (Croft 2003*b*:55). Each verbal semantic class is associated with only one sense of the Ditransitive construction. Also, the association between verbal semantic class and Ditransitive meaning is not random. It is not an accident that the verbs found with Ditransitive sense E, "agent enables recipient to receive patient" are verbs of permission, or that the verbs found with sense C, "agent causes recipient not to receive patient" are verbs of refusal. That is, the modulation of the possessive relation specified by each constructional sense—actual, enabling, and negative transfer of possession—matches a semantic component of these verbs.

Koenig and Davis (2001) also observe this fact about the semantics of the Ditransitive construction in their review of Goldberg's analysis. They name the phenomenon 'sublexical modality', and observe that it is found with other verbs (Koenig and Davis 2001:77):

(35) a. Bill had/received/lost/lacked/needed many books.
     b. Sue perceived/noticed/overlooked/missed him.
     c. Bill managed/tried/failed/neglected to read the books.
     d. Sue forced/urged/defied/forbade Bill to go.

Koenig and Davis's name 'sublexical modality' implies an analysis in which this semantic component is attributed to the verb meaning. This is the issue we are considering here, and so we will retain the term 'modulation' for this semantic component. (We return to this aspect of Koenig and Davis's analysis below.)

Further evidence for this approach is the existence of at least one other sense of the Ditransitive construction, required by one class of verbs (Croft 2003*b*:55; Koenig and Davis 2001:76):

(36) a. That vase cost him $300.
b. That painting set him back $500.
c. Burns charged Smithers $10 for the dinner.

(37) G. Acquisition of goods causes recipient to no longer have possession of money.
1. Verbs of costing:
cost, set back, charge, . . .

Even the verb classes that do not inherently specify a modulation of the transfer of possession relationship occur with only one "sense" of the polysemous Ditransitive construction. Verbs of creation and obtaining are found only with the intended transfer of possession modulation, though verbs of instantaneous ballistic motion and deictic continuous causation are found with the actual transfer of possession modulation.

Goldberg points out that this fact is evidence against a monosemy analysis of the Ditransitive construction, that is, an analysis such that the Ditransitive construction simply means transfer of possession without specifying the modulation of this event (Goldberg 1995:36–7). But if the Ditransitive construction were truly polysemous, one might expect that the verb *bring*, for example, would be found with Ditransitive sense F, resulting in a meaning like "X brings Z with the intention of causing Y to receive Z", or *kick* could also occur with Ditransitive sense C, resulting in a meaning like "X kicks Z causing Y not to receive Z". But we do not. Instead, it seems that the different "senses" of the Ditransitive construction are very closely tied to the verb classes that each "sense" occurs with.

In other words, a proper representation of the construction schema for each "sense" of the Ditransitive construction must include the relevant modulation and specify which verb classes occur with it (Croft 2003*b*:56–9). That is, the proper representation of an English speaker's knowledge of the Ditransitive construction is not the polysemous representation given in (34). Instead, there is a distinct syntactic schema for each constructional "sense" specifying the verb classes found with each subtype, and its corresponding meaning:

(38) Family of Ditransitive constructions:

	Form:	*Meaning:*
A.	[Sbj Giving.Verb Obj1 Obj2]	actual XPoss
	[Sbj Ball.Mot.Verb Obj1 Obj2]	actual XPoss via ballistic motion
	[Sbj Deic.Caus.Verb Obj1 Obj2]	actual XPoss via deictic caused motion
B.	[Sbj Cond.Giving.Verb Obj1 Obj2]	conditional XPoss
C.	[Sbj Refuse.Verb Obj1 Obj2]	negative XPoss
D.	[Sbj Fut.Giving.Verb Obj1 Obj2]	future XPoss
E.	[Sbj Permit.Verb Obj1 Obj2]	enabling XPoss
F.	[Sbj Create.Verb Obj1 Obj2]	intended XPoss after creation
	[Sbj Obtain.Verb Obj1 Obj2]	intended XPoss after obtaining
G.	[Sbj Cost.Verb Obj1 Obj2]	depriving XPoss via paying

Of course, there is a family resemblance in both the form and the meaning of the Ditransitive constructions in (38): all involve a modulated transfer of possession, and all have two Object phrases and a verb. But the verb classes used for each construction are mutually exclusive, and the modulation of the transfer of possession differs for each construction in the Ditransitive family.

The semantic type of the Second Object NP argument also varies significantly. The latter two constructions of sense A require a mobile physical object participant in this argument, while senses C–E do not; sense G requires a price NP, etc. The Subject and First Object NP arguments are human participants, of course. Just as semantically based verb classes are involved in constructional representations, so are semantically based argument phrase classes. Adopting properly specified argument phrase classes will make even clearer how distinct each of the constructions in (38) actually are.

The representations in (38) are a more precise and accurate representation of an English speaker's knowledge than those in (34). In Croft (2003*b*:58), I call the representations in (38) VERB-CLASS-SPECIFIC CONSTRUCTIONS.

In fact, other evidence that Goldberg presents indicates that even more specific representations than those in (38) are necessary. She points out that not every permission and refusal verb occurs in the Ditransitive construction (Goldberg 1995:130):

(39) Sally refused/denied/*prevented/*disallowed/*forbade him a kiss.

(40) Sally permitted/allowed/*let/*enabled Bob a kiss.

A representation of these two "classes" (Goldberg's classes C and E) would in fact have to specify each verb that occurs in the Ditransitive construction (see §9.4 for further discussion):

(41)		*Form:*	*Meaning:*
	C.	[SBJ *refuse* OBJ1 OBJ2]	negative XPoss by refusing
		[SBJ *deny* OBJ1 OBJ2]	negative XPoss by denying
	E.	[SBJ *permit* OBJ1 OBJ2]	enable XPoss by permitting
		[SBJ *allow* OBJ1 OBJ2]	enable XPoss by allowing

In Croft (2003*b*:58), I call the constructions in (41) VERB-SPECIFIC CONSTRUCTIONS.[5]

What is the relationship between verb meanings and verb-specific (or verb-class-specific) constructions? To the extent that verbs are represented independently of the constructions in which they occur, one might be able to isolate the verb's meaning and what it contributes to the meaning of the verb occurring in a particular argument structure construction such as the Ditransitive construction. Yet that contribution appears to differ from verb to verb for the Ditransitive construction, if we assume a unitary-meaning model of verbal semantic representation as Goldberg does.

The semantics of the combination of verb + Ditransitive construction can be divided into three components. The first is the verbal root: the core of meaning that differentiates verbs of the same semantic class such as *throw, toss, kick*, etc. The second is the transfer of possession meaning that is associated with the verbs when they occur in the Ditransitive construction. The third component is the modulation ('sublexical modality'): whether the transfer of possession is actual, conditional, intended, etc.

The verbs that occur in the Ditransitive construction can be put into three groups depending on how many of the above semantic components the basic verbal meaning would include. These groups are listed in Table 9.1 on p. 380; a V indicates which component is intuitively part of the verb meaning.

When any verb from any of these classes occurs in the Ditransitive construction, all three semantic components are present. For Group I verb classes, occurrence in the Ditransitive construction does not "add" anything over and above the intuitive verbal meaning. The semantics of Group I verbs is a simple relation of specific meaning subsumed under a more schematic meaning (Goldberg 1995:60). For Group II verb classes, occurrence in the Ditransitive construction adds only transfer of possession to the intuitively basic verb meaning. The modulation is part of the verb meaning as well as part of the verb + construction as a whole (as in Koenig and Davis's analysis). For Group III verb classes, occurrence in the Ditransitive construction adds both a

[5] Barðdal (2006, 2007, 2008) analyzes a variety of verb-specific and verb-class-specific argument structure constructions in Icelandic and German.

TABLE 9.1. Componential analysis of Ditransitive verb class basic meanings.

Verb class	*Verbal Root*	*Modulation*	*Transfer of Possession*
Group I			
inherent giving (A1)	V	V [actual]	V
conditional giving (B1)	V	V [conditional]	V
future transfer (D1)	V	V [future]	V
Group II			
refusal (C1)	V	V [negative]	
permission (E1)	V	V [enabling]	
costing (G1)	V	V [depriving]	
Group III			
instantaneous ballistic motion (A2)	V	[actual]	
deictic continuous causation (A3)	V	[actual]	
creation (F1)	V	[intended]	
obtaining (F2)	V	[intended]	

modulation (actual or intended) as well as transfer of possession to the intuitively basic verb meaning.

The question then is: Do verbs of Groups II and III include the additional semantic components as part of derived verbal lexical entries, as in a lexical rule (polysemy or derivational) approach, so that the process of semantic composition of verb + construction is simply subsumption? Or are they contributed only by the (verb-class-specific) Ditransitive construction, in which case a more complex semantic composition process is necessary? Or is it something else?[6]

The verb semantic classes of Group III are the ones that appear to make the strongest case for a constructional meaning: the verb meaning does not intuitively include either the transfer of possession meaning or its modulation. Goldberg argues that one should avoid 'a system where a new sense is posited in an unrestrained way for each new syntactic configuration that is encountered' (Goldberg 1995:44). Thus, verbs of creation like *bake* should not have an additional meaning posited that adds transfer of possession because it occurs in the Ditransitive construction.

[6] The verb semantic classes of Group III are not discussed by Koenig and Davis (2001); they discuss only the examples in which the verb meaning includes the 'sublexical modality' (i.e. Groups I and II). The modulations of intended transfer and actual transfer are not intuitively part of the meaning of creation/obtaining and of ballistic motion and deictic continuous causation, respectively. Hence Koenig and Davis would have either to use a lexical rule to derive intended/actual transfer verbs from these classes, or require a semantic contribution from the Ditransitive construction.

However, the idea that *bake* has a basic meaning apart from what it means in the Ditransitive construction is simply because *bake* occurs in another construction, the Transitive construction in (1a) (*Karen baked a cake*), and the meaning of *bake* in that construction is taken to be the more basic meaning. In other words, arguments supporting one meaning as intuitively basic and another as derived are based on privileging the meaning of the verb in one argument structure construction over its meaning in another argument structure construction.

In the case of *bake*, the lower valency argument structure construction is taken to manifest the "basic" verb meaning, or in the constructional approach, the verb's inherent meaning (as opposed to the contribution of the constructional meaning). But in other cases, the verb meaning in the Transitive construction is taken as the "basic" or "verbal" meaning, and the meaning in the lower-valency Intransitive construction is the "derived" meaning:

(42) a. Masha ate dinner at 5.
b. Masha ate at 5.

(43) a. Bill was reading a magazine.
b. Bill was reading.

(44) a. A tiger killed the villager.
b. Tigers only kill at night. [Goldberg 2001:506]
c. The villager was killed by a tiger.

Relative valency of the verb + argument structure construction is therefore not a consistent criterion for basic verb meaning.

The fundamental fact is that neither linguists nor the speakers whose behavior they are trying to explain encounter verbs outside of argument structure constructions. Any "general" or "basic" meaning attributed to a verb is an abstraction of the range of meanings the verb has in the various argument structure constructions it occurs in. (In fact, a verb's "basic" meaning is better analyzed not as an abstraction but as a force-dynamic potential that is manifested by the argument structure constructions in which it occurs; see §9.2.) Likewise, speakers do not encounter argument structure constructions such as the Ditransitive construction apart from the verbs that occur in them. Any meaning attributed to the Ditransitive construction is an abstraction across the range of verbs that occur in it.

As we have seen, for the Ditransitive construction there is no simple way to determine either a unitary verb meaning or a unitary construction meaning that would be abstracted from all of the uses of the verb across constructions or of the construction across all the verbs that occur in it. Different combinations of verbs and constructions have different meanings—for example, the

modulation of the transfer meaning in the different Ditransitive construction subtypes. Also, the apparent contribution of the verb and the construction to the meaning of the verb + construction combination varies from one group of verbs to the next. For example, it follows from neither the semantics of verbs of creation nor the semantics of the Ditransitive construction (in all of its uses) that *Karen baked Sam a cake* involves only intended and not actual transfer of possession. In other cases there is semantic overlap. For example, it follows from both the semantics of verbs of inherent transfer of possession such as *give* and the semantics of the Ditransitive construction that *Julie gave Simon a book* involves (actual) transfer of possession.

What speakers actually encounter are utterances containing specific verbs combined with specific argument structure constructions, and the meaning of that particular verb + construction combination. What appears in utterances is therefore closest to the verb-specific constructions and the verb-class-specific constructions proposed above for the Ditransitive combined with specific verbs or narrowly defined verb classes. Linguists disagree as to what a speaker analyzes out as a verb meaning (or meanings) and as a constructional meaning (or meanings). The disagreements are due in part to theoretical assumptions, such as the acceptance or rejection of constructions having meanings. But the disagreements are also in large part due to the fact that the data lend themselves to alternative interpretations. Yet speakers are exposed to the same data. If linguists make different abstractions from verb + argument structure construction combinations in verb-specific constructions, speakers might do so as well.

Speakers may analyze their component units in different ways; and we should not expect all speakers to form the same generalizations. Consider the options available to an English speaker for the array of constructions in (38) and (41) with respect to both modulation and transfer of possession. An English speaker could abstract a single schematic Ditransitive construction with a syntax of [Sbj Ditr.Verb Obj1 Obj2] and a meaning of transfer of possession, and analyze out fully derived verb meanings, along the lines of the Group I verbs or a polysemy/lexical rule analysis of the Group II and III verbs. The construction could include transfer of possession meaning, but the modulation would come from the derived verb entries. Or a speaker could abstract a set of Ditransitive constructions like the ones given in (38), each construction specifying transfer of possession and its modulation, combining with underived verbs, which would have to match the modulation of the particular construction for Groups I and II.

In fact, a speaker need not induce any construction more abstract than the verb-class-specific constructions in (38), or even the verb-specific constructions in (41). In this case, the form–function analysis of verb and argument

structure construction may not be fully specified. That is, for a particular verb + argument structure combination in a verb-specific construction, speakers may simply store the entire meaning without attributing specific parts of it to an abstracted verb or an abstracted argument structure construction. It is this meaning that is represented by the three-dimensional semantic structures in chapters 7–9. The three-dimensional representations denote whole event structures and whole verb-specific or verb-class-specific syntactic structures. They do not specify abstract verb meaning or abstract constructional meaning, although a generalization could possibly be formed across event structures containing the same verb form or the same argument structure construction.

The contrast between a lexical rule analysis and a constructional analysis is a false dichotomy (Croft 2003*b*). Verb-specific constructions are a third type of analysis. They share with lexical rules the specificity of association with a particular verb (or narrow verb class). They share with constructions the fact that the meaning is associated with the construction as a whole, not just a single element. A verb-(class-)specific construction represents a particular construal of an event that is taken to be denoted by the verb, or narrow verb semantic class (see §9.2).

The contrast between a verb-specific construction and an abstraction across constructions is also a false dichotomy. In the usage-based model, abstractions are emergent properties of exemplars of more specific linguistic structures, even specific utterances. Verb-specific constructions are a direct and explicit representation of "exceptions" to general rules of argument realization. Verb-specific constructions allow us to discard special representational devices such as exception features or verb role profiling to notate verb-specific idiosyncrasies in argument realization. All grammatical structures are represented uniformly, as pairings of (complex) forms with (complex) meanings—a basic principle of the construction grammar model (Croft and Cruse 2004:255; Goldberg 2006:5). Finally, verb-specific constructions appear to be the basic level of mental representation of verbs and argument structures. The next section will offer evidence in support of a usage-based, exemplar model of argument structure constructions.

9.4 A usage-based exemplar model of verb + construction meaning

The analyses described in §§9.2–9.3 are based largely on the assumption that there are strong regularities in the relationship between verbal semantics and occurrence of the verbs in argument structure constructions. As we have seen, even with this assumption, there is no a priori way to determine the contribution of the verb meaning or the constructional meaning to the overall meaning of the combination. One recurring theme of the research discussed

in those sections, however, is that the relevant verbal semantic classes are much narrower than previously thought. The verbal semantic classes are certainly much narrower than "intransitive", "transitive", and "ditransitive". In §9.3 (following Croft 2003*b*), it is argued that even the Ditransitive construction must be broken down into several subconstructions. Dang et al.'s (1998) reanalysis of the Levin semantic classes (see §9.2), already quite numerous, into intersective classes based on verb occurrences in all their argument structure alternations renders the classes even smaller. The FrameNet semantic frames (see §9.2) are also extremely numerous and fine-grained, although FrameNet also includes more general semantic frames whose frame elements are inherited by the more specific frames (Fillmore, Johnson, and Petruck 2003:239; Baker, Fillmore, and Cronin 2003:286–7). This research indicates that verb-class-specific constructions are often quite narrow in their distribution. But there is plenty of empirical evidence that even specific verbs which are semantically very similar display idiosyncratic patterns of occurrence in argument structure constructions.

