Constructional Approaches to Language

Construction Grammars

Cognitive grounding and theoretical extensions

edited by

Jan-Ola Östman
and Mirjam Fried

John Benjamins Publishing Company

Construction Grammars

Constructional Approaches to Language

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Volume 3

Construction Grammars: Cognitive grounding and theoretical extensions
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Cognitive grounding and theoretical extensions

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Chapter 1

The cognitive grounding of Construction Grammar

Jan-Ola Östman & Mirjam Fried

1. Introduction

The contributions to this volume all share the view that there are form-meaning configurations larger than morphemes and words which are conventionally conceptualized as wholes. This view is pursued in a variety of analyses within the framework of Construction Grammar and within a number of grammatical models which incorporate a constructional 'component' or 'level'.

The original tenets of Construction Grammar as developed by Charles J. Fillmore include the following four general requirements on the model:

i. it should be a generative grammar and thus formalizable;
ii. it should integrate different domains or 'components' of grammar (phonology, morphology, syntax, semantics, pragmatics);
iii. it should be a grammar with universal impact; and
iv. it should be consistent with what we know about cognition and social interaction.

Much recent work within Construction Grammar has focused on the first two requirements (i)–(ii) above, including the most influential studies by Fillmore and Kay, in particular Fillmore (1989, 1999, 2002, but also his earlier studies: 1985, 1986a, 1986b, 1988, with their precursor in Fillmore 1979), Fillmore & Kay (1987), Fillmore, Kay & O'Connor (1988), Kay (1994, 1995, 1997, 2002), and Kay & Fillmore (1999). The crucial concern of those studies has been to develop Construction Grammar as a model in which we can describe, analyze, and generate *all* the linguistic constructs of a language, incorporating both the 'core' and the 'periphery' in a single grammatical system. In order to accomplish this, Construction Grammar argues, it must be possible to integrate different parts of grammar as equally relevant in formulating adequate generalizations, without one domain of analysis having inherent precedence over any other. The relationship between form and meaning – between what formal approaches differentiate as syntactic and semantic 'components' – is taken as basic and inherent in any grammatical description. This interdependence also applies to the interaction between syntax and information structure, and a fair amount of research has been done on that relationship as well (cf. especially Michaelis & Lambrecht 1996). As a result of all this work, the Construction Grammar formalism has also become significantly more refined over the past fifteen years.[1]

The present volume takes as its starting point the approach to language which has its basis in the theorizing of Charles Fillmore and his students and colleagues at the University of California at Berkeley in the early 1980s, and which has come to be known as *Construction Grammar* (for a comprehensive overview of the theory, the reader is referred to Fried & Östman 2004).[2] The contributions concentrate specifically on the issues mentioned under (iii) and (iv) above, addressing the potential of Construction Grammar for grounding a grammatical framework in the fundamentals of speakers' experience and construal. Many of the contributions explore what Construction Grammar can offer in developing cognitively sound linguistic models, and – conversely – what kinds of cognitive constraints need to be taken into account in such a theory. The volume as a whole thus shows how Construction Grammar relates to cognition, and also – even if less directly – to universal aspects of language.

2. The cognitive dimension

The precursor to Construction Grammar is no doubt Fillmore's Case Grammar (e.g. Fillmore 1968), which came into being in an atmosphere in which the search for a more 'semantically' defined underlying structure was at the top of the linguistic agenda. Although Case Grammar as such was not intimately tied to the Generative Semantics movement at the end of the 1960s, for the uninitiated it came to be very closely associated with this movement, as was another approach to language that was developed at the University of California at Berkeley around the same time: the research into idiomaticity carried out by Wallace Chafe, culminating in his *Meaning and the structure of language* (1970).

At the dawn of cognitive science at Berkeley, all through the 1970s, Fillmore, Chafe, and (post-)Generative Semanticists George Lakoff and Robin Lakoff were searching for the cognitive and pragmatic correlates of linguistic expressions. In fact, G. Lakoff's (1977) work known informally as Gestalt Grammar and its emphasis on associating grammatical relations with a particular sentence type as a whole must be seen as another influential contribution that helped shape the development of Construction Grammar. Lakoff went beyond grammar and saw "thought, perception, emotions, cognitive processing, motor activity, and language" as "all organized in terms of the same kind of structures, *gestalts*". (Cf. in particular Lakoff 1977: 246–247.) In addition, it is worth pointing out that the interests of many scholars at the Berkeley linguistics department at the time were also in harmony with the interests of Berkeley philosophers of language H. P. Grice and John Searle (cf. in particular Searle 1969; Grice 1975). The general interest in pragmatics (Fillmore 1981; R. Lakoff 1972), deixis (Fillmore 1975b/1997; R. Lakoff 1970), consciousness, information structure, discourse (Chafe 1974, 1976, 1980; cf. also 1994), and orality and literacy (Chafe 1979, 1982, 1985; R. Lakoff 1982) is representative of the Berkeley intellectual interests, irrespective of the fact that the actual research results of individual scholars may have been at odds with each other to varying degrees.

In the late 1970s and early 1980s, scholars who were involved in the Berkeley Cognitive Science Program worked together on the cognitive foundations of grammar. Thus, Fillmore developed Frame Semantics as a particular model of the 'semantics of understanding', which offers a way of thinking about, structuring, and representing meaning while taking into account the relationship between meaning and morphosyntactic patterns (Fillmore 1975a, 1977, 1982, 1984, 1986c; and also Fillmore & Atkins 1992, 1993). Lakoff's research on metaphors (starting with Lakoff & Johnson 1980) moved his own work and the work of his colleagues and students even closer to cognitive science studies; G. Lakoff (1987) also discusses constructions, in particular the Deictic construction. Goldberg's (1995) influential book on argument structure constructions is one of the main recent studies to embody this cognitively oriented approach to the notion of construction. Recently, Lakoff has developed a Neural Language Theory (see the chapter by Bergen & Chang in this volume), which also includes a constructional component for handling syntax. In fact, this approach has further developed into what is now known as Embodied Construction Grammar.

The Berkeley Cognitive Science Program published a respectable series of working papers during the period between 1982 and the early 1990s, including papers by the linguists mentioned above as well as by John Ohala (1988) on phonology and phonetics and Len Talmy (1987) on semantics. But among the contributors were also psychologists (Slobin 1984; Ervin-Tripp et al. 1989), scholars in artificial intelligence (Wilensky 1986), and in anthropology (Cook-Gumperz & Gumperz 1984).

This was the intellectual environment in which Construction Grammar was conceived in the early 1980s. Although both Case Grammar and Construction Grammar were primarily developed as theories of grammar, with the expressed purpose of explaining the intricate relationship between (phonological, morphological, and syntactic) form and meaning, the question of what is meaning came to include not only aspects of pragmatic and discourse function, but also, and in particular, meaning in relation to categorization and conceptualization patterns.

In addition, the early insights into the relationship between form and meaning as displayed in Case Grammar also formed the basis of Frame Semantics, which has become a semantic complement to Construction Grammar. Further development of Frame Semantics has been recently enhanced by intensive corpus study within Fillmore's FrameNet project at the International Computer Science Institute in Berkeley (Fillmore et al. 2000; Baker et al. 2000; Johnson et al. 2001; Atkins et al. 2003; Fillmore et al. 2003).

The present volume focuses specifically on the current state of Construction Grammar and its relation to cognitive aspects of linguistic analysis. However, the notion 'construction' itself has become an integral – and more and more frequently occurring – part of recent conferences addressing cognitive linguistics issues. This means that the very view that underlies constructional approaches – namely, that analyzing language in terms of constructions enhances our understanding of human cognitive capacity in general – is taking ever more concrete shape.

What, then, does Construction Grammar have to do with cognition? The historical background situates Construction Grammar solidly within the general quest for cognitively sound theorizing. Given the general interest of Berkeley scholars in studying the pervasiveness of 'formulas' in both spoken and written language and in language learning (including second language acquisition, cf. Wong Fillmore 1976; also Peters 1983), the most straightforward – if, perhaps, somewhat glib – answer to this question would be that Construction Grammar has *everything* to do with cognition.

Unfortunately, the cognitive dimension of Construction Grammar has been somewhat neglected of late. Kay (1995: 171) defines Construction Grammar as "a non-modular, generative, non-derivational, monostratal, unification-based grammatical approach, which aims at full coverage of the facts of any language under study without loss of linguistic generalizations within and across languages". This definition lacks any reference to the cognitive and interactive dimensions and represents a marked shift from the 1993 version (Chapter 1.4–1.5) of the forthcoming book on Construction Grammar, where Fillmore and Kay still keep cognitive aspects as a potential ingredient of Construction Grammar:[3]

> . . . we will be downright rapturous if we can convince ourselves that the formal frameworks that we rely on for doing linguistic descriptions have a reality of their own, i.e., that they can themselves be interpreted as reflecting universals of human experience, or as providing insights into the nature of innate human cognitive capacities.

However, the 1997 updates of some of the chapters of the manuscript – accessible on the internet – do not include any direct reference to cognition. The explicit purpose of the present volume is thus to address the cognitive dimension of Construction Grammar and bring it back for informed discussion.

Many cognitively based theories of language understandably focus their attention on 'semantic' aspects – semantics is, in a sense, cognition *par excellence*: it touches, directly and naturally, on categorization, reference, sense, prototypes, and propositions. If Construction Grammar can retain its formalism(s) for handling morphosyntax, while at the same time including appropriate accounts of semantics, and if it can give a reasonable account of the interfaces between phonology, morphosyntax, semantics, and pragmatics, then it is clearly a viable alternative as a cognitive model of language. As noted above, the basic formalisms for representing complex grammatical knowledge are already well worked out. But it is even more important to stress that Construction Grammar does not elevate syntactic form to being the backbone of grammar, nor does it relegate semantics to a waste-paper basket status; let us recall that Fillmore's Frame Semantics is developed in parallel to, and getting ever more integrated with, Construction Grammar. Consequently, its potential for being a cognitively coherent model is not *a priori* compromised by its formalism or its concerns for (morphosyntactic) form.

A more complicated issue connected to the cognitive grounding of a grammatical model is the extent to which it may serve as a universal model of language. According to Kay & Fillmore (1999: 1), "[C]ross-language generalizations are captured by the architecture of the representation system and by the sharing of abstract constructions across languages." We see this as a two-sided kind of sharing: a grammatical system sharing and a cognitive sharing. These are intertwined, and the nature of the interconnections is one of the general theoretical issues that are addressed in this volume. Some of the chapters ask not only whether Construction Grammar is a reasonable and useful approach to grammatical theory, but also indirectly whether it can serve as a model of language *in general*. Some issues related to this question are touched upon in attempts to take Construction Grammar beyond the sentence, responding to the general trend within cognitive linguistics to move into the areas of discourse and variation.

3. Present advances

The chapters in the present volume are grouped into two parts, each of them responding to particular questions and challenges posed by the research community at large about the views Construction Grammar takes on these particular points.

The first part extends the original Fillmorean Construction Grammar in various directions. In particular, the chapters in this part address the nature and role of the cognitive dimension within Construction Grammar. Goldberg's (1995) book on constructions already incorporates cognitive aspects in her analysis of argument structure. Goldberg's chapter in this volume continues in that line of research, building on the insights from Conceptual Semantics and thereby suggesting one direction in which a cognitively enhanced Construction Grammar can move. Michaelis addresses coercion effects displayed in English aspectual marking, showing that a single combinatory mechanism, incorporating Pustejovsky's (1995) approach to formal semantics, can be used to represent both compositional and non-compositional constructional meaning. Leino's chapter advances an argument in favor of adopting Langacker's Cognitive Grammar as an adequate account of the semantic aspects of constructions. Recently, Langacker (To appear) himself has explicated the relationship between Construction Grammar and the 'constructional schemas' that have been developed as integral parts of Cognitive Grammar. The chapter by Östman extends Construction Grammar notions into the domain of discourse, also taking into account what we know about discourse processing and frames. If semantics is seen to be inherently associated with cognition, then Frame Semantics – including the wider notion of 'frame' – is a viable cognitive approach, since it does not rule out issues of text semantics. In fact, it is the cognitive basis of Construction Grammar that facilitates the move into the area of discourse.

The second part of the volume takes us beyond Construction Grammar, and thus fills another gap in constructional research. The notion 'construction' is widely used, both in a very pre-theoretical, general sense, and in reference to certain phenomena addressed in other theoretical models that are not inherently connected with Construction Grammar. Since there is no available authoritative text that could be regarded as *the* introduction to Construction Grammar, the primary purpose of the contributions in this part of the book is two-fold: to bring readers' attention to the fact that there are several 'construction grammars' around, and to illustrate how they may differ from the Fillmore-Kay model.

These four chapters give detailed accounts of how the notion of construction is used in four cognitively and cross-linguistically oriented grammatical models. The chapter by Bergen & Chang addresses the place and function of a constructional component in George Lakoff's Neural Language Theory, constituting at the same time one of the very first presentations of Embodied Construction Grammar. Nikanne's chapter elaborates on the notion of construction in Ray Jackendoff's Conceptual Semantics, which recognizes the need for constructions, but only as one part of the grammar. Specifically, constructions are seen in contrast to 'rules': constructions are a tool for incorporating relatively 'idiomatic' sentences, whereas rules handle regular, systematic, 'rule-governed' sentences. Dick Hudson's Word Grammar is presented in the chapter by Holmes & Hudson; Word Grammar is a type of constructional model, based primarily on grammatical relations rather than on categorial notions. And finally, Croft gives an overview of, and arguments for, a Radical Construction Grammar, which leaves little place for anything *but* constructions in a universal theory of language. In his view, all formal grammatical structures are seen as language-specific and construction-specific and there is no need for lexical categories such as Noun or Verb or relational categories such as Subject and Object.

There are a number of other models and approaches that make use of the term 'construction', and could therefore in principle have been represented in greater detail in this volume. The close connection between Construction Grammar and HPSG has been explored in various recent publications (e.g. Ginsburg & Sag 2000; Sag 2001; Kay 2002). Another constraint-based model that is close to these two in overall purpose, although not in format, is Lexical Functional Grammar (LFG; Bresnan 1982), including its extension in the direction of optimality syntax. The details of both HPSG and LFG are widely known, and their relation to, and similarities with, Construction Grammar will no doubt be addressed in the forthcoming introduction to Construction Grammar by Fillmore & Kay (Forthcoming). As we have noted, the notion of construction is also gaining more and more importance within Cognitive Grammar (Langacker 1987, 1991, to appear) and in other approaches within cognitive linguistics – cf. also Leino's chapter in this volume.

4. Further issues

When exploring the cognitive and cross-linguistic dimensions of a representational model, a number of issues arise that need addressing. Let us bring up two sets of such issues in relation to Construction Grammar.

The first general question can be phrased as follows: What is the relationship of Construction Grammar to other cognitive linguistic theories? Evidently, addressing this issue entails several other, more specific questions. One of them asks the very pertinent question of whether Construction Grammar – in spite of the arguments we have presented above – really *is* a cognitively oriented linguistic model and in what sense it is one. We mentioned earlier that Construction Grammar, together with Frame Semantics, has the potential for addressing cognitive issues. Minimally, it has a clear advantage in having constructions at the very center of analysis rather than as an ancillary mechanism ('component') for treating just those patterns that do not fit some other general model. In this respect, it offers an ideal answer to the view that "there is no way in which meaning can be completely divorced from the structure that carries it" (Pustejovsky 1995: 5). But the details of incorporating the cognitive dimension still have to be worked out. For example, does Construction Grammar have to develop its *own* view of cognitive structures and their representation, say, as part of the Frame Semantics model of meaning, or can it draw on and incorporate naturally what other models suggest, without compromising or giving up its essence as a unique grammatical model? Likely candidates for providing representational tools might include G. Lakoff's (1987) Idealized Cognitive Models view and his Neural Language Theory; Langacker's (1987, 1991) Cognitive Grammar; or Chafe's (1994) discourse model for cognition. Further possibilities for enriching the cognitive grounding of Construction Grammar might include extensions referring to Fauconnier's (1985) theory of mental spaces or aspects of Pustejovsky's (1995) generative lexical model.

From a slightly different perspective, we may also ask what are the psycholinguistic aspects of constructional analyses and in particular, what cognitive constraints apply in determining what can be a construction. This connection brings up a number of specific issues, such as what we know about memory in terms of storage, accessibility, and the activation of connections, or what we know about the mechanisms of language acquisition.

The second set of questions relates to the issue of cross-linguistic applicability of Construction Grammar and its potential for serving as a universal theory of grammar. Several more specific questions come to mind here. For example, would the quest for universal validity lead to a level of abstraction that would result in essentially vacuous claims and unfalsifiable generalizations? A simple answer to this question would be to say that if the proposed generalizations are not falsifiable, then we have gone too far. This, however, does not apply to the view that everything in grammar might be constructions; a claim like this is no less falsifiable than saying that everything follows linguistic rules. However, the issue of abstractness leads to the question of whether Construction Grammar as a universal theory is cognitively *plausible*, and plausible for whom. A related issue, then, has to do with the tension between seeing the form-meaning fit as a relatively language-specific characteristic on the one hand and the pressure to make universal generalizations on the other.

Finally, one question that is often raised has to do with how much of language is (or should be) left outside of constructions. This question actually misses the point with respect to constructions as understood in Construction Grammar: the objective of Construction Grammar is to address *all* of language, and since constructions are taken to be the elementary building blocks of language, nothing can be left outside, simply by definition. To be sure, a great amount of detailed and cross-linguistically oriented work needs to be carried out in order to determine what, if any, *types* of meaning-form patterns may have universal validity. However, Construction Grammar does not operate with any explicitly stated assumptions about the universality of specific grammatical categories or structural configurations, and it is, therefore, fair to conclude that this property gives Construction Grammar the flexibility needed for capturing typologically diverse grammatical patterns.

Notes

1. This does not mean, however, that there is a rigid and universally applied formalism that all practitioners of constructional analysis adhere to. Indeed, construction grammarians have been using a variety of notational styles (as this volume also documents), in addition to the 'traditional' nested-boxes formalism introduced by Fillmore (1988). Construction grammarians consider the relative notational flexibility as a positive feature, reflecting the shared commitment to deriving abstract representations and categories from the data at hand, rather than fitting the data into a predetermined formal structure.

2. In this introductory chapter, we have purposely avoided using an acronym for Construction Grammar. The abbreviation CG is often used when there is no possibility of confusing the referent with, say, Case Grammar, Cognitive Grammar, Categorial Grammar, or Constraint Grammar; the abbreviation CxG for Construction Grammar is the one we favor in our own work.

