

UC Berkeley
Dissertations, Department of Linguistics

Title

Argument Structure Constructions

Permalink

<https://escholarship.org/uc/item/6d01k2vd>

Author

Goldberg, Adele

Publication Date

1992

Argument Structure Constructions

by

Adele Eva Goldberg

B.A. (University of Pennsylvania) 1985
M.A. (University of California at Berkeley) 1989

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of
Doctor of Philosophy

in

Linguistics

in the


GRADUATE DIVISION

of the

UNIVERSITY of CALIFORNIA at BERKELEY

Approved:

Chair:

| | |
|---|---------|
|  | 7/27/92 |
| | Date |
| Charles J. Fillmore | 7/27/92 |
| Amir Zarew | 7/17/92 |
| Day J. Rubin | 7/27/92 |
| | |

To the memory of my father, Mel Goldberg, for showing me by example what it was to love to learn, and for better or worse, to ignore the odds,

And to my mom, Ann Goldberg, for her easy laughter, her wisdom and her elegance, and for being a pillar of love and support from day one.

Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 1 |
| 1.1 | A Brief Introduction to Construction Grammar | 6 |
| 1.2 | On the Need to Recognize Constructions | 9 |
| 1.2.1 | To Preserve Compositionality | 9 |
| 1.2.2 | Subtle Semantic Differences Between Constructions | 16 |
| 1.2.3 | Circularity is Avoided | 21 |
| 2 | The Interaction Between Verbs & Constructions | 24 |
| 2.1 | Frame-semantics | 26 |
| 2.2 | The Nature of Verb Meaning | 30 |
| 2.3 | The Nature of Constructional Meaning | 38 |
| 2.3.1 | Polysemy | 38 |
| 2.3.2 | Humanly Relevant Scenes | 50 |
| 2.4 | The Integration of Verb and Construction | 57 |
| 2.4.1 | Representing the Meaning of Constructions | 66 |
| 2.4.2 | The Possible Relations between Verbs and Constructions | 79 |
| 2.5 | Unexpressed Profiled Participant Roles | 90 |

| | | |
|----------|---|------------|
| 2.6 | Conclusion | 92 |
| 3 | Relations Among Constructions | 94 |
| 3.1 | Motivation | 98 |
| 3.2 | Inheritance | 103 |
| 3.2.1 | Inheritance Links As Objects | 107 |
| 3.3 | Relating Particular Constructions | 115 |
| 3.3.1 | The Caused Motion and Resultative Constructions | 115 |
| 3.3.2 | The Ditransitive and Prepositional Paraphrases | 127 |
| 3.4 | Generalizations Across Constructions | 137 |
| 3.4.1 | Multiple Inheritance | 139 |
| 3.4.2 | Inheritance within Constructions | 141 |
| 3.5 | Conclusion | 142 |
| 4 | In a Larger Context | 145 |
| 4.1 | Transformational Theories of Argument Structure | 146 |
| 4.2 | Lexical Rule Accounts | 158 |
| 4.2.1 | Lexical Rules relating Subcategorization Frames | 160 |
| 4.2.2 | LFG Lexical Mapping Theory | 161 |
| 4.2.3 | Semantic Changing Lexical Rule Accounts | 171 |
| 4.3 | Other Constructional Approaches | 181 |
| 4.3.1 | Jackendoff (1990a) | 182 |
| 4.3.2 | Montague | 186 |
| 4.3.3 | Wierzbicka | 188 |

| | | |
|----------|---|------------|
| 6 | The English Ditransitive Construction | 225 |
| 6.1 | Introduction | 225 |
| 6.2 | The existence of the construction | 226 |
| 6.3 | The Semantics | 228 |
| 6.3.1 | Volitionality of the agent | 228 |
| 6.3.2 | Semantic Constraints on the recipient | 233 |
| 6.3.3 | On the notion recipient | 236 |
| 6.3.4 | Other Metaphors | 237 |
| 6.4 | Conclusion | 241 |
| | | |
| 7 | The English Caused-Motion Construction | 242 |
| 7.1 | Introduction | 242 |
| 7.2 | The existence of the construction | 243 |
| 7.3 | The Various Interpretations | 252 |
| 7.4 | Lexical Exceptions | 257 |
| 7.5 | Specific Semantic Constraints on the Construction | 258 |
| 7.5.1 | Defining the notion of a Direct Causation or a Single Event | 260 |
| 7.6 | Conclusion | 276 |
| | | |
| 8 | The English Resultative Construction | 279 |
| 8.1 | Introduction | 279 |
| 8.2 | The Status of the Postverbal NP | 282 |
| 8.3 | Middle Formation | 285 |
| 8.4 | Other Accounts | 289 |

| | | |
|-----------|---|------------|
| 8.5 | A Resultative Construction | 293 |
| 8.6 | Other Constraints on the Resultative Construction | 300 |
| 8.7 | Conclusion | 308 |
| 8.8 | Appendix | 309 |
| 9 | X's Way Construction | 315 |
| 9.1 | The existence of the construction | 317 |
| 9.2 | The Semantic Interpretation | 319 |
| 9.3 | Other Semantic Constraints | 323 |
| 9.4 | Variable Interpretation | 326 |
| 9.5 | Conclusion | 332 |
| 10 | Conclusion | 333 |
| 10.1 | Allowing for the Possibility of Syntactic Bootstrapping | 333 |
| 10.2 | Summary | 337 |
| 11 | Bibliography | 343 |

Acknowledgments

I would like to thank my advisor, George Lakoff, for sparking my interest in linguistics, for his encouragement, his optimism, his wisdom, his enthusiasm for the data (“Wow, that’s wild!”), his ever-ready example and counterexample, for always asking, “Why should that be?,” and for sharing his office, his time and his deep insights with incredible generosity. He has been everything an advisor should be, offering help and advice at every stage, and yet allowing me to explore what I wanted to in the way that I wanted to.

I’d like to thank Charles Fillmore for instilling in me a deep respect for the complexities of the data, and for sharing his wisdom. His enduring insights have profoundly influenced this work in innumerable ways. I’m grateful to Dan Slobin for his encouragement and guidance, and for providing a reality check on the plausibility of psychological claims.

In the final stages of writing this dissertation, I was fortunate enough to work closely with Annie Zaenen at Xerox PARC and CSLI, turning what could have been stark days of dissertation-writing into an enriching, exciting period. I am immensely grateful for her careful reading of drafts of every chapter, her advice, her many leads to relevant literature, and for our many interesting and helpful discussions which have deeply influenced the final writing of this dissertation.

Other members of the Berkeley faculty contributed in countless ways to my education and enjoyment of graduate school. Eve Sweetser tirelessly read and offered valuable comments on all my papers; Paul Kay provided much helpful input, and was consis-

tently willing to lend an ear and a critical eye; Robert Wilensky offered many helpful discussions, and some wonderful data. Len Talmy was always willing to discuss all manner of ideas. Visitors Don Forman, Knud Lambrecht, Minoko Nakau, Frederika Van der Leek, and Robert Van Valin, offered different perspectives and very helpful discussions. I am grateful also to George Bergman, Jerry Feldman, Alison Gopnik, Jim Greeno, Larry Hyman, Sam Mchombo, Pete Piroli, Michael Ranney, and the rest of the Berkeley cognitive science community for providing as stimulating as well as welcoming environment as could be imagined.

Of other faculty outside of Berkeley, I'd like to offer a special thanks to Steve Pinker and Ray Jackendoff for writing their wonderful books, for their insights and their encouragement. I also thank Jess Gropen for his friendship and for many enlightening discussions; In addition, I am grateful to the community at CSLI, Xerox PARC and Stanford, in particular Joan Bresnan, Eve Clark, Cleo Condoravdi, Mark Gawron, Geoff Nunberg, Ivan Sag, Tom Wasow, and Sandro Zucchi, who, in various ways, made my year of living at Stanford most enlightening and enjoyable.

For financial support, comfortable offices, and stimulating environments, I'd like to thank the Sloan Foundation for funding the Cognitive Science Institute at Berkeley, the International Computer Science Institute (ICSI), the Center for the Study of Language and Information (CSLI), and Xerox Palo Alto Research Center (Xerox PARC).

I'm grateful to my friends and colleagues Michele Emanatian, Jane Espenson, Marti Hearst, Kyoko Hirose, Dan Jurafsky, Maarten Lemmens, Terry Regier, Hadar

Shem-Tov and especially Hana Filip, Jean-Pierre Koenig and Laura Michaelis for reading papers, previewing talks, acting as informant, for countless enlightening discussions and e-mail debates, for moral support, and for injecting the graduate experience with many more good times than could reasonably be expected. I'm also grateful to Claudia Brugman, for her friendship, for aiding my transition to linguistics, for her unflagging support, and for being an example.

I'd like to thank my friends outside of linguistics for reminding me there's more to life: Carolyn, Lluisa, Luis, Rolf, Susan, Steve, Vered, Kourosh, Nazhin, the Eaton clan, and the Yazdani family. I also thank the many inhabitants of the Pink House over the years who helped to make California home.

A crucial debt is owed to my family: my mom, who always made time, and never wondered aloud why I made such a crazy choice of professions; my brother Ken, for his sage advice and for making dreams seem possible; my sister, Elena, for being a trusted confidant, and for her empathy and her sense of humor. I'm also grateful to my grandparents, Harry & Birdie and Rose, for their generous loving support, and to my aunt Nina, who showed me all the wonders California has to offer. I owe a deep debt to all of them and to the rest of my extended family for being themselves and for being my inspiration.

Finally, I am immensely grateful to Ali, who believed in me, put up with me, challenged me, and encouraged me relentlessly. His sense of humor, his amazing wisdom and his generous heart made me laugh, kept me on track, and made me happy every step of the way.

Chapter 1

Introduction

What is it children learn when they learn to speak a language? What is the nature of verb meaning and what is its relation to sentential meaning? How and to what extent are novel utterances based on previously learned utterances?

These questions are addressed through a study of basic sentence types (the “simple sentences” of traditional grammarians, the “kernel sentences” of Chomsky 1957, the “basic clauses” of Lakoff 1987). The central thesis of this work is that basic sentences instantiate valence *constructions* — i.e. form – meaning correspondences, that exist independently of particular verbs. That is, it is argued that the constructions themselves, independently of the *words* in the sentence, carry meaning and specify syntactic structure.

This idea runs counter to the current trend in linguistic theories to attempt to predict semantic interpretation and syntactic structure from the information encoded in individual lexical entries. For example, the idea that syntactic structure is predictable from lexical requirements is made explicit in the case of GB in the Projection Prin-

principle. The Projection Principle requires that each level of syntactic representation be a projection of lexical representation in observing the subcategorization properties of lexical items. The idea that the overall syntax and semantics is predictable from lexical requirements is also implicit in all current linking theories that attempt to predict syntactic expression from the array of thematic roles or semantic decomposition associated with particular verbs (e.g. Fillmore 1968, Levin 1985, L. Levin 1987; Bresnan and Moshi 1989; Bresnan & Moshi 1989; Pinker 1989; Van Valin 1990). The thematic arrays or decompositional structures are claimed to be uniquely associated with predicates or derived by lexical rule.

In general, the move toward having the lexicon play a more central role in grammar is well-motivated. There is no question that a large amount of idiosyncratic syntactic and semantic information is contributed by lexical items (cf chapter 5). However in this work it is argued that an entirely lexically-based or bottom-up approach fails to account for the full range of English data. Particular semantic structures together with their associated syntactic expression must be recognized as constructions independently of the lexical items which instantiate them.

While current theories focus almost exclusively on the existence of related valences or “alternations” in describing the semantics of particular argument structure expressions, we will see that by considering various constructions first on their own terms, instead of immediately focusing on their relationships to other constructions, interesting generalizations and subtle semantic constraints emerge.

In order to pursue these points, the semantics of the following constructions are analyzed in some detail:

1. The Ditransitive Construction:

(1) *Elwin faxed her the news.*

2. The “caused-motion” construction:

(2) *Sam sneezed the napkin off the table.*

3. The Resultative Construction:

(3) *The nice man probably just wanted Mother to...kiss him unconscious.* (D. Shields, *Dead Tongues*)

4. X’s Way Construction:

(4) *“...a gadget that bleeps and snoops its way into other people’s answering machines.”* (*Oxford University Press corpus*)

Several of these constructions are shown to be associated with a family of distinct but related senses, much like the polysemy recognized in lexical items. Moreover constructions are shown to license a full array of metaphorical extensions.

This proposal follows from current research in Construction Grammar (cf. Fillmore 1985b, 1987, 1988, 1990; Fillmore & Kay ms; Lakoff 1987; Fillmore, Kay and O’Connor 1988; Brugman 1988; Kay 1990; Lambrecht 1990, to appear). According to Construction Grammar, *constructions* are defined to be form - meaning correspondences that are not strictly predictable from knowledge of the rest of grammar. Constructions are taken to be the units of language. According to this definition, morphemes are clear examples of constructions in that they are pairings of meaning and

form, that are not predictable from anything else (Saussure 1916).¹ Other constructions involve larger form-meaning correspondences including phrasal constructions whose meaning or use is not strictly predictable from the meanings of the constituent parts. That is, a construction can be shown to be necessarily posited in the grammar if it can be shown that its meaning and/or its form is not compositionally derived from other constructions existing in the language (cf sec. 1.2).

Previous relevant work within Construction Grammar includes for example, Fillmore, Kay and O'Connor's analysis of the *let alone* construction (1988), Brugman's analysis of *have* constructions (1988), Kay's work on *even* (1990), the "What, me worry?" construction of Lambrecht (1990), and Sweetser's analysis of modal verbs (1990). This work owes its greatest debts to Lakoff's indepth study of *there* constructions (1984) and to Fillmore (1987), who suggested that the meaning of an expression is arrived at by the superimposition of the meanings of open class words with the meanings of the grammatical elements.

In order to successfully challenge the widely held assumptions that both syntactic expression of arguments and semantic interpretation are uniquely tied to lexical items, non-lexically filled constructions are obviously of interest. Single clause level constructions hold a special interest because these cases clearly lie at the heart of any theory of grammar. If it can be shown that constructions are essential to a description of the domain of simple clauses, then it must be recognized that constructions are

¹This is not to deny the existence of onomatopoeia, even of a pervasive kind, cf. Bolinger 1949/1968: Chapter 5. That is, we do not need to claim that the pairings of form and meaning are *arbitrary*, to claim that they are not predictable. There is an important third choice, that the meanings are *motivated*, although not fully predictable. Motivation is discussed more fully in section 3.1.1

crucial to the description of language. Therefore, the constructions that have been chosen for analysis are single clause level non-lexically filled.²

Constructions can be understood to correspond to the “listemes” of DiSciullo and Williams (1987)—that is, the entities of grammar that must be listed. However our view of the collection of listemes is radically different from theirs. They state categorically:

If conceived of as the set of listemes, the lexicon, is incredibly boring by its very nature. It contains objects of no single specifiable type (words, VPs, morphemes, perhaps intonational patterns, and so on), and those objects that it does contain are there because they fail to conform to interesting laws. The lexicon is like a prison—it contains only the lawless, and the only thing that its inmates have in common is lawlessness.(1987:3)

This view of the lexicon is rejected in the present work. The collection of constructions is not assumed to consist of an unstructured set of independent entities, but instead it will be argued that constructions form a highly structured lattice of interrelated information. These relationships are discussed in chapter 3.

A basic axiom that is adopted is that:

Knowledge of language is knowledge.

From this, it follows that many of the findings of the following chapters are expected:

that linguistic constructions display prototype structure and linguistic constructions

²Fillmore & Kay (ms) also discusses non-lexically filled argument structure constructions; that work is for the most part complementary to the research developed here, insofar as their focus is on a linking theory which relates particular argument structure constructions to overt syntactic forms. This is not the main concern of the present work, although issues bearing on a possible linking theory are discussed in chapters 3 and 4.

form networks of associations. Hierarchies of inheritance and semantic networks, long found useful for organizing other sorts of knowledge are adopted for explicating our linguistic knowledge (cf. Quillian 1968; Bobrow & Winograd 1977; Fahlman 1977/1979; Wilensky 1986; Norvig & Lakoff 1987; Jurafsky 1992).

On the basis of research in language acquisition by Clark (1978), Slobin (1985) and Bowerman (1989) together with the findings presented here, it is hypothesized that:

Simple clause constructions are associated directly with semantic structures which reflect scenes basic to human experience.³

In particular, basic argument structure constructions are shown to be associated with dynamic scenes: experientially grounded gestalts, such as that of someone volitionally transferring something to someone, someone causing something to move or change state, something experiencing something, something moving, etc. It is proposed that the basic clause types of a language form an interrelated network, with semantic structures paired with particular forms in as general a way as possible.

1.1 A Brief Introduction to Construction Grammar

The basic tenet of Construction Grammar, as developed in Fillmore & Kay ms, Fillmore, Kay and O'Connor 1988, Lakoff 1987, Brugman 1988, Lambrecht 1986, is that traditional *constructions*, i.e. form - meaning correspondences are the basic units of language.

³I am using "scene" in the sense of Fillmore (1975, 1977b) to mean an idealization of a coherent individuatable perception, memory experience, action or object.

Theorists working within this theory share an interest in characterizing the *entire* class of structures which make up language, not only the structures which are defined to be part of “core” grammar. This interest stems from the belief that fundamental insights can be gained from considering such non-core cases, in that the theoretical machinery that accounts for non-core cases can be used to account for core cases. In addition, much of actual corpus data involves such non-core cases. Construction Grammarians also share an interest in accounting for the conditions under which a given construction can be *used felicitously*, since this is taken to be part of speakers competence or knowledge of language; from this interest stems the conviction that subtle semantic and pragmatic factors are crucial to understanding the constraints of grammatical constructions.

These tenets, which in many respects harken back to Generative Semantics (e.g. Lakoff 1963/1976, 1965/1970, 1969, 1970a,b, 1972; Lakoff & Ross 1967/1976; Langacker 1969; Dowty 1972; Keenan 1972; McCawley 1973, 1976) are also shared by the theory of Cognitive Grammar (Langacker 1987a, 1991), the framework implicit in much of Wierzbicka’s work (e.g. Wierzbicka 1988), and by many functionalist approaches to grammar (e.g. Bolinger 1968; DeLancey 1991; Givón 1979a, b; Haiman 1985a; Foley & Van Valin 1984). In many ways, aspects of the proposals made here are also compatible with recent work by Levin (1985), Levin & Rapoport (1988), Pinker (1989) and Jackendoff (1990a). The similarities and differences are discussed in chapter 4.

Owing in part to the fact that Construction Grammar has grown largely out of work on frame semantics (Fillmore 1975, 1977b, 1982b, 1985) and an experientially

based approach to language (Lakoff 1977, 1987), the approach to semantics that is adopted by the theory is one that crucially recognizes the importance of speaker centered *construals* of situations in the sense of Langacker (1987a, 1991). This approach to semantics is discussed in chapter 2.

In Construction Grammar, no strict division is assumed between the lexicon and syntax. Lexical constructions and syntactic constructions differ in internal complexity, and also in the extent to which phonological form is specified, but both lexical and syntactic constructions are essentially the same type of declaratively represented data structures: both pair form with meaning.

Another dichotomy which is rejected by Construction Grammar is a strict division between semantics and pragmatics. Information about focussed constituents, topicality, and register is represented in constructions alongside semantic information.

Construction Grammar is generative in the sense that it tries to account for the infinite number of expressions which are allowed by the grammar, while attempting to account for the fact that an infinite number of other expressions are ruled out or disallowed. It is not generative in the sense of attempting to provide a purely formal system for recursively producing all and only allowable strings of symbols.

Construction Grammar is not transformational. No underlying syntactic or semantic forms are posited. Instead, Construction Grammar is a mono-stratal theory of grammar like many other current theories, including Lexical Functional Grammar (Bresnan 1982), Role and Reference Grammar (Foley & Van Valin 1984), Generalized Phrase Structure Grammar (Gazdar, Klein, Pullum and Sag 1985), Head Driven

Phrase Structure Grammar (Pollard & Sag 1987, in press), Cognitive Grammar (Langacker 1987a, 1991).

1.2 On the Need to Recognize Constructions

1.2.1 To Preserve Compositionality

A construction is posited in the grammar if and only if something about its form, meaning or use is not strictly predictable given other constructions in a language.⁴

In order to understand this definition, we must first consider the notion of *compositionality*. Frege is generally acknowledged to have originally formulated the idea that semantics need be compositional: the meaning of every expression in a language must be a function of the meanings of its immediate constituents and the syntactic rule used to combine them.

Montague stated the condition that there must be a homomorphism from syntax to semantics; i.e. there must be a structure-preserving mapping from syntax to semantics. The meaning of the expression is therefore taken to result from applying to the meanings of the immediate constituents a semantic operation which directly corresponds to the relevant syntactic operation.

As Dowty (1979) observes, if we wish to view the principle of compositionality as an interesting and significant claim about natural languages, then we must recognize

⁴This definition of course leaves us with a degree of indeterminacy, since there may be several distinct sets of *basis* constructions for a given language. That is, given for example, three types of expressions, it may turn out that two would be predictable given the third, or that the one would equally well be predictable given the other two. Determining which of the three types of expression to consider grammatical constructions is subjective, but will take into account the relative motivations of the various proposed constructions, economy of representation, speaker intuitions about basicness, etc. It may be possible that speakers actually differ in the set of grammaticalized constructions that they learn in some cases, even if their grammar, in an extensional sense is the same.

that the claim only has intuitive content and falsifiability to the extent that the relation between syntactic expression and semantic representation is straightforward and direct.

The same sentiment, that the semantic rules of combination must directly reflect the syntactic rule of combination is expressed by Gazdar, Pullum, Klein and Sag (1985) working within the Montague Grammar tradition:

...we assume that there exist a universal mapping from syntactic rules to semantic translations...We claim that the semantic type assigned to any lexical item introduced in a rule... and the syntactic form of the rule itself are sufficient to fully determine...the form of the semantic translation rule.
(1985:8-9)

Because the rules of combination are so widely regarded as transparent, it is easy to overlook the fact that there are any substantive rules at all. For example, one researcher states: "In a strictly compositional language, all analytic content comes from the lexicon, and no semantic rules...are needed to account...[for] adding meaning to the sentence which is not directly contributed by some lexeme of the sentence."⁵

Even Jackendoff (1990a), who as we will see later, in fact does recognize non-lexical meaning, states in his introduction: "It is widely assumed, and I will take for granted, that the basic units out of which a sentential concept is constructed are the concepts expressed by the words in the sentence, that is, *lexical* concepts." (p. 9).

The transparent rule of composition for verbs that is typically assumed stems

⁵Carter 1988: 171. It should be noted that Carter goes on to argue that natural languages are not strictly compositional.

back to Frege (1879): the meaning of a verb is a predicate with a fixed arity n , which takes n arguments and yields a proposition. In this way, the verb is taken to be the semantic *head* of the sentence, the element which determines the basic semantic structure of the clause.

The same idea is implemented in recent *unification-based* grammars (cf. Shieber et al. 1984; Shieber 1986), for example, LFG, GPSG, and HPSG, which make explicit the critical assumption that semantic features of the head percolate upwards to the phrasal level; in particular, semantic features of the verb are assumed to percolate upwards to determine the semantic features of the sentence (this is made explicit in the Head Feature Convention of GPSG and HPSG, and in the $\uparrow = \downarrow$ feature of heads in LFG).⁶

We will argue that this view of the principle of compositionality is false: that substantive principles of composition, what we will view as constructions, are needed.

A simple example is provided by the English “conative” construction:

- (5) a. She struck at him.
b. She cut at the bread.
c. She kicked at the wall

Verbs which occur in the conative construction must lexicalize both movement and contact (Guersell et al 1985, Laughren 1988: *shoot, hit, kick, cut, hack, *move,*

⁶This is not a general criticism of unification grammars, since such grammars are capable in principle of capturing extra-lexical effects, and non-direct rules of composition by making a distinction between the **external** and **internal** semantics of phrases. That is, unification grammars can capture these effects by allowing meaning to be contributed by non-lexical nodes. In fact the current version of Construction Grammar in Fillmore and Kay (ms) adopts a unification system.

**touch*). Notice that once the verbs are in this construction however, contact is no longer implied:

(6) The would-be assassin struck at the President, but missed.

This construction demonstrates that semantic features of the verb are not necessarily shared by the clause. In particular, one of the crucial semantic features of the head verb ([+contact]) is not shared by the sentential expression.

Zaenen (1991) argues for a constructional account of the Dutch impersonal passive. There is a constraint on the impersonal passive that the described situation be atelic:

(7) *Er werd opgestegen.

There was ascended.

(8) Er werd gelopen.

There was run.

(9) *?Er werd naar huis gelopen.

There was run home.

Zaenen notes however that the acceptability of the sentence can be altered by the addition of particular adverbs:

(10) Van Schiphol wordt er de hele dag opgestegen.

From Schiphol there is ascending the whole day.

(11) Er werd voortdurend naar huis gelopen.

There was constantly run home.

The constraint on the impersonal passive then seems to be a constraint on the aspect of the entire expression, and not a constraint directly on the Aktionsart of the main verb. However this being the case, the construction is not lexically governed: the constraint must be associated with the construction as a whole.

Recognizing the controversial nature of such a proposal, Zaenen explicitly argues against a move to postulate dual senses of each verb, one telic and one atelic. Her counterargument relies on the fact that another phenomenon, auxiliary selection, crucially relies on the inherent Aktionsart of the main verb, and cannot be altered by adverbial modification. The auxiliary *zijn* is chosen when the verb's Aktionsart is telic, regardless of whether the sentential expression is telic or atelic:

(12) Hij is opgestagen.

He has ascended.

(13) Hij is dagelijks opgestagen.

He has ascended daily.

Hebben, on the other hand is chosen when the verb's Aktionsart is atelic. A theory which posited two lexical items, with opposite Aktionsart specifications, would not be able to predict the facts about auxiliary selection. One could conceivably add further features to the description of the main verbs but this solution appears to only be motivated by the desire to avoid recognizing the effect of contextual factors independent of the verb. A more satisfactory solution is to posit a single verb sense, and allow the impersonal passive to be sensitive to factors outside the main verb.

By recognizing the existence of contentful constructions, we can save compositionality in a weakened form: that the meaning of an expression is a result of integrating the meanings of the lexical items into the meanings of constructions.⁷ In this way, we do not need to claim that the syntax and semantics of the clause is projected exclusively from the specifications of the main verb.

In this way, we avoid the problem of positing implausible verb senses to account for examples such as the following:

(14) He sneezed the napkin off the table.

(15) She baked him a cake.

(16) Dan talked himself blue in the face.

In none of these cases does the verb intuitively require the direct object complement. To account for 14, for example, a strictly compositional theory would have to say that *sneeze*, a parade example of an intransitive verb, actually has a three-argument sense, "X causes Y to move Z by sneezing." To account for 15, such a theory would need to claim that there exists a special sense of *bake* that has three arguments, an agent, a theme, and an intended recipient. This in effect argues that *bake* has a sense which involves something like "X intend to cause Y to have Z." To account for 16, the theory would need to postulate a special sense of *talk*, "X causes Y to become Z by talking."

On a constructional approach, we can understand aspects of the final interpretation involving caused motion, intended transfer, or caused result to be contributed

⁷Extra-linguistic knowledge is undoubtedly required in order to arrive at a full interpretation of an expression in context, however: cf. Lakoff 1977, Langacker 1987a.

by the respective constructions. That is, we can understand skeletal valence constructions to be capable of contributing arguments. For example, we can define the ditransitive construction to be associated directly with agent, patient and recipient roles, and in addition associate the class of verbs of creation with the ditransitive construction. We do not need to stipulate a specific sense of *bake* unique to this construction. In general we can understand the direct objects found in the above examples to be licensed, not directly as an argument of the verb, but by the particular constructions.

Other examples where it is implausible to attribute the complement configuration and the resulting interpretation directly to the main verb include the following cases cited by Levin & Rapoport 1988, and Levin & Rappaport 1990b:

(17) Frances kicked a hole in the fence.

(18) Philip waltzed Sally across the room.

(19) Pauline smiled her thanks.

(20) The truck rumbled down the street.

The suggestion being made here is to account for these cases, in which the whole is in some sense larger than the sum of its parts, by postulating a *construction* that is itself associated with meaning. The construction may require or allow elements with conflicting meaning.

1.2.2 Subtle Semantic Differences Between Constructions

It has long been recognized that differences in complement configuration are often associated with differences in meaning. For example, the ditransitive requires that its goal argument be animate, while the same is not true of paraphrases with *to*:

(21) a. I brought a glass of water to the table.

b. *I brought the table a glass of water. (Hall-Partee 1965/1979: 60)

Fillmore noted that sentences such as the following:

(22) a. Bees are swarming in the garden.

b. The garden is swarming with bees.

differ in that 22b suggests that the whole garden has bees in it everywhere, whereas 22a could involve bees in only a part of the garden. (1968: footnote 49: 48).

Anderson (1971) observed that the following sentences also differ in meaning:

(23) a. I loaded the hay onto the truck.

b. I loaded the truck with the hay.

While 23b implies that the truck is entirely filled with hay (or at least relevantly affected), no such implication is made for 23a.

Work by Green, Oehrle, Bolinger, Borkin, and Wierzbicka and Interpretive Semanticists such as Chomsky, Partee, and Jackendoff have drawn attention to systematic differences in meaning between sentences with the same lexical items in slightly

different constructions.⁸

Borkin (1977/1984), for example, provides the following contrast:

- (24) a. When I looked in the files, I found that she was Mexican.
b. ?When I looked in the files I found her to be Mexican.
c. *When I looked in the files I found her Mexican.

Borkin argues that the small clause form (24c) is only possible with verbs of proposition when the proposition expressed is considered to be a matter of *judgment* as opposed to a matter of fact. The “raised” form of 24b prefers but does not require the proposition to express judgments, and the full clausal form with “that” complementizer freely allows matters of judgment or fact.

Wierzbicka (1988) contrasts:

- (25) a. I am afraid to cross the road.
b. I am afraid of crossing the road.

Again, only in 25a is the speaker presumed to have some intention of crossing the road. This difference in interpretation is argued to account for why 26b is infelicitous, except, where the falling is interpreted as somehow volitionally intended⁹

- (26) a. #I am afraid to fall down.
b. I am afraid of falling down.

⁸Early questions about whether transformations preserved meaning were raised by Kuroda 1965; Partee 1965/1979, 1971; Bolinger 1968.

⁹Wierzbicka suggests that the TO + infinitive construction is itself associated with the semantic elements of “thinking” “wanting” “future time.”

Similar observations of subtle differences in meaning led Bolinger to conclude: "...a difference in syntactic form always spells a difference in meaning" (1968:127). The same conclusion has been reached by Givón 1985, Kirsner 1985, Langacker 1985, Clark 1987, and Wierzbicka 1988. The principle of No Synonymy of Grammatical Forms is adopted here as a working hypothesis.¹⁰

On a constructional approach to argument structure, systematic differences in meaning between the same verb stem in different constructions are attributed directly to the particular constructions. Moreover, because of the No Synonymy of Grammatical Forms Hypothesis, if the form is different, there must be a difference in meaning.¹¹

Another possible way to capture these differences would be to allow senses to proliferate, and to posit distinct verb senses to account for each of the above contrasts (cf. Levin 1985; Levin & Rapoport 1988; Pinker 1989). For example, two distinct senses of *send* could be posited to account for the contrast in 27:

(27) a. She sent the Countess/*the countryside a letter.

b. She sent a letter to the Countess/the countryside.

One sense of *send*, "send₁", would constrain its goal to be animate, while the other, "send₂", would have no such constraint. The problem with this solution is that it

¹⁰It is important to bear in mind that both semantic *and* pragmatic aspects of grammatical forms are relevant for determining synonymy. I.e. only if two forms have *both* the same semantics and the same pragmatics, they will be disallowed by the principle of No Synonymy of Grammatical Forms. This principle is impossible to prove conclusively, since one would have to examine all forms in all languages. Further motivation for it is provided in chapter 3.

¹¹This is not to say that *every* instance of a construction must be semantically distinct from every instance of another construction. All that is required is that, for *some* lexical items, there is a difference in meaning.

does not insure that “send₁” will only occur with the ditransitive construction, as is desired. Notice we cannot readily claim that the ditransitive syntax is determined for “send₁” by general linking rules, because verbs which do *lexically* constrain their goals to be animate—e.g., verbs such as *give* or *hand*—can be used with other valences. For example, when used derivatively (as in ex 28), or with other valences, (as in ex 29), *give* and *hand* still require that their goals are animate:

- (28) a. The giving of fig-leafs to children/*statues is encouraged.
b. The handing of fig-leafs to children/*statues is encouraged.

- (29) a. To whom/*Where did they give the money?
b. To whom/*Where did they hand the money?

However *send* is only constrained to have an animate goal when it appears in the ditransitive construction, and is not so constrained when used derivatively or with other valences:

- (30) The sending of signs to the border is encouraged.
(31) To whom/Where did they send the money?

If we assume that there are two different senses of *send*, only one of which constrains its goal to be animate, then we must stipulate that this sense may *only* occur with the ditransitive valence. This fact cannot be predicted from general linking rules, since other verbs which do lexically constrain their goal arguments to be animate can appear in other constructions. Instead of positing both an additional sense of *send*, and a

stipulation on that sense that it can only occur in the ditransitive construction, we can simply attribute the constraint that the goal must be animate to the construction.¹²

Moreover, many differences in argument structure are not plausibly attributed to the main verb, since they do not involve a difference in the subcategorization of the verb as the examples cited above might be argued to. For example, holding the verb constant, the following b) sentences are better than the corresponding a) sentences:

(34) a. Martha was rushed to by George, because he needed advice.

b. *Martha was rushed from by George, because he needed a rest. (adapted from Rice 1987a)

(35) a. ?It's easy working.

b. It's easy working on a job like this. (Bolinger 1968:125)

There is no natural way to capture these types of constraints in the lexical semantics of the main verb. On a constructional account, however, it is possible to associate constraints on the complements or on the overall interpretation of the expression directly to the construction itself. For example, Rice (1987a,b) argues that prepositional passives such as in 34 are more felicitous when the surface subject argument is

¹²It might be argued that "send₁" is not actually constrained to appear ditransitively, and that it is this sense (just like *give* and *hand*) which appears in expressions such as:

(32) He sent them to his mother.

(I have been assuming that the sense in 32 is the unconstrained sense, since the following is also acceptable:

(33) He sent them to the border.)

However this does not alleviate the problem – we still need to insure that the ditransitive construction can only occur with "send₁." That is, instead of needing to stipulate that "send₁" can only appear ditransitively, we would need to posit a constraint on the construction that it can only occur with verbs which constrain their goals to be animate. But if we *have* this constraint, then there is no need to posit an additional verb sense.

construed as affected or as the locus of transmission of energy; these conditions are met in 34a, in which Martha is the goal, much better than in 34b in which Mary is the source. This is because in 34a, the direction of energy (in this case the direction of motion) is *toward* Mary (cf. also Hopper & Thompson 1980).

1.2.3 Circularity is Avoided

Another reason to recognize the importance of constructions is to avoid a certain circularity of analysis. There is a widespread assumption in current linguistic theories that syntax is a projection of lexical requirements. As noted above, this claim is explicit in The Projection Principle of Government and Binding Theory (Chomsky 1981), the Bijection Principle of Lexical Functional Grammar (Bresnan 1982), and in all current accounts which attempt to predict overt syntax from semantic role or theta role arrays. In all of these cases, it is the *verb* which is taken to be of central importance. That is, it is assumed that the verb determines how many and which kind of complements will cooccur with it. In this way, the verb is analogized to the predicate of formal logic which has an inherent number of distinct arguments. The verb is taken to be an n-place relation waiting for the exactly correct type and number of arguments.

However such a claim often results in circular analyses. An ordinary verb such as *kick* can appear with at least eight distinct argument structures:

1. Pat kicked the wall.
2. Pat kicked the football into the stadium.

3. Pat kicked at the football.
4. Pat kicked Bob black and blue.
5. Pat kicked his foot against the chair.
6. Pat kicked Bob the football.
7. The horse kicks.
8. Pat kicked his way out of the operating room.

Theories which assume that the verb directly determines particular complement configurations, are forced to claim that *kick* is a binary relation, with agent and patient arguments, and therefore occurs with the transitive syntax, except in *Pat kicked Bob the football* in which it is a ternary relation, with agent, recipient and patient arguments, and therefore occurs in the ditransitive construction; further, in *Pat kicked the football into the stadium*, *kick* is again ternary, but now with agent, theme and goal arguments, and must “therefore” occur with the direct object and prepositional complements, and so on.

That is, both the evidence for the claim that *kick* has a particular n-argument sense, and the explanation for *kick* having the corresponding complement configuration, comes from the fact that *kick* can occur overtly with a particular n-complement construction. That is, it is claimed that *kick* has an n-argument sense on the basis of the fact that *kick* occurs with n complements; it is simultaneously argued that *kick* occurs with n complements because it has an n-argument sense. This is where the circularity arises.

A constructional approach to argument structure allows us to avoid the circularity of arguing that a verb is an n -ary predicate and “therefore” has n complements when and only when it has n complements. Instead, the ternary relation for example, is directly associated with the skeletal ditransitive construction. The verb, on the other hand, is associated with one or more basic senses. The meaning of the verb must be *integrated* into the meaning of the construction. Under what conditions this is possible is the subject of the following chapter. Instead of positing new senses every time a new syntactic configuration is encountered, and then using those senses to explain the existence of the syntactic configuration, a constructional approach requires that the issue of the interaction between verb meaning and constructional meaning be addressed.

Chapter 2

The Interaction Between Verbs & Constructions

The constructional approach to argument structure brings several tricky questions to the fore. If basic sentence types viewed as argument structure constructions, and we wish to claim that essentially the same verb is involved in more than one argument structure construction, we need to deal with the following questions:

1. What is the nature of verb meaning?
2. What is the nature of constructional meaning?
3. When can a given verb occur in a given construction?

Although we have argued that constructions have meaning independently of verbs, it is clearly not the case that the grammar works entirely top-down, that constructions simply *impose* their meaning on unsuspecting verbs. In point of fact, there are reasons

to think that the analysis must be *both* top-down and bottom-up. That is, as will be discussed more fully below, the meanings of constructions and verbs interact in non-trivial ways, and therefore some cross reference between verbs and argument structures will be necessary.

It might be worthwhile to note that the general idea of invoking two simultaneous mechanisms has been recently challenged by Baker (1987). In his introduction, Baker argues simply that involving *two* separate mechanisms as opposed to a single mechanism should make learning more difficult, because some mediation between the two mechanisms would be necessary, and should therefore be dispreferred as a psychologically plausible account.

This view, although having some degree of intuitive appeal, has been shown to be *false* in other domains of cognitive processing. The clearest evidence comes from the domain of vision. For example, it is well-known that the perception of depth does not follow from a single principle, but from the integration of information of many kinds. Perhaps the most important mechanism is *stereopsis*, the fusing of the two disparate images from the two retinas into a single image. However, stereopsis alone is not the only mechanism by which we determine depth (as can be demonstrated clearly by closing one eye—the perception of depth remains, for the most part, intact). Other cues include occlusion and differences in gradients of texture (Gibson 1950).

Moreover, Waltz (1975) has shown that modeling systems can be improved by incorporating multiple types of information. In particular, he demonstrated that the introduction of shadows and more complex objects into a model of visual processes which would seem to lead to complications, in fact led to a simplification. Shadows

give information that is equivalent to that given by another viewpoint. Waltz showed that although there were more primitive symbols and more meanings for them, the system arrived at an unambiguous interpretation of a scene as a whole in *less* time than in a “simpler” system.

Another example that demonstrates the need for simultaneous mechanisms, and in particular, both top-down and bottom-up processing, comes from letter recognition tasks. Wheeler (1970) and others have shown that letters are more quickly recognized within the context of a word than in isolation. This indicates that the recognition of the word (top-down processing) aids the recognition of the letters that make it up. At the same time recognition of individual letters (bottom-up processing) is a prerequisite to recognition of the word. Recent connectionist models have had success in trying to model this type of interactive mechanism (McClelland et al. 1986).

Therefore, counterexamples to Baker’s argument from the domain of human and computer vision and word recognition tasks, should make it clear that the type of interactive system that is being proposed here has ample precedent and should not be dispreferred on unempirical claims of what is “simpler.”

Before discussing the meanings associated with constructions and verbs, it is necessary to describe the type of semantics that will be adopted.

2.1 Frame-semantics

“MEANINGS ARE RELATIVIZED TO SCENES”

Charles Fillmore (1977a:59)[capitals in the original]

Many researchers have argued that words are not exhaustively decomposable into atomic primitives, (e.g. Fodor et al. 1975, Fodor et al. 1980). However, it is not necessary to conclude that meanings have no internal structure. Instead, it has been argued that meanings are typically defined relative to some particular background *frame* or *scene*. I use these terms in the sense of Fillmore (1975, 1977b) to designate an idealization of a “coherent individuable perception, memory, experience, action, or object” (1977b:84).

The point is made in the following passage by Austin:

“Take the sense in which I talk of a cricket bat and a cricket ball and a cricket umpire. The reason that all are called by the same name is perhaps that each has its part – its *own special* part – to play in the activity called cricketing: it is no good to say that cricket *simply* means ‘used in cricket’: for we cannot explain what we mean by ‘cricket’ *except* by explaining the special parts played in cricketing by the bat, ball, & etc.” (Austin 1940/1961:73)

Fillmore (1977b) compares *land* and *ground*. *Land* is used to denote solid ground as opposed to the sea, whereas *ground* also denotes solid ground but as opposed to air. These terms are distinguished, therefore, primarily on the basis of the frames in which these terms are defined.

Another Fillmorian example is *bachelor*, often defined simply as an unmarried man. Fillmore points out that *bachelor* is in fact defined relative to a background frame of cultural knowledge. For that reason, it is odd in many cases to ascribe the

term *bachelor* to particular unmarried men. For example, is the Pope a bachelor? a gay man a bachelor? is Tarzan a bachelor? a hermit a bachelor? or a recently bar mitzvah'ed young man a bachelor? In these cases whether the term applies or not is unclear, because aspects of the background frame in which bachelorhood is defined are not present.

In order to understand the word *precocious*, we need to understand a fair amount of cultural background about normal rates of the maturation of children, and that a positive value may be associated with surpassing the normal rate of development. In order to understand *over-achiever* we must understand a model of goal-oriented progress in which a person's innate talents are assumed to normally determine a progress-rate, but which can be overcome by means of excessive diligence.

Sometimes the background frame is fairly simple, and yet the same crucial point can be made. Langacker (1987a) provides the example of *hypotenuse*, which can only be defined with reference to *right triangle*, which in turn can only be understood by assuming the notion of hypotenuse. Such an example provides a simple case for which to explain the notion of *profiling* (Langacker 1987a, 1991). Differences in profiling correspond to differences in the prominence of substructures within a semantic frame, reflecting changes in our distribution of attention.

While both *hypotenuse* and *right triangle* are defined relative to the same background frame (or "base" according to Langacker's terminology), the meanings of the terms differ in that different aspects of the frame are profiled. The different terms can be characterized by the following Langacker-style representations:

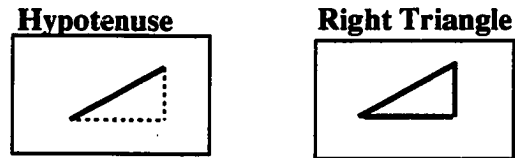


Figure 2.1

Frames in the sense being used here date back to the “schemas” of Bartlett (1932), and have been reintroduced more recently by researchers in Artificial Intelligence including Minsky (1975), and Schank and Abelson (1977). Frames are intended to capture useful chunks of encyclopedic knowledge. Such frame-semantic knowledge has been implemented in FRL (Roberts and Goldstein 1977) and KRL (Bobrow and Winograd 1977) in terms of a hierarchy of data-structures (or “frames”), each with a number of labeled slots (cf. Wilensky 1986 for discussion and critique of various actual implementations; see Gawron 1988 for an application of AI frames to lexical semantics).

Lakoff (1987) argues that certain concepts are defined in terms of a cluster of distinct frames, or “Idealized Cognitive Models”. He gives the example of *mother*, which is defined via the following models:

- a. The birth model: The person who gives birth
- b. The genetic model: The female who contributes genetic material
- c. The nurturance model: The female who nurtures and raises a child
- d. The marital model: the wife of the father
- e. The genealogical model: the closets female ancestor

Lakoff argues that the concept *mother* normally involves a complex model in which all of the above models are combined. He notes that oftentimes there is pressure to pick one of the models as criterial, the one that “really” defines the concept. But he goes on to show that which model is picked varies according to circumstance and individual choice:

e. I was adopted, and I don't know who my real mother is.

f. I am not a nurturant person, so I don't think I could ever be a real mother to any child.

g. My real mother died when I was an embryo.

h. I had a genetic mother who contributed the egg that was planted in the womb of my real mother. (1987: 75)

Lakoff goes on to analyze the concept of *mother* as involving a *radial* category: a category with a central subcategory (which in this case combines all of the above models), and non-central extensions from that prototype (including *adoptive mother*, *birth mother*, *foster mother*, *surrogate mother*, etc.).

2.2 The Nature of Verb Meaning

So far, the discussion of frame-semantics has centered around nominal examples, but the semantics of nouns and verbs cannot be argued to involve qualitatively different types of knowledge, since nouns are often extended for use as verbs (cf. Clark & Clark 1979). Verbs, as well as nouns, involve frame-semantic meanings; i.e. their designation must include reference to a background frame rich with world and cultural knowledge.

It is typically difficult to capture frame semantic knowledge in concise paraphrase, let alone in formal representation or by a static picture. Still, it is indisputable that speakers do have such knowledge, as a moment of introspection should make clear. Consider the following (oversimplified) definitions:

renege To change one's mind after previously making a promise or commitment to do something.

marry To engage in a ritualized ceremony with a partner, resulting in a change in legal status, with the assumed intention of engaging in conjugal relations and remaining with said partner until one of the two dies.

boycott To avoid buying goods and/or services from a company with the aim of expressing disapproval or causing the company to change one or more of its policies or to go out of business.

riot For three or more people, acting as a group, to engage in activities outside of cultural norms in an unruly and aggressive manner often with the intention of effecting political consequences.

Other examples of verbs requiring aspects of complex world knowledge are not difficult to come by. Consider the rich frame-semantic knowledge necessary to capture the meanings of: *languish*, *lamine*, *saunter*, *divorce*, *merge (of companies)*, *promote*, *subpoena*. In order to capture the richness of these meanings, verbs must be able to refer to conceptual structure, broadly construed (cf Fillmore 1975, 1977b; Lakoff 1977, 1987; Langacker 1987a; Jackendoff 1983, 1987, 1990a).¹

¹This view of verb meaning is parallel to Higginbotham's (1989) notion of the *elucidation* of verb

The idea that lexical entries should make reference to world and cultural knowledge is not without challengers. While many current theorists using semantic decompositional structures, such as X CAUSES Y to RECEIVE Z, X ACTS or X CAUSES Y to MOVE Z, readily recognize that such paraphrases do not capture all of what is intuitively the verb's meaning (cf. e.g. Lakoff 1965/1970; Foley & Van Valin 1984; Levin 1985; Pinker 1989), they argue that such paraphrases are adequate for capturing the "syntactically relevant" aspects of verb meaning. The syntactically relevant aspects of verb meaning are defined to be those aspects which are relevant for determining the syntactic expression of arguments via linking rules. Similar proposals have been made by researchers who claim that the θ role arrays associated with lexical entries constitute the only syntactically relevant aspects of verb meaning (e.g. Kiparsky 1987, Bresnan & Kanerva 1989).²

meaning. Higginbotham cites Hale and Keyser's (1985) definition of *cut*:

'cut' is a V that applies truly to situations *e*, involving a patient *y* and an agent *x* who, by means of some instrument *z*, effects in *e* a linear separation in the material integrity of *y*. (p. 467)

Elucidations are like frame-semantic meanings insofar as they are an attempt to capture the entirety of the meaning associated with a verb. That is, like frame-semantic representations, elucidations do not assume a strict division between dictionary and encyclopedic knowledge. Higginbotham states, "I doubt that a criterial demarcation of lexical and wordly knowledge is necessary, or even desirable, to pose the problems of knowledge and its acquisition that linguistic theory hopes to answer." (p. 470).

²Recent research within the GB framework has claimed that only the structure and not the content of the θ role array is relevant for syntax (Burzio 1986, Zubizarreta 1987, Rappaport & Levin 1988, Belletti & Rizzi 1988, Grimshaw 1990). However the degree of stipulation that is necessary to arrive at a verb's structured array of contentless roles, sometimes termed, the verb's "predicate-argument structure" (PAS) is such that the PAS itself seems little more than an alternate way of encoding what is taken to be the syntactic deep structure. That a level corresponding to the syntactic level is needed in order to make concise statements of certain regularities (e.g. Levin & Rappaport 1986) is not denied here—syntactic encoding is explicitly represented within constructions. What *is* argued here is that what these theorists take to be the Lexical Conceptual Structure (LCS), or the lexicosemantic structure of verbs, from which the syntactic structure (or PAS) is claimed to be projected must have access to rich frame semantic knowledge. Moreover, constructions, which correspond roughly to the level of PAS are argued to be directly associated with semantics.

On the account proposed here, the skeletal meanings, such as X CAUSES Y to RECEIVE Z, X ACTS, or X CAUSES Y to BECOME Z correspond to *constructional meanings*. Only in the limiting case do verbs have such skeletal meanings (e.g. *give, do, make*). Since the mapping between semantics and syntax is done via constructions, not via lexical entries, *that there should be* a class of “syntactically relevant aspects of verb meaning” follows from the existence of constructions, which are independently motivated (cf. chapter 1).

Moreover, by distinguishing verbal semantics from constructional semantics, we can predict an observation noted by Pinker as to the nature of “syntactically relevant aspects of verb meaning,” or what we are claiming is constructional meaning. Pinker (1989) observes that such syntactically relevant aspects of verb meaning are like that of closed-class elements. That is, Pinker notes that the semantic features that are used to predict overt syntactic structure (via linking rules) are the same types of semantic features that have been shown to be associated with closed class items, e.g. motion, causation, contact, change of state, etc. (Talmy 1978, 1983, 1985a; Bybee 1985).

On a constructional account Pinker’s observation is predicted. What needs to be recognized is that what Pinker takes to be the “syntactically relevant” aspects of verbal meaning are aspects of what we are suggesting is constructional meaning. Constructions *are* closed class elements, they are predicted to have semantics like other closed class elements.

A further reason to distinguish the semantics of argument structure constructions from the verbs which instantiate them, and to allow the verbs to be associated with

rich frame-semantic meanings, is in order to account for novel uses of verbs in particular constructions. For example, in order to interpret (or generate) the following expression:

(1) Sam sneezed the napkin off the table.

one needs to know that sneezing involves the forceful expulsion of air. This would not be captured by the skeletal decompositional lexical entry for sneeze such as e.g., "X ACTS."

It is also clear that richer aspects of verb meaning are required for aspects of language other than predicting the syntactic expression of arguments. For example, frame semantics is needed in order to account for the distribution of adverbs and adjuncts, to be able to account for the process of *preemption*, to allow for the possibility of meaningful interpretation and translation, and in order to make correct inferences. Each of these motivations is discussed in turn.

The particulars of the manner designated by verbs is typically taken to be opaque to syntax (while whether the verb encodes a manner or not is taken to be part of the syntactically relevant aspects of verb meaning) For example with respect to the verb *roll*, Pinker notes:

The idiosyncratic information about the topography of rolling is a black box as far as grammar is concerned, and we need not be concerned about decomposing it, whereas the information that there is a manner specified, or a manner and a path, is something that grammar cares about. (1989: 182).

However, in order to account for the distribution of adverbs and adjuncts, reference to the nature of the manner designated by the verb is necessary. For example, to predict the distribution of the adverb *slowly*, reference to particulars of manner are required:

- (2) a. Joe walked into the room slowly.
- b. ?? Joe careened into the room slowly.

That is, one must know that *careening* implies quick, out of control motion; therefore 2b is contradictory. Similarly, in order to predict the distinctions between the following examples, reference to the particulars of manner are essential:

- (3) a. Joe walked into the room with the help of a cane.
- b. ?Joe marched into the room with the help of a cane.
- c. ??Joe rolled into the room with the help of a cane.
- d. *Joe careened into the room with the help of cane.

Another reason to include frame semantic knowledge in lexical entries is in order to account for the phenomenon of *preemption* (or “blocking”). It is widely recognized children readily stop using overgeneralized forms upon hearing an irregular form with the same meaning. For example, children tend to overregularize *go* to *goed*; but upon hearing *went*, the child learns not to produce *goed*. That is, *went* is said to *preempt* *goed*. Similarly, speakers do not generalize the pattern exemplified by *teacher*, *fighter*, *listener*, *doer* to form **cooker* because *cooker* is preempted by *cook*.

In order for preemption to occur, the hypothesized (regular) form and the newly learned (irregular) form, must have identical semantics. We would not expect *flew* to preempt *soared*, because their meanings are not identical. But in order to determine that *soared* is in fact not synonymous with “flew”, the child must know what “soared” and “flew” mean. It is not enough to know that they are motion verbs with a manner component; the entirety of the frame-semantic knowledge associated with them must be recognized (their phonetic dissimilarity is not enough to distinguish them conclusively, since *went* preempts *goed* despite phonetic dissimilarity).

In order to ever have a hope of accounting for interpretation or translation, it should be immediately clear that we need to make reference to frame-semantic knowledge associated with lexical entries. For example, interpretations that only involve the “syntactically relevant” aspects of verb meaning would leave us with severely underspecified interpretations. For example a short story such as:

Hershel kissed Bolinda. Bolinda slapped Hershel. Hershel slunk away.

would be interpreted as:

Hershel ACTED ON Bolinda in an M_1 manner. Bolinda ACTED ON Hershel in an M_2 manner. Hershel MOVED in an M_3 manner.

We would know that $M_i \neq M_j$, for all $i \neq j$, but clearly such an interpretation is missing an intolerable amount of information. Translation would be rendered impossible, since there would be no means by which to determine correspondence between words.

Finally, it should be obvious that general frame-semantic knowledge is required to account for correct inferences as has been amply shown by Bartlett 1932, Minsky

1975, Shank & Abelson 1977, Bobrow & Winograd 1977. To make the case specifically for verbs, contrast the following:

- (4) a. Sally skipped over the crack in the ground. (\longrightarrow she didn't touch the crack)
- b. Sally crawled over the crack in the ground. (\longrightarrow she did touch the crack).

This type of inference is required to determine the acceptability of:

- (5) a. Sally, playing a child's game, avoided touching the crack by skipping over it.
- b. ??Sally, playing a child's game, avoided touching the crack by crawling over it.

In order to know whether or not to infer that Sally made contact with the crack, one needs to know exactly what manner of motion is involved in skipping and crawling; the knowledge of the specific manners involved is part of our frame-semantic understanding of what these terms mean. It is not enough to know simply that these verbs encode *some* manner.

To summarize, frame-semantic knowledge associated with verbs is necessary for:

1. Accounting for the distribution of adverbs and adjuncts
2. Interpretation and translation
3. The process of preemption or blocking to occur.
4. Making correct inferences

Unless we decree that the distribution of adverbs and adjuncts, preemption, interpretation, and inferences are not within the domain of grammar, lexical entries must have access to rich frame-semantic knowledge.

2.3 The Nature of Constructional Meaning

2.3.1 Polysemy

Constructions are typically associated with a family of closely related senses and not a single fixed abstract sense. Given the fact that no strict division between grammar and the lexicon is assumed, this polysemy is expected, since morphological polysemy has shown to be the norm in study after study (Wittgenstein 1953; Austin 1940; Bolinger 1968; Rosch 1973, Rosch et al. 1976, Fillmore 1976, 1982b; Coleman & Kay 1981; Lakoff 1977, 1987; Haiman 1978; Brugman 1981/1988, 1988; Lindner 1981; Sweetser 1990; Emanatian 1990). That is, since constructions are treated as the same basic data-type as morphemes, that they should have polysemous senses like morphemes is expected. It is worth discussing a particular example of such constructional polysemy.

Ditransitive expressions in English typically imply that the agent argument acts to cause transfer of an object to a recipient. It is argued below that this case, of actual successful transfer is the *basic sense* of the construction.

At the same time, it is widely recognized that many ditransitive expressions do not strictly imply that the patient argument is successfully transferred to the potential recipient. For example, *Chris baked Jan a cake* does not strictly imply that Jan actually received the cake. It may happen that Chris was mugged by cake-thieves on the way over to Jan's. In general, expressions involving verbs of creation (e.g. *bake*,

make, build, cook) and verbs of obtaining (e.g. *get, grab, win, earn*) do not strictly imply that the agent causes the potential recipient to actually receive the patient argument. Transfer is rather a *ceteris paribus* implication. What is implied by *Chris baked Jan a cake* is that Chris baked a cake *with the intention* of giving the cake to Jan. In fact many of the verb classes associated with the construction can be seen to give rise to slightly different interpretations.

Expressions involving verbs which imply that the agent undertakes an obligation (e.g. *promise, guarantee, owe*) also do not strictly imply transfer. For example, *Bill promised his son a car* does not imply that Bill actually gives his son a car, or even that Bill intends to give his son a car. Rather, transfer is implied by the “satisfaction conditions” associated with the act denoted by each predicate (Searle 1983). A *satisfied* promise for example does imply that the promisee receives whatever is promised.

Expressions involving verbs of future having (e.g. *bequeath, leave, refer, forward, allocate, allot, assign*) imply that the agent acts to cause the referent of the first object to receive the referent of the second object at some future point in time. This class differs from the last two classes in that no intention or obligation of future action on the part of the referent of the subject is implied; i.e., the agent’s role in the transfer is accomplished by the action referred to by the predicate.

Expressions involving verbs of permission (e.g. *permit, allow*) imply that the agent *enables* the transfer to occur by not preventing it, not that the agent actually *causes* the transfer to occur. For example, *Joe allowed Billy a popsicle* implies only that Joe enabled, or did not prevent Billy from having a popsicle, not that Joe necessarily

caused Billy to have a popsicle.

Expressions involving verbs of refusal (e.g. *refuse*, *deny*) express the negation of transfer, for example:

(6) Joe refused Bob a raise in salary.

(7) His mother denied Billy a birthday cake.

Here transfer is relevant in that the possibility for successful transfer has arisen, the agent is understood to *refuse* to act as the cause of the reception.

Because of these differences, the semantics involved can best be represented as a category of related meanings. That is, the ditransitive form is associated with a set of systematically related senses. Thus the ditransitive can be viewed as a case of *constructional polysemy*: the same form is paired with different but related senses. By accounting for these differences in terms of constructional polysemy, as opposed to positing a collection of lexical rules, for example, we can capture the relationships between the different senses in a natural way. In particular, a polysemous analysis allows us to recognize the special status of the central sense of the construction.

The central sense can be argued to be the sense involving successful transfer of an object to a recipient, i.e.: the referent of the subject agentively causes the object to be transferred to the recipient. There are several reasons to postulate this class as the central sense. It involves concrete, as opposed to metaphorical or abstract (here, potential) transfer, and concrete meanings have been shown to be more basic diachronically (Traugott 1988, Sweetser 1990) and synchronically (Lakoff&Johnson

1980). Further this is the class most metaphorical extensions (described in chapter 6) are based on. For example,

(8) Mary taught Bill French.

implies that Bill actually learned some French, i.e. that metaphorical transfer was successful. This is in contrast to:

(9) Mary taught French to Bill.

in which no such implication is necessary. Similarly,

(10) Mary showed her mother the photograph.

implies that her mother actually saw the photograph, whereas for many speakers, no such implication is necessary in,

(11) Mary showed the photograph to her mother (but her nearsighted mother couldn't see it).