The FrameNet project represents a large-scale coverage of the English lexicon: at the time that Baker and Ruppenhofer published their paper, it consisted of 230 frames and covered around 1,700 verbs of English (Baker and Ruppenhofer 2002:29). FrameNet is based purely on semantic structure: a set of core frame elements which are semantically interrelated in a specific way defined by the semantic frame (e.g. the Reasoning frame described in §9.2). But the argument structure behavior of verbs in the same frame—leaving aside the argument structure behavior of the same verbs in other frames—is not always uniform. For example, in the Attaching frame, most verbs occur in both an Asymmetric and a Symmetric argument structure construction, illustrated in (45a) and (45b) respectively (Fillmore, Petruck, Ruppenhofer, and Wright 2003:301):

(45) a. He . . . tied **the driving wheel** to **Pete's cardboard box** with string.
b. . . . two horribly bent captives, **their feet** tied by a cord and their heads looking . . .

In (45a), the driving wheel is realized as Object and the cardboard box is realized in an Oblique phrase; the Object participant is typically smaller and less fixed than the Oblique participant, as one would expect for the figure–ground asymmetry (p. 301; see §6.3.2). In (45b), the two feet are construed symmetrically and expressed jointly as a plural Object.

But Fillmore et al. note that *attach, append*, and *secure* do not occur in the Symmetric argument structure construction (p. 301):

(46) a. *I appended the letters (together/to each other).
b. *I attached the letter and the photo (together/to each other).
c. *I secured the cables (together/to each other).

In other words, the occurrence of attaching verb senses in argument structure constructions is not fully predictable by the Attaching frame. There have to be verb-specific constructions for verb senses in the Attaching frame that indicate occurrence in the Symmetric argument structure construction. Fillmore et al. treat the need for 'lexical stipulation'—verb-specific constructions—as unremarkable, as do Koenig and Davis (2001:112, 116).

Dowty (2000, 2001) argues against an argument structure alternation analysis of the construction in (47):

(47) a. Bees are swarming in the garden.
b. The garden is swarming with bees.

Dowty argues that the construction exemplified by (47b), the L[ocation]-Subject construction, has its own distinct semantic effects (he does not treat it as a constructional meaning, however, but as a lexical derivation). He makes four observations about the semantic restrictions imposed by the L-Subject construction (Dowty 2000:114–20), based mainly on the corpus in Salkoff (1983). First, the semantic classes of verbs that occur in the construction denote 'perceptually simple activities usually recognizable from temporally and spatially limited input' (Dowty 2000: 116), i.e. verbs of small-scale movements (*crawl, bubble, throb, vibrate*, etc.), animal and other simple sounds (*hum, buzz, twitter*, etc.), light emission (*blaze, flash, glimmer*, etc.), smells (*reek, smell, be fragrant*, etc.), and degree of occupancy or abundance (*teem, abound, be rich*, etc.). Second, the Object of *with* must be semantically unquantified (Salkoff 1983:292):

(48) a. The wall crawled with roaches.
b. *The wall crawled with a roach.

Third, the Object of *with* can be a sound source but an agent of the sound is dispreferred; this restriction does not seem to apply to light or smell (Dowty 2000:118):

(49) a. ?The courtyard cackled with geese.
b. The courtyard cackled with the sound of geese.

(50) a. The sky glowed with stars.
b. The sky glowed with starlight.

(51) a. The kitchen reeked with garlic.
b. The kitchen reeked with the smell of garlic.

Finally, metaphorical or hyperbolic versions are sometimes more preferable to the literal version:

(52) a. ?The roof dripped with water.
b. Her voice dripped with sarcasm.

Dowty (2001) proposes a 'dynamic texture' analysis based on a suggestion by Ray Jackendoff. L-Subject sentences 'describe a situation where a kind of event is occurring simultaneously and repetitively throughout all parts of a place or space'; the individual events are less salient than the overall effect, which is a 'texture of movement' (p. 176). Hence the events are small-scale and simple, individual events are not individuated (so the Object of *with* is semantically unquantified, and probably animate sound sources are dispreferred) and the small-scale activities are occurring throughout the region named by the Subject (p. 177).

Dowty's semantic analysis of the L-Subject construction allows for some degree of indeterminacy in the types of verbs and argument phrases that occur in it. This is consonant with the construal analysis presented in §9.2: the verbal event must be construable as an activity giving rise to a 'dynamic texture'. Dowty's semantic analysis also imposes restrictions on the arguments as well as the event. Since both event and arguments must be appropriately construed, the meaning must be associated with the combination of predicate and arguments, namely the argument structure construction as a whole. But Dowty also observes that there are 'lexical gaps' in the occurrence of verbs in the L-Subject construction (2000:121):

(53) a. The horizon blazed with campfires.
b. ??The woods burned with campfires.

(54) a. Her voice dripped with sarcasm. [=(52b)]
b. ??His voice dripped with righteous indignation.

In §9.3, verb-specific constructions were posited for the negative subtype of the Ditransitive construction, on the basis of the sentences in (39), repeated below:

(39) Sally refused/denied/*prevented/*disallowed/*forbade him a kiss.

Iwata (2006*b*) observes that in fact, *forbid* does allow the Ditransitive, citing examples from the British National Corpus, three of which are given in (55) (pp. 519–20):

(55) a. . . . if he should continue to molest his wife and daughter the law allows an injunction to be brought against him, **forbidding him access** to the marital home.

b. **Duart is forbidden visitors** today, my lady, so that in two days he may be fit for the ceremony.

c. **The prisoner was forbidden all human rights**, to communicate with his family, to be represented by a lawyer, to protest against the torture, or even to be put on trial.

Although Iwata found no examples of *disallow* or *prevent* in the Ditransitive construction in the British National Corpus, he did find examples on the Web, two of which are given in (56) (Iwata 2006*b*:522):

(56) a. Normal users **were disallowed any access** to any parts of the file system holding a jail.

b. The Finance Sector Union (FSU) campaigned strongly against the agreement, but **were prevented full access** to the workforce by the management.

Iwata argues that the proper semantic analysis of the negative Ditransitive subconstruction is "X does not allow Y to receive Z" (Iwata 2006*b*:517). Iwata argues that in events lexicalized by *disallow* and *prevent*, the agent 'is not in a position to allow somebody to do something', and therefore 'the verb meaning cannot be elaborated into "to not allow somebody to receive something"' (p. 524).

I am not fully convinced by Iwata's semantic explanation for the general nonoccurrence of *disallow* and *prevent* in the Ditransitive construction. However, Iwata makes important observations about the circumstances under which *forbid, disallow*, and *prevent* do occur in the Ditransitive. Iwata observes that in general, the negative verbs are found in the Passive of the Ditransitive especially with the Object nouns *access, entry, permission*, and *right* (Iwata 2006*b*:525–6). He suggests that the occurrence of *disallow* and *prevent* in the Ditransitive found on the Web is an extension of this sub-subconstruction. Note also that the examples of *forbid* in (55) are mostly Passive (this is also true of the longer list of *forbid* instances in Iwata 2006*b*:519–20). In other words, the Ditransitive Passive sub-subconstruction [SBJ *be* NOT.ALLOW.VERB-PASSIVE *access/entry/permission/right*] or the even more specific construction [SBJ *be disallowed/prevented access to* OBL] is an autonomous verb-and-object-specific argument structure construction which allows a different range of verbs than the more general negative Ditransitive subconstruction. These facts support a usage-based analysis in which highly specific Ditransitive Verb+Object combinations form a cluster of exemplars, and one semantically coherent part of that cluster, the Passive plus *access*, etc., is being extended into the conceptual space occupied by the meanings of *disallow* and *prevent*.

A similar phenomenon is found in the Ditransitive construction in Standard Modern Norwegian (Barðdal, Kristoffersen, and Sveen 2011). Most West Germanic languages have a family of Ditransitive constructions, not unlike English, but the range of verbs to which they apply varies from language to language (see also Barðdal 2007). In some subclasses, particularly verbs of creation and obtaining, some verbs are allowed in the Ditransitive construction only when the recipient is Reflexive (i.e. coreferential with the Subject

participant). There is lexical variation in the same semantic class for the Reflexive restriction: for example, in the majority of Norwegian dialects *kjøpe* 'buy' is restricted to the Reflexive but *skaffe* 'get' is not.

Among the verbs of creation and obtaining restricted to Reflexive recipients in Standard Modern Norwegian are those in (57)–(58) (Barðdal et al. 2011:85):

(57) Hun strikket seg en genser.
she knitted herself a sweater
'She knitted herself a sweater.'

(58) Han tok seg en øl.
he took himself a beer
'He got himself a beer.'

However, even these two examples are somewhat different in syntactic behavior: 'knit' allows the Reflexive Object to be emphasized in a *til*-phrase, but 'get' does not (p. 84):

(59) Til seg selv strikket hun en genser
to herself self knitted she a sweater
'To herself did she knit a sweater.'

(60) *Til seg selv tok han en øl.
to himself self took he a beer
[unacceptable in the sense 'he got himself a beer']

Some verbs occur in the Reflexive Ditransitive construction even if they do not have the create/obtain meaning in the simple Transitive: *ha* 'have' in (61) is a stative verb of possession in the simple Transitive and does not even occur with *en støyt* 'a swig' in that construction (p. 87):

(61) ha seg en støyt
have oneself a swig
'take a swig'

Finally, the Reflexive Ditransitive construction has acquired a meaning of agentive effort intended to result in a desirable outcome. Barðdal et al. suggest that this is the conventionalization of a pragmatic implicature, namely that something one does for oneself is likely to be something desirable (pp. 95–6).

A usage-based account of verb-specific constructions best accounts for the Standard Modern Norwegian data. The Ditransitive construction is lexically specific for verbs of creation and obtaining, due to either gradual expansion to or gradual retreat from this verb class. A verb-and-object-specific construction with a Reflexive Object has been established, and has acquired a distinctive meaning and attracted verbs to it that otherwise do not occur in the

Ditransitive construction and even otherwise do not occur with an obtaining meaning (*ha* 'have').

Another example indicates that verb-specific constructions exist even when there is a semantic generalization for the construction. Goldberg points out that there are at least two examples of verbs used in the Ditransitive construction without a transfer of possession meaning (Goldberg 1995:132):

(62) He forgave her her sins.

(63) He envied the prince his fortune.

Goldberg notes that historically *forgive* meant 'to give or grant', and *envy* meant 'to give grudgingly' or 'to refuse to give' (p. 132). Hence they began as members of verb classes normally found in the Ditransitive construction, namely classes A and A or C respectively, with a transfer of possession meaning. The meanings of *forgive* and *envy* in the Ditransitive construction changed such that they no longer have a transfer of possession meaning (in any modulation). Yet *forgive* and *envy* are still allowed in the Ditransitive construction, although Goldberg suggests that they have become archaic and are being lost (p. 132).

If the Ditransitive construction were represented only by a verb-class-specific construction as in (38) in §9.3, then the occurrence of the original *forgive* 'give, grant' and *envy* 'give grudgingly, refuse to give' in the Ditransitive construction could be predicted from the semantics of the basic verb entry and the semantics of the appropriate verb-class-specific construction. That is, there would be no need for verb-specific constructions for these verbs. If this were true, then one would predict that once the verb meanings changed, the verbs could no longer occur in the Ditransitive construction. The semantics of *forgive* and *envy* changed and was no longer predictable from the verb-class-specific construction; yet *forgive* and *envy* continue to occur in the Ditransitive. This implies that for at least these two verbs, and probably many other verbs, the verb-specific constructions were AUTONOMOUS (Bybee 1985), that is, the verb-specific construction was independently represented in the mind before the semantic shift, even though their syntax and semantics were predictable from the verb-class-specific construction. The original semantics of *forgive* and *envy* was therefore associated with the verb-specific construction as a whole, and the meanings shifted without causing a change in their syntax. The semantic divergence of *forgive* and *envy* from the Ditransitive construction meaning of transfer of possession is the constructional analog to lexical split, where for example 'something can be *dirty* without involving real *dirt* at all' (Bybee 1985:88).

A final example of an argument structure construction that lends itself to a usage-based analysis is the Resultative construction. This construction has

been assumed to be a very general construction, adding a Result phrase and a semantic result state to a wide range of events. Its productivity is symbolized by the widely cited invented example *Frank sneezed the napkin off the table* (Goldberg 1995:154). In §8.2, we discussed two major subtypes of Resultative constructions and some restrictions on the types of Resultative constructions. But that discussion still treated the Resultative construction as a very general construction type. In fact, the range of combinations of verb, Object, and Result phrase are highly irregular (Boas 2003:113, 114):

(64) a. Stefan ate his food up.
b. Stefan ate his plate clean.
c. Stefan chewed his food up.
d. *Stefan chewed his plate clean.

(65) a. Christian drank his beer up.
b. Christian drank his glass dry.
c. Christian swallowed his beer down.
d. *Christian swallowed his glass empty.

Boas (2003) analyzes a large sample of Resultative constructions in the British National Corpus. He observes that the distribution of Result phrases is highly idiosyncratic. For example, the verb *drive* in the Resultative construction meaning 'drive X crazy' allows for a range of Result phrases, but they vary arbitrarily as to whether the Result phrase is an Adjectival phrase or a Prepositional (Oblique) phrase, or sometimes both (adapted from Boas 2003:128):

(66)

Adjectival phrase		Prepositional phrase	
mad	108	*to madness*	5
insane	23	*to insanity*	1
crazy	70	*to distraction*	27
wild	22	*up the wall*	13
nuts	18	*to suicide*	9
batty	4	*to despair*	8
dotty	4	*to desperation*	7
crackers	4	*into a frenzy*	3
		over the edge	3

Boas notes that usually either the Adjectival or Prepositional phrase form is chosen for a given lexical root in the Resultative. Although there is a general preference for an Adjectival Result phrase, it is of course not categorical (Boas 2003:128). Nevertheless, there is evidence of productivity or speaker creativity with the verbalization of the 'drive X crazy' meaning (p. 129; examples from the British National Corpus):

(67) a. His lifelong ambitions thwarted again and again, driving him to drink and gambling and unreasoning rage.

b. Stephen Thomas says the ordeal has driven him to the brink of suicide.

Boas argues for the existence of 'mini-constructions': 'each particular sense of a verb constitutes a mini-construction represented by an event-frame with its own semantic/pragmatic and syntactic specification' (Boas 2003:315). Boas's mini-constructions are the same as our verb-specific constructions.

Boas notes that *drive* [crazy] is actually quite productive as [Verb + Resultative] expressions go (2003:315), as evidenced by the range of expressions from the British National Corpus in (66). But for his representation of the Result phrase, Boas simply lists the percentage of Adjectival phrases vs. Prepositional phrases (77% to 23%; pp. 234–5). In a footnote, Boas writes:

> Note that if this event-frame were used to simulate real human language production on a Natural Language Processing System, it would be necessary to encode the entire list of attested corpus resultative phrases including the percentage numbers for each resultative phrase. Based on these lexical specifications it would then be possible to predict how often a certain resultative phrase would be used in discourse.
>
> (Boas 2003:234–5, fn. 20)

Yet what is necessary to 'simulate real human language production' is equally necessary for a theory of real human linguistic behavior. It should not and cannot be restricted to natural language processing systems, if we are to achieve an adequate theory of language.

In other words, the representation of *drive* [crazy] must include all the Resultative expressions and their token frequencies. This is exactly what a usage-based, exemplar analysis of Resultative constructions would be (see Croft, to appear). In the usage-based, exemplar analysis, a speaker's knowledge of language consists of a cluster of occurring exemplars to which the speaker has been exposed. The exemplar cluster may license novel Resultative constructions, with novel verbs and Result phrases (and combinations thereof) if the cluster is large enough—i.e. high enough type frequency—and semantically sufficiently coherent (Bybee 1995; Barðdal 2008). Type frequency and semantic coherence tend to be in an inverse relation, or more precisely, patterns with a high type frequency and a high semantic coherence (i.e. narrow semantic class) are difficult if not impossible to find (Barðdal 2008:34–44).