3. This passage also appears in the 1996 version (Chapter 1.7–1.8) of the manuscript.

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Part I

Theoretical extensions

Chapter 2

Argument realization

The role of constructions, lexical semantics and discourse factors

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1. Introduction[1]

In recent work, a number of researchers have offered explicit and ambitious proposals for how semantic properties of verbs relate to the overt expression of arguments and predicates. These proposals have offered broad typologies that divide the lexicon into large uniform classes. In this paper, it is argued that these analyses underestimate the role of constructions, detailed lexical semantics and discourse factors. Given sufficient attention to these factors, the "exceptions" and in fact the general tendencies themselves, follow without additional grammatical stipulation.

The present approach to grammar, Construction Grammar, takes speakers' knowledge of language to consist of a network of learned pairings of form and function, or *constructions*. Construction Grammar makes a strong commitment to ultimately try to account for every aspect of knowledge of language. That is, the theory commits itself to a criterion of descriptive adequacy. Constructions are posited whenever there is evidence that speakers cannot predict some aspect of their form, function, or use from other knowledge of language (i.e., from other constructions already posited to exist). At the same time, the type of Construction Grammar adopted here demands that *motivation* be sought for each construction that is posited. Motivation aims to explain why it is at least possible and at best natural that this particular form-meaning correspondence should exist in a given language.[2] Motivation can be provided by, for example, appeal to constraints on acquisition, principles of grammaticalization, discourse demands, iconic principles or general principles of categorization. The requirement that each construction must be motivated provides Construction Grammar with explanatory adequacy.

Several varieties of Construction Grammar coexist. The original formulation, due to Charles Fillmore and Paul Kay, is couched within the unification formalism, which allows syntactic generalizations to be stated in an explicit and consistent way (Fillmore, Kay, & O'Connor 1988; Kay & Fillmore 1999; Fillmore et al., forthcoming). This version of Construction Grammar has grown very close to HPSG in many respects, especially since much work in the former tradition is explicitly head-centered (e.g., Kay & Fillmore 1999) and since the latter has embraced the notion of a construction in recent work (e.g., Sag 1997). Lakoff (1987) and Goldberg (1995) develop a somewhat different approach in which motivation, default logic and psycholinguistic explanation play central roles. The present paper employs the formalism and Correspondence Principle developed in Goldberg (1995).[3] All of these approaches share the fundamental insight that grammar consists of constructions (see also Jackendoff 1997; Culicover 1999 for related views). This insight allows for the recognition of subregularities, and allows for a uniform treatment of words, idioms, limited phrasal patterns and fully productive phrasal patterns, since each is viewed as a type of construction. It is the centrality of the construction that sets Construction Grammar apart from traditional generative theories, which often recognize only the most general patterns, failing to account for systematic subregularities that exist.

2. Previous claims

A number of researchers have proposed some version of the following "Argument Realization Principle":

> **A. Argument Realization Principle (ARP):** There must be one argument XP in the syntax to identify each subevent in the event structure template (Grimshaw & Vikner 1993; van Hout 1996; Rappaport Hovav & Levin 1998; Kaufmann & Wunderlich 1998; Wright & Levin 2000).[4]

A further condition is offered by Rappaport Hovav & Levin (1998):

> **B. Subevent Identification Condition (SIC):** Each subevent in an event structure template must be identified by a lexical predicate (e.g., a V, an A or a P) in the syntax. (Rappaport Hovav & Levin 1998: 112)

The relevant subevents alluded to in both conditions include simple actions, causes and states as associated with the sort of decomposition familiar from Vendler (1967) and Dowty (1979), and provided in Table 1 below:

Table 1. Event structure templates (from Rappaport Hovav & Levin 1998: 108)

[x ACT<MANNER>]	(activity)
[x <STATE>]	(state)
[BECOME [x <STATE>]]	(achievement)
[[x ACT<MANNER>] CAUSE [BECOME [y <STATE>]]]	(accomplishment)

Taken together, the two principles above imply that at least one argument and one predicate associated with each subevent in an event structure template must be syntactically expressed.

The Argument Realization Principle has been cited in order to account for the unacceptability of example (1a). The message that is intended in 1a is that of a caused change of location: an accomplishment in the Dowty/Vendler classification. As illustrated in (1b), the analysis assumes that there are two independent subevents: the sweeping action and the motion of the dust onto the floor that is caused by the sweeping. The sweeping action is identified by the subject argument; the motion subevent demands that the theme argument ('dust') be overtly realized as well. That is, the Argument Realization Principle requires that both arguments in boldface in (1b) be overtly expressed as they are in (1c).

(1) a. *Phil swept onto the floor.
(Rappaport Hovav & Levin 1998: 120, example 39)
b. **Phil** ACT<swept>
BECOME [**dust** <onto the floor>]
c. Phil swept the dust onto the floor.

The intended function of the Subevent Identification Principle can be illustrated with example (1c). In (1c), each of the two subevents in (1b) is identified by a lexical predicate: the ACT subevent is identified by *swept*; the BECOME subevent is identified by *onto*. There is in fact a third subevent, the CAUSE subevent that relates the two subevents given in (1b). For some reason this subevent is not given equal status by Hovav Rappaport and Levin, perhaps because it is not an independent subevent, as are the two subevents decomposed in (1b). It is critical to the SIC that this third potential subevent is not treated on a par with the two subevents in (1b), because *there is no lexical predicate* that "identifies" the causing relation. That is, neither *sweep* nor *onto* designates a causal event. This example then, not discussed by Hovav Rappaport and Levin with respect to the SIC, presents a potential counterexample to the principle. Other exceptions to the SIC are discussed in Section 6.

Both the Argument Realization Principle and the Subevent Identification Condition initially appear to be motivated by communicative demands. It may at first seem that the need for semantic recoverability could be invoked to explain why each subevent must be represented in some way by an argument (ARP) and a predicate (SIC). However, the ARP must be relativized to English, since many languages allow any argument to be unexpressed as long as it represents given and non-focal information. This is true for example in Chinese, Japanese, Korean, Hindi, Hungarian and Laos (e.g., Li & Thompson 1981; Huang 1984; Németh 2000). For instance, both arguments can be omitted in Korean in the following conversation despite the fact that there are no arguments that correspond to either subevent of the change-of-state verb *kill* (see Section 3.2 below):

(2) A: <I ran across a big fat rat this morning>
B: kulayse, cwuki-ess-e?
so, kill-PAST-SententialEnding?
"So, did [you] kill [it]?"
(from Woo-hyoung Nahm, personal communication)

In what follows we concentrate on the extent to which the proposed constraints hold in English, identifying open-ended classes of counterexamples that violate the constraints. These exceptional cases lead us to consider constructional, detailed lexical semantic and discourse factors, and ultimately lead to a deeper understanding of the general tendencies that exist.

3. Implicit theme

3.1 Implicit theme construction

The existence of examples (3)–(8) casts doubt on the generality of the explanation of (1a) repeated below:

(1) a. *Phil swept onto the floor.
(3) Pat sneezed onto the computer screen.
(4) Chris blew into the paper bag.
(5) Don't spit into the wind.

(6) The hopeful man ejaculated into the petri dish.

(7) Sam pissed into the gym bag.

(8) Pat vomited into the sink.

In each of examples (3)–(8), the theme argument is unexpressed despite the appearance of an overt directional. It is mucus which moves onto the computer screen, air that moves into the bag, spit which would move into the wind, and so on. These examples stand in direct contrast to the unacceptable example with *sweep* in (1a). That is, the semantic decomposition of (3) (*Pat sneezed onto the computer screen)*, given in (9), is isomorphic with that of (1b) above because both entail the caused motion of a theme to a location. Yet the possibilities of argument realization are distinct.

(9) **Pat** ACT<sneeze>
BECOME [**mucus** <onto the computer screen>]

It may be observed that *sneeze* and the other verbs in (3)–(8) are often classified as intransitive. However, this fact is not relevant since the principles of argument realization must apply to the semantic decompositions of propositions, not the semantics of verbs in isolation. The propositions expressed in (3)–(8) clearly involve two participants: there is an unexpressed theme argument that is caused to move to the location designated by the overt prepositional phrase. In fact, the verbs in examples (3)–(8) can optionally appear transitively:

(3′) Pat sneezed mucus onto the computer screen.

(4′) Chris blew air into the paper bag.

(5′) Don't spit gum into the wind.

(6′) The hopeful man ejaculated his sperm into the petri dish.

(7′) Sam pissed urine into the gym bag.

(8′) Pat vomited her lunch into the sink.

To summarize, the Argument Realization Principle would seem to require the overt expression of the theme argument in expressions that entail a caused change of location, and yet as we saw in (3)–(8), the theme argument is at least optionally unexpressed in many cases.

In many of examples (3)–(8), the verb semantically incorporates the theme argument, in the sense that the theme's existence and motion is entailed by the verb (cf. *blow, spit, piss*). The examples nonetheless stand as counterexamples to the Argument Realization Principle, since the principle is supposed to explain the syntactic realization of arguments.

It might be argued that the semantics is directly reflected in the syntax, and that a direct object is syntactically incorporated into the verb in examples (3)–(8). The Argument Realization principle could thus be claimed to really be a constraint on a level of underlying representation. This type of account might garner support from the fact that the verbs in certain of the examples (e.g. 5, 7) are morphologically related to corresponding nominal forms (*spit, piss*). However, the felicity of other examples (e.g. 3, 4) undermines such an account since the verbs *sneeze* and *blow* do not have nominal morphological counterparts corresponding to their respective bodily emissions.

A proponent of a syntactic incorporation account might try to counter that *sneeze* and *blow* are actually derived from nouns, and that there is a morphological gap in that the nouns cannot be realized in bare form (cf. related proposals in Lakoff 1965; Hale & Keyser 1993). However, such an account would still have to explain the difference between *sweep* in 1a and the examples in (3)–(8). What is the independent evidence that would lead one to conclude that verbs in (3)–(8) are, despite all appearances, derived from nouns while *sweep* is not? Without such evidence the proposal can be seen to be ad hoc.

Perhaps most fatal to an incorporation proposal is the fact that the theme arguments cannot be said to be semantically incorporated into the meanings of the verbs in all of the cases. Notice that it is quite possible to cry without tears and to sneeze expelling only air. The existence of the relevant theme argument is not entailed by the semantics of these verbs. Thus the syntactic incorporation account is not viable for these cases. Therefore, it must be concluded that semantic decomposition does not itself directly determine argument realization: the Argument Realization Principle cannot be correct as it stands.

The Argument Realization Principle is further undermined by the fact that verbs of emission are not the only class of verbs that can appear without an overt theme argument, despite an overt directional phrase. Verbs of contribution, which happen to involve verbs that are intuitively more lexically transitive than verbs of emission, pattern the same way. Note that the understood theme argument in (9a), the contribution, is not overtly expressed despite the fact that the sentence entails its existence, see (9b):

(9) a. Pat contributed to the United Way.
    b. #Pat contributed to the United Way, but there was nothing she contributed.

Verbs of contribution seem to generally behave like *contribute*. For example, the verb *donate* is able to appear in this construction as well:

(10) She donated to the United Way.

The verb *give* normally requires the presence of a theme argument:

(11) *She gave to the girl.

However, when *give* is used with a meaning like that of *contribute* or *donate*, it too can appear without an overt theme argument:[5]

(12) She gave to the United Way.

One way to account for these facts about both verbs of emission and verbs of contribution is to recognize the existence of a particular grammaticalized construction in the grammar of English. The theme argument is only realized implicitly by an inference (or in some cases an entailment) based on the meaning of the verb. The construction conventionally appears only with certain classes of verbs: verbs of emission and verbs of contribution. *Sweep* does not occur in this construction because it cannot be construed as falling into either of these two classes. We can label this construction the Implicit Theme Construction. The construction can be represented as follows:

Semantics:	CAUSE-MOTION (	source	theme	direction)
	|	|	|	|
	$V_{\text{emission, contribution}}$ (			)
Syntax:		Subj	Ø	Oblique

Figure 1. The implicit theme construction.

The top line of Figure 1 represents the semantics of the construction: the caused motion of a theme from a source in a particular direction. Constructions that capture argument structure generalizations, like lexical predicates, have roles associated with them; these are termed *argument roles* and correspond roughly to traditional thematic roles such as *agent*, *patient*, *instrument*, *source, theme, location*, etc. However, because they are defined in terms of the semantic requirements of particular constructions, argument roles in this framework are more specific and numerous than traditional thematic roles (Goldberg 1995).

The argument roles associated with the Implicit Theme Construction can be labeled source, theme and direction. That is, the semantic contribution of the construction is determined by generalizing over both the expressions of emission and the expressions designating contribution. In both cases, something is caused to move from a source in a certain direction.

More specifically, argument roles capture generalizations over individual verbs' participant roles. That is, each verb is conventionally associated with a certain number of participant roles. Only a subset of those roles, namely those roles which are lexically *profiled*, are obligatorily expressed.[6] Lexical profiling, following the general spirit of Langacker (1987, 1991), indicates which participant roles associated with a verb's meaning are obligatorily accessed, serving as focal points within the scene, bearing a special degree of prominence. Fillmore (1977) similarly notes that certain participant roles are obligatorily "brought into perspective" achieving a certain degree of "salience." The notion of lexical profiling is a semantic one: it is a stable aspect of a word's meaning, and can differentiate the meaning difference between lexical items – cf. *buy* vs *sell* (Fillmore 1977) or *rob* vs *steal* (Goldberg 1995). Certain types of argument roles are inherently more likely than others to be profiled and therefore obligatorily expressed. For example, animate roles are generally more salient and central to the scene being expressed than place or location roles (Clark 1978; Goldberg 1995).

Meaningful differences between individual expressions can be attributed to differences in lexical items. For example, in relation to the Implicit Theme Construction, *blow,* as a verb of emission, requires that the person blowing be agentive*; sneeze* only requires that the person sneezing be the source of the theme argument. These facts are captured since the argument must satisfy the specifications of both the argument role of the construction *and* the participant role of the verb. That is, the argument role of the construction may be "fused" with a participant role of the verb.

The term "fusion" is adapted from Jackendoff's (1990) use of the same term to refer to the combination of two sets of semantic constraints on distinct but coindexed slots within a given lexical entry; the term is used here to designate the relation holding between a participant role of a verb and an argument role of a construction when the two are simultaneously instantiated by one argument. Fusion can be considered a type of unification in that the constraints on both roles must be simultaneously met by the argument instantiating the two roles.

Figure 1 also specifies the way the semantic arguments are overtly realized syntactically: the source argument is linked with the subject, the location/direction argument is linked with an oblique argument, and the theme argument is unexpressed.

Two principles constrain the ways in which the participant roles of a verb and the argument roles of a construction can be put into correspondence: the *Semantic Coherence Principle* and the *Correspondence Principle*. The Semantic

Coherence principle requires that the participant role of the verb and the argument role of the construction must be semantically compatible. In particular, the more specific participant role of the verb must be construable as an instance of the more general argument role. General categorization processes are responsible for this categorization task and it is always operative.

The Correspondence Principle is a default principle that ensures that lexical semantics and discourse pragmatics are in general aligned. As is the case with lexical items, only certain argument roles are profiled. In the case of simple sentences, only roles that are realized as Subj, Obj, or the second object in ditransitives are considered profiled. These are the same grammatical relations that receive a special status in most theories as the set of "terms" which correspond to "core," "nuclear" or "direct" arguments. Roles encoded by the subject, object or second object grammatical relations have a high degree of discourse prominence, being either topical or focal in the discourse (see Keenan 1976, 1984; Comrie 1984; Fillmore 1977; Langacker 1987 for arguments to this effect.).

The Correspondence Principle ensures that the semantically salient profiled participant roles are encoded by grammatical relations that provide them a sufficient degree of discourse prominence: i.e., by profiled argument roles. Specifically, participant roles of the verb must be encoded by profiled argument roles of the construction.[7]

A few examples may be useful. In the case of verbs of emission such as *sneeze*, the single profiled sneezer participant is fused with the source argument of the construction. The implicit theme argument and the overt directional are contributed by the construction to yield examples such as *Pat sneezed onto the computer screen*, as represented in Figure 2.

Semantics:	CAUSE-MOTION	(	source	theme	direction)
	sneeze	(	*sneezer*		)
Syntax:			Subj	∅	Oblique

Figure 2. The implicit theme construction with *sneeze.*

Because *sneeze* must be used as a verb of emission in order to appear in this construction, the implicit theme argument must be some type of emission, and not some external object such as a napkin. That is, (13a) is not an available interpretation for (13b):

(13) a. Pat sneezed the napkin onto the floor.
b. Pat sneezed onto the floor.

In the case of verbs of contribution, the combination of verb and construction is as follows:

Semantics:	CAUSE-MOTION (		source	theme	direction)
	|		|	|	|
	contribute	(	*contributor*	*contribution*	*goal*)
Syntax:			Subj	∅	Oblique

Figure 3. The implicit theme construction with *contribute.*

In this case, a participant role of the verb is fused with each one of the argument roles of the construction. The contributor role is fused with the source role since the contributor can be construed as a type of source; similarly the contribution role is fused with the theme, and the goal role is fused with the direction, since the first can in both cases be construed as an instance of the second. The construction ensures that the theme/contribution role is not overtly expressed.

It might be suggested that all of these unusual examples should be accounted for by specifying separate special lexical entries for each of the verbs involved, instead of positing a construction. For example, *contribute* might quite plausibly have the following entry directly: < contributor (contribution) goal >, where the theme argument is stipulated to be optional (Fillmore 1986). The examples would still be exceptions to the Argument Realization Principle, but this move would limit the exceptions to a closed class of lexical exceptions. Arguing against such an approach is the fact that positing additional verb senses fails to account for the generalization within and across verb classes. That is, stipulating additional lexical entries would not capture the fact that all verbs of emission act alike nor the fact that there are strong parallels between the class of verbs of emission and the class of verbs of contribution. Lexical stipulation also fails to capture the open-ended nature of the examples. Any verb that can be construed as a verb of emission or contribution can appear without the theme overtly expressed. For example, *spray* can appear in this construction as long as it is used as a verb of emission as in (14):

(14) The skunk sprayed into the bush.

By recognizing the construction as a generalization over many different verb uses, we are in a position to ask what the motivation for the construction might be. This question is addressed in the following section.