These facts can be accounted for once we recognize actual successful transfer as the central sense of the construction; we need only state that metaphorical extensions have as their source domain, the central sense.³ Finally, successful transfer is argued to be the central sense because the other classes can be represented most economically as extensions from this sense.

³The claim that metaphorical extensions are based on the central sense is only intended to entail that *verbs* which must be metaphorically understood are only understood as extensions from the basic sense. As pointed out to me by Maarten Lemmens (p.c.) not all metaphorical instances of the construction are based on the central sense. For example,

(12) Mary promised Steve a kiss.

involves the metaphorical transfer of a kiss, and yet is based on the non-central sense.

At the same time, the various senses are not predictable and must be conventionally associated with the construction. For example, it is not predictable from knowing the rest of English, that verbs of creation will be allowable in the ditransitive construction in the first place; moreover, it is not predictable that ditransitive expressions involving verbs of creation will imply intended transfer instead of actual transfer or general benefaction. Because of this, the various different possible senses are listed.

The suggestion here of allowing for a fairly specific central sense of the construction and also postulating separate related senses which make reference to specific verb classes, can be contrasted with the possibility of postulating a single abstract sense for the construction and allowing the verbs' semantics to fill out the meaning. Since the latter approach is attractive in being more simple, let me take time to demonstrate why an abstractionist account fails to adequately account for the data.

Several researchers (e.g. Wierzbicka 1986, Paul Kay (personal communication), Frederike Van der Leek (personal communication)) have suggested that there is a uniform meaning associated with the ditransitive, and that is simply that there is some kind of special effect on the first object. It is claimed that the nature of this effect is inferred pragmatically. This proposal is attractive in its elegance, but there are several facts weighing against it.

First, there is no non-circular reason to think that first object is any more affected in the following a) cases than in the corresponding b) cases:

(13) a. Chris baked Pat a cake.

b. Chris baked a cake for Pat.

(14) a. Chris promised Pat a car.

b. Chris promised a car to Pat.

(15) a. Chris kicked Pat the ball.

b. Chris kicked the ball to Pat.

In fact, there is no obvious definition for “affected” which implies that the Pat is necessarily affected in:

(16) Chris baked Pat a cake.

Pat may never receive the cake, and in fact may never even know about the cake.

In addition, it is not possible to construe the first object as affected in just any pragmatically-inferable way. For example, even if we know that there are an agent, a patient, and a goal involved (this we may know by the semantic roles on, e.g. Kay’s account), it is possible to pragmatically infer that the way the goal is affected is by the agent throwing the patient at the goal. However the following cannot be interpreted this way:

(17) Pat threw Chris the ball.

(18) Pat hit Chris the ball.

That is, these examples cannot be interpreted to mean that Pat threw the ball *at* Chris. They can only mean that Pat threw or hit the ball so that Chris would

receive—i.e. in this case, so that Chris would catch the ball. For example, we cannot felicitously say:

(19) # In an attempt to injure Chris, Pat threw Chris the ball.

This fact is unexplained by the abstractionist account.

Another abstractionist analysis that has been offered (Goldsmith 1981) is that the first object semantic role be described as a *prospective possessor*, thus allowing the semantics to be abstract enough to cover all of the possible interpretations of actual, intended, future, or refused transfer. However, this suggestion, and in fact more generally, any abstractionist account, is subject to several criticisms.

One general problem is that an abstractionist account cannot capture the intuition that transfer in general, and *give* in particular are more basic to the construction. *Give*, in fact, is the most prototypical ditransitive verb because its lexical semantics is identical with the construction's semantics. This seems to a strong enough intuition to be worth worrying about. In fact, I performed an informal experiment to gauge the the strength of the intuition that *give* codes the most basic sense of the construction. I asked ten non-linguists what the nonsense word *topamased* meant in the following sentence:

(20) She topamased him something.

A full six out of ten subjects responded that *topamased* meant "give." This fact cannot be attributed simply to effects of general word frequency because there are several other words that are allowable in this construction and are more frequent than *give*. Thus, according to Carroll et al. (1971)'s *Word Frequency Book*, that used a

5,000,000 word corpus, *give* occurred 3366 times, while *tell* occurred 3715 times, *take* 4089 times, *get* 5700 times, and *make* 8333 times. Only *tell* of these other words was given as a response, and it was only given by one speaker. None of the other words were given as responses. One might raise the objection that while *give* is not the most frequently occurring word overall, that it is nonetheless the most frequently word *in this construction*. However, the point of the experiment was exactly to test whether speakers were aware of the close relationship between *give* and this particular construction; the results seem to indicate that they are.

A related problem stems from the fact that not all ditransitive expressions are equally acceptable. That is, there are certain benefactive ditransitives, to be described in chapter 6 in terms of a systematic metaphor, which are acceptable to varying degrees, with some speakers allowing them more freely than others. Examples of this type include:

(21) Hit me a home run.

(22) Crush me a mountain.

(23) Rob me a bank.

These expressions are severely restricted in use as pointed out by Oehrle (1976).

Oehrle notices that they are noticeably more felicitous as commands:

(24) a. Hit me a home run.

b. ?Alice hit me a home run.

And, they are more acceptable when the recipient is referred to by a pronoun:

(25) ?Hit Sally a home run.

On our account, we can understand these cases to be a limited extension from the basic sense; we do not need to put them on a par with other ditransitive examples, and yet we can still treat them as related to the rest of the ditransitives. However, on an abstractionist account, we have to choose whether to include them as ditransitives or exclude them from the analysis. If we include them, we have no way to account for their marginal status and special constraints. If we exclude them, we fail to capture the obvious similarity they bear to other ditransitives, both in their syntax and in their semantics.

Another problem is that it is not predictable that verbs of creation will combine with the ditransitive to imply intended transfer instead of actual or future transfer. For example,

(26) Chris baked Mary a cake.

can only mean that Chris baked the cake with the intention of giving the cake to Mary. It cannot mean that Chris necessarily gave or will give the cake to Mary.

Finally, an abstractionist account does not readily allow us to account for the fact, mentioned previously, that the metaphorical extensions are based on actual transfer, not potential or intended transfer (but see footnote 2 above). That is, if we only postulate an abstract constraint on the first object position, we have no natural way of accounting for the fact that the metaphorical extensions imply that the first object is an *actual* recipient, and not a prospective recipient or goal. However, on our account that constructional polysemy is involved, we can say that the metaphorical

extensions have as their source domain, the central sense of actual transfer.

These problems arise for any abstractionist account; therefore, such an account can be seen to be unsatisfactory. Instead, a polysemous semantics is warranted. The related senses can be diagrammed as follows:

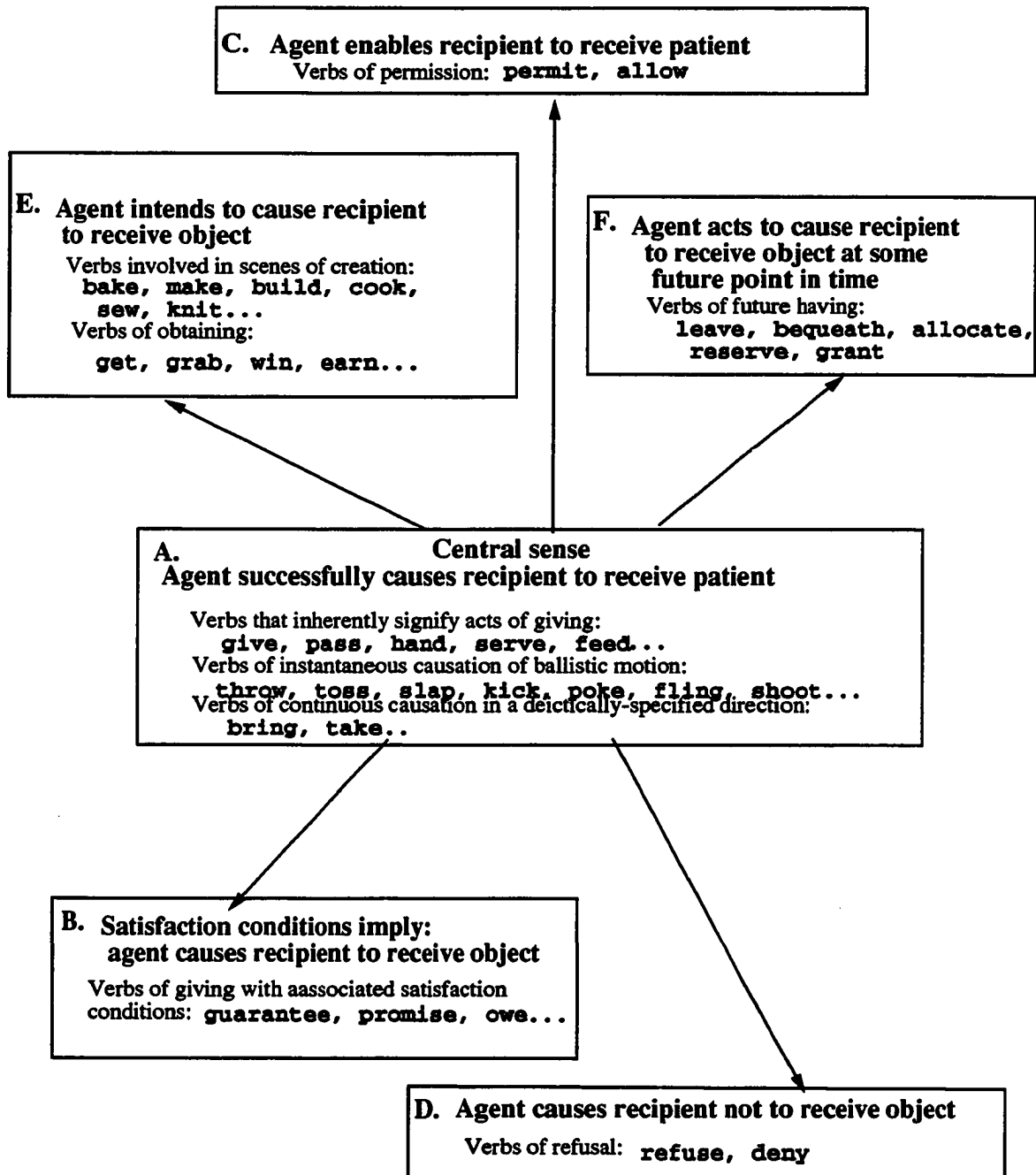


Figure 2.2 Polysemous senses of the Ditransitive Construction

Each of the links from the central sense can be motivated by showing that the same relationship holds in other areas of the grammar. In fact, remarkably similar patterns of polysemy are shown to exist for the “caused motion” construction discussed in chapters 3 and 7. The related senses involve a category of force-dynamically related types of causation as has been described by Talmy (1976, 1985b) and Jackendoff (1990a).

It might be tempting to think that by positing constructional polysemy, we are simply adding complexity to the construction which would otherwise be attributed to the verb. That is, it might be thought that where we save polysemy of lexical items by avoiding postulating separate input and output verb senses of verbs that undergo lexical rules, we create polysemy of the construction.

However, that is emphatically not the case. The polysemy that we are attributing to constructions is polysemy that exists over and above what decision we make as to how the meaning of verbs should be represented. That is, the polysemy that we are attributing to constructions corresponds to polysemy across *outputs* of what is generally taken to be a single lexical rule on traditional accounts. For example, the ditransitive construction is typically captured by a single lexical rule which creates a new verb sense X causes Y to receive Z. However we have seen that ditransitive expressions do not necessarily imply X causes Y to receive Z, but may imply X intends to cause Y to receive Z (*leave, grant*), or only the satisfaction conditions associated with the act designated by the verb imply X causes Y to receive Z (*promise, owe*), or that X causes Y not to receive Z (*deny, refuse*). Thus on a lexical rule

account, a family of lexical rules, each with a slightly different output would need to be postulated. That is, irrespective of whether we posit distinct verb senses or whether we attribute the resulting semantics to an interaction of verb and construction, it is necessary to account for the different resulting semantics that are apparent.

2.3.2 Humanly Relevant Scenes

In the previous section, it was argued that the English ditransitive construction has as its central sense successful transfer, i.e. someone causes someone to receive something. In fact each of the basic clause-level constructions to be discussed can be seen to designate a humanly relevant scene, for example, something causing something to change location (the “caused-motion” construction) construction, an instigator causing something to change state (the resultative construction), an instigator moving despite difficulty (the X’s way construction). Thus we can form the following hypothesis:

Scene-encoding Hypothesis: Constructions which correspond to basic simple sentence types encode as their central sense, event-types which are basic to human experience.

Languages are expected to draw on a finite set of possible event-types, such as that of someone causing something, someone experiencing something, something moving, something being in a state, someone possessing something, something causing a change of state or location, something undergoing a change of state or location, someone experiencing something, and something having an effect on someone.

These event-types are quite abstract. We do not expect to find distinct basic sentence types which have as their basic sense semantics such as: something turned a color, someone became upset, someone overslept.

The idea that constructions designate scenes essential to human experience, is reminiscent of Fillmore's original motivation for the existence of a particular fixed set of case roles.

The case notions comprise a set of universal, presumably innate, concepts which identify certain types of judgments human beings are capable of making about the events that are going on around them, judgments about such matters as who did it, who it happened to, and what got changed.

(1968:24)

Particular combinations of roles which designate humanly relevant scenes are associated with argument structure constructions. That is, the constructions serve to carve up the world into discretely classified event types. Verbs, on the other hand, are associated with richer frame semantic meaning. As discussed in chapter 5, some cross-reference between verbs and constructions is also necessary, so verbs will in effect be notated with the information that they can be classified as certain event-types.

Langacker (1991) argues that language is structured around certain *conceptual archetypes*:

...certain recurrent and sharply differentiated aspects of our experience emerge as archetypes, which we normally use to structure our conceptions insofar as possible. Since language is a means by which we describe our

experience, it is natural that such archetypes should be seized upon as the prototypical values of basic linguistic constructs. (294-95)

He goes on to suggest that these archetypes are extended in various ways for the following reason:

Extensions from the prototype occur...because of our proclivity for interpreting the new or less familiar with reference to what is already well established; and from the pressure of adapting a limited inventory of conventional units to the unending, ever-varying parade of situations requiring linguistic expression. (295)

Support for the hypothesis that the central senses of argument structure constructions designate scenes which are semantically privileged in being basic to human experience comes from certain language acquisition facts. In particular, verbs that lexically designate the semantics associated with argument structure constructions are learned early and used most frequently (Clark 1978); certain grammatical markers are applied earliest to "prototypical" scenes—i.e. scenes which are claimed to be associated with the central senses of constructions (Slobin 1985); and children's first utterances are about the particular scenes claimed to be associated with constructions (Bowerman (1989). Each of these pieces of evidence is discussed in turn.

Clark (1978) observes that "general purpose verbs" such as *go*, *put*, *make*, *do* and *get* are often among the first verbs to be used. These verbs designate meanings that are remarkably similar to the meanings that are associated with argument structure constructions. For example *go* has the meaning associated with the intran-

sitive motion construction; *put* has semantics very close to that of the caused-motion construction; *make* has the semantics associated with the resultative construction. Possible constructions that are correlated with the meanings of the other high frequency verbs are not explicitly discussed here, but *do* could be said to correspond to the meaning associated with the basic sense of the simple intransitive and/or simple transitive construction. *Get* may well code the semantics of yet another construction, that instantiated by verbs such as *receive, have, take*.

Clark cites other studies which have shown that words corresponding to these concepts are among the first to be used cross-linguistically as well (e.g. Bowerman 1973 for Finnish; Grégoire 1937 for French, Sanches 1978 for Japanese and Park 1977 for Korean). Children appear to be using these verbs with a general meaning close to that of adults. Clark provides the following interpretations for the children's early uses in her data:

Do : "perform an action," generally occurring with an agent noun phrase and sometimes with an additional patient argument.

Go : "move," often accompanied by a locative phrase or particle.

Make : "construct" "produce" or "cause some state to come into being or be produced"

Put "cause to be or go in some place"

Not only are these general purpose verbs learned early cross-linguistically, they are also the most commonly used verbs in children's speech. Clark summarizes the

data of several studies in the following table:

| Action | | Locative Action | |
|--------|-----|-----------------|-----|
| get | 252 | go | 417 |
| do | 169 | put | 287 |
| make | 132 | sit | 129 |
| read | 86 | fit | 65 |
| play | 85 | take | 48 |
| find | 69 | fall | 30 |
| eat | 60 | go byebye | 28 |
| fix | 59 | away | 26 |
| draw | 52 | come | 25 |
| hold | 50 | get | 25 |

Table 2.1

She concludes that “*Go, put, get, do and make (plus sit)* are far more frequent than any other verbs” (1978:48).⁴

Slobin (1985) observes that children’s first use of certain grammatical marking is applied to “prototypical scenes”:

In Basic Child Grammar, the first Scenes to receive grammatical marking are “prototypical,” in that they regularly occur as part of frequent and salient activities and perceptions, and thereby become organizing points for later elaboration...(p. 1175).

⁴*Give* is conspicuously not on this list. However Eve Clark (p.c.) has told me that *give* is also learned early and used relatively frequently.

He illustrates this claim by arguing that the grammatical marking of transitivity is first used to describe what he terms the Manipulative Activity Scene. This scene corresponds to the experiential gestalt of a basic causal event in which an agent carries out a physical and perceptible change of state in a patient by means of direct manipulation.

That is, markers of transitivity, both object markers in accusative languages and subject markers in ergative languages, are first applied to the arguments of verbs involving direct physical action, e.g. *give, grab, take, hit*, and not on verbs such as *say, see, call-out*. In Kaluli (Schieffelin 1985) children do not overextend ergative inflection to the subjects of intransitive verbs, even when they have an active meaning, e.g. *run, jump*; Slobin thus concludes that children are not grammaticizing the notion of actor in general, but are grammatically marking Manipulative Activity Scenes.

While Slobin considers the acquisition of grammaticalized morphemes, his observations directly carry over to the non-lexically filled constructions in English which are studied here. That is, the morphemes that mark transitivity in other languages correspond to the English skeletal transitive construction, although the latter has no overt morphological marking.

Bowerman observes more generally that the content of children's first utterances revolve around the general concepts claimed to be associated with constructions:

“Regardless of the language being learned, children's first sentences revolve around a restricted set of meanings to do with agency, action, location, possession and the existence, recurrence, nonexistence, and disap-

pearance of objects (Bloom 1970, Bowerman 1973, Brown 1973, Schlesinger 1971, Slobin 1970.)” (Bowerman 1989)

This data gives us some independent evidence for the claim that the events encoded by constructions are in some sense basic to human experience.

If we are right that valences or subcategorization frames are associated directly with meanings, then what children learn when they learn the syntax of simple sentences is the particular way certain basic scenarios of human experience are paired with forms in their language. That is, we assume that children have already mastered the concepts of transfer between an agent and a willing recipient, causation of motion or change of state, etc., and that they come to the task of learning language trying to learn how to encode these basic concepts. Constructions are then *extended* in various ways allowing the speaker to apply the familiar pattern to new contexts in principled ways, as we saw in the previous section. These patterns of extension are discussed more in the following chapters as well.

At the same time, it is not being claimed that *all* clause-level constructions encode scenes basic to human experience. Non-basic clause-level constructions such as cleft constructions, question constructions, and topicalization constructions, (and possibly passives) are primarily designed to provide an alternative information structure of the clause by allowing various arguments to be topicalized or focused. That is, children must also be sensitive to the *pragmatic information structure* of the clause (Halliday 1967), and must learn additional constructions which can encode the pragmatic information structure in accord with the message to be conveyed. These cases are not

discussed further here.

2.4 The Integration of Verb and Construction

Participant Roles of Verbs

Part of a verb's frame semantics includes the delimitation of *participant roles*. *Participant* roles are to be distinguished from the roles associated with the construction, which will be called, *argument* roles. The distinction is intended to capture the fact that verbs are associated with frame-specific roles, whereas constructions are associated with more general roles such as agent, patient, goal, etc. which correspond to Fillmore's early case roles, or Gruber's thematic roles.⁵ Participant roles are instances of the more general argument roles, and capture specific selectional restrictions as well.

A useful heuristic for determining the basic meaning of a verb is by interpreting the verb in gerundial form in the following frame:

Noing occurred.

⁵The distinction corresponds roughly to Dowty's (1986) distinction between "individual thematic role" (participant role) vs. "thematic role type" (argument role). However, for Dowty, thematic role types are determined by intersecting the semantic entailments of all corresponding arguments of a set of predicates. That is, a thematic role type, e.g. agt, pat, is defined:

Given a set S of pairs $\langle P, i_P \rangle$, where P is an n-place predicate and i_P is the index of one of its arguments, a *thematic role type* is determined by the intersection of all individual thematic roles determined by S.

Therefore if there are m predicates in a language, then S can be chosen in $\sum_{j=1}^m \binom{m}{j} = K$ ways. The total number of role types would only be upperbounded by multiplying K by n, where n is the arity of the predicate with the highest arity. That is to say, there are more than a handful of thematic role types on this view. Dowty suggests that only certain role types such as agent and patient are interesting for linguistics in that they have systematic grammatical consequences; he leaves the determination of which role types are linguistically relevant as an empirical issue (cf. Dowty 1991 for a rather different suggestion – the Proto-Agent and Proto-Patient roles he suggests are not determined by intersecting the set or a particular subset of all entailments of transitive predicates—which might well yield the null set.) On our account, the linguistically relevant "role types" are the roles associated with constructions.

The number and type of participant roles implicitly understood to be involved in the interpretation of this expression corresponds to the number and type of participant roles in the frame-semantics associated with the verb. For example:

- (27) a. No kicking occurred. (one or two participant interpretation)
- b. No sneezing occurred. (one participant interpretation)
- c. No rumbling occurred. (one participant (sound emission) interpretation)
- d. No hammering occurred. (one participant (sound emission) or two participant (impact interpretation))
- e. No painting occurred. (two participant interpretation– either creation or coloring interpretation)
- f. No sewing occurred. (one participant activity interpretation)
- g. No giving occurred. (3 participant interpretation)

In some cases, the verb cannot be used in this frame, but must be accompanied by certain complements. For example,

- (28) a. *No putting occurred.
No putting of cakes into the oven occurred.
- b. *No devouring occurred.
No devouring of cupcakes occurred.

In these cases, the necessarily expressed complements are assumed to correspond to (profiled) participants associated with the verb.⁶

Notice that several of the above examples have more than one interpretation, indicating more than one verb sense. We know from extensive studies of polysemy that lexical items are typically associated with a set of related meanings, and not a single abstract sense (Wittgenstein 1953; Austin 1940; Bolinger 1968; Rosch 1973; Rosch et al. 1976; Fillmore 1976, 1976, 1982a; Coleman & Kay 1981; Lakoff 1977, 1987; Haiman 1978; Brugman 1981/1988, 1988; Lindner 1981; Sweetser 1990). Therefore the existence of two or three or more distinct, but related verb senses is expected. These polysemous senses can be explicitly related by appealing to the frame-semantics associated with the different senses.

What is avoided is a system wherein senses are postulated in an unrestrained way: where new senses are posited for each new syntactic configuration that is encountered.

Lexical Profiling of Participants

As was the case with nouns, verbs lexically determine which aspects of their frame-semantic knowledge are obligatorily profiled. Lexically profiled participant roles are entities within the frame-semantics associated with the verb that are obligatorily accessed, and which function as the focal point within the scene, achieving a special degree of prominence (Langacker 1987a). These profiled participant roles correspond to those participants which are obligatorily brought into *perspective* achieving a cer-

⁶Stative verbs with alternate valences must be dealt with differently. I do not attempt an adequate way to discern their basic meaning here.

tain degree of “salience” (Fillmore 1977b). Profiling is lexically determined, and highly conventionalized—it cannot be altered by context.

In some cases differences in profiling capture the primary difference between verbs. Fisher et al. (1991a) appeal to a process which corresponds to profiling to distinguish *take* and *give*. They note:

Movie directors make an art of distinguishing such notions visually. They can zoom in on the receiver’s grateful mien, the giver out of focus, or off the frame completely. Using the word *take* rather than *give* is a linguistic way of making the same distinction.

Similar examples which seem to invoke the same semantic frame, but differ in which participant roles are profiled include *loan/borrow*, *buy/sell* (cf. Fillmore 1977b for discussion) and *substitute/replace* (cf. Landau & Gleitman 1985 for discussion).

The test for profiled status that will be used here is that profiled participant roles are those roles which are normally obligatorily expressed in finite clauses. The “normally” caveat is for when verbs appear in certain constructions which serve the purpose of avoiding the overt expression of particular arguments, e.g. passive (cf. discussion in section 2.5).

An Example: *Rob* vs. *Steal*:

Rob and *steal* at first glance appear to be synonymous despite their differing syntactic realizations:

(29) a. Jesse robbed the rich (of all their money).

b. *Jesse robbed a million dollars (from the rich).⁷

(30) a. Jesse stole money (from the rich).

b. *Jesse stole the rich (of money).

However, the differences in the expressions of their arguments can be accounted for by a semantic difference in profiling. In the case of *rob*, the target and the thief are profiled, while in the case of *steal* the valuables and the thief are profiled. Representing profiled participant roles in boldface, we might represent the difference between *rob* and *steal* thus:

rob < **thief target** goods >

steal < **thief goods** target >

The different syntactic realizations of participant roles will be shown to follow from differences in profiling, since profiled participant roles must be fused with argument roles which are realized as direct grammatical functions (how this is done is discussed in section 2.4.1).

It might be objected that this putative semantic difference is only postulated to hide an idiosyncratic syntactic difference in the expression of participants. That is, it might be argued that we are only accounting for the fact that the goods role of *steal* must be linked to OBJ, and the target role of *rob* must be linked to OBJ. That is, if we need to stipulate the profiling differences as entirely lexically idiosyncratic in order to predict the syntactic expression of arguments, it cannot be considered a

⁷In some dialects this sentence is in fact acceptable. Such dialects would involve a different lexical entry for *rob*.

great advance over stipulating the syntactic expression of arguments straightaway. Either way we have a stipulation, the only difference being that one stipulation is semantic and the other syntactic. The differences between the two accounts can be represented thus:

Syntactic Stipulation:

Rob < thief target goods >
 |
 OBJ

Steal < thief target goods >
 |
 OBJ

Profiling Difference:

Rob < **thief target goods** >

Steal < **thief target goods** >

However, it can be demonstrated that *rob* and *steal* do differ semantically, and that this difference amounts to a difference in profiling. *Rob* necessarily entails that the robbed person is seriously negatively affected; this is not true of *steal*. Notice the contrast between:

- (31) a. I stole a penny from him.
 b. *I robbed him of a penny.

If the victim is indeed negatively affected by the theft, the sentence is however acceptable, as can be seen in the following sentence:

- (32) I robbed him of his last penny.

This effect holds generally. Notice 33a, in which a rather serious negative effect on the victim is implied, is acceptable, while 33b, in which the effect on the victim is not necessarily serious, is unacceptable:

- (33) a. I robbed him of his pride/his livelihood/his nationality.

b. *I robbed him of money/ a lock of his hair.

Steal, on the other hand, does not require any effect on the victim.

(34) I stole a penny/money/a lock of his hair from him.

Steal focuses on the fact that the stolen goods are not legitimately the thief's property, not that they are in fact someone else's. The victim is often left vague or unknown:

(35) He stole jewels for a living.

Pinker provides an example which exploits the semantic distinction between *rob* and *steal*:

(36) She could steal but she could not rob (From Beatles, "She Came in Through the Bathroom Window") (1989: footnote 4:15 p. 396).

This line plays on the fact that *rob* profiles the victim, while *steal* profiles the stolen goods. A person capable of stealing, but not robbing, is deemed less criminal since each action involves a different focus.

An analogous difference between *rob* and *steal* exists between their nominal counterparts, *robbery* and *theft* ("the act of stealing"). Robbery is a more serious offense than theft because it entails that the robbery is committed *against* someone, the victim has to be present.⁸ This is not true of theft. The difference is exemplified in the following:

⁸The *verb*, *rob* normally also implies that the victim is present:

(37) ?Joe robbed her in Hawaii while she was in Chicago on business.

But contexts do occur in which *rob* can be used upon realization of the crime, even if the victim had not been present:

(38) She walked in the door, and realized she'd been robbed!

(39) They charged her with *robbery/theft for shoplifting a jacket.

(40) With an Uzi, the disgruntled citizen committed many robberies/*many thefts.

The different semantics of *steal* and *rob* can be represented in the following representations:

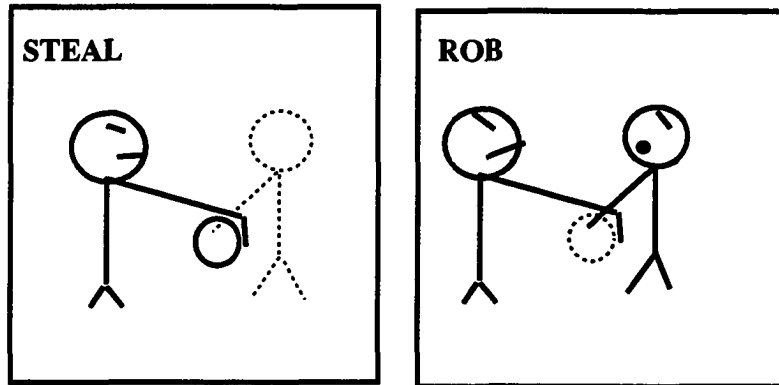


Figure 2.3

A Deeper Explanation

I have claimed that the that the semantic differences are equivalent to a difference in profiling. A different way to look at the data would be to claim that the differences stem from differences in the verbs' semantic frames, and that these differences underlie or motivate the difference in profiling.

That is, it might be argued that the scenes associated with *rob* and *steal* are distinguished by more than a difference in profiling. One piece of evidence arguing for this is the fact that the target role of *steal* is not required to be a person at all, but only a source, as we might expect given its syntactic encoding.

(41) He stole money from the safe.

The same is not true of *rob*:

(42) *He robbed the safe of its contents.

We might distinguish *rob* and *steal* by distinguishing their semantic frames, and thus their participant roles as follows:

rob < **robber** **victim** goods >

steal < **stealer** **goods** source >

Participant roles, such as 'victim' which imply a direct affect of the action denoted by the verb, are instances of the more general role, patient, and patient is a prime candidate for profiled status across lexical items and across languages. That is, patient roles are often obligatorily expressed. Source, on the other hand, is rarely lexically profiled, although occasional examples with apparent lexical profiling do exist, as is the case with *depart*.⁹

There are certain generalizations about what types of participants are generally profiled. In particular, participants which are instances of the more general categories agent or patient tend to be the best candidates for profiled status. Citing Greenfield and Smith (1976), Clark (1978) suggests that agent or patient-like entities are the most salient to children and are learned earliest:

Most of the object categories named in children's early vocabularies are salient or attractive to them for various reasons: they move on their own, can move other objects, or can be manipulated by children. Notice that they name agents or movers—people and animals...They also name a vari-

⁹This fact was observed by Jean-Pierre Koenig and Laura Michaelis (p.c.)

ety of smallish objects that are movable or can be manipulated...In contrast, children hardly ever name places, instruments or goals.(1978:35)

Fillmore 1977b discusses various attributes which tend to cause a participant to be “brought into perspective.” Unfortunately a full exploration of the question of which participants tend to be profiled would take us too far afield of the present work, and I do not attempt it here.

2.4.1 Representing the Meaning of Constructions

Phrasal constructions, as well as lexical items, specify which roles are profiled.

The Constructional Profiling of Argument Roles:

Every argument role linked to a direct grammatical function (SUBJ, OBJ or OBJ₂¹⁰) is profiled.

The definition of constructional profiling embodies the claim that direct grammatical functions serve to distinguish certain arguments semantically and/or pragmatically, i.e. direct grammatical functions profile particular roles (cf. Keenan 1976, 1984; Comrie 1984; Fillmore 1977b; Langacker 1987a, 1991 for arguments to this effect). These grammatical functions are distinguished in most theories as the set of functions which are “terms,” or which correspond to “core,” “nuclear” or “direct” arguments. Like profiled participant roles, profiled argument roles will be indicated by **boldface**.

Thus the ditransitive construction is associated with the semantics “X CAUSE Y to RECEIVE Z”, which will be represented as:

¹⁰OBJ₂ is the grammatical function filled by the second NP in ditransitive expressions.

CAUSE-RECEIVE < agt rec pat >

The semantics of the construction is represented in terms of a list of roles simply because it facilitates the statement of the relationship between constructional roles and participant roles. However, it should be recognized that neither the constructional roles nor the participant roles constitute an unstructured list of atomic primitive elements. Rather, roles are semantically constrained relational slots in the dynamic scene associated with the construction or the verb (cf. Jackendoff 1983, 1987, 1990a, Foley & Van Valin 1984, Rappaport & Levin 1988, Pinker 1989, Gropen 1991, and Fillmore & Kay ms for arguments that roles are not primitive, but are derived from richer semantic structures). Therefore the particular labels that are used to identify these roles have no theoretical significance.

The construction must specify in which ways verbs will combine with it. That is, constructions will need to be able to constrain the class of verbs that can be integrated with it in various ways (to be discussed in following chapters), and must also specify the ways that the event-type designated by the verb is integrated into the event-type designated by the construction. These “principles of integration” between verbs and constructions are discussed in section 2.4.1.

The Fusion of Participant Roles and Argument Roles

If a verb is a member of a verb class that is conventionally associated with a construction, then the participant roles of the verb may be semantically *fused* with argument roles of an argument-structure construction. The term *fusion* is borrowed from Jackendoff (1990a) who uses it to designate the combining of semantic con-

straints on distinct, but coindexed slots within a given lexical entry. I am using the term somewhat differently here, insofar as the possibility of roles fusing is not determined by whether a single role-filler can simultaneously fill both roles, but by whether instead the roles themselves are of compatible types. In addition, fusion is meant here to capture the simultaneous semantic constraints between the participant roles associated with the verb and the argument roles of the construction, as opposed to fusion of slots within a single lexical entry.

Which participant roles are fused with which argument roles is determined by two principles:

1. **Principle of Semantic Coherence:** Only roles which are semantically compatible can be fused. Two roles r_1 and r_2 are semantically compatible iff either r_1 can be construed as an instance of r_2 , or r_2 could be construed as an instance of r_1 . Whether a role can be construed as an instance of another role is determined by general categorization principles. For example, the kicker participant of the *kick* frame may be fused with the agent role of the ditransitive construction, because the kicker role can be construed as an instance of the agent role.
2. **Principle of Correspondence:** Each participant role which is lexically profiled must be fused with a profiled argument role of the construction unless the construction specifically *shades*, *cuts* or *merges* the argument role it would otherwise fuse with (each of these is discussed in 2.5).

If the verb has three profiled participant roles, then one of them may be fused

with a non-profiled argument role of a construction.¹¹

For example, the ditransitive construction, can be represented as follows:

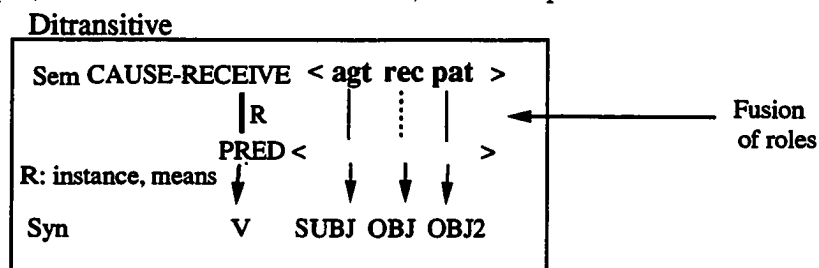


Figure 2.4

The semantics associated directly with the construction is CAUSE-RECEIVE < agt pat rec >. PRED is a variable that is filled by the verb, when a particular verb is integrated into the construction. The construction specifies which roles of the construction are obligatorily fused with roles of the verb; these are indicated by a solid line between the argument roles and the verb's participant role array. Roles which are not obligatorily fused with roles of the verb — i.e. roles which can be contributed by the construction — are indicated by a dashed line. The construction also specifies the way in which the verb is integrated into the construction: i.e. what type of relation R can be. This relation is discussed more in section 2.4.2.

In the above diagram, the ditransitive construction is represented by a pairing between a semantic level and a syntactic level of grammatical functions. There is more to say about generalizations in these linking patterns (cf. chapters 3,4), but at the moment the linking pattern is simply stated as a brute force stipulation.

The typical case is a case in which the participant roles associated with the verb can be put in a one-to-one correspondence with the argument roles associated with

¹¹This parameter may be varied in Bantu languages which make extensive use of the applicative construction.

the construction. In this case, the constructional meaning is entirely redundant with the verb's meaning. That is, the verb adds information to the event designated by the construction. For example, the verb *hand* is associated with three profiled participants: **hander**, **handee**, **handed**. The particular labels of these roles are of no theoretical significance—the role labels are only intended to identify a particular participant in the verb's frame semantics.

Hand's three profiled participants can be put in a one-to-one correspondence with the profiled argument roles of the ditransitive construction:

Composite Fused Structure: ditransitive + *hand* :

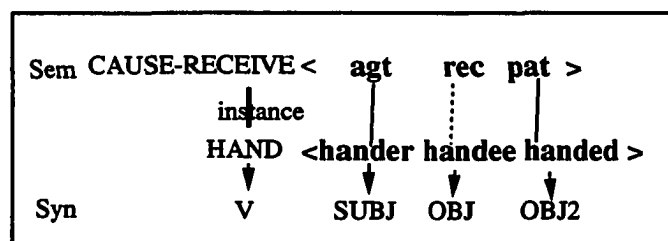


Figure 2.5

The composite structure corresponds to what is traditionally taken to be an additional or derived lexical meaning of the main verb. On the present account, however, the composite structure is just that, a composite structure. Allowing for the constraints specified by the construction (and discussed in more detail in the following chapters), new composite structures can be freely constructed.

Mismatches of Roles

I. Profiling Mismatches The “caused-motion” construction, instantiated by expressions such as:

(43) Joe squeezed the rubber ball inside the jar.

can be represented as follows:

Caused-Motion Construction:

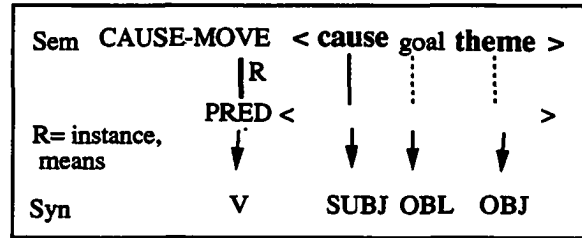


Figure 2.6

Explicit arguments that a construction is required for this case are given in chapter 7.

Put's participant roles are fused with the argument roles of the caused-motion construction as follows:

Composite Fused Structure: Caused-Motion + Put

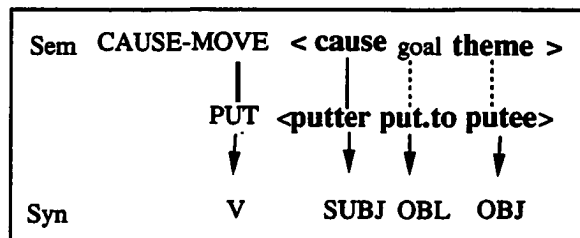


Figure 2.7

In this case, the caused-motion construction's cause argument fuses with the "put-ter" role of *put*, since a putter is a type of cause. The theme argument fuses with the "putee", or put-thing role of *put*, since the roles of theme and put-thing are compatible. The goal (or perhaps more generally, loc) argument fuses with the "put.to" role because the "put.to" role is a type of goal; however the goal argument role of the caused-motion construction is not profiled (we can tell because it is linked to an oblique function), although the "put.to" role is (we can tell because it's obligatory).

The Principle of Correspondence allows for one participant role to be linked to

a non-profiled argument role in cases in which the verb lexically profiles three participant roles. This allows the profiled participant role *put.to* to be fused with the non-profiled argument role *goal*.

The integration of *mail* and the ditransitive construction is an opposite case. *mail* has three participant roles, two of which are lexically profiled:

send < **mailer mailed** mailee >

That is, *mail* differs from *hand* in that only two of its participant roles are obligatory:

(44) a. Paul mailed a letter.

b. *Paul handed a letter.

When *mail* is integrated with the ditransitive construction, the construction imposes a profiled status on the sendee role:

Composite Fused Structure: ditransitive + *mail* :

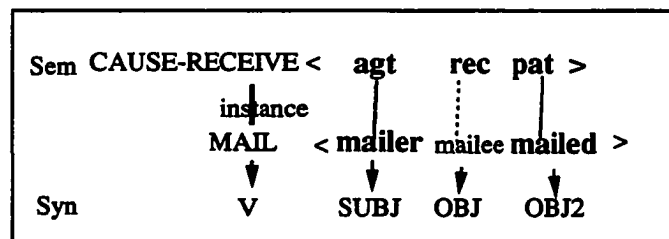


Figure 2.8

That is, if a verb's participant role is fused with a profiled argument role, the participant role inherits the semantic profiled status.

II. Mismatches in Number of Roles

Notice that the Principle of Correspondence is stated only in one direction: The profiled participant roles must be fused with profiled argument roles (except in the

case of 3 profiled participant roles). That is, all profiled participant roles must be accounted for by the construction. However, it is not necessary that each argument role of the construction correspond to a participant of the verb. As is argued in more detail in the following chapters, the construction can add roles not contributed by the verb.

For example, the participants of *kick* are kicker and kicked, and the arguments of the ditransitive construction are agent, patient, recipient. The ditransitive construction, therefore, contributes a recipient role, not associated with a participant role of the verb. The roles are fused as follows:

Composite Structure: Ditransitive + *kick* :

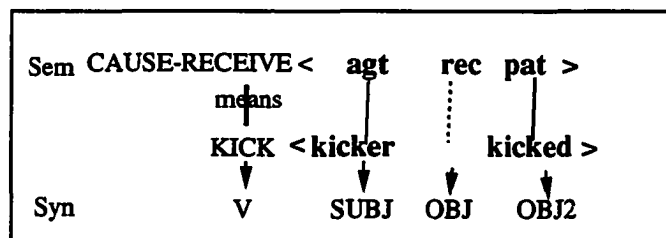


Figure 2.9

The participant roles cannot fuse with the argument roles in any other way because of the semantic coherence principle. The kicker role can only fuse with the agent role because the agent role is the only role it is semantically compatible with. A kicker is not a type of recipient, and is not a patient. The kickee role is an instance of the patient role, and is not an instance of the recipient role.¹² *The recipient role is contributed by the construction.* This structure yields:

(45) Joe kicked Bill the ball.

Other cases we have seen work similarly. *Sneeze*, for example, has a single profiled

¹²Metaphorical extensions such as *She gave him a kick* are discussed in chapter 3.

participant role, a sneezer. It integrates with the “caused-motion” construction as follows:

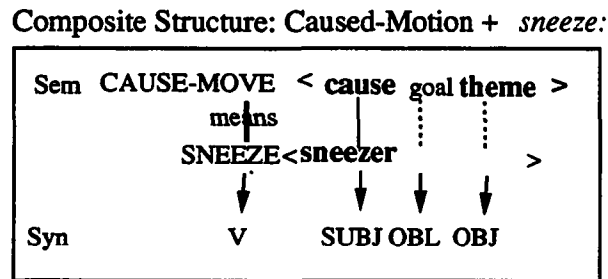


Figure 2.10

To yield:

(46) He sneezed the napkin off the table.

Other cases in which constructions contribute roles which do not correspond to participant roles associated directly to the verbs include constructions and verbs exemplified by the following (cf. Levin & Rapoport 1988, Levin & Rappaport 1990b):

- (47) a. The truck rumbled down the street.
 b. Dave hammered the nail into the door.
 c. Rolf painted his way to fame and glory.
 d. Carolyn sewed a button onto Adam’s coat.

Other kinds of Mismatches

In all the cases considered so far, the participant roles have been independently classifiable as instances of the more general argument roles. However, in other cases, this is not so. For example, consider the verb *send* when integrated into the ditransitive

construction. It is assumed that the same sense of *send* is involved in both 48 and 49:

(48) Joe sent Chicago a letter.

(49) Joe sent a letter to Chicago.

The difference in semantics, namely that in 48 Chicago is necessarily construed as standing metonymically for certain people in Chicago, is to be attributed to an effect of the ditransitive construction, since the construction imposes the constraint that the send.goal role must be a *recipient*, i.e. must be animate.

The integration of *send* into the ditransitive construction is represented below:

Composite Fused Structure: ditransitive + *send* :

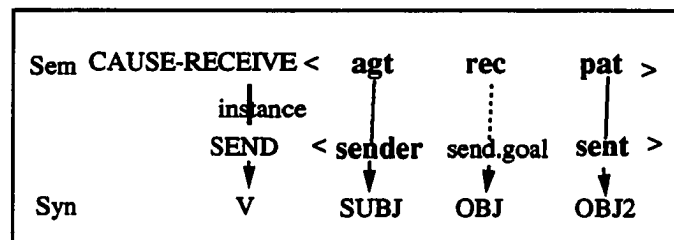


Figure 2.11

That is, the Principle of Semantic Coherence was stated as follows: two roles are semantically compatible iff one role *can be construed* as an instance of the other. The send.goal role can be construed as a type of recipient even though it is not independently necessarily a recipient.

Differences in Profiling

Occasionally verbs have distinct senses which are systematically related by a difference as to which participant roles are profiled. For example *lease* and *rent* can occur with

either the tenant or the landlord, in addition to the property being profiled:

(50) a. Cecile leased the apartment from Ernest. (tenant, property: profiled)

b. Ernest leased the apartment to Cecile. (landlord, property: profiled)

(51) a. Cecile rented the apartment from Ernest. (tenant, property: profiled)

b. Ernest rented the apartment to Cecile. (landlord, property: profiled)

It might be tempting to think that we could analyze these cases along the lines of the other cases discussed above—we could try to underspecify the meaning of the verb and allow the particular constructions to impose a profiled status on particular roles. In particular, we might try to postulate a single sense of *lease* with the property role as the only lexically profiled participant role. However, our test for profiled participant roles is that all and only roles which are obligatorily expressed in finite sentences are profiled. Given this test, it is not possible to simply say that *lease* only has one profiled role, the property, because the verb cannot occur with only the property role:

(52) *The property leased.

Therefore, to account for these cases, we posit two distinct senses of the verb:

$lease_1$ < **tenant property** landlord >

$lease_2$ < **landlord property** tenant >

It should be borne in mind, however, that what we have here is an instance of polysemy and not homonymy, because of the fact that the two senses share the same semantic frame. They only differ in which roles are profiled.

The well-known cases of “load-spray” alternating verbs (cf. e.g. Fillmore 1968, Hall 1965/1979, Anderson 1971, Rappaport & Levin 1988, Gropen et al. 1991) are treated the same way. That is, a small class of verbs can appear in two alternate constructions. For example:

(53) a. She loaded the wagon with the hay.

b. She loaded the hay onto the wagon.

We cannot simply say that *load* only has a single profiled participant role, the loader, thereby underspecifying the verb and allowing the constructions to impose a profiled status because the loader role is not the only obligatory role:

(54) *He loaded.

Alternatively, one might suggest that we lexically specify that all three participant roles are profiled; in this way a single lexical entry would be compatible with both constructions in 53a-b (the third profiled role would be expressed by an oblique). However, this is also not possible since it is not necessary to express the “loaded” role (i.e. the role filled by “the hay”) in all contexts:

(55) He loaded the truck.

That is, the “loaded” role is not obligatory, and is therefore not lexically profiled. One might argue that this is a drawback of our *test*, and that there should in fact only be a single sense of *load* that only profiles the loader role; however, since I have not found a better test for profiled status, I will follow the suggestion of Rappaport & Levin 1988, Pinker 1989, and Gropen et al. 1991 and postulate two distinct, although

related senses of *load*. On our account, the difference between the two verb senses stems from a difference in the profiling of arguments, the semantic frame remaining constant between the two senses. The two senses can be represented as follows:

1. load_1 < loader container loaded >

“He loaded the truck with the hay.”

2. load_2 < loader loaded container >

“He loaded the hay onto the truck.”

Notice that load_2 must profile the container role in addition to the loaded role, since one cannot say,

(56) *He loaded the hay.

Therefore although I have generally tried to avoid positing additional verb senses to account for each alternate valence expression, I do not rule out the possibility that *some* valence alternations must be accounted for by postulating distinct, but related verb senses. The conclusion that two distinct senses are involved in this case should not be viewed as a terrible drawback, since the majority of verbs that might be considered to be candidates for both realizations only appear in one or the other (Rappaport & Levin ms).

Moreover, to the extent that the relationship between the two senses of *load* and *spray* is paralleled by other verbs, the relationship itself, represented by a link between the two senses (cf Chapter 3), may be productively extended to new cases which are similar in the relevant respects to existing cases, as suggested by Pinker (1989) (cf. chapters 3 and 5 for discussion).

2.4.2 The Possible Relations between Verbs and Constructions

The R Relation

On a constructional approach to argument structure in which the semantics of the verb classes and the semantics of the constructions are integrated to yield the semantics of particular expressions, a question arises as to what range of verb classes can be associated with a given construction.

Could *any* verb class in principle be conventionally associated with a particular construction?¹³ For example, if we accept that the ditransitive construction is directly associated with a particular semantics, roughly, X causes Y to receive Z, then why would it not be possible in principle for, say, verbs of mood, e.g. *sadden*, *anger*, *regret* to be used with the ditransitive construction, to imply the resulting emotional state:

(57) Joe angered Bob the pink slip.

“Joe gave Bob a pink slip, causing Bob to become angry.”

Obviously we would want to rule out such a possibility.

In order to circumscribe the possible types of verb classes that can be associated with particular constructions, we need to examine more closely the types of relationships that the verb's semantics may bear to the semantics of the construction.

Commonly, the event-type designated by the verb is an instance of the more general event-type designated by the construction. For example, *hand* as in:

(58) She handed him the ball.

¹³An analogous question is raised by lexical rule accounts. It can be stated: can a verb from any class be transformed into a verb of any other class?

lexically designates a type of event of transfer, and transfer is the semantics associated with the ditransitive construction . Another example of the same type is *put* as in:

(59) She put the phone on the desk.

Put lexically designates a type of event of caused-motion, and caused motion is the semantics associated with the “caused-motion” construction.

Other systematic relationships between verbs and constructional meanings have been discussed under the heading of “conflation patterns” (Talmy 1985). In our terms, conflation patterns correspond to mismatches between the semantics of the verb and the semantics designated by the construction. The mismatches can be of several types.

As had been implicit in much of the generative semantics literature (e.g. Lakoff 1965/1970, McCawley 1973), and has been more recently been recognized by Talmy 1985, Levin & Rapoport 1988, and Jackendoff 1990a, verbs which do not directly denote the meaning associated with the construction often denote the *means* by which the action is performed. This is the relationship that verbs of ballistic motion bear to the meaning of the ditransitive construction. For example,

(60) Joe kicked Bob the ball.

“Joe caused Bob to receive the ball by kicking it.”

Kicking is the means by which transfer is effected.

In the case of causative constructions, the verb designates the *result* associated with the construction. The construction in these cases supplies an agent argument

which does not fuse with any of the participant roles associated with the verb. For example, consider the Chicheŵa causative morpheme *íts*, in 61 (from Alsina & Mchombo 1990):

- (61) Nūngu i-na-phík-íts-a maūngu kwá kádzĩdzi.
9 porcupine 9s-ps-cook-CAUSE-fv 6 pumpkins to 1 owl.

“The porcupine had the pumpkins cooked by the owl.”

Alsina (to appear) analyzes this morpheme as having the following semantic representation:

- (62) CAUSE < agt PRED < ... > >

The causative morpheme is thus a construction into which the verb’s semantics (represented by PRED) integrates. This morphological construction is quite analogous semantically to the non-lexically filled English constructions that have been discussed so far. The verb stem and the causative morpheme must integrate, just as the English verb must integrate into the various English constructions.

Croft (1991) proposes a general constraint on possible conflation patterns. He suggests that “individual lexical items appear to denote only causally linked events.” (p. 160) (cf. also Matsumoto 1991 for discussion of the centrality of causality in this respect). To illustrate his point, Croft cites the following example adapted from Talmy (1985a):

- (63) The boat sailed into the cave.

He argues that the sailing manner and the implication of motion can only be conflated if the activity of sailing *causes* the motion. That is, the following is unacceptable:

(64) *The boat burned into the cave.

Example 64 cannot mean that the boat entered the cave while burning.¹⁴

Croft's claim can be restated in terms of the present account in the following way:

Causal Relation Hypothesis: The meaning designated by the verb and the meaning designated by the construction must be integrated via a (temporally contiguous) causal relationship.

Evidence supporting Croft's claim comes from distribution of verbs of sound emission with constructions that designate motion. Such verbs can freely occur when the sound is a *result* of the motion, and occurs simultaneously with the motion:

- (66) a. The wooden-legged man clumped into the room.
- b. The train screeched into the station.
- c. The fly buzzed out of the window.
- d. The truck rumbled down the street. (Levin & Rappaport 1990b)
- e. The elevator creaked up 3 flights.

E.g. the clumping noise of 66a is a result of the man's moving. Verbs of sound emission cannot be used for simple cooccurring (or characteristic) sounds, when no causal relationship is involved:

¹⁴Pinker (1989) similarly notes that Talmy's original example:

(65) The bottle floated into the cave.

cannot refer to an event in which someone carries a tub of water containing a bottle into a cave. (cf. also Carter 1988).

- (67) a. *The bird chirped out of the door.
- b. *The dog barked into the room.
- c. *The rooster crowed out of the barn.
- d. *The man laughed out of the room.

However Croft's claim is not sufficient to account for all cases. This brings us to the following section.

Violations of the Causal Relation Hypothesis

There are several types of violations of the Causal Relation Hypothesis that are allowed by particular constructions. The construction exemplified by the following:

- (68) She kicked her way out of the room.

allows verbs which designate non-causally related events, at least to a limited extent (cf chapter 9). For example, the following naturally occurring examples involve only the *manner* of motion, not the *means* of motion (cf. Levin & Rapoport 1988, Jackendoff 1990a):¹⁵

- (70) a. "I knitted my way across the Atlantic," he reveals.

¹⁵Talmy's (1985a) distinction between "means" and "manner" conflation patterns is often misinterpreted. Talmy used these terms only to distinguish verbs which primarily designate an action performed by an agent (e.g. *push*) from those that primarily designate an action of the theme (e.g. *roll*). However, most "conflation patterns" involving "manner" verbs, imply that the particular manner *is* the means of motion. For example,

- (69) The bottle rolled down the hill

can only be paraphrased as, "The bottle moved down the hill *by* rolling" and *not*: "The bottle moved down the hill *while* rolling.

- b. ...without a party to go to, he nods and winks his way through the set crammed with seaside singalongs.
- c. "...[anyone] watching would have thought he was scowling his way along the fiction shelves in pursuit of a book." (examples from Oxford University Press corpus)

Interestingly, the X's way construction tends to be used with purely manner verbs only when the manner is particularly salient and emphasized. This is reflected in the fact that a large percentage of manner cases seem to consist of two or three conjoined verbs of manner.

Returning to verbs of sound emission again, it seems that they can at least marginally be used in the motion construction when the verbs do not designate a sound resulting from the motion. In particular, if the sound is the means of identifying the path of motion, the expressions seem at least marginally acceptable:

- (71) a. ?The police car screamed down the street.
- b. ?The train whistled into the station.

The conative construction, discussed briefly in chapter 1, is a different case. The construction is exemplified by the following:

- (72) a. Ethel struck at Fred.
- b. Ethel shot at Fred.

In this case the verb designates the *intended result* of the act denoted by the construction. The semantics of the construction can be represented roughly as, X DIRECTS

ACTION AT Y. That is, Ethel does not necessarily strike Fred, but striking him is the intended result of the directed action. The construction can be represented as follows:

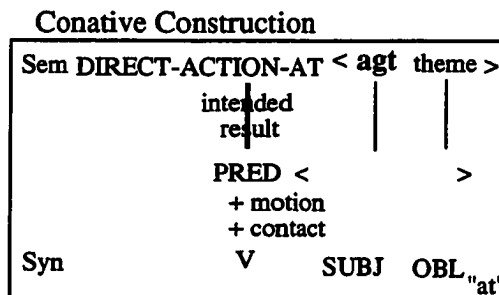


Figure 2.12

The fact that a verb that is related by the intended result relation must be [+motion, +contact] serves to allow verbs such as *shoot*, *hit*, *kick* and *cut*, while correctly ruling out verbs such as **move*(no contact) and **touch*(no motion) (Guessell et al. 1985, Laughren 1988). This constraint is captured by constraining the class of verbs which can instantiate PRED when the R relation is one of intended result.

This representation allows us to assimilate expressions such as 72a-b above to other related expressions, e.g.:

- (73) a. Fred looked at Ethel.
 b. Ethel aimed at Fred.

Look and *aim* are not [+motion, +contact] verbs, and yet they bear an obvious similarity to the cases above. The difference between the former cases and the latter cases is that in the latter, the verb's semantics is an instance of the semantics of the construction. That is, "look" and "aim" are instances of DIRECT-ACTION-AT. For example, *look* fuses with the conative construction as follows:

Composite Structure: Conative + *look*

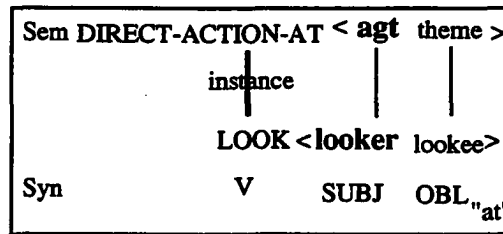


Figure 2.13

The meaning of the construction remains constant, regardless of whether the verb designates an instance or the caused-result; it is the relationship between the meaning of the verb and the meaning of the construction, i.e. the R relation, which is different. Particular R relations must be able to refer to classes of verbs in order to capture the [+motion, +contact] constraint. The general conative construction can be represented as follows:

Conative Construction

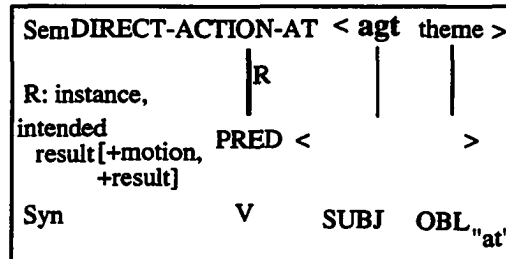


Figure 2.14

Verbs may also code particular preconditions associated with the semantics of the construction. For example, creation-verbs designate an act of creation which is a precondition for transfer. For example,

(74) Sally baked Harry a cake.

does not entail that the baking itself was causally related to the transfer. The baking does not cause the transfer, and the transfer does not cause the baking. However, the

creation of the cake is a necessary *precondition* of the transfer.

An important question is, why should these relations be privileged? Why should means, preconditions, and to a lesser extent, the manner involved in an event be more likely candidates for use in a construction which implies the entire event than the mood of one of the participants?

This deeper question is difficult to answer, but if we consider certain verbs' inherent semantics to bear a *metonymic* relationship to the semantics of the construction, we may find a partial explanation. The semantics associated with the construction defines a semantic frame, and the verb must inherently designate a particular salient aspect of that frame.

The Fusion of Roles

Matsumoto (1991) notes that when two verbs are combined to form a complex motion predicate in Japanese, they must share at least one role. He labels this constraint the Shared Participant Condition. In our terms, this constraint can be translated into the following hypothesis: that at least one participant role and argument role must be fused; i.e. not all of the argument roles can be contributed by the construction. In almost all of the cases we have seen so far, this has been the case. The one exception has been the Chichewa causative construction, analyzed by Alsina (to appear). In this case, the entire event designated by the verb and its arguments fuses with the construction, but none of the individual participant roles fuse with argument roles of the construction.