The *drive* [crazy] cluster of Resultative exemplars clearly has a (relatively) high enough type frequency and possesses a sufficiently coherent semantics that it sanctions (Langacker 1987:65–73) the creation of novel *drive* [crazy] Resultative constructions. Other verb-specific Resultative constructions are

not as productive. Boas contrasts *drive* [crazy] with Resultatives containing the Result phrases *dead* or *to death* (Boas 2003:130–2). Different main verbs tend to select only *dead* or *to death*. Here the type frequency of the Result phrase is extremely low, and even replacement of *dead* by *to death* or vice versa rarely occurs.[7]

Bybee (1995) argues that the proper way to represent an "abstraction" from linguistic exemplars is as a pattern of relationships among exemplars. The abstraction, and hence productivity, of the construction schema is gradient, a function of the number of structurally and semantically similar exemplar types (see also Barðdal 2008, chapter 2). In this analysis, there is no sharp distinction between an exemplar or a specific structure like a verb-specific construction and an "abstraction", rule, or schema. The latter are simply another way of describing the relationships among a set of specific exemplars or verb-specific constructions. Likewise, the notion of a "basic" and "derived" meaning is determined in large part by the relative token frequency of the "basic" and "derived" exemplars. For example, if *bake* occurs much more frequently in the simple Transitive construction without a recipient than it does in the Ditransitive construction with a recipient, then its meaning in the Transitive construction is likely to be considered more basic than the meaning in the Ditransitive construction.

9.5 Conclusion

A verb in a particular argument structure construction represents a force-dynamic (in the broad sense) construal of an event, just as a verb in a particular tense–aspect construction represents an aspectual construal of an event. The event construal found in an argument structure construction represents a particular construal of the relationships among the participants in the event, as described by the force-dynamic and other relations among participants in the three-dimensional representation, or by the richer albeit informal description of the interactions among frame elements in the FrameNet semantic frame. The semantic frames representing event construals are very specific, e.g. attaching, filling, sound emission, etc. A specific argument structure construction such as the simple Transitive allows many alternative construals depending on the verb found in it and the force-dynamic potential of the verb to allow the construal in question. In this sense, argument structure constructions are polysemous across different frame-semantic

[7] Boas notes that there is a correlation between *dead* and a directed achievement predicate and *to death* and a nonincremental accomplishment predicate (in our terms), but it is not categorical (Boas 2003:132, fn. 12).

construals of events. The ability of an event to be construed in a particular semantic frame is constrained in part by the nature of reality, i.e. the tendency of a particular event to exhibit the relevant force-dynamic relationships in particular situations.

Speakers are not exposed to verbs in isolation, nor are they exposed to schematic argument structure constructions without verbs in them. Actually-occurring utterances are closest to verb-specific constructions. Verb-specific and verb-class-specific constructions exist as part of a speaker's grammatical knowledge: there are idiosyncrasies in the form–meaning mapping that show that we cannot discard them for more general constructions. The idiosyncrasies are due to the fact that construal of events is constrained in part by the conventions of the speech community. So a mapping of specific semantic components of the meaning of a verb-specific construction to the verb (in the abstract) or the construction (in the abstract) does not have to be fully specified. Verb-specific and verb-class-specific constructions are semantically partially analyzable but need not be completely so. Most of the time this is not a problem in communication, since the verb-specific construction specifies the meaning of the whole as well as its syntax. But the analysis of the form–function mapping can vary across speakers, and can result in variation and change across time. As linguists, we should accommodate this variation and indeterminacy in our analysis of argument structure constructions.

The process of learning language forms and (re)using them is a process of analyzing the structure of utterances into its component parts. But this process is actually the organization of exemplars of utterances and of verb-specific constructions into clusters of greater or lesser size, with greater or lesser syntactic and semantic coherence. The analysis and abstraction of verbs in isolation or constructions in isolation is based on recurrent meanings across the exemplars and verb-specific constructions. The parts may possess recurring meanings in most of their various contexts: *bake* will involve creating a food item, and the Ditransitive construction will involve transfer of possession. The recurrent aspects of meanings will sanction the use of *bake* and of the Ditransitive construction in new situations that the speaker wants to describe. But those recurrent meaning aspects do not give the full description of the meaning of the verb or the construction in each and every context of use (see Croft 2000, chapter 4). They do not even give the full description of the meaning in other conventionalized contexts, such as the Ditransitive construction with *refuse, bequeath*, or *forgive*. This is in fact the great asset of language, its flexibility in communication—although it poses major challenges to natural language processing and to formal models of syntax and semantics of any type.

10

Envoi

This book has presented a model of the temporal, qualitative, and causal structure of events, as they are conceptualized in language. We have argued that the best representation of these three components of event structure is as three independent, orthogonal dimensions. The dimensions of temporal and qualitative structure are just that: geometric dimensions. The temporal dimension is always construed as continuous, and the qualitative dimension is construed as continuous or discontinuous depending on the semantic class of the event. The temporal and qualitative dimensions together define the linguistic category of aspect: how events unfold qualitatively through time. The third "dimension", causal structure, is in fact a causal chain consisting of participant subevents causing other participant subevents (when the overall event is construed as involving more than one participant). The causal chain is not technically a geometric dimension but a directed, acyclic, nonbranching graph structure.

An important conceptual semantic process that plays a central role in the linguistic representation of event structure is conceptualization or construal. Events as experienced by human beings in the world are construed to possess certain temporal, qualitative, and causal (force-dynamic) properties. These properties are encoded as part of the meanings of words, namely verbs, and tense–aspect and argument structure constructions. Events as we experience them have an aspectual and force-dynamic potential to be conceptualized in a variety of ways. This aspectual potential is manifested in the variability in how events are lexicalized and the variability in how their structure is realized in grammatical constructions, within and across languages. The symptoms of the semantic potential of events, as humans experience them, are the patterns and constraints on the mapping from meaning to form in tense–aspect and argument structure constructions. As linguists, we may use the grammatical patterns that we observe across and within languages to infer the semantic structure of events and their potential for alternative construals.

In this book, I have tried to address the question: What kind of event is lexicalized as a simple verb, that is, as a morphologically underived verb in a simple clause construction? This question does not have a simple answer,

partly for theoretical reasons, and partly for practical reasons. Event construal is subject to a number of differing constraints, cognitive and cultural, which vary across languages. Some languages are more flexible in lexicalizing events in simple verbs than others; English appears to be one of these languages. Other languages require overt morphological derivation of verb forms, or complex or multiclausal verbalization of certain event types that English speakers readily lexicalize as simple verbs. Also, simple verbs may be the outcome of grammaticalization and lexicalization processes (Brinton and Traugott 2005). These processes cause complex structures, e.g. morphologically derived verb forms, complex predicates, serial verbs, or verbs with incorporated nouns, to evolve into synchronically unanalyzable simple verb forms. Since the grammaticalization/lexicalization process is gradual and not uniform across languages, there will be event types that are widely encoded in complex linguistic structures which will have evolved into simple, unanalyzable verb forms in some languages.

But at a practical level, the issue is that we simply do not know. Many of the analyses presented in this book are based on detailed analyses of English, although I have drawn on crosslinguistic evidence in many places. I am reasonably confident that the overall model of event structure presented in this book will prove useful in analyzing the meaning of verbs, tense–aspect constructions, and argument structure constructions in other languages. But I am also certain that many details and specific analyses and generalizations will need to be revised, perhaps substantially, if and when more systematic crosslinguistic surveys are performed. I am always uncomfortable in making generalizations based on only English data, or only on the data of the major European languages. I feel some of that discomfort with some of the generalizations made in these chapters. Nevertheless, I hope that this book will provide a framework for addressing these questions and producing useful answers—or further interesting questions.

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Glossary of terms

This glossary gives terms used for properties of the semantic structures and processes introduced in this book, as well as basic properties of argument structure constructions. The reference in parentheses indicates the section where the term is defined and additional citations for the term. Cross-references to other terms in the glossary are in small capitals.

ACCOMPLISHMENT (§2.2.1, §2.4.1): an EVENT construed as a *T*-BOUNDED, DURATIVE DIRECTED CHANGE, as assumed in the VENDLER CLASSICATION. Accomplishments may be more precisely defined as INCREMENTAL ACCOMPLISHMENTS in contrast to NONINCREMENTAL ACCOMPLISHMENTS.

ACHIEVEMENT (§2.2.1): an EVENT construed as involving PUNCTUAL change, and hence *T*-BOUNDED and *Q*-BOUNDED. The VENDLER CLASSICATION assumes that achievements are DIRECTED, but CYCLIC ACHIEVEMENTS are not.

ACQUIRED PERMANENT STATE (§2.2.3, §2.4.1): a PERMANENT STATE that is acquired in the lifetime of the individual but lasts for the remaining lifetime of the individual.

ACTIVITY (§2.2.1): an EVENT construed as a *T*-UNBOUNDED DURATIVE PROCESS. The VENDLER CLASSICATION assumes that activities are UNDIRECTED, but DIRECTED ACTIVITIES are not.

ADPOSITION (§1.1): morphologically free CASE MARKING, including prepositions, postpositions, and their combination (the last sometimes called circumpositions).

AFFECTEDNESS (§7.4.3; Beavers 2011): a measure of the likelihood of a PARTICIPANT to be realized as OBJECT; presumed to involve at least TELICITY, DIRECTED CHANGE, and transmission of force to the ENDPOINT of the CAUSAL CHAIN.

AFFECTIVE CAUSATION (§5.3.1; Talmy 1976; Croft 1991): a physical level entity (usually called the stimulus in thematic role approaches) acts upon the mental capacity of the ENDPOINT (usually called the experiencer in thematic role approaches).

ANTECEDENT OBLIQUE (§5.3.2; Croft 1991): a CASE MARKING that is used for ANTECEDENT ROLES.

ANTECEDENT ROLE (§5.3.2; Croft 1991): a PARTICIPANT ROLE that is antecedent to the OBJECT in the CAUSAL CHAIN of the EVENT.

ARGUMENT LINKING: see ARGUMENT REALIZATION.

ARGUMENT PHRASE (§1.1): a grammatical phrase that encodes a PARTICIPANT playing a particular PARTICIPANT ROLE in an EVENT.

ARGUMENT REALIZATION (§1.1, §5.1; Levin and Rappaport Hovav 2005): the grammatical encoding of PARTICIPANT ROLES as ARGUMENT PHRASES with CASE MARKING in ARGUMENT STRUCTURE CONSTRUCTIONS.

ARGUMENT STRUCTURE CONSTRUCTION (§1.1, §1.5; Goldberg 1995): the specific configuration of ARGUMENT PHRASES found in a particular clause type that realizes a particular array of PARTICIPANT ROLES in an EVENT.

ASPECT (§2.1, §2.3.2; Comrie 1976): a domain of grammar for the lexical and grammatical realization of how EVENTS unfold over time.

ASPECTUAL CONSTRUAL (§2.3.2): a construal of an EVENT as having a particular aspectual structure.

ASPECTUAL CONTOUR (§2.3.2): the sequence of PHASES representing how a particular EVENT is construed as unfolding over time.

ASPECTUAL POTENTIAL (§2.2.1, 2.2.2): the range of ASPECTUAL CONSTRUALS available for an EVENT as lexicalized by a particular verb in a particular language.

ASPECTUAL PROFILE (§2.3.2): the PHASE(S) of an EVENT'S ASPECTUAL CONTOUR that are denoted by the combination of a verb in a particular TENSE-ASPECT CONSTRUCTION.

ASPECTUAL TYPE (§2.3.2): synonym for ASPECTUAL CONSTRUAL.

BASE OBJECT INERTIA (§6.4.3): a crosslinguistically common phenomenon in which the ENDPOINT of the VERBAL PROFILE of the base verb form is realized as OBJECT in a derived (causative or applicative) verb form, even though the derivation alters the verbal profile.

BASIC INCREMENTAL THEME (§3.1.1; Dowty 1991): a PARTICIPANT that can function as an INCREMENTAL THEME even when singular in cardinality (i.e. not quantified).

BOUNDED (§2.2.1, §3.1.2): see *T*-BOUNDED and Q-BOUNDED.

CASE INFLECTIONS (§1.1): morphologically bound CASE MARKING.

CASE MARKING (§1.1; Croft 2003*a*): the formal realization of a PARTICIPANT ROLE in an ARGUMENT STRUCTURE CONSTRUCTION. The term covers both CASE INFLECTIONS and ADPOSITIONS (or their combination).

CAUSAL CHAIN (§5.3.1; Croft 1991): the sequence of PARTICIPANTS linked by the FORCE-DYNAMIC (transmission of force) relationships that hold among them; generally construed as asymmetrical and nonbranching. One of the dimensions of the THREE-DIMENSIONAL REPRESENTATION of EVENT STRUCTURE.

CAUSAL ORDER HYPOTHESIS (§6.2.1; Croft 1991, 1998*a*): the theory that ARGUMENT REALIZATION rules are based on the order of PARTICIPANTS in the CAUSAL CHAIN of an EVENT.

CAUSAL SEGMENT (§5.3.2; Croft 1991): see SEGMENT.

CAUSATION OF ACTION (§5.3.1; Talmy 1988/2000): a situation where the initial SUBEVENT brings about action, as opposed to stasis, of the ENDPOINT of causation.

CAUSATION OF REST/STASIS (§5.3.1; Talmy 1988/2000): a situation where the initial SUBEVENT brings about or maintains rest or stasis of the ENDPOINT of causation.

CIRCUMSTANTIAL (§7.4.2): the spatial and/or temporal location of an EVENT; intended to be distinguished from PARTICIPANTS in events.

CO-EVENT (§7.4.2; Talmy 2000*b*): EVENTS that occur along with the "main" event and are lexicalized together with the "main" event in a single, possibly morphologically complex, verb form.

CONCEPTUAL SPACE (§4.2.1; Croft 2003*a*; Haspelmath 2003): a representation of conceptual similarity relations among SITUATION TYPES, either as a graph structure or a Euclidean geometric space. Also called a SEMANTIC MAP, a term used slightly differently here. It is constructed by a typological analysis of the functions performed by specific linguistic forms across languages.

CONCEPTUALIZATION (§1.3): synonym for CONSTRUAL.

CONCOMITANT ROLE (§6.2.1; Luraghi 2001): a PARTICIPANT ROLE that is antecedent to the OBJECT in the CAUSAL CHAIN but included in the VERBAL PROFILE.

CONSTRUAL (§1.3; Croft and Cruse 2004): a cognitive process by which an experience to be communicated is structured to serve as the semantic representation of a linguistic form or construction.

CONSTRUCTION GRAMMAR (§1.5; Fillmore et al. 1988; Goldberg 1995; Croft 2001; Croft and Cruse 2004): an approach to grammar in which complex syntactic structures are represented as entities autonomous from other constructions, paired with their meanings.

CONVERSION (§1.4): alternative use of a word for different CONSTRUALS without any morphological derivation.

CYCLIC ACHIEVEMENT (§2.2.2, §2.4.1): an EVENT construed as involving an instantaneous change of state and reverting back to the REST STATE; also referred to as 'semelfactive'.

CYCLIC ACTION (§2.2.2): a lexical semantic class with an ASPECTUAL POTENTIAL of either a CYCLIC ACHIEVEMENT or an UNDIRECTED ACTIVITY corresponding to iterated occurrence of the cyclic achievement. Typically found with emission (sound, light, substance) predicates and contact predicates.

CYCLIC ACTIVITY (§2.4.1): synonym for UNDIRECTED ACTIVITY.

DEFAULT CONSTRUAL (§1.4): for a word with alternative CONSTRUALS, the construal (or meaning) that is most common, or typically inferred from a decontextualized example.

DERIVATIONAL CONSTRUAL (§1.4): morphologically overt derivation of a word form that is used for a different CONSTRUAL than the base form of the word.

DERIVED INCREMENTAL THEME (§3.1.1; Dowty 1991): a participant that functions as an INCREMENTAL THEME by virtue of quantification, so that the incremental change is measured as change to successive individuals in the set denoted by the quantified phrase.

DIRECTED ACHIEVEMENT (§2.4.1): a DIRECTED CHANGE that is construed as instantaneous and therefore *Q*-BOUNDED.

DIRECTED ACTIVITY (§2.2.3, §2.4.1): an ACTIVITY which is construed as involving incremental change in a single direction on Q. Often called 'degree achievement'.

DIRECTED ASPECTUAL CONTOUR (§4.4): an ASPECTUAL CONTOUR that involves a DIRECTED CHANGE to a RESULT STATE, and is associated with ASPECTUAL CONSTRUALS of the Perfective GRAMMATICAL ASPECT form.

DIRECTED CHANGE (§3.1.1): ASPECTUAL TYPES that profile a change in a single direction from inception to completion. They may be (*Q*- AND *T*-)BOUNDED or UNBOUNDED, and PUNCTUAL or DURATIVE. The change is monotonic except in the case of NONINCREMENTAL ACCOMPLISHMENTS, which may be a marginal member of this category.

DISPOSITION (§2.2.2): a lexical semantic class with the ASPECTUAL POTENTIAL of either an UNDIRECTED ACTIVITY or the INHERENT STATE of tending to perform the activity. Typically associated with behavioral traits.