3.2 Motivating the implicit theme construction

There seem to be two factors involved in motivating the existence of the construction represented in Figure 1. Semantic recoverability is clearly a necessary condition on argument omission (cf. Rice 1988; Fellbaum & Kegl 1989; Resnik 1993; Cote 1996; Lambrecht & Lemoine 1998; Goldberg 2000). Speakers will simply not be understood if they refer to unexpressed arguments that are not recoverable in context. The unexpressed theme argument is semantically recoverable for both verbs of emission and verbs of contribution. At the same time, semantic recoverability is not a sufficient constraint. The theme argument of *sweep* in (1a), namely dust, is also recoverable and yet this example is categorically unacceptable.

A second motivating factor that may have led to the grammaticalization of the construction for these particular verb classes involves concerns about politeness. As the reader is no doubt already aware, many of the examples that have been cited describe scenes that are typically not discussed in polite company. The more explicit the description, the less polite it is. While the verbs involved often name the same process, the nominal counterpart is even more taboo because nouns are more "imagable" than verbs (Gentner 1978). Contrast the following:

(15) a. He spit into the wind.
b. His spit flew into the wind.

(16) a. He pissed into the gym bag.
b. His piss streamed into the gym bag.

The (b) sentences much more vividly describe the taboo theme (*spit*, *piss*). Thus there is a pragmatic motivation to leave the theme argument unspecified. It is clear that unexpressed theme arguments associated with *blow* or *cry* (i.e., air or tears) are not taboo, and there is no reason to avoid mentioning them. It is because these verbs fall into the class of verbs of bodily emission, and because bodily emissions are generally awkward to discuss, that the verb is licensed to be used in this way.

Supporting the idea that concerns of politeness may motivate the existence of the construction is the fact that the appearance of verbs of contribution can be motivated in the same way. In our society, it is often not tactful to mention money or the amount of money contributed. In many contexts, example (17a), while fully grammatical, would be considered uncouth as compared with (17b):

(17) a. I contributed $1000 to the United Way.
b. I contributed to the United Way.

The construction allows a means of making implicit an argument that would be indiscreet to mention. The proposed motivation, concerning semantic recoverability and politeness, has the status of a hypothesis about the metagrammar: it is proposed to explain why it is natural for such a construction to exist. By taking into account language's function as a venue for communication in a culture, we are able to motivate the somewhat marked formal expression of a particular construction. The motivation is not itself part of the construction. Although the construction's existence may be motivated by concerns of politeness and recoverability, speakers need to learn that it is available and which classes of verbs can appear in it. Therefore, the present proposal is to recognize the Implicit Theme Construction as a grammaticalized construction in the grammar.

4. Omission under low discourse prominence

The Argument Realization Principle makes additional predictions; for example, it predicts that causative verbs obligatorily express the argument that undergoes the change of state in all contexts, since the change of state would have to correspond to some overt argument. That is, the decomposition of a causative expression such as *The tiger killed its prey* is given in (18):

(18) **The tiger** ACT <killed>
BECOME <**prey** killed>

Since an argument must identify the second subevent designating a change of state, the patient argument is necessarily always expressed, according to the Argument Realization Principle. This claim has in fact been made explicitly by a number of researchers (Browne 1971; Brisson 1994; van Hout 1996: 5–7; Rappaport Hovav & Levin 1998; Ritter & Rosen 1998). Initial support might be drawn from the following examples:

(19) a. *The tiger killed.
b. *Chris broke.

However, causative verbs often do actually allow patient arguments to be omitted under certain discourse conditions. The following examples illustrate this phenomenon:[8]

(20) a. The chef-in-training chopped and diced all afternoon.
b. Tigers only kill at night.
c. The singer always aimed to dazzle/please/disappoint/impress/charm.
d. Pat gave and gave, but Chris just took and took.
e. These revolutionary new brooms sweep cleaner than ever (Aarts 1995: 85)
f. The sewing instructor always cut in straight lines.

Clearly each of the examples in (20a–f) retains its change of state meaning. Example (20a) designates a scene in which something was chopped and diced, thus undergoing a change of state. Example (20b) designates a scene in which tigers cause some unspecified animals to die; (20c) involves various psychological causative predicates; in (20d), Pat causes something to be given to Chris; (20e) involves an overt result phrase, and in (20f) some unspecified fabric is caused to be cut.

As noted above, the semantic requirement of recoverability must be satisfied, and as expected it is in each of the examples in (20). Goldberg (2000) demonstrates that a further discourse condition is necessary to license the object omission in (20a–f).

> **Principle of Omission under Low Discourse Prominence**:
> Omission of the patient argument is possible when the patient argument is construed to be deemphasized in the discourse vis à vis the action. That is, omission is possible when the patient argument is not *topical* (or *focal*) in the discourse, and the action is particularly *emphasized* (via repetition, strong affective stance, contrastive focus, etc.). (Goldberg 2000)

The definition of focus in the characterization above is a traditional one. Halliday (1967: 204), for example, writes "Information focus is one kind of emphasis, that whereby the speaker marks out a part (which may be the whole) of a message block as that which he wishes to be interpreted as informative." Similarly Lambrecht (1994: 218) defines the focus relation as relating "the pragmatically non-recoverable to the recoverable component of a proposition and thereby creates a new state of information in the mind of the addressee." Cross-linguistically, focal elements must be expressed. This follows from the fact that they are not predictable: they must be expressed in order to be identified.

A sentence topic can be defined as a "matter of [already established] current interest which a statement is about and with respect to which a proposition is to be interpreted as relevant" (Lambrecht 1994: 119; see also Gundel 1988: 210). It follows from this definition that topicality should be recognized as a matter of degree: a proposition can be about and relevant to an argument to more or less extent. As a very weak necessary condition on topicality, we can use the criterion of anaphoricity. Arguments that are at all topical should be available for subsequent anaphoric reference, since they are by definition elements that are relevant to the discourse. As predicted, since the omitted arguments are by hypothesis non-topical, they do not provide possible discourse antecedents (see Goldberg 2000 for details):[9]

(21) a. A tiger only kills at night.
*It is easier to catch then.
b. The chef chopped and diced all day.
*It was put into a large bowl.

Emphasis in the principle above is intended as a cover term for several different ways in which an action is construed to be especially prominent in the discourse. These include the following:

(22) Pat gave and gave but Chris just took and took.
= Repeated Action

(23) Tigers only kill at night.
= Generic action

(24) She picked up her carving knife and began to chop.
= Narrow focus

(25) Why would they give this creep a light prison term!? He murdered![10]
= Strong Affective Stance

(26) "She could steal but she could not rob." (Beatles: She came in through the Bathroom Window)
= Contrastive Focus

Languages differ in their grammatical possibilities for argument omission. Again, no languages allow focal elements to be omitted. In many languages including Chinese, Japanese, Korean, Hindi, Hungarian and Laos any given, non-focal argument can be omitted. In English, with a few lexical exceptions (cf. Fillmore 1986), all topical arguments must be expressed. However, what we

Prag:	$\underline{\mathrm{P}}_{\text{(emphasized)}}$	(...	pat/theme$_{\text{(deemphasized: non-topical, non-focal)}}$)
Sem:	Pred	(...	patient/theme)
Syn:	V	Subj	∅

Figure 4. The Deprofiled Object Construction (DOC).

have seen in this section is that if the action is particularly emphasized (by repetition, contrast, etc.), it is possible to omit arguments that are both predictable (non-focal) and non-relevant (non-topical) in English. This combination of discourse and syntactic characteristics can be represented by the following construction, which is labeled, the Deprofiled Object Construction (DOC).

The top line in Figure 4 captures the pragmatic constraints on the construction. In particular, the predicate is emphasized (indicated by the underlining and capital $\underline{\mathrm{P}}$), and the patient or theme argument is deemphasized in being both non-topical and non-focal. The fact that the theme or patient argument is omitted syntactically is captured by the "∅". Motivation for the construction comes from the fact that it is not necessary to mention non-focal, non-topical arguments since they are predictable and non-relevant in the discourse. Following Grice's maxim of Quantity (second half) to "say no more than is necessary" there is motivation to leave these particular arguments out. Moreover, the fact that the predicate must be emphasized in some way indicates that the construction may be further motivated by a different kind of quantity generalization. There appears to be some kind of trade-off in just how much information is expressed by the object vs the predicate. That is, the object seems to be more likely to be deemphasized to the point of being omissible when the predicate is emphasized. Precedent for this general type of trade-off exists. For example, Brown (forthcoming) finds that in Tzeltal, semantically "heavier" verbs are more likely to allow object omission; for example, *k'ux* "eat mush stuff" allows object omission more readily than *tun* "eat (anything)." Cacoullous and Hernandez (1999) likewise document the use of Mexican Spanish *le* as an intensifier, which they describe as emphasizing the verb by deemphasizing the object argument.

Other generalizations about how much is naturally expressed in a given clause have been proposed previously (Givón 1975; Chafe 1987; DuBois 1987).[11] These precedents make the generalizations about the DOC more natural or motivated.

We have seen instances in which an argument that the Argument Realization Principle predicts should necessarily be expressed may in fact be omitted (Sections 3 and 4). In the following section we observe the converse phenomenon: arguments that the Argument Realization Principle predicts should be omissible without special context, but which are nonetheless obligatory (except as expected under the discourse conditions captured by the DOC construction).

5. Obligatorily transitive single-event verbs

The Argument Realization Principle has been interpreted by some as a biconditional: verbs are claimed to be obligatorily transitive if and only if they designate complex events (Hovav Rappaport & Levin 1998). According to this claim, verbs that designate single events should never be obligatorily transitive, modulo the independent constraint that all arguments must be recoverable. There are, of course, clear examples of single-event verbs that readily do allow the omission of their second argument, as predicted. Well-known instances include *drink, smoke, sing, bake, read* (Fellbaum & Kegl 1989; Fillmore 1986). Despite the fact that these verbs are intuitively semantically transitive, the discourse constraints described in the previous section do not need to hold in order for these verbs to appear intransitively. The action need not be emphasized; it is possible to say for example, *Pat drank today*, if only a single instance of drinking occurred and there is no other type of contextual emphasis.

Interestingly, the same set of verbs occurs frequently in a context that does fall within the purvue of the DOC construction, namely: in generic contexts with a habitual interpretation: e.g., *Pat drinks*; *Pat smokes; Chris sings; Sam writes.* It seems likely that the frequent appearance of the verbs in this context led to the grammaticalization of a lexical option for these verbs, whereby they could appear intransitively in less constrained contexts. That is, if a verb appears frequently in a particular discourse context, which generally allows the omission of the non-subject argument, the omission may over time become a conventional or grammaticalized option for that verb, through a process of reanalysis. Listeners reanalyze the frequently encountered intransitive use of the verb as a lexical option instead of as being licensed by the particular discourse context via the DOC construction.[12] Supporting this idea is the fact that verbs which are near synonyms but which have lower frequencies, do not readily allow object omission:

(27) Pat drank/#imbibed last night.

(28) Pat read/#perused last night.

(29) Pat wrote/#drafted last night.

Low frequency verbs such as *imbibe, peruse* and *draft* do not appear frequently in the DOC context since they do not have very high overall frequency. Thus their possible, but rare appearance in the DOC context has not enabled a re-analysis to occur in which the intransitive use is understood to be a lexical option. Thus recognizing the Deprofiled Object Construction can motivate both currently productive cases and also lexicalized "idiosyncratic" cases. The failure of the verbs such as *imbibe*, *peruse*, and *draft* to appear intransitively is unexpected, on the other hand, by an account that claims that any single-event verb should be able to appear intransitively.

Levin & Rappaport Hovav (1998) and Wright & Levin (2000) illustrate the claim that only complex events are necessarily transitive by considering the class of verbs of surface contact. They argue that, as a particular class of simple-event verbs, verbs of surface contact are never obligatorily transitive, modulo the independent constraint of semantic recoverabilty. However, there is at least one subclass of verbs of surface contact that systematically resists object omission. Consider the examples below involving the verbs of surface contact, *pet*, *stroke*, and *caress*:

(30) Context: Pat observes Chris petting a cat.
Chris pet *(her) yesterday, too.

(31) Context: Chris approaches a cat that is known to bite.
You'd better not stroke *(it)!

(32) Context: Pat and Bob were very affectionate at the restaurant.
They caressed ??(each other) throughout the meal.

The contexts above make each of the omitted arguments semantically recoverable, and yet the second argument is nonetheless obligatorily expressed. The examples in (30)–(32) all share the property that each prototypically involves an animate theme argument; i.e. we normally *pet, stroke,* or *caress* animate beings.[13] Animate participants are typically prominent in the discourse (cf. Clark 1978; Goldberg 1995), and therefore normally need to be expressed in languages like English that require the expression of prominent participants, whether recoverable or not. In the special discourse context captured by the DOC construction, they can, as expected, be made less prominent, and therefore omitted:

(33) The proud owner of 65 cats, Pat *patted* and *stroked* all day.

(34) Clarisa always *caressed* with a light touch.

We have at this point seen exceptions to the Argument Realization Principle of various kinds: directionals can appear without overt expression of the theme argument when licensed by the Implicit Theme Construction, change of state verbs can appear intransitively under certain discourse conditions defined by the DOC construction, and single-event verbs often require the overt expression of their second argument, due to their specific lexical semantics.

In the following section we turn our attention to the second principle that has been proposed, the Subevent Identification Condition (Hovav Rappaport & Levin 1998).

6. Ditransitives

The Subevent Identification Condition suggested by Hovav Rappaport & Levin (1998) claims that each subevent must be identified by a predicate. For example, an endstate or result subevent may be identified in one of two ways: either it will be overtly identified by a resultative or directional phrase, or it will be implicitly identified by the lexical semantics of the verb, as is the case with causative verbs such as *break,* or *kill.* These two possibilities would seem at first to be the only two logical options: in order to express a resultant state, one must either overtly predicate that state or one must choose a verb that lexically entails the resultant state.

The authors of this condition allow for a subevent to be identified by means other than the lexical semantics of the main verb, which represents a move away from the idea that the main verb must lexically encode the basic event type of the clause and toward a more construction-oriented approach (for discussion of the earlier approach see, e.g., Levin & Rappaport 1995; Pinker 1989; Grimshaw 1990). This move allows for more compositional meaning, taking the meanings of co-predicators such as prepositions and resultative phrases into account.

The recognition that constructions themselves carry meaning allows for yet another means of conveying aspects of meaning. Constructions can serve to convey meaning not attributable to any lexical item. We saw one example of this early on. In (1c), *Phil swept the dust onto the floor*, the entailment of causation is contributed by the construction, not by a lexically expressed predicate. Another example in which a construction contributes meaningful predication not naturally attributable to any lexical predicate involves the double object or ditransitive construction. The verbs that appear in the construction often do not themselves inherently imply transfer (Goldberg 1992, 1995; Jackendoff 1990); yet they appear with an interpretation of transfer when they occur in the ditransitive construction. For example, notice that the verb *kick* does not entail transfer when used in various other constructions:

(35) The duck kicked the wall.

(36) The dancers kicked high.

(37) The child kicked at the ball.

However, when *kick* is used in the double object construction, transfer to a recipient is entailed:

(38) Pat kicked her the ball. (⇒ Pat causes her to receive the ball)

A natural way to account for these facts is to note that *kick* lexically encodes a particular forceful motion of the foot. Other aspects of the final interpretation are contributed by the meaningful construction. That is, the ditransitive construction itself and not any particular lexical item contributes the transfer entailment in example (38). Following Goldberg (1995), the ditransitive construction can be represented as follows:

Semantics:	CAUSE-RECEIVE	(agent	recipient	theme)
	|	|	|	|
	PRED	(		)
Syntax:	V	Subj	Obj	Obj2

Figure 5. Ditransitive construction.

The ditransitive construction combines with *kick* as follows:

Semantics:	CAUSE-RECEIVE	(agent	recipient	theme)
	|	|	|	|
	kick	(*kicker*		*kicked*)
Syntax:	V	Subj	Obj	Obj2

Figure 6. Ditransitive construction with *kick*.

The recipient argument and the interpretation of transfer are contributed by the construction. To argue that *kick* must lexically designate the transfer subevent because there is no other candidate predicate would be to render the Subevent Identification Conditions a stipulation instead of an empirical claim. Any contentful version of the SIC is contradicted by the open-ended set of examples licensed by the ditransitive construction.

7. Explaining the tendencies

To summarize, we have seen several classes of counterexamples to the broad claim that each subevent must be "identified" by exactly one argument (the Argument Realization Principle) and predicate (Subevent Identification Condition). These principles were proposed on the basis of English data, but many languages, including Korean, Japanese, Chinese, Hindi, Hungarian, and Laos routinely allow arguments to be omitted where English does not. Therefore the ARP must be parameterized in some way to account for these differences. Moreover, even in English, we have seen instances in which the motion subevent is not necessarily identified by an overt argument, instances in which a causal subevent is not necessarily identified by an overt argument, instances in which there are two obligatory arguments despite there being only one event. Finally, in violation of the SIC, we have seen instances in which there is no overt predicate identifying certain subevents.

What are the empirical generalizations? It seems clear that in English, the theme argument is generally expressed if motion is predicated of it; the patient argument is also generally expressed if a change of state is predicated of it. Subregularities that are exceptions to these generalizations also exist, and can be captured by the two constructions posited here: the Implicit Theme Construction and the Deprofiled Object Construction.

How can we motivate the broader empirical generalizations that the Argument Realization Principle was intended to capture? In Goldberg (1995) it is argued that the overt expression of arguments is determined by two interacting factors: lexical semantics and constructions. Recall that the Correspondence Principle is a default principle that determines how a verb's participant roles are fused with a construction's argument roles. It ensures that lexical semantics and discourse pragmatics are in general aligned. In particular, the Correspondence Principle requires that the semantically salient profiled participant roles are encoded by grammatical relations that provide them a sufficient degree of discourse prominence: i.e. by profiled argument roles. Specifically, participant roles of the verb must be encoded by profiled argument roles of the construction, with the exception that if a verb has three profiled roles, one can be represented by an unprofiled argument role (and realized as an oblique argument). The intuition is that the participants that are highly relevant to a verb's meaning (the profiled participant roles) are likely to be the ones that are relevant or important to the discourse, since this particular verb was chosen from among other lexical alternatives. The class of change-of-state verbs illustrates this point in a relevant way.