Summary of the ways the verb's and construction's semantics can be related:

Let e_C be the event type designated by the construction, and e_V be the event type designated by the verb.

I. e_V must be related to e_C in one of the following ways:

- (a) e_V may be a subtype of e_C
- (b) e_V may designate the means of e_C
- (c) e_V may designate the result of e_C
- (d) e_V may designate a precondition of e_C
- (e) to a very limited extent, e_V may designate the manner of e_C , the means of identifying e_C , the intended result of e_C

II. e_C and e_V must share at least one participant (Matsumoto 1991) or e_V itself must be an argument of e_C .

Which of these possible relationships is actually allowed by the construction is specified by the construction itself.¹⁶

¹⁶Many aspects of these conditions are similar to Matsumoto's (1991) claims about which types of verbal predicates can be combined to create a complex motion predicate in Japanese. He argues that the complex verbal form is treated as a single word (with respect to argument structure), and discusses the constraints on combinations of verbs as constraints on possible lexicalization patterns (cf. Talmy 1985a). He proposes the following constraints:

(75) An event is semantically conflated with another event in one verb only when:

- 1. the two events share at least one participant and
- 2. either:
 - (a) it is the activity or [resulting] state whose duration is co-extensive with the duration of the other event. OR

The result of integrating the verb with the construction must result in a event type, E, that is itself construable as a single event. That is, only a single event can be expressed by a single clause. Some of the constraints on exactly what this entails are discussed in chapters 7 and 8.

(b) it is the cause of the other event, or the means with which the other event is caused.

However the constraints on the Japanese complex predicate construction seem somewhat freer than the constraints on English. For example, Matsumoto cites:

(76) Boku wa mado o akete kita
I TOP window ACC open came
I came after opening a window.

noting that this example can be uttered felicitously when arriving at a coffee house after opening a window back at the office. The relationship between the opening and the arriving is only one of temporal proximity; this type of relation between e_V and e_C is not possible in English. The fact that Japanese is freer in its “conflation” patterns is likely attributable to the fact that there are two verbs in the Japanese construction.

2.5 Unexpressed Profiled Participant Roles

There are several ways in which constructions can account for profiled participant roles without fusing them with argument roles that are necessarily overtly expressed. This topic in itself could be the subject of a dissertation, and I do not claim to do the topic justice here. Several possibilities are discussed all-too-briefly in turn.

The Principle of Correspondence insures that every profiled argument is expressed unless the verb occurs in a construction which specifically shades, cuts or merges that argument. These three ways that profiled arguments can avoid being expressed are:

1. **Shading:** The term “shading” is intended to evoke the metaphor suggested by Fisher et al. (1991a), that profiling is in some ways analogous to a movie camera focusing on certain participants. Shading is a process whereby a particular participant is shaded, or put in the shadows, and thus no longer profiled. The passive construction serves to shade the most animate participant associated with the verb. “Shading” might as well have been termed “deprofiling” except that it is not necessary that the shaded participant is otherwise lexically profiled. Shading is analogous to suppression of arguments in RG, LFG and GB, although these theories do not make any claims about the semantic/pragmatic effects of passive. A *shaded* participant may be expressed by an adjunct.

Passive

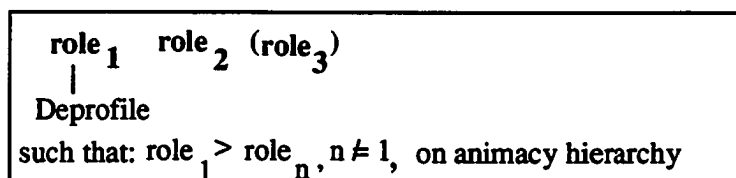


Figure 2.15

The animacy hierarchy used in the statement of the passive is taken to correspond to the following thematic hierarchy, versions of which have been proposed for example, by Fillmore 1968, Jackendoff 1972, Kiparsky 1987, and Grimshaw 1990:

agt, cause > rec, ben, exp > inst > pat, thm > loc, source, goal

The roles expressed by the hierarchy are all roles types in the sense of Dowty 1986. That is, they are more general than the verb-specific participant roles. These roles correspond to argument roles; i.e. roles associated with argument structure constructions. Since participant roles are generally instances of one or more of these roles, the hierarchy serves to define a *partial* ordering of all roles. For example, the *hitter* role is higher on the animacy hierarchy than the *hittee* role. The fact that the ordering is partial means that not all roles are ordered with respect to each other. Passive applies only to verbs which are associated with two or more roles, one of which is higher than the others in terms of animacy.

2. **Cutting:** The term “cutting” is intended to invoke a notion of a director cutting one of the participants out of the picture. Stative constructions in Bantu (Mchombo, 1992), impersonal passive constructions in Dutch (Zaenen to appear) , and the Middle Construction in English serve to *cut* a profiled participant. The difference between a shaded participant role and a *cut* participant role is that the latter cannot be expressed. For example, the agent role is cut in the English Middle Construction:

(75) *This bread cuts easily by Sarah.

3. **Role-Merging:** Reflexive constructions, e.g. in Romance serve to *merge* one participant role with another. The merged participant roles are fused with a single argument role, and are then linked with a single grammatical function.¹⁷

2.6 Conclusion

In this chapter, I have attempted to argue for some of the basic claims underlying this dissertation, and have laid out some of the machinery needed to make these claims precise. Following the discussion in chapter 1, where it was argued that constructional meaning exists independently of verb meaning, the type of semantics associated with verbs and constructions has been discussed in more detail.

Verbs, and other lexical items have been argued to be associated with rich, frame semantic knowledge. Basic sentence level constructions, or argument structure constructions, have been argued to designate scenes which are in some sense basic to human experience (cf. also Fillmore 1968, Langacker 1991). That is, it is claimed that the set of basic clause types of a language are used to encode such general event-types as someone did something to someone, something moved, someone caused something to change state, someone experienced something, someone possessed something, etc. The evidence for this claim came from certain language acquisition facts noticed by Clark (1978), Slobin (1985), and Bowerman (1989).

In addition it has argued that these basic senses are extended in various ways so that particular syntactic frames are associated with a family of related meanings.

¹⁷This sketchy analysis of reflexives is inspired by work by Alsina (1992).

This idea has been explicitly contrasted with the idea that the semantics associated with the construction is ultimately generalized, or abstracted to a single more general sense.

Finally, generalizations about the types of ways that verbs and constructions can be related have been suggested, extending observations by Talmy (1985a), Croft (1991) and Matsumoto (1991).

Chapter 3

Relations Among Constructions

The repertoire of constructions is not an unstructured set. Generalizations *across* constructions must be captured. In this chapter, several organizational principles are discussed and applied to the constructions that have been analyzed. It is argued that constructions form a network, linked by inheritance relations which serve to motivate many of the properties of particular constructions. The inheritance network allows us to capture generalizations across constructions while at the same time allowing for subregularities and exceptions.

Before explicating the nature of the relationships between the constructions we have looked at, it is important to describe the general psychological principles of language organization that will be assumed.

Psychological Principles of Language Organization

Each of the following principles is stated in terms of constructions, since constructions are the data structures in our system. All of these principles have direct

analogues in various functionalist frameworks.

I. Motivation is Maximized:

If construction A is related to construction B syntactically, then construction A is *motivated* to the degree that it is related to construction B semantically (cf. Haiman 1985a, Lakoff 1987).

II. Synonymy is Avoided: If two constructions are syntactically distinct, they must be semantically or pragmatically distinct (cf. Bolinger 1968; Haiman 1985a; Clark 1987; MacWhinney 1989). Pragmatic aspects of constructions involve the information structure of the clause, including such things as topic and focus.

Corollary I: If two constructions are syntactically distinct and S(emantically)-Synonymous \implies they must **not** be P(ragmatically)-Synonymous.

Corollary II: If two constructions are syntactically distinct and P-Synonymous \implies they must **not** be S-Synonymous.

III. Expressive Power is Maximized: The inventory of constructions must be extensive enough for communicative purposes.

IV. Economy is Maximized: Distinct constructions are minimized as much as possible, given II and III (Haiman 1985a).

In order to motivate these principles, consider the analogy Haiman (1985a) proposes between the forms of a language and a diagram such as map or a musical score.

Haiman suggests that while a map depicts geography, and a musical score depicts a melody, language depicts our construal of reality.

There are several relevant facts about diagrams. Haiman notes that in principle, every point in an ideal diagram would correspond to some point in the reality being depicted. He refers to this property as *isomorphism*, which would seem to imply that the property also entails that every point in the geography or in the musical score would correspond to a unique point on the map or musical score, respectively. Moreover, every relationship between two points on a diagram would correspond to a relationship between points in reality. This property is referred to as *motivation*. He notes that working against these two properties is the fact that diagrams are designed to simplify, so that strict adherence to these properties is not possible. That is, diagrams only need represent, not reproduce. For example, a map does not show all of the territory being represented and a musical score diagram does not uniquely determine the exact way that the music is to be played. Moreover, certain distortions exist in diagrams: Greenland is represented too largely, a low note on the treble clef is higher than a high note on the bass clef.

However, the general principles of isomorphism and motivation are preserved to a large degree: each point on a map corresponds roughly to one point in the world, each representation of a musical note corresponds to only one pitch most of the time. Also, the distance between two points on the map is generally greater when the corresponding distance in the world is greater; within the same clef, higher notes are higher than lower notes.

The analogy to natural language runs as follows. The principle of isomorphism

covers two aspects. On one hand, differences in form would imply differences in meaning (or pragmatics), which corresponds to the principle that Synonymy is Avoided (Haiman attributes this principle to Humboldt, Vendryes, Ogden and Richards, and it has been echoed more recently by among others, Bolinger 1968, Clark 1987, and MacWhinney 1989). Conversely a difference in meaning or pragmatics would lead to difference in form, which corresponds to what we have called the Principle of Expressive Power.

Noting a need for simplification, Haiman allows for deviations from isomorphism. He suggests that deviations from this rule in natural languages occur in cases of polysemy and homonymy, but that exceptions to this rule can be attributed to a general need for simplification as is the case in diagrams. This principle is captured by maximizing economy.

Therefore, while the principle of maximizing economy works to constrain the multitude of constructions, the principle of maximizing expressive power works in the opposite direction, creating the tendency for more distinct forms. That is, a maximally expressive system would have a distinct label for every distinct item in the user's world. These two principles mutually constrain each other.

With one possible exception, each of the functional principles are widely assumed and are sufficiently intuitive so that a more extended defense of them is not attempted here. However, the principle which is somewhat less widely adopted within linguistics is the principle of Maximizing Motivation. Since this principle plays an important role in the discussion of the relationships between constructions, it is worthwhile

discussing it in more detail.

3.1 Motivation

The term “motivation” was introduced into linguistics at least as early as 1916, by Saussure. In the *Cours* he provides the example of *dix-neuf* “nineteen”, noting that while the parts of this word are arbitrary signs, the complex taken as a whole is *motivated*. It is clear that it is not predictable that *dix-neuf* should take the form it does. A unique morpheme could have been introduced to signify the concept nineteen, or *neuf-dix* could have been used. Still there is an obvious sense in which the term is not arbitrary.

Motivation in this sense lies between predictability and arbitrariness. In an intuitive sense, it often constitutes explanation. If a (somewhat hapless) French child were to ask, “Why is this many [pointing to 19 things] referred to by ‘*dix-neuf*’?” a natural response would be to point out that *neuf* means “nine” and *dix* means “ten” and that nine plus ten is nineteen.

Haiman argues that making generalizations and simplifications is a necessary function of language, because it would be impossible in our finite world, with our finite memories to have distinct names for the infinite number of actual distinctions in the world. Rather than recognize an infinity of sounds and concepts, human languages recognize a finite inventory of phonemes and morphemes. In order to reveal the importance of motivation in grammar, he recounts J.L. Borges’ tale of “Funes the Memorious” (1962). Borges’ hero, Funes, has undergone an accident that has left him with a perfect memory. Funes can remember “the outlines of the foam raised by an

oar in the Rio Negro the night before the Quebracho uprising." (Borges:63) Since he has a perfect memory, he devises his own language in which every sense experience and every concept he recognizes is given a separate name: "It bothered him that a dog at 3:14 (seen from the side) should have the same name as the dog at 3:15 (seen from the front)."(p.65) Funes scorned the use of mnemonic classification: "In place of 7,013, he would say *Maximo Perez*; in place of 7,014, he would say *The railroad*...in place of five hundred, he would say *nine*."(p.64)

By rejecting principles of organization, Funes' language is not motivated. Every difference is a *complete* difference; motivation is absent to code generalizations and similarities. It is admittedly often not *predictable* which generalizations or similarities a language will encode; however, unless the necessity of motivation in a grammar is accounted for, we cannot account for the fact that Funes' language is an inconceivable human language.

Langacker(1987a) has also stressed the importance of a notion between predictability and arbitrariness. He notes that our inability to predict what pattern a language uses does not entail that the choice has no semantic basis. For example, he observes that while the fact that *scissors, pants, glasses* and *binoculars* have the form of plurals is not *predictable* from their designations, it is nonetheless motivated by the bipartite character of the type of objects the words designate (1987:47).

Lakoff (1987) suggests a precise definition for the term "motivation" in grammar. A given construction is *motivated* to the degree that its structure is inherited from other constructions in the language.

On Lakoff's (1987) account of *there*-constructions, the "based-on" relationship is

of central importance. It is said to be an asymmetric inheritance relation, so that if construction A is based on construction B, then A inherits all of B's properties that do not specifically conflict with its own specifications. Lakoff suggests that the more the properties of a given category are redundant, the more it is motivated and the better it fits into the system as a whole. An optimal system is a system that maximizes motivation. There may be many optimal grammars since motivation can be maximized in many ways.

Researchers in child language acquisition are also arguing against the idea of a strict dichotomy between predictability and arbitrariness. More and more they are advocating learning mechanisms in which there is no sharp division between obligatory rules and probabilistic tendencies (e.g. Bates and MacWhinney 1987, MacWhinney 1989, in press; Pinker 1987).

Evidence that a relationship in form aids in the acquisition of concepts which are related in meaning comes from studies of children's learning of taxonomic relations. Gelman et al. (1989) have shown that children learn the names of subordinate terms more easily when those terms are compounded with basic level terms that the child already knows. For example, children were more likely to learn the name for a new type of car when it was called a *fep-car* than when it was simply called a *fep*. This finding is not obvious, since it would seem on the face of it that the child would have to learn *more* in learning the compound term than in the uncompounded novel term. However, when motivation is taken into account as an aide in learning, the findings can be seen to be natural. Children learn new terms for concepts which are related to other concepts more easily when the new terms are systematically related to the

terms for the other concepts.¹

A recognition of the importance of motivation-like reasoning is growing in the field of Artificial Intelligence. Abduction, or reasoning to the best explanation, has been argued to be useful in attempts to model human inferences (Wilensky, 1990). Typically one must know the outcome in order to perform abduction, which distinguishes it from deduction. In critical respects, the seeking out of motivation can be understood to be abductive inferencing applied to language learning, whereas predictability corresponds to the result of applying deductive reasoning. That is, abductive reasoning involves after-the-fact inferencing to determine why a given sequence of events should have occurred as it did. The given sequence of events is not, however, a priori predictable. Similarly, while speakers cannot predict whether or to what extent two related concepts will be related formally, it is claimed that they nonetheless search for such relationships in order to “make sense of” the input forms, fitting the new forms into the network of interrelated constructions that constitutes their knowledge of language. This idea has been suggested by, for example, Bates and MacWhinney(1987), who suggest that relationships between forms, meanings, and form-meaning pairs are (unconsciously) observed and pondered in their own right. If Wilensky is right in arguing that people seek out abductive explanations, i.e. motivation, in trying to account for sequences of events, then this would give us reason to suspect that speakers might unconsciously apply the same principles in trying to acquire language.

Connectionist representations also make no sharp exhaustive division between

¹It should be pointed out that the relationship of form must be interpreted as *representing* in some way the relationship in meaning. We would not expect a relationship in meaning to be motivated by just any relationship in form. As Gelman et al. (1985) point out, compounds are a familiar way (in English and many other languages) for capturing subordinate-basic level relationships.

what is predictable and what is arbitrary, instead allowing there to be correlations of varying strength (cf. Rumelhart & McClelland 1986a, b). Individual correlations can be interpreted as motivating factors: they may influence the system in a certain direction, but they are not in isolation predictive. Such techniques have begun to be applied to linguistic phenomena. In these systems soft rules are of central importance—i.e. rules which add to the naturalness (or unnaturalness, if framed negatively) of a given expression. This idea has given rise to Harmony Theory being developed by Smolensky, Goldsmith and Prince (Smolensky 1986, Legendre et al. 1990; Goldsmith to appear. Prince & Smolensky 1991).

In connectionist networks, items of new information are more easily incorporated as variations on known information; that is, new patterns, are automatically assimilated to old patterns as much as possible. Optimization in such systems, therefore produces motivated structures.

Incorporating motivation into the grammar captures a fundamental structuralist insight which has been overlooked by most formal linguistic theories. This insight is that elements in a system influence each other even when they do not literally interact. Evidence for this kind of influence is abundant in the domain of phonology, e.g. in the phenomena of analogic extension and restoration, back formations, push and drag chains, paradigmatic leveling, and in the very fact that, to a striking degree, sound change is regular. These phenomena attest to the fact that speakers (unconsciously) seek out regularities and patterns, and they tend to impose regularities and patterns when these are not readily available.

The idea of explicitly linking constructions which are related in various ways is in accordance with what is currently known about the lexicon. Current research overwhelmingly rejects the idea that the lexicon is simply a list of unrelated facts or completely independent pieces of knowledge; instead, memory in general, and the lexicon in particular, have been shown to involve a richly interconnected web of information. In particular various psycholinguistic priming experiments have shown that form and meaning relationships between lexical items are cognitively real (e.g. Meyer and Schvaneveldt 1971, Ratcliff and McKoon 1978, Anderson 1984).

3.2 Inheritance

To capture relationships of motivation, asymmetric **normal mode inheritance** links are posited between constructions which are related both semantically and syntactically. That is, construction A motivates construction B iff B inherits from A. Inheritance allows us to capture the fact that two constructions are in some ways the same, and in some ways distinct.

The idea of using inheritance as a method of capturing generalizations originated within computer science as a way to represent data-structures in as general a way as possible (cf. Fahlman 1977/1979 Touretzky 1984/1986). Inheritance has since been found to be useful in many programming and knowledge representation systems including: FRL, KRL, KL-ONE, KODIAK, SMALLTALK, FLAVORS, LOOPS, ADA, and object-oriented LISP. By postulating abstraction hierarchies in which lower levels inherit information from higher levels, information is stored efficiently and made easily modifiable.

Inheritance is currently growing as a way to capture linguistic generalizations, for example in work by Bobrow & Webber 1980, Hudson 1984, Lakoff 1984, Flickinger, Pollard and Wasow 1985, Wilensky 1986, Pollard & Sag 1987, Jurafsky 1988 and Thomason 1992. The following inheritance system draws on aspects of each of these theories.

Following Lakoff 1984, Wilensky 1986 and Jurafsky 1992, the data structures in our system are constructions. Constructions specify which more abstract constructions they inherit from, or equivalently, to use the terminology of Wilensky 1986, which constructions **dominate** a given construction.

Notation

An inheritance relation between two constructions, C_1 and C_2 such that C_2 inherits from C_1 will be represented as follows:

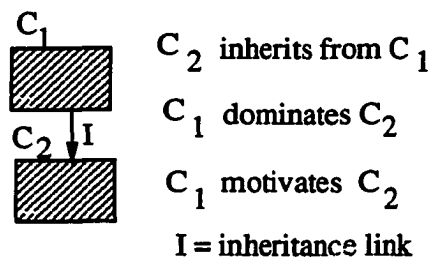


Figure 3.1

Inherited information will be represented in *italics*. That is, all information which is shared between the dominating and dominated node is italicized in the dominated construction. Because of type-script limitations, profiling (which had been represented by boldface), will not be represented if that information is inherited (the font possibilities do not allow italicized boldface).

Multiple Inheritance is Allowed

In accord with all of the linguistic applications of inheritance cited above, multiple inheritance paths are allowed. That is, inheritance systems resemble tree diagrams if each child has only one parent, but in the general case they can be “tangled” and can be represented as directed acyclic graphs (DAGs). This allows data-structures in the hierarchy to inherit from more than one dominant data-structure.

Normal Mode Inheritance

Following Flickinger, Pollard and Wasow (1985) the **normal** mode of inheritance is distinguished from the **complete** mode. The normal mode is designed to allow for subregularities and exceptions, and is the only type to be used here. In the normal mode, information is inherited from dominant nodes transitively as long as that information does not conflict with information specified by nodes lower in the inheritance hierarchy. Lakoff (1984) refers to this type of inheritance as “inheritance with overrides” in his analysis of *there*-constructions. Normal inheritance is simply a way of stating partial generalizations.

The complete mode of inheritance, which is not exploited here, is designed to capture purely taxonomic relations and constraints. In the complete mode, information specific to any node which directly or indirectly dominates a given node is inherited. Information from one node may not conflict with that of a higher dominant node, without resulting in illformedness. This is the type of inheritance normally assumed in unification-based grammars (e.g. Kay 1984).

Real Copies: Full-Entry Representations

Fahlman (1977/1979) distinguishes real copying from virtual copying of information. In real copying, dominated constructions contain all the information that the dominating constructions do: each construction is fully specified, but is *redundant* to the degree that information is inherited (i.e. is shared) by dominating constructions. This is the type of inheritance employed here. Jurafsky (1992) likens this type of inheritance to the full-entry theory of redundancy rules as opposed to the impoverished-entry theory (cf. Jackendoff 1975). That is, the inheritance mechanism of our system is not an on-line process, but is rather a static relationship of shared information (cf. also Lakoff 1984).

In virtual copying, on the other hand, dominated constructions are only partially specified. Information that is inherited is only stored with the dominating construction, from which it is inherited. Under this mechanism, inferences are computed by searching up the inheritance tree to determine the full specifications of a given construction. This type of inheritance is not exploited here.

Allowing each construction to be fully specified would seem to be an inefficient way to store information; however, this inefficiency may only be apparent, depending on the particular implementation adopted. A connectionist system could in principle capture the redundancy without inefficiency by allowing inherited information to be shared information; that is, instead of stating the specifications twice, aspects of the patterns that are inherited would be shared by two overlapping patterns. Similarly, in a symbolic system, it may be possible to avoid fully specifying particular information twice by allowing particular specifications within constructions to have pointers to other information.

3.2.1 Inheritance Links As Objects

So far we have not said how inheritance links make explicit the particular types of relations that may hold among elements of constructions. That is, inheritance links capture the fact that all non-conflicting information between two constructions related by an inheritance link is shared. However, we have not said anything about how to distinguish among various different types of relationships.

In order to make explicit the specific ways that constructions may be related, another idea from computer science is adopted, that of *object oriented design*.² In particular, the inheritance links themselves are treated as objects in our system (cf. also Wilensky 1991). That is, they, like constructions, have internal structure and are related hierarchically. Links are of several types, and each type has various subtypes. This idea is useful because various relationships among constructions reoccur in the grammar, so in order to capture the generalizations, it is useful to be able to explicitly notate inheritance links as being of specific types. Moreover, as discussed below, by treating links as objects we are able to capture the fact that extensions may be created productively.

Four major types of inheritance links are distinguished: polysemy links, metaphorical extension links, subsumption links, and instance links.

Polysemy (I_P) Links:

Polysemy links capture the nature of the semantic relationships between a particular sense of a construction and various extensions from it. The syntactic specifications

²Some authors have conflated the two notions of inheritance and object-oriented design, since they often cooccur in particular implementations. However the ideas are conceptually distinct.

of the central sense are inherited by the extensions; therefore we do not need to state linking properties for each extension—they are inherited from the linking properties of the dominating construction. The same general type of link is posited to capture morphological polysemy.

Each particular extension is related by a particular type of **I_p** link. For example, in chapter 2, it was argued that the ditransitive syntactic pattern was associated with a family of related senses, and not a single abstract sense. The following pattern of polysemy was observed:

1. “X causes Y to receive Z” (central sense)
e.g. Joe gave Sally the ball.
2. Satisfaction conditions imply: “X causes Y to receive Z”
e.g. Joe promised Bob a car.
3. “X enables Y to receive Z”
e.g. Joe permitted Chris an apple.
4. “X causes Y not to receive Z”
e.g. Joe refused Bob a cookie.
5. “X intends to cause Y to receive Z”
e.g. Joe baked Bob a cake.
6. “X acts to cause Y to receive Z at some future point in time.”
e.g. Joe bequeathed Bob a fortune.

The “caused-motion” construction has a strikingly similar pattern of polysemy:

1. "X causes Y to move Z" (central sense)

Pat pushed the piano into the room.

2. Satisfaction conditions imply: "X causes Y to move Z"

Pat ordered him into the room.

3. "X enables Y to move Z"

Pat allowed Chris into the room.

4. "X causes Y not to move from Z"

Pat blocked Chris out of the room.

5. "X helps Y to move Z"

Pat assisted Chris into the room.

In both cases, several of the extensions involve the type of family of related causal relationships discussed by Talmy (1976, 1985a, 1985b) under the rubric of "force-dynamics." In particular, enablement, resistance and aiding are concepts force-dynamically related to causation, which is associated with the central senses. Each of these concepts involve two entities which are construed as interacting via transmission of energy either in the same or in opposing directions (cf. also Jackendoff 1990a for discussion).

Extensions 2, 3 and 4 of both constructions are quite analogous. The particular verbs involved are different, but the relationship between the central sense of transfer or caused-motion and the entailments of these extensions is the same. Jackendoff 1990a has noted that the infinitive (or "equi") construction also has a remarkably similar pattern of interpretations.

At the same time, the full patterns of polysemy in the various constructions are not identical. For example, while the caused-motion construction can be used to entail “X helps Y to move Z,” no such interpretation is possible for the ditransitive construction:

(1) *She helped him the prize.

to mean “She helped him to get the prize.”

Therefore the patterns of polysemy must in general be learned for each individual construction.

Each of the extensions constitutes a minimally different construction, motivated by the central sense; i.e. each sense can be represented by a construction that is minimally different from that of the central sense. The semantic relationships are captured by a particular I_P links and all information about syntactic specifications is inherited from the central sense.

For example, the fifth extension of the ditransitive, sometimes called the “benefactive” construction, can be represented thus, with information that is inherited from the central sense italicized:

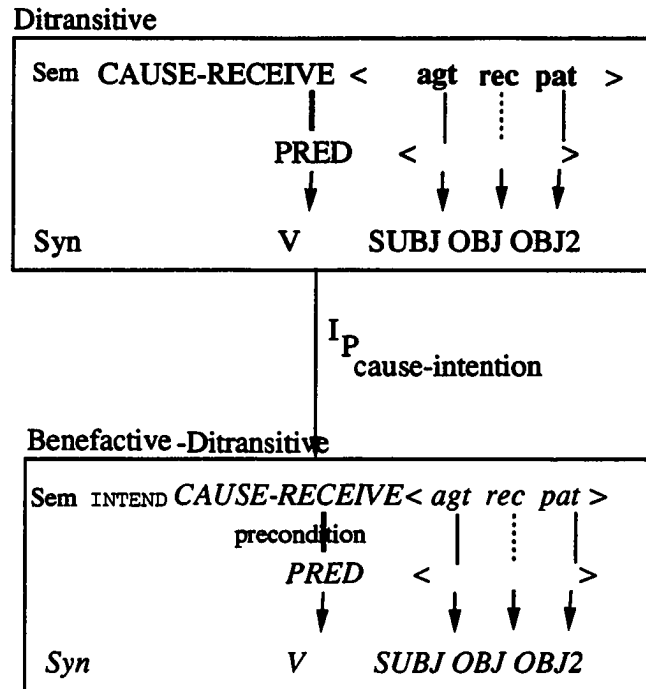


Figure 3.2

The I_P link between the central sense and the benefactive extension is one that relates causation with intended causation. It licenses expressions such as *Bob baked Mary a cake*.

Since links are objects in the present system, a particular link which recurs often throughout the grammar can be said to have a high type frequency (i.e. there are many instances of the same type of link), and is therefore predicted to be productively applied to new cases which share the particular semantic and/or syntactic factors associated with the existing cases (cf. chapter 5). That is, if a polysemy link or any other type of link occurs frequently between distinct constructions with a shared set of characteristics, then that link will be applied to newly learned constructions as a productive form of extension. In this sense, a highly recurrent motivation link is quite

analogous to a rule in that the existence of one construction will predict the existence of an extension related by the productive link.

Subsumption (I_S) links:

A subsumption link is posited when one construction is a proper subpart of another construction although it exists independently. For example, the caused-motion construction is related to the intransitive motion construction by a subsumption link. The syntactic and semantic specifications of the intransitive motion construction are subsumed by the syntactic and semantic specifications of the caused-motion construction. The subsumption link relating the resultative and intransitive resultative construction is the same subsumption link, since in both cases the transitive construction and intransitive construction are related in exactly the same way. This type of relationship is diagrammed as follows:

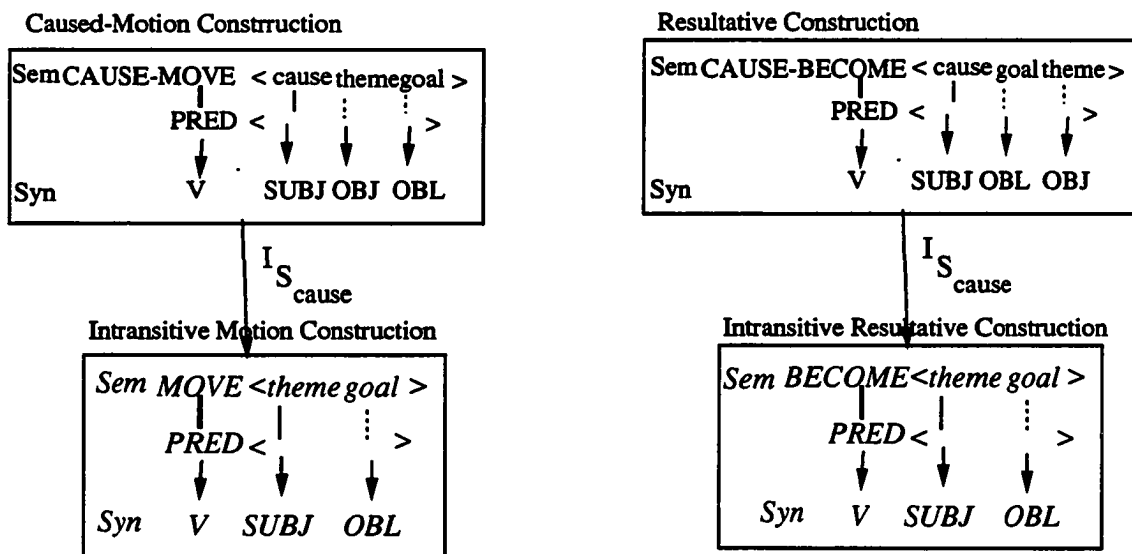


Figure 3.3

Instance (I_I) links:

Instance links are posited when a particular construction is a *special case* of another construction; that is, an instance link exists between constructions iff one construction is a more fully specified version of the other. Particular lexical items which only occur in a particular construction are instances of that construction. They lexically inherit the syntax and semantics associated with a construction. That is, these cases are treated as partially-lexically-filled instances of the construction. For example, there is a special sense of *drive* which only occurs in the resultative construction. This sense of *drive* constrains the result-goal argument to mean “crazy”:

- (2) a. Chris drove Pat mad/bonkers/bananas/crazy/over the edge.
 b. *Chris drove Pat silly/dead/angry/happy/sick.

The relationship between this sense of *drive* and the resultative construction is represented as follows:

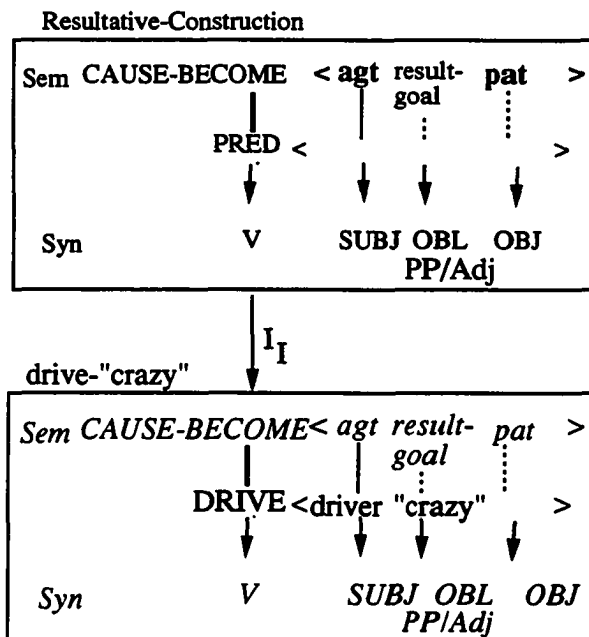


Figure 3.4

Drive's semantics is categorized to be an instance of the CAUSE-BECOME semantics of the resultative construction. Again, all inherited information is represented by *italics*.

Because of the way instance links are defined, every construction C_1 which is an instance of another construction C_2 , and thus is *dominated* by C_2 by an I_I link simultaneously *dominates* C_2 by a subsumption I_S link. That is, the resultative construction subsumes the *drive* lexical construction:

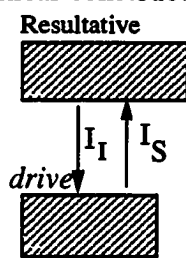


Figure 3.5

This entails that instances of a particular construction and the construction itself mutually motivate each other.³ This makes sense insofar as a productive construction is more likely to exist and, once existing, is easier to learn given the existence of several instances, while at the same time, conventionalized instances are more likely to exist given the existence of a productive construction.

Because instance links always entail an inverse subsumption link, only the instance links will be represented in the diagrams that follow.

Metaphorical extension (I_M) links:

³At the same time, subsumption links do not necessarily entail the existence of an instance link; there exist subsumption links between certain constructions which do not involve one construction being an instance of another construction. For example the “caused-motion” construction and the intransitive motion construction are related by a subsumption relation since the caused-motion construction properly subsumes the intransitive motion construction; yet the intransitive motion construction is not an instance of the caused-motion construction.

When two constructions are found to be related by a metaphorical mapping, a metaphorical extension link is posited between them. This type of link makes explicit the nature of the mapping. Thus the way that the dominating construction's semantics is mapped to the dominated construction's semantics is specified by the metaphor. By treating the links as objects, it is possible to capture relationships among systematic metaphors and ultimately relate the metaphors via an inheritance hierarchy (cf. Lakoff, to appear), quite analogous to the hierarchy of constructions. A case of a metaphorical extension is discussed in the following section.

3.3 Relating Particular Constructions

3.3.1 The Caused Motion and Resultative Constructions

In Goldberg (1991b), it is argued extensively that the resultative construction crucially involves a metaphorical interpretation of the result phrase as metaphorical type of goal. Therefore the resultative construction itself can be seen to be a metaphorical extension of the "caused-motion" construction involving literal caused motion to be discussed in chapter 7. That is, resultative construction, exemplified by 3:

(3) Pat hammered the metal flat.

is a metaphorical extension of the "caused-motion" construction, exemplified by 4:

(4) Pat threw the metal off the table.

The idea that these two constructions are related is not new. The two cases are often assumed to be instances of a single more abstract construction.⁴ The arguments

⁴L. Levin et al. (1988), as discussed by Rappaport Hovav & Levin 1991, assumes a metaphorical relationship between the two constructions, although they apparently do not provide explicit arguments for such an analysis.

from Goldberg (1991b) for a metaphorical analysis are summarized below.

The metaphorical analysis allows a wide variety of cooccurrence restrictions to be accounted for. Resultatives cannot occur with directional phrases. For example:

- (5) a. *Sam kicked Bill black and blue out of the room.
(*Sam kicked Bill out of the room black and blue.)

- b. *Sam tickled Chris silly off her chair.
(*Sam tickled Chris off her chair silly.)

At the same time, resultatives can co-occur with prepositional complements that are not directionals:

- (6) a. Lou talked himself blue in the face about his latest adventure.

- b. Joe loaded the wagon full with hay.

- c. He pried the door open with a screwdriver.

Another constraint on the occurrence of resultatives is that they cannot be applied to the theme argument of ditransitive expressions. For example:

- (7) *Joe kicked Bob a suitcase open. (meaning Joe kicked the suitcase to Bob, causing the suitcase to fly open)

Also, two distinct resultative phrases cannot co-occur:

- (8) a. *She kicked him bloody dead.

- b. *He wiped the table dry clean.

Finally as Simpson (1983) and Rappaport & Levin (1991) have pointed out, resultatives cannot occur with directed-motion verbs when used literally. For example:

- (9) a. *She ascended sick. (meaning the ascension made her sick)
b. *Jill took the child ill. (meaning the child became ill because of the traveling)

The above restrictions can be explained in the same way as the following, more straightforward example:

- (10) *Shirley sailed into the kitchen into the garden.

We need only recognize the **Unique Path (UP) constraint**: if an argument X refers to a physical object, then more than one distinct path cannot be predicated of X within a single clause. The notion of a single path entails two things: 1) X cannot be predicated to move to two distinct locations at any given time t. and 2) The motion must trace a path within a single landscape.

In the case of literal motion of an object, this constraint is unremarkable. However, the UP constraint applies not only to literal motion, but to metaphorical motion as well.

The stipulation that the motion must occur within a single landscape is meant, then, to rule out examples which would combine literal and metaphorical motion such as the following:

- (11) *The vegetables went from crunchy into the soup.

The UP constraint can be seen to be relevant to resultatives if resultatives are understood as coding a metaphorical change of location. The necessary metaphor

is a general systematic metaphor involving understanding changing state in terms of moving to a new location. The mapping involved is simply:

motion -- > change

location -- >state

English expressions reflecting this metaphor include:

- (12) The jello *went from liquid to solid* in a matter of minutes. He *couldn't manage to pull himself out of his miserable state*. No one could help her as she *slid into* madness.

By allowing that resultatives metaphorically code a change of location, and understanding the UP constraint to apply to metaphorical changes of location as well as literal ones, we can explain the co-occurrence restrictions described above. That is, a resultative would be restricted from occurring with a directional because the directional, coding a change of physical location, would code a distinct path from the change of state resultative. The argument in question would be prevented from being understood to simultaneously move to two distinct locations.

The fact that resultatives cannot occur with *arrive*, *ascend*, *bring*, and other verbs which imply a physical path stems from the fact that a change of state resultative would code a distinct path that would also be predicated of the theme argument.

At the same time, many verbs of directed-motion can be used metaphorically to code changes of state. This fact in itself is motivated by the existence of the metaphor. When used in this way, verbs of directed-motion do not code a distinct path from the change of state resultative. And, as we would expect, they can occur felicitously with

resultatives as long as a single path is designated. For example:

(13) a. He fell asleep.

(he doesn't literally fall anywhere, but metaphorically falls into sleep)

b. He went crazy.

(he does not literally go anywhere, but metaphorically moves to the state of insanity)

To summarize, we can account for the fact that resultatives cannot occur with directionals, that two resultatives cannot cooccur, that resultatives cannot occur with ditransitives, and that resultatives cannot occur with verbs of motion when used literally, but can occur with motion verbs when those verbs are used to imply a change of state by postulating that the resultative is a metaphorically interpreted goal phrase.

A metaphorical account of resultatives allows us to explain the lack of polysemy of this construction. That is, resultatives do not allow the range of extensions exhibited by the the caused-motion construction (or the ditransitive construction). The resultative cannot be used to imply an intended, or potential change of state:

(14) a. *She allowed it green.

(to mean that if she enabled it to become green.)

b. *She blocked him dead.

(to mean she prevented him from becoming dead)

Caused-motion expressions do have these extensions:

(15) a. She allowed him into the room.

(She enabled him to move into the room.)

b. She blocked him out of the room.

(She prevented him from moving into the room.)

This is accounted for on a metaphorical account, since as was discussed above, metaphorical extensions have as their source domain, the *central* sense of the construction. That is, the resultative construction is a metaphorical extension of the central sense of the caused-motion construction, which is associated with the semantics “X causes Y to move Z”. Therefore resultative expressions entail “X causes Y to become Z” and not “X enables Y to become Z” or “X intends to cause Y to become Z”, etc.

Alternative Analyses

It may be suggested that we can avoid appealing to the metaphor by reformulating the UP constraint as a target domain constraint. In this way, we might be able to avoid reference to any metaphorical interpretation of resultatives. That is, it may be suggested that the constraint can instead be stated as follows:

Unique Change of State Constraint: if an argument X refers to a physical object, then more than one distinct change of state cannot be simultaneously predicated of X within a single clause. This constraint would require that: 1) X cannot be predicated to undergo two distinct changes of state at any given time t. 2) Any sequence of changes must be understood to involve the same type of change.

In order for this formulation to account for the co-occurrence restrictions between resultatives and directionals, it would require that we consider changes of location to be instances of changing state. In this way, what had up to now been analyzed as involving two distinct paths could be reanalyzed as involving two distinct changes of state. That is, we could try to account for the data cited above without recourse to any metaphors.

However there is reason to prefer the Unique Path formulation to this one. In order for the latter formulation to be viable, we would need to consider all changes of location as instances of changing state, not only those which specify a final destination. For example in the following:

(16) Joe moved Bob toward the door.

the direct object, Bob would necessarily be understood to undergo a change of state. But if we generalize the notion of “change of state” to this degree, it seems that undergoing any kind of effect would entail a change of state. But this would entail that Bob undergoes a change of state in, for example:

(17) Joe kicked Bob.

And then the proposed Unique Change of State constraint would be violated by sentences such as:

(18) Joe kicked Bob into the room.

Moreover, it has not been argued that *all* of even the clear instances of changes of state involve the metaphor. That is, there is no evidence that I know of that simple

causative verbs involve the metaphor. For example, although *break* is a causative verb, we have no reason to think that it is necessarily understood in terms of *causing to move to a broken state*. And, if we let the UP constraint be our guide, then there is good reason to think that it does not involve the metaphor. That is, we find that *break* can occur with a literal directional:

(19) He broke the walnuts into the bowl.

For these reasons, I have chosen to retain the UP constraint in favor of a Unique Change of State constraint.

The account presented here of the co-occurrence restrictions described above can also be contrasted with two accounts that have been suggested in the literature. Simpson (1983) suggests that the co-occurrence restrictions against resultatives occurring with directionals are accounted for by the principle that only one XCOMP, or predicative complement, can appear in a given clause. This account takes both resultatives and prepositional directionals to be XCOMPs. In the case of prepositional directionals, this is a move away from their more traditional category of OBL, but it is a reasonable move since directionals can be understood to predicate the theme argument. By distinguishing directionals from other prepositional complements, Simpson's account can satisfactorily explain why resultatives can occur with other prepositional complements, but not specifically with directionals. At the same time, depictive predicates are analyzed as XADJUNCTs, and so they are not subject to the same constraint.

However, Simpson's account fails to generalize over the fact that resultatives can-

not occur with ditransitive expressions. That is, ditransitive expressions are analyzed as involving a SUBJ, an OBJ, and an OBJ θ ; the fact that the resultative XCOMP cannot be added is not explained. Moreover, this account does not generalize to account for why directed-motion verbs when used literally cannot occur with resultatives, but can when used metaphorically to code a change of state. Finally, this account has the problem of explaining why it is that two directionals can co-occur as long as a single path is designated. For example:

(20) Ken drove to LA from Pittsburgh.

Notice, we cannot readily claim in this example that a single constituent is involved because *only* can have as its focus anything in its sister constituent (McCawley 1986), and yet we find that *only* cannot have as its focus *Pittsburgh* in the following example:

(21) *Ken drove only [to LA from *Pittsburgh*.]

This fact argues strongly against *to LA from Pittsburgh* being treated as a single constituent.

The second suggestion for accounting for many of the co-occurrence restrictions cited here comes from Levin and Rappaport (1990a) who follow Tenny (1987) in arguing that resultatives act as delimiters or bounders of events, and that a clause can only be delimited once. This claim is used to account for the non-occurrence of resultatives with verbs like *arrive*. They note that *arrive* is inherently delimited because it is an achievement predicate, and cannot be delimited again by a resultative. However, both accomplishment and achievement predicates, which are inherently delimited in Tenny's sense, often occur felicitously with resultatives. For example:

- (22) a. The water froze solid. (achievement)
- b. The door closed shut. (achievement)
- c. Nina broke the walnut apart. (accomplishment)

Moreover, directionals do not always serve to delimit the event. Directionals can be used to specify a direction, without implying any endpoint or delimiting point, as in:

- (23) She kicked him toward the door.

However these non-delimiting directionals are also restricted from occurring with resultatives:

- (24) *She kicked him black and blue towards the door.

Presumably we would like to have the same constraint account for both examples 23 and 24. For these reasons, Levin and Rappaport's suggestion can be seen to be inadequate.

One might think that once we decide that resultatives are a metaphorical extension of the caused-motion construction, nothing more needs to be said. However, there are several reasons for distinguishing the resultative and the caused-motion constructions as two related but distinct constructions. One reason to keep the constructions distinct is that certain verbs are compatible with only one or the other construction.

For example, *make* only occurs in the resultative construction:⁵

⁵At least one verb, *render* seems to further require that the resultative phrase be an adjective:

- (25) a. The catastrophe rendered her helpless/ineffectual/impotent.

(26) a. It made him sick/into a better man.

b. ?*It made him into the room.

Move, on the other hand, cannot occur with the resultative construction:

(27) a. He moved it onto the top shelf/away.

b. *He moved it black.

Moreover, it will be argued in Chapter 8 that resultatives can only apply to arguments which potentially undergo a change of state as a result of the action denoted by the verb, i.e. resultatives can only apply to arguments which can be categorized as *patient* arguments. This constraint alone serves to distinguish resultatives from caused-motion expressions. Directionals do not require that the argument which they predicate be a patient, but only that the argument be a theme:

(28) a. Joe moved it onto the table.

b. Joe ran out of the room.

That these arguments are not patients can be demonstrated by their failure to pass Lakoff's (1963/1976) test for patienthood:

(29) a. ?? What Joe did to it was he moved it.

b. ?? What happened to Joe was he ran.

b. *The catastrophe rendered her out of commission.

This at first led me to consider that a further division should be drawn between adjectival and prepositional resultative phrases; however, *render* appears to be an isolated case, which can be captured by a lexical stipulation. In particular, the lexical entry for *render* will specifically link the result-goal argument to an AP.

In addition, resultatives are subject to several specific constraints that do not hold of caused-motion expressions. For example, it will be argued that there is a constraint on resultatives that they must code an end of scale (section 8.7). The same is not true of directionals:

(30) a. He threw it towards the door.

b. He put it near the table.

Capturing the Relationship

We can represent the relationship between the two constructions as follows:

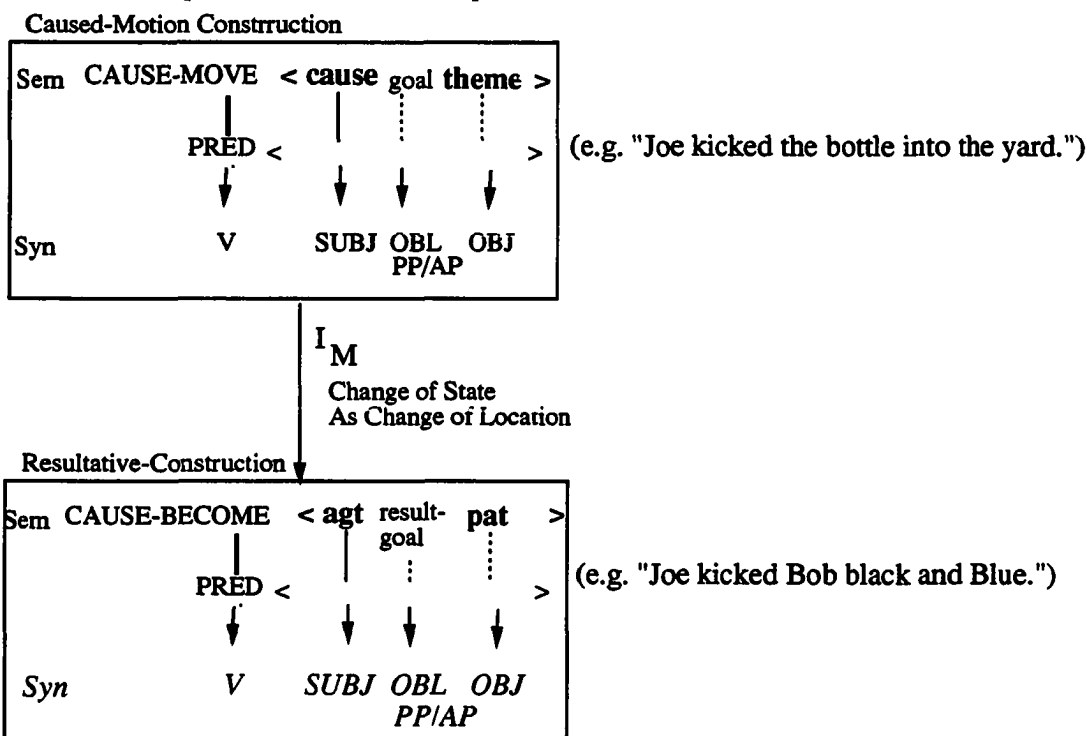


Figure 3.6

Metaphorical extension inheritance links, or I_M -links, as noted above are a certain type of inheritance link: The metaphor, in this case, Change of State As Change of Location, accounts for the relation between the semantics of the two constructions.

The syntactic specifications of the metaphorical extension are inherited from the Caused-Motion Construction.

3.3.2 The Ditransitive and Prepositional Paraphrases

Many ditransitive expressions can be paraphrased using either *to*:

(31) a. John gave Mary an apple.

b. John gave an apple to Mary.

The question that arises, on the account presented here, is not whether verbs are allowed to undergo a lexical or syntactic rule that alters its semantic structure or its subcategorization frame, as it is typically taken to be. Rather, the question becomes: how are the semantics of the independent constructions related such that the classes of verbs associated with one overlap with the classes of verbs associated with another? The answer to this question is the subject of this section.

There is a metaphor that involves understanding possession as being located next to, transferring an entity to a recipient as causing the entity to move to that recipient, and transferring ownership away from a possessor as taking that entity away from the possessor. Evidence for the existence of such a metaphor includes:

(32) They *took* his house *away* from him. He *lost* his house. Suddenly several thousand dollars *came into* his possession.

As has previously been suggested by Gruber (1965) and Jackendoff (1972), this metaphor, which we might call, Transfer of Ownership as Physical Transfer motivates

expressions such as:⁶

(33) The judge awarded custody to Bill.

(34) Bill gave his house to the Moonies.

This metaphor is motivated by the fact that giving prototypically correlates with movement from a possessor to a recipient; however it is clear that such motion is not literally implied by the transference of ownership examples 33-34. Custody does not literally move from the judge to Bill, and neither does the house literally move to the Moonies.

The relationship between the caused-motion construction and this metaphorical extension can be represented as follows:

⁶Gruber and Jackendoff do not actually refer to metaphor. Instead they propose that the domains of ownership and physical transfer share an abstract schema (see also Langacker 1987a for a similar view). An approach involving metaphors is preferred here because of the asymmetric nature of the relationship between change of ownership and physical transfer. While we find many words which are "basically" associated with physical motion being used in the domain of change of ownership, we do not find instances of the reverse. Moreover, physical transfer is more directly understood than the more abstract domain of transfer of ownership in that the former is directly perceivable. See Lakoff and Johnson 1980 for further arguments against an abstractionist account of similar phenomena.

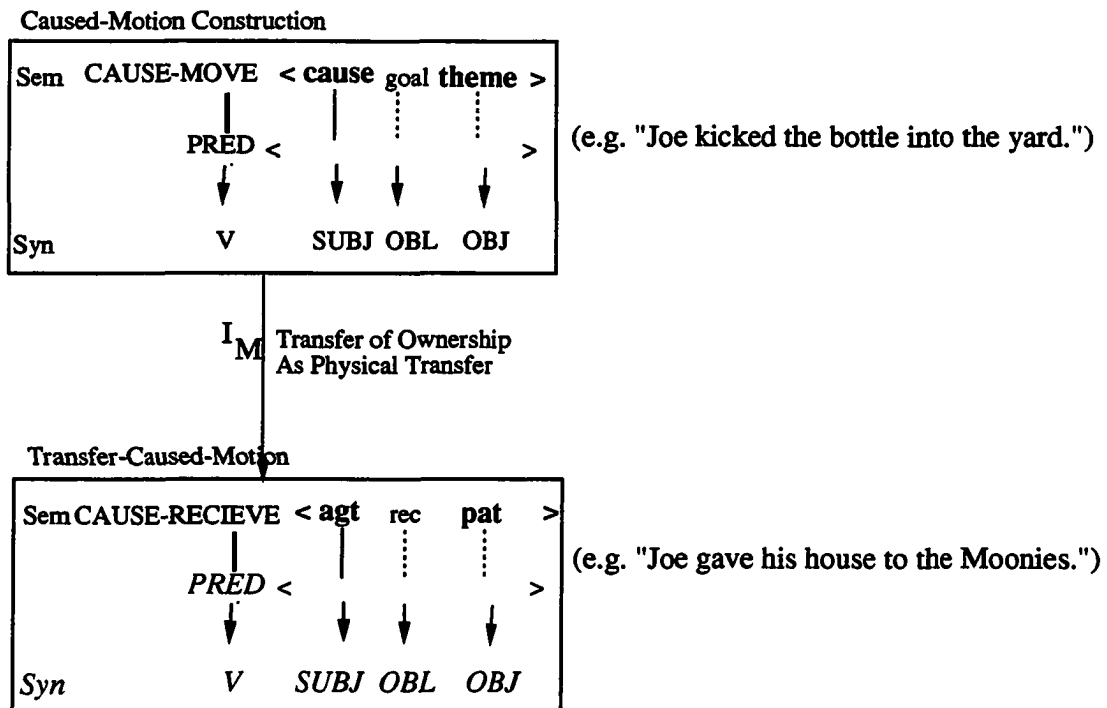


Figure 3.7

The metaphor allows the caused-motion construction to be used to encode the transfer of possession. This is just the semantics associated with the ditransitive construction (cf. Chapter 2). We can represent the relationship between the metaphorical extension and the ditransitive with the following diagram:

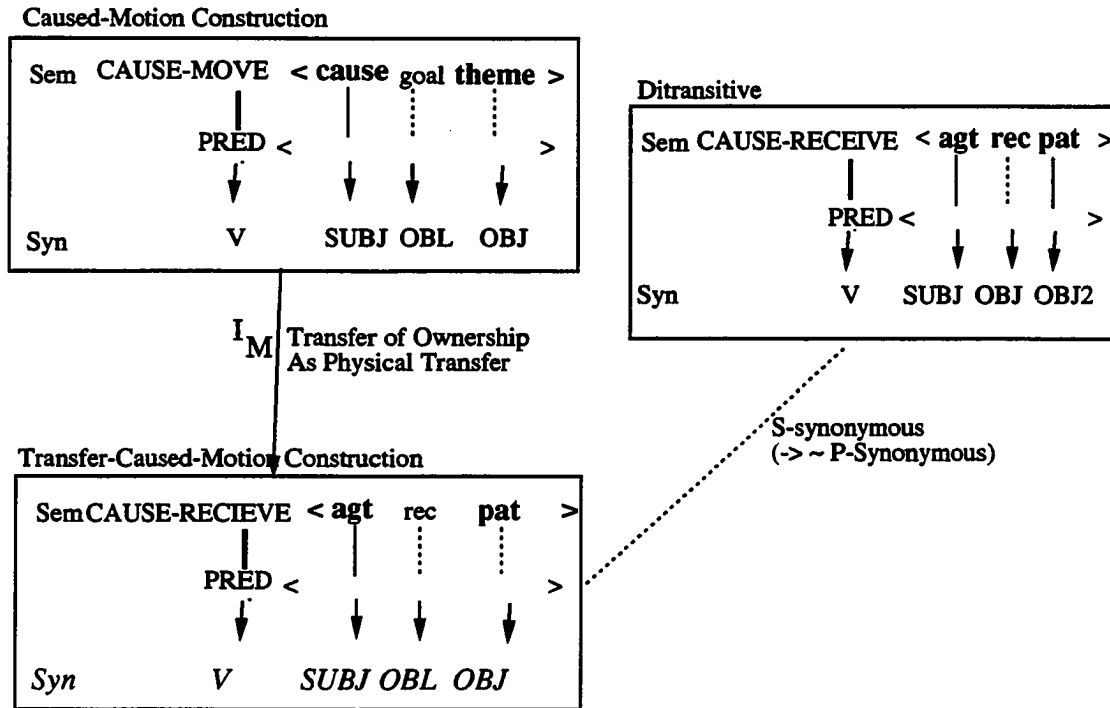


Figure 3.8

The semantic extension (via metaphor) of the caused-motion construction is S(emantically) synonymous with the ditransitive construction.⁷ Since the ditransitive construction and the caused-motion construction are not related syntactically, their semantic synonymy does not constitute a motivation link (it is represented by a dashed line in the diagram above).

By corollary I of the Principle of Avoiding Synonymy, the two constructions must not be P(ragmatically)-synonymous. That is, a semantic synonymy between two constructions implies a pragmatic difference. And in fact, such a pragmatic difference does exist.

⁷They do differ in whether the recipient argument role of the construction is profiled or not—i.e. whether it is expressed by a direct grammatical function; however they are semantically the same in designating “X causes Y to receive Z.”

Erteschik-Shir (1979) argues that the ditransitive construction is used when the recipient is non-focused or non-“dominant” (to use Erteschik-Shir’s terminology), commonly being encoded by a personal pronoun; the transferred object tends to be the focus, commonly being encoded by an indefinite noun phrase.⁸ When these constraints are violated, the expressions are infelicitous:

(35) a. #She gave an old man it.

b. (She gave it to an old man.)

(36) a. #He sold a slave-trader her.

b. (He sold her to a slave-trader.)

On the other hand, the metaphorical extension of the caused-motion construction is used when the focus is on the goal or recipient. For instance, example 37a is odd because the transferred object (the house) is the focused information and the recipient is non-focused.

(37) a. #Mary gave a brand new house to him.

b. (Mary gave him a brand new house.)

Note examples such as the following are acceptable even though the transferred object is focused and the recipient is non-focused:

⁸A definition of focus that is adequate for our purposes is found in Halliday (1967):

Information focus is one kind of emphasis, that whereby the speaker marks out a part...of a message block as that which he wishes to be interpreted as informative. What is focal is “new” information; not in the sense that it cannot have been previously mentioned, although it is often the case that it has not been, but in the sense that the speaker presents it as not being recoverable from the preceding discourse (1967:204).

Cf. Lambrecht (1986) for recent thorough discussion of this notion.

(38) Sally threw a football to him.

(39) Sally handed a scented letter to him.

However these cases imply physical motion as well as metaphorical motion. That is, these cases imply that the football or the letter actually *moves* from Sally to the recipient. Therefore these cases do not require the metaphorical extension of the caused-motion construction but can be based on the literal caused-motion construction itself. Since the ditransitive construction is not S-synonymous with the literal caused-motion construction, no difference in pragmatics is required by the system and no particular pragmatics is claimed here.⁹

It is argued that expressions such as

(40) a. She gave a great new house to him.

are odd, since no literal motion is implied and the transferred entity is focused, the recipient, non-focused. We can represent the difference between the ditransitive construction and the metaphorical extension of the caused-motion construction as follows:

⁹Although 38 and 39 are acceptable, they seem to be slightly less preferred than their ditransitive counterparts, indicating that the “caused-motion” construction generally tends to prefer the goal argument to be focused, and the transferred object, non-focused.