DURATIVE (§2.2.1): an EVENT or event PHASE that is construed as extended in time.

DYNAMIC (§2.2.1): the modifying term synonymous with PROCESS.

ENDPOINT (§5.3.1; Croft 1991): the force recipient (Rappaport Hovav and Levin 2001) of transmission of force in a SEGMENT of the CAUSAL CHAIN.

EVENT (§2.2.1): a category subsuming all ASPECTUAL TYPES, including STATES and PROCESSES. Synonymous with 'situation' and 'eventuality' as used in other traditions.

EVENT DECOMPOSITION (§5.2.3; Levin and Rappaport Hovav 2005): a representation of the semantic structure of an EVENT as a complex structured entity.

EVENT LEXICALIZATION (§1.1, Levin and Rappaport Hovav 2005): how an EVENT is encoded by a verb or verb plus affix or satellite.

EVENT STRUCTURE (§5.2; Levin and Rappaport Hovav 2005): a representation of the semantic structure of EVENTS that is relevant to syntax.

EXTENDED CAUSATION (§5.3.1; Talmy 1988/2000): a DURATIVE EVENT causes another durative event by means of a continuous application of force.

FIGURE (§6.2.2; Talmy 1974): The entity whose position/motion is being specified in relation to the GROUND in a spatial relation.

FIGURE-FIRST CONSTRUAL (§6.2.2; Talmy 1974): the entity that is moving or is situated relative to the GROUND in a spatial relation.

FIGURE-FIRST CONSTRUAL (§6.2.2; Croft 1991): the crosslinguistically widespread construal of the spatial figure as antecedent to the ground in the CAUSAL CHAIN.

FORCE-DYNAMIC CONSTRUAL (§9.2): the construal of an event into a particular force-dynamic configuration (in the broad sense of 'force-dynamic'), represented schematically by the CAUSAL CHAIN or more precisely (but informally) by the prose description of a SEMANTIC FRAME in FrameNet (Fillmore, Johnson, and Petruck 2003).

FORCE-DYNAMIC POTENTIAL (§9.2): the range of FORCE-DYNAMIC CONSTRUALS available for an event as lexicalized by a particular verb in a particular language.

FORCE-DYNAMIC TYPE: synonym for FORCE-DYNAMIC CONSTRUAL.

FORCE-DYNAMICS (§5.3.1; Talmy 1988/2000): a generalization of the theory of causal relations based on transmission of force.

FRAME (SEMANTIC): see SEMANTIC FRAME.

GLOBAL CATEGORY (§1.5; Croft 2001): a grammatical category of any type that is assumed to exist independently of constructions and apply across all constructions in a language that make reference to that category.

GRAMMATICAL ASPECT (§2.1): the encoding of ASPECT in TENSE-ASPECT CONSTRUCTIONS.

GRAMMATICAL RELATIONS/FUNCTIONS (§1.5; Croft 2001): a grammatical role category (e.g. SUBJECT, OBJECT) that is intended to apply GLOBALLY across most if not all constructions that make reference to categories of arguments.

GRANULARITY (§3.2.2): see SCALAR ADJUSTMENT.

GROUND (§6.2.2; Talmy 1974): the entity that functions as the reference point for the position/motion of the FIGURE in a spatial relation.

HOLISTIC THEME (§3.1.1; Dowty 1991): synonym for PATH INCREMENTAL THEME. Not treated as an INCREMENTAL THEME by Dowty.

INACTIVE ACTION (§2.2.2, §2.2.3, §3.2.2): a lexical semantic class with the ASPECTUAL POTENTIAL of either an INHERENT STATE or a TRANSITORY STATE (sometimes analyzed as an UNDIRECTED ACTIVITY, sometimes called 'progressive states'). Typically found with posture, holding, and internal mental/physiological process predicates.

INCEPTIVE STATE (§2.2.2): a lexical semantic class with the ASPECTUAL POTENTIAL of either a TRANSITORY STATE or a DIRECTED ACHIEVEMENT denoting the inception of the state. Typically includes predicates of perception and cognition.

INCREMENTAL ACCOMPLISHMENT (§2.4.1): an EVENT construed as DURATIVE and *T*-BOUNDED, ending in a RESULT STATE, and having incremental progress along the QUALITATIVE DIMENSION toward the result state. Also referred to as an 'accomplishment' by Vendler and in this book, unless it must be distinguished clearly from a NONINCREMENTAL ACCOMPLISHMENT.

INCREMENTAL THEME (§3.1.1, Dowty 1991): a PARTICIPANT in an EVENT that undergoes an incremental change in a single direction. Dowty restricts his use of the term to BASIC, MEREOLOGICAL INCREMENTAL THEMES; we use it for all types of basic incremental themes.

INDUCIVE CAUSATION (§5.3.1; Talmy 1976; Croft 1991): an entity uses its mental capacity (intentionality) to act on the mental capacity of another entity, usually in the form of verbal persuasion or command.

INHERENT (PERMANENT) STATE (§2.2.3, §2.4.1): a PERMANENT STATE that is construed as inherent in the individual and therefore lasts the individual's entire lifetime.

INITIATOR (§5.3.1; Croft 1991): the effector of transmission of force for a SEGMENT of the CAUSAL CHAIN.

INTERVAL (§2.3.2): a temporal or qualitative PHASE consisting of more than one point on a dimension such that for all points *a* and *b* in the interval, there is no defined point *c* between *a* and *b* that is not in the interval.

IRREVERSIBLE (DIRECTED) ACHIEVEMENT (§2.2.3, §2.4.1): an ACHIEVEMENT whose result is construed as a PERMANENT STATE.

LETTING CAUSATION (§5.3.1; Talmy 1988/2000): a FORCE-DYNAMIC relationship in which absence of exertion of force by the INITIATOR leads to the ENDPOINT acting or remaining at rest.

LEXICAL ASPECT (§2.1): the encoding of ASPECT in lexical items.

LEXICALIZED CONSTRUAL (§1.4): a word that encodes a specific CONSTRUAL of a particular experience.

MENTAL EVENTS (§6.2.3.1): EVENTS of perception, cognition, and emotion. It is likely that events of internal physical sensation should be included in this category (Malchukov 2005).

MEREOLOGICAL INCREMENTAL THEME (§3.1.1): an INCREMENTAL THEME whose change is measured by changes to successive parts of the PARTICIPANT. The only type of "genuine" incremental theme recognized by Dowty (1991).

MIDDLE MARKER (§6.2.3.2; Kemmer 1993): a verb form used to distinguish EVENTS construed as REFLEXIVE/RECIPROCAL RELATIONS from other events not so construed.

MULTIDIMENSIONAL SCALING (§4.2.1; Croft and Poole 2008): a statistical technique that can be used to apply the SEMANTIC MAP MODEL to large-scale, complex crosslinguistic data.

NONINCREMENTAL ACCOMPLISHMENT (§2.4.1): an EVENT construed as DURATIVE and *T*-BOUNDED, ending in a RESULT STATE, but lacking incremental progress along the QUALITATIVE DIMENSION toward the result state; represented by a profiled UNDIRECTED CHANGE PHASE between the inception and completion TRANSITION PHASES. Called 'runup achievement' in Croft (1998*c*, 2009*a*) and 'progressive achievement' in other work.

NON-QUANTIZED (§3.1.1): an INCREMENTAL THEME PARTICIPANT that is not QUANTIZED.

OBJECT (§5.3.2; Croft 1991): the ENDPOINT of the VERBAL PROFILE.

ONSET CAUSATION (§5.3.1, §7.3; Talmy 1988/2000): a PUNCTUAL SUBEVENT causes a DURATIVE SUBEVENT by initiating the latter subevent.

PARTICIPANT (§1.1): an entity—person, thing, or even a quality or process—that plays a role in an EVENT.

PARTICIPANT ROLE (§1.1, §5.2.3; Goldberg 1995): the SEMANTIC ROLE that a PARTICIPANT plays in an EVENT; used for semantic roles specific to a single predicate (e.g. *robber*, *victim*, *goods* for *rob*).

PATH (INCREMENTAL) THEME (§3.1.1): an INCREMENTAL THEME whose change is measured by successive changes in the location (literal or metaphorical) of the PARTICIPANT along a (literal or metaphorical) path. Not treated as an INCREMENTAL THEME by Dowty.

PERMANENT STATE (§2.2.3, §2.4.1): a STATE that extends through the lifetime of the individual; divided into ACQUIRED PERMANENT STATES and INHERENT PERMANENT STATES.

PHASE (§2.3.1; Binnick 1991): a temporal part of an EVENT defined as unfolding over time, which has a single ASPECTUAL CONSTRUAL for that time period (STATE, UNDIRECTED CHANGE, DIRECTED CHANGE, TRANSITION).

PHYSICAL CAUSATION (§5.3.1; Talmy 1976; Croft 1991): a physical entity transmitting force to another physical entity.

POINT STATE (§2.2.3, §2.4.1; Mittwoch 1988): a STATE that is construed as existing for only a point in time.

POSSESSUM-FIRST CONSTRUAL (§6.2.2; Croft 1991): the crosslinguistically widespread construal of the possessum as antecedent to the figure in the CAUSAL CHAIN.

POTENTIAL (§1.4): the range of alternative CONSTRUALS of an experience found with a particular linguistic form.

PROCESS (§2.2.1): an EVENT which is construed as involving change over time.

PROFILE (§1.2, §2.3.2, §5.3.2): the concept denoted by a linguistic form in the SEMANTIC FRAME for that form.

PROPERTY INCREMENTAL THEME (§3.1.1): an INCREMENTAL THEME whose change is measured by progressive change in the scalar value of a property of the participant. Not treated as an incremental theme by Dowty.

PUNCTUAL (§2.2.1, §2.3.2): an EVENT or event PHASE that is construed as occurring instantaneously.

Q (§2.3.2): the QUALITATIVE DIMENSION of the representation of EVENT STRUCTURE.

Q-BOUNDED/UNBOUNDED (§3.1.2): an EVENT that has a defined RESULT STATE on the QUALITATIVE DIMENSION, regardless of whether the result state is profiled in the ASPECTUAL PROLE of the verb + TENSE-ASPECT CONSTRUCTION or not. The result state may be the consequence of having a QUANTIZED participant as the INCREMENTAL THEME.

QUALITATIVE DIMENSION (§2.3.2): the dimension that represents the construal of the qualitative states that an EVENT passes through as it unfolds over time. One of the dimensions of the THREE-DIMENSIONAL REPRESENTATION of EVENT STRUCTURE. Corresponds roughly to the verbal ROOT.

QUANTIZED (§3.1.1; Krifka 1989): an INCREMENTAL THEME PARTICIPANT that is BOUNDED, that is, denotes a bounded individual or a specific measured quantity of individuals.

RECIPROCAL RELATION (§6.2.3.2): an EVENT in which one PARTICIPANT acts on another participant and the second participant acts on the first participant in the same way.

REFLEXIVE RELATION (§6.2.3.2): an EVENT in which a PARTICIPANT acts on itself, either directly or indirectly.

REPRESENTATION-SOURCE (INCREMENTAL) THEME (§3.1.1; Dowty 1991): an INCREMENTAL THEME whose change is measured by the incremental transfer of information to a mental or physical representation. Not treated as an incremental theme by Dowty.

REST STATE (§2.4.1): a PHASE in the ASPECTUAL CONTOUR of an EVENT denoting the initial state before anything happens. The initial state is occasionally not a state (§7.2).

RESULT STATE (§2.4.1): a PHASE in the ASPECTUAL CONTOUR of an EVENT denoting the end state of a DIRECTED CHANGE.

REVERSIBLE (DIRECTED) ACHIEVEMENT (§2.2.3, §2.4.1): an ACHIEVEMENT whose RESULT STATE is construed as a TRANSITORY STATE.

ROOT (§2.3.2; Levin and Rappaport 2005): the concrete, specific, and idiosyncratic aspect of a verb's meaning. The root is largely represented by the QUALITATIVE DIMENSION in the THREE-DIMENSIONAL REPRESENTATION of EVENT STRUCTURE.

RUNUP ACHIEVEMENT (§2.2.2; Croft 1998*c*, 2009*a*): synonym for NONINCREMENTAL ACCOMPLISHMENT.

SCALAR ADJUSTMENT (§3.2.2; Croft and Cruse 2004): a CONSTRUAL operation in which the extent of a conceptual structure is expanded (fine-grained) or decreased (coarse-grained) on the corresponding conceptual dimensions (quantitative or qualitative).

SCHEMATIC (§1.5): a category or construction that generalizes over specific or substantive linguistic forms (e.g. KINTERM generalizes over *mother*, *father*, etc.)

SEGMENT (OF CAUSAL CHAIN): (§5.3.2; Croft 1991): a continuous subpart of the CAUSAL CHAIN in the SEMANTIC FRAME of an EVENT.

SELECTION (§3.2.2; Croft and Cruse 2004): a CONSTRUAL operation by which the concept PROFILE is shifted to another element of a SEMANTIC FRAME.

SEMANTIC FRAME (§1.3; Fillmore 1982, 1985; Croft and Cruse 2004): a semantic representation in which a concept (the PROFILE) is supplemented by a semantic structure which is presupposed by the concept.

SEMANTIC MAP (§4.2.1; Croft 2003*a*; Haspelmath 2003): the region in a CONCEPTUAL SPACE that is denoted by a single language-specific form. This term is also used by Haspelmath and others to refer to the conceptual space itself.

SEMANTIC MAP MODEL (§4.2.1; Croft 2003*a*; Croft and Poole 2008; Haspelmath 2003): the technique of inferring universals of conceptual relations among SITUATION TYPES by the statistical analysis of the distribution of functions among linguistic forms across languages, e.g. by MULTIDIMENSIONAL SCALING.

SEMANTIC ROLE (§1.1): the role that a PARTICIPANT plays in an EVENT denoted by a verb or other predicate.

SEMELFACTIVE (§2.2.2, §2.4.1; Smith 1991): synonym for CYCLIC ACHIEVEMENT.

SITUATION TYPE (§1.4): any semantic structure denoted by any utterance or semantically coherent part of an utterance.

STATE, STATIVE (§2.2.1, §2.4.1): an EVENT which is construed as involving no change. In the VENDLER CLASSIFICATION, states are assumed to be DURATIVE; but POINT STATES are not.

STATIVE PROGRESSIVE (§2.2.2; Dowty 1979): synonym for INACTIVE ACTIONS.

STRUCTURAL SCHEMATIZATION (§3.2.2; Talmy 1985; Croft and Cruse 2004): a CONSTRUAL operation which provides an alternative structure of an event, e.g. by the Gestalt principle of good form/continuation.

SUBEVENT (§5.4.2): the ASPECTUAL CONTOUR for a single PARTICIPANT in the THREE-DIMENSIONAL REPRESENTATION OF EVENT STRUCTURE.

SUBJECT (§5.3.2; Croft 1991): the INITIATOR of the VERBAL PROFILE.

SUBSEQUENT OBLIQUE (§5.3.2; Croft 1991): a CASE MARKING that is used for SUBSEQUENT ROLES.

SUBSEQUENT ROLE (§5.3.2; Croft 1991): a PARTICIPANT ROLE that is subsequent to the OBJECT in the CAUSAL CHAIN of the EVENT.

T (§2.3.2): the TIME DIMENSION of the THREE-DIMENSONAL REPRESENTATION of EVENT STRUCTURE.

T-BOUNDED/UNBOUNDED (§2.4.1, §3.1.2): an EVENT bounded in time, represented by PROFILING of the TRANSITION PHASES at the beginning and end of the event's ASPECTUAL PROFILE.

TELIC/ATELIC (§3.1.2): synonym for Q-BOUNDED/UNBOUNDED.

TEMPORAL PHASE (§2.3.1; Binnick 1991): see PHASE.

TEMPORAL UNITY (§7.3): the state of affairs when all the SUBEVENTS in the CAUSAL CHAIN have the same temporal PROFILE.

TENDENCY TO ACTION (§5.3.1; Talmy 1988/2000): a PARTICIPANT's internal tendency to change.

TENDENCY TO REST/STASIS (§5.3.1; Talmy 1988/2000): a PARTICIPANT's internal tendency to rest or stasis.

TENSE-ASPECT CONSTRUCTIONS (§1.4): constructions whose meaning include time reference and a specification of the ASPECTUAL structure of the EVENT.

THREE-DIMENSIONAL REPRESENTATION (§5.4.2): the representation of EVENT STRUCTURE as possessing three independent dimensions: the QUALITATIVE DIMENSION, the TIME DIMENSION, and the CAUSAL CHAIN.