Normally, the patient argument of a change of state verb is profiled in that it is obligatorily accessed, acting as a central participant in the scene, and bearing a degree of prominence, since the verb is by definition a verb that designates that this participant undergoes a change of state. Correspondingly, the patient argument is typically quite prominent in the discourse. One typically does not assert that a participant changes state unless one wishes to discuss or draw attention to that participant. Therefore patient arguments of causative verbs are generally obligatorily expressed by a profiled argument role (subject, object or object2). Thus it is the lexical semantics of change-of-state verbs that accounts for the strong tendency for the patient argument of change-of-state verbs to be expressed.

At the same time, the typical situation for causative verbs just described, namely that the patient argument is both lexically profiled and prominent in the discourse, does not always hold. In the discourse context outlined in Section 4, patient arguments of change of state verbs have very low discourse prominence. In particular, the patient argument is neither focal nor topical, while at the same time the action is emphasized, thereby further shifting discourse prominence away from the patient argument. The Deprofiled Object Construction serves to allow for this situation.

That is, as noted in Goldberg (1995), the Correspondence Principle can be overridden by the specifications of particular constructions. Perhaps the most central reason for there being more than one possible construction available to express a given proposition is that the variety of constructions provide alternative ways of packaging information structure (Lambrecht 1994). For example, constructions can serve to increase the prominence of an argument, for example, by topicalizing or focusing the argument. They can also contribute a profiled argument that is not associated with the verb; for example, the ditransitive construction can readily add a recipient argument to verbs that have only two participant roles (cf. the discussion of *kick* above). Topicalization, Focus constructions and the addition of a profiled argument are all ways of making an argument especially prominent in the discourse.

Constructions can also serve to deemphasize an argument by specifically *shading* an argument. The term *shading* is intended to invoke the idea of casting a participant in the shadows: the participant is present semantically, but is not "under the spotlight." One example of this type of construction is the passive construction, which *shades* or deprofiles the agent argument. We have seen other examples of this type in this paper. In the case of the Deprofiled Object Construction, an argument that is normally associated with the verb is unexpressed due to a combination of its low discourse prominence together with an increased emphasis on the action.

The Implicit Theme Construction also serves to shade a theme argument. In the case of this construction, the shaded theme argument does not necessarily correspond to a participant role of the verb at all (recall the use of intransitive verbs of emission such as *sneeze*); thus shaded arguments are not necessarily otherwise lexically profiled, and may be arguments of the construction only. Still, if a path of movement is explicitly predicated of a theme argument, the theme argument is normally prominent in the discourse, by the same rationale as above: one typically does not assert that a participant changes location unless one wishes to discuss or draw attention to that participant. In languages like English, in which discourse prominent participants are normally obligatorily expressed, we expect that the theme argument would normally be obligatorily expressed when a change of location is predicated of it. The Implicit Theme Construction allows us to account for the class of exceptions to this generalization. It allows speakers to avoid mentioning a theme argument when it would be indiscreet to mention it, as long as the argument is semantically recoverable.

One might attempt to criticize the constructional approach by claiming that the constructions are ad hoc means of accounting for exceptional cases. However, each construction is motivated by independent factors. For example, the Deprofiled Object Construction is motivated by the idea that arguments that are not prominent in the discourse need not be expressed. The Implicit Theme Construction is motivated by the factors of semantic predictability and politeness. Therefore, these constructions serve clear communicative functions: that is, their existence is motivated and not arbitrary or ad hoc. Moreover, the general tendencies are naturally captured by the Correspondence Principle together with an account of which arguments are likely to be lexically profiled.

Cross-linguistic differences are captured in two ways. First, the status of profiled participant roles differs cross-linguistically. While in English profiled participants are necessarily expressed unless a specific construction serves to shade them, in many if not most languages, they are necessarily expressed only if they are not given or if they are focal. The Principle of Correspondence is presumed to be the same across languages insofar as lexically profiled roles are expressed by core grammatical relations *when they are expressed*. The inventory of constructions is a second source of cross-linguistic variation. We have seen that each construction is motivated, but its existence is not strictly predictable. Thus the inventory of constructions is expected to differ cross-linguistically.

We have seen that sweeping generalizations that are intended to be exception-less are oversimplified. The Correspondence Principle captures the tendency to align lexical and discourse prominence and allows us to capture the observed general tendencies. At the same time, attention to specific constructions and their motivation allows us to account for open-ended subregularities.

Notes

1. I would like to thank Knud Lambrecht, Laura Michaelis, Woo-hyoung Nahm and two anonymous reviewers for very helpful discussion on various aspects of this paper. The research reported here was supported by NSF Grant SBR-9873450.

2. An account that fully motivates a given construction is ultimately responsible for demonstrating how the construction came to exist and how it can be learned by new generations of speakers. This more stringent requirement requires further research.

3. Hybrid appoaches also exist. Michaelis (To appear) uses the unification formalism but employs an explicitly default logic. She also makes use of the idea that constructional meaning does not necessarily arise from the meaning of the head constituent. Croft (2001) outlines a "Radical Construction Grammar" which shares much with both Construction Grammar and Cognitive Grammar (Langacker 1987, 1991). See Cruse & Croft (2004) and Goldberg (Forthcoming) for detailed comparison of various constructional approaches.

4. The original formulation by Grimshaw & Vikner (1993) allowed adjuncts as well as arguments to "identify" a subevent, but more recent formulations have stated the requirement more strictly, as stated above. See Ackerman & Goldberg (1996) and Goldberg & Ackerman (2001) for evidence that even the original formulation was too strong. In this paper, I will focus on the more restrictive formulation in terms of arguments, which seems to be receiving a lot of attention in the literature.

5. The observation about *give* is due to Charles Fillmore (personal communication 1990).

6. Again, this generalization is true for English. In other languages, lexically profiled roles are also expressed by a small set of core grammatical relations, when they are expressed. However, these arguments may sometimes be omitted as long as they are given and non-focal in the context.

7. If a verb has three profiled roles, one can be represented by an unprofiled argument role (and realized as an oblique argument). Profiled status does not directly determine argument/adjunct status. Any participant roles specified by the verb, whether profiled or not, are potential arguments. Moreover, arguments may be contributed only by the construction;

whether these arguments correspond to profiled argument roles also differs construction by construction.

8. In an in-depth survey of various types of omitted argument, Cote (1996: 130ff.) classifies omitted arguments of this type as "Arbitrary Null Objects," but suggests that the class is highly lexically constrained to include *warn, advise, amuse* and closely related verbs with animate patient arguments. She further observes that the generic interpretation is often required. We see here that a great variety of verbs can appear with this type of omitted argument, regardless of the animacy of the patient argument. Genericity does seem to be a sufficient although not necessary interpretation for the action as discussed below. These cases are a subtype of "Indefinite Null Complementation" (Fillmore 1986), and would also fall under the heading of "Lexically Conditioned Intransitivity" (Fellbaum & Kegl 1989), although we argue here that such expressions are licensed by a construction that applies broadly across lexical items.

9. The anaphoricity condition is a necessary but not sufficient condition on topicality, since as is well known focal elements are also available for subsequent anaphoric reference.

10. I thank Christiane Fellbaum and Knud Lambrecht for suggesting several of these examples.

11. There is a difference between the Givón-Chafe-DuBois generalization, "Prefer only one lexical mention per clause" in that we have not claimed that there is a preference for object omission in the DOC context, only that the context allows for omission.

12. It is sometimes claimed that this use of *drink* necessarily implies that Pat drinks alcohol. As Cote (1996) observes, it is possible to use *drink* intransitively in a context in which Pat is a patient who just had an operation on her esophagus, in which case her ability to drink anything at all could be at issue. At the same time, the fact that the generic sentence *Pat drinks* is most commonly uttered in contexts in which alcohol is the relevant beverage gives further credence to the idea that the lexical option arose historically from repeated use in the generic context.

13. Other exceptions are not hard to come by. For example, single-event statives including *like, hate, weigh, cost* are all obligatorily 2-argument verbs.

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CHAPTER 3

Entity and event coercion in a symbolic theory of syntax

Laura A. Michaelis

1. Introduction

Where does sentence meaning come from? Leaving aside the inference strategies targeted by the Gricean paradigm, formal models of the syntax-semantics interface have supplied a single answer to this question: the words of the sentence and the frames which those words project. Since word combination in formal theory is inextricably tied to phrase building, the drivers of sentence semantics are not simply words but, more particularly, the heads of syntactic projections. The assumption that the licensing of sisterhood relations is the unique privilege of lexical heads is woven into the formal conventions of formal theory, e.g., phrase-structure rules like those in (1), in which the 'optionality' of complements, specifiers and adjuncts is defined over a set of lexical classes distinguished by their projection behaviors:

(1) a. VP → V (NP) (PP)
b. NP → (determiner) N

Models of sentence meaning based on lexical projection provide a straightforward picture of the syntax-semantics interface: while words determine WHAT a sentence means, rules of morphosyntactic combination determine HOW a sentence means. While rules of syntactic combination assemble heads and their dependent elements into phrases, they play no role in either the licensing or construal of arguments. It is apparent, however, that the syntax-semantics mapping is less tidy than the foregoing statement would imply. In particular, the identification of licensors with syntactic heads cannot always be maintained. This is shown by the following examples, in which the projection properties of the boldfaced items are distorted in various ways. These distortions involve, respectively, nominal morphosyntax (2), verbal thematic structure (3), and those aspects of verbal morphosyntax which are determined by the aspectual class of the verbal projection or SITUATION RADICAL (4):

(2) **Nominal Morphosyntax**
   a. Give me some **pillow**.
   b. They sampled some **wines**.
   c. She had a **beer**.

(3) **Semantic Frame**
   a. Down at the harbor there is teal-green clubhouse for socializing and parties. Beside it **sparkles** the community pool. (*Vanity Fair* 8/01)
   b. When a visitor passes through the village, young lamas stop picking up trash to mug for the camera. A gruff 'police monk' **barks** them back to work. (*Newsweek* 10/13/97)

(4) **Aspectual Morphosyntax**
   a. **She lik**ed **him** in a minute.
   b. I'm feeding him a line and **he**'s **believ**ing **every word**.
   c. **She wash**es **the car**.

In (2a), a word which denotes a bounded entity, *pillow*, is embedded in the morphosyntactic frame ordinarily projected by a mass noun, while in (2b–c) the inverse is the case. In (3), two monovalent verbs, *sparkle* and *bark*, are embedded, respectively, in a bivalent frame comprising a location and a theme, and a trivalent frame comprising an agent, a theme and a goal. In (4a–b) stative situation radicals are combined with aspectual operators which logically require tenseless propositions denoting events. In (4a), the state radical *She like-him* combines with a frame adverbial (*in a minute*), which is logically compatible only with those predications which do not entail downward to subintervals, i.e., telic events (Herweg 1991). In (4b), the state radical *He believe- every word* combines with Progressive morphology. This combination is unpredicted by verbal aspect. Since the Progressive maps events to medial states, it appears to apply vacuously in this context (see Vlach 1981; Langacker 1987; Herweg 1991; De Swart 1998). In (4c), an event radical, *She wash- the car*, combines with Present inflection. While this combination is widely attested it too involves a distortion of verbal aspect: (4c) does not denote a unique event, as would its simple Past counterpart. As a momentaneous 'sampling' device, the Present cannot accommodate the positive temporal profile of an event. Instead, the Present appears to index the class of stative situations, e.g., a state of the world in which car-washing takes places at regular intervals.

A model of the syntax-semantic interface based solely upon lexical-head licensing would, of course, fail to account for the fact that all of the examples in (2–4) have coherent, consistent interpretations. For example, the verb *bark* in (3b) is uniformly construed as denoting (metaphorical) caused motion, while the situation radical *She like- him* in (4a) receives an inchoative interpretation. Although these interpretive effects might be dismissed as the products of manner- or relevance-based implicatures, the relevant implications do not obviously qualify as generalized implicata: because they are based on the presence of specific lexical items, these implications, like conventional implicatures, are neither detachable nor defeasible. The foregoing examples therefore suggest that there is not in fact a single source of sentence meaning: conceptual content comes not only from words but also from an inferential procedure which bridges semantic gaps in morphosyntax. I will refer to this procedure as IMPLICIT TYPE-SHIFTING, reserving the more widely used terms COERCION and COERCION EFFECT to refer to the enriched representations produced by the reconciliation mechanism in question.

Our exploration of implicit type-shifting thus far enables us to draw the following three generalizations. First, semantic operators can apply even in the absence of an appropriate situation-type argument, since the argument can adapt to the requirements of the functor. This fact is difficult to model in a noncircular way, since a given operator must not only operate on the output of an inference rule, but also trigger the very inference rule which enables it to apply. Second, the patterns which trigger coercion effects do not have a uniform syntactic characterization. The coercion trigger may be a syntactic head, as in the case of the Progressive, where the auxiliary head *be* selects for a participial complement of the appropriate aspectual class, forcing a dynamic reading in the 'mismatch' condition (4b). The coercion trigger may be a specifier like *some* in (2b), which selects for a noun whose denotatum is a mass. Finally, it may be an open schema, as in (3), where the relevant scene-construal properties follow from the presence of specific grammatical functions, rather than being attributable to a given verb or argument. Third, coercion effects are produced by both TYPE-SHIFTING schemas and TYPE-SENSITIVE schemas. An example of the former is the Progressive construction. An example of the latter is the Frame Adverbial construction (3a).

Coercion effects appear to indicate a modular grammatical architecture, in which the process of semantic composition may add meanings absent in the syntax in order to ensure that various functors, e.g., the indefinite article, receive suitable arguments. One such model, proposed independently by both Jackendoff (1990, 1997) and De Swart (1998), involves the interpolation of coercion operators in semantic structure. In the case of (2c), for example, a specific coercion operator would be used to derive a count type from a mass type, making *beer* a suitable argument for the indefinite article. The interpolated-functor model successfully extricates two widely conflated head properties – that of being a syntactic head (determining the distribution of the phrasal projection), and that of being a semantic head – calling for an argument of a particular type (Zwicky 1985; Croft 1996).

However, the functor-based model of coercion also have three significant failings. First, it requires a powerful indexing mechanism to constrain coercion operations. Jackendoff (1997: 50) notes this issue, pointing out that such operations might "insert arbitrary material into arbitrary arrangements". De Swart (1998: 361) seeks to avoid such overgeneration by assuming that a coercion operator is introduced only when there is a trigger for it. For example, a 'unitizing' coercion operator might be indexed to the class of linguistic expressions requiring count-noun sisters, e.g., the indefinite article. However, by enabling a given linguistically expressed operator to invoke a given coercion operator on an 'as needed' basis we do not thereby ensure that that this coercion operator will appear *only* where needed. For example, there is no obvious means by which to prevent the unitizing operator from intervening between the determiner *the* and a mass-noun sister (e.g., *beer*) in the expression *the beer* – an unwelcome result since this expression need not denote a portion or variety of beer. Coercion operations may be morphosyntactically invisible, but if their representation owes nothing to morphosyntax it is not obvious how they can be constrained. Second, it misses the following generalization: both the 'match' conditions upon which lexical projection is based and the 'mismatch' conditions which trigger implicit type-shifts are created by morphosyntax. On the modular account, there is no obvious relationship between strict (projection-based) composition and enriched (coercion-based) composition. The enriched representations do not appear to owe anything to the syntactic configurations in which the particular functor appears. In fact, Jackendoff (1997: 50) admits that enriched composition considerably complicates the syntax-semantics interface. Third, it cannot account for cases of template-based coercion, as in (3). As noted above, the coercion effects in question cannot be traced to the presence of a specific functor, be it a verb or an argument. Instead, the modulation of meaning is the result of the verb's conformity to a linking pattern whose valence set properly includes that projected by the verb. Fourth, it provides no rationale for the existence of type-sensitive operators. What use does an interpretive module have for a set of identity functions? Since functions in construal-based semantic theories are intended to represent cross-domain mappings, type-sensitive operators, whose input and output types are identical, appear to serve no explanatory role.

As an alternative to a modular model, I will propose an account of implicit type-shifting based upon the grammatical construction. This account will draw upon the mechanisms and architecture of Construction Grammar (Fillmore et al. to appear; Kay & Fillmore 1999; Zwicky 1994; Goldberg 1995; Michaelis 1994; Michaelis & Lambrecht 1996; Koenig 1999). In this model, the grammar is a network of symbolic rules of morphosyntactic combination. As in Bybee's (1995) conception of morphological storage and processing, rules traditionally conceived in processual terms are replaced with schemas which differ from one another with regard to the level of specificity (e.g., whether or not particular words or affixes are invoked) and productivity, as determined both by the restrictiveness of the schema and its type frequency (see Bybee 1995: 432). In addition, constructions represent diverse formal objects. Grammatical constructions determine: constituent-structure relations, dependency relations, role-function linkages, linear orderings, and combinations thereof (Zwicky 1994). Grammatical constructions are combined with one another, and with lexical items, via superimposition, a mechanism whose technical implementation is unification (Fillmore et al. forthcoming; Kay & Fillmore 1999). Grammatical constructions refer in the same way that words do: they denote types – among them classes of entities and events. Accordingly, coercion is not merely the resolution of semantic conflict, but is instead the resolution of conflict between constructional and lexical denotata.[1] This interaction is subject to a principle which I will refer to below as the Override Principle.

The construction-based model of coercion has the following explanatory features. First, it uses a single combinatory mechanism, the construction, to account for both coerced and syntactically transparent interpretations. Rather than representing a special form of composition, coercion effects are predictable by-products of construction-word combination: they mediate conflicts between the meaning of a construction and the meaning of a superimposed lexical item. This means that the constraint which requires semantic concord between the syntactic sisters in the string *a bottle* also triggers the coerced interpretation found in *a beer*. Since this concord constraint is stated for a rule of morphosyntactic combination, the same construction underlies both strict and enriched composition. Second, it captures head-driven and non-headed (exocentric) coercion effects by means of a single combinatory mechanism. Since combination in unification-based syntax has nothing *per se* to do with phrase building, licensing is not the unique domain of syntactic heads. Further, since its combinatory mechanisms are based upon schemas rather than sisterhood relations, Construction Grammar provides a straightforward model of 'functor-free' coercion, as exemplified in (3). Third, it predicts the existence of two sources of coercion effects: type-selecting constructions (e.g., Indefinite Determination) and type-shifting constructions (e.g., the Progressive). Type-sensitive constructions express concord relations while type-shifting constructions perform derivations. Both kinds of constructions denote types, whether entities or events, and invoke types. When the type provided is not the type invoked, implicit type-shifts may occur.