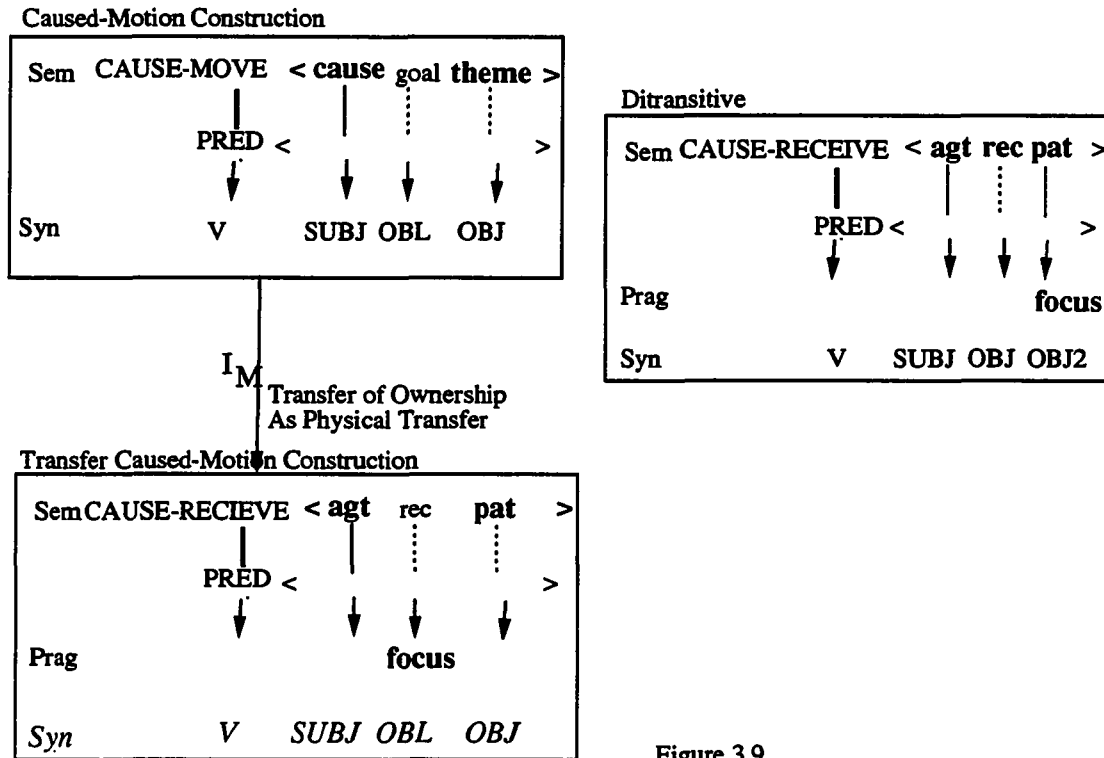


Figure 3.9

The difference in pragmatic structure between the metaphorical extension of the caused-motion construction and the ditransitive construction can be used to explain the puzzle as to why some metaphorical extensions are not felicitous in the prepositional construction. Typically, systematic metaphors whose source domains are compatible with the semantics of a construction license expressions which instantiate the construction. That is, general metaphors apply to constructions which have the relevant semantics.¹⁰

However there are potential metaphorical extensions which do not occur. For example, we have a metaphor that involves understanding an action directed at a

¹⁰This is of course not to say that *every* potential instance of a systematic metaphor can appear in a particular construction, but only that the particular instances which are otherwise conventional will occur in the construction, as long as the semantic and pragmatic conditions are satisfied.

person as an object given to the person. This metaphor is evidenced by the following sorts of examples:

(41) She *threw* him a parting glance. She *shot* him a keep-quiet look. She *gave* him a wink/kiss/wave/finger/bow. She *let* him *have it*.

Notice that this metaphor is somewhat productive:

(42) Bob gave Joe a nudge/a jab/a karate kick to the jaw/a high five/a peck on the cheek.

That is, it is not necessary for the speaker to have heard each of these expressions in order for him to spontaneously generate them or recognize them as acceptable sentences of English. However, we will need to constrain the use of the metaphor to prevent the following a) expressions that involve the caused-motion construction:

(43) a. *She gave a kick to him.

b. (She gave him a kick.)

(44) a. *She gave a kiss to him.

b. (She gave him a kiss.)

(45) a. *She threw a parting glance to him.

b. (She threw him a parting glance).

Similarly, although we have a metaphor, Causation is Physical Transfer, as evidenced by:

(46) The idea *presented* her with an opportunity. The missed ball *handed* his opponent an opportunity on a silver platter. The noise *gave* me a headache. The music *lent* the party a festive air.

the following are not acceptable:

(47) a. *She gave a headache to him.

b. (She gave him a headache).

(48) a. *The trial gave a lot of grief to her.

b. (The trial gave her a lot of grief.)

The fact that these metaphorical extensions cannot readily occur with the prepositional construction can be attributed to a difference in their pragmatic specifications. Metaphorical expressions such as *give a kick* focus attention on the action denoted by the nominal, e.g. *a kick*. This is, in fact, what distinguishes *give a kick* from the verbal form *kick*, which can readily be used when the focus is not on the action performed. Similarly in the metaphorical expressions involving the effecting of some result, the result is typically new or focused information. Therefore the pragmatic properties of the ditransitive argument structure are particularly well suited to expressions such as *give a kick* or *give a headache*, while the pragmatics associated with the caused-motion construction are less well suited.¹¹ That is, the metaphorical extension is

¹¹It is true that 43a-45 and 47a-48a are more marked than 40. This might be because 40, repeated here:

(49) #She gave a great new house to him.

is sufficiently like the non-metaphorical case:

(50) She gave a nickel to him.

that it is less noticeably an instance of metaphorical extension.

better motivated as an extension of the ditransitive construction, since it can inherit more information; in particular, it can inherit the specification that the action (the metaphorical “transferred thing”), and not the recipient the focused element:

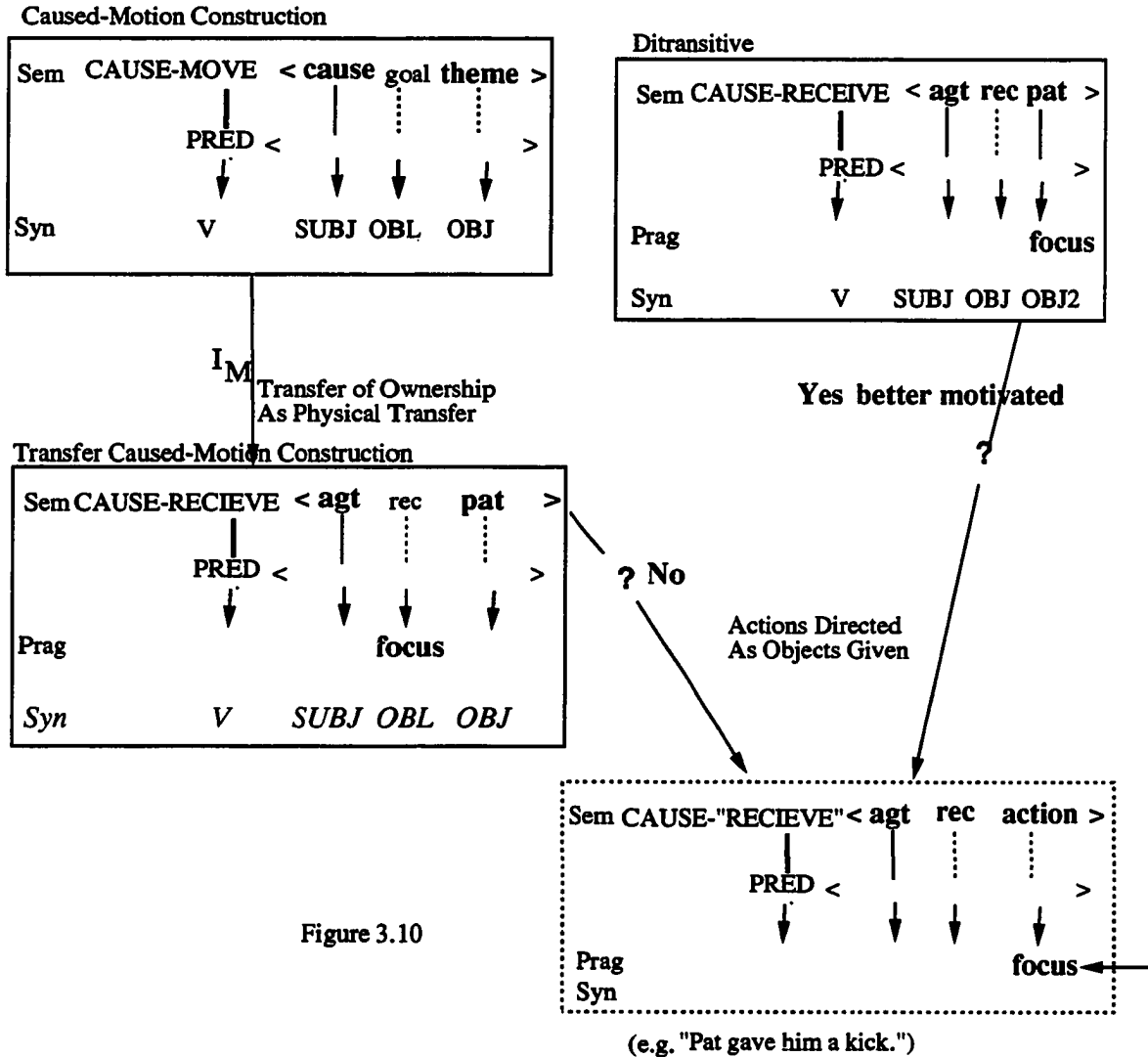


Figure 3.10

Notice that the metaphors can be expressed in the caused-motion construction when the information structure is made more compatible:

(51) When your father comes home, he's really going to give it to you.

(52) Bill gave Mary a kiss and she was so happy that she gave one to everyone she ran into that day.

Thus we find that whether the information structure of the metaphorical expressions is compatible with the information structure of the particular constructions or not plays a role in whether the particular metaphorical instance is felicitously expressed in that particular construction. Therefore the reason why certain metaphorical expressions are not readily expressed in the metaphorical extension of the caused motion construction despite the fact that they readily occur in the ditransitive construction is attributable to the difference in pragmatics between the two constructions.

3.4 Generalizations Across Constructions

The following is a diagram of all the relationships discussed so far in this chapter:

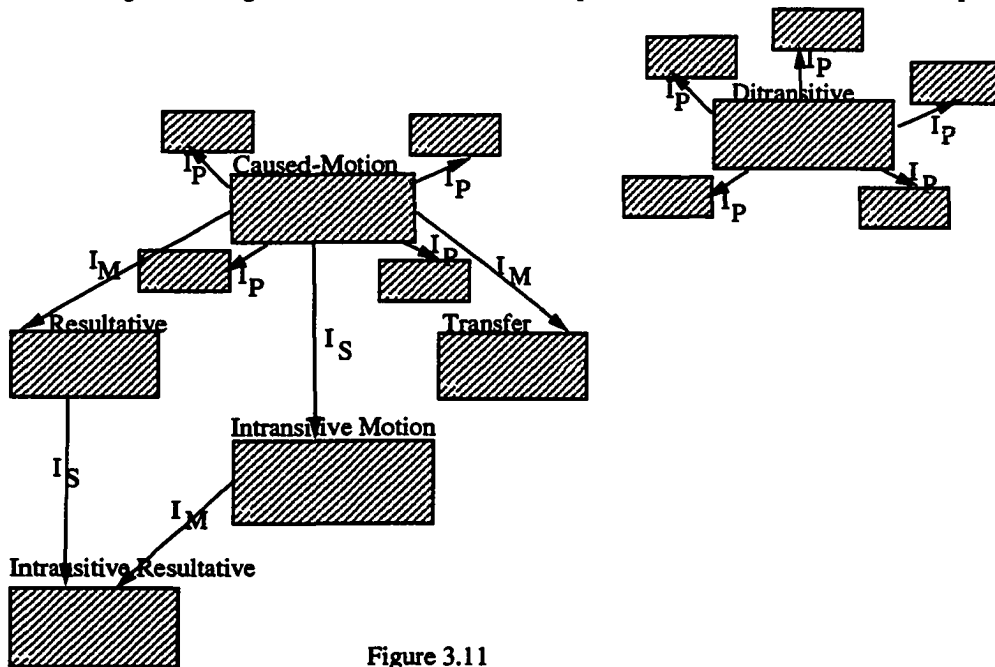


Figure 3.11

Leaving the polysemy and metaphorical extensions out of the diagram, we can

represent some of the more general relationships among constructions as follows:

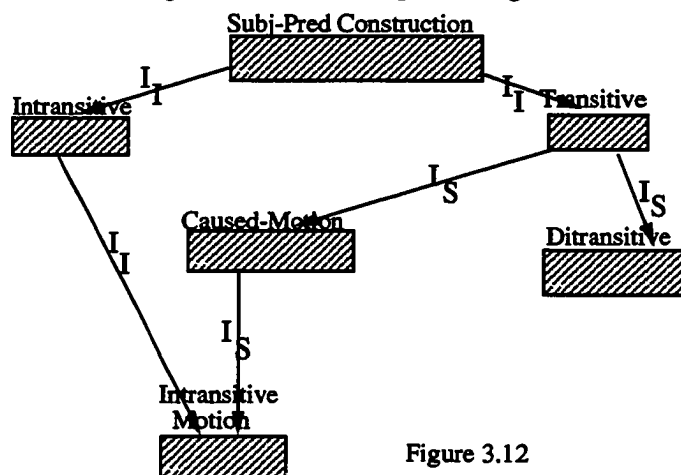


Figure 3.12

Generalizations across constructions concerning word order facts, case-marking properties, linking between semantics and grammatical functions can all be captured by stating the generalization at a relevantly high node in the hierarchy of constructions. Thus, such generalizations are inherited through dominated constructions, unless a particular construction specifically prevents such inheritance by having a conflicting specification.

For example, the fact that English is an SVO language can be captured by specifying a word order constraint on the top node of the diagram, at the level of the subject-predicate construction. Certain constructions further down the inheritance hierarchy, such as the topicalization construction (not shown), can override the word order constraint by a construction-specific constraint. Subregularities are captured similarly by stating a generalization at a node intermediate on the hierarchy.

Linking generalizations, for example those proposed by Foley & Van Valin (1984) or Dowty (1991), to the effect that if there is a SUBJ and an OBJ, then the role that is more agent-like, the “Actor” or “proto-Agent” is linked with SUBJ and the

“Undergoer” or “proto-Patient” role is linked with OBJ, can be captured by specifying these linking rules within a skeletal Transitive Construction, and allowing other constructions to inherit from this construction.¹²

In syntactically ergative languages, (e.g. Dyirbal (Dixon 1972), certain Mayan languages including Mam(England 1983), and Quiche (Trechsel 1982)), the Transitive Construction has the reverse linking, so that SUBJ is linked with the proto-Patient role and OBJ is linked with the proto-Agent role; these linkings are then inherited by other constructions as long as those constructions’ specifications do not conflict.

Thus the inheritance hierarchy allows us to capture generalizations, while at the same time allowing for exceptions and subregularities.

3.4.1 Multiple Inheritance

Multiple inheritance allows us to capture the fact that instances of some construction types seem to resist being uniquely categorized in a natural way (cf. Borkin 1984; Lakoff 1984). For example, Bolinger (1971) has observed that some instances of the resultative construction pass the test often used as a criterion for the verb + particle construction, in that the resultative phrase can occur either before or after the postverbal NP. He cites examples such as the following:

(53) a. He cut short the speech.

b. He cut the speech short.

(54) a. Break the cask open.

¹²I am assuming here that there is more than one transitive construction, to allow for expressions with the same overt form, but which do not involve an Actor and an Undergoer (e.g. stative verbs *have*, *know*, *see*).

b. Break open the cask.

One might be tempted to simply collapse the distinction between resultatives and verb + particles to account for this overlap. However, this move would simply replace one question with several new questions—why is it that the majority of resultative expressions cannot occur with the resultative phrase before the postverbal NP:

(55) a. *He talked hoarse himself.

b. *He hammered flat the metal.

c. *He closed shut the door.

Moreover, the verb + particle construction allows particles with an aspectual interpretation, which do not predicate the NP argument:

(56) a. He cleaned the mess up.

\neq The mess is up.

On our account examples such as 53-54 are understood to inherit from two independently existing constructions:

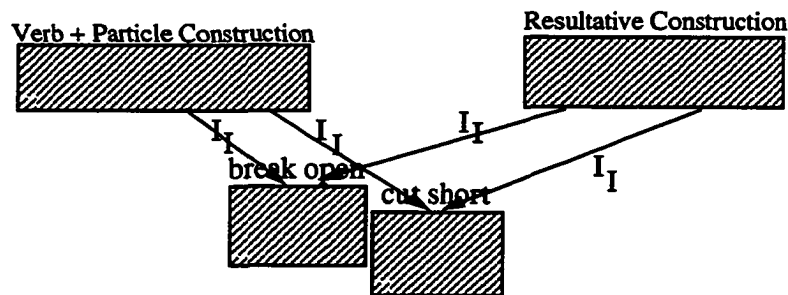


Figure 3.13

Allowing multiple normal mode inheritance links raises the issue of the need for conflict resolution rules. That is, a particular construction may inherit from two other

constructions which have conflicting specifications; normal mode inheritance allows for partial inheritance of information when the dominated construction itself has conflicting specifications, but conflict resolution rules would seem to be required for cases in which two or more dominating constructions have conflicting specifications in order to determine which if any of the specifications are inherited.

However, this issue is only relevant if we conceive of inheritance as an on-line process that is used to predict the specifications of a dominated construction given those of the dominating construction. If instead, as discussed above, each construction is fully specified, any conflict is resolved by an overt specification in the dominated construction.

3.4.2 Inheritance within Constructions

Constituents of constructions are also treated as objects in our system, i.e. constructions, and can therefore inherit from other constructions as well (cf. Wilensky 1986). For example, many clausal constructions will have a slot for a OBJ grammatical function. Since we allow the constituents to be constructions themselves, generalizations across constructions as to the semantic and/or syntactic representation of the direct object construction can be captured by allowing the OBJ function in particular constructions to inherit from a free-standing OBJ construction.

The special sense of *drive* that occurs in the resultative construction inherits from the basic sense of *drive* since the two senses are related via the metaphor, Change of State As Change of Location described above. Thus a I_M link is posited between them:

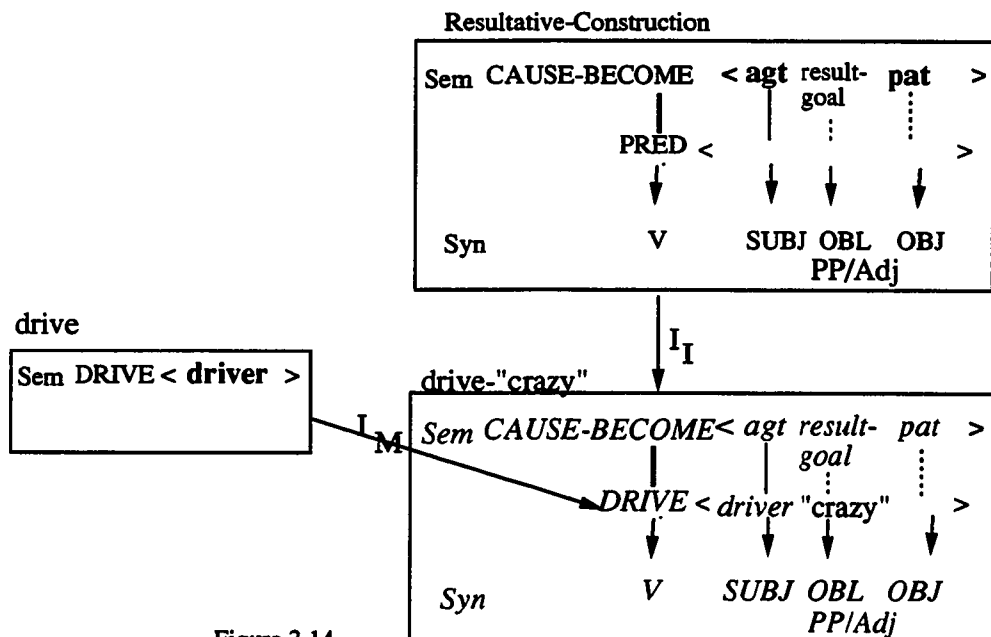


Figure 3.14

3.5 Conclusion

In this chapter, it has been argued that generalizations about relationships among constructions can be captured by conceiving of the entire collection of constructions as forming a lattice, with individual constructions related by specific types of asymmetric normal mode inheritance links. If construction A inherits information from construction B, then B *motivates* A.

Cases of systematically related form and systematically related meaning are related by inheritance links. The input and output of some traditional lexical rules are related by inheritance links—for example the causative and inchoative versions of constructions. In addition, other cases, not normally related by lexical rule are similarly related by inheritance links. For example, the “caused-motion” construction:

(57) She kicked him out of the room.

is related to the resultative:

(58) She kicked him black and blue.

by an I_M link. That is, the metaphor Change of State as Change of Location, discussed above, constitutes the systematic relationship between form and meaning, i.e. the inheritance link. In other words, the resultative construction is motivated by the caused-motion construction.

Constructions with different form, although the same or closely related meaning, are not related by motivation links. For example, *kill* and *die*, although semantically related, are not related directly by an inheritance link. Similarly, the ditransitive construction and prepositional paraphrases are not related by an inheritance link. That is, neither case motivates the other.

By allowing inheritance to hold of constituents internal to particular constructions, we can capture generalizations about the internal structure of constructions. By allowing multiple inheritance we account for instances which appear to be simultaneously motivated by two distinct constructions.

Moreover, the links themselves are objects in the system, and so they too can inherit from other cases. For example, metaphors which constitute links between constructions can themselves be captured via an inheritance hierarchy (cf. Lakoff, to appear). Also, by treating links as objects, particular links can be said to have different type frequencies, depending on how many distinct constructions they relate. A particular link which recurs often throughout the grammar therefore has a high type frequency, and is discussed in chapter 5, is predicted to be productively applied to

new cases which share the particular semantic and/or syntactic factors associated with the existing cases. That is, if a link relating pairs of constructions occurs frequently, then that link will be applied to newly learned pairs of constructions which share semantic and/or syntactic characteristics with the existing cases as a productive form of extension. In this sense, a highly recurrent motivation link is analogous to a rule: the existence of one construction will predict the existence of an extension related by the productive link.

Generalizations about the way that arguments are mapped to syntactic structure are captured by attaching such mapping information high in the hierarchy of constructions. Subregularities are captured by information lower in the hierarchy.

Chapter 4

In a Larger Context

In this chapter, several proposals for accounting for the relationship between lexical semantics and overt complement configurations are discussed, and compared with the present proposal. Unfortunately, because of the vast literature on the topic, many relevant proposals are not discussed in detail, and I fear some are not even mentioned. In the first section, approaches which involve syntactic transformation or derivation are discussed in no-doubt too-broad strokes in order to situate the current proposal within an historical perspective. In subsequent sections, several recent lexical rule approaches are discussed, and finally the current proposal is contrasted with the closely related proposals by Jackendoff (1990a), Wierzbicka (1988) and the framework of Montague Grammar (Montague 1973).

4.1 Transformational Theories of Argument Structure

In an effort to constrain the application of potentially all-powerful transformations as conceived by Chomsky (1957), Katz and Postal(1964) hypothesized that transformations be constrained so that they necessarily preserve meaning. Thus the deep structure of a sentence would mirror the semantic structure of a sentence. Generative Semanticists (e.g. Lakoff 1968, 1972; Langacker 1969; McCawley 1973; Keenan 1972; Dowty 1972) accepted the hypothesis that transformations preserve meaning and extended it to the position that all and only sentences which are paraphrases of each other should have the same deep structures. Thus upon observing that two sentences bore the same (truth-functional) meaning, researchers set out to derive the two sentences from the same underlying form.

Lakoff (1965/1970) and Hall Partee (1965/1979) presented some of the earliest attempts to account for the systematic relationship between active simple sentences with systematically related semantics. Lakoff proposed deriving 1b from 1a by an optional FLIP transformation:

(1) a. I like it.

b. It pleases me.

Hall Partee suggested deriving sentences such as 2b from from structures similar to 2a by an optional transformation:

(2) a. John smeared paint on the wall.

b. John smeared the wall with paint. (1965/1979: 85)

She also proposed a transformational relationship between:

(3) a. John annoyed Mary with his persistence.

b. John's persistence annoyed Mary.(1965/1979:36)

Fillmore (1971) proposed deriving caused motion expressions such as *I hit the ball over the fence* from from an underlying structure consisting of two propositions, roughly captured by "My hitting the ball caused it to go over the fence."

Lakoff (1963/1976) and Lakoff & Ross (1967/1976), giving rise to the tradition of Generative Semantics, proposed that semantic structures actually underlie syntactic structures, and that the base component of grammar generate the set of well-formed semantic structures. A large body of analyses developed this proposal which essentially argued that semantic structure needed to be taken into account in order to predict surface structure (e.g. Lakoff 1965/1970, 1968, 1970b; Fillmore 1968; R.Lakoff 1968; McCawley 1968a,b, 1972, Ross 1969, 1970).

The idea that two forms with the same semantics should be identified at some level of representation has more recently been made explicit within the theory of Relational Grammar. Perlmutter & Postal(1983a) have proposed the Universal Alignment Hypothesis (UAH):

There exists some set of universal principles which will map the semantic representation of a clause onto the initial grammatical relations.

Although the UAH is not uncontroversial (cf. Rosen 1984), a more specific version

of it has been echoed within the Government and Binding Theory in Baker(1988)'s Universal Theta Assignment Hypothesis: (UTAH)

Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure.

The more recent proposals are somewhat more constrained than Generative Semantics analyses, because transformations or derivations are generally taken to be relevant only in cases of of (reasonably) productive morphology (e.g. Baker 1988).¹

Although these theories differ in many substantive ways, they share the assumption that morphologically-related, (truth-functionally) synonymous sentences must share a level of representation. This assumption has guided much of the work in transformational or derivational accounts of argument structure expression, in that arguments for transformations often run as follows: because the initial level of representation must be the same for all synonymous sentences, if two synonymous expressions are distinct on the surface, one or both must be derived from a shared level of representation.

Early Generative Semantics, and more recent RG and GB theories share the important insight that semantics plays a crucial role in determining structure. Lakoff states this insight thus: "syntax and semantics cannot be separated and the role of transformations and of derivational constraints in general, is to relate semantic representations and surface structures." (1969:note 1:65)

¹However, as Van Valin (to appear), points out, what counts as "reasonably productive morphology" is not adequately defined, since Baker suggests that the output of an incorporation transformation can be regular, irregular or even suppletive morphologically.

What counts as synonymous

Many of the early proponents of transformations noted semantic differences between forms that were taken to be derived from the same underlying structure (e.g. Hall Partee 1965/1979, Fillmore 1968). They assumed, however, that complete synonymy was not required in order to posit an underlying level of shared representation.

Oftentimes a notion of truth-functional synonymy was and is invoked as the criterion for relating two forms (e.g. Hall Partee 1971). However, with the growing recognition that many aspects of what is intuitively called “meaning” are not captured by truth-conditions alone (cf. Fillmore 1975; Fauconnier 1985; Jackendoff 1983; Lakoff 1977, 1987; Langacker 1987a; Pinker 1989; Talmy 1978, 1985a),² it is not at all clear why truth-conditional synonymy should have a privileged status in grammar.

In any case, many expressions commonly related by transformation do not have identical truth conditions. For example, the semantic difference between the following results in a difference in truth conditions:

- (4) a. He sprayed the wall with paint.
b. He sprayed paint onto the wall.

Only in 4a is it entailed that the wall is somehow “holistically” affected by the paint-spraying (Anderson 1971). That is, 4b can be used felicitously in a context in which only a drop of clear paint is sprayed on the wall, although the wall may not be affected in any way by the paint; 4a on the other hand requires a context in which the wall is

²Since the world is necessarily filtered through our cognitive and perceptual apparatus, all we really have access to are *construals* of situations. This idea is by no means new, and extends at least as far back as Kant and Hobbs.

interpreted as holistically affected—the most natural interpretation is that the wall is covered with paint.

Similarly, the following examples adapted from Baker (1988) involve a difference in meaning although they are claimed to be related transformationally:

(5) Mayi a-nachit-its-a kuti mtsuko u-gw-e.

woman 3sg-ps-do-CAUSE-mood that waterpot 3sg-fall-mood

“The woman made the waterpot fall.

(6) Mayi a-na-gw-ets-a mtsuko

woman 3sg-ps-fall-CAUSE-mood waterpot.

“The woman felled the waterpot.”

As Van Valin (ms) notes, the two sentences are not synonymous in that only 6 entails that the causation is “direct.” That is, 5 does not entail 6. In particular, Mchombo (p.c.) observes that 5 could be felicitously uttered in the context that a woman was chasing her daughter, and the daughter stumbled over the waterpot as she tried to run away. 6 cannot be felicitously uttered in the same context; 6 requires that the woman actually makes physical contact with the waterpot.³

Semantic differences, when acknowledged, have been accounted for by positing semantic constraints on the application of transformations (cf e.g. Lakoff 1965/1970; R.Lakoff 1968). However, while adding semantic constraints to syntactic transformations can capture semantic differences, the *motivation* for postulating syntactic

³Baker does not seem to recognize the difference in interpretation between these two sentences, since citing Fodor 1970, he explicitly rejects analyzing *kill* from an underlying *cause to die* because they are not synonymous. However the semantic difference is paralleled fairly closely in the Chichewa examples (Van Valin ms.).

transformations in the first place is often undermined by the existence of semantic differences. That is, without the assumption that one form *must* be derived from another form because of a semantic synonymy, many arguments for a derivational relationship lose their force.

This fact was recognized with respect to Generative Semantics analyses. Ultimately, the GS framework died out because of the recognition that rough synonymy of form was not enough to justify a transformational relationship. In addition, aspects of surface form were shown to be necessary for semantic interpretation (cf. Bresnan 1969; Jackendoff 1969, 1972; Chomsky 1970).

However, the underlying assumption that two forms that are related semantically are necessarily derived from the same underlying form is still implicitly adopted by many theorists (for discussion, cf. Jackendoff 1990b, Van Valin to appear). To take a fairly recent example, consider Dryer's (1986) in-depth argument for an Antidative analysis. Dryer argues that ditransitives that can be paraphrased with *to* are in fact more basic than their prepositional paraphrases, and that the latter are derived from the former. That is 7b is taken to be derived from 7a:

(7) a. Bob gave Sam an apple. (base-generated)

b. Bob gave an apple to Sam. (derived)

A major aim of Dryer's paper is to defend the existence two grammatical relations, primary object (PO) and secondary object (SO). The PO corresponds to the direct object of transitive clauses and the first object of ditransitive clauses; the SO corresponds specifically to the second object of ditransitive clauses. The central argument

for the existence of these categories is based on an appeal to what Dryer calls the “Natural Class Principle,” which states that if many languages have rules that apply specifically to some form, then it should be treated as a natural class.⁴ Since passive and object marking are sensitive to the PO in many languages, the Natural Class Principle implies that the PO therefore exists as a natural class. Further evidence for the existence of distinct categories PO and SO comes from the simplifications of word order and case marking facts. That is, if we accept the (partial) ordering:

(8) Subj > Obj

Abs > Erg

DO > IO

PO > SO⁵

Then the statement of English word order and case marking facts can be stated simply: All and only terms (i.e. Su,DO,IO,PO,SO) are not marked with prepositions; word order must be: Su-V-PO/DO-SO/IO-nonterms.

Dryer goes on to give these same facts, that the word order and case marking descriptions can be simplified, given the existence of the categories PO and SO, to be evidence for his Antidative analysis. In order for this to substantiate his claim that prepositional paraphrases with *to* are derived from ditransitive expressions, Dryer must assume that 1) that the two forms necessarily share a level of representation, and 2) that derivations cannot create grammatical relations (therefore if PO and

⁴This is a weaker claim than Dryer makes in 1983, where he argues that a single rule showing a difference between two kinds of arguments is enough to show that the two are distinct grammatical relations. (Dryer 1983:139).

⁵DO and IO are not replaced by PO and SO; rather, Dryer leaves it as an empirical issue as to which of these grammatical functions exist in a particular language.

SO exist, they must be base-generated). If we do not assume 1), that either the ditransitive or prepositional paraphrase is derived, there is no reason given why they cannot both be base-generated. That is, the argument as to whether the categories PO and SO exist in English has no bearing on the question of *whether* an alternation account is warranted; Dryer provides no other evidence that the derivation should be accepted.⁶

Not all syntactic accounts rely crucially on the assumption of an underlying shared representation between pairs of expressions that share a rough semantic equivalence (e.g. Perlmutter 1978; Perlmutter & Postal 1983b; Aissen 1983; Farrell 1991). However, there are other reasons to avoid a transformational relationship between related constructions if possible.

Bowerman (1982) and Gropen et al. (1989) show that semantic restrictions are operative as soon as certain constructions are produced, there being no period of unconstrained overgeneralization on the basis of a pure syntactic relationship.⁷ For example, Gropen et al.(1989) show that the semantic restriction that the recipient of ditransitive must be animate is operable as soon as the ditransitive syntax is

⁶Citing,

(9) a. John baked a pie for Mary.

b. John baked Mary a pie.

Dryer again assumes (in the same article) that the two forms must share a level of representation because of their close semantic relationship; in particular he assumes that one must be derived from the other. The question that is raised is which form is derived from which. In order to decide, Dryer relies implicitly on the UAH. He argues, "the beneficiary nominal in [b]...behaves like a final term in its case-marking and position. *since its semantic properties would suggest that it is an initial non-term*, it must have advanced to become a term [*italics added*]." If, because of semantic distinctions, we no longer accept as given the idea that there necessarily *is* an earlier stage of derivation, Dryer's account is immediately undermined.

⁷There are of course, overgeneralizations, but these conform to the general semantic constraints of the construction.

produced, there being no period of unconstrained overgeneralization. That is, none of the following possible types of overextensions were ever uttered by any of the children:

(10) *Amy took Chicago the road. (Amy took the road to Chicago.)

(11) *Betty threw the tree the box. (Betty threw the box to the tree.)

(12) *Alex put his head a gun. (Alex put a gun to his head.)

(13) *Babs took fun a trip. (Babs took a trip for fun.) (Gropen 1989: 218)

As Gropen et al. note, this calls into question the idea that the dative rule is fundamentally a syntactic operation; there is no clear reason why a syntactic operation would be constrained by an arbitrary semantic condition as soon as the syntactic operation is learned. Moreover, since an unconstrained rule would be easier to learn and represent (Fodor ms.) and would provide more expressive power (Pinker 1989), it is not clear why the semantic constraints on this putative syntactic rule are not ignored by new generations of speakers.

Another problem with approaches that rely on transformations is that they posit an often unwarranted asymmetry between two constructions that are thought to be related. In the case of the ditransitive, *He gave the book to her* is usually supposed to be more basic than *He gave her the book* (contra Dryer 1986). A typical reason that is given is that the verbs which allow ditransitives are a proper subset of those that allow prepositional paraphrases. However, this is not actually so since *refuse*, and *deny* do not have paraphrases with *to* or *for*, and neither do many metaphorical expressions, for example:

(14) a. She gave me a headache/a kiss/an idea.

b. *She gave a headache/a kiss/an idea to me.

Oehrle(1976), moreover, has argued that there is no principled way to distinguish those cases which have prepositional paraphrases from those that do not.

Developmental data (Gropen et al. 1989) shows that the ditransitive and prepositional paraphrases occur at roughly the same time in children's speech, neither construction reliably preceding the other, so that evidence for an asymmetry cannot be grounded in evidence from children's acquisition of the forms.

The asymmetry implicit in many alternation accounts is even more difficult to defend in the case of the locative alternation. In general, the valence associated with 15:

(15) He loaded hay onto the wagon

is supposed to be more basic than that associated with 16:

(16) He loaded the wagon with hay.

cf. Channon 1980, Perlmutter & Postal 1983a. However, when different verbs are examined, this asymmetry is clearly unwarranted. So, although *stack* and *plaster* allow both argument structures, there is no intuition that the *into* variant is more basic than the *with* variant. That is, the following appear to have equal status in terms of being basic or unmarked:

(17) a. He stacked the shelves with boxes.

b. He stacked boxes onto the shelves.

(18) a. He plastered the wall with posters.

b. He plastered posters onto the wall.

Moreover, *adorn, blanket, block, cover, dam, enrich, fill, dirty, litter, smother, soil, trim, endow, garnish, imbue, pave, riddle, saturate* to name a few, only occur with the *with* variant. In fact in a detailed study of locative verbs, Rappaport and Levin(ms) found that out of 142 verbs studied, only 34 alternate, with exceptions existing in both directions (Pinker 1989).

On a constructional approach, we need not assume an asymmetrical relationship between two constructions that are found to be related. Instead, we can describe instances of partial-overlap of syntax, semantics, or pragmatics as such, without necessarily assuming that one or the other is basic, the other derived. For example we can state that the semantics associated with the ditransitive construction is related to the semantics of the paraphrase with “to;” we do not need to assume the primacy of one over the other. Likewise, we can describe the relationship between paraphrases with “to” and other instances of the caused motion construction, e.g. between the following a and b expressions:

(19) a. Ethel brought the wrench to Fred.

b. Ethel brought the wrench toward Fred.

(20) a. Ethel threw the ball to Harry.

b. Ethel threw the ball over Harry.

These cases are discussed in chapter 7.

To summarize, accounts of argument structure which relate one construction to another by a syntactic transformation or derivation that derives one from the other have several drawbacks:

1. Expressions which are claimed to share a level of representation are not fully synonymous. This raises the following problems:
 - (a) Which aspects of semantics are relevant to determining semantic equivalence, and thus a shared level of representation, have never been adequately detailed.
 - (b) In many cases, the only motivation (often implicit) for proposing a derivational relationship in the first place is a semantic synonymy.
2. The semantic distinctions are learned as early as the forms are learned, casting doubt on the idea that the transformations are basically or primarily syntactic.
3. Such accounts postulate an asymmetry between two forms. However:
 - (a) There are typically lexical items which only have the output form of a putatively optional transformation.
 - (b) Both forms are often learned at roughly the same age (with neither one reliably preceding the other).

The other dominant way of capturing relationships between constructions is via lexical rules. Several such proposals are discussed in the following section.

4.2 Lexical Rule Accounts

There are a number of different types of lexical rule accounts which deal with the issue of alternate valences. Lexicalists argue that much of the work that had been done by transformations is better done in the lexicon. For example, transformations such as passive, causativization and dative shift are better captured by lexical rules (Freidin 1974, Bresnan 1978, Mchombo 1978, Foley & Van Valin 1984, Marantz 1984, Pollard & Sag 1987, in press).⁸

Lexicalists depart from theorists taking a syntactic approach largely for four reasons. The first is that many alternations tend to be sensitive to lexical items, particularly verbs. The notion of lexically-governed rules stems back to Lakoff (1965/1970), who recognized that no alternation seems to be exceptionless, and that verbs largely determined whether a given alternation applies or not. He states:

In some sense the verb 'governs' the passive transformation: it is central to the operation of the rule...There are a number of other clear cases where it is obvious which item it is that governs the rules. Most of these involve verbs. (p. 28)

A second motivation is that cross-linguistically, many alternations are accompanied by morphological marking on the verb. For example, applicatives, causatives,

⁸Many lexicalists argue in fact that all "structure-preserving" (Emonds 1972) transformations be handled in the lexicon (e.g. Freidin 1974, Bresnan 1978). A transformation is considered structure-preserving iff:

1. both the input and output constructions could be generated by rules of the base component
2. the forms share a root morphology
3. the cooccurrence restrictions of one were predictable from the other

See Wasow 1977 for a more conservative view of the role of lexical rules.

and passives cross-linguistically tend to involve overt morphology on the verb stem. This is taken as evidence that alternations are crucially lexical processes, deriving one form of the verb from another.

A third motivation stems from the fact that the lexicon is viewed as the receptacle of all idiosyncratic information. Therefore the existence of seemingly idiosyncratic exceptions is taken as evidence for a lexical phenomenon (Jackendoff 1975; Wasow 1977; Dowty 1979).

A final motivation is that “output” verbs undergo word-formation processes, which are generally agreed (since Chomsky 1970, Aronoff 1976) to be a result of lexical rules. Because lexical rules and syntactic rules are taken to be autonomous, and because lexical rules are assumed to be ordered before syntactic rules, evidence that a rule R feeds a lexical rule is taken as strong evidence that R is a lexical rule. Each of these underlying motivations is analyzed below, but before addressing the motivations, let us take a look at some various implementations.

Lexical rules which relate alternate valences of a given verb can take several forms. They may explicitly relate the syntactic subcategorization frames of verbs, as well as capturing the semantic differences; they may alter general default *linking rules* which map semantic representations of lexical items onto syntactic representations; or they may alter the *semantic* representation of the verb, changing the verb’s inherent semantics—the semantic representation is then argued to map to syntactic structure by universal or near universal linking rules. Each of these approaches is discussed in turn.

4.2.1 Lexical Rules relating Subcategorization Frames

Several lexicalist theories have proposed rules which explicitly relate both the syntactic subcategorization frames and the semantic representation of verbs which can occur in more than one construction. This type of rule is proposed, for example, by Jackendoff 1975, early work in LFG (cf. Bresnan 1978, 1982), and in HPSG (Pollard & Sag 1987, in press). Jackendoff proposes that the English causative alternation be captured by the following lexical rule (p. 659):

$$\left[\begin{array}{l} +V \\ +[NP_1 \dots\dots] \\ NP_1 W \end{array} \right] \iff \left[\begin{array}{l} +V \\ +[NP_2 \dots\dots NP_1] \\ NP_2 CAUSE (NP_1 W) \end{array} \right]$$

This rule explicitly relates the (syntactic) subcategorization frames and the semantic representations of the verb stem. This “lexical redundancy rule” is symmetric in that neither form is derived from the other; both forms coexist in the lexicon. The double arrow captures the symmetric “is related to” relation.⁹

Therefore redundancy rules are not predictive. They are claimed to aid in learning

⁹There is actually some vacillation on whether or not redundancy rules are supposed to be productive; i.e., whether lexical rules are intended to be purely redundant generalizations over stored items in a fixed lexicon, or whether they are understood to be generative rules which produce new forms productively.

Jackendoff (1975) for example states that his lexical rules are intended only to state existing regularities (both morphological and semantic) within the lexicon. These rules are represented by two way arrows which represented the symmetric relation “is lexically related to.” This aspect of Jackendoff’s account is crucial, since he argues explicitly against Lakoff’s (1965/1970) proposal that productive rules generated “hypothetical lexical entries.”

At the same time, proponents of lexical rules seem to want the rules to be conceptualized as somehow generative. Jackendoff for example suggests that “after a redundancy rule is learned, it can be used generatively, producing a class of partially specified possible lexical entries” (p. 668). Bresnan (1982) also attempts to find a middle ground between non-productive rules and fully-productive rules. While the lexical rules of LFG are explicitly “redundancy rules,” the metaphor of a lexical-changing process is pervasive. The following is Bresnan’s early description of the passive lexical rule (*italics added*):

(cf. chapter 3 for support for this claim). In addition, lexical rules are designed to capture *partial* similarities in either form or meaning. Differences in meaning or in form between related entries are therefore naturally accounted for.

These redundancy rules have much in common with what we have postulated as *motivation* links between constructions (chapter 3). However, redundancy rules are explicitly *lexical*, containing only morphemes, words and (lexically filled) idioms. Therefore due to motivations outlined above, such rules embody the claim that alternations are lexical. The validity of each of the motivations for this claim is discussed in section 4.2.3, and it is argued that this claim should be rejected. Other similarities and differences between redundancy rules and motivation links are discussed in chapter 3.

4.2.2 LFG Lexical Mapping Theory

In chapter 3, It was suggested that argument roles are linked to syntactic forms within constructions. It was also suggested that generalizations across constructions can simultaneously be captured by positing a network of constructions related by

Passivization in English
Functional *change*: (SUBJ) \Rightarrow \emptyset / (BY OBJ)
 (OBJ) \Rightarrow (SUBJ)
Morphological *change*: V \Rightarrow V_[part]

The use of single-headed arrows and the word “change” would seem to indicate that the rule is a generative relation *changing* rule.

In fact, the notion of a “redundancy rule” itself is slightly oxymoronic, since a redundant statement of regularity is not in any intuitive sense rule-like.

There is of course good motivation for hedging between rules which are fully productive and those which are non-productive; as discussed at length by Pinker (1989), rules are typically *partially* productive. It is argued in chapter 5 that both the instances and the generalization over those instances must be recognized to exist. Novel forms can be used by analogy to previously learned cases just in case the novel forms are relevantly similar to a cluster of existing cases with high enough type frequency.

inheritance links. It might be tempting to think that individual constructions are not the right level at which to predict syntactic expression, and that instead very general linking rules mapping particular roles onto particular grammatical relations or syntactic configurations should be a priori preferable.

Such general linking theories have been proposed for some time. For example, Fillmore (1968) suggested that subject selection was determined with reference to a fixed semantic role hierarchy; the highest available role on the hierarchy would be mapped onto subject. More recent attempts to relate argument structure and overt syntactic form in a general way can be found in, for example, Foley & Van Valin (1984), Carter (1988), Pinker (1989), Rappaport & Levin (1988), and Dowty (1991). Such linking theories are motivated by the fact that there are intra and inter-language generalizations about the kinds of complements particular predicates have. The attempt, then is based on the fact that it is clear that syntactic form is not related in an arbitrary way to the semantics of predicates. In this section I will discuss a particular attempt in this direction, in an effort to demonstrate that construction-specific linking rules are required.

In an attempt to ground the issues in concrete terms, I here consider in some detail the specific linking theory of LFG as recently formulated by L. Levin (1987), Alsina and Mchombo (1990), Bresnan & Kanerva (1989), Bresnan & Moshi (1989), Bresnan & Zaenen (1990), and Ackerman (1990). In this particular theory, grammatical relations are predicted from the argument structure of particular predicates.¹⁰ Argument

¹⁰Grimshaw (1990) proposes an approach which is similar in some respects. In Grimshaw's account, deep subject and object are projected from the argument structure associated with the main verb. G's account differs, however, in several ways, most notably that 1) the content of θ roles is claimed to be opaque to syntax, and 2) two distinct hierarchies of roles are postulated, one for

structures are represented by θ role arrays, although there is no strong assumption that the θ roles are primitives, and not derived from a richer decompositional semantics. In fact most proponents of this theory suppose that the roles are shorthand for different argument places in some logical decomposition in the style made familiar by Generative Semantics (see Jackendoff 1972, 1983, 1987; Foley & Van Valin 1984; Rappaport and Levin 1988; and Gropen et al. 1989; and Pinker 1989 for arguments that thematic roles are not primitive).

Two abstract features are postulated: r and o , which categorize four types of grammatical functions:

SUBJ [-r, -o] OBL θ [+r, -o] OBJ θ is the second object of ditransitives.
 OBJ [-r, +o] OBJ θ [+r, +o]

Thematic roles are assigned features in two ways. First, they have an intrinsic classification, which is said to be based on their semantic properties. A first approximation of the basic classifications are:

Intrinsic classification(IC):

- thm/pat roles \implies [-r]
- all other roles \implies [-o]

Secondly, roles receive a default assignment: the highest theta role on the proposed hierarchy receives a [-r] feature as a default, the rest receive [+r] (Bresnan & Moshi 1989; Alsina & Mchombo 1990). The hierarchy that is adopted is:

ag > ben > goal > inst > pt/theme > loc

traditional thematic roles and one for “aspectual” roles. See Zaenen & Goldberg (forthcoming) for a review.

Lexical rules in the Lexical Mapping Theory are of two kinds. One type that has been proposed, for example in the case of the applicative construction in Bantu, operates on the semantic structure of verbs to yield different but related senses (Alsina & Mchombo 1990). This type of rule is analogous to the semantic-changing lexical rules proposed by Levin & Rapoport 1988 and Pinker 1989. The ramifications of the semantic claims of this approach are discussed in the following section. However, the primary focus within LFG is on the linking between lexical semantics and surface syntax; it is this aspect of the approach which is considered first.

Applicatives in Chichewa are formed by a lexical rule which adds an “dependent” argument to the argument structure of the matrix verb (Alsina & Mchombo 1990):¹¹

$$\text{cook} < \text{agt pat} > \implies < \text{agt } \theta_{\text{dependent}} \text{ pat} >$$

The *dependent* subscript on the θ role is intended to capture a semantic property that is claimed to be loosely correlated with affectedness. Other LFG accounts have described this semantic property as “applied” (Bresnan & Moshi 1989) “patient-like” (Bresnan 1990) or “affected” (Ackerman 1990). Unfortunately this semantic property is not well-defined in any of these articles. For the sake of consistency, I will refer to this semantic attribute as “dependent” throughout.

Alsina & Mchombo state the intrinsic classification assignment for the applicative construction in general terms:¹²

(21) When there is a theme and a(nother) dependent argument, then one

¹¹If we assume that this lexical rule is a non-generative redundancy rule, then both entries must be stored in the lexicon, and the arrow is better represented as pointing in both directions:

$$\text{cook} < \text{agt pat} > \iff < \text{agt } \theta_{\text{dependent}} \text{ pat} >$$

¹²In order to account for the English ditransitive in a similar way, they would need to suppose that the ditransitive did not necessarily add an argument, but could alter an existing argument to be a “dependent” argument, thus able to receive the intrinsic classification of [-r].

will receive [-r] and the other will receive [+o]. (in asymmetric languages like Chichewa and English)

Dependent *recipient* roles have a special status, since when present, they must occur directly after the verb, can be expressed as an object-marker on the verb, and can be passivized, whereas the cooccurring theme argument cannot (Alsina & Mchombo 1990). These facts are accounted for if dependent recipients are necessarily either surface SUBJs or OBJs. Therefore, Alsina & Mchombo propose that dependent recipient roles must receive a [-r] classification, which distinguishes SUBJ and OBJ functions from other functions.

Thus the revised list of intrinsic classifications include:

- thm/pat roles \implies [-r] or [+o]
- “dependent” recipient role \implies [-r]
- other dependent roles \implies [-r] or [+o]
- all other roles \implies [-o]

Another example of a semantic-changing lexical rule is proposed by Ackerman (1990) in order to account for the locative alternation involving verbs such as “spray” and “load.” Although the discussion centers on Hungarian data, the analysis could presumably be extended to English. The locative argument of the “basic” form of the verb is changed to become a dependent argument, which in turn gets the [-r] intrinsic classification, just as dependent arguments do on Alsina & Mchombo’s account. Thus,

$$load_0 < agt \ loc \ th > \implies load_1 < agt \ loc_{dependent} \ th >$$

“Load₀” appears in “He loaded the hay onto the wagon” type expressions; “Load₁” appears in “He loaded the wagon with the hay” type expressions. As in Alsina & Mchombo’s analysis, dependent arguments are assigned the [-r] intrinsic classification.

The locative *with* variant seems to fit squarely within the domain suggested in 21, which would predict that the theme argument should receive a [+o] intrinsic classification, ultimately resulting in its being linked to an OBJ_θ function, as are theme arguments in applicative constructions. However, even in Chichewa, these arguments are not linked to OBJ_θ, but are either mapped to OBJ or OBL.¹³

In order to avoid the conclusion that locative expressions in Hungarian (or English, or Chichewa) should be expressed in a way directly parallel to applicatives, Ackerman stipulates that the theme argument does not get the intrinsic classification [+o], but instead receives [+r] as an intrinsic classification and then [-o] as a default. These assignments are not independently motivated.

For languages that have ditransitive (or applicative) expressions, and both forms of the locative alternation (e.g. English and Chichewa), we need to postulate the following intrinsic classifications:

Intrinsic classifications (IC):

¹³In fact, Chichewa seems to allow a very similar locative alternation at least for some verbs, e.g. (examples from Sam Mchombo p.c.):

(22) a-na-pachira mchenga m'ngolo
sm-pst-load 3-sand in-9-cart
He loaded the sand in the cart.

(23) a-na-pachira ngolo ndi mchenga
sm-pst-load 9-cart with sand
He loaded the cart with sand.

- if there is another dependent role which is a recipient
thm/pat role \implies [+o]
- if there is another dependent role which is a locative,
thm/pat role \implies [+r]
- if there is no other dependent role,
thm/pat \implies [-r]
- dependent recipient role \implies [-r]
- all other roles \implies [-o]

In addition to being language-specific, the first three feature assigning rules are sensitive to other roles present in the argument structure. This context-sensitivity is expected on a constructional approach to linking, but may be been specifically what the LFG linking theory had wanted to avoid (Mchombo, personal communication).

Another difficulty with the linking theory is apparent. Taking the Alsina & Mchombo and Ackerman analyses together, we find that the locative argument is assigned the intrinsic classification [-r] or [-o] (depending on the form of the locative alternation to be predicted); that the recipient argument can receive [-o] or [-r] (depending on whether the recipient role is “dependent” or not); and that the theme can receive the intrinsic classification [-r], [+o], or [+r] (depending on what other roles are assigned), i.e. all but one possible assignment [-o]. It becomes difficult to see what is supposed to be meant by “intrinsic classification.”

Adding to this difficulty of too wide a range of possible intrinsic classifications for

a given role is the fact that what determines which of the possible IC classifications is actually assigned is what construction is supposed to be predicted. In this way, the classifications become circular: the recipient is dependent, and thus [-r] as opposed to [-o], just in case it is supposed to be the OBJ in the ditransitive construction. That is, since the notion of “dependent” is never adequately defined, no independent criterion for the assignment of dependent status is offered. Since the linking theory can, *by its nature* capture the necessary facts because the abstract features *r* and *o* are all that is needed to code the grammatical relations, unless independent criteria for assigning grammatical relation features are found, the formalism only serves to code the syntactic structure that is supposed to be predicted.

A different type of lexical rule has also been proposed within the Lexical Mapping framework. Lexical rules have been employed to alter or constrain the default mapping between θ roles and features yielding grammatical relations. For example, passive is a lexical rule which “suppresses” the highest thematic role, making that role unavailable for linking to a grammatical function.

Bresnan & Kanerva’s (1989) account of locative inversion involves the postulation of a lexical rule which constrains the mapping of argument roles to syntax. They discuss the relationship between sentences such as the following a and b examples:

(24) a. A cat sat on the roof.

b. On the roof sat a cat.

(25) a. My friend Joe was among the players.

b. Among the players was my friend, Joe.

B&K argue that this alternation only occurs with verbs which have the following argument structure:

< *theme, loc* >

The semantic representation of the verb is claimed to be the same whether the theme or locative is ultimately linked to subject. No semantic changing lexical rules are assumed to account for this alternation. Still, a difference in pragmatics between the two constructions is recognized; citing Hetzron and Bolinger, B&K note that locative inversion has a special discourse function in that the inverted subject referent must be new on the scene and focused.

The pragmatic difference is captured by requiring the linking rules relating roles to grammatical functions to be sensitive to whether the theme role is a presentational focus. If it is, the linking rule optionally assigns the locative role a feature which allows it to be mapped to subject position. Therefore the account presupposes that linking rules can be sensitive to 1) the total argument structure of the verb (to account for the restriction that the alternate linking can only apply to < thm, loc > argument structures) and 2) semantic/pragmatic restrictions on co-occurring arguments (to account for the fact that the location role is linked with a particular feature only if the theme role is a presentational focus).

By recognizing these two factors, this type of lexical rule can be seen to be parallel in many ways to the constructional approach proposed explicitly here. That is, the linking from semantics to grammatical functions is dependent on 1) the verb class (to

account for the < *thm loc* > restriction) and 2) semantic/pragmatic aspects which do not alter the lexical semantics of the main verb. That is, on a constructional account, a locative-inversion construction is posited as follows:

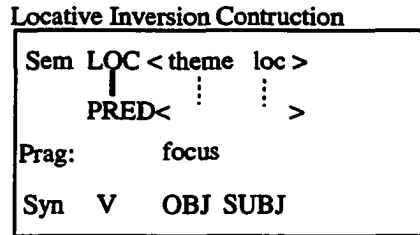


Figure 4.1

There are two main differences between the constructional approach and Bresnan & Kanerva's approach. First, while constructions correspond in function to the rules of their theory, constructions are declaratively represented, whereas rules are procedurally represented.¹⁴ The second more important distinction is that while linking rules may be sensitive to semantic constraints, they cannot in their intended function, add semantic entities. That is, while certain types of semantic *constraints* may be attached to linking rules, semantic *constructs*, in particular, semantic arguments cannot be attached to linking rules. Instead, such a theory requires both semantic changing lexical rules such as proposed by Alsina & Mchombo (described above), *and* construction-specific semantic constraints on linking rules. The semantic aspect of the semantic changing lexical rules are discussed in more detail in the following section.

¹⁴Recent object-oriented programming strategies, however, could obviate this difference.

4.2.3 Semantic Changing Lexical Rule Accounts

The recognition of subtle semantic differences between related subcategorization frames has been growing, and there has also been an increasing focus on the fact that there appears to be a strong correlation between the meanings of verbs and the syntactic frames they can occur in, leading many researchers to speculate that in any given language the syntactic subcategorization frames of a verb may be uniquely predictable from the verb's lexical semantics (e.g. Levin 1985; Carter 1988; Levin & Rapoport 1988; Rappaport & Levin 1988; Pinker 1989; Gropen et al. 1989).

The following factors have led these theorists to postulate lexical rules which are designed to operate on the semantic structures of lexical items:

1. Overt complement structure is to be predicted by general linking rules that map semantic structure onto syntactic form (cf. Levin 1985; Levin & Rapoport 1988; Gropen et al. 1989; Pinker 1989).
2. The same verb stem often occurs with more than one complement configuration.

For example Pinker (1989) proposes that the prepositional/ditransitive alternation results from a semantic rule rather than being the product of a syntactic transformation. Specifically, he suggests that productive use of the ditransitive syntax is the result of a lexicosemantic rule which takes as input a verb with the semantics, *X causes Y to go to Z* and produces the semantic structure *X causes Z to have Y*. The double object syntax, he argues, is then predictable from near universal linking rules mapping the arguments of a verb with the meaning *X causes Z to have Y* into the ditransitive form. In this way, Pinker argues that the dative rule produces a “concep-

tual gestalt shift," that it is, in effect, a semantic operation on lexical structure(cf. also Gropen et al. 1989).

The general approach can be outlined as follows:

- I. The syntactic complement configuration of a clause is taken to be uniquely predictable from the semantic representation of the matrix verb.
- II. Different syntactic complement configurations therefore reflect differences in the semantic representations of the main verb.
- III. The mapping from semantic representation to particular complement configurations is performed via universal, or near universal linking rules.
- IV. Different semantic representations of a particular verb stem, i.e. different verb senses are related by generative lexical rules, which take as input a verb with a particular semantics and yield as output a verb with different semantics.
- V. Differences in semantics are not necessarily truth-functional differences, but may represent a different construal of the situation being described; that is, the relevant semantics is speaker-based.

These principles are detailed most most explicitly by Pinker 1989, but are also shared by Levin 1985, and Levin & Rapoport 1988 and Gropen et al. 1989.