TIME DIMENSION (§2.3.2): one of the three dimensions of the representation of EVENT STRUCTURE, for the time course of the event. Corresponds to the temporal PROFILE of a process, as the latter is defined in Cognitive Grammar (Langacker 1987, 2008).

TRANSITION (PHASE) (§2.3.2): a temporal PHASE in the representation of EVENT STRUCTURE denoting an instantaneous change of state on the QUALITATIVE DIMENSION.

TRANSITION THEME (§3.1.1): a type of INCREMENTAL THEME in which the DIRECTED CHANGE occurs all at once and instantaneously. Also divided into MEREOLOGICAL, PROPERTY, PATH, and REPRESENTATION-SOURCE subtypes (see corresponding entries for incremental themes).

TRANSITORY STATE (§2.2.3, §2.4.1): a STATE that lasts for a finite period of time (point or INTERVAL).

UNBOUNDED (§2.2.1, §3.1.2): an EVENT CONSTRUAL that is neither *T*-BOUNDED nor Q-BOUNDED.

UNDIRECTED ACHIEVEMENT (§2.4.1): synonym for CYCLIC ACHIEVEMENT.

UNDIRECTED ACTIVITY (§2.2.3): an ACTIVITY in which the change does not progress incrementally in a direction.

UNDIRECTED ASPECTUAL CONTOUR (§4.4): an ASPECTUAL CONTOUR that includes a cyclic or UNDIRECTED CHANGE, and is associated with ASPECTUAL CONSTRUALS of the Imperfective GRAMMATICAL ASPECT form.

UNIVERSAL CATEGORY (§1.5; Croft 2001): a grammatical category that is intended to be valid across most if not all languages, and making up the characterization of constructions referring to that category across languages.

VENDLER CLASSICATION (§2.2.1; Vendler 1967): an influential classification of lexical aspect into four categories: STATES, ACTIVITIES, ACHIEVEMENTS, and ACCOMPLISHMENTS. In this book, the subtypes of the four Vendler types are broader than originally envisaged by Vendler.

VERBAL PROFILE (§5.3.2): the SEGMENT of the CAUSAL CHAIN that is PROFILED by the verb.

VERBAL ROOT: see ROOT.

VOLITIONAL CAUSATION (§5.3.1; Talmy 1976; Croft 1991): an entity using its mental capacity (intentionality, not simply 'volition') to transmit physical force to a physical entity.

References

Ackerman, Farrell, and John Moore. 2001. *Proto-properties and grammatical encoding: a correspondence theory of argument selection*. Stanford: Center for the Study of Language and Information.

Aikhenvald, Alexandra Y. 2006. Serial verb constructions in typological perspective. In *Serial verb constructions: a cross-linguistic typology*, ed. Alexandra Y. Aikhenvald and Robert M. W. Dixon, 1–68. Oxford: Oxford University Press.

Alsina, Alex, and Sam Mchombo. 1993. Object asymmetries and the Chichewa applicative construction. In *Theoretical aspects of Bantu grammar*, ed. Sam Mchombo, 17–45. Stanford: Center for the Study of Language and Information.

Amberber, Mengistu. 2000. Valency-change and valency-encoding devices in Amharic. In *Changing valency: case studies in transitivity*, ed. R. M. W. Dixon and Alexandra Y. Aikhenvald, 312–32. Cambridge: Cambridge University Press.

Anderson, Stephen R. 1971. On the role of deep structure in semantic interpretation. *Foundations of Language* 7:387–96.

Anderson, Stephen R. 1976. On the notion of subject in ergative languages. In *Subject and topic*, ed. Charles Li, 1–24. New York: Academic Press.

Anderson, Stephen R. 1977. On mechanisms by which languages become ergative. In *Mechanisms of syntactic change*, ed. Charles Li, 317–64. Austin: University of Texas Press.

Arka, I. Wayan, and Malcolm Ross. 2005. Introduction. In *The many faces of Austronesian voice systems: some new empirical studies*, ed. I Wayan Arka and Malcolm Ross, 1–15. Canberra: Research School of Pacific and Asian Studies, Australian National University.

Atkins, Sue, Charles J. Fillmore, and Christopher R. Johnson. 2003. Lexicographic relevance: selecting information from corpus evidence. *International Journal of Lexicography* 16:251–80.

Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9:5–16.

Baker, Collin F., Charles J. Fillmore, and Beau Cronin. 2003. The structure of the FrameNet database. *International Journal of Lexicography* 16:281–96.

Baker, Collin F., and Josef Ruppenhofer. 2002. FrameNet's frames vs. Levin's verb classes. In *Proceedings of the Twenty-eighth Annual Meeting of the Berkeley Linguistics Society*, ed. Julie Larson and Mary Paster, 27–38. Berkeley: Berkeley Linguistics Society.

Baker, Mark C. 1988. *Incorporation: a theory of grammatical function changing*. Chicago: University of Chicago Press.

Baker, Mark C. 1997. Thematic roles and syntactic structure. In *Elements of grammar: handbook of generative syntax*, ed. Liliane Haegeman, 73–137. Dordrecht: Kluwer.

Baker, Mark C. 2001. Phrase structure as a representation of 'primitive' grammatical relations. In *Objects and other subjects: grammatical functions, functional categories*

and configurationality, ed. William D. Davies and Stanley Dubinsky, 21–51. Dordrecht: Kluwer.

Baker, Mark C. 2003. *Lexical categories: verbs, nouns and adjectives*. Cambridge: Cambridge University Press.

Barber, E. J. W. 1975. Voice: beyond the passive. In *Proceedings of the First Annual Meeting of the Berkeley Linguistics Society*, ed. Cathy Cogen, Henry Thompson, Graham Thurgood, Kenneth Whistler, and James Wright, 16–23. Berkeley: Berkeley Linguistics Society.

Barðdal, Jóhanna. 2006. Construction-specific properties of syntactic subjects in Icelandic and German. *Cognitive Linguistics* 17:39–106.

Barðdal, Jóhanna. 2007. The semantic and lexical range of the ditransitive construction in the history of (North) Germanic. *Functions of Language* 14:9–30.

Barðdal, Jóhanna. 2008. *Productivity: evidence from case and argument structure in Icelandic*. (Constructional Approaches to Language, 8.) Amsterdam: John Benjamins.

Barðdal, Jóhanna, Kristian Emil Kristoffersen, and Andreas Sveen. 2011. West Scandinavian ditransitives as a family of constructions: with special attention to the Norwegian 'V-REFL-NP' construction. *Linguistics* 49:53–104.

Beavers, John. 2008. Scalar complexity and the structure of events. In *Event structures in linguistic form and interpretation*, ed. Johannes Dölling, Tatjana Heyde-Zybatow, and Martin Schäfer, 245–65. Berlin: Mouton de Gruyter.

Beavers, John. 2011. On affectedness. *Natural Language and Linguistic Theory* 29:335–70.

Beavers, John, Beth Levin, and Shiao Wei Tham. 2010. The typology of motion expressions revisited. *Journal of Linguistics* 46:331–77.

Bennett, Michael, and Barbara H. Partee. 1972. *Toward the logic of tense and aspect in English*. Bloomington, Ind.: Indiana University Linguistics Club.

Bertinetto, Pier Marco, and Mario Squartini. 1995. An attempt at defining the class of 'gradual completion verbs'. In *Temporal reference, aspect and actionality. Vol. 1: semantic and syntactic perspectives*, ed. Pier Marco Bertinetto, Valentina Bianchi, James Higginbotham, and Mario Squartini, 11–26. Torino: Rosenberg & Sellier.

Bickel, Balthasar. 1997. Aspectual scope and the difference between logical and semantic representation. *Lingua* 102:115–31.

Binnick, Robert I. 1991. *Time and the verb*. Oxford: Oxford University Press.

Bisang, Walter. 1995. Verb serialization and converbs—differences and similarities. In *Converbs in cross-linguistic perspective: structure and meaning of adverbial verb forms—adverbials participles, gerunds*, ed. Ekkehard König and Martin Haspelmath, 137–88. Berlin: Mouton de Gruyter.

Blansitt, Edward L. 1984. Dechticaetiative and dative. In *Objects*, ed. Frans Plank, 127–50. New York: Academic Press.

Blume, Kerstin. 1998. A contrastive analysis of interaction verbs with dative complements. *Linguistics* 36:253–80.

Boas, Hans C. 2003. *A constructional approach to resultatives*. Stanford: Center for the Study of Language and Information.

Boas, Hans C. 2005. Determining the productivity of resultatives: a reply to Goldberg and Jackendoff. *Language* 81:448–64.

Boas, Hans C. 2006. A frame-semantic approach to identifying syntactically relevant elements of meaning. In *Contrastive studies and valency: studies in honor of Hans Ulrich Boas*, ed. Petra C. Steiner, Hans C. Boas, and Stefan J. Schierholz, 119–49. Frankfurt: Peter Lang.

Boas, Hans C. 2008. Determining the structure of lexical entries and constructions in Construction Grammar. *Annual Review of Cognitive Linguistics* 6:113–44.

Bogoras, Waldemar. 1910. *Chukchee mythology.* (Memoirs of the American Museum of Natural History.) Leiden: Brill.

Bowden, John. 2001. *Taba: description of a South Halmahera language.* (Pacific Linguistics, 521.) Canberra: Research School of Pacific and Asian Studies, Australian National University.

Bowerman, Melissa. 1982. Reorganizational processes in lexical and syntactic development. In *Language acquisition: the state of the art*, ed. Eric Wanner and Leila R. Gleitman, 319–45. Cambridge: Cambridge University Press.

Bowerman, Melissa. 1983. Hidden meanings: the role of covert conceptual structures in children's development of language. In *The acquisition of symbolic skills*, ed. Don R. Rogers and John A. Sloboda, 445–70. New York: Plenum.

Bowerman, Melissa. 1989. When a patient is the subject: sorting out passives, anticausatives, and middles in the acquisition of English. Paper presented at the Workshop on Voice, University of California, Santa Barbara, California, USA.

Bowerman, Melissa. 1990. Mapping thematic roles onto syntactic functions: are children helped by innate linking rules? *Linguistics* 28:1253–89.

Bresnan, Joan. 2001. *Lexical-functional syntax.* Oxford: Blackwell.

Bresnan, Joan, and Jonni Kanerva. 1989. Locative inversion in Chichewa: a case study of factorization in grammar. *Linguistic Inquiry* 20:1–50.

Breu, Walter. 1994. Interactions between lexical, temporal and aspectual meaning. *Studies in Language* 18:23–44.

Bricker, Victoria. 1978. Antipassive constructions in Yucatec Maya. In *Papers in Mayan Linguistics*, ed. Nora England, 3–24. Columbia: University of Missouri.

Brinton, Laurel J., and Elizabeth Closs Traugott. 2005. *Lexicalization and language change.* Cambridge: Cambridge University Press.

Bruce, Les. 1988. Serialization: from syntax to lexicon. *Studies in Language* 12:19–49.

Butt, John, and Carmen Benjamin. 2004. *A new reference grammar of Modern Spanish* (4th edition). New York: McGraw Hill.

Bybee, Joan L. 1985. *Morphology: a study into the relation between meaning and form.* Amsterdam: John Benjamins.

Bybee, Joan L. 1995. Regular morphology and the lexicon. *Language and Cognitive Processes* 10:425–55.

Bybee, Joan L. 2001. *Phonology and language use.* Cambridge: Cambridge University Press.

Bybee, Joan L. 2007. *Frequency of use and the organization of language.* Oxford: Oxford University Press.

Bybee, Joan L. 2010. *Language, usage and cognition*. Oxford: Oxford University Press.
Bybee, Joan L., Revere D. Perkins, and William Pagliuca. 1994. *The evolution of grammar: tense, aspect and modality in the languages of the world*. Chicago: University of Chicago Press.
Carlson, Gregory N. 1979. Generics and atemporal *when*. *Linguistics & Philosophy* 3:49–98.
Carlson, Lauri. 1981. Aspect and quantification. In *Tense and aspect* (Syntax and Semantics, 14), ed. Philip Tedeschi and Annie Zaenen, 31–64. New York: Academic Press.
Chafe, Wallace (ed.). 1980. *The pear stories*. New York: Ablex.
Chierchia, Gennaro. 1995. Individual-level predicates as inherent generics. In *The generic book*, ed. Gregory N. Carlson and Francis Jeffry Pelletier, 176–223. Chicago: University of Chicago Press.
Chung, Sandra. 1978. *Case marking and grammatical relations in Polynesian*. Austin: University of Texas Press.
Clark, Eve V., & Kathie L. Carpenter. 1989. The notion of source in language acquisition. *Language* 65:1–30.
Cole, Peter. 1983. The grammatical role of the causee in universal grammar. *International Journal of American Linguistics* 49:115–33.
Collins, B. 1962. *Tonga grammar*. London: Longmans Green & Co.
Comrie, Bernard. 1976. *Aspect*. Cambridge: Cambridge University Press.
Comrie, Bernard. 1978. Ergativity. In *Syntactic typology*, ed. Winfrid Lehmann, 329–94. Austin: University of Texas Press.
Comrie, Bernard. 1979. Definite and animate objects: a natural class. *Linguistica Silesiana* 3:13–21.
Comrie, Bernard. 1985. Causative verb formation and other verb-deriving morphology. In *Language typology and syntactic description, Vol. 3: grammatical categories and the lexicon*, ed. Timothy Shopen, 309–48. Cambridge: Cambridge University Press.
Comrie, Bernard. 1989. *Language universals and linguistic typology* (2nd edition). Chicago: University of Chicago Press.
Comrie, Bernard. 2003. On explaining language universals. In *The new psychology of language, Vol. 2*, ed. Michael Tomasello, 195–209. Mahwah: Lawrence Erlbaum Associates.
Comrie, Bernard. 2005. Alignment of case marking. In *The world atlas of language structures*, ed. Martin Haspelmath, Matthew S. Dryer, David Gil, and Bernard Comrie, 398–405. Oxford: Oxford University Press.
Comrie, Bernard, and Norval Smith. 1977. Lingua Descriptive Series: questionnaire. *Lingua* 42:1–72.
Cooreman, Ann. 1987. *Transitivity and discourse continuity in Chamorro narratives*. Berlin: Mouton de Gruyter.
Cooreman, Ann. 1994. A functional typology of antipassives. In *Voice: form and function*, ed. Barbara Fox and Paul Hopper, 49–87. Amsterdam: John Benjamins.

Creissels, Denis. 2006. Encoding the distinction between location, source and destination: a typological study. In *Space in languages: linguistic systems and cognitive categories*, ed. Maya Hickmann and Stéphane Robert, 19–28. Amsterdam: John Benjamins.

Croft, William. 1986. Categories and relations in syntax: the clause-level organization of information. Ph.D. dissertation, Department of Linguistics, Stanford University.

Croft, William. 1988. Agreement vs. case marking and direct objects. In *Agreement in natural language: approaches, theories, descriptions*, ed. Michael Barlow and Charles A. Ferguson, 159–80. Stanford: Center for the Study of Language and Information.

Croft, William. 1990. Possible verbs and event structure. In *Meanings and prototypes: studies on linguistic categorization*, ed. S. L. Tsohatzidis, 48–73. London: Routledge.

Croft, William. 1991. *Syntactic categories and grammatical relations: the cognitive organization of information*. Chicago: University of Chicago Press.

Croft, William. 1993/2002. The role of domains in the interpretation of metaphors and metonymies. *Cognitive Linguistics* 4:335–70. Revised version printed in *Metaphor and metonymy in comparison and contrast*, ed. René Dirven and Ralf Pörings, 161–205. Berlin: Mouton de Gruyter, 2002.

Croft, William. 1993. Case marking and the semantics of mental verbs. In *Semantics and the lexicon*, ed. James Pustejovsky, 55–72. Dordrecht: Kluwer Academic.

Croft, William. 1994*a*. The semantics of subjecthood. In *Subjecthood and subjectivity*, ed. Maria Yaguello, 29–75. Paris: Ophrys.

Croft, William. 1994*b*. Voice: beyond control and affectedness. In *Voice: form and function*, ed. Paul Hopper and Barbara Fox, 89–117. Amsterdam: John Benjamins.

Croft, William. 1995. Autonomy and functionalist linguistics. *Language* 71:490–532.

Croft, William. 1998*a*. Event structure in argument linking. In *The projection of arguments: lexical and compositional factors*, ed. Miriam Butt and Wilhelm Geuder, 21–63. Stanford: Center for the Study of Language and Information.

Croft, William. 1998*b*. Linguistic evidence and mental representations. *Cognitive Linguistics* 9:151–73.