The remainder of this paper will be structured as follows. In Section 2, I will describe the construction-based model and its unification-based implementation, using nominal syntax to illustrate both transparent and enriched composition. In Section 3, I will apply the model to argument structure, drawing upon the framework developed by Goldberg (1995). In Section 4, I will analyze three distinct types of aspectual constructions: aspectual concord constructions (as illustrated by the Frame Adverbial construction), aspectual shift constructions (as illustrated by the Progressive), and tense constructions (as illustrated by the Present in English and French).

2. Coercion by construction: Nominal syntax

Unification of constructions can grossly be described in terms of a metaphor involving the superimposition of slides. A lexical entry can be superimposed upon a construction (or vice versa) as long as the semantic and syntactic specifications on each slide "show through" – that is, provided there is no conflict among the specifications on the slides in the stack. The specifications take the form of attribute-value matrices: a list of syntactic (*syn*) and semantic (*sem*) attributes (both relational and intrinsic) with exactly one value assigned to each (including the value [ ], or unspecified).[2] Among the values of the *sem* attribute are the attributes INDEX and FRAME. The value of the *index* attribute is the referential index of the expression. The value of the *frame* attribute is the set of relations and participant roles which jointly define the type of the expression. The constructions themselves are represented as box diagrams. Each box corresponds to a node in a tree-structure representation, and contains an attribute-value matrix. In a branching construction, a lexical entry unifies with a single daughter box within the construction. The topmost attribute-value matrix of the construction represents the external syntax and semantics of the construction – that is, what instances of this construction 'count as'. The traditional conception of a lexical head – as the determinant of the syntactic category and semantic type of its projection – plays a limited role in this model, as a default.[3]

Unification is used to represent a semantic dependency between two or more types which figure in the statement of a construction. When there is a concord requirement within a branching construction, the two daughter boxes will contain identical atomic values for the relevant attributes. When a range of values is possible, a concord requirement will be indicated by a unification variable, a numbered pound sign # preceding the empty brackets, e.g., #1. For example, each of the two daughter constituents in the Determination construction (the article and the nominal head) carries the attribute-value pair *plural #[ ]* (Fillmore et al. to appear: Chapter 2). This concord requirement rules out such tokens as **these person* and **this persons*. Functor-argument relations are represented by the VALENCE attribute. The value of the valence attribute is the set of arguments which a lexical daughter (or its projection) requires, with intrinsic and relational information given for each member of the valence set. An argument of a functor (e.g., a verb) is represented as the daughter which unifies semantically with a member of the valence set of its sister, the functor. While some implementations of unification-based Construction Grammar, e.g., Kay & Fillmore 1999 (as described in Fn. 1), equate any failure of unification with ill-formedness, I assume a coercion mechanism whereby constructional requirements (e.g., semantic constraints upon the head daughter) 'win out' over lexical features when the lexical item and the construction upon which it is superimposed have different values for a given attribute. This accommodation mechanism is described in (5) as the Override Principle:

(5) **The Override Principle.** If a lexical item is semantically incompatible with its syntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded.

Under (5), coercion is a side effect of the ordinary semiotic function of grammatical markers rather than a special form of composition. Further, (5) targets a broader array of phenomena than do models based on the interpolation of coercion operators. Notice that the Override Principle refers to semantic incompatibility between a lexical item and its syntactic context, rather than merely to the lack of conformity between a particular lexical item and a given grammatical formative, e.g., the indefinite article. In construction-based syntax, meaning-bearing grammatical units like the indefinite article and plural suffix are seen as the semantic heads of PARTIALLY LEXICALLY FILLED CONSTRUCTIONS. This means that grammatical formatives are also grammatical constructions, and the Override Principle subsumes the classic cases of coercion. In addition, however, the Override Principle also explains the source of coercion effects which cannot plausibly be represented in terms of functor-argument relations. One such case is given in (6):

(6) You have **apple** on your shirt.

In (6), the word *apple* denotes a mass type which it would not ordinarily denote. What is the source of that coerced interpretation? There is no determiner or modifier which calls for it. The verbal sister of the nominal, *have,* cannot be said to coerce the mass interpretation either, since this verb does not select for a mass type. Instead, implicit type-shifting occurs because a verb's object function is filled by a bare nominal. The licensing relationship between a given verb and a nominal which expresses an internal argument of that verb is represented by the Verb Phrase construction, described by Fillmore et al. (to appear: Chapter 4). The Verb Phrase construction is both a constituency construction and a dependency construction. It licenses combinations containing a lexical head verb and one or more phrasal complements, whether these complements are arguments or adjuncts. The Verb Phrase label is taken literally: an intransitive verb like *disappear*, would, in the absence of adjuncts, simply unify directly with the Subject-Predicate construction, as in (7), rather than representing both a lexical verb and a verb phrase, as required by traditional X'-based models:

(7) The problem disappeared.

The Verb Phrase construction represents lexical projection by providing that the valence set of the lexical verb is a subset (potentially a proper subset) of the valence value of the Verb Phrase construction. The Verb Phrase construction requires that all sisters of the head verb represent MAXIMAL categories.[4] Maximal nouns are those which refer, in the sense of introducing existentially quantified or anaphorically linked variables into semantic representation. Since maximality is a lexical feature, a noun will be marked for one of three maximality values in the lexicon, depending upon lexical class. If a lexical noun is to unify directly with the Verb Phrase construction, it must either bear the lexical feature [+maximal] (as does a pronoun) or have no value for the maximality feature. The only lexical nouns which are unmarked for maximality are those which denote mass types (Fillmore et al. to appear: Chapter 2). Via feature co-occurrence restrictions, a negative value for the feature BOUNDED entails an UNSPECIFIED value for maximality. This form of underspecification is used to capture the fact that a mass noun may serve either as a grammatical function via direct unification with one of several constructions which govern the instantiation of verbal arguments, e.g., the Verb Phrase construction, or as a sister in one of several determination constructions, e.g., Definite Determination. What this means is that a noun can combine directly with the Verb Phrase construction only if this noun designates an unbounded (mass) type. Since the noun *apple* designates a bounded type, it must shift its designation in order to unify with the Verb Phrase construction, as in (6). Thus, the mass interpretation in (6) involves the resolution of conflict between the meaning of a word and the meaning of a syntactic pattern. This conflict is resolved in favor of the meaning of the construction, as per the Override Principle. It is the construction, rather than the semantic valency of a particular functor, which instructs the interpreter to construct a mass interpretation for the noun *apple* in (6).[5]

Any model which extends to 'templatic' or functor-free coercion will *a fortiori* provide a mechanism for representing those syntactic sisterhood relations which map isomorphically to functor-argument relations. Binary-branching constructions which feature such isomorphic structure provide particularly clear illustrations of both implicit and explicit type-shifting. We will now focus on two such examples drawn from nominal syntax: the Indefinite Determination construction and the Plural construction. In (8–9), we see two pairs of nominal constructs; each pair illustrates one of the two respective constructions. The (a) construct illustrates instantiation of constructional meaning while the (b) construct illustrates implicit type-shifting:

(8) **Indefinite Determination**
  a. She read **a book**. (lexical match)
  b. Did you eat **a pudding**? (lexical mismatch)

(9) **Plural**
  a. She bought some **pencils**. (lexical match)
  b. They serve delicious **soups**. (lexical mismatch)

The Indefinite Determination construction is shown in Figure 1. In this construction, the indefinite article has a valence requirement calling for a noun with specific values for the attributes *boundedness*, *configuration* and *number*. These values are required to match those of the nominal sister. The nominal sister is the syntactic head, but its semantic type is restricted by its sister. The construct *a book* in (8a) transparently reflects the semantics of the construction: the input lexical item shares semantic feature values with the right daughter of the construction. By contrast, the construct *a pudding* in (8b) illustrates a context of coercion: the noun *pudding* denotes a mass entity and therefore fails to unify with the construction's right daughter. In accordance with the Override Principle, the relevant feature values of the input noun will

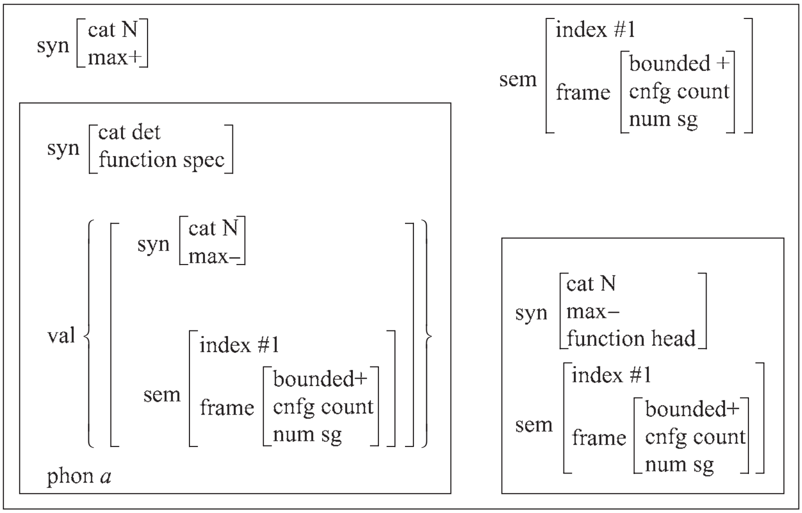

Figure 1. The Indefinite Determination construction.

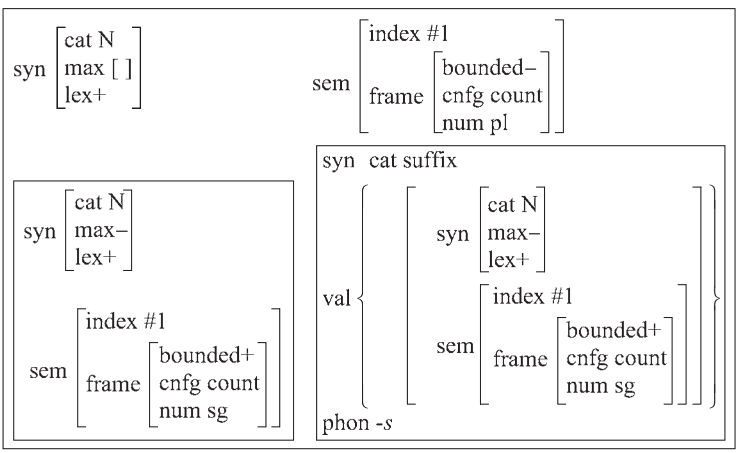

Figure 2. The Plural construction.

switch to those required by the construction. This means that mass nouns like *pudding* will receive the value [count+] in combination with the Indefinite Determination construction.

The Plural construction is shown in Figure 2. Like Indefinite Determination, the Plural construction is binary branching. And like the indefinite article, the plural suffix has a valence requirement which calls for a nominal sister having particular values for the attributes *boundedness*, *configuration* and *number*. The nominal sister shows these same values. Here, the functor's requirements are captured through unification of the semantic features of functor and argument. However, there is no case in which the input lexical item and the construction itself will share all values for the relevant *sem* features. (By *relevant* here I mean the set of *sem* features which excludes the referential index.) The Plural construction SHIFTS the boundedness value of the input noun to [bounded-], producing forms like *soups* in (9b). Unlike the Indefinite Determination construction, the Plural construction performs two kinds of type shifts – one to which it is dedicated (an explicit type-shift) and one which is a side effect of its dedicated function (an implicit type-shift). Notice that by modeling inflectional morphology as syntactic combination, we potentially incur violations of the principle of lexical integrity, as discussed by Bresnan & Mchombo (1995). This principle states that elements of morphological structure are not subject to syntactic processes, e.g., recursion. Thus, the Plural suffix cannot be paired with a coordinate nominal head, although nothing in the representation in Figure 2 would seem to prevent this. While I leave open the question of how constructions like Plural might be brought into line with lexical integrity, I maintain that inflectional morphology is appropriately represented by constructions, since concord constraints upon sisterhood relations provide a model of coercion effects which exactly parallels that given for syntactic structures like Indefinite Determination. The two kinds of semantic mappings illustrated by (9a–b) are defined in (10–11):

(10) **Explicit type-shifting**. A shift in the designation of a lexical item (or its projection) by a grammatical construction with which that lexical expression is conventionally combined.

(11) **Implicit type-shifting**. A shift in the designation of a lexical item (or its projection) in order to reconcile semantic conflict between word and construction, as per (5).

Constructions which inherently perform type shifts differ from those which do not inherently do so. We capture this difference by drawing a distinction between CONCORD CONSTRUCTIONS and SHIFT CONSTRUCTIONS. These two classes are defined in (12–13):

(12) **Concord construction**. A construction which denotes the same kind of entity or event as the lexical expression with which it is combined. In the case of branching constructions, the construction and its lexical daughter have

the same values for the relevant semantic features. **Examples**: Indefinite Determination, *SM*-determination.[6]

(13) **Shift construction**. A construction which denotes a different kind of entity or event from the lexical expression with which it is combined. In the case of branching constructions, the construction and its lexical daughter have different values for the relevant semantic features. **Examples**: Partitive, Plural.

While the Plural is a shift construction, it has something crucial in common with concord constructions like Indefinite Determination: it requires semantic agreement between its two daughters with regard to the boundedness, configuration, and number attributes. When the input noun does not match the semantic feature values requested by the Plural suffix, the result is coercion. As per the Override Principle, conflict is resolved in favor of grammatical meaning. Table 1 compares the two types of constructions:

Table 1. Comparison of the two types of constructions

	Implicit type-shifting	Explicit type-shifting
Concord constructions	Yes (via (5))	No
Shift constructions	Yes (via (5))	Yes

Table 1 shows that the two types overlap in function, since both types perform implicit type-shifting. Why should this overlap exist? In the case of functor-argument relations, whose constructional analog is syntactic sisterhood, the basis of this overlap is easy to see. Both concord and shift constructions have unification requirements which involve semantic agreement between daughters. Since the Override Principle, as a constraint on conflict resolution, is potentially operative wherever sisters constrain one another semantically, the principle necessarily applies to shift constructions as well.

3. Argument-Structure constructions

Another type of licensing relationship which is mediated by a construction within the Construction Grammar framework is the relationship between a verb and the thematic roles which that verb assigns. The relevant constructions are argument-structure constructions, as described by Goldberg (1995) and discussed in Section 1 above. These constructions are the source of mismatches between the event type denoted by the head verb and the event type denoted by the sentence. An example of such a mismatch is given in (14):

(14) It worked, sir! We bored them right out of the game.
(Marcie, *Peanuts* 10/97)

In (14), the verb *bore*, which is otherwise a bivalent verb licensing stimulus and experiencer roles, assigns an agent, a theme, and a goal. As a result, the sentence has a construal in which boring people is the means by which they are propelled in a particular direction. Under Goldberg's model, this meaning results from the combination of the verb *bore* with an argument-structure construction which denotes causation of a change of state. The valence set licensed by this construction properly includes the valence set licensed by the verb. The combination of verb and construction results in augmentation of the verbal valence. It also results in reconstrual of the verb's arguments according to the Semantic Coherence Principle: compatible thematic roles in the respective valence sets contributed by verb and construction are fused; the nonfused thematic roles are those contributed exclusively by the construction (Goldberg 1995: 50–51). Only once we assume that linking patterns denote event types can we speak of such patterns as assigning thematic roles above and beyond those contributed by the verb.

While we have focused on mismatches like (14) in motivating Goldberg's theory, INSTANCES play a crucial role as well. Instances are clauses in which the projection properties of the verb and of the construction are identical. Example (15) illustrates the instance relation between verb and construction:

(15) She put them outside.

The argument structure projected by *put* is identical to that of the Caused-Motion construction. The fact that instances exist suggests that cases of verb-construction valency mismatch like (14) are appropriately treated as cases of coercion. This in turn suggests the appropriateness of an analogy between argument-structure constructions and functors like the indefinite article – an analogy which Goldberg exploits when she identifies constructions with closed-class expressions (pp. 39–43). The fact that argument-structure patterns create coerced interpretations is relevant for our purposes because it provides further evidence that the Override Principle is best stated in terms of word-construction interactions, rather than functor-argument relations alone. There is no functor that can plausibly be seen as the trigger of coercion in the case of (14). Instead, the modulation of meaning is the result of the verb's conformity to a linking pattern.

$$
\boxed{\begin{array}{l}
\text{syn V}\\
\text{sem}\ \begin{bmatrix}\text{index \#4}\\ \text{frame PROPEL}\\ \text{arg1 \#1}\\ \text{arg2 \#2}\\ \text{arg3 \#3}\end{bmatrix}\\
\text{integrate}\ (\text{type}_{\text{V}},\text{type}_{\text{C}})\ \{\text{instance-means}\}\\
\text{val}\left\{\begin{bmatrix}\text{sem \#1}\\ \text{rel}\ \theta\ \text{agent}\\ \text{syn N}\end{bmatrix} - \begin{bmatrix}\text{sem \#2}\\ \text{rel}\ \theta\ \text{theme}\\ \text{syn N}\end{bmatrix} - \begin{bmatrix}\text{sem \#3}\\ \text{rel}\ \begin{bmatrix}\text{gf obl}\\ \theta\ \text{goal}\end{bmatrix}\\ \text{syn P}\end{bmatrix}\right\}
\end{array}}
$$

Figure 3. The Caused-Motion construction.

Formally, these linking patterns are verb-level constructions which are 'superimposed' upon the lexical entries of verbs. This unification has the effect of augmenting what Fillmore et al. (to appear) refer to as the MINIMAL VALENCE of the verb (the repertoire of semantic roles licensed by the verb). When a verb's lexical entry unifies with one or more linking constructions the result is a FULLY SPECIFIED verbal valence, in which each semantic role of the verb is assigned a grammatical function. Crucially, as we have seen, the theta frame licensed by the construction may properly include that licensed by the verb. Figure 3 combines compatible proposals of Fillmore et al. (to appear: Chapter 8) and Goldberg (1995: Chapter 7):

As shown in Figure 3, the Caused-Motion construction specifies only one argument linking: the thematic role of *goal* is linked to an oblique grammatical function. The linking of the remaining arguments depends upon whether this construction unifies with the Passive constuction or the Active construction. These two linking constructions are mutually incompatible. The Passive construction requires that the highest-ranking thematic role be linked to an oblique grammatical function. The Active construction requires that a nondistinguished argument (i.e., non highest-ranking argument) be linked to the Object grammatical function. In either case, the highest-ranking unlinked role will receive the Subject grammatical function, which must be assigned to one argument, as per the Subject Principle (Fillmore et al. to appear: Chapter 8). What is relevant for our purposes here is the attribute *integrate*, whose value is the set of verb-construction integration relations licensed by the construction. As described by Goldberg (1995: Chapter 7), the Caused-Motion construction permits both *instance* and *means* relations. The particular relation selected is determined by the verb itself. As mentioned, verbs which are instances of the construction's semantics, e.g., *put* in the case of the Caused-Motion construction, license a theta frame identical to that of the construction. Verbs which have a means relation to the construction license a valence set which is properly included in the construction's valence set. This is the case in (14). We view (14) as a case of coercion simply because the Caused-Motion construction, like Indefinite Determination, can and typically does merely exhibit semantic concord with the open-class element which combines with it. In (14), concord is 'forced', via the Override Principle, as is the count reading of the noun *pudding* in the nominal construct *a pudding*. Concord, or the achievement of concord, involves valence matching in the case of argument structure. This means that we must recognize concord requirements as facts about grammatical patterns, not merely functors. However, while we will view coercion effects through the lens of the constructional framework, we must also keep in mind that many such effects can also be seen as involving the resolution of conflict between the requirements of a given functor and the particular argument with which that functor is paired.