By postulating rules that operate on semantic structure as opposed to rules or transformations that are purely or primarily syntactic, these theories manage to incorporate important insights. As was discussed in chapters 1 and 2, different valence

expressions are typically, possibly always, accompanied by slightly different semantic interpretations; these semantic differences are respected as soon as the forms are learned (Bowerman 1982, Gropen et al. 1989). By postulating semantic changing rules, as opposed to syntactic changing rules with additional semantic constraints, the theory captures the insight that changes in complement configurations are crucially semantic. Regularities in the syntax are captured by linking rules mapping the semantic structure to surface form.

To a large degree, as alluded to above (chapter 2), this approach is directly comparable to the approach being proposed here. That is, the verb sense which is integrated into the construction is analogous to the input to a lexical rule; the composite fused structure is analogous to the output of a semantic changing lexical rule.

The strongest differences between the present approach and the lexical rule approach stem from the increased focus on the nature of the relationship between verb and construction (on the lexical rule approach the relationship is only implicitly represented by the statement of the rule itself). By recognizing constructions and verbs to be interrelated but independent, the nature of constructional meaning, the principles of fusion, and the relationships among constructions are put squarely onto center stage. These are the topics that are the focus of much of the present research.

Other differences stem from whether the the composite fused structure is claimed to be a new sense of the input verb, or whether it is understood to be a composite structure formed by integrating the meaning of the verb with the meaning of an independently existing construction. The reasons to prefer the latter formulation are the following.

Because syntactic representation is taken to directly reflect the lexical semantics of the main verb (point II), these accounts are forced to claim that the following examples involve special senses of each of the verbs:

- (26) a. She broiled him a lobster.
- b. He ate himself sick.
- c. He sneezed the napkin off the table.
- d. He sniffled his way to the bathroom.

That is, “broil” would require a special sense “to intend to cause to receive by broiling” to account for 26a; “eat” would require a special sense “to eat with the effect of becoming sick”; “sneeze”, a parade example of an intransitive verb would require a three argument sense “to cause to move by sneezing”; and “sniffle” would require a special sense, “to move with difficulty while sniffing.”

A verb such as *smile* can occur with a variety of different complement configurations:

1. Jill smiled.
2. Jill smiled at Jack.
3. Jill smiled her way past the guard.
4. Jill smiled her thanks.
5. Jill smiled at the memory.

The theory is forced to claim that *smile* has 5 different senses, one for each of the above complement configurations. However the only *evidence* for each of these senses is the fact that such a complement configuration with the intended meaning is possible.

Levin (1985), suggests that evidence for different verb senses does exist. For example, she argues “there is evidence that when the verb *slide* is found in the double object construction,...its sense is not the purely physical transfer sense of *slide* but rather a transfer of possession sense (p. 35).” She cites, for example, the fact that “the goal argument of a change of possession verb must denote an entity capable of ownership, but the goal argument of a change of location verb need not.” Correspondingly, she notes:

(27) a. Jill slid Susan the present.

b. *Jill slid the door the present.

However, as was noted in chapter 1, even if we posit a distinct sense of *slide*, “slide₁,” which is a change of possession sense, we must *additionally* stipulate that this sense can only occur in the ditransitive construction. This fact cannot follow from general linking rules mapping the verb’s meaning onto an overt syntactic form, because verbs which uncontroversially *do* constrain their goals to be animate, do not necessarily have to appear ditransitively. For example, *give* and *hand* constrain their goals to be animate even when they are used with the prepositional “to” phrase:

(28) a. He gave the money to Joe/*the wall.

b. He handed the money to Joe/*the wall.

That is, we must stipulate, that “slide₁” (unlike *give* and *hand*), only occurs with the ditransitive construction.

One might argue that in fact, “slide₁” is *not* constrained to only occur in the ditransitive construction. It could be argued that it is “slide₁” that appears in:

(29) Joe slid a beer to Lou.

as opposed to a more general sense (“slide₂”), which allows, but does not constrain its goal to be animate. However this move does not solve the problem, because we still must account for how it is that the ditransitive construction *must* occur with “slide₁.” To capture this fact, a constraint on the ditransitive construction that the goal argument must be animate is required; but once we have this constraint, there is no longer any reason to posit two distinct senses. While the same semantic constraint is lexically imposed by *give* and *hand*, the construction can be viewed as imposing the constraint on other verbs, such as *slide*, when they occur in the construction. I.e. the construction adds a constraint to the lexical semantics of *slide*.

More generally, I concur with Levin that the semantics (and constraints) on the full expressions are different whenever a verb occurs in a different construction. But these differences need not be attributed to different *verb* senses; rather they are more parsimoniously attributed to the construction itself.

Another difference between lexical rule approaches and the current approach is that on the current approach, the semantics of the lexical verb is preserved when integrated into a particular construction. This is important insofar as the verbs’

inherent lexical semantics can be seen to play a role in other cooccurring syntactic phenomenon. For example, in Zaenen's (1991, to appear) discussion of the Dutch impersonal passive construction, she points out auxiliary selection is determined the inherent Aktionsart of the verb, at the same time that the construction requires atelicity. An account which stipulated that there were dual senses of each verb in order to account for the effects of extra-verbal complements on the availability of impersonal passives would fail to account for auxiliary selection without adding ad hoc features to the main verb (cf. discussion in chapter 1). The other motivations for postulating a semantic changing lexical rule analyzed below.

What about the original motivation for postulating lexical rules?

On the notion of Government: Extra Verbal Effects

In a passage following the suggestion of a notion of government, Lakoff candidly recognizes:

Government,...is not yet a completely well-defined notion, and we can offer no proposal for an adequate definition of it. (1965/1970: 28)

In fact, in Chapter 1 it was argued that the verb alone often cannot be used to determine whether a given construction is acceptable (cf. section 1.2.2). Some additional examples to make the same point include the following:

(30) a. This room was slept in by George Washington.

b. ?*This room was slept in by Mary. (Rice 1987b)

(31) a. ?It's nice resting.

b. It's nice resting here. (Bolinger 1968:125)

(32) a. Joe cleared Sam a place on the floor.

b. *Joe cleared Sam the floor. (Langacker 1991)

Holding the verb constant, the b) sentences are better than the corresponding a) sentences. There is no natural way to capture these types of constraints in the lexical semantics of the main verb. On a constructional account, however, it is possible to associate constraints on the complements or on the overall interpretation of the expression directly to the construction.

For example, the problem with example 32b is that the ditransitive construction implies that the argument designated by the first object comes to receive the argument designated by the second object. In this case Joe doesn't "receive" the floor, although he does "receive" a place on the floor.¹⁵

Each of the other three reasons for positing lexical rules which change the specifications of the main verb rely on the assumption that the lexicon is distinct from the rest of grammar. Since Construction Grammar does not make this assumption, none of these reasons retain their full force.

¹⁵The question arises as to why *the floor* can't be interpreted metonymically to stand for "a place on the floor" in this example. But the answer to that question is not a question about ditransitives specifically, since *the floor* in *Joe cleared the floor for Sam* cannot refer to a behind-size piece of floor either.

Example 32a: "Joe cleared Sam a place on the floor" is acceptable on the interpretation that a place was *created* for Sam by the clearing (cf. **I wiped him a piece of the floor* since the place is not created by wiping). It may be that the creation sense of clearing is aided by using the indefinite "a place." When the definite article is used, the creation interpretation is not as likely, since it is all too clear that the floor and the place on the floor (assuming the metonymy were available) already exist prior to the clearing.

Morphological Marking on the Verb

Many languages morphologically mark verb stems when those stems occur with alternate argument structures. The morphological markers are taken to be evidence for a lexical rule that changes the inherent subcategorization (or semantic representation) of the verb stem. However the approach suggested here can account for these cases without appealing to any type of lexical rule. On the present account, the closed class grammatical morpheme is analogous to the English skeletal construction; the verb stem plays the role of the main verb. The semantic integration of morpheme and verb stem is analogous to the integration of construction and verb in English. Since morphemes *are* constructions, and since no strict division is drawn between the lexicon and the rest of grammar, the analogy is quite strong. In fact, Emanatian (1990) has proposed an account of the Chagga applicative morpheme along these lines, as has Alsina (1992) for Romance and Bantu causative constructions.

Idiosyncrasy

It is often suggested that the lexicon is the repository of all idiosyncratic information. However, if this is how the lexicon is defined, it must contain information about particular grammatical constructions that are phrasal and even clausal. For example, each of the following are idiomatic in the sense some aspect of their form and/or meaning is not strictly predictable given knowledge of the rest of grammar.

(33) a. Why paint your house purple? (Gordon & Lakoff 1971)

- b. The more you look the more you find. (cf. Fillmore, Kay & O'Connor 1988, Michaelis forthcoming)
- c. He cried himself to sleep. (cf. chapter 8)

Therefore evidence that a phenomenon is idiosyncratic is not evidence that it is *lexical*, unless "lexical" is defined so as to mean all and only idiosyncratic items. Once the definition of "lexical" is extended to this degree, the inevitable consequence is that the lexical is not neatly delimited from the syntactic (cf. also DiSciullo & Williams 1987).

Forms as Input to other Processes

Bresnan 1982 argues that passive must be a lexical rule since the output of passive is the input to a "conversion" lexical rule of adjective formation. The conversion rule takes passive participles and changes them into adjectives, which are then available for adjectival passives. This rule accounts for the identity of form between verbal and adjectival passives.

Once this rule is adopted, Bresnan argues that it implies that passive is a lexical phenomenon: "Since it is assumed that the rule systems of natural language are decomposed into components of lexical rules, syntactic rules,...which are subject to autonomous sets of constraints, this constitutes the strongest possible kind of evidence that Passivization is a lexical rule." (p. 16) However if we do not make the assumption that language is divided into separate modules that interact serially, then this argument is no longer persuasive.

4.3 Other Constructional Approaches

Elements of the constructional approach suggested here are not without precedent, and there are a few voices in the field who have gone against current trends and have noted the need for constructional meaning (cf. e.g. Bolinger 1968, Wierzbicka 1988, Zwicky 1987, 1989; Jackendoff 1990). There is also of course previous work within Construction Grammar (Fillmore 1985, 1987; Lakoff 1987; Fillmore, Kay & O'Connor 1988; Lambrecht 1986, 1990, to appear; Brugman 1988; Kay 1990; Michaelis forthcoming), and the closely related framework of Cognitive Grammar (Langacker 1987a,b, 1988, 1991; Rice 1987b; Kemmer 1988; Tuggy 1988; Maldonado 1991). Coming from a different perspective, Emonds (1991) argues for a "syntactically based semantics" in which syntactic deep-structures are paired with semantic structures.

Other work has explored various means of accounting for the mutual influence of various lexical items in a sentence. For example, Pustejovsky (1991) attempts to avoid rampant verbal polysemy by having nouns play a more central role; MacWhinney (1989) attempts to capture the effects of co-occurring complements on lexical meaning in what he terms "pushy polysemy."

I do not attempt to survey the full array of relevant literature here, but instead I will briefly discuss how the current proposal is related to the framework suggested by Jackendoff 1990a, the general framework of Montague Grammar (Montague 1973), and that of Wierzbicka 1988.

4.3.1 Jackendoff (1990a)

Jackendoff has touched on several of the ideas presented here in his latest book *Semantic Structures*. For different reasons, based primarily on the economy of representation as well as the idea that in many cases, an argument is not intuitively a semantic argument of the main verb, Jackendoff suggests extra-lexical “correspondence rules,” to account for examples in which the verb does not lexically code the semantics expressed at the clausal level. At several points he likens these correspondence rules to “constructional idioms,” which are on the present view, constructions, pairings of syntax and semantics that can impose particular interpretations on expressions containing verbs which do not themselves lexically entail the given interpretations.

Jackendoff’s discussion of the *way* construction, as described in chapter 9, is particularly close in many respects to the proposals made here. However, there are several differences in perspective and in focus between the two accounts.

Many of Jackendoff’s correspondence rules are stated as extra-lexical “adjunct rules.” For example, Jackendoff proposes that the postverbal NPs in the following expressions are actually not arguments, but adjuncts:

(34) Bill pushed the piano into the orchestra pit.

(35) The critics laughed the show out of town.

(36) Beth wiggled the tooth out of her mouth.

(37) Harry sneezed the handkerchief right across the room. (1990a:233)

However they fail traditional tests for adjuncthood: They may be passivized:

(38) The piano was pushed into the orchestra pit.

(39) The show was laughed out of town.

They occur directly after the verb, and cannot occur with intervening material:

(40) *Joe pushed forcefully the piano into the orchestra pit.

And they cannot be left out of *do so*:

(41) *Joe pushed the piano into the room and Bill did so the harp.

In fact Jackendoff (1990a) considers all such complements that are not intuitively licensed by corresponding arguments of the main verb to be adjuncts. However in appealing to an “argument/adjunct” distinction for these cases, the more traditional distinction is rendered obsolete. But then Jackendoff’s claim that some direct objects are “adjuncts” reduces to the claim that some direct objects are not independently directly associated with an argument of the verb. This is the claim that has been explicitly proposed here.

We have argued that some direct objects, which by all traditional tests *do* correspond to arguments are not licensed directly by the verb. We have proposed that arguments are directly associated with clause-level constructions. Sometimes the arguments associated with the construction are isomorphic with the participants directly associated with the semantics of particular verbs, but sometimes the arguments associated with the construction are imposed on the semantics directly associated with the predicates. This approach allows us to retain the traditional argument/adjunct distinction (such as it is), for distinctions between subjects, objects and some PP’s

on the one hand, and other PP's such as temporal or spatial modifiers on the other hand.

Another difference between Jackendoff's account and the one presented here is that Jackendoff proposes that his adjunct rules apply to sentences "on the fly" to provide them with an interpretation (p. 235). In the introduction, he makes an analogy between rules that operate "on the fly" and metonymic expressions as analyzed by Nunberg (1979). Nunberg's point was that metonymic processes are general and pragmatic, not conventional and not part of grammar. However, as noted above, it is necessary to account for the production of these expressions as well as their interpretation. It does not follow that because one may be able to infer the meaning of a construction that one therefore can predict its existence. Thus in the account presented here, the construction is represented declaratively as a conventionalized piece of grammatical knowledge, and is available for the generation as well as the interpretation of sentences.¹⁶

On the present account, constructions play a more central theoretical role than on Jackendoff's account. For Jackendoff, correspondence rules are only required in exceptional cases, when the correspondence rule itself contributes an argument. For the majority of cases, he supposes that argument structure is determined on the basis of *verbal* semantics in isolation, while it has been argued here that verbs are generally associated with frame-semantic knowledge that is integrated with independently

¹⁶Jackendoff (personal communication) has said that his intention was not to imply that the Adjunct Rule was not a conventional part of grammar by saying that the Adjunct rules were interpreted "on the fly." In a more recent paper, Jackendoff (to appear), in fact, he argues that Nunberg's examples are also not purely pragmatic, in the sense of being outside of the grammar. Therefore, although it was not made clear in the original text, Jackendoff's actual view is that the correspondence rules are conventionalized pieces of grammar.

existing argument structure constructions.

Moreover, in the theory of Construction Grammar, no strict division is drawn between the lexicon and the more general inventory of constructions. Therefore, while Jackendoff claims that Adjunct Rules should be considered to operate outside of the lexicon (p. 235-241), the constructions suggested here can be viewed as free-standing valences, stored within the lexicon along lexical items, idioms and other partially or non-lexically filled constructions.

Other differences between Jackendoff's approach and the present one stem more from differences in focus than in differences in theoretical perspective. Jackendoff does not attempt to constrain the application of many of the Adjunct rules either by adding specific semantic constraints or by delimiting verb classes as has been done here. In fact, he seems to suggest that whether his Adjunct Rule may apply must be stipulated lexically. This is implied by his analysis of *hit* vs. *strike* in which he argues that whether a verb can occur with a directional must be stipulated in each lexical entry. He makes this point on the basis of the following:

(42) a. Bob hit the ball across the field.

b. *Joe struck the ball across the field.

Although I have acknowledged their to be some degree of lexical idiosyncrasy (cf. chapter 5), the majority of cases appear to be predictable once a sufficiently detailed semantic characterization of the construction and associated verb classes have been delimited (see chapter 7 for a semantic account of the difference between *hit* and *strike*).

A final difference in focus between the two accounts is that Jackendoff does not attempt to explicitly relate the various constructions that are proposed. One general criticism of Construction Grammar as it has been practiced is that it has rarely attempted to account for the systematic relationships among constructions (but cf. Lakoff 1987, and current work by Fillmore & Kay ms for notable exceptions). In the enthusiasm to show just how much of language is necessarily learned as idiosyncratic (even if motivated) bits of grammatical knowledge, attention to overarching principles and generalizations has often been lacking. Chapter 3 of this manuscript is a stab at beginning to rectify this shortcoming.

4.3.2 Montague

Montague and many linguists working within the Montague grammar tradition have adopted the “rule-to-rule” hypothesis (Bach 1976). This approach involves associating of each syntactic rule with a semantic rule which determines the meaning of the syntactic constituent formed. In this way, Montague grammar is essentially a system for pairing surface structures with a representation of the meanings of those surface structures, with no significant level of “deep” or “underlying” structure between the two. In this way, Construction Grammar is quite similar in approach to Montague Grammar (cf. Montague 1973, Dowty, Wall & Peters 1981).

One difference between Construction Grammar and Montague grammar is that the semantic rules in Montague grammar are supposed to be determined by the *syntactic* mode of combination. Therefore semantic rules cannot refer to semantic features of items being combined in order to determine whether to apply. When such semantic

features are required, it is necessary to posit corresponding syntactic features (such as differences in type), in order to constrain the application of the semantic rule. Alternatively, a semantic filter may serve to rule out expressions generated by the erroneous application of a semantic rule. Whether these alternatives can take the place of explicitly referring to semantics as part of the “mode of combination“ is an empirical issue.

While Montague Grammar has always allowed for the possibility of rich constructional meaning, the actual practise has been to have rules of composition be defined in terms of simple function application. The quote from Gazdar, Pullum, Klein and Sag (1985) cited earlier reflects that widespread assumption. I repeat the quote here:

...we assume that there exist a universal mapping from syntactic rules to semantic translations...We claim that the semantic type assigned to any lexical item introduced in a rule..and the syntactic form of the rule itself are sufficient to fully determine...the form of the semantic translation rule.

(1985:8-9)

However, there may be a trend toward assigning richer meanings and semantic constraints to the rules of combination. For example, such a direction is suggested by Dowty (1991). Dowty suggests that an alternative analysis to the idea that the unaccusative/unergative distinction is purely grammatical and lexically determined is that the unaccusative/unergative distinction is actually an epiphenomenon arising from the semantic constraints on particular constructions. He states: “Certain grammatical constructions have certain meanings associated with them involving P-

Agent or P-Patient properties, hence a given intransitive verb is appropriate in such a construction only if it has the right kind of meaning. The set of grammatical rules/constructions appropriate to one semantic class, versus the set appropriate to the other class, thus isolates two classes of verbs, but via semantic constraints originating in the rules themselves” (1991:608). This analysis would “of course presupposes that a grammatical construction (or some morpheme serving as head of the construction) can be analyzed as having a meaning and/or conventional implicature of its own...” (1991:609).¹⁷

4.3.3 Wierzbicka

Language is an integrated system, where everything 'conspires' to convey meaning - words, grammatical constructions, and illocutionary devices (including intonation). (1988: 1).

In her book, *Semantics of Grammar*, Wierzbicka argues for the idea that grammatical morphemes and constructions are directly associated with meanings. She motivates this move by noting the sort of systematic semantic distinctions existing in related constructions that were discussed in Chapter 1.

In arguing that grammatical constructions are directly associated with meaning, W.'s approach fits squarely into the general approach of construction grammar, generally defined.

¹⁷A concrete proposal along these lines has been made by Legendre & Smolensky (1991). L&S propose that each test frame for unaccusativity may be associated directly with its own semantic requirements; they further propose that *in addition* verbs lexically encode a binary syntactic feature, which designates whether the verb is unaccusative. They suggest that grammaticality is determined by allowing for the interaction of semantic constraints of the various constructions and verbs together with the syntactic marker of unaccusativity.

She covers a breath-taking range of data, including causatives cross-linguistically, the Japanese adversative passive, the English ditransitive and a variety of complement types, and particular cases in Polish and Russian. However, the only construction that she discusses which is entirely lexically non-filled, and thus directly parallel to the cases discussed here is the ditransitive construction.

There are other differences between Wierzbicka's work and the present approach. While I have argued that there are lexical exceptions to the generalizations, and that there is a high degree of conventionalization associated with the association of verbs and constructions, Wierzbicka argues that the relationship between syntax and semantics is exceptionless. She states, "In every case...the syntactic possibilities are determined by the underlying semantic structures (that is, by the intended meaning). Generally speaking, what is semantically incoherent, is syntactically incongruous. Syntax, so to speak, follows from semantics."(1988: 4)

Another difference between Wierzbicka's account and the account proposed here is in the kind of semantics that is assumed. She adopts, following Leibnitz, a reductionist approach to semantics, attempting to account for the full range of semantic knowledge associated with open class (and closed class) lexical items in terms of a set of 15-20 atomic semantic elements including: *I, you, this, someone, something, time, place, want, don't want, say, think, know, imagine, become, and part*. She provisionally includes also *like, two, other, world, good, kind of and feel*. In particular, she proposes that the entire semantics of any lexical item can be captured by paraphrases involving these atomic semantic primitives combined in a determinate ways. We have taken rather the opposite approach to semantics, arguing that lexical items are associated

with rich frame-semantic or encyclopedic knowledge, and that decomposition into atomic elements is impossible.

Finally, the scope of the two projects only overlaps to a limited extent. Wierzbicka concentrates on exemplifying the existence of constructional meaning in a wide variety of constructions and in a wide variety of languages, whereas the present account has focussed on causal constructions almost exclusively in English. On the other hand, I have attempted to detail the way verbs and constructions are related, and to provide some overall picture of the way constructions may be related to one another in a general hierarchy of constructions.

Chapter 5

Partial Productivity

...if you invent a verb, say greem, which refers to an intended act of communication by speech and describes the physical characteristics of the act (say a loud, hoarse quality), then you know...it will be possible to greem, to greem for someone to get you a glass of water. to greem to your sister about the price of doughnuts, to greem "Ecch" at your enemies, to have your greem frighten the baby, to greem to me that my examples are absurd, and to give a greem when you see the explanation. (Zwicky, 1971:)¹

It has been a long standing puzzle that many constructions are used somewhat productively (as implied by the above quote), and yet resist full productivity. In this chapter, the issue of partial productivity is addressed by considering the ditransitive construction as an example. In the final section, other constructions which can be

¹This passage is taken from a squib by Arnold Zwicky in which he lists 20 properties that are systematically associated with manner of speaking verbs. Unfortunately the explanation alluded to in the quote is not forthcoming, as the quote is the last paragraph in the squib.

seen to be either more productive or less productive are considered.

The ditransitive construction can be used somewhat productively; i.e. the construction can be extended to new and hypothetical verb forms (e.g. Wasow 1981). For example, the new lexical item *fax* can be used ditransitively as in:

- (1) Joe faxed Bob the report.

Also, hypothetical lexical items are readily adapted to the ditransitive syntax. Marantz notes, for example, that if we define a new verb, *shin* to mean “to kick with the shin” it is quite natural for us to allow this new verb to be used ditransitively, as in:

- (2) Joe shinned his teammate the ball. (1984: 177)

Experimental evidence confirms the fact that speakers extend constructional patterns for use with novel verbs (Pinker et al. 1987; Pinker 1989; Maratsos et al. 1987; Gropen et al. 1989, 1991; Braine et al. 1990).

At the same time, the ditransitive pattern is not completely productive within any generally defined class of verbs. Seemingly closely related words show distinct differences as to whether they allow ditransitive syntax:

- (3) a. Joe gave the earthquake relief fund \$5.
b. *Joe donated the earthquake relief fund \$5.
- (4) a. Joe told Mary a story.
b. *Joe whispered Mary a story.
- (5) a. Joe baked Mary a cake.

b. *Joe iced Mary a cake.

Brown & Hanlon (1970) have argued that children are neither corrected nor mis-comprehended more often when they speak ungrammatically, so that they have no recourse to “negative evidence” that could allow them to either unlearn or avoid learning the above type of ungrammatical sentences (cf. Braine 1971, Baker 1979).

The standard solution to the no-negative-evidence problem in the case of vocabulary learning is to assume that there is indirect negative evidence in the form of attested input, assuming a principle that synonymy is avoided (cf. discussion in chapter 3). That is, a child may overgeneralize the past tense construction to produce *comed* as the past tense of *come*, but upon hearing *came* in the input, the child will expunge *comed* from her vocabulary, since she will assume that the language does not have two terms *comed* and *came* which are synonymous. Such indirect evidence is not forthcoming in an obvious way in the case of valence alternations. It is not likely that the child simply expunges:

(6) *He whispered the woman the news.

upon hearing

(7) He whispered the news to the woman.

because many verbs do occur in both forms (e.g. *give*) (but see the following section). Moreover, as noted above, experimental evidence shows that children do not learn valence selections entirely conservatively, i.e. solely on the basis of the input. If properly primed, they are willing to extend their use of verbs to previously unheard but related valences.

An apparent paradox arises then, since if speakers have a productive mechanism that allows them to extend the use of the ditransitive syntax to new and novel verbs, it is not clear what prevents speakers from overgeneralizing to produce the above ill-formed examples 3b-5b.²

5.1 The possibility of indirect negative evidence

I do not attempt to survey the full range of efforts to suggest that some type of indirect negative evidence is possible here (see Bowerman 1988 and Pinker 1989 for detailed discussion of the problem and critiques of many possible solutions), but there is one possibility (raised (1981, 1984) and then rejected (1989) by Pinker) that deserves further study.

Since we have assumed that no two constructions are entirely semantically *and* pragmatically synonymous (cf. discussion chapter 3), it should be possible to find

²As noted in chapter 4 (footnote 9), this paradox is often sidestepped in linguistic theories. I repeat the discussion here:

Whether relation-changing lexical rules are intended to be purely redundant generalizations over stored items in a fixed lexicon, or generative rules which produce new forms productively is often not made entirely clear.

Jackendoff (1975) for example states that his lexical rules were intended only to state existing regularities (both morphological and semantic) within the lexicon. These rules were represented by two way arrows which represented the symmetric relation “is lexically related to.” This aspect of Jackendoff’s account is crucial, since he argues explicitly against Lakoff’s (1965/1970) proposal that productive rules generate “hypothetical lexical entries.” However, Jackendoff also suggests that “after a redundancy rule is learned, it can be used generatively, producing a class of partially specified possible lexical entries.” (p. 668).

Bresnan (1982) also attempts to find a middle ground between non-productive rules and fully-productive rules. While the lexical rules of LFG are explicitly “redundancy rules,” the metaphor of a lexical-changing process is pervasive. The following is Bresnan’s early description of the passive lexical rule (*italics added*):

Passivization in English
 Functional *change*: (SUBJ) \Rightarrow \emptyset / (BY OBJ)
 (OBJ) \Rightarrow (SUBJ)
 Morphological *change*: V \Rightarrow V_[*Part*]

The use of single-headed arrows and the word “change” indicate that the rule is a generative relation *changing* rule. In fact, the notion of a “redundancy rule” itself is slightly oxymoronic, since a redundant statement of regularity, is not in any normal sense rule-like.

contexts in which a given construction is the most preferred. If the preferred form is *not* used, then the child is able to tentatively infer that that form is disallowed. The inference would have to be tentative, since it is unrealistic to expect speakers to systematically use the most felicitous form in all contexts. However, if the situation is repeated several times, the child's tentative hypothesis may become a fairly strong conviction. In this way, children would have the opportunity to unlearn certain overgeneralizations.

For example, consider a child's strategy in determining whether a given verb can occur in the ditransitive construction. As noted by Erteschik-Shir (1979) and discussed above in chapter 3, the ditransitive and its prepositional paraphrase with *to* differ in the information structure of the clause. In particular the ditransitive construction requires that the recipient argument be non-focused (or "non-dominant" in Erteschik-Shir's terminology), and the transferred entity be focused ("dominant"). Prepositional paraphrases, on the other hand, prefer the opposite information structure: the recipient tends to be focused, the transferred entity tends to be non-focused. Both of these generalizations are motivated by the fact that focused information tends to come at the end of the clause.

If the recipient is non-focused and the transferred entity is focused, we find the ditransitive more acceptable than the prepositional paraphrase:

(8) a. Sally gave him a brand new red Volkswagon. >

b. Sally gave a brand new red Volkswagon to him.

Conversely, if the recipient argument is focused, and the transferred entity non-

focused, we find the reverse situation:

(9) a. Sally gave that to a charming young man. >

b. Sally gave a charming young man that.

When using verbs which freely occur in both constructions, speakers are free to exploit the difference in pragmatic structure. There is, in fact, evidence that children are sensitive to these pragmatic factors (Gropen et al. 1989).

Indirect evidence would then arise from situations in which the discourse context matches one form, but the speaker nevertheless uses the less-felicitous form. For example, speakers use the prepositional form for *donate*, even when the information to be conveyed more closely matches the information structure of the ditransitive construction. E.g., if the child hears:

(10) Sally donated a brand new red Volkswagon to them.

instead of:

(11) Sally donated them a brand new red Volkswagon.

as might be expected given the fact that the car is the focused information, the child will infer that the ditransitive form is not a possibility for *donate*.

A similar case is the case between lexical and periphrastic causatives. It is well known that lexical causatives are used for cases of direct causation, whereas periphrastic causatives may be used for indirect causation (e.g. Fodor 1970; Shibatani 1973, 1976). Therefore, if, after seeing a magician make a bird disappear, the child hears her father say,

(12) Look! The magician made the bird disappear.

the child may tentatively hypothesize that one cannot say:

(13) *The magician disappeared the bird.

That is because, in this case, the causation is direct, which would make the lexical causative preferable if it were an option.

Pinker raises this possibility in several places (1981, 1984:400). However, he ultimately rejects the idea that this process could be sufficient for rejecting particular forms because 1) children's sensitivity to discourse contexts is statistical, not absolute and 2) other focusing devices such as pronouns, cleft constructions and contrastive stress can be used to override the default differences in information structure between alternative argument structures (1989:16).

Pinker suggests that children are only sometimes sensitive to discourse properties because children do not treat discourse effects as a determinate factor in choosing alternate argument structures; they are more likely to use an argument structure with the better-suited pragmatics, but they do not always do so (Gropen et al. 1989). However, the very fact that children are more likely to use the construction with better-suited pragmatics is sufficient to show that they do have an implicit knowledge of the information structure and they are able to attend to it. That is, it is possible that children wouldn't notice the first time that *donate* was used with the focus on the transferred entity, or the second time. But, eventually, the child would presumably notice, and would at that time be able to use the input evidence to form the hypothesis that *donate* can not be used in the ditransitive form.

The second reason Pinker gives is that adult speakers are able to compensate for using less-preferred argument structures by overlaying less-preferred argument structures with various focusing devices, thus altering the information structure preferred for particular argument structures as a default. Assuming that speakers make use of these strategies, the input would be for the most part optimal, and children would have no reason to infer that the speaker would have used the different argument structure if he could have.

However this suggestion is ultimately not persuasive, since it is not clear that the alternative focusing devices are able to *alter* or override the information structure of the clause. Instead, there is reason to think that they are actually used to exploit the independently existing information structure of the clause. For example, pronouns are preferred in non-focus positions:

(14) a. She gave it to a woman. >

b. She gave a woman it.

(15) a. She gave her a brand new house. >

b. She gave a brand new house to her.

Similarly, focus constructions have been claimed to only apply to argument positions that are otherwise focused. For example, Erteschik-Shir (1979) has argued that the recipient argument of the ditransitive construction is not available for occurrence in focused constructions because it is non-focused:

(16) a. ?? Who did you give the book?

b. ?? It was Mary you gave the book.

c. ??Was it Mary you gave the book?

Finally, focus stress is also more felicitous on arguments which are in focal position, thereby generally emphasizing the information structure rather than overriding it. Thus while both 17a and 17b are acceptable, example 17a is slightly more felicitous:

(17) a. She gave the key to A CRAZY PERSON! >

b. She gave A CRAZY PERSON the key!

Therefore, focusing devices might well give the child additional evidence of the information structure of the clause rather serving to dilute the evidence by providing ways for the adult speaker to circumvent the information structure associated with particular argument structures. Since two constructions generally differ either semantically *or* pragmatically, the hypothesis that indirect negative evidence is inferred from hearing a verb in a less-than-optimal construction deserves further study.

5.2 Circumscribing Verb Classes à la Pinker 1989

Pinker (1989), arguing against any negative evidence (direct or indirect), ultimately provides a different, compelling resolution of the paradox of partial productivity. A broad range rule is proposed to capture the necessary conditions for various valences. In the case of the ditransitive, Pinker posits a broad range rule that states in effect that a prospective possessor must be involved — i.e., the first object referent must be understood to be a prospective possessor. This general rule does not provide sufficient

conditions, however, there being many verbs which can be understood to involve a prospective possessor which do not allow ditransitive syntax (cf. *donate, contribute, pull, shout, choose, credit, say*).

Drawing on work by Green (1974), (and Levin (1985) and Rappaport & Levin (ms) for the locative alternation), Pinker suggests that sufficient conditions are determined by a set of narrow range rules which classify verbs into narrowly defined semantic classes. The specific classes that Pinker proposes are the following (cf. also Gropen et al. 1989):

1. Verbs that inherently signify acts of giving, e.g. *give, pass, hand, sell, trade, lend, serve, and feed*.
2. Verbs of instantaneous causation of ballistic motion, e.g. *throw, toss, flip, slap, slap, poke, fling, shoot, blast*.
3. Verbs of sending, e.g. *send, mail, ship*.
4. Verbs of continuous causation of accompanied motion in a deictically-specified direction: *bring, take*.
5. Verbs of future having (involving commitments that a person will have something at some later point), e.g. *offer, promise, bequeath, leave, refer, forward, allocate, guarantee, allot, assign, advance, award, reserve, grant*.
6. Verbs of communicated message e.g. *tell, show, ask, teach, pose, write, spin, read, quote, cite*.

7. Verbs of instrument of communication, e.g. *radio, e-mail, telegraph, wire, telephone, netmail, fax*.
8. Verbs of creation, e.g. *bake, make, build, cook, sew, knit, toss* (when a salad results), *fix* (when a meal results), *pour* (when a drink results).
9. Verbs of obtaining, e.g. *get, buy, find, steal, order, win, earn, grab*.

It may seem that if we admit the possibility of indirect negative evidence as suggested above, that there is no need to adopt Pinker's suggestion that narrowly defined semantic classes also play a role in the acquisition of argument structure. However, circumscribing narrowly defined classes of verbs to be associated with a particular construction will allow us to account for extremely low frequency or novel non-alternating verbs (since the indirect negative evidence presupposes hearing the verb in a non-optimal construction on several occasions).³ For example taking Zwicky's example of a novel verb *greem*, defined as a manner of speaking verb, in which the speech is of a loud, hoarse quality, speakers presumably know that they *cannot* say:

(18) *He greemed her the news.

This knowledge cannot be attributed to any kind of indirect negative evidence because the verb is novel; speakers would not have had a chance to unlearn or avoid learning it in this use. Other cases in which the type of indirect negative evidence suggested above would not be an aid to acquisition might include cases in which the construction in question is so low-frequency that the child can never with any modicum of

³I thank Jess Gropen for bringing this case to my attention

confidence expect its occurrence, and cases in which there is no construction which is closely related enough semantically to the target construction that the child would be able to infer that the speaker would have used the target construction if possible.⁴ Moreover, the generalizations Pinker describes are real; it is necessary to account for the fact that verbs which are used in particular argument structures do often fall into similarity clusters. There is no reason not to believe that children exploit multiple sources of evidence for learning argument structure; it is suggested that they make use of narrowly defined verb classes, as well as appealing to some degree of indirect negative evidence as described above.

Before continuing with Pinker's argument, we might make several small comments on this particular set of subclasses. First, the fifth subclass, "Verbs of future having," actually can be seen to conflate three distinct subclasses. Some of the verbs are used in expressions which imply that the subject argument actually acts to cause the first object argument to receive the second object argument at some later point in time (e.g. *bequeath, leave, forward, allocate, assign*). In other cases, only if the *satisfaction conditions* (Searle 1983) associated with the act denoted by the predicate hold does the subject argument cause the first object argument to receive the second object argument at some later point in time (e.g. *promise, guarantee, owe*). Finally some verbs are used in expressions which imply that the subject argument only *enables* the first object argument to receive the second object argument (e.g. *permit, allow*).

The sixth class, verbs of communicated message, should be understood to include

⁴Examples of the latter situations would seem to include the English middle construction (e.g. *This book reads easily*, and the *X's way* construction (cf chapter 9). However, these cases are perhaps not convincing as cases which require recourse to Pinker's subclasses, since these particular cases seem to be fully productive once general semantic constraints on the constructions are identified.

verbs whose inherent semantics involves a communicative act, in order to distinguish this class from similar verbs such as *say*, *assert*, *claim*, and *doubt* which might be described as verbs of propositional attitude. Understood in this way, several of the verbs listed by Pinker seem to be misclassified; for example, *pose* and *spin* do not obviously fall into the class of “verbs of communicated message,” and accordingly, are not (at least in my dialect) readily dativizable:

(19) ?*Bill posed him a problem.

(20) ?*Bill spun her a fairy tale.

Both this class and the seventh class, verbs of instrument of communication, should be classified as metaphorical classes since they are based on a systematic metaphor which involves understanding meaning as being packaged in linguistic form and sent between interlocutors (Reddy 1979).

Finally, at least one additional subclass should be added to the list of subclasses. This involves verbs of refusal (e.g. *refuse*, *deny*), e.g. *Bill refused Joe a raise. The committee denied him a promotion.* Expressions involving these verbs imply that the subject argument refuses to cause the first object argument to receive the second object argument. In any case, we need only accept the spirit of Gropen et al. (1989)’s analysis, that narrowly defined semantic subclasses need to be identified, in order to accept Pinker’s conclusion that this type of narrow circumscription allows us to capture the fact that other subclasses of verbs which refer to the same kind of general events, but do not fall into any of the above particular classes, fail to dativize. Their examples of such nondativizing classes are as follows:

1. Verbs of fulfilling (X gives something to Y that Y deserves, needs, or is worthy of): **I presented him the award; *I credited him the discovery. *Bill entrusted/trusted him the sacred chalice; *I supplied them a bag of groceries.* [I would also include in this class non-dativizing *concede, furnish, and donate.*]

2. Verbs of continuous causation of accompanied motion in some manner: **I pulled John the box. *I carried/pushed/schlepped/lifted/lowered/hailed John the box.*

3. Verbs of manner of speaking:
**John shouted/screamed/ murmured/whispered/yodeled Bill the news.*

4. Verbs of propositions and propositional attitudes:
**I said/asserted/questioned/claimed/doubted her something.*

5. Verbs of choosing: **I chose/picked/selected/favored/indicated her a dress.*

Gropen, Pinker, Hollander, Goldberg and Wilson (1989) provide experimental evidence to show that speakers are sensitive to certain morphophonological constraints. In particular, verbs with particular morphemes such as *per-*, *con-*, *-mit*, *-sume* and polysyllabic verbs with non-initial stress are disallowed. These constraints largely coincide with distinctions between Latinate and native vocabulary, and between specialized and more basic vocabulary; however, we clearly would not want to ascribe recourse to etymological information to children, and the experiments in support of these particular constraints controlled for semantic information. Therefore, the constraints are stated in terms of morphophonology. These constraints are used to explain the following:

(21) Chris bought/*purchased/*obtained/*collected him some food.

(22) Jan told/*explained/*reported/*announced Chris a story.

However the constraints do not apply to every narrowly defined classes of verbs. Verbs of future having, in particular, are not subject to this constraint:

(23) Chris assigned/allotted/guaranteed/bequeathed him the tickets.

The class of instrument-of-communication verbs and the class of creation verbs also include verbs which are exceptions to the morphophonological constraint:

(24) Chris e-mailed/radioed/arpanetted him a message.

(25) Chris xeroxed/thermofaxed/nroff'd him a copy.

Gropen et al. suggest that each of the verbs in exs. 24-25 is classified independently of the morphological criteria as a special kind of complex stem having a noun or name as its root. They cite evidence that tacit knowledge that a word's stem is from another category allows it to be treated specially with respect to morphological processes (cf. Pinker & Prince 1988). To account for these cases, we can state the generalization that a verb from any class which is understood to have a noun or name as its root, is not constrained by the morphophonological constraint.

The narrowly defined subclasses of verbs together with the morphophonological constraint provide a high degree of predictive power. A new or nonsense verb which falls into one of the recognized narrow classes of verbs and which, if applicable, obeys the morphophonological constraint, is automatically licensed to be used ditransitively

(however see next section). Verbs in conflict with these constraints are ruled out. This circumscribing of narrow domains in which the ditransitive is locally productive goes a long way toward accounting for the apparent paradox which Pinker sets out to resolve: that the ditransitive syntax can be extended to new and novel verbs, but at the same time is not available to all verbs of any broadly defined class.

5.3 Exceptions

The above generalizations are compelling, and in fact every researcher who has studied the semantics of the ditransitive construction in any detail has found it necessary to classify verbs which occur in the construction into narrowly defined subclasses as a descriptive device (cf. Green 1974; Oehrle 1976; and Wierzbicka 1986). Still, there are various kinds of exceptions to the generalizations just described. First there are subclasses with a couple of occurring members which are nonetheless not fully productive. There is a degree of variability in judgments for verbs which are supposedly within the same narrowly defined class. Finally, there are exceptional verbs such as *envy* and *forgive* which do occur in the ditransitive construction although they do not entail the relevant semantics.

Each of these cases is discussed in turn. In section 3.5, an interpretation of the nature of the verb classes is suggested which can naturally account for all of these seemingly problematic phenomena.

The existence of unproductive subclasses

The small classes of verbs of permission (*permit, allow*) and verbs of refusal (*refuse, deny*) are unique in not forming productive subclasses:

(26) a. Sally permitted/allowed/*let/*enabled Bob a kiss.

(27) b. Sally refused/denied/*prevented/*disallowed/*forbade him a kiss.

These classes actually have a slightly different status in the theory proposed by Pinker (1989), because the verbs in these classes do not alternate with prepositional paraphrases. Thus, on Pinker's account, semantically related verbs are not eligible to undergo the lexical rule. However, since we are not postulating a lexical rule, we cannot appeal to the same solution. We need another way to account for their lack of productivity.

Differences in judgments within narrowly defined classes

An expected source of idiosyncrasy stems from the fact that the determination of which narrowly-defined class a given verb belongs in is not always entirely clear-cut. For example, I have suggested that *bequeath* falls into the dativizing class of verbs of future having, along with *leave, forward, allocate*, etc. However, it seems it might be possible to instead classify *bequeath* in the non-dativizing class of verbs of fulfilling (X gives something to Y that Y deserves, needs, or is worthy of), along with *present, credit, entrust, donate*, etc. Because of these two classification possibilities, we would expect *bequeath* in fact to dativize in some dialects, and not to dativize in others. In general, in the case of verbs that may fall into one of two classes, one which can

appear ditransitively and one which cannot, we would expect to find some dialectal variation in whether the verbs can be used ditransitively.

Another source of lexical idiosyncrasy is evidenced by the fact that speakers occasionally report different degrees of grammaticality even among verbs which are uncontroversially within the same narrow range class. For example, *throw* and *blast* both fall within the class of verbs of instantaneous causation of ballistic motion and yet:

(28) She threw him a cannonball.

is decidedly better for many speakers than,

(29) She blasted him a cannonball.

Similarly,

(30) ? Sally designed him a sculpture.

is judged to be more grammatical than,

(31) ?? Sally created him a sculpture.

although both *design* and *create* should fail to dative because of the verbs' non-initial stress. These facts are not obviously accounted for on Pinker's proposal, since according to the theory, the productive rule should operate blindly within narrowly defined classes; there is no reason to expect some instances to be judged more acceptable than others.⁵

⁵Pinker (p.c.) has suggested that differences in judgments are only unexpected if they do not also hold in the input form. For example, we should only expect:

Positive exceptions

There are a few ditransitive expressions that do not entail any associated transfer. Some uses of *ask* can be fit into the pattern described above if they are interpreted as instances of the a metaphor involving understanding information as traveling from speaker to hearer (cf. Reddy 1979). For example,

(35) She asked Sam a question.

can be understood to mean she caused Sam to “receive” a question. However, other uses of *ask* are clearly exceptional, e.g.:

(36) She asked Sam his name/his birthday/his marital status.

This type of example clearly does not imply that Sam potentially receives his name, his birthday or his marital status. Grimshaw (1979) discusses these “concealed questions” at some length.

She argues that noun phrases such as those above, that are semantically questions, can appear as arguments of any verb which subcategorizes for an NP in that position and which selects for a question complement. Thus example 36 is motivated by

(32) She blasted him a cannonball.

to be as good as:

(33) She blasted a cannonball to him.

And in fact, both examples are fairly odd.

However, the question still remains as to why the input form is not fully acceptable, since other “verbs of ballistic motion” are acceptable in that form. That is, how is it that the child learns that *blast* is not completely felicitous in the input argument structure?

Moreover, this line of reasoning will not account for the difference in judgments between 29 and 30, since in both cases, the input forms are completely acceptable:

(34) a. Sally designed a sculpture for him.

b. Sally created a sculpture for him.

factors which are independent of the ditransitive construction, resulting in a case of “target-structure conspiracy” in the sense of Green (1973).⁶

Forgive and especially *envy* as used in:

(37) He forgave her her sins.

(38) He envied the prince his fortune.

are also exceptional. The subjects in these cases are not causal and no reception is involved. However, these predicates have illuminating semantic histories. *Forgive* and *envy* historically had senses that were closely related to *give*. *Forgive* used to mean “to give or grant” (OED:452). *Envy* used to mean “to give grudgingly” or “to refuse to give a thing to” (OED:232). This of course is not evidence that *forgive* or *envy* are part of the synchronic semantic pattern outlined above. But the historical facts do suggest that these predicates were at least at one time associated with this sort of pattern. These facts also of course suggest that the construction can occasionally be frozen without continuing reference to the original semantics.

However, it seems reasonable that syntactic change should tend toward patterns that are more transparent to the speaker. If the construction with the semantics outlined here is psychologically real, then it would be natural for odd cases of ditransitives involving *forgive* and *envy* to drop out of use. And in fact I myself find archaic sounding sentences involving *forgive* and *envy* much more acceptable than modern-sounding sentences. For example:

⁶More needs to be said about how exactly these cases would be worked out on a constructional account. I do not attempt a full explanation here.

(39) a. She forgave him his sins.

b. ?*She forgave him his goof.

(40) a. She envied him his vast fortune.

b. ?*She envied him his extensive stock portfolio.

In fact, in attempting to explain the idea of positive exceptions to a class of undergraduate cognitive science students, I wrote sentence 39a and 40a on the board. In response an audible groan arose from the class. When asked what was wrong, the students said they didn't find those sentences acceptable (this judgment was held by more than half of the students). Thus it seems that *envy* and *forgive* are dropping out of the language (at least among speakers under 21), just as we would expect if the semantics associated with the ditransitive pattern were synchronically real.

Nonetheless, *envy* and *forgive* have been exceptions for some time, and have been learned by new generations of speakers. Thus an adequate account of grammar must allow for some degree of lexical idiosyncrasy, despite semantic motivations (cf. also Lakoff 1965/1970; Fillmore 1977b; Rosen 1984; Mithun 1991; Dowty 1991).

These cases are unproblematic from the point of view of learning, since the child has positive evidence that these verbs are used in this construction, and can therefore learn them on an instance by instance basis as idioms.

5.4 Accounting for the Exceptions: A usage-based account

In the preceding sections, we have seen that even after embracing the idea of narrowly defined classes to account for the partial productivity of the construction, there remains a residue of lexical idiosyncrasy. There are small subclasses which are not productive, varying degrees of acceptability within narrowly defined seemingly productive subclasses, and positive exceptions to the semantic generalizations such as *envy* and *forgive*.

This idiosyncrasy is in fact expected because of certain experimental findings. Gropen et al. (1989) show that speakers “tend to be conservative” in their use of lexical items. Specifically they show experimentally that people tend to use lexical items in the same constructions in which they heard those items used, but that they can, if properly primed, extend the uses to new patterns.⁷ This phenomenon would be impossible unless people store in memory the specific syntactic patterns that a word is heard used with (see also Bybee 1985, Langacker 1987a for particular usage-based models of grammar). This being the case, a certain degree of lexical idiosyncrasy is to be expected.

The existence of some degree of lexical idiosyncrasy, however, should not be taken as counterevidence for the existence of narrowly defined semantic subclasses of verbs that occur in the ditransitive construction. Although the exact formulation of the

⁷It is not clear whether this information is stored indefinitely since Gropen et al.’s finding of a tendency toward conservatism is only demonstrated in a single experimental encounter. It would be interesting to see if the tendency toward conservatism were lessened by allowing an intervening time interval of a number of days between the acquisition of a novel word, and the subsequent production of that word.

classes has differed, the existence of such subclasses has been noticed by every researcher who has looked at the verbs which occur in the ditransitive construction in any detail. And, as has just been discussed (and is spelled out in more detail in Pinker 1989), the existence of such classes helps to explain the phenomenon of partial productivity.

These two facts, that there are productive narrowly defined verb classes, and that at the same time we find scattered positive exceptions and varying degrees of acceptability within narrowly defined classes can be reconciled by recognizing verb classes to be *implicitly* represented as generalizations over learned instances. Because memory is associative, relationships between similar verbs used in the same valences are classified together by general categorization processes. Therefore, the claim is that speakers attempt to *categorize* learned instances.

Narrowly defined verb classes, then, are implicitly represented as clusters of semantically related verbs known to occur with a given construction. New or previously unclassified verb forms are attracted to existing clusters on the basis of similarity to existing cases.

The principles that delimit the verb classes can be seen as providing a similarity metric on which to base analogies. That is, judgments of similarity are notoriously flexible and variable, and two things can almost always be said to be similar in some respect. Therefore in order to adequately defend the idea that the use of new and novel senses is determined by similarity to existing cases, one must define the similarity metric which is to be used as the basis of comparison. The verb classes can be viewed as providing the similarity metrics. For example, if one of the verb classes

associated with the ditransitive is “verbs of ballistic motion” then we can consider *shin* to be relevantly like *kick* in that it is a verb of ballistic motion.

The determination of which verb classes are relevant, or alternatively, what features of similarity are important requires empirical cross-linguistic study, and I do not claim to provide an account here (but cf. Pinker 1989 for discussion and suggestions). Only by looking at what distinctions are made cross-linguistically can we determine what are the semantically (or morphophonologically) relevant aspects of verb meaning which determine the basis of the clustering into subclasses.

On this view, type frequency is expected to affect the classification of new verbs. Two types of frequency information need to be distinguished. On the one hand, there is *token* frequency which refers to the number of times a given instance (e.g. a particular word) is used in a particular construction; the other type of frequency is *type* frequency, which refers to the number of distinct words that occur in a particular construction. MacWhinney (1978) and Bybee (1985) have argued that the type frequency of a particular process (or a particular construction) plays a crucial role in determining how likely it is that the process may be extended to new forms. That is, the higher the type frequency, the higher the productivity.

To see the relevance of the type-token frequency distinction for productivity, consider the following example cited by Bybee (1985: 132-133). She notes that Guillaume (1927) documented the fact that French speaking children most frequently overgeneralize the use of First Conjugation suffixes with verbs of other conjugations. He also observed the number of verbs of each conjugations used spontaneously in children’s speech. Bybee cites the following table which shows the number of occurrences of

each conjugation class, and the number of verbs used from each class:

| Conjugation class | Number of uses | Number of verbs | Number of uses | Number of verbs |
|-------------------------|----------------|-----------------|----------------|-----------------|
| First(<i>chanter</i>) | 1,060 | 36.2% | 124 | 76.0% |
| Second(<i>finir</i>) | 173 | 6% | 10 | 6.1% |
| Third(<i>vendre</i>) | 1,706 | 57.8% | 29 | 17.9% |

Table 5.1

Although more than half of the number of tokens or “uses” of verbs were of the Third Conjugation class, the number of different verbs that occurred in this class was much smaller than the number which occurred in the First Conjugation class. Correspondingly, the First Conjugation class was seen to be much more productively used.

The proposal to implicitly represent verb classes as similarity clusters can perhaps be made more clear by the following rough and ready representation (morphophonological similarity is not represented):

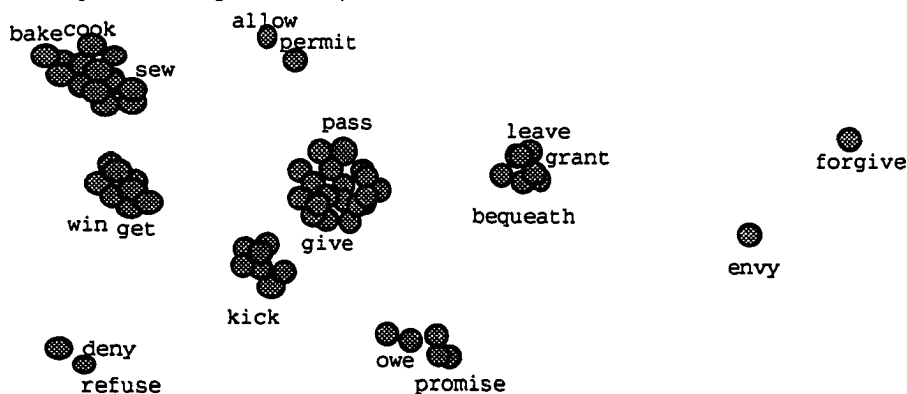


Figure 5.1 Projection of Semantic Similarity of Verbs Used in the Ditransitive Construction

Semantically related verbs are projected onto two dimensions, with semantically closer verbs being represented by physically closer circles. One or more instances

within a given cluster have been labeled by way of demonstration. The circles representing *bake* and *cook*, for example, are close together to indicate their being in the same narrowly defined class.⁸

Type frequency can be discerned by considering the number of circles in any of the clusters which designate narrowly defined verb classes. Clusters of more circles are more likely to be productive. Subclasses with only two members, e.g. verbs of refusal (*deny*, *refuse*) are expected not to be productive because of their low type frequency.

The idea that verbs are represented this way in an associative memory is of course inspired by recent connectionist representations. However, the diagram need not be construed as necessarily presupposing a connectionist model of memory; all that is needed is an associative memory (e.g. as proposed in work in the domain of morphology by Pinker(1991).)

This view of the way new verbs are attracted to learned instances makes several predictions. First, it predicts that subclasses with few members will not contain enough instances to create a similarity class, and so will not be productive. Secondly, it predicts the possibility of differences in judgments within similarity classes. Such differences will result from 1) the degree of similarity between the case being judged and other cases within the subclass, and 2) the degree of type frequency that the relevant cluster displays. It is not necessary (or possible) to exhaustively list all the verbs that can potentially occur in a given construction. Novel cases are analogized

⁸I have not attempted to delimit the relevant parameters, so the relative closeness of the circles is not claimed to be accurate in detail.

to previously learned cases on the basis of the the similarity to learned cases and the type frequency of similar cases.

Occasional positive exceptions (such as *envy* and *forgive* for the ditransitive construction) are tolerated because speakers simply associate the words with the constructions idiosyncratically. There is no danger of productive extensions from these outliers because they, like subclasses of fewer than two members, do not constitute a cluster, and therefore do not attract novel cases.

The representation in Figure 2 entails that the knowledge that certain verbs are used in a particular construction is part of a speaker's competence. However it is not necessary that each new entry is stored as an additional member of a cluster throughout the speaker's life. It is possible that once a critical mass of instances in a particular cluster is learned, insuring that novel instances which fall into the class will be extended, new cases are no longer stored in memory, since they would provide only entirely redundant information. It is also possible that learned instances are not necessarily stored as discrete, clearly individuated cases; rather the edges of learned instances which form a cluster may blend into each other, delimiting an area in semantic space without specifically retaining each individual instance.

Other Constructions

The ditransitive provides a good example of a construction with associated verb classes. However, the degree of productivity of particular constructions can be seen to form a cline, between those constructions which are not fully productive even

within narrowly defined verb classes, and those which approach full productivity, as long as general constraints are obeyed. An example of the first case, of very limited productivity (at least in some dialects) is the resultative construction. As discussed in chapter 8, there is a large degree of idiosyncrasy as to whether verbs can occur with resultatives, and if they can, with which resultative phrases. Notice the following contrasts:

(41) a. She shot him dead. >

b. ?? She blasted him dead.

(42) a. She cried herself to sleep. >

b. She cried herself asleep. >

c. ?? She wept herself to sleep/asleep.

(43) a. ?? He ate himself asleep.

b. ?? He cried himself sick.

At the same time, it is clear that resultatives are not entirely idiomatic, and do occasionally occur productively. For example:

(44) a. I cried myself well-nigh blind (1884 Tennyson, Grandmother X, cited by Visser 1963)

b. Drive your engine clean (Mobile ad; cited by Rappaport Hovav & Levin 1991ms)

- c. She could wonder herself crazy over the human eyebrow (1881 R.L. Stevenson, *Virginibus Puerisque*)

The particular factors which underlie the limited productivity of this construction must take into account semantic factors of the type outlined in chapter 8. In addition, morpho-phonological factors, as Gropen et al. 1989 found was the case with the ditransitive, and the token frequency of the analogical source may need to be taken into account. The role of each of these factors remains for further research.

An example at the opposite end of the continuum is the *way*-construction discussed in chapter 9. This construction, appears to be almost entirely productive. The following examples come from the Oxford University Press Corpus:

- (45) a. But he consummately ad-libbed his way through a largely secret press meeting.
- b. ...nasty gossip about me now sludging its way through the intestines of the society I know...
- c. I cannot inhabit his mind nor even imagine my way through the dark labyrinth of its distortion.
- d. ...their customers snorted and injected their way to oblivion and sometimes died on the stairs.
- e. ...[they] hoped they too could massage their way to keeping power.
- f. Lord King craftily joked and blustered his way out of trouble at the meeting.

As discussed in chapter 9, the few non-occurring cases (such as vanilla motion verbs *go*, *walk*, *move*) can be accounted for by general semantic constraints on the construction. Interestingly, the token frequency of this construction is low, with one example occurring approximately every 40,000-56,000 words in the Lund Corpus of conversational texts and the Wall Street Journal.⁹ This provides support for the idea that productivity has little to do with token frequency, and more to do with type frequency.

The range of differing productivity is exactly what we would expect given the usage-based model of grammar described above. That is, learned and thus stored resultative cases are few and only dot the semantic landscape; little or no clustering of examples is attested. Therefore novel extensions sound novel, and are not fully idiomatic as are extensions of the ditransitive cases such as *fax* or Marantz's novel verb *shin*.

At the same time, attested *way* construction examples seem to span the spectrum of semantic space, given the general constraints imposed by the construction. Since the construction has such a high type frequency of attested verbs, novel verbs are freely used in the construction.

Productive Links

As discussed in chapter 3, relationships between constructions, represented by various types of inheritance links, are also objects in our system. Different instances

⁹The frequency of *way* examples is increased dramatically in one particular subtext of the Lund corpus (not included in the above statistic) taken from various sports commentaries to an example every 2,500 words. The difference in frequency can be attributed to the semantic constraints on the construction: forceful or deliberate motion despite obstacles is particularly appropriate in competitive sport contexts.

of a given link occur with different type frequencies, just as different instances of a particular construction occur with different type frequencies.

For example, the causative-inchoative relation which is represented by a kind of subsumption inheritance link, occurs between the caused-motion and intransitive motion constructions, the resultative and the intransitive resultative constructions, and the simple causative and simple inchoative constructions. Therefore this particular link would be said to have type frequency of at least three.