Croft, William. 1998*c*. The structure of events and the structure of language. In *The new psychology of language: cognitive and functional approaches to language structure*, ed. Michael Tomasello, 67–92. Mahwah: Lawrence Erlbaum Associates.

Croft, William. 2000. *Explaining language change: an evolutionary approach*. Harlow: Longman.

Croft, William. 2001. *Radical Construction Grammar: syntactic theory in typological perspective*. Oxford: Oxford University Press.

Croft, William. 2003*a*. *Typology and universals* (2nd edition). Cambridge: Cambridge University Press.

Croft, William. 2003*b*. Lexical rules vs. constructions: a false dichotomy. In *Motivation in language: studies in honour of Günter Radden*, ed. Hubert Cuyckens, Thomas Berg, René Dirven, and Klaus-Uwe Panther, 49–68. Amsterdam: John Benjamins.

Croft, William. 2007. The origins of grammar in the verbalization of experience. *Cognitive Linguistics* 18:339–82.

Croft, William. 2009*a*. Aspectual and causal structure in event representations. In *Routes to language development: in honor of Melissa Bowerman*, ed. Virginia Gathercole, 139–66. Mahwah: Lawrence Erlbaum Associates.

Croft, William. 2009*b*. Methods for finding language universals in syntax. In *Universals of language today*, ed. Sergio Scalise, Elisabetta Magni, and Antonietta Bisetto, 145–64. Berlin: Springer.

Croft, William. 2010*a*. The origins of grammaticalization in the verbalization of experience. *Linguistics* 48:1–48.

Croft, William. 2010*b*. Ten unwarranted assumptions in syntactic argumentation. In *Language usage and language structure*, ed. Kasper Bøye and Elisabeth Engberg-Pedersen, 313–50. Berlin: Mouton de Gruyter.

Croft, William. To appear. Exemplar semantics. To appear in a volume edited by Seana Coulson. (Available at www.unm.edu/~wcroft/WACpubs.html.)

Croft, William, Jóhanna Barðdal, Willem Hollmann, Violeta Sotirova, and Chiaki Taoka. 2010. Revising Talmy's typological classification of complex events. In *Contrastive construction grammar*, ed. Hans C. Boas, 201–35. Amsterdam: John Benjamins.

Croft, William, and D. Alan Cruse. 2004. *Cognitive linguistics*. Cambridge: Cambridge University Press.

Croft, William, and Keith T. Poole. 2008. Inferring universals from grammatical variation: multidimensional scaling for typological analysis. *Theoretical Linguistics* 34:1–37.

Croft, William, Hava Bat-Zeev Shyldkrot, and Suzanne Kemmer. 1987. Diachronic semantic processes in the middle voice. In *Papers from the 7th International Conference on Historical Linguistics*, ed. Anna Giacolone Ramat, Onofrio Carruba, and Guiliano Bernini, 179–92. Amsterdam: John Benjamins.

Croft, William, Chiaki Taoka, and Esther J. Wood. 2001. Argument linking and the commercial transaction frame in English, Russian and Japanese. *Language Sciences* 23:579–602.

Cruse, D. Alan. 1973. Some thoughts on agentivity. *Journal of Linguistics* 9:11–23.

Cruse, D. Alan. 1986. *Lexical semantics*. Cambridge: Cambridge University Press.

Cruse, D. Alan, and Pagona Togia. 1995. Towards a cognitive model of antonymy. *Lexicology* 1:113–41.

Culicover, Peter W., and Ray Jackendoff. 2005. *Simpler syntax*. Oxford: Oxford University Press.

Dahl, Östen. 1981. On the definition of the telic-atelic (bounded-nonbounded) distinction. In *Tense and aspect* (Syntax and Semantics, 14), ed. Philip Tedeschi and Annie Zaenen, 79–90. New York: Academic Press.

Dahl, Östen. 1985. *Tense and aspect systems*. Oxford: Basil Blackwell.

Dahl, Östen. 1995. The marking of the generic/episodic distinction in tense-aspect systems. In *The generic book*, ed. Gregory N. Carlson and Francis Jeffry Pelletier, 412–25. Chicago: University of Chicago Press.

Dahl, Östen. 2008. The map and the terrain [commentary on Croft and Poole 2008]. *Theoretical Linguistics* 34:53–57.

Dang, Trang Hoa, Karen Kipper, Martha Palmer, and Joseph Rosenzweig. 1998. Investigating regular sense extensions based on intersective Levin classes. In *Proceedings of the 17th International Conference on Computational Linguistics (COLING_ACL), Vol. 1*, 293–99. Morristown: Association for Computational Linguistics.

Davis, Anthony R., and Jean-Pierre Koenig. 2000. Linking as constraints on word classes in a hierarchical lexicon. *Language* 76:56–91.

Dayley, Jon P. 1985. *Tzutujil reference grammar.* (University of California Publications in Linguistics, 107.) Berkeley and Los Angeles: University of California Press.

De Swart, Henriette. 1998. Aspect shift and coercion. *Natural Language and Linguistic Theory* 16:347–85.

Declerck, Renaat, and Susan Reed. 2000. The semantics and pragmatics of *unless*. *English Language and Linguistics* 4:205–41.

DeLancey, Scott. 1981. An interpretation of split ergativity and related patterns. *Language* 57:626–57.

DeLancey, Scott. 1984. Notes on agentivity and causation. *Studies in Language* 8:181–214.

DeLancey, Scott. 1985. Agentivity and syntax. In *Papers from the Parasession on Causatives and Agentivity, Twenty-first Regional Meeting, Chicago Linguistic Society*, ed. William H. Eilfort, Paul D. Kroeber, and Karen L. Peterson, 1–12. Chicago: Chicago Linguistic Society.

Dench, Alan Charles. 1995. *Martuthunira: a language of the Pilbara region of Western Australia.* (Pacific Linguistics, Series C125.) Canberra: Australian National University.

Denison, David. 1993. *English historical syntax.* London: Longman.

Dixon, R. M. W. 1972. *The Dyirbal language of North Queensland.* Cambridge: Cambridge University Press.

Dixon, R. M. W. 1979. Ergativity. *Language* 55:59–138.

Dixon, R. M. W. 1994. *Ergativity.* Cambridge: Cambridge University Press.

Dowty, David. 1977. Toward a semantic analysis of verb aspect and the English 'imperfective' progressive. *Linguistics and Philosophy* 1:45–78.

Dowty, David. 1979. *Word meaning and Montague grammar.* Dordrecht: Reidel.

Dowty, David. 1986. The effects of aspectual class on the temporal structure of discourse: semantics or pragmatics? *Linguistics and Philosophy* 9:37–61.

Dowty, David. 1991. Thematic proto-roles and argument selection. *Language* 67:547–619.

Dowty, David. 2000. 'The garden swarms with bees' and the fallacy of 'argument alternation'. In *Polysemy: theoretical and computational approaches*, ed. Yael Ravin and Claudia Leacock, 111–28. Oxford: Oxford University Press.

Dowty, David. 2001. The semantic asymmetry of 'argument alternations' (and why it matters). In *Making sense: from lexeme to discourse, in honor of Werner Abraham at the occasion of his retirement* (Groninger Arbeiten zur germanistischen Linguistik, 44), ed. Geart van der Meer and Alice G. B. ter Meulen, 171–86. Groningen: Center for Language and Cognition, University of Groningen.

Dumestre, Gérard. 2003. *Grammaire fondamentale du bambara*. Paris: Éditions Karthala.

Durie, Mark. 1997. Grammatical structures in verb serialization. In *Complex predicates*, ed. Alex Alsina, Joan Bresnan, and Peter Sells, 289–354. Stanford: Center for the Study of Language and Information.

Ekman, Gosta. 1954. Dimensions of color vision. *Journal of Psychology* 38:467–74.

Estival, Dominique, and John Myhill. 1988. Formal and functional aspects of the development from passive to ergative systems. In *Passive and voice*, ed. Masayoshi Shibatani, 441–92. Amsterdam: John Benjamins.

Evans, Nicholas, Alice Gaby, and Rachel Nordlinger. 2007. Valency mismatches and the coding of reciprocity in Australian languages. *Linguistic Typology* 11:541–97.

Eythórsson, Thórhallur, and Jóhanna Barðdal. 2005. Oblique subjects: a common Germanic inheritance. *Language* 81:824–81.

Fauconnier, Gilles. 1985. *Mental spaces*. Cambridge, MA: MIT Press.

Fillmore, Charles J. 1968. The case for case. In *Universals in linguistic theory*, ed. Emmon Bach and Robert T. Harms, 1–90. New York: Holt Rinehart and Winston.

Fillmore, Charles J. 1970. The grammar of *hitting* and *breaking*. In *Readings in English transformational grammar*, ed. R. Jacobs and P. Rosenbaum, 120–33. Waltham, MA: Ginn.

Fillmore, Charles J. 1975. An alternative to checklist theories of meaning. In *Proceedings of the First Annual Meeting of the Berkeley Linguistics Society*, ed. Cathy Cogen, Henry Thompson, Graham Thurgood, Kenneth Whistler, and James Wright, 123–31. Berkeley: Berkeley Linguistics Society.

Fillmore, Charles J. 1977*a*. The case for case reopened. In *Grammatical relations* (Syntax and Semantics, 8), ed. Peter Cole and Jerrold M. Sadock, 59–82. New York: Academic Press.

Fillmore, Charles J. 1977*b*. Scenes-and-frames semantics. In *Linguistic structures processing* (Fundamental Studies in Computer Science, 5), ed. Antonio Zampolli, 55–81. Amsterdam: North-Holland.

Fillmore, Charles J. 1982. Frame semantics. In *Linguistics in the morning calm*, ed. The Linguistic Society of Korea, 111–37. Seoul: Hanshin.

Fillmore, Charles J. 1985. Frames and the semantics of understanding. *Quaderni di semantica* 6:222–54.

Fillmore, Charles J. 1986. Pragmatically-controlled zero anaphora. In *Proceedings of the Twelfth Annual Meeting of the Berkeley Linguistics Society*, ed. Vassiliki Nikiforidou, Mary VanClay, Mary Niepokuj, and Deborah Feder, 95–107. Berkeley: Berkeley Linguistics Society.

Fillmore, Charles J., and B. T. S. Atkins. 1994. Starting where the dictionaries stop: the challenge of corpus lexicography. In *Computational approaches to the lexicon*, ed. B. T. S. Atkins and Antonio Zampolli, 349–93. Oxford: Oxford University Press.

Fillmore, Charles J., Christopher R. Johnson, and Miriam R. L. Petruck. 2003. Background to FrameNet. *International Journal of Lexicography* 16:235–50.

Fillmore, Charles J., and Paul Kay. 1993. *Construction Grammar coursebook, chapters 1 thru 11 (Reading materials for Ling. X20)*. University of California, Berkeley.

Fillmore, Charles J., Paul Kay, and Mary Catherine O'Connor. 1988. Regularity and idiomaticity in grammatical constructions: the case of *let alone*. *Language* 64:501–38.

Fillmore, Charles J., Miriam R. L. Petruck, Josef Ruppenhofer, and Abby Wright. 2003. FrameNet in action: the case of attaching. *International Journal of Lexicography* 16:297–332.

Foley, William A., and Mike Olson. 1985. Clausehood and verb serialization. In *Grammar inside and outside the clause*, ed. Johanna Nichols and Anthony Woodbury, 17–60. Cambridge: Cambridge University Press.

Foote, I. P. 1967. Verbs of motion. In *Studies in the modern Russian language, 1 & 2*, ed. Dennis Ward, 4–33. Cambridge: Cambridge University Press.

Forsyth, James. 1970. *A grammar of aspect: usage and meaning in the Russian verb*. Cambridge: Cambridge University Press.

Frajzyngier, Zygmunt. 1993. *A grammar of Mupun*. Berlin: Dietrich Riemer Verlag.

Freeland, L. S. 1951. *Language of the Sierra Miwok*. (Indiana University Publications in Anthropology and Linguistics, Memoir 6.) Baltimore: Waverly Press.

Geurtjens, Hendrik. 1921. *Spraakkunst der Keieesche taal*. Weltevreden: Albrecht.

Gibson, James J. 1979. *The ecological approach to visual perception*. Boston: Houghton Mifflin.

Givón, Talmy. 1976. Topic, pronoun and grammatical agreement. In *Subject and topic*, ed. Charles Li, 149–89. New York: Academic Press.

Givón, Talmy. (ed.). 1983. *Topic continuity in discourse: a quantitative cross-language study*. Amsterdam: John Benjmains.

Givón, Talmy. 1984. *Syntax: a functional-typological introduction, Vol. I*. Amsterdam: John Benjamins.

Givón, Talmy. (ed.). 1994. *Voice and inversion*. Amsterdam: John Benjamins.

Givón, Talmy. 2001. *Syntax: an introduction, Vol. 1*. Amsterdam: John Benjamins.

Goldberg, Adele E. 1995. *Constructions: a construction grammar approach to argument structure*. Chicago: University of Chicago Press.

Goldberg, Adele E. 2001. Patient arguments of causative verbs may be omitted: the role of information structure in argument distribution. *Language Sciences* 23:503–24.

Goldberg, Adele E. 2005*a*. Constructions, lexical semantics, and the Correspondence Principle. In *The syntax of aspect: deriving thematic and aspectual interpretation*, ed. Nomi Erteschik-Shir and Tova Rapoport, 215–36. Oxford: Oxford University Press.

Goldberg, Adele E. 2005*b*. Argument realization: the role of constructions, lexical semantic and discourse factors. In *Construction grammars: cognitive grounding and theoretical extensions*, ed. Jan-Ola Östman and Mirjam Fried, 17–43. Amsterdam: John Benjamins.

Goldberg, Adele E. 2006. *Constructions at work: the nature of generalization in language*. Oxford: Oxford University Press.

Goldberg, Adele E., and Ray Jackendoff. 2004. The English resultative as a family of constructions. *Language* 80:532–68.

Goldsmith, John, and Eric Woisetschlaeger. 1982. The logic of the English progressive. *Linguistic Inquiry* 13:79–89.

Gregores, Emma, and Jorge A. Suárez. 1967. *A description of colloquial Guaraní*. The Hague: Mouton.

Haig, Geoffrey L. J. 2008. *Alignment change in Iranian languages: a construction grammar approach*. Berlin: Mouton de Gruyter.

Haiman, John. 1978. Conditionals are topics. *Language* 54:564–89.

Haiman, John. 1983. Iconic and economic motivation. *Language* 59:781–819.

Hale, Kenneth L. 1970. The passive and ergative in language change: the Australian case. In *Pacific studies in honor of Arthur Capell*, ed. S. A. Wurm and D. C. Laycock, 757–81. Canberra: Australian National University.

Hale, Kenneth L., and Samuel Jay Keyser. 1993. On argument structure and the lexical expression of syntactic relations. In *The view from Building 20*, ed. Kenneth L. Hale and Samuel Jay Keyser, 53–109. Cambridge, MA: MIT Press.

Hale, Kenneth L., and Samuel Jay Keyser. 1997. On the complex nature of simple predicators. In *Complex predicates*, ed. Alex Alsina, Joan Bresnan, and Peter Sells, 29–65. Stanford: Center for the Study of Language and Information.

Hale, Kenneth L., and Samuel Jay Keyser. 2002. *Prolegomenon to a theory of argument structure*. Cambridge, MA: MIT Press.

Halmøy, Jane-Odile. 1982. *Le gérondif. Éléments pour une description syntaxique et sémantique*. (Contributions Norvégiennes aux Études Romanes, 6.) Trondheim: Tapir.

Harrison, Sheldon P. 1976. *Mokilese reference grammar*. Honolulu: University Press of Hawaii.

Haspelmath, Martin. 1987. *Transitivity alternations of the anticausative type*. (Arbeitspapiere Nr. 5 [Neue Folge].) Köln: Institut für Sprachwissenschaft, Universität zu Köln.

Haspelmath, Martin. 1990. The grammaticization of passive morphology. *Studies in Language* 14:25–72.

Haspelmath, Martin. 1993. *A grammar of Lezgian*. Berlin: Mouton de Gruyter.

Haspelmath, Martin. 1995. The converb as a cross-linguistically valid category. In *Converbs in cross-linguistic perspective: structure and meaning of adverbial verb forms-adverbials participles, gerunds*, ed. Ekkehard König and Martin Haspelmath, 1–55. Berlin: Mouton de Gruyter.

Haspelmath, Martin. 1997. *Indefinite pronouns*. Oxford: Oxford University Press.

Haspelmath, Martin. 1999. External possession in a European areal perspective. In *External possession*, ed. Doris L. Payne and Immanuel Barshi, 109–35. Amsterdam: John Benjamins.