Argument structure also demonstrates the constructional basis of explicit type-shifting. The *Way*-construction, described in detail by Jackendoff (1990), Goldberg (1995) and Israel (1996), *inter alia*, provides an example of explicit type-shifting involving the augmentation of verbal valency. Examples of this construction are given in (16–17), with the coerced verbs shown in boldface:

(16) She **talked** her way into the shareholders' meeting.

(17) [A]nyone who has ever had the occasion to observe the average American family as they **snack** their way toward the departure gate[...]
(Fran Lebowitz, *Vanity Fair* 10/97)

The meaning of the *Way*-construction, as described by the aforementioned authors, involves the motion of an agent creating a path by means of some activity or in a particular manner – in the case of (16–17), talking and snacking, respectively. The construction's head, an intransitive verb, denotes an activity which does not involve directed motion (e.g., neither talking nor snacking involve directed motion). The event denoted by the construction is an act of motion along a path. There is no verb which licenses a theta frame identical to that of the *Way*-construction. In fact, verbs which *do* denote directed motion inherently are not welcomed by the construction:

(18) ??He walked his way into the meeting.

(19) ??She ran her way along the shore.

$$
\begin{array}{l}
\text{syn V} \\
\text{sem} \begin{bmatrix} \text{index \#4} \\ \text{frame } \textsc{create} \\ \text{arg1 \#1} \\ \text{arg2 \#2} \\ \text{arg3 \#3} \end{bmatrix} \\
\text{integrate } (\text{type}_V, \text{type}_C)\ \{\text{means-manner}\} \\
\text{val} \left\{ \begin{bmatrix} \text{sem index \#1} \\ \text{rel } \theta \text{ agent} \end{bmatrix} - \begin{bmatrix} \text{sem} \begin{bmatrix} \text{index \#2} \\ \text{frame } \textsc{path} \\ \text{frame } \textsc{possession} \\ \text{arg1 \#1} \\ \text{arg2 \#2} \end{bmatrix} \\ \text{rel} \begin{bmatrix} \text{gf obj} \\ \theta \text{ theme} \end{bmatrix} \\ \text{syn} \begin{bmatrix} \text{N} \\ \text{det poss} \end{bmatrix} \\ \text{phon } \textit{way} \end{bmatrix} - \begin{bmatrix} \text{sem \#3} \\ \text{rel} \begin{bmatrix} \text{gf obl} \\ \theta \text{ goal} \end{bmatrix} \\ \text{syn P} \end{bmatrix} \right\}
\end{array}
$$

Figure 4. The *Way*-construction.

These facts suggest that the *Way*-construction is inherently a type-shifting device, since the event type denoted by the construction is always distinct from that denoted by the verb with which the construction combines. Figure 4 gives a representation of the *Way*-construction which reflects its role as a type-shifting device: the set of verb-construction integration relations does not include the instance relation.

We will see below that constructions which perform explicit type-shifting can perform this function in a quasi-iconic fashion. These constructions are generally phrasal: the phrase contains a head and a complement denoting distinct semantic types. The head determines the type denoted by the construction. The Progressive construction, as we will see, conforms to this description. However, our examination of the *Way*-construction has shown that explicit type-shifting via construction does not require the existence of a sisterhood relation. Explicit type-shifting entails only that the construction denotes a type distinct from that denoted by the lexical (open-class) expression with which the construction combines. As a shift construction, the *Way*-construction imposes aspectual constraints upon input verbs, and, as predicted by the Override Principle, it therefore also triggers coercion effects. Since the verb which combines with the construction is necessarily construed as an activity, verbs which do not otherwise have processual readings receive such readings in the context of the construction. Examples of implicit type-shifting involving the *Way*-construction are given in (20–21):

(20) She blinked her way into the light.

(21) He dove his way into the hearts of millions of viewers (??with a single dive).

While *blink* and *dive* have momentaneous (semelfactive or achievement) readings under ordinary circumstances, they are interpreted as iterated events in the context of the *Way*-construction: the subject-denotatum in (20) is necessarily construed as having blinked numerous times; the subject-denotatum in (21) is necessarily understood as having performed a series of dives. Such iterated events, or event chains, qualify as activities, as I will argue in Section 4.1 below. Since the construction requires that the input verb denote the means or manner of directed motion, rather than directed motion itself, verbs which inherently denote directed motion are not welcomed (see (18–19)). However, as Goldberg observes (1995: 205), verbs of directed motion are permitted in contexts in which "a basic-level motion verb is understood to imply motion despite difficulty":

(22) The novice skier walked her way down the ski slope. (=Goldberg's (22a))

The explanation which I offer for the relative felicity of (22) is compatible with Goldberg's, but requires a further assumption about the construal of *walk*: in this context it does not denote a verb of directed motion. In essence, the *Way*-construction is here stripping the verb *walk* of its directed-motion component, so that the addition of the directed-motion component by the CONSTRUCTION makes sense. We will see this same combination of semantic theft and reimbursement in the case of Progressive-form statives. Notice, however, that the coercion effects found in (20–22) do not arise from an agreement requirement holding between two sisters. The requirement common to all shift constructions, branching and nonbranching, is that the open-class expression must provide the input type that the shift requires. If the open-class form does not denote a type appropriate to the shift, coercion occurs. As per the Override Principle, coercion is asymmetric: only the input type (the lexical expression), and not the output type (the construction's denotatum), is changed in the resolution of a type mismatch.

4. Aspectual constructions

4.1 Aspectual meaning

The semantics of aspectual constructions are complex, but a good deal of the confusion surrounding aspectual meaning appears to have arisen from the failure of many theorists to distinguish between the CODING of aspectual categories, as by verbs, and the INVOCATION of aspectual categories, as by constructions. For example, the perfective and imperfective Past constructions of Romance are frequently referred to as exponents of 'grammatical aspect' when in fact, as De Swart (1998) and others have argued, such constructions are actually aspectually sensitive TENSE operators. Once coding and invocation functions are distinguished, the rationale for a division between grammatical and lexical aspect (Aktionsart) becomes less apparent. According to this traditional division, verbs and verbal projections express ontological distinctions, e.g., the event-state distinction, while grammatical markers express viewpoint-based distinctions, e.g., the perfective-imperfective distinction. For example, Smith (1997: 73) analyzes imperfective marking as the means by which a speaker "presents part of a situation, with no information about its endpoints". This type of account is intuitive in that it is based upon a visual metaphor: the grammatical aspects are lenses of various powers through which speakers view the event schemas denoted by verbs. It is difficult, however, to extend this model to other conceptual domains. If we were to say, for example, that the speaker who pairs a mass noun with an indefinite article is 'attending to the boundaries of the substance', we would miss a generalization: this speaker is presenting a mass as an individuated entity by using the syntactic structure otherwise projected by count nouns. By the same token, the speaker who combines a state verb with the morphosyntax typically projected by an event verb is presenting that state as an instance of the event category. If aspectual encoding is a form of categorization, it is reasonable to conclude that the ontological distinctions which figure in Aktionsart-based categorization underlie semantic representation at both the lexical and constructional levels. Constructions, as we have seen, both denote and evoke event types. The invoked event type may or may not be identical to the type denoted by the invoking construction. Invoked and denoted event types are identical in the case of concord constructions and distinct in the case of shift constructions. While only constructions evoke, both words and constructions denote. Therefore it stands to reason that aspectual meaning, whether expressed by a construction or a verb, should be represented in the same way.

If Aktionsart classification is to provide a unified aspectual semantics, then it must provide an inventory of types sufficient to describe all of the mappings involved in explicit and implicit aspectual type shifts. This system of representation must capture the fact that, for example, activities pattern with states for some grammatical purposes and with telic events for others. Thus, the inventory of Aktionsart types must be hierarchically organized. The primary ontological division in this hierarchy has an epistemological basis: states are those situations whose existence can be verified on the basis of a momentaneous 'sample', while event verification requires tracking over time. Let us illustrate this criterion by application to the least prototypical class of events – activities. As described by Langacker (1987, 1991), activities are those situations which either involve repeated type-identical subevents (heterogeneous activities) or are conventionally construed as episodes (homogeneous activities). Verification of a heterogeneous activity, e.g., running, requires several frames. Since running consists of successive leaps involving alternating legs, witnessing a single leap is insufficient to verify an event of running. Verification of a homogeneous activity, e.g., holding a broom, standing in a corner or sleeping, requires access to points of inception and termination, as well as several contiguous frames between those endpoints. Sleeping is distinct both from being comatose and from nodding off for a second, and staying at one's sister's house is distinct both from popping in on one's sister and living with her. While states like being tall endure in the same way that the events of sleeping and standing in a corner do, states do not take time: any subinterval of a state counts as an instance of that same state. The existence of a state can thus be confirmed on the basis of an atemporal sample. The same cannot be said of a STATE PHASE.[7] Examples of state-phase predications are given in (23a–b):

(23) a. She was sick for three days.
 b. She was short as a child.

Once the duration of a state is fixed, as in (23a–b), it is 'tracked' in the same manner that an activity would be. Unlike activities, however, state phases do not entail energy input. For example, one can try to sleep or lie on the floor, but one cannot try to be sick for three days or to be short as a child.

The epistemic criterion described here is highly compatible with the picture of the event-state distinction which emerges in the viewpoint-based models of grammatical aspect discussed above: perfective aspect involves 'endpoint focus' because the assertion that an event exists entails confirmation that this event has begun or ceased, or both. Under the assumption that grammatical aspect and Aktionsart have uniform semantic representations, we expect that

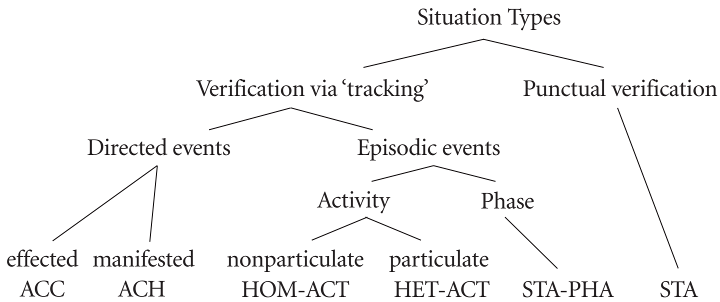

Figure 5. Hierarchical structure for the Aktionsart classes.

categories at the two levels will have such isomorphic characterizations. Figure 5 gives a hierarchical representation of the Aktionsart classes.

In Figure 5, situations are divided into those which take place over time (events) and those which hold at a given point in time, states (STA). Within the class of events, a division is made between those events which culminate in a specific resultant state (directed events) and those which do not (episodic events). The class of directed events is divided into accomplishments (ACC), effected changes of state, which involve a preparatory process, and achievements (ACH). Achievements are state changes which come about rather than being brought about (Dowty 1986; Van Valin & LaPolla 1997). Within the class of episodic events, we distinguish between activities and phases. The label *activity* is used to refer to the class of actions which occur over a period of time but do not culminate (Binnick 1991:142–143). This category includes both internally homogeneous activities (HOM-ACT) and activities which comprise iterated subevents (HET-ACT). The category of phase includes nondynamic situations which nonetheless have duration. This category has a single member, that of state phases (STA-PHA). Because state phases begin and end within the reference interval, they can be assigned an explicit duration, as in (23a). In contrast to states, state phases have perfective behavioral properties. For example, they can be enumerated, as shown in (24a), and they cannot be reported by means of the simple Present tense, as shown in (24b). Like states, however, state phases require no energy expenditure for their maintenance:

(24) a. Anna was ill for two weeks twice.
b. *Anna is ill for two hours.

Situation types are both conceptual gestalts and topological structures. Aspectual topology underlies space-time analogies that are widely used in aspectual theory, in which states count as masses and events as individuals based on criteria like enumerability and internal composition (Mourelatos 1978). Gestalt-based situation-type categorizations describe the relationship of the situation type in question to a causative prototype (Smith 1997; Croft 1998). They are fundamental to aspectually based theories of argument linking. It therefore makes sense that both causal and temporal representations matter in aspectual type shifts. In the next three subsections, I will describe these two representational systems and two mapping operations, permutation and concatenation, which mediate between input and output representations.

4.1.1 *Causal representation*

Rappaport Hovav & Levin (1998), henceforth RHL, capture the distinction between aspectual and frame-specific features of verb meaning by proposing a set of fixed event-structure templates with which verbs can combine. Verbs 'fill in' information represented by constants; the type of the constant determines the information that the verb must provide. Table 2 presents an adaptation of RHL's inventory of event-structure templates.

In these templates, operators (shown in small caps) represent subevent connectives in the Jackendoff-Dowty-Vendler tradition, while variables represent participant roles. Constants are represented by the material in angled brackets. I have augmented the RHL inventory of event templates in order to represent Aktionsart classes and event properties which, while having no direct relevance to verbal argument structure, figure prominently in aspectual type-shifts. The class of state phases has been added and the class of processes split into two classes: homogeneous and heterogeneous activities. The state-phase template, as shown, contains the operator HOLD. This operator combines with a stative situation type to yield a state which begins and ends within the reference interval. The homogeneous-activity template, as shown, also contains the operator HOLD. In this template, however, HOLD takes two arguments: a state radical

Table 2. Causal representation (based on Rappaport Hovav & Levin 1998)

Aktionsart Class	Causal Representation
State	[x <STATE>] e.g., *seem*
State phase	[HOLD [x <STATE>]] e.g., *be sick for two days*
Homogeneous activity	[x HOLD [x <STATE>]] e.g., *sleep*
Heterogeneous activity	[x REPEAT [x <EVENT>]] e.g., *skip*
Achievement	[BECOME [x <STATE>]] e.g., *sink*
Accomplishment	[[[x REPEAT [x <EVENT>]] CAUSE [BECOME [y <STATE>]]] e.g., *build*

and an effector. The effector argument is also an argument of the state radical; this notation reflects the fact that the subject-denotatum, although nonagentive, is responsible for the maintenance of the denoted state. The template for heterogeneous activities contains the operator REPEAT. This operator has the same valence and 'control' properties which HOLD has in the homogeneous-activity template. The use of the REPEAT operator captures the observation that heterogeneous activities, e.g., *skip*, consist of iterated type-identical events. Since a heterogeneous activity is itself an event, a heterogeneous activity may replace the event variable in the heterogeneous-activity template. The resulting event is an event chain, or, equivalently, a heterogeneous activity. As in RHL's original model, the achievement template properly includes the state template, while the accomplishment template contains the templates for activities, achievements and states, respectively.

RHL propose a single mechanism of semantic derivation, TEMPLATE AUGMENTATION: "Event structure templates may be freely augmented up to other possible templates in the basic inventory of event structure templates" (p. 111). The added structures are the subevents represented by operators, e.g., BECOME. Template augmentation involves the unification of Aktionsart representations. Through template augmentation, an event-structure template, e.g., the heterogeneous-activity template, projects that event-structure representation by which it is entailed – the accomplishment template. Template augmentation thereby drives verbal valence augmentation at the syntactic level. For example, the verb *sweep* has both a monovalent activity pattern (*She swept for hours*) and a trivalent accomplishment pattern, in which it denotes causation of motion (*She swept the dust off the steps*); the accomplishment template licenses both the direct object and locative oblique.

Template augmentation is a more constrained operation than unification, in two respects. First, augmentation allows only pairwise unifications. Second, augmentation is limited to the addition of a single subevent, as expressed by an operator and the arguments it projects. For example, although accomplishment and state templates overlap, creating an accomplishment template from a state template would entail the addition of two subevents: that headed by BECOME and that headed by CAUSE. One can, however, build an accomplishment representation from an activity representation: this entails the addition of a single subevent, represented by the operator CAUSE and its two situation-type arguments, an activity radical and an achievement radical. The first argument unifies with the representation of the input type. As we will see, both of these constraints can be violated by aspectual mappings.

Table 3. Temporal representation (based on Bickel 1997)

Aktionsart Class	Temporal Representation
State	φ
State phase	$\tau\varphi\tau$
Homogeneous activity	$\tau\varphi\tau$
Heterogeneous activity	$\tau\varphi[\tau\varphi]^{+}\tau$
Achievement	$\tau\varphi$
Accomplishment	$\kappa\tau\varphi$

4.1.2 *Temporal representation*

Temporal representation captures the patterns of stasis and change which characterize each situation type. They do not, for example, represent causal links between contiguous situations or agentive implications attaching to certain participants. Table 3 gives temporal representations for the six Aktionsart classes discussed above.

These representations utilize three situation-type components: STATES (φ), TRANSITIONS (τ), and EVENT CHAINS (κ). States are internally homogeneous situations which include no transitions (i.e., temporal boundaries). For this reason, we say that states INCLUDE the intervals at which they hold (Partee 1984; Herweg 1991). Transitions are state-change events, and as such are isomorphic to achievements. However, the category of transitions is not limited to those inchoative events which are lexicalized as achievement verbs, since it also includes the events of INCEPTION and CESSATION, which jointly define the endpoints of a situation. For example, the endpoints of sleeping, a homogeneous activity, are, respectively, the events of falling asleep and waking up. Unlike states, transitions cannot stand alone, nor can they be iterated without the mediation of a state. Accordingly, the representations *[τ] and *[$\tau\tau$] are ill formed (Bickel 1997: 126). By contrast, the representation [$\tau\varphi\tau$] is well formed; it corresponds to both a state phase and a homogeneous activity (recall that agentive properties are invisible to temporal representation). When the representation [$\tau\varphi\tau$] is iterated it corresponds to an event chain or heterogeneous activity (κ). The representation corresponding to heterogeneous activities contains the notation $[\tau\varphi]^{+}$, denoting one or more instances of particular state change, e.g., that of crossing from one side of the room to another in an event of pacing. While both heterogeneous activities and homogeneous activities can be protracted indefinitely, the mechanisms are different in each case. In the former case, expansion entails iteration, while in the latter case expansion simply entails lack of change. Notice, however, that in neither case does expansion have any effect upon bounding: the initial and final transitions are present whatever intervenes between them. When a heterogeneous activity is embedded in an accomplishment representation, shown in Table 2 as [κτφ], its offset transition is superimposed upon the initial transition of the embedded achievement, [τφ]. This reflects the observation that, for example, in an event of walking home, the threshold-crossing transition is also the final step of the walk.