Some of the polysemous extensions we have seen occur in both the ditransitive construction and the caused-motion construction. Each of these polysemy link's type frequency is increased with every construction which is extended in the same way.

Because productivity is directly correlated with type frequency, the higher the type frequency, the more likely a particular inheritance link will exist between pairs of new constructions which are relevantly similar to the pairs of existing constructions, which the inheritance link already relates. In the limiting case, an extension will apply fully productively, yielding extensions every time a novel construction is encountered, as long as that construction satisfies the particular semantic characteristics of the existing instances. In this case, the link between the two constructions is quite analogous to a rule, in that the existence of one form can be used to predict the existence of the other form.

For example, the passive construction, discussed briefly at the end of chapter 2, is instantiated by many different particular versions of the construction: one corresponding to each active construction with the relevant semantics (the active construction must have at least two arguments, one of which is higher on the role hierarchy than

the other). Because the link between active and passive constructions occurs between so many different active and passive pairs, it has an extremely high type frequency. Therefore the passive link is, in effect, rule-like in its application.

5.5 Conclusion

The account proposed to account for the partial productivity of constructions involves two types of learning mechanisms. The first is a type of indirect negative evidence, based on the hypothesis that every construction contrasts with every other construction. Therefore upon hearing a verb in a given construction that would otherwise be non-optimal given the current context, the child tentatively hypothesizes that the verb cannot occur in the preferred construction. The reasoning is roughly, "If that construction could have been used, I guess it would have been used; therefore maybe it can't be used." Upon witnessing the verb in a non-optimal construction, given the context, a number of times, the child's hypothesis that the verb cannot occur in the target construction is strengthened. This strategy was first proposed by Pinker (1981); his later rejection of this strategy (Pinker 1989) was argued to have been unwarranted.

The second learning mechanism, presumably working in tandem with the first, draws largely on recent work by Pinker (1989) and the related experimental evidence of Gropen et al. (1989). Specifically, the need to circumscribe narrowly defined semantic subclasses characterized by local productivity is acknowledged.

The account proposed here differs somewhat from Pinker's and Gropen's in that on the present account, the narrowly defined subclasses are understood to be clus-

ters defined by semantic and morphophonological similarity that are conventionally associated with the construction, as opposed to subclasses that are conventionally allowed to undergo a lexical rule. Moreover, on the account presented here, the verb classes are interpreted as implicit generalizations over learned instances. This is done in order to account for small non-productive subclasses, differences in judgments even within narrowly defined classes, and the existence of positive exceptions such as *envy* and *forgive*. In addition, viewing verb classes as clusters of cases in an associative memory allows us to assimilate other cases which involved markedly more or less productivity. In particular, the resultative construction was argued to be productive only to a limited degree, whereas the *way* construction is almost fully productive.

It may seem that by allowing the knowledge of whether a verb is used in a particular construction to be stored, the existence of the construction as an independent entity is undermined. That is, if we posit the fact that *kick* can be used with the ditransitive construction as a piece of grammatical knowledge, why not instead posit a new sense of *kick*, along the lines suggested by semantic changing lexical rule accounts (cf. discussion in chapter 4)?

The reasons to postulate the construction are analogous to the reasons why other researchers have wanted to postulate a lexical rule; in order capture the generalizations across the instances. Moreover, it is claimed here that what is stored is the knowledge that a particular verb, *with its inherent meaning*, can be used in a particular construction. This is equivalent to saying that the composite fused structure involving both verb and construction is stored in memory. By recognizing the stored

entity to be a *composite* structure, we gain the benefits described in Chapter 1 and 4 over a lexical rule account. For example, we avoid implausible verb senses, since *kick* does not mean “to cause to receive by kicking,” rather the *composite* structure of verb and construction has this meaning. We also allow other syntactic processes to refer to the inherent lexical semantics of the verb. That is, we do not lose the information conveyed by the verb, because the verb is not *changed* into a new verb with a different sense.

Chapter 6

The English Ditransitive Construction

6.1 Introduction

The ditransitive construction has already been discussed with respect to its polysemy (chapter 2) and its partial productivity (chapter 5). In this chapter, I concentrate on particular semantic constraints and metaphorical extensions of the construction. Highly specific semantic constraints are associated directly with the ditransitive argument structure, revealing a more specific semantic structure than is generally acknowledged. In particular, the central sense is argued to involve transfer between a volitional agent and a willing recipient. Several systematic metaphors are identified and associated with the construction, showing that expressions such as *Mary gave Joe a kiss*, and *Mary's behavior gave John an idea*, which are often assumed to be idiosyncratic are instances of a large and productive class of expressions which are based on

systematic metaphors.

Before getting to those constraints, however, evidence that a construction is indeed required for this case is reviewed.

6.2 The existence of the construction

Following the program laid out in the previous chapters, it is necessary to show that aspects of the syntax or semantics of ditransitive expressions are not predictable from other constructions existing in the grammar. To see that the construction contributes semantics not attributable to the lexical items, consider the verb *bake* when used ditransitively:

- (1) Sally baked her sister a cake.

This expression can only mean that Sally baked a cake with the intention of giving the cake to her sister. It cannot mean that Sally baked the cake so that her sister wouldn't have to bake it; nor can it mean that Sally baked the cake as a demonstration of cake-baking; nor can it mean that Sally baked a cake for herself because her sister wanted her to have one. Unless we associate the "intended transfer" aspect of meaning to the construction, we are forced to say that *bake* itself means something like "X intends to cause Y to receive Z by baking." This "transfer sense" of *bake* would be posited only to avoid attributing aspects of the semantics to the construction. The positing of such ad hoc verb senses, which only occur in a particular construction, was argued against extensively in previous chapters.

In addition, as was noticed by Hall-Partee (1965/1979: 60) and Green (1974:103), the goal argument of ditransitives must be animate — i.e., must be a recipient:

- (2) a. She brought the boarder/*the border a package. (cited by Gropen et al. (1989), and attributed to J. Bresnan)

As has been argued in chapters 1 and 4, this semantic constraint is most parsimoniously attributed to the construction.

Ditransitive expressions are syntactically unique in allowing two non-predicative noun phrases to occur directly after the verb; i.e., the fact that English will allow such a configuration is not predictable from other constructions in the language. In addition, it is the only construction which links the recipient role with the OBJ grammatical function.

The construction is represented as follows:

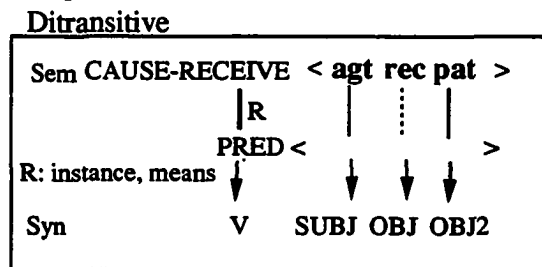


Figure 6.1

The construction's agent and patient roles must be fused with independently existing participant roles of the verb (represented by the PRED variable), as is indicated by the solid lines between the agent and patient argument roles and the PRED's participant roles. The recipient role may be contributed by the construction; this is indicated by the dashed line between the recipient argument role and the PRED's

array of participant roles.

6.3 The Semantics

The semantics of the ditransitive construction has not been understudied, and this work owes a large debt to previous analyses, in particular to Cattell (1984), Green (1974), and Oehrle (1976), for their detailed analyses of hundreds of ditransitive expressions.

6.3.1 Volitionality of the agent

There are certain semantic constraints on the ditransitive syntax which have not been incorporated into most theories of argument structure. The reason these constraints are often overlooked is that there appear to be exceptional cases. However, the exceptional cases form a delimitable class that can be seen to involve a general systematic metaphor (of the type described in Lakoff & Johnson 1980). It will be shown that the constraints do in fact hold in the source domain of the metaphor.

To identify the first constraint, notice that each of the verbs described so far independently selects for a volitional subject argument. This generalization can be captured by assigning a constraint on the subject argument's volitionality directly to the construction.

The volitionality must extend so that not only is the action described by the verb performed agentively, but also so that the transfer is intended. For example, in:

(3) Joe painted Sally a picture.

Joe must be understood to intend to give the picture to Sally. It cannot be the case

that Joe painted the picture for someone else and later happened to give it to Sally.

Similarly, in:

(4) Bob told Joe a story.

It cannot be the case that Bob told the story to someone else, and Joe just happened to overhear.¹ This constraint accounts for the ill-formedness of the following examples:

(6) *Joe threw the outfielder the ball he had intended the firstbaseman to catch.

(7) *Hal brought his mother a cake since he didn't eat it on the way home.

(8) *Joe took Sam a package by leaving it in his trunk where Sam later found it.

This is not to say that the first or second object arguments of the ditransitive cannot be given a transparent interpretation. The description used to pick out the argument referents may be understood to be the speaker's description, not the subject argument's. For example, it is acceptable to say:

(9) Oedipus gave his mother a kiss.

despite the fact that Oedipus did not realize he was kissing his mother. Likewise, it is acceptable to say:

(10) Joe gave Mary a sweater with a hole in it.

¹Subjects which metonymically stand for volitional beings are also acceptable:

- (5) a. The bank loaned him the money.
b. His company promised him a raise.
c. The orchestra played us the symphony.

even if Joe did not intend to give Mary a defective sweater. Also, it is not necessarily contradictory to use “accidentally” in ditransitive expressions, for example:

- (11) Joe accidentally loaned Bob a lot of money [by mistaking Bob for Bill, his twin; without realizing that Bob would skip bail with it; instead of giving the money as a gift as he had intended.]

While I do not attempt to untangle the relevant issues here, I appeal to the fact that the same possibilities of interpretation occur with other expressions which are generally agreed to require volitional subject arguments. For example, *murder* is a verb which is universally recognized as selecting for a volitional subject argument. Still, it is possible to say without contradiction,

- (12) Joe accidentally murdered Mary [although he had meant to murder Sue/ although he had only meant to knock her unconscious].

What I am suggesting, then, is whatever notion of volitionality is adopted to deal with verbs such as *murder*, should be also used to capture the semantic requirement of the subject position of the ditransitive construction.

The existence of this constraint has been obscured by examples such as:

- (13) The medicine brought him relief.
- (14) The rain bought us some time.
- (15) She got me a ticket by distracting me while I was driving.
- (16) She gave me the flu.

(17) The music lent the party a festive air.

(18) The missed ball handed him the victory on a silver platter.

In these examples the subject argument is not volitional. Even when the subject argument is an animate being, as in exs 15 and 16, no volitionality is required. However these examples form a delimitable class of expressions, as each is an instance of a particular conventional systematic metaphor, Causal Events are Transfers.² This metaphor involves understanding causing an effect in an entity as transferring the effect, construed as an object, to that entity. Evidence for the existence of this metaphor, independent of the ditransitive construction, comes from the following expressions:

The Catch-22 situation *presented* him with a dilemma. The unforeseen circumstances *laid* a new opportunity *at our feet*. The document *supplied* us with some entertainment. The report *furnished* them with the information they needed.

Further evidence, both for the existence of the metaphor, and for it motivating the ditransitive examples 13–18, comes from the polysemy of each of the predicates involved in those examples. The predicates *bring*, *buy*, *get*, *give*, *lend* and *hand* are used to imply causation, but each of their basic senses involve transfer by an agent to a recipient. The link between these senses is accounted for by appeal to the metaphor. *Bring*, *buy*, *get*, *give*, *lend* and *hand* here involve the metaphorical transfer of effect;

²I would like to thank Dirk Geeraerts (p.c.) and Alan Schwartz (p.c.) for indicating that this metaphor could be stated in terms of transfer.

i.e., each of the examples 13–18 implies that the subject argument is the cause of the first object argument being affected in some way by “receiving” the second object argument.

This class can be represented as an extension of the central sense as follows:

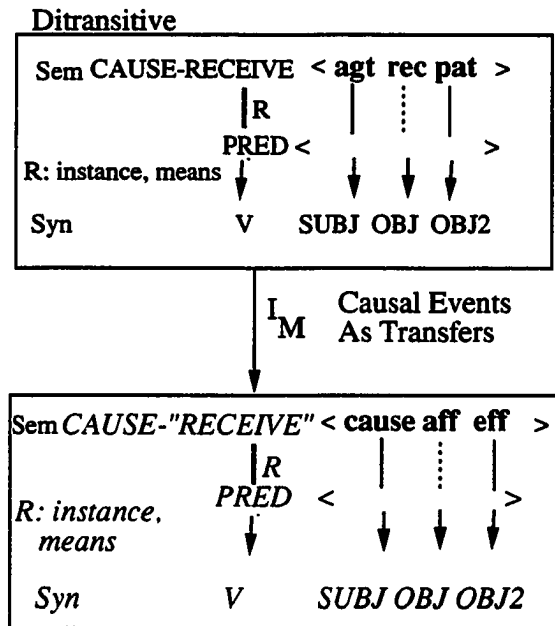


Figure 6.2

Recognizing the metaphor allows us to divorce ourselves from the often made, but erroneous claim that examples such as

(19) Sally gave Bill a headache.

(20) Mary’s behavior gave John an idea.

are idiosyncratic. In fact, they are actually instances of a general, productive and principled class of expressions based on the Causal Events are Transfers metaphor.

Returning to the statement of the constraint that the subject argument must intend the transfer, we can now see the necessity of recognizing this metaphor. By

identifying the metaphor, we are able to understand the exceptional cases to be licensed by it; we can recognize that the volitionality constraint is satisfied in the source domain of the metaphor. At the same time, this metaphor differs from the other metaphors to be described below in not mapping volitionality to the target domain; however, the fact that volitionality is not mapped in this metaphor, follows from the fact that the target domain is concerned with abstract causes. Abstract causes cannot necessarily be volitional because they are not necessarily human. Each of the other metaphors described below, on the other hand, involve human actors in the target domain as well as in the source domain, and in each of the target domains, the volitionality constraint is respected.

6.3.2 Semantic Constraints on the recipient

As noted above, it has long been realized that the referent designated by the first object must be an animate being. This constraint, however, just like the constraint that the subject argument must intend the transfer, is somewhat obscured by expressions licensed by the Causal Events are Transfers metaphor. For example:

(21) The paint job gave the car a higher sale price.

(22) The tabasco sauce gave the baked beans some flavor.

(23) The music lent the party a festive air.

In none of these examples is the first object an animate being; however, in the source domain of the metaphor, the affected party is understood to be a recipient, i.e. an

animate being. That is, the constraint is satisfied in the source, but not the target domain of the metaphor.

An additional semantic constraint is that the first object be understood to be a beneficiary or a *willing* recipient, if willingness on the part of the agent is necessary for successful transfer.³ This constraint is needed to account for the following example from Green (1974):

(24) *Sally burned Joe some rice.

Example 24 is unacceptable even if malicious intentions are attributed to Sally; however, it *is* acceptable in the context that Joe is thought to like burnt rice. Furthermore, one cannot felicitously say:

(25) *Bill told Mary a story, but she wasn't listening.

(26) *Bill threw the coma victim a blanket.

In these examples, the first object is not understood to be a willing recipient, and accordingly, these examples are unacceptable.

This constraint may be responsible for the slight difference in meaning between the following two examples provided by Robert Wilensky (p.c.):

(27) a. She fed lasagna to the guests.

b. She fed the guests lasagna.

³Many theories capture this constraint by postulating a beneficiary role for the first object position of expressions which are paraphrasable with a benefactive *for* phrase.

Most speakers find the first example to be somewhat less polite than the first. Since “feed” is normally used with reference to the food intake of babies or animals, the impoliteness of the first example is not surprising; what requires explanation is the fact that the second example is interpreted to be more polite. The constraint that the first object must be construed as a willing recipient can account for this since the ditransitive version has the effect of imposing the interpretation that the guests are willing agents, thereby according them more respect.

That the recipient is expected to be willing should not be confused with the idea that the recipient is expected to benefit from the transfer. Thus while,

(28) Jack poured Jane an arsenic-laced martini.

does not imply that Jane will benefit from imbibing the martini, it does presuppose that she is expected to willingly drink the martini.

In some cases, however, the issue of the recipient’s willingness or unwillingness is irrelevant to whether transfer is successful. These involve expressions in which actual successful transfer is implied:

(29) Bill gave the driver a speeding ticket.

(30) Bill gave Chris a headache.

(31) Chris gave Bill a kick.⁴

⁴These final two examples happen to be based on metaphors. What is relevant here is that successful (metaphorical) transfer is implied, i.e., ex 30 implies that Chris has a headache, and ex 31 implies that Bill received a kick.

Nonetheless, all cases in which the first object is required to *accept* the transferred object in order for transfer to be successful imply that the first object is assumed to be a willing recipient.

6.3.3 On the notion recipient

I have been referring to the semantic role of the first object position as “recipient” instead of as a “goal” or “possessor.” In view of the above constraint, that the argument must be animate, “recipient” is clearly more accurate than “goal.”

“Recipient” is also preferable to “possessor” because many of the metaphors involving transfer (to be described below) do not map the implication that the recipient possesses the transferred entity after reception. For example,

(32) Joe gave Mary an insult.

does not imply that Mary “possesses” an insult, but only that Mary “received” an insult. Similarly,

(33) Jan gave Chris a punch.

does not imply that Chris “possesses” a punch, but only that he “received” a punch. If we describe the role as that of a “recipient” instead of “possessor” these facts pose no problem. The fact that a possessive relationship is usually implied follows automatically from the fact that what is received is normally subsequently possessed.

Noticing that a recipient is involved in ditransitive expressions may be a first step toward motivating the double object syntax of the construction. Those interested in the semantics of the direct object since Jakobson have noted that *recipients* of force

and effect make for good direct objects (Jakobson 1938, Langacker 1987, Rice 1987). (Of course this is not to say that all direct objects are recipients; clearly the objects of cognition verbs such as *believe*, *see*, and *know* would present difficulties for such a claim.)

Finally, the construction has been shown to be associated with a scene of transfer. Describing the first object as a “recipient” more adequately captures the dynamic character of this semantics. It is for these reasons that I consider “recipient” to be a more appropriate description for the semantics of the first object than “possessor.”

6.3.4 Other Metaphors

The systematic metaphor, Causal Events as Transfers, is just one of several metaphors which licenses the use of the ditransitive construction. Other metaphors can be understood to license further extensions from the central sense of literal transfer. The source domain of each of these metaphors is the central sense of actual successful transfer.

The Conduit Metaphor, described and named by Michael Reddy (1979) involves communication *traveling across* from the stimulus to the listener. The listener understands the communication upon “reception.” Evidence for the metaphor includes:

He got the ideas across to Jo. His thoughts came across from his speech.

Jo received the information from Sam. Jo got the information from Bill.

This metaphor licenses the following examples:

(34) She told Jo a fairy tale.

(35) She wired Joe a message.

(36) She quoted Jo a passage.

(37) She gave Joe her thoughts on the subject.

A related metaphor involves understanding perceptions as entities which move toward the perceiver. The perception is understood to be perceived upon “reception.”

Evidence for the metaphor includes the following:

The view *knocked me over*. I *caught* a glimpse of him. I *missed* that sight.

I *had* a view of the orchestra. He *let me have* a look.

This metaphor licenses the following examples:

(38) He showed Bob the view.

(39) He gave Bob a glimpse.

Another metaphor involves understanding actions that are intentionally directed at another person as being entities which are transferred to that person. Evidence for the metaphor includes:

He *blocked* the kick. He *caught* the kiss she *threw to* him. All he *got from* her was a goodbye wave. Joe *took a punch from* Bill. She couldn't get a *smile out of* him. She *threw a parting glance in his direction*. She *targeted him* with a big smile. Bob *received* a slap/kick/kiss/smile from Jo.

This metaphor licenses the following expressions:

(40) She blew him a kiss.

(41) She shot him a keep-quiet look.

(42) She gave him a wink.

(43) Jo gave Bob a punch.

(44) She threw him a parting glance.

Another metaphor extends the use of the ditransitive to the speech act domain. This metaphor is used in reference to the situation where a person agrees to accept certain facts and assumptions. The metaphor involves understanding these facts and assumptions as objects which are given to the person who is making the argument to be used in the building of the argument. (The idea of *building an argument* assumes another metaphor, Arguments are Constructed Objects). If the facts or assumptions do not need to be agreed to because they are in some sense self-evident, then they may be called “givens” where no explicit “giver” is necessary. We can title this metaphor, Facts and Assumptions that are Agreed to are Objects which are Given. Evidence for the metaphor includes the following expressions,

I'll *let you have that much*. I don't want to *give up* that assumption.
Accept that as a given . If you *take that assumption away* , you don't
have a great argument. If you don't *have* that assumption, you're not *left*
with much. Even *granted* that, your argument is still full of holes.

This metaphor licenses the following:

(45) I'll give you that assumption.

(46) I'll grant you that much of your argument.

The final metaphor to be discussed here licenses ditransitive expressions which are often assumed not to involve a possessor at all. The following examples come from Green 1974:

(47) Crush me a mountain.

(48) Cry me a river.

(49) Slay me a dragon.

(50) They're going to kill Reagan a commie.

These expressions can be seen to involve metaphorical transfer once the following metaphor is recognized. The metaphor involves understanding actions which are performed for the benefit of a person as objects which are transferred to the person. The metaphor is exemplified in the following expressions:

He *owes* you many favors. By slaving away quietly for him, she has *given* more than he deserves. The senator claimed never to have *received* any favors. He always *gets* what he wants out of people. He graciously *offered* a ride to the airport.

The mapping of this metaphor is different from the others in that the source domain of this metaphor is not "X causes Y to receive Z" as it was in each of the other metaphors.

In particular, the second object argument is not the received object in the mapping; rather it is the action performed that is the received object. This metaphor, then represents an extended use of the ditransitive. And, as we might expect, there is wide dialectal variation in the degree of acceptability of these expressions. In fact, these cases are subject to their own special constraints. As noted Oehrle (1976), they are more acceptable as commands:

(51) a. Cry me a river.

b. ?Sally cried me a river.

and they are more acceptable with pronouns in first object position:

(52) ?Cry Joe a river.

These cases can be seen to be a limited extension from the central sense of the construction. The source domain of this metaphor is not “X causes Y to receive Z” as it was in each of the other metaphors; rather, it is: “X causes Y to receive an object (not necessarily designated Z).” The target domain is: “X Performs an Action for the Benefit of Y.” Z is mapped to the object acted on by X.

6.4 Conclusion

In this chapter the central sense of the ditransitive construction has been argued to be associated with a highly specific semantic structure, that of successful transfer between a volitional agent and a willing recipient. In addition, several systematic metaphors, which license extensions from the basic sense, have been identified.

Chapter 7

The English Caused-Motion Construction

7.1 Introduction

In this chapter the “caused-motion” construction is discussed in some detail, and arguments that a particular construction is required in the grammar are made explicit. In particular, it is argued that a construction must be specified in the grammar to account for these cases by showing that the semantic interpretation often cannot plausibly be attributed to the main verb, and that other means of deriving the semantics compositionally also fail.

This construction can be defined (in active form) structurally as follows:

[SUBJ [V OBJ OBL]]

where V is a non-stative verb and OBL is a directional phrase.

This definition is meant to include the following types of expressions:

- (1) They laughed the poor guy out of the room.
- (2) Frank sneezed the tissue off the table.
- (3) Mary urged Bill into the house.
- (4) Sue let the water out of the bathtub.
- (5) Sam helped him into the car.
- (6) They sprayed the paint onto the wall.

The basic semantics of this construction is that the causer argument directly causes the theme argument to move along a path designated by the directional phrase, i.e. "X causes Y to move Z." The various extensions from this basic sense described in chapter 3 are discussed in more detail.

Quite specific semantic constraints on the types of situations that can be expressed by this construction are proposed, revealing principled patterns where there is apparent idiosyncrasy. Each of these constraints intuitively falls under the heading of "direct" causation, or under what can count as a single event; therefore the constraints can be viewed as beginning to provide a more specific characterization of these notional terms.

7.2 The existence of the construction

In order to show that a construction is required, it is necessary to show that the semantics is not compositionally derived from other constructions existing in the grammar. For example, it is necessary to show that some aspect of the construction

is not compositionally derived from the lexical items (i.e. lexical constructions) which instantiate it. Several observations in the literature lead to this conclusion. As Fillmore (1971), Talmy (1976), and more recently Randall(1983) have noticed, many verbs are not causative verbs independently of this construction. For example, *kick* and *hit* in:

(7) Joe kicked the wall.

(8) Joe hit the table.

do not have causative interpretations. Yet, when these verbs are used in the caused-motion construction, a causal interpretation is implied:

(9) Joe kicked the dog into the bathroom.

(->He caused the dog to move into the bathroom)

(10) Joe hit the ball across the field.

(->He caused the ball to move across the field)

As has been noticed by Aske(1989), many verbs do not necessarily code motion independently of this construction. Aske provides the following contrast, and notes that it is implausible to posit a distinct motion sense to the predicate “squeeze.”:

(11) a. Frank squeezed the ball.

(it does not necessarily move)

b. Frank squeezed the ball through the crack.

(it necessarily moves)

Also, as has been noted by Green(1973), Randall(1983), and Hoekstra(1987), many transitive verbs which can occur in this construction do not bear the same semantic relationship to their direct object as they do in simple transitive sentences. Notice:

- (12) a. Sam sawed/tore/hacked/ripped a piece off the block.
b. Sam washed/rinsed/cleaned the soap out of her eyes.
c. Sam mixed/stirred the paint thinner into the paint.

do not entail:

- (13) a. Sam sawed/tore/hacked/ripped a piece.
b. Sam washed/rinsed/cleaned the soap.
c. Sam mixed/stirred the paint thinner.

In addition verbs can sometimes appear in this construction that do not independently license direct object complements at all:

(14) The audience laughed the poor guy off of the stage.

(15) Frank sneezed the napkin off the table.

(16) In the last Star Trek episode, there was a woman who could think people into a different galaxy.

The move to postulate novel causative motion senses for each of these verbs, thereby positing the meaning of the whole in the meaning of the parts by stipulation, has been argued against in chapters 1 and 4.

Accepting that the caused-motion interpretation is not felicitously associated directly with the main verb, one might alternatively suggest that we understand the caused-motion semantics to be contributed by the preposition (cf. Aske 1989), or by either the verb or the preposition (cf. Gawron 1985).

Gawron argues that the caused-motion expressions consist of two predicates: a verb and a preposition, and that both of them retain their normal meanings. The relationship between the two predicates, if not determined independently by the verb's semantics, is said to be pragmatically inferable from the possible relations that can hold between predicates in a single clause. Gawron argues that the verb and the preposition act in this way as co-predicators, sharing one argument and combining in pragmatically inferable ways. For example, "John squeezed the ball through the crack" would be analyzed as <squeeze, John, the ball> <through, the ball, the crack>. The causation is argued to be inferred.

However there are several problems with this approach. One problem is the existence of caused-motion expressions which involve predicates which do not bear their normal relation to their direct objects, or which cannot occur transitively at all. For example we cannot account for:

(17) Fred mixed the paint thinner into the paint.

in terms of two 2-place relations <mix, Fred, the paint thinner>, <into the paint thinner, the paint> because this example does not entail that Fred mixed the paint thinner. We also cannot account for:

(18) Fred sneezed the napkin off the table.

in terms of <sneeze, Fred, the napkin>, <off the napkin, the table>, because the first predication <sneeze, Fred, the napkin> is nonsensical. Each of these verbs would require a three argument sense on Gawron's account.

Another problem stems from the conclusions drawn from the fact that we may be able to pragmatically infer the meaning of the construction. If one knows that the construction has the form [NP [V NP PP]], where PP is a directional phrase and V is non-stative, then one might indeed reasonably infer that it has the caused motion interpretation that it has. However it is fallacious to argue that because we may be able to pragmatically infer the meaning of a construction, its existence is therefore predictable and not conventionalized. Such reasoning is based on a model of interpretation, yet we also must account for production. That is, while we may be able to infer that a construction of this form has this semantics, we cannot predict that a construction of this form will exist.¹

Makkai's (1972) distinction between "idioms of encoding" from "idioms of decoding" can be used to make the same point. Decoding idioms are idioms which a listener would be unable to confidently interpret, without having learned the idiom separately. Encoding idioms are idioms whose meaning may be inferable, but without having heard such an idiom, the speaker would have no way of knowing that it was a conventional way of saying what it says. *Fly by night*, *by and large* are examples of decoding idioms; *serial killer*, *sofa bed* are examples of encoding idioms. (Strictly speaking, the set of encoding idioms properly includes the set of decoding idioms,

¹In fact, Talmy (1985a) has suggested that this pattern of expression is not available as a productive form in Romance, Semitic or Polynesian language families although it does occur in Chinese as well as in English (but cf. Napoli 1992 for some discussion of the possible existence of such a construction in Italian).

since the former's interpretation is defined to be *possibly* inferable.) By referring to both kinds of terms as *idioms*, Makkai makes the point that neither kind of term is predictable from general pragmatic principles.

Another problem with associating motion semantics with the preposition is that many of the prepositions which appear in this construction favor a locative interpretation:

(19) Fred stuffed the papers *in* the envelope.

(20) Sam pushed him *within* arm's length of the grenade.

(21) Sam shoved him *outside* the room.

In response to a possible suggestion that we might attribute the motion interpretation *either* to the verb or to the preposition, but that one or the other must lexically specify motion, consider examples such as:

(22) Sam squeezed the rubber ball *inside* the jar.

(23) Sam urged Bill *outside* of the house.

In these cases, it is neither the verbs *squeeze* or *urge* nor the prepositions *inside* or *outside* which independently codes motion. It is only the *combination* of non-stative verb and predicative PP which provides the necessary motion interpretation.

Still, it might be suggested that the prepositions are systematically ambiguous in English, being able to receive either a locative or directional interpretation. However, such a proposal fails to account for the intuition that prepositions such as *inside*, *in*,

outside and *within* do *not* intuitively code motion. More to the point, these terms are not ambiguous in all contexts. For example, when fronted, these terms can only receive a locative interpretation:

- (24) a. Into the room he ran, quick as lightning.
- b. *Inside the room he ran, quick as lightning. (on the directional reading that he ran into the room)
- c. *Within the room he ran, quick as lightning. (on directional reading)

An account relying on an ambiguity between terms would need to specify in exactly which contexts the ambiguity could arise.

Therefore, since the causal interpretation cannot be systematically attributed to either the verb or the preposition or their combination, and systematically attributing the motion interpretation to the preposition requires that seemingly locative prepositions such as *within* are actually ambiguous, although they are not ambiguous in other contexts, we attribute the caused-motion interpretation to a construction which combines the verb and directional yielding a particular, conventionalized interpretation.

The possibility of allowing “basically” locative, non-directional PP’s in this construction raises a question for our account. In particular, we have specified that the construction must contain a PP coding a *directional* phrase, and yet we are here claiming that non-directional *locative* phrases are allowed. However, we noted that terms which are intuitively locative cannot receive a directional interpretation in all

contexts. What needs to be recognized to account for these cases is a particular process of accommodation (cf. Talmy 1977, Fillmore ms., Carter 1988) or *coercion* (Croft 1991; Sag and Pollard 1991) in which the construction is able to *coerce* the locative term into a directional reading.

Coercion, on this view, is not a purely pragmatic process, but rather is only licensed by particular constructions in the language. That is, coercion is only possible when a *construction* requires a particular interpretation, which is not independently coded by particular lexical items. To the extent that the occurring lexical items can be coerced by the construction into having a different, but related interpretation, the entire expression will be judged grammatical.² On this view, the locative terms are not independently ambiguous, but instead are capable of being coerced *by particular constructions* into having the related directional meaning. In the case at hand, we can understand the locative terms to be coerced into having a directional meaning by the caused-motion construction itself.

In order for coercion to be possible, there needs to be a relationship between the inherent meaning of the lexical items and the coerced interpretation. Clearly it is not possible for just any lexical item to be coerced into receiving a directional interpretation. The relationship between the meaning of the locative term and the directional interpretation it receives is one of *end-point focus* (Brugman 1988). That is, the location encoded by the locative phrase is interpreted to be the end-point of a

²This view of coercion is somewhat different than that proposed by Sag and Pollard. Sag and Pollard propose a rule of coercion that operates on particular lexical items, but which does not make reference to any licensing construction. The view presented here is preferred since we are able to constrain the potentially all-powerful process by insisting that only constructions can coerce lexical items into having systematically related meanings.

path to that location.

Thus the construction can be understood to be a free-standing valence construction which can be directly referenced by individual lexical items or which can be imposed on particular lexical items that do not otherwise code caused motion, but which can be viewed as falling into one of the verb clusters which are associated with the valence.

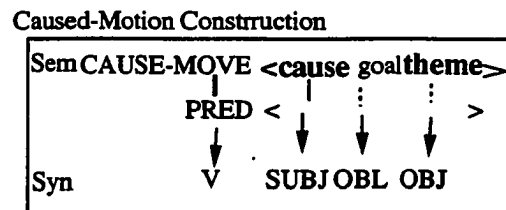


Figure 7.1

A distinct, but related construction must be posited to account for intransitive motion cases, which can also add a motion interpretation to verbs that do not lexically code motion:

(25) The bottle floated into the cave. (Talmy 1985a)³

³In fact Carter (1988) has proposed such a construction.

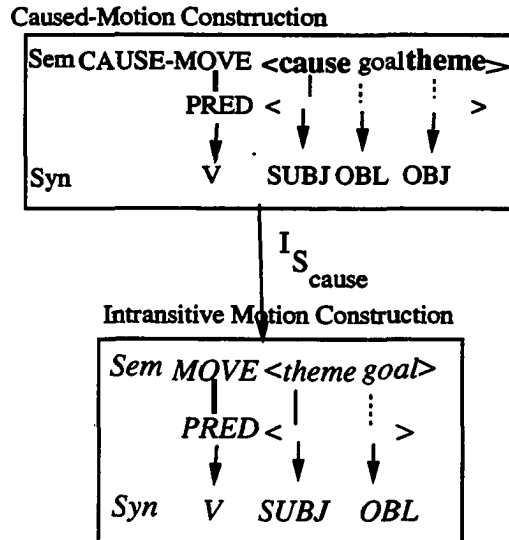


Figure 7.2

7.3 The Various Interpretations

As discussed in chapter 3, the caused-motion construction is associated with a category of related senses. The various senses that occur are the following:

A. X causes Y to move Z

- (26) Frank pushed it into the box.
- (27) Frank kicked the dog into the bathroom.
- (28) Frank sneezed the tissue off the nightstand.
- (29) Sam shoved it into the carton.

B. The satisfaction condition associated with the act denoted by the predicate entail: X causes Y to move Z.

Included in this class are force-dynamic verbs (Talmy 1985b) that encode a communicative act. Examples of this class include:

(30) Sam ordered him out of the house.

(31) Sam asked him into the room.

(32) Sam invited him out to her cabin.

(33) Sam beckoned him into the room.

(34) Sam urged him into the room.

(35) Sam sent him to the market.

These examples differ from the previous cases in that motion is not strictly entailed. For example, Sam ordering someone out of the house does not necessarily entail that the person moves out of the house. However, motion *is* entailed by the “satisfaction conditions” (Searle 1983) associated with the actions denoted by the particular predicates. If in example 30, the order is *satisfied*, the person will leave the house. Similarly if the request (ex 31) or invitation (ex 32) is satisfied, the person will move along the designated path.

C. X enables Y to move Z

Verbs in this class include force dynamic verbs that encode the removal of a barrier, e.g. *allow, let, free, release*. Examples of this class include:

(36) Sam allowed Bob out of the room.

(37) Sam let Bill into the room.

In general enablement is understood force-dynamically to involve either the active removal of a barrier or the failure to impose a potential barrier (Talmy 1976, Sweetser 1990). However this construction allows only the former type of enablement, whereby the enabler retains some aspect of agentivity. That is, enablement that does not actively involve the removal of a barrier is not acceptable in caused-motion expressions:

(38) a. *Sara let Bill into the room by leaving the door open.

b. (Sara let Bill come into the room by leaving the door open).

D. There is also a class of expression which can be described in terms of the force-dynamic schema of an imposition of a barrier, causing the patient to stay in a location despite its inherent tendency to move:

X prevents Y from moving comp(Z)

This class includes verbs which encode the imposition of a barrier: *block, lock, barricade*.. Examples include:

(39) Harry blocked Joe out of the house.

(40) Sam locked him into the bathroom.

(41) He kept her at arm's length.

(42) Sam barricaded him out of the room.

The path argument of this class, argument Z, codes the *complement* of the potential motion. Thus example 39 implies that Harry prevented Joe from moving *into* the house.

E. Another case involves ongoing assistance to move in a certain direction:

X helps Y to move Z

Examples of this class include:

- (43) Sam helped him into the car.
- (44) Sam assisted her out of the room.
- (45) Sam guided him through the terrain.
- (46) Sam showed him into the livingroom.
- (47) Sam walked him to the car.

The Central Sense

Sense A (e.g. *He pushed the box into the room*) can be argued to be the central sense of the construction. It involves manipulative causation and actual movement, the scene to which transitive markers are applied earliest cross-linguistically (Slobin 1985), which has been suggested as the most basic causative situation (Talmy 1976). Moreover, the other extensions are most economically described as extensions of this sense.

The entire category of related senses can be diagrammed as follows:

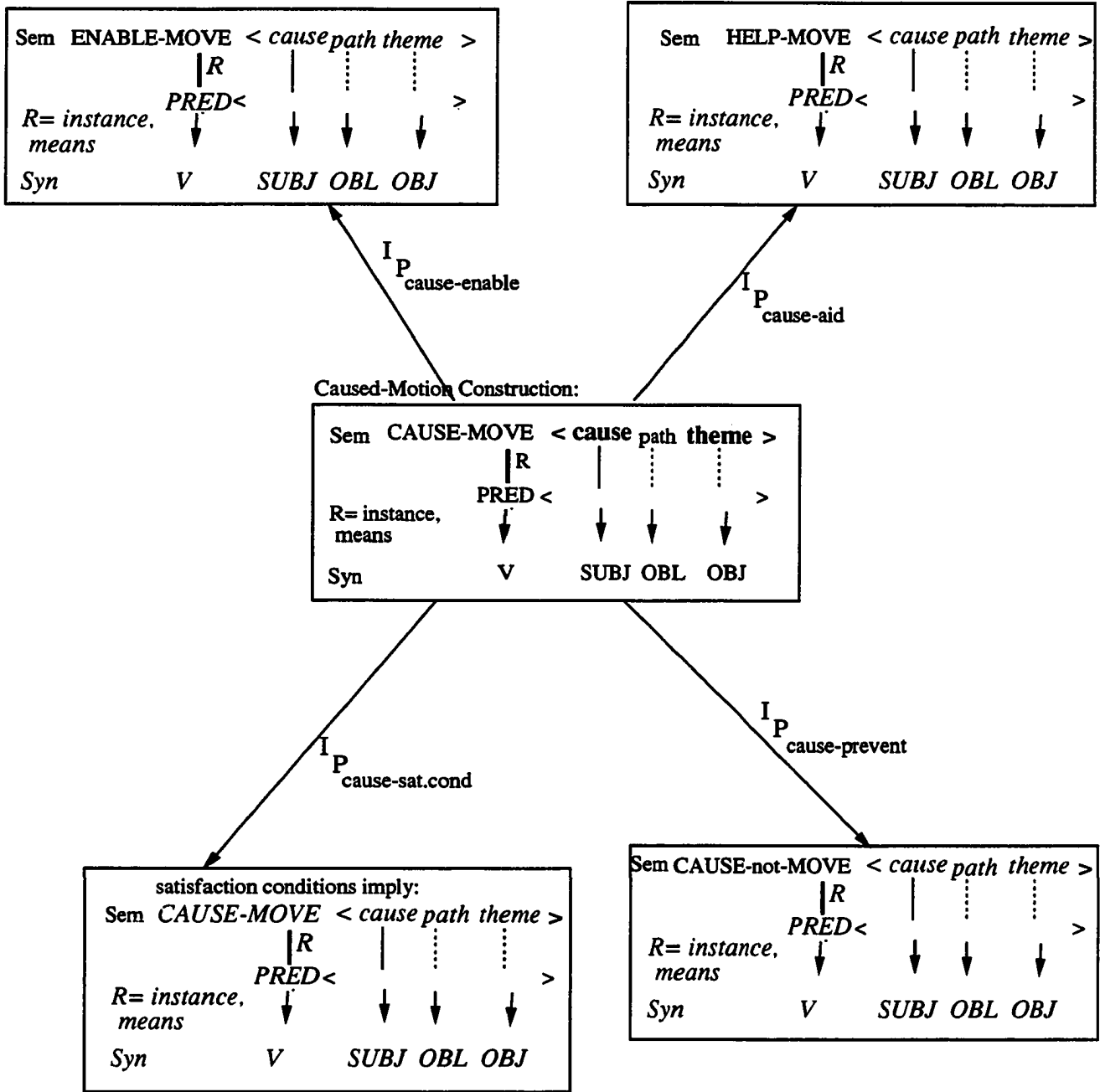


Figure 7.3

The close parallel between the links required for this construction, and the links previously suggested for the ditransitive construction indicates that these patterns of

extension may be quite systematic. We may find that patterns of constructional extension, like patterns of polysemy generally, embody subregularities (Wilensky 1991); i.e. patterns of polysemy that recur, although they are not strictly predictable. At the very least it should be clear that the links are not being posited on an ad hoc basis.

7.4 Lexical Exceptions

There are finally a few verbs which do not fit into any of the above patterns, in that the subject is not interpreted to cause, enable, or prevent the theme's motion. These are a subset of cases which entail the motion of both the agent and the theme. For example, the verb *accompany*, when used in:

(48) Sam accompanied Bob into the room.

although similar to uses of *escort*, *walk* and *show*, does not necessarily entail any assistance on the part of the agent. Also, *follow*, *trail*, *tail* while similar to the unexceptional use of *chase* in:

(49) Ann chased the squirrel out of her house.

differ in that they do not entail that the theme's motion is caused or aided by the agent.

These exceptional cases are lexically determined—only a few of the scores of verbs mentioned so far allow exceptional interpretations. Moreover, the entire group of exceptions can be characterized as a subclass of verbs which entail that the agent argument as well as the theme argument move along the specified path. Still, the

existence of these cases suggest that the lexical specifications can override the constraints of the construction. It is clear that a theory of argument structure expression will necessarily have to allow for some degree of lexical idiosyncrasy (cf. chapter 5).

7.5 Specific Semantic Constraints on the Construction

In section 7.2 we argued for the existence of the caused-motion construction, independently of the verbs which instantiate it. One of our primary motivations for doing so was to avoid arbitrary lexical stipulations on each verb which could potentially occur in the construction. Still, if we find that there is rampant lexical idiosyncrasy associated with the construction, our motivation for postulating a construction would be partially undermined, since the arbitrary lexical stipulation we were trying to avoid would be necessary. Therefore it is worthwhile to see how much can be accounted for in a principled way by paying close attention to semantic constraints.

At first glance, there does appear to be a large degree of idiosyncrasy. Consider the following minimal pairs:

(50) a. Sam coaxed him into the room.

b. *Sam encouraged him into the room.

(51) a. He hit the ball over the fence.

b. *He struck the ball over the fence. (adapted from Jackendoff 1990)

(52) a. Please chop the kindling into the bin provided for it. (Paul Kay)

b. *?Please don't chop the kindling onto the rug.

(53) a. Sam asked him into the room.

b. *Sam begged him into the room.

However, in what follows it will be argued that each of these pairs can be accounted for in a principled way, once careful attention is paid to the semantics of the construction.

A Constraint on the Causer Argument

There is a particular constraint on the cause argument of the caused-motion construction. The cause argument can be an agent or a natural force:

(54) Joe pushed the piano up the stairs.

(55) The wind blew the ship off course.

(56) The rain swept the ring into the gutter.

But it cannot be an instrument:

(57) a. The hammer broke the vase.

b. *The hammer broke the vase onto the floor.

c. *The hammer broke the vase into pieces.

(58) a. His cane helped him get around.

b. *His cane helped him into the car.

The fact that the choice of argument encoded as subject plays a role in the acceptability of caused-motion expressions demonstrates that the semantics of the construction must make reference to that argument, and cannot be stated as a VP construction.

7.5.1 Defining the notion of a Direct Causation or a Single Event

It has long been recognized that there is a difference in interpretation between lexical causatives, such as *kill* and *melt* and periphrastic causatives such as *cause to die* and *cause to melt* (Fodor 1970; Shibatani 1973, 1976; Lakoff 1977; McCawley 1978; Gergely and Bever 1986). Lexical causatives have been argued to primarily involve causation that is “prototypical” (Lakoff 1977), “efficient” (Gawron 1985), or “direct” (Fodor 1970, Shibatani 1973, McCawley 1978). Alternatively it has been suggested that single clause causative expressions can only express a single event, via an iconic principle (e.g. Haiman 1980). In this chapter, specific constraints on what kinds of situations can be encoded by the caused-motion construction are discussed with an aim at explicating these notions. Each of these constraints intuitively falls under the more general heading of Direct causation, or alternatively under the principle of “one event per clause” but each provides a more specific principle by which to characterize such notions.

No mediating cognitive decision can be implied

The first pair of examples that we might try to explain is the difference in judgments between:

(59) a. Sam coaxed Bob into the room.

b . *Sam encouraged Bob into the room.

Notice that *convince, persuade, instruct* pattern like *encourage* in not appearing in the caused-motion construction:

(60) a. *Sam convinced/persuaded/encouraged/instructed him into the room.

b. Sam convinced/persuaded/encouraged/instructed him to go into the room.

What all of these verbs have in common is that they entail that the entity denoted by the direct object makes a cognitive decision. This is in distinction to cases such as:

(61) Sam frightened Bob out of the house.

(62) Sam coaxed him into the room.

(63) Sam lured him into the room.

Frighten, coax, and lure, although referring to psychological states, do not entail the existence of a cognitive decision. That is, they can apply equally well to rodents without any anthropomorphizing:

(64) Sam frightened/coaxed/lured the mouse out of its hiding place.

(65) ?#Sam encouraged the mouse to move out of its hiding place.

One might argue that this is a coincidence—that verbs which occur with this valence just happen not to entail any cognitive decision on the part of the theme argument—i.e. that the “constraint” is an epiphenomenon of particular idiosyncratic lexical facts.

However, a piece of evidence weighing against such an account and instead suggesting that it is indeed the construction that prohibits a mediating cognitive decision, comes from an examination of verbs which occur in more than one valence together with the the distribution of the adverb *willingly*. Lakoff(1970) noticed that *willingly* can be applied to logical (i.e. underlying) or surface subjects:

(66) a. Harry_i sold the slave-girl willingly_i.

b. *Harry sold the slave-girl_i willingly_i.

(67) a. The slavegirl_i was sold willingly_i by Harry.

b. The slavegirl was sold willingly_i by Harry_i.

According to many theories, the direct object argument is the logical subject of the the predicative PP. And yet, we find that *willingly* cannot apply to the direct object argument of caused-motion expressions:

(68) a. *He asked her_i into the room willingly_i.

b. He_i asked her to go into the room willingly_i.

(69) a. *He forced her_i into the room willingly_i.

b. He_i forced her to go into the room willingly_i.

This is generally true of the passive forms of the caused-motion construction as well:⁴

⁴An anonymous reviewer of an earlier draft of this chapter pointed out that *lure* does seem to allow *willingly* to be predicated of the theme argument:

(70) He_i was lured into the room willingly_i.

This can be interpreted as “He allowed himself to be lured into the room.” I have no account of why this case is different than the others.

(71) a. *She_i was asked into the room willingly_i.

b. She_i was asked to go into the room willingly_i

(72) a. *He_i was forced into the room willingly_i.

b. He_i was forced to go into the room willingly_i

A general constraint against a mediating cognitive decision in the caused-motion construction allows us to prevent *willingly* from applying to the theme argument on semantic grounds, despite the fact that the theme argument may well be considered a logical subject.

The constraint can be stated as follows:

Generalization: No cognitive decision can mediate between the causing event and the entailed motion.

The implication of actual motion

Another source of apparent idiosyncrasy is the following. There are two subclasses associated with the construction that do not strictly entail actual motion. In the first class, only the satisfaction conditions associated with the act denoted by the verb entail that the theme argument actually moves. Expressions in this class include:

(73) Sam asked him into the room.

(74) Sam invited him onto the deck.

(75) Sam urged him into the room.

The second class involves a specific case of enablement: an agent actively removes a barrier to motion. Expressions in this class include:

(76) Sam allowed him into the room.

(77) Sam permitted him out of the house.

These classes do seem to allow a cognitive decision on the part of the theme to be implied if the theme argument actually moves, but these cases can be distinguished from the earlier cases in that actual motion is not entailed by the expression.

Notice that alongside the acceptable,

(78) Sam asked Joe into the room.

We find the unacceptable,

(79) *Sam begged Joe into the room.

(80) *Sam pleaded Joe into the room.

What needs to be noticed in this case, is that the theme's ultimate direction must be presumed to be that determined by the subject. That is, no contrary tendency can be implied. To see this, notice:

(81) a. #Sam asked Harry into the jail cell.

b. Sam asked Harry to go into the jail cell.

That is, if the theme's motion is not strictly entailed, it must be presumed as a *ceteris paribus* implication, that the theme argument will actually move on the Path

specified. In the case of *beg* or *plead*, or in ex 81a. in which there are pragmatically given reasons why Harry may not want to go into the jail cell, motion cannot be presumed.

Notice it is not necessary that the theme argument actually *wants* to move along the specified path, only that he be presumed to do so:

(82) Sam ordered Bob into the jail cell.

Generalization: If motion is not strictly entailed, it must be presumed as a *ceteris paribus* implication.

Conventionalized Scenarios

Certain cases seem to flout the general constraint that there can be no intermediate causation. As Shibatani (1973) noticed, activities which are conventionally accomplished in a particular way may be expressed as simple causatives, even when there is in actuality an intermediate cause. For example,

(83) The invalid owner ran his favorite horse (in the race).

(84) Chris cut her hair at the salon on University.

(85) She painted her house. (when in fact the painters did the actually painting)

(86) Farmer Joe grew those grape vines.

It is a conventional way to have one's hair cut to go to a salon, a conventional way to have one's house painted by having professional painters do it, etc. That

is, simple causatives can be used to imply *conventionalized* causation that may in actuality involve an intermediate cause. It seems that conventionalized scenarios can be cognitively “packaged” in such a way that their internal structure is ignored.

Notice many of the same scenes described above cannot occur with directionals:

(87) *Farmer Joe grew those vines onto his roof.

(88) *The invalid owner ran his favorite horse onto the field.

However, we would not want to say that these are ruled out because conventional causation is not acceptable in the caused motion construction, but rather that these scenes as wholes are not conventional. That is, planting and watering is not a conventional way to grow plants *onto the roof*, and arranging for your horse to run in a race is not a conventional way to have your horse run *onto the field*. Expressions which do express non-direct, but conventional caused motion are allowable in the caused motion construction as well:

(89) The company flew her to Chicago for an interview.

This is acceptable since paying for and arranging a ticket for someone else are conventional ways to have someone travel for interviews.

The fact of motion and the path of motion

In this section, it will be argued that the action denoted by the verb as performed by the causer on the causee must be understood to completely determine both the fact of motion and the particular path of motion.

The Effect of Motion

Another set of examples involves a seemingly idiosyncratic difference between the verbs *hit* and *strike* as has been noticed by Jackendoff (1990):

- (90) a. He hit the ball across the field.
b. *He struck the ball across the field.

A pattern emerges when a wider class of verbs is considered. Notice that the verbs *slap*, *smack*, *whack*, *knock* pattern like *hit*, whereas the verbs *assault*, *sock*, *spank*, *clobber*, *slash*, *bludgeon*, *impact* pattern like *strike*.

What distinguishes some verbs of forceful impact from others is whether the impacted entity is necessarily effected in a way which does not involve motion. All of the verbs of the *strike*-class (*assault*, *sock*, *spank*, *clobber*, *slash*, etc.) require that the impacted entity be affected:⁵

- (91) a. *With an open hand, the toddler struck the tree.
b. The toddler stuck his playmate.

- (92) a. *The disgruntled player socked the wall.
b. The disgruntled player socked the coach.

⁵ *Strike* can be used when the impacting entity, and not the impacted entity is affected:

1. The mosquito struck the window. (ex from Paul Kay)
2. The car struck a brick wall.

However in these cases, the argument whose location is in question—i.e. the theme— is the subject, not the direct object. The following example is ruled out by the Unique Path Constraint (see sec XX since the car and the wall would have to be interpreted as moving along two distinct paths.

1. *The car struck a brick wall into pieces.

c. *Joe assaulted/bludgeoned/impacted the steel block.

At the same time, the verbs that do allow the directional to be specified do allow their direct objects either to be unaffected generally (*hit, slap*) or unaffected except for the particular effect of motion (*knock*).

(93) Sam hit the table.

(94) Sam slapped/smacked the table.

(95) Sam knocked off the lid.

To make this point more clear, consider also the verb *shoot*, which allows either the trajectory or the impacted entity as direct object:

(96) a. Harry shot Sally.

b. Harry shot the bullet.

Notice that when a path argument is present, the direct object can only be interpreted as a trajectory, and cannot be simultaneously viewed as trajectory and impacted entity:

(97) #Harry shot Sally across the room. (unacceptable except on the interpretation that Sally is a human cannonball).

This is explained on our account, because if the bullet is understood to penetrate Sally, then Sally is necessarily affected in a way that does not involve motion, and so a path of motion cannot be specified.

The constraint, then can be tentatively stated as follows:

If the action denoted by the verb implies an effect other than motion \implies a path of motion cannot be specified.

This generalization will need to be revised, however, in view of the examples in the following section.

Change of State Verbs

Consider the following examples:

(98) The butcher sliced the salami onto the wax paper.

(99) Joey clumped his potatoes into the middle of his plate.

(100) Joey grated the cheese onto a serving plate.

(101) Sam shredded the papers into the garbage pail.

Each of these examples implies a definite effect on the theme argument quite apart from the motion that is implied. However these change of state verbs can be distinguished from the *strike* class of verbs just discussed, which also entail a definite effect on the direct object argument in the following way. The action denoted by each of the verbs in exs 98 - 101 as performed by the agent argument on the theme argument typically implies some incidental motion. For example, in slicing salami, the salami normally falls away from the slicer; in clumping potatoes into a pile, the potatoes are moved; the act of grating cheese normally implies that the cheese falls away from the instrument used. It is the path of this incidental motion that can be specified by the directional.

It might be argued that it is not a necessary part of the meaning of *slice* that the sliced object necessarily moves. One can imagine a mechanical breadslicer which slices a bread while the bread is contained in a supporting container, not allowing the bread to fall away after being sliced. Similarly, one can imagine a paper shredder which shreds paper that is fixed in place. However, it is clear that in the neutral context, in which the action is done in the conventional way, the action does entail incidental motion. Thus, in order to account for these cases, we have to appeal, not to necessary truth-conditions holding on the action denoted by the verb, but rather to the conventional scenario associated with the particular act denoted by the verb.

This class of cases is further constrained. Consider the following contrasts:

(102) a. *Sam unintentionally broke the eggs onto the floor.

b. Sam carefully broke the eggs into the bowl.

(103) a. < said to someone who was chopping kindling on a chopping board in the livingroom > *Please don't chop that kindling onto the rug.

b. Please chop that kindling into the bin provided for it. (ex from Paul Kay)

In the a) cases, the ensuing motion is intended and both examples are acceptable. However in 102-103, the motion is interpreted as unintentional, and they are unacceptable.

The relevant generalization seems to be:

If the activity causing the change of state (or effect), when performed in the conventional way effects some incidental motion

and moreover is performed with the *intention* of causing the motion \implies the path of motion may be specified.

In understanding this generalization, it is important to realize that the change of state (or effect) must cause incidental motion as a *result*, not that incidental motion is involved as the means of causing the change of state. This is important, because the following are unacceptable:

(104) *He filled water into the tub.

(105) *He covered the blanket over Mary.

In these cases, motion is implied in the scenes associated with *fill* and *cover*, insofar as water must move into the tub and the blanket must move over Mary. However, the motion in these cases, occurs as the *means* of accomplishing the change of state; it is not an incidental *effect* of the change of state.

The Path of Motion

A constraint related to the previous constraint can be recognized by considering the following:

(106) a. *He nudged the ball down the incline. (unless there are repetitive nudges)

b. He nudged the golf ball into the hole.

This is despite the fact that the nudging of a ball at the top of an incline can cause the ball to roll down the incline. 106a is nonetheless unacceptable.

The crucial fact is that the causal force initiated by the agent argument in this case does not in itself determine the path of motion; gravity is necessary as an intermediary cause. If the causal force initiated by the agent argument does determine the path of motion, the sentence is acceptable:

(107) He shoved the cart down the incline.

Under many circumstances, a specific path is not determined by the activity described; the direction of force only implies that the the theme argument moves out of or away from its present location. Accordingly, more specific paths cannot be predicated. This observation can account for the following:

(108) a. *They laughed the poor guy into his car.

b. They laughed the poor guy off the stage.

c. They laughed the poor guy out of the auditorium.

Similarly,

(109) a. *Sam frightened Bob under the bed.

b. Sam frightened Bob out of the house.

c. Sam frightened Bob away from the door.

Generalization: the path of motion must be completely determined by the causal-force.

Therefore, while there has traditionally been only a two-way distinction made between “onset” and “continuous” causation (Talmy 1976),⁶ what we see here suggests that “onset” may cover two distinguishable types of causation. The first type is that in which the causing event determines the entire path of motion, even though actual physical contact is not maintained over the entire path of motion. This is the only type of onset causation which is acceptable in caused-motion expressions. The second type of onset causation is that in which the causing event initiates motion, but does not itself determine the full subsequent path. This type of onset causation is evident in the following:

(110) Joe’s nudging the ball at the top of the incline caused the ball to roll all the way down to the bottom.

Which paths count as being “completely determined” is in part pragmatically determined. For example, imagine that a group of gang members are crowded around a man who is standing by the door of his car waiting for a friend. The gang members are intimidating the man by making jokes about him and laughing. In this context, it is felicitous to say,

(111) They laughed the poor guy into his car.

Similarly, imagine that Sam is playing a game with a child who is lying on the floor next to the bed. The game involves putting on a scary mask and taking it off again. Each time Sam puts on the mask the child predictably shrieks and rolls under the bed in mock-fear. In this context, one *can* felicitously say,

⁶Or equivalently, for our purposes, “ballistic” and “controlled” causation (Shibatani 1973).

(112) Sam, stop frightening Bobby under the bed!

In general, if the action is interpreted to be the driving force determining the particular path of motion as opposed to some other path, the motion can be said to be “completely determined” by the action.

A Summary of The Constraints

To summarize the constraints that have been argued for:

- No cognitive decision can mediate between the causing event and the entailed motion.
- If the result is not strictly entailed, it must be presumed as a *ceteris paribus* implication.
- Conventionalized scenarios can be cognitively packaged as a single event even if an intervening cause may in fact exist (Shibatani 1973).
- If the verb is a change of state verb (or a verb of effect) \implies

the path of motion may be specified \iff the activity causing the change of state (or effect), when performed in a conventional way, effects some incidental motion and moreover is performed with the **intention** of causing the motion.
- The path of motion must be completely determined by the action denoted by the verb.