Haspelmath, Martin. 2001. Non-canonical marking of core arguments in European languages. In *Non-canonical marking of subjects and objects*, ed. Alexandra Y. Aikhenvald, R. M. W. Dixon, and Masayuki Onishi, 53–83. Amsterdam: John Benjamins.

Haspelmath, Martin. 2003. The geometry of grammatical meaning: semantic maps and cross-linguistic comparison. In *The new psychology of language, Vol. 2*, ed. Michael Tomasello, 211–42. Mahwah: Lawrence Erlbaum Associates.

Haspelmath, Martin. 2005. Ditransitive constructions: the verb 'give'. In *The world atlas of language structures*, ed. Martin Haspelmath, Matthew S. Dryer, David Gil, and Bernard Comrie, 426–29. Oxford: Oxford University Press.

Haviland, John. 1979. Guugu Yimidhirr. In *Handbook of Australian languages, Vol. 1*, ed. R. M. W. Dixon and Barry J. Blake, 27–180. Amsterdam: John Benjamins.

Hay, Jennifer, Christopher Kennedy, and Beth Levin. 1999. Scalar structure underlies telicity in 'degree achievements'. In *Proceedings of SALT 9*, ed. Tanya Matthews and Devon Strolovitch, 127–44. Ithaca, NY: Cornell University, CLC Publications.

Heine, Bernd. 1990. The dative in Ik and Kanuri. In *Studies in typology and diachrony: papers presented to Joseph H. Greenberg on his 75th birthday*, ed. William Croft, Keith Denning, and Suzanne Kemmer, 129–49. Amsterdam: John Benjamins.

Heine, Bernd. 1997. *Possession: cognitive sources, forces, and grammaticalization*. Cambridge: Cambridge University Press.

Heine, Bernd, Ulrike Claudi, and Friederieke Hünnemeyer. 1991. *Grammaticalization: a conceptual framework*. Chicago: University of Chicago Press.

Heine, Bernd, & Tania Kuteva. 2002. *World lexicon of grammaticalization*. Cambridge: Cambridge University Press.

Herskovits, Annette. 1985. Semantics and pragmatics of locative expressions. *Cognitive Science* 9:341–78.

Himmelmann, Nikolaus P., and Eva Schultze-Berndt. 2005. Issues in the syntax and semantics of participant-oriented adjuncts: an introduction. In *Secondary predication and adverbial modification: the typology of depictives*, ed. Nikolaus Himmelmann and Evan Schultze-Berndt, 1–67. Oxford: Oxford University Press.

Hobbs, Jerry. 1985. Granularity. In *Proceedings of the Ninth International Joint Conference on Artificial Intelligence*, ed. Aravind Joshi, 432–35. Los Altos, CA: Morgan Kaufman.

Holisky, Dee Ann. 1987. The case of the intransitive subject in Tsova-Tush (Batsbi). *Lingua* 71:103–32.

Hook, Peter Edwin. 1983. The English abstrument and rocking case relations. In *Papers from the Nineteenth Regional Meeting, Chicago Linguistic Society*, ed. Amy Chukerman, Mitchell Marks, and John F. Richardson, 183–94. Chicago: Chicago Linguistic Society.

Hopper, Paul. 1979. Aspect and foregrounding in discourse. In *Discourse and syntax* (Syntax and Semantics, 12), ed. Talmy Givón, 213–41. New York: Academic Press.

Hopper, Paul, and Sandra A. Thompson. 1980. Transitivity in grammar and discourse. *Language* 56:251–99.

Hopper, Paul, and Sandra A. Thompson. (eds.) 1982. *Studies in transitivity* (Syntax and Semantics, 15). New York: Academic Press.

Iwata, Seizi. 2005*a*. Locative alternation and two levels of verb meaning. *Cognitive Linguistics* 16:355–407.

Iwata, Seizi. 2005*b*. The role of verb meaning in locative alternations. In *Grammatical constructions: back to the roots*, ed. Mirjam Fried and Hans C. Boas, 101–18. Amsterdam: John Benjamins.

Iwata, Seizi. 2006*a*. Argument resultatives and adjunct resultatives in a lexical constructional account: the case of resultatives with adjectival result phrases. *Language Sciences* 28:449–96.

Iwata, Seizi. 2006*b*. Where do constructions come from? (Review article of Croft 2001). *English Linguistics* 23:493–533.

Iwata, Seizi. 2008. *Locative alternation: a lexical-constructional approach*. (Constructional Approaches to Language, 6.) Amsterdam: John Benjamins.

Jackendoff, Ray. 1990. *Semantic structures*. Cambridge, MA: MIT Press.

Jackendoff, Ray. 1991. Parts and boundaries. *Cognition* 41:9–45.

Jackendoff, Ray. 1996. The proper treatment of measuring out, telicity, and perhaps even quantification in English. *Natural Language and Linguistic Theory* 14:305–54.

Jackendoff, Ray. 2002. *Foundations of language*. Oxford: Oxford University Press.

Jacobsen, Wesley. 1982. *Transitivity in the Japanese verbal system*. Bloomington: Indiana University Linguistics Club.

Janda, Laura. 2004. A metaphor in search of a source domain: the categories of Slavic aspect. *Cognitive Linguistics* 15:471–527.

Janda, Laura. 2007. Aspectual clusters of Russian verbs. *Studies in Language* 31.607–48.

Janda, Laura. 2008. Cluster types for Russian verbs. http://hum.uit.no/lajanda/clusterfrontpage.html, updated 20 February 2008.

Jarkey, Nerida. 1991. Serial verb constructions in White Hmong: a functional approach. PhD dissertation, University of Sydney.

Johanson, Lars. 1996. Terminality operators and their hierarchical status. In *Complex structures: a functionalist perspective*, ed. Betty Devriendt, Louis Goossens, and Johan van der Auwera, 229–58. Berlin: Mouton de Gruyter.

Johanson, Lars. 2000. Viewpoint operators in European languages. In *Tense and apsect in the languages of Europe*, ed. Östen Dahl, 27–187. Berlin: Mouton de Gruyter.

Kay, Paul. 2005. Argument structure constructions and the argument-adjunct distinction. In *Grammatical constructions: back to the roots*, ed. Mirjam Fried and Hans C. Boas, 71–98. Amsterdam: John Benjamins.

Kay, Paul, and Charles J. Fillmore. 1999. Grammatical constructions and linguistic generalizations: the *What's X doing Y?* construction. *Language* 75:1–33.

Kazenin, Konstantin I. 1994. Split syntactic ergativity: toward an implicational hierarchy. *Sprachtypololgie und Universalienforschung* 47:78–98.

Keenan, Edward L. 1976. Towards a universal definition of 'subject'. In *Subject and topic*, ed Charles Li, 303–34. New York: Academic Press.

Kemmer, Suzanne. 1993. *The middle voice*. (Typological Studies in Language, 23.) Amsterdam: John Benjamins.

Kemmer, Suzanne, and Arie Verhagen. 1994. The grammar of causatives and the conceptual structure of events. *Cognitive Linguistics* 5:115–56.

Kennedy, Christopher, and Beth Levin. 2008. Measure of change: the adjectival core of degree achievements. In *Adjectives and adverbs: syntax, semantics, and discourse*, ed. Louise McNally and Christopher Kennedy, 156–82. Oxford: Oxford University Press.

Kennedy, Christopher, and Louise McNally. 2005. Scale structure, degree modification, and the semantics of gradable predicates. *Language* 81:345–81.

Kikusawa, Ritsuko. 2002. *Proto Central Pacific ergativity: its reconstruction and development in the Fijian, Rotuman and Polynesian languages.* (Pacific Linguistics, 520.) Canberra: Research School of Pacific and Asian Studies.

Kimenyi, Alexandre 1980. *A relational grammar of Kinyarwanda.* (University of California Publications in Linguistics, 91.) Berkeley and Los Angeles: University of California Press.

Klein, Wolfgang. 1992. The present perfect puzzle. *Language* 68:525–52.

Klein, Wolfgang. 1994. *Time in language.* London: Routledge.

Koenig, Jean-Pierre, and Anthony R. Davis. 2001. Sublexical modality and structure of lexical semantic representations. *Linguistics and Philosophy* 24:71–124.

Koenig, Jean-Pierre, and Gail Mauner. 2000. A-definites and the discourse status of implicit arguments. *Journal of Semantics* 16:207–36.

König, Ekkehart. 1995. The meaning of converb constructions. In *Converbs in cross-linguistic perspective: structure and meaning of adverbial verb forms-adverbials participles, gerunds*, ed. Ekkehard König and Martin Haspelmath, 57–95. Berlin: Mouton de Gruyter.

König, Ekkehart, and Volker Gast. 2008. Reciprocity and reflexivity—description, typology and theory. In *Reciprocals and reflexives: theoretical and typological explorations*, ed. Ekkehard König and Volker Gast, 1–31. Berlin: Mouton de Gruyter.

König, Ekkehart, and Shigehiru Kokutani. 2006. Towards a typology of reciprocal constructions: focus on German and Japanese. *Linguistics* 46:271–302.

Kratzer, Angelika. 1995. Stage-level and individual-level predicates. In *The generic book*, ed. Gregory N. Carlson and Francis Jeffry Pelletier, 125–75. Chicago: University of Chicago Press.

Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In *Semantics and contextual expression*, ed. Renate Bartsch, Johan van Benthem, and Peter van Emde Boas, 75–115. Foris: Dordrecht.

Kuno, Susumu. 1973. *The structure of the Japanese language.* Cambridge, MA: MIT Press.

Lakoff, George. 1977. Linguistic gestalts. In *Papers from the Thirteenth Regional Meeting, Chicago Linguistic Society*, ed. Woodford A. Beach, Samuel E. Fox, and Shulamith Philosoph, 236–87. Chicago: Chicago Linguistic Society.

Lakoff, George. 1987. *Women, fire and dangerous things: what categories reveal about the mind.* Chicago: University of Chicago Press.

Lakoff, George, and Mark Johnson. 1980. *Metaphors we live by.* Chicago: University of Chicago Press.

Lambrecht, Knud, and Kevin Lemoine. 2005. Definite null objects in (spoken) French: a Construction-Grammar account. In *Grammatical constructions: back to the roots*, ed. Mirjam Fried and Hans C. Boas, 13–55. Amsterdam: John Benjamins.

Langacker, Ronald W. 1976. Semantic representations and the linguistic relativity hypothesis. *Foundations of Language* 14:307–57.

Langacker, Ronald W. 1987. *Foundations of Cognitive Grammar, Vol. I: theoretical prerequisites.* Stanford: Stanford University Press.

Langacker, Ronald W. 1988. An overview of cognitive grammar. In *Topics in cognitive linguistics*, ed. Brygida Rudzka-Ostyn, 3–48. Amsterdam: John Benjamins.

Langacker, Ronald W. 1991. *Foundations of Cognitive Grammar, Vol. II: descriptive application.* Stanford: Stanford University Press.

Langacker, Ronald W. 2008. *Cognitive Grammar: a basic introduction.* Oxford: Oxford University Press.

Larson, Richard. 1988. On the double object construction. *Linguistic Inquiry* 19:335–91.

Lehmann, Christian. 1982/1995/2002. *Thoughts on grammaticalization: a programmatic sketch, Vol. I*, Arbeiten des Kölner Universalien-Projekts, 48, Köln: Institut für Sprachwissenschaft. Revised edition published by LINCOM Europa, München, 1995. Revised edition reprinted as 'Arbeitspapiere des Seminars für Sprachwissenschaft der Universität Erfurt, 9'. Erfurt: Seminar für Sprachwissenschaft der Universität.

Lehmann, Thomas. 1989. *A grammar of modern Tamil.* Pondicherry: Pondicherry Institute of Linguistics and Culture.

Levin, Beth. 1993. *English verb classes and alternations.* Chicago: University of Chicago Press.

Levin, Beth. 1999. Objecthood: an event structure perspective. In *Papers from the Thirty-fifth Regional Meeting, Chicago Linguistic Society, Part I: papers from the main session*, ed. Sabrina J. Billings, John P. Boyle. and Aaron M. Griffin, 223–47. Chicago: Chicago Linguistic Society.

Levin, Beth, and Malka Rappaport Hovav. 1995. *Unaccusativity: at the syntax-lexical semantics interface.* Cambridge, MA: MIT Press.

Levin, Beth, and Malka Rappaport Hovav. 1999. Two structures for compositionally derived events. In *Proceedings of SALT 9*, ed. Tanya Matthews and Devon Strolovitch, 199–223. Ithaca, NY: Cornell University, CLC Publications.

Levin, Beth, and Malka Rappaport Hovav. 2005. *Argument realization.* Cambridge: Cambridge University Press.

Levinson, Stephen C., Sérgio Meira, and the Language and Cognition Group. 2003. 'Natural concepts' in the spatial topological domain—adpositional meanings in crosslinguistic perspective: an exercise in semantic typology. *Language* 79:485–516.

Lichtenberk, Frantisek. 1985. Multiple uses of reciprocal constructions. *Australian Journal of Linguistics* 5:19–41.

Lieven, Elena, and Michael Tomasello. 2008. Children's first language acquisition from a usage-based perspective. In *Handbook of cognitive linguistics and second language acquisition*, ed. P. Robinson and Nick C. Ellis, 168–96. Mahwah: Lawrence Erlbaum Associates.

Lord, Carol. 1975. Igbo verb compounds and the lexicon. *Studies in African Linguistics* 6:23–48.

Luraghi, Silvia. 2001. Syncretism and the classification of semantic roles. *Sprachtypologie und Universalienforschung* 54:35–51.

Malchukov, Andrej L. 2005. Case pattern splits, verb types and construction competition. In *Competition and variation in natural languages: the case for case*, ed. Mengistu Amberber and Helen de Hoop, 73–117. Amsterdam: Elsevier.

Marantz, Alec. 1992. The way-construction and the semantics of direct arguments in English: a reply to Jackendoff. In *Syntax and Semantics 26: syntax and the lexicon*, ed. Tim Stowell and Eric Wehrli, 179–88. New York: Academic Press.

Maslova, Elena. 2008. Reflexive encoding of reciprocity: cross-linguistic and language-internal variation. In *Reciprocals and reflexives: theoretical and typological explorations*, ed. Ekkehard König and Volker Gast, 225–57. Berlin: Mouton de Gruyter.

Matthews, Stephen, and Virginia Yip. 1994. *Cantonese: a comprehensive grammar*. London: Routledge.

McCawley, James D. 1971. Tense and time reference in English. In *Studies in linguistic semantics*, ed. Charles J. Fillmore and D. Terence Langendoen, 96–113. New York: Holt, Rinehart and Winston.

McCawley, James D. 1973. Prelexical syntax. In *Grammar and meaning: papers on syntactic and semantic topics*, ed. James D. McCawley, 343–56. Tokyo: Taishukan.

McLendon, Sally. 1978. Ergativity, case, and transitivity in Eastern Pomo. *International Journal of American Linguistics* 44:1–9.

Merlan, Francesca. 1976. Noun incorporation and discourse reference in modern Nahuatl. *International Journal of American Linguistics* 42:177–91.

Michaelis, Laura A. 1998. *Aspectual grammar and past-time reference*. London: Routledge.

Michaelis, Laura A. 2004. Type shifting in construction grammar: an integrated approach to aspectual coercion. *Cognitive Linguistics* 15:1–67.

Mithun, Marianne. 1984. The evolution of noun incorporation. *Language* 60:847–94.

Mithun, Marianne. 1991. Active/agentive case marking and its motivations. *Language* 67:510–46.

Mittwoch, Anita. 1982. On the difference between eating and eating something: activities versus accomplishments. *Linguistic Inquiry* 13:113–22.

Mittwoch, Anita. 1988. Aspects of English aspect: on the interaction of perfect, progressive and durational phrases. *Linguistics and Philosophy* 11:203–54.

Mittwoch, Anita. 1991. In defense of Vendler's achievements. *Belgian Journal of Linguistics* 6:71–86.

Mittwoch, Anita. 2005. Unspecified arguments in episodic and habitual sentences. In *The syntax of aspect: deriving thematic and aspectual interpretation*, ed. Nomi Erteschik-Shir and Tova Rapoport, 237–54. Oxford: Oxford University Press.

Mittwoch, Anita. 2008. Tenses for the living and the dead: lifetime inferences reconsidered. In *Theoretical and crosslinguistic approaches to the semantics of aspect*, ed. Susan Rothstein, 167–87. Amsterdam: John Benjamins.

Montague, Richard. 1974. *Formal philosophy: selected papers of Richard Montague*, ed. Richmond H. Thomason. New Haven: Yale University Press.