The constraint which rules out sequences of the form *[τ] and *[ττ] need not be stipulated, since one cannot logically conceive of an inchoative event which is unaccompanied by a resultant state. Notice, however, that in the temporal representations given in Table 2 resultant states are not consistently indicated. In particular, states which follow events of termination are missing from the representations. These states are not indicated because they can be 'read in' on the assumption that transitions are isomorphic to achievements. Notice, however, that ANTECEDENT states are equally crucial to the definition of transition, and our temporal representations lack these as well. Let us assume, therefore, that antecedent states and consequent states – as well as periods of stasis which lie BETWEEN chained events – can be subsumed under the rubric of RESTS. The term *rest* is meant to be construed as it is in rhythmic representation: a pause between 'beats', or transitions. While in the foregoing remarks I have distinguished intermediate states from antecedent and consequent states, this distinction is not particularly meaningful: because events are located with respect to one another on a time line, all events potentially qualify as chained events and all states can be construed as intermediate states. This point will become particularly relevant when we consider chained events which represent habitual and generic situations.

4.1.3 *Aspectual mapping*

Rather than being suppletive relations, aspectual mappings are based on shared structure. That is, all aspectual mappings are subject to a principle which I will refer to as Aktionsart Preservation. This principle is described in (25):

(25) **Aktionsart Preservation.** In an aspectual mapping, whether implicit or explicit, input and output types must share some portion of their respective causal and/or temporal representations.

Aktionsart Preservation governs two kinds of operations upon Aktionsart structure: PERMUTATION and CONCATENATION. Permutation operations add or select a single component of the input Aktionsart representation. The definition of component differs according to whether we are using causal or temporal representation. In causal representation, a component corresponds to an operator, e.g., HOLD, and the arguments it projects. In temporal representation, a component corresponds to a state, transition or event chain. As an example of addition, consider the transition from state to achievement. This type shift occurs implicitly when, for example, a frame adverbial is combined with a state radical, as in (4a), repeated here as (26):

(26) She liked him in a minute.

This type shift involves the addition of the operator BECOME, or, equivalently, a transition, to the causal or temporal representation of the state.[8] As an example of selection consider the explicit type shift performed by the copular resultative construction in English:

(27) a. The truck is loaded.
b. The soup is cooled.

The resultant-state predications in (27a–b) denote states, or more specifically those states which are embedded in the Aktionsart representations of their participial complements. These states are, respectively, that of the truck being full and that of the soup being cool. The stative type shift performed by the resultative construction involves selection of the state component in the causal or temporal representation of the lexical verb. Since both the accomplishment verb *load* and the achievement verb *cool* entail a resultant state, the application of selection conforms to Aktionsart Preservation. Notice, however, that the type shift exemplified in (27a) is not incremental: states and accomplishments differ by more than a single component of Aktionsart representation, since the accomplishment entails two subevents (an activity and an achievement) which the state does not.

Occasionally, permutation operations appear to violate Aktionsart Preservation. These violations are in fact only apparent, since the relevant mappings are in fact mapping chains – ordered pairs of mappings, the first of which feeds the second. I will refer to these chained mappings as INDIRECT TYPE SHIFTS since they involve the mediation of a third aspectual category. Indirect type shifts exist because semantic transitions, as equivalence relations, are transitive; that is, if A=B and B=C then it follows that A=C. Indirect type shifting will be invoked below in the analysis of the Progressive.

Like other mappings in the general class of repetition operations, concatenation applies to event types (i.e., dynamic situation radicals), and outputs a series of events which are type identical both to one another and to the input event. In addition, like other iteration operations, concatenation is used to represent both implicit and explicit type shifting, e.g., coerced readings triggered by frequency adverbials, as in (28):

(28) She was depressed several times last year.

The difference between concatenation and its predecessor notions lies in the nature of the output type. While repetition operations are typically assumed to output state types, concatenation instead outputs an event chain, which, as discussed above, qualifies as a heterogeneous activity rather than a state. The identification of event chains with heterogeneous activities is an independently motivated one, since, as has been widely observed, telic verbs with multiplex complement denotata receive activity readings. Note, for example, the contrast between the sentence *She ate mushrooms*, which asserts an activity, and the sentence *She ate a mushroom*, which asserts an accomplishment. Further, as Smith observes (1997:51), the syntactic properties of habitual predications suggest that they are event predications: they can appear in imperatives, with agent-oriented adverbials like *deliberately*, and in pseudo-cleft constructions. The syntactic constructions in question do not in general appear capable of coercing perfective readings of stative predications: sentences like (29a–b) are awkward at best:

(29) a. ??What she did was prefer white wine.
b. ??Prefer white wine!

By rejecting the assumption that repeated events are *ipso facto* stative, we resolve a longstanding paradox in the literature on generic aspect: situations which consist of multiple type-identical subevents, e.g., pacing, qualify as events rather than states; it is not obvious therefore why event radicals which otherwise denote unique events receive coerced repeated-event interpretations in morphosyntactic contexts which call for state radicals. Two such contexts are illustrated in (30):

(30) a. She smokes.
b. She smoked when I met her.

Habitual sentences appear to be recognized as such only on the basis of a mismatch between eventive verbal Aktionsart and the syntactic context in which that verb appears. For example, Bybee, Perkins & Pagliuca (1994), in attempting to motivate a grammatical category of present habitual sentences, observe that "the difference between habitual and present stative resides entirely in the lexical meaning of the predicate: the present habitual reading of dynamic predicates covers many different instances of the same situation, while the present stative covers one continuous situation" (p. 152). It therefore appears appropriate to conclude that habitual meaning is a specific type of coercion effect, achieved by combining an event-chain radical with a state-sensitive construction. I therefore propose to treat habitual-event radicals and iterated-event radicals as indistinguishable at the level of Aktionsart structure: both qualify as heterogeneous activities. Accordingly, the concatenation operation takes us only part of the way toward a stative interpretation; it yields a heterogeneous activity. It is at this juncture that perfective and habitual meanings are compatible. The permutation operation of selection provides the ultimate bridge to stative meaning: since iterated events contain intermediate rests, and since such rests qualify as states, those type shifts which require stative input types (whether implicit or explicit) are free to select intermediate rests. In the next two sections, we will use the two Aktionsart-based operations of permutation and concatenation to analyze the type shifts performed by aspectual shift constructions and aspectual concord constructions.

4.2 Aspectual concord constructions: The Frame Adverbial construction

The Frame Adverbial construction is represented in Figure 6. This construction is an adjunct-licensing construction as described by Kay & Fillmore (1999: 11–12). Adjuncts and arguments are licensed in distinct ways in this model. While arguments are valence elements of the minimal lexical verb, adjuncts are contributed by particular constructions which unify with a lexical verb entry, augmenting the verbal valence. The result is a verb entry, rather than a branching structure. This flat representation appears justified in light of the fact that there is no strong evidence for the recursive branching V' structures that have traditionally been used in X-bar models to represent strings of adjuncts. In Figure 6, we see that the Frame Adverbial construction adds an adverbial expression to the valence set of the lexical verb. This valence set minimally contains one additional valence member, that element whose grammatical function is subject. The adverbial element (a preposition phrase headed by *in*) itself has a valence structure. The first member of the valence set is an event expression, whose semantic index is identical to that of the verb itself. The second valence member is an oblique expression denoting an interval. The semantic frame expressed by the adjunct is one in which event occurrences are counted. This construction is a concord construction. The construction denotes a telic event and the valence set of the adverbial element calls for an event of this same type. This construction is unlike Indefinite Determination, in that it is nonbranching: there are no boxes within it. Nonetheless, this construction projects a sisterhood relation and constrains this relation by means of an aspectual concord requirement, making it analogous to constructions like Indefinite Determination.

The adjunct which is added to the verbal valence is interpreted according to the logic of containment. Judgements of containment entail upward vis-à-vis intervals, and are therefore limited to those events which culminate within the relevant time frame. As a consequence, frame adverbials select exclusively for those event radicals which denote or entail a change of state. As a result, examples like (31) represent contexts of coercion:

(31) My radio program ran in less than four minutes.

De Swart observes (1998: 359) that examples like (31) allow both achievement and accomplishment readings. In (31), the frame adverbial *in less than four minutes* either denotes the running time of the program or the time during which the program began to air following some other event (say, a call to the radio station). These two readings involve distinct permutations of the input activity representation. Addition of an inchoative event to the causal structure of the input activity yields the accomplishment reading. The achievement reading, by contrast, results from selection: the event selected is the onset phase τ in the temporal representation of the input activity. The semantic representation of the construction is captured by the semantic frame labeled WITHIN. This frame has two arguments: a telic event and an interval. These arguments are coindexed with linguistic expressions listed in the valence set of the preposition *in*. As a concord construction, the Frame Adverbial construction licenses instances, as in (32):

(32) She fixed the problem in a few minutes.

In (32), the verb matches the type called for by the valence of the frame adverbial: the class of telic (or, equivalently) directed events.[9] Via the Override Principle, this construction also performs implicit type-shifting, as in (26): *She liked him in a minute.* In this example, a stative verb receives an inchoative construal: the event denoted is the onset of the liking state and therefore counts as an achievement. This construal involves the addition of the inchoative operator BECOME to the Aktionsart representation of the state; it reflects the reconciliation of a unification conflict between the verbal Aktionsart and the constructional semantics as per the Override Principle.

4.3 Aspectual Shift constructions: The Progressive

The Progressive, like the Frame Adverbial construction, specifies a concord relationship via cross-indexation in paired valence sets. Unlike the Frame Adverbial construction, however, the Progressive construction also contains in-

$$
\begin{array}{l}
\text{syn}\left[\begin{array}{l}\text{V}\\ \text{lex+}\end{array}\right]\\[2ex]
\text{sem index \#4}\\
\text{val}\left\{
\left[\begin{array}{l}\text{syn N}\\ \text{sem \#3}\\ \text{role gf subject}\end{array}\right];
\left[\begin{array}{ll}
\text{syn} & \left[\begin{array}{l}\text{P}\\ \text{lexical head } \textit{in}\end{array}\right]\\[2ex]
\text{sem} & \left[\begin{array}{l}\text{\#1}\\ \text{frame } \textsc{within}\\ \text{arg 1 sem \#4}\\ \text{arg 2 sem \#2}\end{array}\right]\\[2ex]
\text{val} & \left\{
\left[\begin{array}{ll}
\text{syn V} & \\
\text{sem} & \left[\begin{array}{l}\text{\#4}\\ \text{frame } \textsc{telic event}\end{array}\right]\\
\text{val} & \left\{\left[\begin{array}{l}\text{syn N}\\ \text{sem \#3}\end{array}\right]\right\}
\end{array}\right];
\left[\begin{array}{ll}
\text{syn N} & \\
\text{sem} & \left[\begin{array}{l}\text{\#2}\\ \text{frame } \textsc{interval}\end{array}\right]
\end{array}\right]
\right\}
\end{array}\right]
\right\}
\end{array}
$$

Figure 6. The Frame Adverbial construction (concord).

formation about constituent structure: it has a binary-branching structure, in which an auxiliary head (*be*) is paired with a VP sister whose morphology is that of a gerund. The aspectual mapping performed by the Progressive is directly reflected in its formal structure: the auxiliary head denotes a state and the participial complement denotes the situation radical from which that state is derived. However, a precise aspectual characterization of the type denoted by the complement has proven elusive. The Progressive appears to be less selective with regard to its input type than its type-shifting function would lead one to predict. I will argue that this apparent lack of selectivity in fact reflects restrictive input conditions coupled with broad coercive capacity.

The Progressive construction is shown in Figure 7. It is an instance of the Coinstantiation construction, as described by Kay & Fillmore (1999: 22–23). The Coinstantiation construction captures both raising and control phenomena by requiring unification of the intrinsic (nonrelational) semantic values of an argument of the head verb and that valence member of the VP complement whose grammatical function is subject. In Figure 7, the unification formula captures the 'raising' property of the auxiliary head *be*. The Progressive as depicted in Figure 7 is a shift construction: its VP complement denotes an event of the activity Aktionsart type[10] and the construction denotes a state which holds during the interval for which the activity goes on (this period is represented as an argument of the activity frame, where it carries the referential index #5). The explicit type-shift performed by the Progressive involves

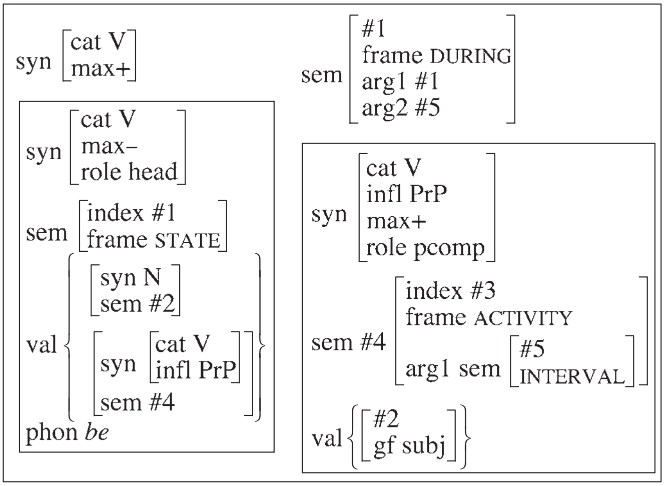

Figure 7. The Progressive construction (shift).

the selection operation: the state which the Progressive denotes represents an intermediate rest in the temporal representation of the input activity.

The Progressive construction can unify with any tense construction. A sentence which is licensed by the combination of the Progressive construction and a tense construction (e.g., the Past) has an interpretation which is identical to that of a simplex state predication of the same tense. As per Partee (1984), we assume that states include the reference time for which they are asserted. This inclusion relation accounts for the ability of a state to temporally overlap prior and subsequent events in a temporal discourse. Events, by contrast, are included within the reference times for which they are asserted, accounting for our intuition that events succeed one another in a temporal discourse.

The Progressive, as a stativizing device, triggers coercion when combined with a stative complement VP, as per the Override Principle (5). The concord feature which is relevant to the application of the Override Principle is the feature ACTIVITY, which, as required, is invoked by both daughters in the construction. This feature expresses the semantic type of the VP complement and, via the unification index #4, the semantic value of the second valence member of the auxiliary head *be*. The activity feature 'wins out' over the stative feature of the input lexical item. By analyzing the VP complement of the Progressive construction as denoting an activity, we capture the intuition that Progressive-form state predications like *I'm living on Pearl Street*, as well as those in (33–35) below, express 'temporary states':

(33) I'm liking your explanation.

(34) He is remaining stable.

(35) Right now she's believing there's going to be a reconciliation.

The 'temporary states' expressed by (33–35) are not in fact states but homogeneous activities. To see this, recall the basis upon which we analyzed certain apparently stative verbs, e.g., *sleep*, *hold one's breath*, as denoting activities: such verbs exhibit perfective behaviors. For example, Present predications containing these verbs cannot be used to report upon events ongoing at speech time. This is shown by (36–39), where the # indicates infelicity on a reportive reading, rather than, e.g., a habitual one:

(36) She's the one in the corner. #She wears a Fendi blazer.

(37) Try to be quiet! #The baby sleeps!

(38) #He holds his breath.

(39) #Your socks lie on the floor.

Activities, like accomplishments, are enabled to continue by the energy input of an animate entity. The subject denotata of such predications are participants in a causal chain, whether they are agents, effectors or objects which an agent has oriented or configured in a specific way (e.g., socks which are in a bundle are *located* on the floor but not *lying* on the floor). The complement VPs in Progressive sentences like *We were living in Boulder* denote internally homogeneous activities analogous to those which require the Progressive form in (36–39).[11] The effector argument assigned by the operator HOLD in the causal representation of the homogeneous-activity type represents the agentive properties which accrue to the subject denotata in (36–39). Crucially, a bounded state is not *ipso facto* a homogeneous activity; it is merely a state phase. By assuming that state phases and homogeneous activities are distinct situation types, we can explain why certain Progressive-form stative predications, exemplified in (40–42) are anomalous:

(40) *His hair is being green this semester.

(41) *The British Museum is containing the Parthenon Marbles right now.

(42) *She is having a cold today.

While all of the state radicals expressed by (40–42) can be described as temporary, no one of them is readily construed as a homogeneous activity. Such a construal would require that the subject denotata in these sentences be seen as effectors. If these sentences have interpretations at all, they require very unusual background assumptions, e.g., that the British Museum is preventing the Parthenon Marbles from leaving. Therefore, it is reasonable to conclude that participial complements in Progressive constructs do not denote states, temporary or otherwise, whether or not their head verbs are stative. Progressive predications denote states, whatever the Aktionsart of the complement denotatum. Thus, an apparent paradox – a stativizing construction accepts stative input verbs – dissolves when we recognize that the input state – by the very fact of its combination with the Progressive construction – come to denote that type which warrants the use of the Progressive construction. The reconciliation procedure which yields the dynamic interpretations of Progressive-form state predications like those in (33–35) involves the addition operator: the operator HOLD and the effector argument it projects are added to the causal representation of the input state, yielding an activity representation. This type matches the type of the participial complement in the Progressive construction.