The nature of the constraints

On the analysis presented here, the difference in directness between “lexical” causatives and periphrastic causatives, cannot be attributed simply to the lexical items themselves, since we have argued that many of the lexical items are not causative independently of this construction. For example, it is not possible to attribute direct causation to *kick* if we accept that *kick* does not itself encode any kind of cause. Moreover many of the verbs that occur in this construction also occur in other constructions which do not entail Direct causation (at least they do not obey the constraints outlined here). For example, *force*, *push*, *ask*, *invite* can occur with an infinitival complement, and expressions involving infinitives do not necessarily involve Direct causation. For example, expressions with infinitival complements *do* allow the theme to make a cognitive decision:

(113) Sam convinced/persuaded/encouraged/instructed him to go into the room.

They also do not presuppose that the theme will actually move along the specified path:

(114) Sam asked/begged him to go into the jail cell.

Therefore, the constraint of Direct causation must be attributed to the caused-motion construction, or more generally, to a principle that only Direct causation can be expressed within a single clause.

Several of the constraints described here require access to contextual information and general world knowledge combined with specific specifications of particular lexical

items. For example, we saw that change of state (or effect) verbs could occur in the caused motion construction as long as the activity performed was associated with a conventional scenario which implied incidental motion.

Another example of the influence of pragmatic considerations was seen with respect to the constraint that the causal force must completely determine the path of motion. As was noted above, context plays a role in what kinds of actions can “completely determine” a given path.

The fact that a combination of real-world and situational knowledge together with knowledge of lexical specifications plays a role in the possibilities of argument structure has serious repercussions for theories which make a strict division between semantics and pragmatics. The expression of argument structure is generally taken to exclusively involve semantics (if not exclusively syntax), not pragmatics. Yet these cases suggest that pragmatics, in the sense of general world knowledge, does play a crucial role in argument structure (see also Dinsmore 1979, Jackendoff 1983, Langacker 1987, Zaenen 1991).

7.6 Conclusion

It has been argued that the argument structure associated with the interpretation of directly-caused motion needs to be recognized as an English construction, independently of the lexical items which instantiate it. The evidence came from the fact that several aspects of the meaning of caused-motion expressions (causation, motion) and of the form (e.g. the direct object complement) are not generally predictable from lexical requirements or from other constructions.

The construction discussed in this chapter has as its basic sense a causer or agent directly causing a theme to move to a new location. The basic sense is extended in various ways allowing the construction to appear with a variety of systematically related interpretations. As noted in chapter 3, this polysemy is strikingly similar to the polysemy argued to exist for the ditransitive construction in Chapter 2.

In addition, specific semantic constraints have been proposed in an attempt to show principled patterns where there is apparent idiosyncrasy. These specific constraints can be interpreted as beginning to provide necessary conditions on the notion of “direct” causation (or of a “single event”). These constraints have been argued to involve a combination of lexical semantics and general world knowledge.

PLEASE NOTE:

**Page(s) missing in number only; text follows.
Filmed as received.**

U·M·I

Chapter 8

The English Resultative Construction

8.1 Introduction

In this chapter, the resultative construction, which was argued to be a metaphorical extension of the “caused-motion” construction (in chapter 3), is discussed in more detail. A great deal of attention has been focused recently on attempting to delimit the class of expressions to which resultatives can be applied (Bresnan and Zaenen 1990; Carrier and Randall to appear; Hoekstra 1987; Hovav Rappaport and Levin 1991; Jackendoff 1990a; Levin and Rappaport 1990; Napoli 1992; Randall 1983; Simpson 1983; Van Valin 1990a).

This chapter defends the position that the necessary constraint on the appearance of resultatives can be stated in semantic terms: that the resultative can only apply to arguments that potentially (although not necessarily) undergo a change of state as a result of the action denoted by the verb. Such arguments are traditionally identified as *patients*. The traditional test for patienthood is that the expression can occur in the following frame (Lakoff 1963):

(1) a. What X did to <patient> was, ...

b. What happened to <patient> was, ...

This idea would seem to be intuitive, given the fact that resultatives code a change of state caused by the verb. In fact this proposal has been approximated recently by Bresnan and Zaenen 1990, Jackendoff 1990a, and Van Valin 1990a. However the existence of so-called “fake” object cases have been analyzed as being exceptions to the semantic constraint. “Fake” object cases, so named by Simpson (1983) are cases such as the following (The attested examples here and below come from Visser 1963):

(2) a. Paulo, who had roared himself hoarse, was very willing to be silent. (OED: 1797 Mrs. Radcliff, Italian vii.)

b. *He roared himself.

(3) a. The Germans cried their throats dry with calling for a general Council (OED: 1674 Leighton in Lauderdale Papers (1885))

b. *The Germans cried their throats.

The postverbal NP in these cases is said to bear no semantic relation to the main verb, and therefore is viewed as being exceptional to the semantic constraint of patienthood. The existence of these cases has led several researchers to conclude that the phenomenon must be stated in syntactic terms (Simpson 1983, Carrier and Randall, to appear, Hovav Rappaport and Levin 1991).

In what follows, I will continue to refer to these as “fake” object cases despite the fact that I will argue that the “fake” object should be treated as a semantic argument.

In what follows, I restrict my attention to adjectival resultatives, although I intend “resultatives” to cover expressions which encode a resultant state with a PP as well.

The facts which must be accounted for are the following:

1. Resultatives apply to direct objects of some transitive verbs:

(4) This nice man probably just wanted Mother to...kiss him unconscious.

(p.39 D. Shields, *Dead Tongues*)

(5) I had brushed my hair very smooth. (1847 Ch. Bronte, *Jane Eyre* 107)

(6) You killed it stone-dead. (1910 W. Somers, *Maugham, Altogether*)

2. But not to others:

(7) *He watched the TV broken.

(8) *He believed the idea powerful.

3. Resultatives apply to subjects of passives which correspond to acceptable actives:

(9) I charged with them, and got knocked silly for my pains. (1889 Rider Haggard, *King Solomon's Mines*)

(10) The tools were wiped clean.

4. To the subjects of particular intransitive verbs, often associated with unaccusativity:

- (11) The river froze solid.
- (12) It exploded apart.
5. But not to the subjects of other intransitive verbs, often associated with unergativity:
- (13) *He talked hoarse.
- (14) *At his wedding, he smiled sore.
- (15) *He coughed sick.
6. In addition, as mentioned above, resultatives occasionally occur with so-called “fake” objects. That is the postverbal NPs do not bear the normal argument relation to the matrix verbs. Some additional examples are (also see the final section of this chapter):
- (16) Whose whole life is to eat, and drink...and laugh themselves fat. (OED: 1947 Trapp, Comm, and Epist. and Rev.)
- (17) The dog would bite us all mad. (1846 Dougl. Jerrold, Mrs. Caudle’s Curt. Lect 4.) (This does not necessarily imply that the dog would bite us all).
- (18) She laughed herself crooked. (1910 Benson, Mr. Teddy XIII)

8.2 The Status of the Postverbal NP

Many researchers following Simpson (1983) have assumed that the postverbal NP in the case of “fake” object resultatives is not an argument of the verb while the

postverbal NP of transitive resultatives is an argument (Hovav Rapoport & Levin 1991; Bresnan and Zaenen 1990; Jackendoff 1990a; Napoli 1992). Carrier and Randall (to appear) explicitly argue this point. They observe that some processes that are taken to apply only to direct internal arguments do not apply to “fake” object resultatives, while they do apply to regular resultative expressions. Specifically, they argue that middle formation, adjectival passive formation, and process nominalizations apply to direct internal arguments, and they are said to apply to “transitive” resultatives, for example:

- (19)
- a. transitive: He hammered the metal (flat).
 - b. middle: This metal hammers flat easily.
 - c. adjectival passive: The hammered-flat metal.
 - d. nominalization: The hammering of the metal flat.

but not to apply to “fake” object resultatives:

- (20)
- a. “fake” object: He drove his tires *(bald).
 - b. middle: *Those tires drive bald easily.
 - c. adjectival passive: *The driven bald tires
 - d. nominalization: *The driving of the tires bald.

However none of these construction occurs across the board with all transitive resultatives either. For example, the following middles are based on transitive verbs and yet they pattern exactly like fake object cases in being ungrammatical:

Middle Construction with transitive verbs:

- (21) a. *She kicks black and blue easily.

b. *The washer loads full easily.

c. *His face washes shiny clean easily.

And, as Jackendoff (1990a) has pointed out, most if not all adjectival passives and nominalizations based on transitive resultatives are also ungrammatical: Adjectival passives of transitive verbs:

(22) a. *the washed-shiny clean face

b. *the shot-dead man

c. *the kicked-black and blue woman

Nominalization of transitive verbs:

(23) a. *the shooting of the man dead

b. *the washing of the face shiny clean

c. *the driving of him crazy

Notice we cannot claim that these facts provide evidence that even transitive resultatives do not have an internal argument, since some transitive resultatives *do* occur in these constructions (cf. ex 19a-d). Examples with uncontroversial direct internal arguments divide on whether they can occur in these constructions. For example:

Middle Construction:

(24) a. This movie watches easily.

b. *This movie sees easily.

Adjectival Passive Construction:

(25) a. the murdered man¹

b. *the killed man

Nominalization Construction:

(26) a. the persuasion of people to new faiths

b. *the persuasion of people to be quiet

Therefore, although there may well be an implication:

If *x* occurs in:

The Middle Construction *v* Adjectival Passive Construction *v* Nominalization Construction \implies *x* is an argument

the converse is clearly false. So we cannot use these constructions to argue that “fake” object cases are *not* arguments. Neither Carrier & Randall nor the other accounts cited above, provide other reasons or benefits to attributing a non-argument status to the postverbal NP.

Each of the above constructions should be considered independently to see why some resultatives are compatible with them and others not. To make this point, we will take for example the case of middle formation.

8.3 Middle Formation

Middles require that the unexpressed agent argument be indefinite, interpreted as “people [or whatever the agent is] in general.” Middles also require that the patient

¹I thank Charles Fillmore for suggesting this minimal pair.

subject argument have a particular inherent quality which makes it primarily responsible for the property expressed in the predicate phrase (van Oosten 1977, 1984). Moreover the unexpressed agent argument is typically interpreted as volitional, intending the result (if a result is entailed) as well as intending to perform the action denoted by the verb. To illustrate the fact that middles are normally interpreted as involving an (indefinite) volitional agent, notice the contrast between:

(27) a. This car drives with the greatest of ease.

b. #This car drives with the greatest of difficulty.

(28) a. This wine drinks like it was water. (van Oosten 1977)

b. #This wine drinks like it was vinegar.²

The same semantic features which are characteristic of middles can be captured by a paraphrase of the middle construction. For example,

(29) The metal hammers flat easily.

is interpreted to mean:

(30) People can hammer the metal flat easily, because of an inherent quality of the metal.

Several factors conspire to make “fake” object cases (as well as many transitive resultatives and in fact many simple transitives) incompatible with the middle construc-

²The interpretation of volitionality is not a hard and fast constraint, however, since speakers do find: *Those rolls overbake easily* to be acceptable. (I thank Annie Zaenen for bringing this example to my attention).

tion. First, “fake” object cases occur most readily with objects which are coreferential with the subject (Jackendoff 1990a), e.g.:

(31) She cried herself asleep.

(32) He talked himself blue in the face.

The restriction on middles that the unexpressed agent argument be indefinite, suffices to rule the corresponding middles ungrammatical:

(33) *She cries asleep easily.

(34) *He talks blue in the face easily.

Another source of incompatibility stems from the constraint that the patient argument must be interpreted to have a particular inherent quality which makes the predicate true. “Fake” object cases, on the other hand, are often used as hyperbole to express the idea that the action performed was done to excess; in this use, it would be anomalous to attribute the predicate’s holding to some particular property of the “fake” object referent. For example,

(35) The joggers ran the pavement thin. (Carrier and Randall, to appear)

would not be used to describe an actual change in the thickness of the pavement, let alone to convey the idea that the pavement bore some kind of particular property which caused it to become thin from people running on it. Notice the semantically analogous paraphrase is as unacceptable as the middle form:

(36) a. #People can run that pavement thin easily because of an inherent quality of the pavement.

b. #That pavement runs thin easily.

Moreover, the fact that middles are typically used when the unexpressed indefinite agent is understood to be volitional, serves to render other possible “fake” object cases infelicitous. In particular, “fake” object cases are often used to express a negative outcome; therefore assigning volitionality to the unexpressed agent results in anomaly.

Given the right context, we find that middles with “fake” objects are greatly improved. For example, imagine that people in charge of props on a movie set are asked to drive 50 tires bald for a stunt. Insofar as speakers find:

(37) He drove 50 tires bald.

acceptable, the corresponding middle form is also acceptable:

(38) Go buy some cheap tires for that scene, those inexpensive tires drive bald really quickly.

Similarly, imagine that a farmer has had such trouble with stray dogs attacking his chickens that he breeds the chickens such that they wake up easily upon hearing any barking. In this context, insofar as speakers accept:

(39) The dog barked the chickens awake.³

speakers I have checked with also report the following example to be acceptable:

³I thank Jane Espenson for suggesting this example.

(40) His chickens bark awake easily.

Thus once closer attention is paid to the particular semantics associated with the middle construction, we can account for why fake object resultatives are not normally acceptable as middles, and we find that it is possible to concoct a context in which the semantics of a particular expression in fact *is* compatible with the middle construction.

8.4 Other Accounts

Jackendoff (1990a)

Jackendoff, although rejecting Carrier and Randall's specific arguments, also rejects the idea that the postverbal NP is an argument, instead suggesting that it is an adjunct. However the postverbal NP fails traditional tests for adjuncthood. It can appear as the subject of passives:

(41) The baby was barked awake every morning by the neighbor's noisy dog.

It must occur directly after the verb, and cannot occur with intervening material:

(42) *The dog barked ferociously the baby awake.

Omission of the postverbal NP results in a radical change of meaning. Only one can occur in a given clause:

(43) *The dog barked us them awake.

Therefore the claim that the postverbal NP of "fake" object cases is an adjunct and not an argument is unwarranted. In postulating an "Adjunct Rule" which can add the postverbal NP to the basic semantics of the verb, Jackendoff however does

capture the basic insight that particular lexical items can be viewed as “fitting into” a construction with its own inherent semantics. A detailed comparison of Jackendoff’s general approach and the one suggested here is presented in section 4.3.

Bresnan and Zaenen (1990)

Bresnan and Zaenen(1990) argue that the critical factor is that the resultative be predicated of an argument that is intrinsically marked with the [-r], “unrestricted”, feature. This feature is taken to be shared by both subjects and direct objects, distinguishing them from prepositional objects and secondary objects. The [-r] feature is assigned as an intrinsic classification in two cases:

1)the argument bears the semantic role of patient (or “theme”)

OR

2) the argument is assigned no semantic role by the verb.

The first case, that the argument bears the semantic role of patient, accounts for the majority of resultatives: those that are predicated of the direct objects of transitives, the subjects of passives, and the subjects of unaccusatives. The second case, that the argument is assigned no semantic role by the verb, is designed to account for “fake” object cases. That is, the “fake” objects are assumed to be unsubcategoryed for by the verb; therefore they are claimed to bear no thematic role, and are assigned the critical unrestricted feature.

The problem with this account is that not only is the “fake” object not assigned a semantic role by the verb, it is not normally an argument of the verb, whether semantically empty or not; i.e. it does not normally correspond to a *complement* of

the verb. Bresnan & Zaenen fail to account for how it is that the internal object makes its way into the argument structure of the verb in order to receive its critical [-r] marking.

The approach and the problem with the approach can be stated more generally. Bresnan and Zaenen propose treating the verb with its “fake” object as a raising verb: treating the postverbal NP as a complement, but not an argument. However, the question of accounting for the existence of the postverbal complement remains.

In order to deal with this issue, they could postulate a lexical rule which would add the internal argument to the argument structure of the verb (as is currently done for applicatives Alsina and Mchombo 1989) and for the resultative adjective itself within their theory. However if this were done, the additional argument would be assigned the thematic role of patient, since it is in all cases an affected argument. Providing thematic roles to arguments yielded by lexical rule is uncontroversial.

This would allow Bresnan & Zaenen’s account to reduce to the straightforward semantic account proposed here: that resultatives can only be predicated of patient arguments.

Van Valin (1990a)

The claim that resultatives can only be applied to patient arguments sounds on the face of it much like the account recently proposed by Van Valin (1990a). Van Valin argues that the resultative must be predicated of an “undergoer”. However he notes that “the label ‘undergoer’ should not be taken literally” (226: footnote 6). In particular, undergoers do not correspond to patients in that it is not necessary that

they potentially undergo a change of state; instead in English any argument which can be passivized is taken to be an undergoer.⁴ Therefore the undergoer condition is underconstrained, and would falsely predict examples which have undergoer, but non-patient arguments to be acceptable.

There is more serious problem with Van Valin's account. He claims:

“the constructions allowing resultative phrases are either accomplishments or achievements, all of which code a result state as part of their inherent meaning. Activity verbs, which are inherently atelic and therefore cannot in principle code a result state or have an undergoer argument, do not take resultative predicates.”(255)

The problem stems from the fact that when Van Valin tries to exemplify the claim that resultatives only occur with accomplishments or achievements, he cites the resulting construction, not the construction before the resultative is added. For example, he notes that

(44) Terry wiped the table clean in-*for 5 minutes.

is an accomplishment, and that

(45) The river froze solid.

is an achievement. But then he argues that unergative verbs do not allow resultatives, citing the following example:

(46) He talked *in-for 10 minutes.

⁴This follows from the fact that in RRG, passive is stated as an operation on the undergoer.

However this example is not parallel to his other examples since the other examples had resultative phrases. There is no disagreement about the fact that expressions with a resultative are accomplishments or achievements, since the resultative phrase itself serves to bound the event. However it is not the case that only *independently* classifiable accomplishments or achievements occur with resultative predicates. For example *push* in the following is an activity verb:

(47) Terry pushed the door *in an hour/for an hour.

And yet *push* can occur with a resultative:

(48) Terry pushed the door shut.

Also *talk* is an activity verb, and

(49) *He talked himself.

is simply ungrammatical. In short, Van Valin's account begs the question of accounting for which predicates can occur with resultatives, and of how the "fake" object is related to the main verb.

8.5 A Resultative Construction

The generalization we wish to capture is that the occurrence of resultatives in purely semantic terms:

Resultatives can only be applied to arguments which potentially undergo a change of state as a result of the action denoted by the verb.

I.e. the argument must be classifiable as a type of *patient*. Again, we can use the traditional test for patienthood, in order to determine whether the argument is of this sort.

(50) a. What X did to <patient> was, ...

b. What happened to <patient> was, ...

Notice there is no requirement that the predicate independently codes a change of state, only that it *potentially* causes a change of state.

By now, reader who has been following along might guess how we might account for the occurrence of resultatives within a constructional approach.⁵ A resultative construction is posited which exists independently of particular verbs which instantiate it. In order to account for “fake” object cases, we need to recognize that the construction itself can add a patient argument as well as adding the result argument to non-stative verbs which only have an instigator profiled argument (see appendix for discussion of the requirement that the verb must otherwise appear intransitively—i.e. that they must have only a single profiled argument). Constructions as defined, have semantics, and are capable of bearing arguments. Thus the postverbal NP of the “fake” object cases is an argument *of the construction*, although not necessarily of the main verb. Under this analysis, the verb retains its intrinsic semantic representation, while being integrated with the meaning directly associated with the construction.

The resultative construction can be represented thus:

⁵To see how the account could be translated into semantic-changing lexical rule type of account see Goldberg 1991a.

Resultative Construction

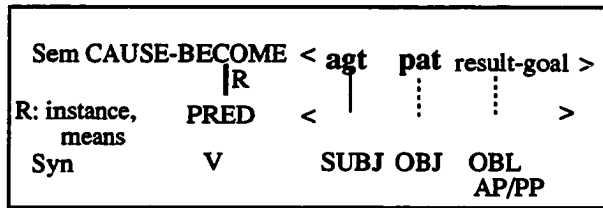


Figure 8.1

To see how the construction is able to add arguments, consider the following cases.

Verbs such as the following can integrate into the resultative construction:

(51) a. talk < **talker** >

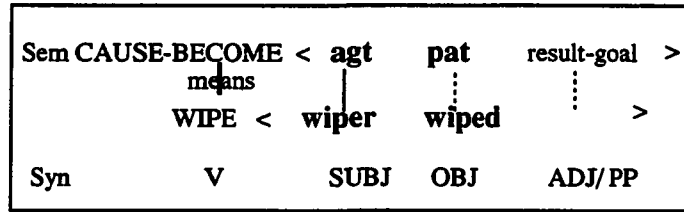
He talked himself blue in the face.

b. wipe < **wiper** wiped >

He wiped the table clean.

In order for the verb to occur in a particular construction, the participant roles associated with the verb must fuse with the argument roles associated with the construction, according to the principles described in chapter 2. The participant roles of the verbs *talk* and *wipe* fuse with the argument roles of the construction as follows:

Composite Structure: Resultative +*wipe*



Composite Structure: Resultative+ *talk*

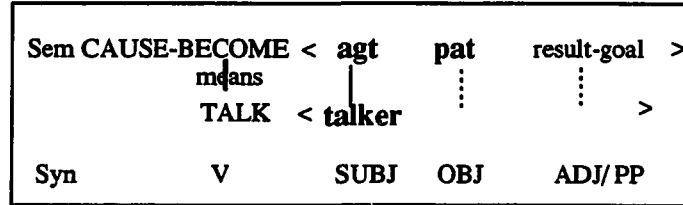


Figure 8.2

Thus the construction adds only the result-goal argument if the verb has a participant role which fuses with the patient argument of the construction, as is the case with *wipe*.⁶ Alternatively, the construction can contribute both patient and result-goal roles, as is done in the case with *talk*.

Two other types of cases are ruled out. The construction itself does not prohibit a hypothetical verb with participant roles which are instances (types) of agent and result-goal from integrating into the construction, since the construction could presumably add the patient argument. However, the existence of such a verb is disallowed, by the general constraint that instances of the result-goal type role can only be predicated of patient-like roles.

A verb such as *become* with participant roles, < pat result-goal > cannot integrate with the construction, because the construction specifies that the agent role must be

⁶Note that if the verb's patient-type participant role is profiled, then it *must* be fused with the patient argument role of the construction; if it is not profiled, then the construction does not rule out the possibility that it is left unexpressed, and that the patient role is contributed by the construction.

fused with an independently existing participant role of the verb (this is indicated by the solid line from the construction's agent role to the PRED role array).

Intransitive resultatives (i.e. resultatives with unaccusative verbs) require a slightly different construction; however, the more general constraint on patienthood is shared by two place resultatives and resultatives with unaccusative verbs (cf. exs. 10-11):

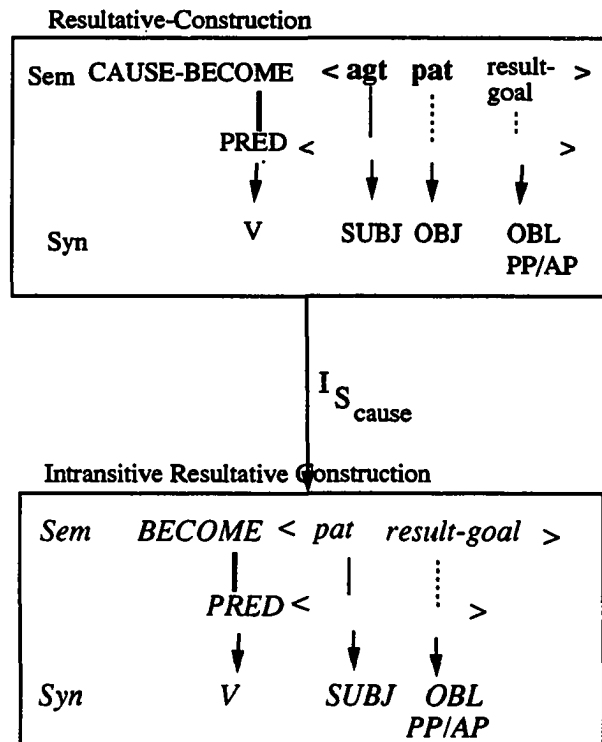


Figure 8.3

The two constructions are related by a subsumption inheritance link, which relates the causal resultative construction to the intransitive resultative construction. That two constructions are necessary is not necessarily a drawback of the present proposal. It seems that Italian allows only two argument resultatives, and does not allow resultatives with unaccusatives (cf. Napoli 1992).

Advantages of this Account

The constructional approach captures the insight which led other researchers to explore the possibility that the postverbal NP is not an argument of the main verb. That is, the postverbal NP does not intuitively correspond to any participant normally associated with the activity denoted by the main verb. The resultative construction is itself associated with a particular argument structure configuration, independently of verbs which instantiate it. Particular verbs retain their inherent semantics.

The analysis can motivate the existence of “fake” objects cases. Since the “fake” *reflexive* cases—i.e. the cases in which the resultative adjective is predicated of an argument which is coreferential with the subject—are the most common (according to Visser’s survey), the most prototypical examples, and for some the only grammatical cases, we can understand fake object cases as having arisen from an expressive desire to predicate a change of state of an agent or instigator argument. A construction which adds a patient argument to the inherent argument structure of the verb allows the resultative to apply to a patient argument, while allowing the patient argument to be coreferential with the agent argument.

In addition, the syntactic expression of the postverbal NP would follow from general principles. Assuming a ternary branching structure – see Green 1973, Williams 1983, Carrier & Randall to appear, for arguments against a small clause analysis – the patient argument is linked with OBJ by the canonical linking conventions of English. (as suggested recently by e.g. Gropen et al. 1991; Pinker 1989; Dowty 1991).

Finally, an account which situates the possibility of resultative expressions in the

semantics, can naturally account for various semantic constraints on the construction. These are discussed in the following section.

This approach also allows us to capture the fact that there is a great deal of idiosyncrasy that is involved (Green, 1972; Dowty 1979). Resultatives are often part of collocations with particular verbs. For example, *eat* is most colloquial with the resultative *sick*:

(52) a. He ate himself sick.

b. ?He ate himself ill/nauseous/full.

Cry is most colloquial with the resultative *to sleep*:

(53) a. She cried herself to sleep.

b. ?She cried herself asleep.

c. ??She cried herself calm/wet.

The following minimal variants are markedly odd:

(54) ? He ate himself asleep.

(55) ? She cried herself sick..

What needs to be noted is that there are grammaticalized instances of the construction which are partially lexically filled.

Adopting a usage-based model of grammar as discussed in chapter 5 (which draws on the work of Bybee 1985 and Langacker 1987), novel extensions are acceptable to the degree that they conform to the semantic (and morphophonological) constraints of existing clusters of cases.

8.6 Other Constraints on the Resultative Construction

The construction suggested above only provides a necessary condition on the appearance of resultatives. Several other cooccurring constraints are required in order to begin to triangulate sufficient conditions on resultatives. In this section, the following restrictions will be argued to hold of (adjectival) resultative expressions generally (modulo cases in which the verb is lexically causative independently of the construction):

- The resultative construction with two arguments must have an (animate) instigator argument.
- The action denoted by the verb must be interpreted as directly causing the change of state: no intermediary time intervals are possible.
- The resultative adjective must denote an end of scale.
- Resultative phrases cannot be headed by deverbal adjectives (Green 1972, Carrier and Randall, to appear).

The argument linked to subject position must be an (animate) instigator:

For many speakers (including myself), only animate instigator arguments are acceptable as subjects in two argument resultative constructions. The animate argument is not necessarily an agent, since no volitionality is required:

(56) She coughed herself sick.

(57) She slept herself sober.

In some dialects, inanimate instigator arguments are also acceptable. For example:

(58) The jackhammer pounded us deaf. (Randall 1983)

(59) The alarm clock ticked the baby awake. (Randall 1983)

However no speakers I have found find instrument subjects acceptable:

(60) *The feather tickled her silly.

(61) *The hammer pounded the metal flat.

This constraint does not hold of lexical causatives, i.e. verbs whose basic sense entails a change of state independently of the resultative:

(62) Water filled the tub half full.

(63) The sleeping pills made me sick.

Aspectual Constraint

There has been some disagreement about which aspectual classes can occur with resultative phrases. Van Valin (1990a) suggests that resultatives can only occur with telic predicates. Dowty (1979) and Jackendoff (1990a) on the other hand, suggest that resultatives can only occur with activity or “unbounded” predicates. It is at least generally agreed that resultatives can not occur with stative verbs (Hoekstra 1987).

In this section, I will argue that there is an aspectual constraint, but that it does not coincide with a distinction between telic and atelic predicates, both of which can be seen to appear in the resultative construction:

(64) a. Harry shot Sam dead.

b. Harry shot Sam *for an hour. (atelic)

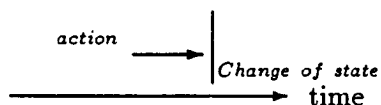
(65) a. Sam talked himself hoarse.

b. Sam talked for an hour.(telic)

The relevant constraint can be stated as follows:

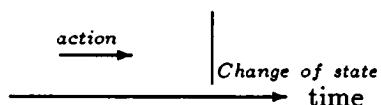
The change of state must occur simultaneously with the endpoint of the action denoted by the verb.

Allowed:



This constraint rules out cases in which there is any time delay between the action denoted by the verb and the subsequent change of state:

Disallowed:



Notice that in a neutral context, *eat* with an unexpressed argument normally implies that he finished eating a meal:

(66) He (already) ate.

However, when *eat* occurs in the resultative construction, the eating is necessarily interpreted as extending over the period of time leading up to the change into a state of being sick. That is,

(67) He ate himself sick.

necessarily implies that his continuous eating made him sick; it cannot imply that the meal he ate made him sick. The following example,

(68) Sam cut himself free.

cannot be used to mean that Sam cut himself, causing his captors to release him in order to clean him up. It must mean that he cut whatever binds were preventing him from being free, thereby immediately gaining his freedom. Similarly,

(69) Sam shot Sue dead.

cannot be used to mean that Sam shot Sue and she later died in the hospital; instead it must mean that Sue died immediately from the shot.

This constraint can be interpreted as a consequence of a more general constraint that the causation must be direct: no intervening time in a causal sequence is possible.

End of Scale

The type of resultative adjective that can occur is fairly limited. While adjectives meaning “asleep/awake,” “open/shut,” “flat/straight/smooth,” “free,” “full/empty,” “dead/alive,” “sick,” “hoarse,” “sober,” and “crazy” occur fairly regularly, other adjectives occur rarely, if at all:

(70) * He drank himself funny/happy.

(71) * He wiped it damp/dirty. (Green 1972)

(72) * The bear growled us afraid.

(73) * He encouraged her confident.

(74) * He hammered the metal beautiful/safe/tubular. (Green 1972)

Most of the adjectives which can occur can be independently classified as having a clearly delimited lower bound, and therefore are typically *non-gradable* (Sapir 1944). Non-gradable adjectives are said to be unable to appear (*ceteris paribus*) with quantifying phrases:

(75) ? a little sober

(76) ? a little flat/smooth

(77) ? a little alive/dead

(78) ? a little asleep/awake

(79) ? a little full/empty

(80) ? a little free

Intuitively, one cannot be a little sober, because one is either entirely sober or not sober: there is, all things being equal, no grey area.

Sick and *hoarse*, on the other hand, do not obviously code states with a clearly delimited lower bound:

(81) a little sick

(82) a little hoarse

However when used in the “fake” object construction, they are interpreted as delimiting the clear boundary beyond which the activity can not continue. That is,

(83) He ate himself sick.

(84) He talked himself hoarse.

imply that he ate to the point where he could eat no more, or he talked to the point where he could talk no more. Notice in this context they receive a non-gradable interpretation:

(85) ? He talked himself a little hoarse.

(86) ? She ate herself a little sick.

The resultatives *crazy* and *silly*, as in:

(87) He drove her crazy/bananas/bonkers/mad/insane.

(88) He tickled her silly.

are similar since they imply that the patient argument has “gone over the edge,” beyond the point where normal functioning is possible (of course they are typically used as hyperbole, not literally).⁷ *Render*, is interesting, in that it lexicalizes this

⁷It is possible that example 15:

(89) Whose whole life is to eat, and drink...and laugh themselves fat. (OED: 1647 Trapp, Comm. and Epist. and Rev.)

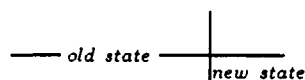
is also a novel extension based on the idea that they became fat to the point of being non-functional.

constraint, requiring a resultative adjective which codes a state of loss of function (in particular, the property must be a negative end of scale):

(90) a. It rendered them speechless/impotent/obsolete.

b. ??It rendered them alive/full/free.

Therefore it is fair to say that the resultative of the “fake” object construction codes a clearly delimited endpoint.⁸ The endpoint may be on a kind of absolute scale (in the case of inherently non-gradable adjectives) or on a scale of functionality, beyond which continuation of functioning is impossible:



Exceptions to this generalization are of two kinds. First, there are verbs which are lexically causative, independently of the resultative construction. These verbs are much freer in the semantic and syntactic type of resultative phrases which are allowed than *render* and productive cases:

(91) a. He made the metal safe/pretty/tubular/damp/dirty.

b. He made her a queen.

(92) a. He painted his house pink-ish.

b. He painted his house a bright shade of red.

⁸Napoli (1992) has independently suggested a similar constraint that is argued to hold even more strongly in Italian. Because I received her manuscript in the final stages of writing this chapter, I have not attempted to compare and contrast our accounts.

Other exceptions to this generalization have been attested, but in addition to their apparent rarity, each can be seen to have a distinctly novel character. In general, exceptional cases tend to be from the same semantic domain as more conventionalized cases, and can be seen as one shot novel extensions from a grammaticalized pattern:

(93) Bees will suck themselves tipsy upon varieties like the sops-of-wine. (OED: 1879
Burroughs, Locusts and Wild Honey II)

(94) Till he had drunk himself sleepy. (1883 Stevenson, Tres. Isl. I)

At least one attested case has been cited by Hovav Rappaport and Levin (1991), however, which truly seems to fly in the face of this generalization:

(95) “Look, isn’t it lovely? It’s the stale loaf I put out for the birds and they’ve pecked it really pretty.” (cited by Hovav Rappaport and Levin 1991: Z. Wicomb, *You Can’t Get Lost in Cape Town*, Pantheon, New York, 1987, p. 161)

However this example is judged ungrammatical by American English speakers I have asked. It is possible that South African English does not have the end of scale restriction.

Restriction against Deverbal Adjectives

A general constraint that is widely recognized is that resultatives can not be adjectives derived from either present or past participles (Green 1972, Carrier and Randall, to appear):

(96) a. She painted the house red.

- b. *She painted the house reddened.
 - c. *She painted the house reddening.
- (97) a. She shot him dead.
- b. *She shot him killed.
 - c. *She shot him dying.
- (98) a. She kicked the door open.
- b. *She kicked the door opened.
 - c. *She kicked the door opening.

This restriction has been attributed to a semantic clash of aspect (Carrier and Randall, to appear), however the nature of the clash and therefore an exact statement of the clash has proved elusive.

8.7 Conclusion

This chapter has argued that the semantic restriction that resultatives can only apply to patient arguments is viable, even in the case of “fake” object resultative expressions, despite recent arguments to the contrary. This analysis has the advantages of 1) assimilating “fake” object cases to other transitive resultative cases, 2) motivating the existence of “fake” object cases, 3) allowing for the existing idiosyncrasy in a natural way, 4) predicting the syntax of the construction from canonical linking patterns and

without ad hoc stipulations, and 5) accounting for semantic constraints in a natural way.

Specific semantic constraints were proposed in order to constrain the applicability of the lexical rule (or the instantiation of the construction): 1) two argument resultatives were argued to have an instigator argument, 2) the causation involved must be direct, with no intervening time periods allowed, 3) the resultative adjective must have a clearly delimited lower bound, and 4) several co-occurrence restrictions were accounted for by considering the resultative adjective a type of path phrase.

8.8 Appendix

On the question of whether the predicates can otherwise occur intransitively: (i.e. whether they have a sense with a single profiled argument)

The predicates that occur with “fake” objects and resultatives are typically intransitive, as in:

(99) She could wonder herself crazy over the human eyebrow. (1881 R. L. Stevenson, *Virginibus Puerisque*)

(100) He used to talk one sick about how little scope he had in his parish (1920 Rose Macaulay, *Potterism*)

(101) You...have not slept yourself sober. (1839 Dickens, *Nich. Nickl*)

(102) I cried myself well-nigh blind. (1864 Tennyson, *Grandmother X*)

(103) (Re: laughing): It's not exactly a major calorie burner—you can laugh yourself silly, but not thin—yet it does help move nutrients and oxygen... (UC Berkeley Wellness Letter, observed by Suzanne Kemmer)

But the predicates may also be two place, as in the following examples:

(104) To eat oneself sick. (1933 OED “eat” 4a.)

(105) Bees will suck themselves tipsy upon varieties like the sops-of-wine. (OED: 1879 Burroughs, Locusts and Wild Honey II)

(106) Till he had drunk himself sleepy. (1883 Stevenson, Tres. Isl. I)

Many researchers have claimed that verbs which can occur with “fake” object must otherwise be able to occur intransitively (Dowty 1976 1979; Carrier and Randall to appear; Hovav Rappaport and Levin 1991). The examples cited in support of this claim are cases such as:

(107) a. The bombing destroyed *(the city).

b. *The bombing destroyed the residents homeless. (Hovav Rappaport and Levin, 1991)

(108) a. The bears frightened *(the hikers).

b. *The bears frightened the campground empty. (Carrier & Randall, to appear)

(109) a. The magician hypnotized *(the volunteers).

- b. *The magician hypnotized the auditorium quiet. (Carrier & Randall, to appear).

In terms of the present account, this constraint follows from the principle of correspondence of section 2.4. That is, it is claimed that the same verb that occurs in the resultative construction and in other contexts. If the verb *cannot* occur intransitively, then the argument that is linked with OBJ is profiled, which means that it must be obligatorily fused with a profiled argument role of the construction. Therefore obligatorily transitive verbs do not allow the patient role to be contributed by the construction; the construction's patient role will necessarily fuse with the profiled patient-type participant role of the verb.

Fernald (1991) has recently pointed out that this claim is apparently falsified by:

(110) a. Smitty guzzled himself sick.

b. Smitty guzzled the beer.

c. *Smitty guzzled. (Fernald's example 27)

(111) a. Smitty shot himself free.

b. Smitty shot someone.

c. *Smitty shot. (Fernald's example 26)

However it may be possible to explain these apparent counterexamples. First, whether the restriction should not be stated so to only allow verbs which *in isolation* can appear intransitively depends to some degree on differences in dialect. The intransitive use of *guzzle* is greatly improved in the following context:

(112) The barfly just guzzled for hours.

Similarly, *water* cannot in a neutral context appear without an object:

(113) He watered.

However, the following is acceptable:

(114) The gardener watered for hours. (Carrier and Randall, to appear)

Judgments differ as to whether *water* can appear with a “fake” object. Carrier and Randall find the following example acceptable:

(115) The gardener watered his sneakers soggy. (to mean that the gardener watered (something) causing his sneakers to become soggy)

However, my own judgment is that both examples 110a and example 115 are only marginally acceptable.

The second apparent counterexample, 111, is an instance of a semantically delimitable class of cases which are all exceptions to the intransitivity constraint. This class includes:

(116) a. He cut himself loose.

b. *He cut.

(117) a. He tore himself free.

b. *He tore.

(118) a. He ripped himself away.

b. *He ripped.

This class of cases can be semantically characterized as involving verbs which imply the forceful breaking of constraints in order to gain freedom. The resultatives are readily modified by a source phrase⁹ :

(120) He cut himself loose from the tree.

(121) He tore her free from his clutches.

(122) He ripped himself away from the meeting.

This class must involve the forceful breaking of constraints, as can be witnessed from the following:

(123) *He untied himself free.

(124) *He sliced himself free.

Because the exceptions form a delimitable semantic class, I have retained the more general intransitivity constraint on the productive use of resultatives.

⁹Annie Zaenen (p.c.) has pointed out that most of these examples can also occur without the adjectival resultative, with only the source phrase:

(119) a. He cut himself from the tree.

b. He tore her from his clutches.

c. ? He ripped himself from the meeting.

She noted that if the source phrases are not analyzed as resultatives, then we may have grounds for not considering these cases to be “fake” object cases at all, since the verbs appear with the direct object independently of the resultative phrase.

Chapter 9

X's Way Construction

In this chapter, we'll be concerned with a particular clause-level construction which can be exemplified by the following:

- (1) She pushed her way out of the room.

The construction can be skeletally represented as follows:

[SUBJ_i [V [POSS_i *way*] OBL]],

where V is a non-stative verb, and OBL codes a directional.

This construction differs from constructions discussed in previous chapters in several ways. First, it is more specialized syntactically in that it makes crucial reference to an anaphorically bound phrase headed by the noun *way*. As is discussed in more detail below, its semantics is also more specialized. In particular, the construction is used to express motion despite external difficulty. For example:

- (2) Sally made her way into the ballroom.

is understood to imply that Sally moved through a crowd or other obstacles. Notice the difference in interpretation between:

(3) a. ??Sally drank her way through the glass of lemonade.

b. Sally drank her way through a case of vodka.

Example 3b is greatly improved because it is much easier to construe drinking a case of vodka as being difficult than drinking a glass of lemonade. Because of its idiosyncratic properties, other languages typically do not have obvious correlates of this construction.

The construction can be seen to be highly productive, an enormous variety of verbs being compatible with it. This feature of the construction provides compelling evidence for the claim that aspects of sentential meaning be directly associated with constructions, and not uniquely to individual verbs. That is, it is highly implausible that each verb that can occur in the construction (which includes, with a large percentage of the entire class of non-stative verbs) has a sense which means, roughly “to move with difficulty.” That is, for each of the verbs in the following examples, we would need to posit such a motion sense (the following examples come from the Oxford University Press Corpus):

(4) a. He turns left, then right again, picking his way through the broad, tree-lined residential streets..

b. ...glaciers which had repeatedly nudged their way between England and Wales.

c. ..they clawed their way back..

d. ..he'd bludgeoned his way through, right on the stroke of half-time.

The X's way construction can be seen to be like the other constructions discussed in chapters 6 and 7, in that it is directly associated with a particular semantics, that integrates with the semantics of the main verb. The construction is in fact shown to be associated with several related interpretations.

This construction has recently been studied by Jackendoff (1990a), who also points out that this construction provides evidence for the claim that verbs do not exclusively determine argument structure. He further notes the possibility of variable interpretations, which is discussed in more detail below.

9.1 The existence of the construction

Instances of this construction imply that the subject referent moves along the path designated by the prepositional phrase. As Jackendoff notes, the construction's semantics cannot be predicted on the basis of the constituent parts of the construction. For example,

(5) Frank dug his way to safety.

entails that Frank moved through the created path to safety. Similarly,

(6) Frank found his way to NY.

entails that Frank managed to travel to NY. However none of the lexical items entails motion. To see this compare 5 and 6 with 7 and 8 below:

(7) Frank dug his escape route to safety.

(8) Frank found a way to NY.

The only interpretation for these examples is one in which the prepositional phrase modifies the direct object. Neither of these examples entail motion. For example, 7 in contrast to 5 entails only that Frank dug a hole in a prison wall not that he necessarily moved through it, while the only difference between 7 and 5 is that *way* is replaced by “escape route.” Examples 8 and 6 prevent us from postulating that *way* codes motion, because *way* is present in both these examples, and only 6 entails that Frank traveled to NY. Without belaboring the point, we should point out that motion is not dictated by the bound pronoun plus *way* in its entirety, either, since the expression,

(9) He knows his way around town.

does not entail motion. Here it is because the verb “know” is not an activity verb as required by the construction, but is stative.

The verbs that can occur in this construction are varied (cf. Salkoff 1988 for extensive discussion). Some are semantically intransitive:

(10) *claw, edge, dance, negotiate, talk*

Others are semantically transitive:

(11) *pick, punch, elbow, push*

Still others seem to be primarily associated with this construction:

(12) *find, make, weave, wind, worm*

The verb does need not normally have a path argument e.g. *pick, nudge, claw, bludgeon* in exs 4a-d above.

Jackendoff notes that a purely syntactic account of this construction is undermined by the fact that it is sensitive to the semantic property that the verb must be a process. In fact, as discussed below, the construction is sensitive to other subtle semantic constraints as well. Instead, Jackendoff suggests that there is a correspondence rule or a “rule of construal” which allows verb phrases of a certain form to be licensed and interpreted on the fly: “An intransitive action verb is inserted into a VP of the form [V-NP’s way-PP], and it and its complements are all licensed and interpreted ‘on the fly’ by the correspondence rule” (1990a: 221). He also suggests that, “In a sense, the *way-construction* can be thought of as a kind of ‘constructional idiom’ a specialized syntactic form with an idiomatic meaning, marked by the noun *way*.”(1990a:221) Adopting this basic idea in the following, the semantic aspects of the construction are analyzed in more depth.

9.2 The Semantic Interpretation

Jespersen (1949) had the basic insight that the direct object, *X’s way*, was a type of “object of result.” That is, the path through which motion takes place is not preestablished, but rather created by some action of the subject. Given this, we might hope for a general abstract meaning for the construction, motivated by the “object of result” path. However, we find that there are reasons to make finer grained distinctions, and to posit several conventional uses of the construction in the grammar. Several large corpora were searched for examples. Three different databases were used:

- the Wall Street Journal (1989) (4-8 million words)

- the Lund corpus consists of various spoken dialogs (435,000 words)
- the united states department of agriculture corpus (520,000 words)¹

By looking at the naturally occurring data, it became evident that it was necessary to distinguish several classes of cases. Beyond the fact that instances seem to naturally fall into clusters with shared semantic properties, the classes are subject to slightly different constraints. In what follows, naturally occurring data are supplemented with minimal pairs where such information is relevant.

The Central Sense

The most common interpretation of this construction involves motion through a crowd, mass, obstacles or other difficulty. The verb designates the *means* by which this motion is achieved. For example:

(13) For the record, Mr. Klein, as lead climber for the Journal team, pushed his way past the others, trampling the lunch of two hikers in his black army boots, and won the race to the summit.

(14) In some cases, passengers tried to fight their way through smoke-choked hallways to get back to their cabins to get their safety jackets.

(15) For hours, troops have been shooting their way through angry, unarmed mobs.

¹After the initial categorization of examples was done, I received a deluge of additional examples from the Oxford University Press Corpus via Patrick Hanks and Annie Zaenen. Some of these examples are cited here, but it was not possible to categorize all of the new examples in time.

(16) Hundreds of Californians made their way to to their computers after the quake, and checked in with each other on electronic bulletin boards, which link computers CB-radio-style, via phone lines.

A slightly different interpretation involves deliberate, careful, methodical, or winding motion, although no external difficulty is necessarily implied. The motion in these cases is *as if* there were obstacles. Again, the verbs designate the means by which the motion is achieved. For example:

(17) This time, with no need to thread his way out, he simply left by the side door for a three-day outing.

(18) A couple in fashionable spandex warm-up suits jogs by, headphones jauntily in place, weaving their way along a street of fractured and fallen houses.

(19) The wily thieves who invade these fields in the dead of night, scoop up clusters of glistening fruit, then wend their way along the uncharted byways of Deblois, Cherryfield or Township 18, to the receiving docks of processors known for not asking too many questions.

(20) As aftershocks shook the San Francisco Bay area, rescuers searched through rubble for survivors of Tuesday's tremblor, and residents picked their way through glass-strewn streets.

(21) Instead, the Secret Service will work its way along the barricades before the president arrives.

The fact that these cases involve motion despite external difficulty or motion as if through obstacles in that the path is winding or indirect can account for why high frequency, monomorphemic (basic level) motion verbs are typically unacceptable in this construction:

(22) *She went/walked/ran her way to NY.(Napoli cited by Jackendoff 1990a)

(23) *She stepped/moved her way to NY.

If a context is provided in which a basic level motion verb is understood to imply motion despite difficulty, these cases are decidedly better:

(24) The novice skier walked her way down the ski slope.

(25) The toddler managed to walk her way across the large room.

Motion verbs with highly salient manner components, that are interpreted to imply motion through a crowd, mass, obstacle or other difficulty are much more acceptable:

(26) She waltzed her way across the room.

(27) She limped her way across the street.

Notice that it is not simply the addition of a manner component which makes these examples better. It is also the fact that the verb allows us to construe the motion as being through a crowd, mass, obstacle or difficulty. For example, waltzing typically takes place in a room full of people. The following examples are not nearly as good:

(28) *She raced her way over the field.

(29) *She pranced her way out of the room.

9.3 Other Semantic Constraints

Motion must be self-propelled

An additional constraint is that the motion must be self-propelled. In the case of human movers, this amounts to a constraint that the mover be an agent. For example the following examples with non-agentive subjects are unacceptable:²

(32) *She tripped her way down the stairs.

(33) *Without noticing that she was jabbing everyone and stepping forward, Stella accidentally elbowed her way to the front of the line.

(34) *Not realizing the trigger of the machine gun was so sensitive, Sue-Ellen accidentally shot her way through the crowd.

The subject referent need not be human as long as the motion is construed as self-propelled:

(35) "...sometimes it [the cyst] forces its way out of the ((plumpton)) at the top."

(36) The large seeds sprout quickly and dependably and the strong seedlings can push their way through crusted soil.

In fact the class of methodical motion is readily extended to non-human subjects.

For example,

²At the same time, the constraint of volitionality does not preclude the possibility that the subject arrives at an unintended resulting location:

(30) Stella accidentally elbowed her way to the front of the wrong line.

(31) The convict accidentally tunneled his way back into the prison.

(37) The spending bills working their way through Congress don't present much of a problem in terms of the Gramm-Rudman law.

Notice that even in these cases with a non-agentive subject, the motion must be understood to be self-propelled:³

(41) *The boxes while stacked on the train worked their way through several states.

(42) *In that old cafeteria, the food works its way through a dilapidated conveyorbelt despite many stops and starts.

Related to this constraint is the fact that the motion must be goal-directed, it cannot be aimless motion. This accounts for the unacceptability of the following examples:

(43) *She wandered her way around town.

(44) *She meandered her way through the crowd.

(45) *She strolled her way through the crowd.

Notice it is actually not possible to state the constraint as a constraint on a class of verbs per se, since it is not possible to designate non-directed motion by means of prepositions such as *among* either:

³Jackendoff, however includes the following example:

(38) The barrel rolled its way up the alley. (1990a:212)

I myself find this example unacceptable, and I suspect that Jackendoff may have had a personification interpretation because he further includes the following:

(39) The barrel rolled its ponderous way up the alley.

which he paraphrases as,

(40) "The barrel, ponderous (as an elephant), went up the alley rolling." (1990a:217)

(46) *The politician worked his way among the crowd.

The activity designated by the verb must be unbounded (Jackendoff (1990a))

A constraint that the verb necessarily designate a repeated action or unbounded activity, noted by Jackendoff (1990a) holds of this class:

(47) a. Firing wildly, Jones shot his way through the crowd.

b. *With a single bullet, Jones shot his way through the crowd.

(48) a. Bill punched his way through the crowd by pummelling everyone in his path.

b. *Bill punched his way through the crowd by leveling the largest man and having everyone else step aside.

For the same reason, we find the following to be unacceptable:

(49) *She dove her way into the fire.

(50) *She jumped her way over the ditch.

Unaccusative verbs

Given the last two constraints, it is not surprising that unaccusative verbs are typically not acceptable in this construction, since unaccusativity has been correlated with non-agentivity and telicity (Van Valin 1990a; Zaenen to appear):

(51) *The butter melted its way off the table.

(52) *The water boiled its way over the sides of the pot.

However it seems that the relevant constraint is semantic, insofar as the normally unaccusative verbs *grow* and *shrink* are attested in the data, with an agentive interpretation:

(53) The planned purchase furthers Bull's strategy of trying to grow its way out of its extensive computer-marketing problems.

(54) The bank-debt restructuring is the centerpiece of Lomas Financial's months-long effort to shrink its way back to profitability after two straight years of heavy losses.

9.4 Variable Interpretation

Both Levin & Rapoport (1988) and Jackendoff (1990a) suggest two distinct paraphrases of this construction, one in which the verb designates the means of motion, the other in which the verb designates the manner of motion. For example,

(55) Sam joked his way into the meeting

is said to be interpretable in either of the following ways:

(56) a. Sam got into the meeting by joking. (means)

b. Sam went into the meeting joking. (manner)

These paraphrases together are taken to comprise a disjunctive interpretation.

It should be noted that not all speakers find the purely manner interpretation acceptable. When asked for judgments of Jackendoff's example:

(57) He belched his way out of the restaurant.

which was intended to have a manner interpretation, i.e. that the subject went out of the restaurant while belching, several speakers I checked with concocted situations in which the belching was the *means* of the motion. For example, one speaker suggested that the sentence would be acceptable in the context that the other diners found the belching so objectionable that they cleared a path through which the offending party could exit. Another speaker suggested that the sentence would be acceptable if the belching were understood to be a means of propulsion.

In the Lund, Wall Street Journal and Department of Agriculture corpora, verbs which designated the manner of motion, as opposed to the means were rare. In fact the total number of occurrences in the corpora of natural data was 3, which amounted to less than 3% of the data (Surrounding text context was used to determine the intended interpretation). Each of these cases involved motion despite difficulty and/or through a crowd:

(58) But the life of a festival queen is no bed of sude roses: Some have to smile and wave their way tirelessly through three parades in a single weekend.

(59) I phantom my way through three continents.

(60) Keeping the mood light, the two then chanted and chortled their way through some murderous polyrhythms, devised by Mr. Douglas as an alternative to Hindemith's dry theory-teaching techniques, and then, with Mr. Gomes, soared and improvised on the composer's tight 'Bebop Etudes.'

It is possible that even these examples are construed as involving both manner *and* means. That is, it may be that 58 is meant to imply that the way she managed to

get through the parade was by smiling and waving. ⁴

Cases which designate only manner are subject to the same constraints as the central class in which the verb designates the means of motion. There must be some obstacle or difficulty understood to exist on the path:

(61) a. *She smiled her way through the empty streets.

b. She smiled her way through the angry mob.

(62) a. *With an air of confidence, she laughed her way towards the couch.

b. With an air of confidence, she laughed her way towards the electric chair.

The movement must be self-controlled:

(63) *She blushed her way through the angry mob.

And the activity must be a process, i.e. it must be atelic:

(64) *With a single loud noise, he belched his way out of the restaurant.

A Special Case Extension

There is a subclass of *way* expressions which has its own special interpretation and is not subject to all of the constraints of the central sense. The interpretation of this class involves understanding the subject to overcome some human or social obstacle by some unsanctioned means. The subject in these cases is human and is viewed with suspicion. Contrast the following pairs:

⁴The Oxford University Press Corpus seems to have a slightly higher percentage of manner cases, but it is hard to determine whether these cases are really pure manner, or whether the manner is understood as a means in the particular contexts. The surrounding text of the examples was not available for use in making this distinction.

- (65) a. “Welcome our new daughter-in-law who just married into our family.”
- b. #“Welcome our new daughter-in-law who just married her way into our family.”
- (66) a. He bought his way into the exclusive country club.
- b. #He bought his way into the expensive hotel.

Attested examples of this class included *bribe*, *bluff*, *crapshoot*,. Other examples include: *charm*, *lie*, *sweet-talk*, *smooth-talk*, *double-talk*, and *wrangle*. Several lexical items seem to lexicalize this sense, for example: *worm*, *weasel* and *wrangle*.

These cases do not necessarily involve a repeated action or process. For example, one can “marry one’s way into the family“ by a single marriage, or “buy one’s way into the country club” with a single payment. This distinguishes these cases from the central sense of the construction.

There is a specific constraint that the obstacle must be human or social. That is, the subject must gain access through solicitation of an obligation or acquiescence from another person or group of people. Contrast:

- (67) a. He wormed his way into the meeting by sweet-talking the boss.
- b. *He wormed his way into the meeting by picking the lock.

“Find”

The verb *find* can occur in this construction even if the motion is not self-propelled. In this class, the mover is understood to be a patient, and the motion is interpreted

as unexpected or serendipitous. This class shares with the first class the idea that there is no preestablished path, but in this case no difficulty is necessary. Naturally occurring examples of this class included:

(68) Bolivia estimated that about half its sacred textiles had been smuggled out of Bolivia and had found their way into American collections.

(69) "This new service represents a step backward to the days of 'internal use only' financial statements that always found their way into the hands of bankers, creditors and other outside parties who would place reliance on such data."

Find in this use is further distinguished from the previous class in that only the goal or endpoint of the path may be made explicit—the route itself may not be expressed.⁵ This is evident from the fact that the following examples with an explicit path are unacceptable:

(70) *The textiles found their way through customs.

(71) *The statements found their way toward the right people.

This verb is interpreted as an instance of the *way* construction, which inherits from the general construction; since the mode of inheritance that is adopted is the *normal* mode in which conflicting specifications are not inherited, the facts about *find* can be accounted for.

The network of constructions needed to account for the facts so far can be diagrammed as follows:

⁵I thank Charles Fillmore for bringing this fact to my attention.

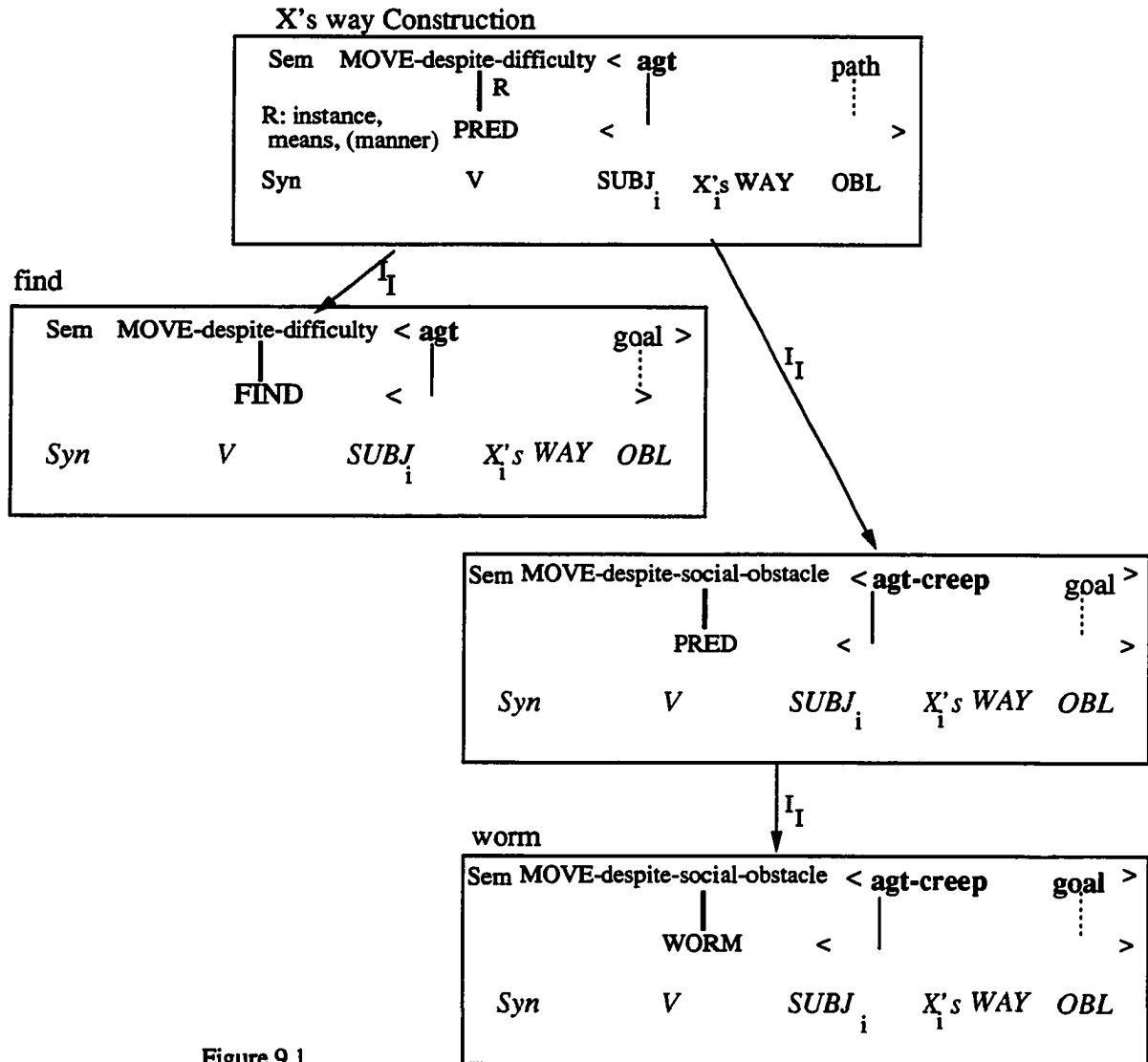


Figure 9.1

Other Idiomatic Cases

Several idiomatic cases, such as “to work one’s way through school,” “to work one’s way up the ladder,” and “to sleep one’s way to the top” are lexically filled constructions which inherit constraints from the general construction; in the sense described in chapter 3, these idiomatic instances are thus highly motivated. Following the dis-

cussion in chapter 5, these cases are also posited in the grammar, and are related by I_T links, since it is part of speakers' knowledge of language that these are conventionalized expressions.