Mourelatos, Alexander P. D. 1981. Events, processes and states. In *Tense and aspect*. (Syntax and Semantics, 14.), ed. Philip Tedeschi and Annie Zaenen, 191–212. New York: Academic Press. (Originally appeared in *Linguistics and Philosophy* 2:415–34 [1978]).

Munro, Pamela. 1984. When 'same' is not 'not different'. In *Switch reference and universal grammar*, ed. John Haiman and Pamela Munro, 223–43. Amsterdam: John Benjamins.

Mustanoja, Tauno F. 1960. *A Middle English syntax*. Helsinki: Société Néophilologique.

Nemoto, Noriko. 2005. Verbal polysemy and Frame Semantics in Construction Grammar: some observations on the locative alternation. In *Grammatical constructions: back to the roots*, ed. Mirjam Fried and Hans C. Boas, 119–36. Amsterdam: John Benjamins.

Newman, Paul. 2000. *The Hausa language: an encyclopedic reference grammar*. New Haven: Yale University Press.

Nichols, Johanna. 1978. Secondary predicates. In *Proceedings of the Fourth Annual Meeting of the Berkeley Linguistics Society*, ed. Jeri J. Jaeger, Anthony C. Woodbury, Farrell Ackerman, Christine Chiarello, Orin D. Gensler, John Kingston, Eve E. Sweetser, Henry Thompson, and Kenneth W. Whistler, 114–27. Berkeley: Berkeley Linguistics Society.

Nichols, Johanna. 1984. Direct and oblique objects in Chechen-Ingush and Russian. In *Objects*, ed. Frans Plank, 183–209. New York: Academic Press.

Nordlinger, Rachel. 1998. *A grammar of Wambaya, Northern Territory (Australia)*. (Pacific Linguistics, Series C-140.) Canberra: The Australian National University.

Onishi, Masayuki. 2001. Introduction: Non-canonically marked subjects and objects: parameters and properties. In *Non-canonical marking of subjects and objects*, ed. Alexandra Y. Aikhenvald, R. M. W. Dixon, and Masayuki Onishi, 1–51. Amsterdam: John Benjamins.

Parsons, Terrence. 1989. The progressive in English: events, states and processes. *Linguistics and Philosophy* 12:213–41.

Parsons, Terrence. 1990. *Events in the semantics of English: a study in subatomic semantics*. Cambridge, MA: MIT Press.

Peterson, David A. 2007. *Applicative constructions*. Oxford: Oxford University Press.

Petruck, Miriam R. L., Charles J. Fillmore, Collin F. Baker, Michael Ellsworth, and Josef Ruppenhofer. 2004. Reframing FrameNet data. In *Proceedings of the 11th EURALEX International Congress*, ed. Geoffrey Williams and Sandra Vessier, 405–16. Lorient: Faculté des Lettres et des Sciences Humaines, Université de Bretagne-Sud.

Pinker, Steven. 1989. *Learnability and cognition*. Cambridge, MA: MIT Press.

Polinsky, Maria. 1995. Double objects in causatives: towards a study of coding conflict. *Studies in Language* 19:129–221.

Polinsky, Maria. 2005. Antipassive constructions. In *The world atlas of language structures*, ed. Martin Haspelmath, Matthew S. Dryer, David Gil, and Bernard Comrie, 438–41. Oxford: Oxford University Press.

Poole, Keith T. 2000. Non-parametric unfolding of binary choice data. *Political Analysis* 8:211–237.

Poole, Keith T. 2001. The geometry of multidimensional quadratic utility in models of parliamentary roll call voting. *Political Analysis* 9:211–26.

Poole, Keith T. 2005. *Spatial models of parliamentary voting*. Cambridge: Cambridge University Press.

Rappaport, Malka and Beth Levin. 1988. What to do with theta roles. In *Thematic relations* (Syntax and Semantics, 21), ed. Wendy Wilkins, 7–37. New York: Academic Press.

Rappaport Hovav, Malka, and Beth Levin. 1998. Building verb meanings. In *The projection of arguments: lexical and compositional factors*, ed. Miriam Butt and Wilhelm Geuder, 97–134. Stanford: Center for the Study of Language and Information.

Rappaport Hovav, Malka, and Beth Levin. 2001. An event structure account of English resultatives. *Language* 77:766–97.

Rappaport Hovav, Malka, and Beth Levin. 2002. Change of state verbs: implications for theories of argument projection. In *Proceedings of the Twenty-eighth Annual Meeting of the Berkeley Linguistics Society*, ed. Julie Larson and Mary Paster, 269–80. Berkeley: Berkeley Linguistics Society.

Rice, Sally A. 1987. Towards a cognitive model of transitivity. PhD dissertation, University of California, San Diego.

Rice, Sally A., and Kaori Kabata. 2007. Crosslinguistic grammaticalization patterns of the ALLATIVE. *Linguistic Typology* 11:451–514.

Robins, R. H. 1980. Grammatical hierarchy and the Yurok bipersonal verb. In *Wege zur Universalienforschung*, ed. Gunter Brettschneider and Christian Lehmann, 360–64. Tübinger: Gunter Narr.

Rothstein, Susan. 2004. *Structuring events*. Oxford: Blackwell.

Saeed, John. 1999. *Somali*. Amsterdam: John Benjamins.

Salkoff, Morris. 1983. Bees are swarming in the garden. *Language* 59:288–346.

Sasse, Hans-Jürgen. 1991. Aspect and Aktionsart: a reconciliation. In *Perspectives on aspect and Aktionsart* (*Belgian Journal of Linguistics*, 6), ed. Carl Vetters and Willy Vandeweghe, 31–45. Bruxelles: Éditions de l'Université de Bruxelles.

Sasse, Hans-Jürgen. 2002. Recent activity in the theory of aspect: accomplishments, achievements, or just non-progressive state? *Linguistic Typology* 6:199–271.

Schachter, Paul. 1974. A non-transformational account of serial verbs. *Studies in African Linguistics*, supplement 5:253–70.

Schachter, Paul. 1977. Reference-related and role-related properties of subjects. In *Grammatical relations* (Syntax and Semantics, 8), ed. Peter Cole and Jerrold Sadock, 279–306. New York: Academic Press.

Schlesinger, Itzchak M. 1979. Cognitive structures and semantic deep structures: the case of the instrumental. *Journal of Linguistics* 15:307–24.

Schultze-Berndt, Eva. 2000. *Simple and complex verbs in Jaminjung: a study of event categorisation in an Australian language*. Nijmegen: Max Planck Institute for Psycholinguistics.

Schultze-Berndt, Eva, and Nikolaus P. Himmelmann. 2004. Depictive secondary predicates in crosslinguistic perspective. *Linguistic Typology* 8:59–131.

Schulz, Charles M. 2005. *The complete Peanuts: 1957 to 1958*, ed. Gary Groth. Seattle: Fantagraphics Books.

Searle, John. 1979. Literal meaning. In *Expression and meaning*, ed. John Searle, 117–36. Cambridge: Cambridge University Press.

Sebba, Mark. 1987. *The syntax of serial verbs.* Amsterdam: John Benjamins.

Shibatani, Masayoshi. 1988. Voice in Philippine languages. In *Passive and voice*, ed. Masayoshi Shibatani, 85–142. Amsterdam: John Benjamins.

Shibatani, Masayoshi. 2006. On the conceptual framework for voice phenomena. *Linguistics* 44:217–69.

Siewierska, Anna. 2005. Alignment of verbal person marking. In *The world atlas of language structures*, ed. Martin Haspelmath, Matthew S. Dryer, David Gil, and Bernard Comrie, 406–9. Oxford: Oxford University Press.

Slobin, Dan I. 1991. Learning to think for speaking: native language, cognition, and rhetorical style. *Pragmatics* 1:7–26.

Slobin, Dan I. 2004. The many ways to search for a frog: linguistic typology and the expression of motion events. In *Relating events in narrative, Vol. 2: typological and contextual perspectives*, ed. Sven Strömqvist and Ludo Verhoeven, 219–57. Mahwah: Lawrence Erlbaum Associates.

Smith, Carlota. 1991. *The parameter of aspect.* Dordrecht: Kluwer.

Smith, Carlota. 2003. *Modes of discourse.* Cambridge: Cambridge University Press.

Sridhar, S. N. 1976. Dative subjects. In *Papers from the Twelfth Regional Meeting, Chicago Linguistic Society*, ed. Salikoko S. Mufwene, Carol A. Walker, and Sanford B. Steever, 582–93. Chicago: Chicago Linguistic Society.

Stahlke, Herbert. 1970. Serial verbs. *Studies in African Linguistics* 1:60–99.

Stassen, Leon. 1997. *Intransitive predication.* Oxford: Oxford University Press.

Stassen, Leon. 2000. AND-languages and WITH-languages. *Linguistic Typology* 4:1–54.

Stassen, Leon. 2009. *Predicative possession.* Oxford: Oxford University Press.

Steever, Sanford B. 1987. *The serial verb formation in the Dravidian languages.* Delhi: Motilal Banarsidass.

Stolz, Thomas. 1996. Some instruments are really good companions—some are not: on syncretism and the typology of instruments and comitatives. *Theoretical Linguistics* 23:113–200.

Stolz, Thomas. 2001. To be with X is to have X: comitatives, instrumentals, locative and predicative possession. *Linguistics* 39:321–50.

Street, John C. 1963. *Khalkha structure.* Indiana University Publications, Uralic and Altaic Series, 24. Bloomington: Indiana University Press.

Talmy, Leonard. 1972. Semantic structures in English and Atsugewi. PhD dissertation, Department of Linguistics, University of California, Berkeley.

Talmy, Leonard. 1974. Semantics and syntax of motion. In *Syntax and Semantics 4*, ed. John Kimball, 181–238. New York: Academic Press.

Talmy, Leonard. 1976. Semantic causative types. In *The grammar of causative constructions.* (Syntax and Semantics, 6.), ed. Masayoshi Shibatani, 43–116. New York: Academic Press.

Talmy, Leonard. 1985. Lexicalization patterns: semantic structure in lexical forms. In *Language typology and syntactic description, Vol. 3: grammatical categories and the lexicon*, ed. Timothy Shopen, 57–149. Cambridge: Cambridge University Press.

Talmy, Leonard. 1991/2000. Path to realization—via aspect and result. In *Proceedings of the Seventeenth Annual Meeting of the Berkeley Linguistics Society*, ed. Laurel A. Sutton and Christopher Johnson with Ruth Shields, 480–519. Berkeley: Berkeley Linguistics Society. Revised and expanded version published as 'A typology of event integration' in *Toward a cognitive semantics, Vol. 2: typology and process in concept structuring*, ed. Leonard Talmy, 213–88. Cambridge, MA: MIT Press.

Talmy, Leonard. 1988/2000. Force dynamics in language and cognition. *Cognitive Science* 12:49–100. Revised and expanded version published in *Toward a cognitive semantics, Vol. 1: concept structuring systems*, ed. Leonard Talmy, 409–70. Cambridge, MA: MIT Press.

Talmy, Leonard. 2000*a*. *Toward a cognitive semantics, Vol. I: concept structuring systems*. Cambridge, MA: MIT Press.

Talmy, Leonard. 2000*b*. *Toward a cognitive semantics, Vol. II: typology and process in concept structuring*. Cambridge, MA: MIT Press.

Taoka, Chiaki. 2000. Aspect and argument structure in Japanese. PhD dissertation, Department of Linguistics, University of Manchester. Available at www.unm.edu/~wcroft/Taoka2000PhD.pdf.

Tenny, Carol L. 1994. *Aspectual roles and the syntax-semantics interface*. Dordrecht: Kluwer.

Tessmann, G. 1929. Die Tschama-Sprache. *Anthropos* 24:241–71.

Thompson, Chad. 1994. Passive and inverse constructions. In *Voice and inversion*, ed. Talmy Givón, 47–63. Amsterdam: John Benjamins.

Timberlake, Alan. 1985. The temporal schemata of Russian predicates. In *Issues in Russian morphosyntax*, ed. Michael S. Flier and Richard D. Brecht, 35–57. Columbus: Slavica.

Tomasello, Michael. 2003. *Constructing a language: a usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.

Trask, R. L. 1979. On the origins of ergativity. In *Ergativity*, ed. Frans Plank, 385–406. New York: Academic Press.

Traugott, Elizabeth Closs. 2007. The concepts of constructional mismatch and type-shifting from the perspective of grammaticalization. *Cognitive Linguistics* 18:523–57.

Tsunoda, Takasu. 1981. Split case-marking patterns in verb-types and tense/aspect/mood. *Linguistics* 19:389–438.

van Driem, George. 1987. *A grammar of Limbu*. Berlin: Mouton de Gruyter.

van Driem, George. 1993. *A grammar of Dumi*. Berlin: Mouton de Gruyter.

van Oosten, Jeanne. 1977. Subjects and agenthood in English. In *Papers from the Thirteenth Regional Meeting, Chicago Linguistic Society*, ed. Woodford A. Beach, Samuel E. Fox, and Shulamith Philosoph, 459–71. Chicago: Chicago Linguistic Society.

van Oosten, Jeanne. 1986. *The nature of subjects, topics and agents: a cognitive explanation*. (PhD dissertation, University of California, Berkeley.) Bloomington: Indiana University Linguistics Club.

Van Valin, Robert D. Jr. 1993. A synopsis of Role and Reference Grammar. In *Advances in Role and Reference Grammar*, ed. Robert D. Van Valin, Jr., 1–164. Amsterdam: John Benjamins.

Van Valin, Robert D. Jr. 2005. *Exploring the syntax-semantics interface*. Cambridge: Cambridge University Press.

Van Valin, Robert D. Jr., and Randy J. LaPolla. 1997. *Syntax: structure, meaning and function*. Cambridge: Cambridge University Press.

Van Valin, Robert D. Jr. and David P. Wilkins. 1996. The case for 'effector': case roles, agents and agency revisited. In *Grammatical constructions: their form and meaning*, ed. Masayoshi Shibatani and Sandra A. Thompson, 289–322. Oxford: Oxford University Press.

Vandeloise, Claude. 1991. *Spatial prepositions: a case study from French*. Chicago: University of Chicago Press.

Vendler, Zeno. 1967. Verbs and times. In *Linguistics in philosophy*, ed. Zeno Vendler, 97–121. Ithaca: Cornell University Press.

Verspoor, Cornelia Maria. 1997. Contextually-dependent lexical semantics. Ph.D thesis, University of Edinburgh.

Wall, Robert. 1972. *Introduction to mathematical linguistics*. Englewood Cliffs: Prentice Hall.

Washio, Ryuichi. 1997. Resultatives, compositionality and language variation. *Journal of East Asian Linguistics* 6:1–49.

Wechsler, Stephen. 1997. Resultative predicates and control. In *Proceedings of the 1997 Texas Linguistics Society Conference*, ed. Ralph Blight and Michell Moosally, 307–21. (Texas Linguistic Forum, 38.) Austin: University of Texas.

Wechsler, Stephen. 2005. Resultatives under the 'event-argument homomorphism' model of telicity. In *The syntax of aspect: deriving thematic and aspectual interpretation*, ed. Nomi Erteschik-Shir and Tova Rapoport, 255–73. Oxford: Oxford University Press.

Wertheimer, Max. 1923/1950. Laws of organization in perceptual forms (abridged and translated by Willis D. Ellis). In *A source book of Gestalt psychology*, ed. Willis D. Ellis, 71–88. New York: Humanities Press. (Original published as 'Untersuchungen zur Lehre von der Gestalt'. *Psychologische Forschung* 4:301–50, 1923.)

Winograd, Terry. 1980. What does it mean to understand language? *Cognitive Science* 4:209–41.

Wise, M. R. 1971. *Identification of participants in discourse: a study of aspects of form and meaning in Nomatsiguenga*. Norman: Summer Institute of Linguistics.

Woisetschlaeger, Eric. 1982. *A semantic theory of the English auxiliary system*. Bloomington: Indiana University Linguistics Club.

Wolfart, H. Christoph, and Janet F. Carroll. 1981. *Meet Cree: a guide to the Cree language* (2nd edition). Lincoln: University of Nebraska Press.

Wulf, Douglas. 2009. Two new challenges for the modal account of the progressive. *Natural Language Semantics* 17:205–18.

Wunderlich, Dieter. 1997*a*. Argument extension by lexical adjunction. *Journal of Semantics* 14:95–142.

Wunderlich, Dieter. 1997*b*. Cause and the structure of verbs. *Linguistic Inquiry* 28:27–68.

Ziegeler, Deborah. 1999. Agentivity and the history of the English Progressive. *Transactions of the Philological Society* 97:53–101.

Ziegeler, Deborah. 2007. A word of caution on coercion. *Journal of Pragmatics* 39:990–1028.

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