9.5 Conclusion

In this chapter the semantic constraints of the *way* construction have been discussed. It has been argued that the construction's semantics is highly constrained; that it must involve self-propelled, goal-directed non-instantaneous motion despite difficulty by a particular means (or to a lesser extent in a manner) designated by the verb. Several subcases were distinguished on the grounds that they were subject to overlapping but distinct semantic constraints.

Chapter 10

Conclusion

This work has been concerned with explicating the nature of argument structure constructions, the relationship between verb meaning and constructional meaning, the phenomenon of partial productivity of constructions, and the relationships among constructions. Before summarizing the main findings, it is worth briefly discussing one way in which a constructional approach may have ramifications in a current debate within the language acquisition community.

10.1 Allowing for the Possibility of Syntactic Bootstrapping

By recognizing that the meanings of verbs do not necessarily change when used in different valences, that the meaning of the expression changes because of the inherent semantics of the argument structure constructions, certain findings in language acquisition research can be made sense of.

Landau & Gleitman (1985) note that children acquire verb meaning with sur-

prising ease, despite the fact that situations in which verbs are used only constrain possible meanings to a very limited degree (cf. Quine 1960). For example, they note that their congenitally blind subject learned the meanings of *look* and *see* without undue difficulty, despite the fact that the meanings are non-physical and for this child, not directly experientially based. They propose that children rely on syntactic cueing, or *syntactic bootstrapping* in order to acquire verbal meaning. In particular, they argue that children make use of the set of valences that a verb is heard used with in order to infer the meaning of the verb. They argue that this is possible because the syntactic frames are surface reflexes of verbal meanings:

..the allowable subcategorization frames, taken together, often tell a semantically quite transparent story, for they mark some of the logical properties of the verb in question.(L&G1985:140)

In particular, they assert that the use of a verb in a particular valence indicates that the verb has a particular *component of meaning* associated with that valence. Certain experimental work substantiates the idea that syntactic frames aid in the acquisition of verb meaning (cf. Naigles 1990 and Fisher et al. 1991)¹.

Pinker(1989), however, rightly criticizes this formulation of the claim. He notes that if different valences are assumed to reflect different components of the meaning of verbs, as Landau and Gleitman assume, then taking the union of these different components of meaning across different argument structures will result in incorrect learning. For example if the appearance of an *into* phrase in *The ball floated into*

¹Unfortunately, neither experiment required subjects to use a *set* of syntactic frames to infer verb meaning, so these experiments do not provide direct counterevidence against Pinker's criticism.

the cave is taken to imply that *float* has a motion component to its meaning, then the child will incorrectly infer that it will not be possible to float without moving anywhere.

This is indeed a general criticism of Landau & Gleitman's formulation. The occurrence of *kick* in the ditransitive construction (e.g. *Joe kicked Mary a ball*) cannot be taken as evidence that *kick*'s meaning has a transfer component, as their account would seem to imply.

Pinker's criticism rules out the possibility that even adult speakers could use the *set* of syntactic frames a verb is heard used with to determine a verb's meaning. That is because each distinct syntactic frame is taken to reflect a *different* sense of the verb according to Pinker and Landau & Gleitman.

On the view presented here, Landau & Gleitman's insight can be slightly reinterpreted. What the child hypothesizes, upon hearing a verb in a particular previously acquired construction, is not that the verb itself *has the component of meaning* associated with the construction, but rather that the verb falls into one of the verb clusters conventionally associated with the construction. That is, it has been argued that constructions are conventionally associated with classes of narrowly defined verbs which retain their inherent meaning (cf. chapter 5).²

Hearing a verb used in different constructions may then indeed aid in the acquisition of verb meaning, because upon hearing the verb in a number of different constructions, the child would be able to begin to triangulate the verb class that

²Barbara Landau (p.c.) has said that she did not intend the component of meaning associated with the syntax to be directly associated with the verb, and that in her view her account is consistent with the one presented here.

the verb must belong to. For example, if a child hears an unfamiliar verb occur in a particular construction which is known to be associated with 8 verb clusters, and the child also hears the verb used in a different construction that is known to be associated with, say, 10 overlapping but distinct verb clusters, the child can narrow down the possible class of verbs by examining only the intersecting classes.

Of course contextual information undoubtedly is added into the equation, allowing the child to further narrow down the possible verb classes. That is, language learning does not take place in a vacuum. It is generally accepted that children's first understanding of lexical meaning is tied directly to the situations in which the word is heard used.³

Once constructions are recognized, the idea that the syntactic frames that a verb is heard used with can aid in determining verb meaning is made coherent. However, this account as it stands, presupposes that the child already knows that certain verb classes are conventionally associated with certain constructions; i.e. this account presupposes that a fair number of verbs have already been learned, and so would not provide an account of bootstrapping from ground zero. That is, the account suggested here would allow constructions to aid in the acquisition of the meanings of novel verbs, once a fair number of verbs were already learned, but it would not

³Fisher et al. (1991) state this idea succinctly:

.../touch/ is mapped onto 'touch' because (a) the child can represent scenes observed as "scenes of touching" and b) the wave form /touch/ is likely to be heard when touching is happening. That this has to be at least part of the truth about word learning is so obvious as to be agreed upon by all theorists despite their differences in every other regard (see e.g., Locke, 1690 and Chomsky 1965 – and everybody in between who has commented on the topic). You can't learn a language simply by listening to the radio. (1991:2)

be useful in acquiring the meanings of the first verbs as Landau and Gleitman had proposed.

However, constructions could be claimed to play a more central role in the acquisition of verbal semantics if it were possible to delimit a priori the potential range of verb classes that might be associated with a construction. As discussed in section 2.4.2. there are only a handful of ways that verb meaning and constructional meaning can be related. Therefore knowledge of the set of argument structure constructions that a verb is used with may well be an aid to acquisition of lexical meaning.

10.2 Summary

This work has argued, counter to the current trend, that an entirely lexically based approach to grammar is inadequate, and that non-lexically filled constructions must be recognized to exist independently of the particular lexical items which instantiate them.

By recognizing the existence of contentful constructions, we do not need to claim that the syntax and semantics of the clause is projected exclusively from the specifications of the main verb. In this way, we avoid the problem of positing implausible verb senses to account for examples such as the following:

- (1) He sneezed the napkin off the table.
- (2) She baked him a cake.
- (3) Dan talked himself blue in the face.

In none of these cases does the verb intuitively require the direct object complement. To account for 1, for example, we would have to say that *sneeze*, a parade example of an intransitive verb, actually has a three-argument sense, “X causes Y to move Z by sneezing.” To account for 2, we would need to claim that there exists a special sense of *bake* that has three arguments, an agent, a theme, and an intended recipient. This in effect argues that *bake* has a sense which involves something like “X intends to cause Y to have Z by baking.” To account for 3, we would need to postulate a special sense of *talk*, “X causes Y to become Z by talking.”

On a constructional approach, aspects of the final interpretation involving caused motion, intended transfer, or caused result are understood to be contributed by the respective constructions. That is, we can understand skeletal valence constructions to be capable of contributing arguments. For example, we can define the ditransitive construction as being directly associated with agent, patient and recipient roles, and in addition associate the class of verbs of creation with the ditransitive construction. We do not need to stipulate a specific sense of *bake* unique to this construction. In general we can understand the direct objects found in the above examples to be licensed, not directly as an argument of the verb, but by the particular constructions.

In Chapter 2, it was argued that verbs must be associated with rich frame semantic meanings; at the same time, lexical meaning is acknowledged to be highly conventionalized. In particular, which participants associated with the verb’s frame semantics are inherently *profiled* is determined by each lexical item. Constructions are also associated with dynamic scenes, but their semantics is more abstract: constructional meaning can be generally captured by skeletal decompositional structures,

e.g. X CAUSES Y to RECEIVE Z, X ACTS, X CAUSES Y to MOVE Z, etc.

It has been argued that constructions, as well as lexical items (which are also strictly speaking, constructions) are typically associated with a family of closely related senses. For example, the ditransitive involves *constructional polysemy*: the same form is paired with different but related senses. Polysemy has been shown to be a natural and recurring phenomenon of lexical items in many studies (Wittgenstein 1953; Austin 1940; Bolinger 1968; Rosch 1973; Rosch et al. 1976; Fillmore 1976, 1982a; Coleman & Kay 1981; Lakoff 1977, 1987; Haiman 1978; Brugman 1981/1988, 1988; Lindner 1981; Sweetser 1990; Emanatian 1990). The existence of constructional polysemy suggests that research which treats constructions and lexical items as the same basic type of data structure, as is done in Construction Grammar (and HPSG), may well lead to revealing generalizations. In fact, a remarkably similar pattern of extensions was shown to exist for the “caused-motion” construction (cf. chapters 2, 7).

The central senses of those constructions which encode simple basic sentence types—i.e. the argument structure constructions, have been argued to be associated with a humanly relevant scene; e.g. someone transferring something to someone, something causing something to move or to change state, someone experiencing something, something undergoing a change of state or location, etc. (cf. the *conceptual archetypes* of Langacker 1991). Evidence that these scenes are semantically privileged came from certain language acquisition facts observed by Clark 1978, Bowerman 1982, and Slobin 1985.

Systematic metaphors have been shown to play more than a superfluous role in the

semantics of construction (cf. also Lakoff 1984). By explicitly recognizing particular metaphors, we can more accurately capture semantic constraints on constructions, and we more explicitly capture the relationships among constructions.

In Chapter 3, various types of relationships among constructions are discussed, including relationships of polysemy, metaphorical extension, subsumption and instances. Constructions are related in an associative memory, via asymmetric normal mode inheritance links. Inheritance links specify the relationship between the dominated and dominating construction, and all non-conflicting information is inherited from the dominated construction to the dominating construction. Because the links themselves are treated as objects, they are able to capture the specific nature of the relationships among constructions. In addition, the links themselves can be related via inheritance hierarchies of different types (e.g. Lakoff, to appear, for discussion of the inheritance hierarchy of systematic metaphors). In addition, different kinds of links have different type frequencies, and as has been discussed chapter 5, high type frequency is correlated with productivity. Therefore frequently reoccurring links will be used productively, extending familiar patterns in predictable ways.

The partially productive nature of constructions has been discussed in chapter 5. Adapting insights from Pinker (1989), it has been proposed that constructions are associated with clusters of instances; new or novel cases are acceptable to the degree that they are relevantly similar to existing cases. Thus a particular usage-based model of grammar was proposed to account for different constructions' varying degrees of productivity (cf. Bybee 1985, Langacker 1987a, 1991). In addition, the idea that there may well be some degree of indirect negative evidence was defended.

While current theories focus almost exclusively on the existence of related valences or “alternations” in describing the semantics of particular argument structure expressions, it has been argued that by considering various constructions first on their own terms, instead of immediately focusing on their relationships to other constructions, interesting generalizations and subtle semantic constraints emerge. These constraints were detailed in chapters 6-9 for 4 particular cases: the ditransitive, the caused-motion construction, the resultative and X’s way construction. Each of these constructions is argued to have independent status, with its own particular semantic constraints, radial category structure, and lexical exceptions, and yet each is shown to be interrelated to other constructions.

One might wonder how easily the present approach can be extended to other languages. For example, it has been suggested (Gropen et al., to appear) that the approach suggested here runs into problems when faced with languages which morphologically mark verb stems when those stems occur with alternate argument structures. The morphological markers are taken to be evidence for a lexical rule that changes the inherent subcategorization (or semantic representation) of the verb stem. However the approach suggested here can account for these cases without appealing to any type of lexical rule. On the present account, the closed class grammatical morpheme is analogous to the English skeletal construction; the verb stem plays the role of the main verb. The semantic integration of morpheme and verb stem is analogous to the integration of construction and verb in English. In fact, Emanatian (1990) has proposed an account of the Chagga applicative morpheme along these lines, as has Alsina (1992) for Bantu and Romance causative constructions. Since morphemes *are*

constructions, and since no strict division is drawn between the lexicon and the rest of grammar, the analogy is quite strong.

Bibliography

- [1] Ackerman, Farrell. 1990. Locative Inversion vs. Locative Alternation. *WCCFL* 9.
- [2] Aissen, Judith. 1983. Indirect Object Advancement in Tzotzil. In D. Perlmutter (ed) *Studies in Relational Grammar 1*.
- [3] Alsina, Alex. to appear. On the Argument Structure of Causatives. *Linguistic Inquiry*.
- [4] Alsina, Alex. 1992. *Predicate Composition: A Theory of Syntactic Function Alternations*. Stanford University dissertation.
- [5] Alsina, Alex and Sam Mchombo. 1990. The Syntax of Applicatives in Chichewa: Problems for a Theta Theoretic Asymmetry. *Natural Language and Linguistic Theory*. 8 4.
- [6] Anderson, Stephen R. 1971. On the Role of Deep Structure in Semantic Interpretation. *Foundations of Language* 6, 197-219.
- [7] Anderson, John R. 1984. Spreading activation. In J.R. Anderson and S. M. Kosslyn (ed) *Essays in learning and memory*. New York, NY: W.H. Freeman.

- [8] Aronoff, Mark. 1976. *Word Formation in Generative Grammar*. Linguistic Inquiry Monograph 1. Cambridge: MIT Press.
- [9] Aske, Jon. 1989. Motion Predicates in English and Spanish: A Closer Look. *BLS* 15.
- [10] Austin, John L. 1940. The Meaning of a Word. In *Philosophical Papers*. Oxford: Oxford University Press. 1961.
- [11] Bach, Emmon. 1976. An extension of classical transformational grammar. In *Problems of Linguistic Metatheory (Proceedings of the 1976 Conference)*. Michigan State University.
- [12] Baker, C.L. 1979. Syntactic theory and the projection problem. *Linguistic Inquiry* 10. 533-581.
- [13] Baker, Mark C. 1987. Incorporation and the Nature of Linguistic Representation. ms version of paper presented at "The Role of Theory in Language Description" Ocho Rios, Jamaica.
- [14] Baker, Mark C. 1988. *Incorporation: A Theory of Grammatical Function Changing*. Chicago: University of Chicago Press.
- [15] Bartlett, Frederick. 1932. *Remembering*. Cambridge: Cambridge University Press,
- [16] Bates, Elizabeth and Brian MacWhinney. 1987. Competition, Variation and Language Learning. In B. MacWhinney (ed).

- [17] Belletti, Adriana and Luigi Rizzi. 1988. Psyche-verbs and theta theory. *Natural Language and Linguistic Theory*. 6. 291-352.
- [18] Bobrow, D.G. and T. Winograd. 1977. An Overview of KRL, A Knowledge Representation Language. *Cognitive Science* 1 1. 3-46.
- [19] Bobrow, D.G. and B. Webber. 1980. Knowledge representation of syntactic/semantic processing. In *Proceedings of the First National Conference on Artificial Intelligence*, 316-323. Morgan Kaufmann.
- [20] Bolinger, Dwight L. 1949/1968. *Aspects of Language*. Harcourt, Brace & Javanovich.
- [21] Bolinger, Dwight L. 1968. Entailment and the meaning of structures. *Glossa* 2. 119-127.
- [22] Bolinger, Dwight L. 1971. *The Phrasal Verb in English*. Cambridge, Mass: Harvard University Press.
- [23] Borkin, Ann. 1984. *Problems in Form and Function*. Norwood, NJ: Ablex Publishing Corporation.
- [24] Bowerman, Melissa. 1982. Reorganizational processes in lexical and syntactic development. In E. Wanner & L.R. Gleitman (ed), *Language acquisition: the state of the art*. New York, NY: C.U.P.

- [25] Bowerman, Melissa. 1989. Learning a Semantic System, What Role do Cognitive Predispositions Play? In M.L. Rice and R.L Schiefeilnsen (eds) *The teachability of language*. Baltimore: P. H. Brookes.
- [26] Braine, M.D.S. 1971. On two types of models of the internalization of grammars. In D.I. Slobin (ed), *Ontogenesis of Grammar*. New York, NY: Academic Press.
- [27] Braine, M.D.S., R.E. Brody, S.M Fisch, & M. J. Weisberger. 1990. Can children use a verb without exposure to its argument structure? *Journal of Child Language* 17, 313-342.
- [28] Bresnan, Joan. 1969. On Instrumental Adverbs and the Concept of Deep Structure. *MIT Quarterly Progress Report 92*. Research Laboratory of Electronics, MIT, Cambridge, Mass.
- [29] Bresnan, Joan. 1978. A realistic transformational grammar. In M. Halle, J. Bresnan, & G. A. Miller (ed) *Linguistic Theory and Psychological reality*. Cambridge, Mass: MIT Press.
- [30] Bresnan, Joan. 1982. *The Mental Representation of Grammatical Relations*. Cambridge, Mass: MIT Press.
- [31] Bresnan, Joan and Jonni Kanerva. 1989. Locative Inversion in Chichewa. *Linguistic Inquiry* 20. 1-50
- [32] Bresnan, Joan. and Lioba Moshi. 1989. Object Asymmetries in Comparative Bantu Syntax. *Linguistic Inquiry* 20 4.

- [33] Bresnan, J. and A. Zaenen. 1990. Deep Unaccusativity in LFG. In Dziwirek, K. et al. (ed) *Proceedings of the Fifth Biennial Conference on Grammatical Relations*. University of California, San Diego.
- [34] Brown, Roger and Camille Hanlon. 1970. Derivational complexity and order of acquisition in child speech. In J. R. Hays (ed) *Cognition and the development of language*. New York, NY: Wiley.
- [35] Brugman, Claudia M. 1981/1988. *The Story of Over: polysemy, semantics, and the structure of the lexicon*. University of California Master's Thesis. Published by New York, NY: Garland.
- [36] Brugman, Claudia M. 1988. *The Syntax and Semantics of HAVE and its complements*. University of California, Berkeley dissertation.
- [37] Burzio, Luigi. 1986. *Italian syntax: A Government and Binding approach*. Dordrecht: Reidel.
- [38] Bybee, Joan. 1985. *Morphology: A study of the relation between meaning and form*. Philadelphia: Benjamins.
- [39] Carrier, Jill and Janet H. Randall. to appear. The Argument Structure and Syntactic Structure of Resultatives. *Linguistic Inquiry*.
- [40] Carroll, J., P. Davies, and B. Richman. 1971. *Word Frequency Book*. New York, NY: Houghton Mifflin Company.

- [41] Carter, Richard. 1988. Compositionality and Polysemy. In B. Levin and C. Tenny (ed) *On Linking: Papers by Richard Carter*. (eds). MIT Lexicon Project Working Papers #25.
- [42] Cattell, Ray. 1984. *Composite Predicates in English. Syntax and Semantics, vol 17*. Sydney: Academic Press.
- [43] Channon, Robert. 1980. On Place Advancements in Russian and English. In C. V. Chvany and R. D. Brecht (ed) *Morphosyntax in Slavic*. Columbus, Ohio: Slavica Publishers.
- [44] Chomsky, Noam. 1957. *Syntactic Structures*. Mouton.
- [45] Chomsky, Noam. 1970. Remarks on Nominalization. In R. Jacobs and P. Rosenbaum. (ed) *Readings in English Transformational Grammar*. Waltham, Mass: Ginn.
- [46] Clark, Eve V. 1978. Discovering What Words Can Do. In *Papers from the Parasession on the Lexicon, CLS*. 34-57.
- [47] Clark, Eve V. 1987. The Principle of Contrast: A Constraint on Language Acquisition. In B. MacWhinney (ed).
- [48] Clark, Eve V. and Herb H. Clark. 1979. When nouns surface as verbs. *Language*.
- [49] Clark, Eve., Susan A. Gelman and Nancy Lane. 1985. Compound Nouns and Category Structure in Young Children. *Child Development* 56. 84-91.

- [50] Coleman, Linda and Paul Kay. 1981. Prototype Semantics: The English Verb *Lie*. *Language* 57. 1. 26-44.
- [51] Comrie, Bernard. 1984. Subject and object control: syntax semantics and pragmatics. *BLS* 10.
- [52] Croft, William. 1991. *Syntactic Categories and Grammatical Relations*. Chicago: University of Chicago Press.
- [53] DeLancy, Scott. 1991. Event Construal and Case Role Assignment. *BLS* 17.
- [54] DiSciullo, Anna-Maria and Edwin Williams. 1987. *On the Definition of Word*. Cambridge, Mass: MIT Press.
- [55] Dinsmore, John. 1979. *Pragmatics, Formal Theory and the Analysis of Presupposition*. University of California, San Diego dissertation.
- [56] Dixon, R.M. W. 1972. *The Dyirbal language of the Queensland*. Cambridge: Cambridge University Press.
- [57] Dowty, David. 1972. *Studies in the Logic of Verb Aspect and Time Reference in English*, *Studies in Linguistics*. Department of Linguistics, University of Austin, Texas.
- [58] Dowty, David. 1976. Montague Grammar and the Lexical Decomposition of Causative Verbs. In B. Partee (ed) *Montague Grammar*. New York, NY: Academic Press.
- [59] Dowty, David. 1979. *Word Meaning and Montague Grammar*. Dordrecht: Reidel.

- [60] Dowty, David. 1986. Thematic Roles and Semantics. *BLS* 12.
- [61] Dowty, David. 1991. Thematic Proto-Roles and Argument Selection. *Language* 67 3. 547-619.
- [62] Dowty, David, Robert Wall, and Stanley Peters. 1981. *Introduction to Montague Semantics*. Dordrecht: Reidel.
- [63] Dryer, Mathew. 1983. Indirect Objects in Kinyarwanda Revisited. In Perlmutter (ed).
- [64] Dryer, Matthew. 1986. Primary objects, secondary objects, and antidative. *Language* 62 4. 808-845.
- [65] Emanatian, Michele. 1990. The Chagga consecutive construction. In J. Hutchison and V. Manfredi (ed) *Current Approaches to African Linguistics* 7. Dordrecht. 193-207.
- [66] Emonds, J.E. 1972. Evidence that indirect object movement is a structure-preserving rule. *Foundations of Language* 8: 546-561.
- [67] Emonds, Joseph. 1991. Subcategorization and Syntactic-Based Theta-Role Assignment. *Natural Language and Linguistic Theory* 9 3.
- [68] England, Nora. 1983. *A grammar of Mam: A Mayan Language*. Austin: University of Texas Press.
- [69] Erteschik-Shir, Nomi. 1979. "Discourse Constraints on Dative Movement" In *Syntax and Semantics* 12.

- [70] Fahlman, S. 1977/1979. *NETL: A System for Representing and Using Real-World Knowledge* Cambridge, Mass: MIT Press.
- [71] Farrell, Patrick. 1991. *Thematic Relations, Relational Networks and Multistratal Representations*. University of California, San Diego Dissertation.
- [72] Fauconnier, Gilles. 1985. *Mental Spaces*. Cambridge, Mass: MIT Press.
- [73] Fernald, Theodore B. 1991. Resultification. Presentation at UCSC mini-conference. December 11.
- [74] Fillmore, Charles. 1968. The Case for Case. In E. Bach and R.T. Harms. (ed) *Universals in Linguistic Theory*. New York, NY: Holt, Rinehart and Winston. 1-88.
- [75] Fillmore, Charles. 1970. The grammar of hitting and breaking. In R. Jacobs and P. Rosenbaum (ed) *Readings in English Transformational Grammar*. Waltham, Mass: Ginn and Company, 120-133.
- [76] Fillmore, Charles. 1971. Some Problems for Case Grammar. In R. O'Brian (ed) *Monograph Series on Languages and Linguistics*. 22nd Annual Roundtable. Georgetown University.
- [77] Fillmore, Charles. 1975. An Alternative to Checklist Theories of Meaning. *BLS* 1.
- [78] Fillmore, Charles J. 1976. Frame semantics and the nature of language. In Har-nad, Steklis and Lancaster (eds). 1976.

- [79] Fillmore, Charles J. 1977a. The Case for Case Reopened. P. Cole (ed) *Syntax and Semantics 8*. New York, NY: Academic Press.
- [80] Fillmore, Charles J. 1977b. Topics in Lexical Semantics. In R. Cole (ed) *Current Issues in Linguistic Theory*. Bloomington: Indiana University Press.
- [81] Fillmore, Charles J. 1982b. Frame Semantics. *Linguistics in the Morning Calm*, 111-138. Seoul: Hanshin.
- [82] Fillmore, Charles J. 1985a. Frames and the Semantics of Understanding. *Quaderni di Semantica 6 2*. 222-53.
- [83] Fillmore, Charles J. 1985b. Syntactic Intrusions and the Notion of Grammatical Construction. *BLS 11*.
- [84] Fillmore, Charles J. 1987. Stanford Summer Linguistics Institute lectures. Stanford, CA.
- [85] Fillmore, Charles J. 1988. The Mechanisms of "Construction Grammar." *BLS 14*.
- [86] Fillmore, Charles J. 1990. Construction Grammar. Course reader for Linguistics 120A. University of California, Berkeley.
- [87] Fillmore, Charles J., Paul Kay, and Catherine O'Connor. 1988. Regularity and Idiomaticity in Grammatical Constructions: The Case of *Let Alone*. *Language 64*. 501-538.

- [88] Fillmore, Charles J., Paul Kay. ms. Construction Grammar. University of California, Berkeley.
- [89] Fisher, Cynthia Geoffrey Hall, Susan Rakowitz, Lila Gleitman. 1991a. When it is Better to Receive than to Give: Syntactic and Conceptual Constraints on Vocabulary Growth. IRCS Report : 91-41. University of Pennsylvania.
- [90] Flickinger, Daniel Carl Pollard, and Thomas Wasow. 1985. Structure-Sharing in Lexical Representation. *23rd Annual Meeting of the Association for Computational Linguistics*. Chicago.
- [91] Fodor, J.A. ms. The procedural solution to the projection problem.
- [92] Fodor, Jerold. 1970. Three Reasons for Deriving *Kill* from *Cause to Die*. *Linguistic Inquiry* 1.
- [93] Fodor, J.A., J.D. Fodor, and M.F. Garrett. 1975. The psychological unreality of semantic representations. *Linguistic Inquiry* 6. 515-531.
- [94] Fodor, J.A., M.F. Garrett, E.C.T. Walker, and C.H. Parkes. 1980. Against definitions. *Cognition* 8. 263-267.
- [95] Foley, William A. and Robert Van Valin Jr. 1984. *Functional syntax and universal grammar*. Cambridge Studies in Linguistics 38. Cambridge: Cambridge University Press.

- [96] Frege, Gottlob. 1879. *Begriffsschrift*, a formula language, modeled upon that of arithmetic, for pure thought. In J. van Heijenoort (ed) *Frege and Gödel*. Cambridge: Harvard University Press.
- [97] Freidin, R. 1974. Transformations and interpretive semantics. In R. Shuy & N. Bailey, (ed) *Towards Tomorrow's Linguistics*. Washington, D.C.: Georgetown University Press.
- [98] Gawron, Mark Jean. 1985. A parsimonious semantics for prepositions and CAUSE. *CLS 21/2, Papers from the Parasession on Causatives and Agentivity*.
- [99] Gawron, Mark Jean. 1988. *Lexical Representations and the Semantics of Complementation*. New York, NY: Garland.
- [100] Gazdar, Gerald, Ewan Klein, Geoffrey Pullum, and Ivan Sag. *Generalized Phrase Structure Grammar*. Cambridge, Mass: Harvard University Press.
- [101] Gelman, Susan A., Sharon A. Wilcox and Eve Clark. 1989. Conceptual and Lexical Hierarchies in Young Children. *Cognitive Development*.
- [102] Gergely, Gyorgy and Thomas G. Bever. 1986. Related Intuitions and the Mental Representation of Causative Verbs in Adults and Children. *Cognition 23*. 211-277.
- [103] Gibson, J.J. 1950. *The Perception of the Visual World*. Boston: Houghton Mifflin.

- [104] Givón, Talmy. 1979a. *On Understanding Grammar*. New York, NY: Academic Press.
- [105] Givón, Talmy. 1979b. From Discourse to Syntax: Grammar as a Processing Strategy. In *Syntax and Semantics 12: Discourse and Syntax*. New York, NY: Academic Press.
- [106] Givón, Talmy. 1985. Function, structure, and language acquisition. In D. I. Slobin (ed) *The crosslinguistic study of language acquisition (Vol 2)*. Hillsdale, NJ: Lawrence Erlbaum.
- [107] Goldberg, Adele E. 1989. A Unified Account of the Semantics of the Ditransitive Construction. *BLS 15*.
- [108] Goldberg, Adele E. 1991a. A Semantic Account of Resultatives. *Linguistic Analysis 21 1-2*. 66-96.
- [109] Goldberg, Adele E. 1991b. It Can't Go Up the Chimney Down: Paths and the English Resultative. *BLS 17*.
- [110] Goldberg, Adele E. 1991c. On the Problems of Lexical Rule Accounts of Argument Structure. *Proceedings of the Annual Cognitive Science Society Conference*.
- [111] Goldberg, Adele E. 1992. The Inherent Semantics of Argument Structure: The Case of The English Ditransitive Construction. *Cognitive Linguistics 3-1*. 37-74.

- [112] Goldsmith, John. 1980. Meaning and mechanism in language. In S. Kuno (ed) *Harvard Studies in Syntax and Semantics 3*. Cambridge, Mass: Harvard University Press.
- [113] Goldsmith, John. to appear. Harmonic phonology. In J. Goldsmith (ed) *Proceedings of the Berkeley Workshop on derivational Phonology*. Chicago: University of Chicago Press.
- [114] Gordon, David and George Lakoff. 1971. Conversational Postulates. *CLS 7*.
- [115] Green, Georgia. 1972. Some Observations on the Syntax and Semantics of Instrumental Verbs. *CLS 8*.
- [116] Green, Georgia. 1973. A syntactic syncretism in English and French. B. Kachru, R. Lees, Y. Malkiel, A. Piertrangeli, and S. Saporta (ed) *Issues in Linguistics*. Urbana: University of Illinois Press.
- [117] Green, Georgia. 1974. *Semantics and Syntactic Regularity*. Bloomington: Indiana University Press.
- [118] Greenfield, P.M. and J. Smith. 1976. *The structure of communication in early language development*. New York, NY: Academic Press.
- [119] Grimshaw, Jane. 1979. Complement Selection and the Lexicon. *Linguistic Inquiry 10 2*. 279-326.
- [120] Grimshaw, Jane. 1990. *Argument Structure*. Cambridge, Mass: MIT Press.

- [121] Gropen, Jess, Steven Pinker, Michelle Hollander, Richard Goldberg, and Ronald Wilson. 1989. The Learnability and Acquisition of the Dative Alternation in English. *Language* 65 2. 203-257.
- [122] Gropen, Jess, Steven Pinker, Michelle Hollander and Richard Goldberg. 1991a. Affectedness and Direct Objects: The Role of Lexical Semantics in the Acquisition of Verb Argument Structure. *Cognition* 41. 153-195.
- [123] Gruber, J.S. 1965. *Studies in Lexical Relations*. MIT dissertation.
- [124] Guerssel, M., K. Hale, M. Laughren, B. Levin and J. White Eagle. 1985. A Cross-linguistic Study of Transitive Alternations. *CLS 21, Papers from the Parasession on Causatives and Agentivity*.
- [125] Haiman, John. 1978. A study in polysemy. *Studies in Language* 2 1. 1-34.
- [126] Haiman, John. 1985a. *Natural syntax: Iconicity and erosion*. Cambridge: Cambridge University Press.
- [127] Haiman, John. 1985b. (ed) *Iconicity in syntax*. Amsterdam: John Benjamins.
- [128] Hale, K. and S. Keyser. 1985. The View from the Middle. ms. MIT, Cambridge, Mass.
- [129] Halliday, Michael A.K. 1967. Notes on transitivity and theme in English. *Journal of Linguistics* 3. 199-244.
- [130] Higginbotham, James. 1989. Elucidations of Meaning. *Linguistics and Philosophy* 12. 465-517.

- [131] Hoekstra, Teun. 1987. Small Clause Results. *Lingua* 74.
- [132] Hopper, P. J. and S. A. Thompson. 1980. Transitivity in grammar and discourse. *Language* 56. 251-299.
- [133] Hudson, Richard. 1984. *Word Grammar*. Oxford: Basil Blackwell.
- [134] Jackendoff, Ray. 1969. An Interpretive Theory of Negation. *Foundations of Language* 5. 218-241.
- [135] Jackendoff, Ray. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge, Mass: MIT Press.
- [136] Jackendoff, Ray. 1975. Morphological and Semantic Regularities in the Lexicon. *Language* 51 3. 639-671.
- [137] Jackendoff, Ray. 1983. *Semantics and Cognition*. Cambridge, Mass: MIT Press.
- [138] Jackendoff, Ray. 1987. *Consciousness and the Computational Mind*. Cambridge, Mass: MIT Press.
- [139] Jackendoff, Ray. 1990a. *Semantic Structures*. Cambridge, Mass: MIT Press.
- [140] Jackendoff, Ray. 1990b. On Larson's Treatment of the Double Object Construction. *Linguistic Inquiry* 21 3. 427-455.
- [141] Jackendoff, Ray. to appear. Mme. Tussaud Meets the Binding Theory. *Natural Language and Linguistic Theory*.

- [142] Jakobson, Roman. 1938. *Russian and Slavic Grammar Studies/Roman Jakobson*. (1984). L. R. Waugh and M. Halle (ed) New York, NY: Mouton.
- [143] Jespersen, Otto. 1949. *A Modern English Grammar on Historical Principles*. Part VI Syntax. Copenhagen: Munksgaard.
- [144] Jurafsky, Daniel. 1988. Issues in relating syntax and semantics. In *Proceedings of the 12th International Conference on Computational Linguistics*. 278-284. Budapest.
- [145] Jurafsky, Daniel. 1992. An On-line Computational Model of Human Sentence Interpretation: A Theory of the Representation and Use of Linguistic Knowledge. University of California, Berkeley dissertation and Report No. UCB/CSD 92/676, Computer Science Division, University of California, Berkeley.
- [146] Katz, Jerry J. and Paul Postal. 1964. *An Integrated Theory of Linguistic Descriptions*. Cambridge: MIT Press.
- [147] Kay, Martin. 1984. Functional Unification Grammar: A formalism for Machine Translation. *Proceedings of Coling 75-78*.
- [148] Kay, Paul. 1990. Even. *Linguistics and Philosophy* 13 1. 59-112.
- [149] Keenan, Edward. 1972. On Semantically Based Grammar. *Linguistic Inquiry* 4 3. 413-462.
- [150] Keenan, Edward L. 1976. Towards a universal definition of "subject." C. N. Li (ed) *Subject and topic*. 303-334. New York, NY: Academic Press.

- [151] Keenan, Edward L. 1984. Semantic correlates of the ergative/absolute distinction. *Linguistics* 22. 197-223.
- [152] Kemmer, Suzanne. 1988. *The Middle Voice*. Stanford University dissertation.
- [153] Kirsner, Robert S. 1985. Iconicity and grammatical meaning. In Haiman (ed) 249-270.
- [154] Kiparsky, Paul. 1987. Morphology and grammatical relations. ms. Stanford University, Stanford.
- [155] Kuroda, Sige-Yuki. 1965. *Generative Grammatical Studies in the Japanese Language*. MIT dissertation.
- [156] Lakoff, George. 1963/1976. Towards Generative Semantics. In J. D. McCawley, (ed) *Syntax and Semantics Notes from the Linguistic Underground* 7. New York, NY: Academic Press.
- [157] Lakoff, George. 1965/1970. *On the Nature of Syntactic Irregularity*. Indiana University dissertation. Published by New York, NY: Holt, Rinhard & Winston as *Irregularity in Syntax*.
- [158] Lakoff, George. 1968. Instrumental Adverbs and the Concept of Deep Structure. *Foundations of Language* 4. 4-29.
- [159] Lakoff, George. 1969. On Generative Semantics. In D. D. Steinberg & L. A. Jakobovits (ed) *Semantics - An Interdisciplinary Reader in Philosophy, Linguistics, Anthropology and Psychology*. London: Cambridge Univeristy Press.

- [160] Lakoff, George. 1970a. Adverbs and Opacity: A reply to Stalnaker. ms. University of California, Berkeley.
- [161] Lakoff, George. 1970b. Global Rules. *Language* 46. 627-639.
- [162] Lakoff, George. 1972. Linguistics and Natural Logic. In D. Davidson and G. Harman (ed) *Semantics of Natural Language*. Dordrecht: Reidel. 545-665.
- [163] Lakoff, George. 1977. Linguistic Gestalts. *CSL* 13. 225-235.
- [164] Lakoff, George. 1984. *There-Constructions: A case study in grammatical construction theory and prototype theory*. University of California, Berkeley Cognitive Science Technical Report 18. Also published as Case Study in Lakoff 1987.
- [165] Lakoff, George. 1987. *Women, Fire, and Dangerous Things: What categories reveal about the mind*. Chicago: University of Chicago Press.
- [166] Lakoff, George. to appear. The Contemporary Theory of Metaphor. In A. Ortony (ed) *Metaphor and Thought*. Second edition. Cambridge: Cambridge University Press.
- [167] Lakoff, George and John Robert Ross. 1967/1976. Is Deep Structure Necessary? In McCawley (ed).
- [168] Lakoff, George and Mark Johnson. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.
- [169] Lakoff, Robin. 1968. *Abstract Syntax and Latin complementation*. Cambridge, Mass: MIT Press.

- [170] Lambrecht, Knud. 1986. *Topic, Focus, and the Grammar of Spoken French*. University of California, Berkeley dissertation.
- [171] Lambrecht, Knud. 1990. 'What me worry?' Mad Magazine sentences revisited. *BLS* 16. 215-228.
- [172] Lambrecht, Knud. to appear. *Information structure and sentence form. A theory of topic, focus, and the mental representation of discourse referents*. Cambridge Studies in Linguistics. Cambridge: Cambridge University Press.
- [173] Landau, Barbara and Lila R. Gleitman. 1985. *Language and Experience: Evidence from the Blind Child*. Cambridge, Mass: Harvard University Press.
- [174] Langacker, Ronald. 1969. Pronominalization and the Chain of Command. In D. Reibel and S. Schane (ed) *Modern Studies in English*. Englewood Cliffs, NJ: Prentice-Hall.
- [175] Langacker, Ronald W. 1985. Observations and speculations on subjectivity. In Haiman, (ed).
- [176] Langacker, Ronald. 1987a. *Foundations of Cognitive Grammar 1*. Stanford: Stanford University Press.
- [177] Langacker, Ronald. 1987b. Grammatical Ramifications of the Setting/Participant Distinction. *BLS* 13.

- [178] Langacker, Ronald W. 1988. An Overview of Cognitive Grammar. In Brygida Rudzka-Ostyn (ed) *Topics in Cognitive Linguistics*. Philadelphia: John Benjamins.
- [179] Langacker, Ronald W. 1991. *Foundations of Cognitive Grammar 2*. Stanford: Stanford University Press.
- [180] Laughren, M. 1988. Towards a Lexical Representation of Warlpiri verbs. In W. Wilkins, (ed). 215-242.
- [181] Legendre, Géraldine, Y. Miyata & P. Smolensky. 1990. Harmonic Grammar- A format multi-level connectionist theory of linguistic well-formedness: Theoretical foundations. Technical report #90-5, Institute of Cognitive Science, University of Colorado at Boulder.
- [182] Legendre, Géraldine and Paul Smolensky. 1991. Unifying syntactic and semantic approaches to unaccusativity: A connectionist approach. *BLS 17*.
- [183] Levin, Beth. 1985. Lexical semantics in review: an introduction. In B. Levin (ed), *Lexical Semantics in Review*. Lexicon Project Working Papers 1. Cambridge, Mass: MIT Center for Cognitive Science.
- [184] Levin, Beth and T. Rapoport. 1988. Lexical Subordination. *CLS 24*.
- [185] Levin, Beth and Malka Rappaport. 1986. The formation of adjectival passives. *Linguistic Inquiry 17*, 623-661.

- [186] Levin, Beth and Malka Rappaport Hovav. 1990a. The Lexical Semantics of Verbs of Motion: The Perspective from Unaccusativity.
- [187] Levin, Beth and Malka Rappaport Hovav. (1990b). Wiping the Slate Clean: A Lexical Semantic Exploration. ms. Northwestern University and Bar Ilan University.
- [188] Levin, Lori. 1987. Toward a Linking Theory of Relation Changing Rules in LFG. Report CSLI-87-115.
- [189] Levin, Lori, T. Mitamura and A. T. Mahmoud. 1988. Lexical Incorporation and Resultative Secondary Predicates. Presentation at the annual meeting of LSA, New Orleans.
- [190] Lindner, Susan. 1981. *A Lexico-Semantic Analysis of Verb-Particle Constructions with UP and Out*. University of California, San Diego dissertation.
- [191] McCawley, James D. 1968a. The role of semantics in grammar. In Bach and Harms (eds) *Universals in Linguistic Theory*. New York, NY: Holt, Rinhart, and Winston. 124-169.
- [192] McCawley, James D. 1968b. Lexical insertion in a transformational grammar without deep structure. *CLS 4*. 71-80.
- [193] McCawley, James D. 1973. Syntactic and Logical Arguments for Semantic Structures. In O. Farjimura (ed) *Three Dimensions in Linguistic Theory*. TEC Corporation, Tokyo. 259-376.

- [194] McCawley, James E. *Syntax and Semantics 7: Notes from the Linguistic Underground*. New York, NY: Academic Press.
- [195] McCawley, James 1978. Conversational Implicature and the Lexicon. In P.Cole (ed) *Syntax and Semantics: Pragmatics 9*. NY: Academic Press.
- [196] McCawley, James. 1986a. The focus and scope of *only*. University of Chicago Working Papers in Linguistics.
- [197] McClelland, J.L., D.E. Rumelhart and G.E. Hinton. 1986. The Appeal of Parallel Distributed Processing. In Rumelhart & McClelland (eds) Vol. 1.
- [198] Makkai, Adam. 1972. *Idiom structure in English*. The Hague: Mouton.
- [199] Maldonado, Ricardo. 1991. *Se prohíbe fumar: Schematic Initiators*. ms. University of California, San Diego.
- [200] Maratsos, M. R. Gudeman, P. Gerard-Ngo and G. DeHart. 1987. A study in novel word learning: the productivity of the causative. In B. MacWhinney (ed).
- [201] Matsumoto, Yo. 1991. Some Constraints on the Semantic Structures of Verbs: Evidence from Japanese Motion Predicates. ms. Stanford University.
- [202] MacWhinney, Brian. 1978. *The acquisition of morphophonology*. Monographs of the Society for Research in Child Development 174 43.
- [203] MacWhinney, Brian. 1987. (ed) *Mechanisms of Language Acquisition*. Hillsdale, NJ: Lawrence Erlbaum Associates.

- [204] MacWhinney, Brian. 1989. Competition and Lexical Categorization. In *Current Issues in Linguistic Theory 61: Linguistic Categorization*. Amsterdam: John Benjamins.
- [205] MacWhinney, Brian. in press. Connectionism as a Framework for Language Acquisition Theory. In J. Miller (ed) *Advances in Language Disorders*. University Park Press.
- [206] Marantz, Alec P. 1984. *On the nature of grammatical relations*. Cambridge, Mass: MIT Press.
- [207] Mchombo, Sam. 1978. *A Critical Appraisal of the Place of Derivational Morphology in Transformational Grammar*. University of London, School of Oriental and African Studies dissertation.
- [208] Mchombo, Sam. 1992. The Stative in Chichewa and the Relevance of Thematic Information. Presentation at the Cognitive Science Colloquium, University of California, Berkeley.
- [209] Mervis, Carolyn and John Pani. 1980. Acquisition of Basic Object Categories. *Cognitive Psychology* 12, 496-522.
- [210] Meyer, D.E. and R.W. Schvaneveldt. 1971. Facilitation in recognizing pairs of words: Evidence of a dependence between retrieval operations. *Journal of Experimental Psychology* 90. 227-234.
- [211] Michaelis, Laura. forthcoming. A Case of Constructional Polysemy in Latin. *Studies in Language*.

- [212] Minsky, Marvin. 1975. A framework for representing knowledge. In P. H. Winston (ed) *The Psychology of Computer Vision*. New York, NY: McGraw-Hill.
- [213] Mithun, Marianne. 1991. Active/Agentive Case Marking and Its Motivation. *Language* 67 3. 510-547.
- [214] Montague, Richard. 1973. The proper treatment of quantifiers in ordinary English. In R. Thomason (ed) *Formal philosophy*. Yale University Press.
- [215] Napoli, Donna Jo. 1992. Secondary Resultative Predicates in Italian. *Journal of Linguistics* 28.
- [216] Norvig, Peter and George Lakoff. 1987. Taking: A study in lexical network theory. *BLS* 13.
- [217] Nunberg, Geoffrey. 1979. The Non-Uniqueness of Semantic Solutions: Polysemy. *Linguistics and Philosophy* 3 2.
- [218] Oehrle, Richard.T. 1976. *The grammatical status of the the English dative alternation*. MIT dissertation.
- [219] Oosten, Jeanne van. 1977. Subjects and Agenthood in English. *CLS* 13.
- [220] Oosten, Jeanne van. 1984. *The Nature of Subjects, Topics and Agents: A Cognitive Explanation*. University of California, Berkeley dissertation. Reproduced by Indiana University Linguistics Club.
- [221] The Compact Edition of the Oxford English Dictionary. 1971. New York, NY: Oxford University Press.

- [222] Oxford University Press Corpus.
- [223] Hall Partee, Barbara. 1965/1979. *Subject and Object in Modern English*. Jorge Hankamer (ed). Outstanding Dissertations in Linguistics Series. New York, NY: Garland.
- [224] Hall-Partee, Barbara. 1971. On the Requirement that Transformations Preserve Meaning. In C. J. Fillmore and D. T. Langendoen (ed) *Studies in Linguistic Semantics*. New York, NY: Holt, Rinehart, and Winston.
- [225] Perlmutter, David M. 1978. Impersonal Passives and the Unaccusative Hypothesis. *BLS* 4.
- [226] Perlmutter, David M. 1983. (ed) *Studies in Relational Grammar 1*. Chicago: University of Chicago Press.
- [227] Perlmutter, David M. and Carol Rosen 1984. (eds) *Studies in Relational Grammar 2*. Chicago: University of Chicago Press.
- [228] Perlmutter, David M. and Paul M. Postal. 1983a. Some Proposed Laws of Basic Clause Structure. In Perlmutter, (ed).
- [229] Perlmutter, David M. and Paul M. Postal. 1983b. Toward a Universal Characterization of Passivization. In Perlmutter, (ed).
- [230] Pinker, Steven. 1981. Comments on the paper by Wexler. In C.L. Baker and J. J. McCarthy, (eds) *The logical problem of language acquisition*. Cambridge, Mass: MIT Press.

- [231] Pinker, Steven. 1984. *Language Learnability and Language Development*. Cambridge, Mass: Harvard University Press.
- [232] Pinker, Steven. 1987. The Bootstrapping Problem in Language Acquisition. In B. MacWhinney (ed) *Mechanisms of Language Acquisition*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- [233] Pinker, Steven. 1989. *Learnability and Cognition: the acquisition of argument structure*. Cambridge, Mass: MIT Press.
- [234] Pinker, Steven. 1991. Rules and Associations. *BLS 17*.
- [235] Pinker, Steven & Alan Prince. 1988. On language and connectionism: Analysis of a Parallel Distributed Processing model of language acquisition. *Cognition 28*. 73-193.
- [236] Pinker, Steven, D.S. Lebeaux and L.A. Frost. 1987. Productivity and constraints in the acquisition of the passive. *Cognition*, 24.
- [237] Pollard, Carl and Ivan Sag. 1987. *Information-Based Syntax and Semantics 1: Fundamentals*. CSLI Lecture Notes Series.
- [238] Pollard, Carl and Ivan Sag. In press. *Information-Based Syntax and Semantics 2*. CSLI Lecture Notes Series.
- [239] Prince, Alan and Paul Smolensky. 1991. *Lecture Notes on Connectionism and Linguistic Theory*. Summer Institute of Linguistics, Santa Cruz, CA.

- [240] Pustejovsky, James. 1991. The Generative Lexicon. *Computational Linguistics* 17 4. 409-441.
- [241] Quillian, M. Ross. 1968. Semantic memory. In M. Minsky (ed) *Semantic Information Processing*. 227-270. Cambridge, Mass: MIT Press.
- [242] Quine, W.V. 1960. *Word and Object*. Cambridge, Mass: MIT Press.
- [243] Randall, J. 1983. A Lexical Approach to Causatives. *Journal of Linguistic Research* 2 3, 77-105. Bloomington, Indiana: Indiana University Linguistics Club.
- [244] Rappaport, Malka and Levin, Beth. ms. A Study in Lexical Analysis: The Locative Alternation. Bar Ilan University and Northwestern University.
- [245] Rappaport, Malka and Beth Levin. 1988. What to do with theta roles. In W. Wilkins (ed) *Thematic Roles: Syntax and Semantics* 21. New York, NY: Academic Press.
- [246] Rappaport, Malka Hovav and Beth Levin. 1991. Is There Evidence for Deep Unaccusativity in English? An Analysis of Resultative Constructions. ms. Bar Ilan University and Northwestern University.
- [247] Ratcliff, R. and G. McKoon. 1978. Priming in item recognition: Evidence for the propositional structure of sentences. *Journal of Verbal Learning and Verbal Behavior* 17. 403-417.
- [248] Reddy, Michael. 1979. The Conduit Metaphor. In A. Ortony, (ed) *Metaphor and Thought*. 284-324. Cambridge: Cambridge University Press.

- [249] Roberts, R.B. and I.P. Goldstein. 1977. The FRL Manual. Technical Report AIM-408. MIT Artificial Intelligence Laboratory.
- [250] Rosch, Eleanor. 1973. Natural Categories. *Cognitive Psychology* 4. 328-50.
- [251] Rosch, Eleanor, Carolyn Mervis, Wayne Gray, David Johnson and Penny Boyes-Braem. 1976. 1976. Basic Objects in Natural Categories. *Cognitive Psychology* 8. 382-439.
- [252] Rosen, Carol G. 1984. The Interface between Semantic Roles and Initial Grammatical Relations. In D. Perlmutter and C. G. Rosen, (eds).
- [253] Ross, John Robert. 1969. Auxiliaries as Main Verbs. *Journal of Linguistics* 1 1. 77-102.
- [254] Ross, John Robert. 1970. On declarative sentences. In Jacobs and Rosenbaum (eds) *Readings in English Transformational Grammar*. Boston: Ginn.
- [255] Rice, Sally. 1987. Transitivity and the Lexicon. CRL Newsletter, 2 2.
- [256] Rice, Sally. 1987b. Participant and Non-participants: Toward a Cognitive Model of Transitivity. University of California, San Diego dissertation.
- [257] Rumelhart, David E. and James L. McClelland (ed). 1986. *Parallel Distributed Processing: Explorations in the Microstructure of Cognition, vol. 1*. Cambridge, Mass: MIT Press.

- [258] Rumelhart, David E. and James L. McClelland (ed). 1986. *Parallel Distributed Processing: Explorations in the Microstructure of Cognition, vol. 2*. Cambridge, Mass: MIT Press.
- [259] Salkoff, Morris. 1988. Analysis by Fusion. In *Linguistic Investigations Xii:1* 49-84. Amsterdam: John Benjamins.
- [260] Sapir, E. 1944. On grading: a study in semantics. *Philosophy of Science* 2. 93-116.
- [261] de Saussure, Ferdinand. 1916. *Cours de Linguistique Generale*.
- [262] Schieffelin, B.B. 1985. The acquisition of Kaluli. In D. I. Slobin (ed) *The crosslinguistic study of language acquisition Vol 1*. Hillsdale, NJ: Lawrence Erlbaum.
- [263] Searle, John R. 1983. *Intentionality: An Essay in the Philosophy of Mind*. Cambridge: Cambridge University Press.
- [264] Shank, R. C. and R. P. Abelson. 1977. *Scripts, Plans, Goals and Understanding: An Inquiry into Human Knowledge Structures*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- [265] Shibatani, Masayoshi. 1973. *A Linguistic Study of Causative Constructions*. University of California, Berkeley dissertation.
- [266] Shibatani, Masayoshi 1976. (ed) *Syntax and Semantics 6: The Grammar of Causative Constructions*. New York, NY: Academic Press.

- [267] Shieber, S. 1986. An Introduction to Unification-Based Approaches to Grammar. *CSLI Lecture Notes 4*.
- [268] Shieber, S., L. Karttunen and F. Pereira. 1984. (eds) *Notes from the Unification Underground: A Compilation of Papers on Unification-Based Grammar Formalisms*. SRI Technical Report 327, Menlo Park, California: SRI International.
- [269] Simpson, J. 1983. Resultatives. In L. Levin, M. Rappaport and A. Zaenen, (eds) *Papers in Lexical-Functional Grammar*, Bloomington, Indiana: Indiana University Linguistics Club. 143-157.
- [270] Slobin, Dan. 1985. Crosslinguistic Evidence for the Language-Making Capacity. In D. Slobin (ed) *A crosslinguistic study of language acquisition Vol. 2*. Hillsdale, NJ: Lawrence Erlbaum.
- [271] Smolensky, Paul. 1986. Information processing in dynamical systems: foundations of harmony theory. In D.E. Rumelhart and J.L. McClelland (eds).
- [272] Sweetser, Eve. 1990. *From Etymology to Pragmatics*. Cambridge: Cambridge University Press.
- [273] Talmy, Leonard. 1976. Semantic Causative Types. In Shibatani (ed) *Syntax and Semantics 6, The Grammar of Causative Constructions*. New York, NY: Academic Press.

- [274] Talmy, Leonard. 1978. Relation of grammar to cognition. In D. Waltz (ed) *Proceedings of TINLAP-2 (Theoretical Issues in Natural Language Processing)*. Champaign, IL: Coordinated Science Laboratory, University of Illinois.
- [275] Talmy, Leonard. 1983. How language structures space. In H. Pick & L. Acredolo (eds), *Spatial orientation: Theory, research, and application*. New York, NY: Plenum Press.
- [276] Talmy, Leonard. 1985a. Lexicalization Patterns: Semantic Structure in Lexical Forms. in T. Shopen (ed), *Language Typology and Syntactic Description*, vol 3: *Grammatical Categories and the Lexicon*. Cambridge: Cambridge University Press.
- [277] Talmy, Leonard. 1985b. Force Dynamics in Language and Thought. *CLS, Parasession on Causatives and Agentivity*.
- [278] Tenny, Carol. 1987. *Grammaticalizing Aspect and Affectedness*. MIT dissertation.
- [279] Thomason, R. H. 1992. NETL and Subsequent Path-Based Inheritance Theories. In *Computers Math. Applic.* 23. 2-5. 179-204.
- [280] Traugott, Elizabeth C. 1988. Pragmatic Strengthening and Grammaticalization. *BLS 14*.
- [281] Trechsel, Frank R. 1982. A categorial fragment of Quiche. *Texas Linguistic Forum* 20. Austin: University of Texas Department of Linguistics.

- [282] Touretzky, David. 1984/1986. *The Mathematics of Inheritance Systems*. San Mateo, CA: Morgan Kaufmann.
- [283] Tuggy, David. 1988. Nahuatl Causative/Applicatives in Cognitive Grammar. In Brygida Rudzka-Ostyn (ed) *Topics in Cognitive Linguistics* Philadelphia: John Benjamins.
- [284] Van Valin, Robert D. Jr. 1990a. Semantic Parameters of Split Intransitivity. *Language* 66 2. 221-260.
- [285] Van Valin, Robert D. Jr. 1990b. The Linking Theory in RRG. Presentation at CSLI, Stanford, CA.
- [286] Van Valin, Robert D. Jr. to appear. Incorporation in Universal Grammar: A Case Study in Theoretical Reductionism. *Journal of Linguistics*.
- [287] Visser, F. Th. 1963. *An Historical Syntax of the English Language, Part One: Syntactical Units with One Verb*. Leiden: E. J. Brill.
- [288] Wasow, Thomas. 1977. Transformations and the Lexicon. In P. W. Culicover, T. Wasow, and A. Akmajian (ed) *Formal Syntax*. New York, NY: Academic Press.
- [289] Wasow, Thomas. 1981. Comments on the paper by Baker. In C.L. Baker and J. J. McCarthy (eds) *The logical problem of language acquisition*. Cambridge, Mass: MIT Press. 324-329.

- [290] Waltz, D. 1975. Understanding line drawings of scenes with shadows. In P. Winston (ed) *The Psychology of Computer Vision*. New York, NY: McGraw-Hill.
- [291] Wheeler, D. 1970. Processes in word recognition. *Cognitive Psychology* 1. 59-85.
- [292] Wierzbicka, Anna. 1986. The semantics of 'internal dative' in English, *Quaderni di Semantica, vol 7*.
- [293] Wierzbicka, Anna. 1988. *The Semantics of Grammar*. Philadelphia: John Benjamins.
- [294] Wilensky, Robert. 1986. Some Problems and Proposals for Knowledge Representation. University of California, Berkeley Cognitive Science Report 40.
- [295] Wilensky, Robert. 1991. Extending the Lexicon by Exploiting Subregularities. Report UCB/CSD 91/618. Computer Science Division (EECS) University of California, Berkeley, CA.
- [296] Williams, Edwin. 1983. Against Small Clauses. *Linguistic Inquiry* 14 2.
- [297] Wittgenstein, Ludwig. 1953. *Philosophical investigations*. New York, NY: Macmillan.
- [298] Zaenen, Annie. 1991. Subcategorization and pragmatics. Presentation at CSLI, Stanford, CA.

- [299] Zaenen, Annie. to appear. Unaccusativity in Dutch: integrating syntax and lexical semantics. In J. Pustejovsky (ed) *Semantics and the Lexicon*. Kluwer Academic Publishers.
- [300] Zaenen, Annie and Adele E. Goldberg. A Review of Grimshaw's *Argument Structure*. ms. Xerox PARC, CSLI Stanford University and University of California, San Diego.
- [301] Zubizarreta, Maria Luisa. 1987. *Levels of representation in the lexicon and syntax*. Dordrecht: Foris.
- [302] Zwicky, Arnold. 1971. In a manner of speaking. *Linguistic Inquiry* 11 2. 223-233.
- [303] Zwicky, Arnold. 1987. Constructions in monostratal syntax. *CLS* 14.
- [304] Zwicky, Arnold. 1989. What's become of derivations? Defaults and invocations. *BLS* 15.