By treating the complement of the Progressive as denoting an activity rather than a telic event, we solve a problem of semantic representation which otherwise requires recourse to stipulation. It is generally assumed that the semantics of the Progressive is intensional (see, e.g., Dowty 1977): while the Progressive combines with both telic predicates and process predicates, in the former case the culmination of the event denoted by the predicate is only a potential. For example, a Progressive sentence containing a verb of creation, e.g., *She was knitting a vest*, entails nothing about the knitting event having reached its logical endpoint or about the existence of the vest. As De Swart describes this situation, "The Progressive picks out a stage of [a] process/event which, if it does not continue in the real world, has a reasonable chance of continuing in some other possible world" (1998: 355). This view presents a paradox, since we cannot obviously provide a semantic representation for a stage of an event while preventing the variable which represents this event from being existentially bound. It is as though we had to represent the semantics of a Partitive NP, e.g., *an engine from an old Volvo*, while ensuring that the entity corresponding to the term *an old Volvo* is not part of the discourse model. This would make little sense; we cannot extract a portion from a type whose existence is not presupposed. A possible solution to this problem is to propose that the event exists in the discourse model but that it is "stripped" of its culmination point (De Swart 1998: 355). It is not clear what this proposal would gain us, since the very existence of a telic event entails its culmination. De Swart's particular approach to the intensionality problem is to ensure through embedding that the event variable upon which the Progressive operates is not added to the discourse model (pp. 354–355). This solution does not seem to generalize, however, because event variables representing activities (e.g., *She was talking with her friends*) are clearly existentially bound. How will the rule which constructs a discourse representation from a Progressive sentence know the difference between an event which should 'pop up' to the main box of the representation and that which must not? The solution adopted here – to assume that the 'input' event type is inherently processual (i.e., an activity) – avoids such problems.

Under the present proposal, a Progressive sentence like *She is drawing a circle* denotes a state which is a subpart not of the accomplishment type *She draw- a circle* but of the activity type which is entailed by the semantic representation of the accomplishment type. Since this activity can be identified with the preparatory activity that circle-drawing entails, circle-drawing can be distinguished from square-drawing etc. within the narrow window afforded by a Progressive assertion (see Parsons 1990; Mittwoch 1988 for compatible proposals). The only event variable which is added to the discourse model by a Progressive assertion is the activity denoted by the VP complement of the Progressive construction. Because of the subinterval property, any reasonably sized portion of this activity is sufficient to verify the occurrence of that event. The ontological nature of the situation type added to the model, and thus the nature of the commitment made by a speaker who employs a Progressive assertion, is expressed by the semantics of the Progressive construction: this construction denotes a state which holds during the time that a particular activity goes on. If I make an assertion that preparatory activity (e.g., circle drawing) was going on at some point, I say nothing about whether or not that preparatory activity led to its logical culmination (a completed circle).

But of course the representation of the Progressive construction given in Figure 6 predicts that we will induce a unification violation when we attempt to combine a telic verb or VP like *draw- a circle* with the construction, since the construction requires a complement denoting an activity. Only a complement with a processual denotatum, like *play- cards* or *dance-*, unifies unproblematically with the Progressive construction as represented in Figure 7. This poses a problem, since clearly telic VP complements ARE welcomed by the Progressive, as in, e.g., *They were baking a fruitcake*. The solution to this problem depends upon the Override Principle. I postulate that Progressive sentences containing telic VP complements are instances of coercion. In interpreting the sentence *They were baking a fruitcake*, the interpreter must derive an interpretation of the VP complement which is compatible with the activity feature that the construction imposes on its complement daughter. Since accomplishment predicates like *bake- a cake* entail processes, the compromise interpretation will be one in which the VP complement *baking a fruitcake* denotes the preparatory process which leads to the existence of a fruitcake. As we observed above, this preparatory process can be verified under the same circumstances that lead to verification of the state which the Progressive sentence denotes. The Aktionsart-based permutation involved here, in which an accomplishment radical receives an activity construal, involves selection: an activity is selected from the causal representation of the input accomplishment radical. This type shift has a precedent in coercions triggered by the presence of durational adjuncts, e.g., *for ten minutes*. For example, the accomplishment predicate *walk home* receives an activity construal in (43):

(43) She walked home for ten minutes and then decided to take the bus.

As in the case of the Progressive sentence *They were baking a fruitcake*, the activity denoted is entailed by the causal representation of the event radical.

What of the combination of the Progressive and an achievement radical, as in *She was winning the race*? This combination again yields a coerced processual interpretation of the VP complement. Our intuitions suggest that a Progressive-form achievement predication denotes a preparatory phase which is not entailed by the corresponding simple Past predication (*She won the race*). Dowty (1986) describes achievement verbs as "those kinesis predicates which are not only typically of shorter duration than accomplishments, [but also are not ordinarily understood] as entailing a sequence of subevents, given our usual everyday criteria for identifying the events named by the predicate" (p. 43). Our intuition that sentences like *She was winning the race* stretch out the temporal profile of an achievement to reveal its subevents makes sense only if we recognize such sentences as instances of coercion. Since the Progressive requires that its lexical complement denote an activity, the interpreter of a Progressive-form achievement predication is induced to 'find' an activity phase within an event which would otherwise represent a momentaneous transition. An achievement predication which entails the occurrence of a preparatory activity is for all intents and purposes an accomplishment; the sentences *She was winning the race* and *She was fixing the fence* are identical so far as the contribution of the Progressive is concerned. This equivalence is represented in our system by means of an indirect type shift: an activity predicate is added to the causal representation of the input achievement radical; this predicate then becomes available for selection, resulting in an activity representation.

The analysis of Progressive-form achievements offered here is a departure from standard accounts, since Progressive-form achievement predications are generally said to require iterated readings, as in *She was blinking* (Herweg 1991;

Langacker 1991; Bickel 1997). However, such iterated readings are generally required only insofar as the noniterated reading requires unusual background assumptions – for example that a single blink can be 'tracked' during the time that it occurs. Further, the interpretive potential represented by the iterated reading is not unique to Progressive sentences containing VP complements of the achievement class. Perfective verbs of all Aktionsart classes allow iterated readings in Progressive sentences. For example, the Progressive-form accomplishment sentence *She was fixing the fence* and the Progressive-form activity sentence *She was running* both have habitual readings, which are particularly robust in conjunction with frame adverbials like *that summer*.

On the assumption that habitual events have the same temporal and causal representations as event chains, habitual Progressive predications have a straightforward analysis. Since the Progressive construction selects for the activity type as its complement, and a habitual event radical, e.g., *They pick-up donations on Tuesdays*, constitutes an activity, predicate-argument structures denoting habitual events unify directly with the Progressive construction. Combination of the Progressive with a tense construction, e.g., the Present, will yield constructs like (44):

(44) They are picking up donations on Tuesdays.

Notice that adverbial expressions which denote event repetition, e.g., *on Tuesdays*, or large intervals, e.g., *last summer*, can impose iterated-event readings upon situation radicals which might otherwise qualify as simplex events. However, as argued above, the Progressive itself is not responsible for any such implications of iteration, since those implications are present whether or not the Progressive is used, as in (45):

(45) They picked up donations on Tuesdays.

The Progressive construction simply requires a participial complement denoting an activity, and iterated events qualify as such.

4.4 Tense constructions: The Present in French and English

As has been widely noticed, the French Present construction has a wider range of uses than its English counterpart. I will argue that the divergent uses are contexts of coercion. One such use is that in which the Present construction expresses partitive (i.e., 'Progressive-style') meaning in combination with an event radical, as in (46–47):

(46) Faîtes pas attention, Mademoiselle. Il vous **taquine**!
"Don't pay any attention to him, miss. He's teasing you."
(Binet, *Les Bidochon* 2, p. 7)

(47) Eh bien, à present, je me sens mieux. Le moral **revient**.
"Well, now I feel better. My morale is coming back."
(Binet, *Les Bidochon* 8, p. 42)

The coerced stative interpretation in (46) is derived by selection of an intermediate rest from the temporal representation of the input activity radical *Il vous taquiner* ('He tease- you'). The coerced stative interpretation in (47) is derived by an indirect type-shift: the input achievement representation is augmented up to an accomplishment representation via addition; the added activity representation then becomes available for selection. Thus, (47) has the same slow-motion conceptualization as its Progressive translation – the return is not immediate, but has an onset phase. The French Present construction is also used to denote a present-contiguous state phase when combined with either a state-phase or activity radical, as in (48–49), respectively:

(48) Comme moi, alors! Sauf que moi, c'**est** une affaire réglée depuis quinzes jours.
"Same here! Except in my case the thing [surgery] has been a done deal for fifteen days." (Binet, *Les Bidochon* 7, p. 25)

(49) Raymonde: Ça commence à s'éclarcir!
Robert: C'est une chance! Depuis une heure qu'on **attend**!
"Raymonde: It [the waiting room] is beginning to clear out. Robert: That's a stroke of luck – considering we've been waiting for an hour."
(Binet, *Les Bidochon* 7, p. 15)

The coerced stative readings in (48–49) involve the application of selection to the input temporal representation: the state denoted by the construction represents a posterior rest selected from the temporal representation of the input state phase or activity. The French Present construction is also used to coerce stative readings of iterated events via selection, yielding habitual and gnomic readings of event-chain radicals. These readings are exemplified for French in (50–51):

(50) Ils **disent** neuf heures à tout le monde. Comme ça, si t'as pas la chance de passer dans les premiers, tu **attends** des heures!
"They tell everyone to come at nine. That way, if you don't have the luck to get in first, you wait for hours." (Binet, *Les Bidochon* 7, p. 15)

(51) La pratique régulière du jogging **prolonge** la vie de deux à huit ans!
“Regular jogging prolongs life from two to eight years!”
(Binet, *Les Bidochon* 11, p. 36)

As shown by the Present-tense translations in (50–51), the English Present can also coerce stative readings of event chains. However, neither the partitive nor present-contiguous state-phase readings are currently expressed by the Present construction in English. Bybee, Perkins & Pagliuca (1994) attribute this fact to a split in the system of reporting devices in English, arguing that English now has two exponents of Present meaning: the simple Present and the Present Progressive, the latter of which “appears to have been generalizing and taking over some of the functions of the Present for several centuries” (p. 144). While I believe that this assessment of the facts is basically correct, I have a different view of the semantic implications of these facts. According to Bybee, Perkins & Pagliucca (1994: 152), the Present Progressive and Present tense participate in a privative opposition, in which the Present tense is the unmarked member: “the Simple Present carries no explicit meaning at all; it refers to the default situation from which other tenses represent deviations”. Because of its bleached semantics, the Present can “absorb the meaning inherent to normal social and physical phenomena, and this meaning if described and broken down explicitly, consists of habitual occurrence and behavior as well as ongoing states” (ibid). The analysis appears to raise more questions than it answers. First, why should states be more “normal” than ongoing events? Second, why should a meaningless construction require a disjunctive definition, involving both ongoing states and habituals? But even leaving these concerns aside, one could not describe the aspectual constraints which the Present exhibits, and the coercion effects which it performs, if one did not view it as meaning something. I propose that the Present tense is a concord construction in both French and English. In both languages, the Present construction both denotes and invokes a state type. Unlawful combinations are ‘amnestied’ as per the Override Principle. The Present construction is shown in Figure 8.

As shown in this figure, the Present construction signifies a deictic relation; the *sem* value of the Present suffix includes the frame EQUAL, which expresses an identity relation between reference time and the time of coding. Accordingly, this frame has two arguments, a REFERENCE TIME (indexed by the unification variable #5) and the (deictically indexed) time of speaking. The frame INCLUDE, which similarly has two arguments, expresses an inclusion relationship between the situation denoted by the verbal head (which carries the unification index #1) and reference time (an interval which carries the unifica-

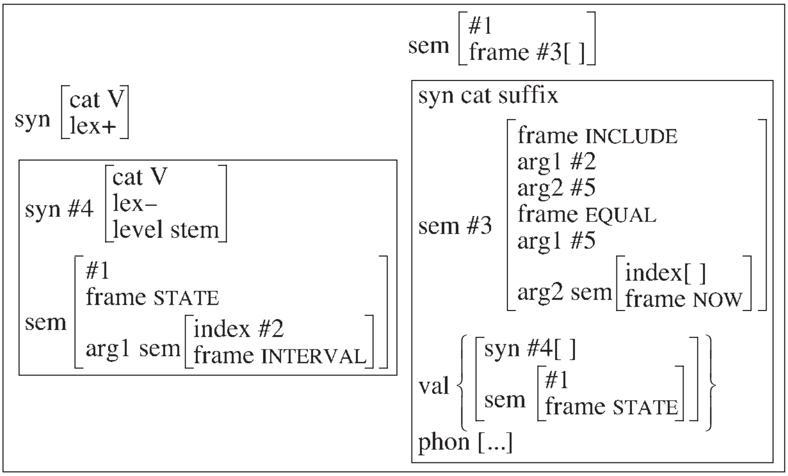

Figure 8. The Present construction.

tion index #5). The verbal head of the construction denotes a state, as indicated by its frame value. The STATE frame has one argument, an interval, since states are properties of times rather than individuals (Herweg 1991). As shown, the Present is a concord construction: the verbal head is a state and its complement (the tense suffix) contains a valence requirement calling for a state.

The analysis of the Present provided here differs from previous attempts to address the source of typological variation in the semantic range of the Present tense. Cooper (1986), for example, argues that the English present tense is "exotic" in requiring a higher degree of coincidence between speech and situation times than does Present inflection in other languages: "the semantic location of the present in other languages requires the discourse [time] to temporally overlap the event [time] rather than be identical with it" (p. 29). The current proposal locates the relevant typological variation elsewhere. Under this proposal, Present constructions are intrinsically state selectors. The selection behavior of the Present is a logical entailment, since speech time is a 'shallow' interval that does not provide the conditions necessary for verification of an event. The difference between the English Present and its analogs in other languages comes down to the coercive potential of each cognate construction: while all Present constructions denote stative types, the English Present limits the type shifts that input event radicals can undergo. These limitations are not predicted by the Override Principle and therefore appear to be construction-specific. Since constructions denote in the manner that words do, we expect that constructions, like words, should carry use conditions that do not follow directly from their referential properties (Michaelis 1998: Chapter 3).

5. Conclusion

Coercion effects have been invoked in support of modular grammatical architectures, because they involve meanings which are not linguistically expressed. These same phenomena have here been interpreted in a very different way, as evidence for syntactic patterns which, like words, denote types of entities and events. We assume that the set of types denoted and evoked by constructions is a universal inventory. On this assumption, it makes sense to ask why two constructions which denote the same type, e.g., the English and French Present constructions, should show distinct patterns of coercion. A satisfactory answer to this question will certainly involve the effects of quantity-based inference. Where shift constructions are available to perform a given aspectual mapping, as is the Progressive in English, the mapping is unlikely to be performed by a less specialized concord construction, e.g., the Present. It remains unclear, however, what conditions favor the diachronic development of shift constructions. While the use of an explicit type-shifting devices can be viewed as a hearer-based accommodation, arising from the drive toward maximal transparency, the use of an implicit type-shifting device can be seen as a speaker-based optimization strategy, involving economy of effort. These two countervailing factors – effort conservation and informativeness – conspire to ensure a relatively balanced division of semiotic labor, as described by Horn (1984): type-shifting functions are apportioned relatively equally among shift and concord constructions in each language's inventory.

Notes

1. The idea that constructional requirements may override lexical requirements in the case of NPs like *a beer* is not part of the conception of Construction Grammar put forth in Kay & Fillmore 1999. In that version of the model, conflict of this type would represent a unification failure, since the [bounded–] feature of the noun *beer* would conflict with the [bounded+] requirement that the Indefinite Determination construction imposes upon its nominal daughter. Therefore, the licensing of tokens like *a beer* requires the intercession of type-shifting constructions. A type-shifting construction has an external semantic value which is distinct from that of it sole daughter node. The Mass»Count construction, for example, unifies with a mass noun like *beer*. Its external semantics is that of a count

noun, which can thereby unify with Indefinite Determination. Type-shifting constructions are essentially lexical rules, and as such fail to capture an important generalization, since type-shifted nominals are freely generated but not indexed to the morphosyntactic contexts which trigger the relevant type shifts. Further, use of the 'box-within-a-box' constructions for type-shifting violates the spirit of a model which, in the interest of concreteness, eschews nonbranching domination in phrase structure. That is, in CG, no phrase consists simply of a noun. If a given lexical noun is of the appropriate semantic class, it will simply unify directly with any grammatical-function position in a construction. In accordance with Goldberg (1995), I therefore employ a version of the CG architecture which allows for unification with overrides, as per the Override Principle to be described in Section 2.

2. In a construct – a linguistic string licensed by a unified combination of constructions – any unspecified values (as for the maximality attribute of a mass noun) will be 'filled in', as Definite Determination imposes a [max–] value on its nominal daughter.

3. See Zwicky (1995) for a discussion of construction-based grammar as a model of non-local licensing relationships (e.g., "niece licensing", in Zwicky's terms) and exocentric determination of syntactic category membership.

4. The maximality-based model in CG targets the same combinatory constraint that X-bar syntax captures by requiring that sisters to lexical heads be phrases. However, while the term *maximality* suggests a model based upon phrasehood, being maximal is not equivalent to being a phrase. The maximal word *water* in *She drank water* is not 'both' a noun and a noun phrase. The syntactic context plays no role in determining whether the nominal *water* is more appropriately categorized as a phrase or as a bare noun. It is always merely a noun, whether it receives the value [max+], via unification with the VP construction, or the value [max–], via unification with the Definite Determination construction. See Kay & Fillmore (1999: 10) for discussion.

5. C. Fillmore (p.c.) argues that coercion can occur in the absence of a morphosyntactic trigger. He points out that a count noun paired with the definite article can receive a mass interpretation despite the fact that the Definite Determination construction does not appear to select for a mass-noun head. That is, sentence (a) is ambiguous between a reading in which the cat is a living animal and one in which the cat is a substance:

(a) I couldn't get the cat off the windshield.

Because the definite article can be combined both with nominals whose denotata are bounded (i.e., count nouns) and nominals whose denotata are unbounded (i.e., mass nouns and plural count nouns) the source of the mass interpretation in (a) is mysterious. A similar mystery is illustrated in (b). Here, the noun *pudding* may have either the expected mass interpretation or an apparently coerced count interpretation in which it is construed as a packaged portion (e.g., a can of pudding). This latter interpretation is apparently not attributable to coercion, or at least it is not evidently attributable to the type-selection constraints of the Definite construction:

(b) I threw the pudding on the table.

It appears that the Definite construction is neither a shift construction nor a concord construction: although it denotes a bounded type, it does not require its head daughter to have any particular value for the [bounded±] feature. One possible solution to the mysteries in (a–b), which I will not pursue further here, is to resolve the Definite construction into two distinct but related constructions – a shift construction which yields a bounded type from an unbounded type (masses and unbounded sets of entities) and a concord construction which selects for a bounded head daughter (i.e., a count noun). Under this solution, each of the two sentences (a) and (b) represents a distinct direction of coercion. Sentence (a) represents count-to-mass coercion, which is performed by the shift version of Definite Determination. Sentence (b) represents mass-to-count coercion, which is performed by the concord version of Definite Determination.

6. The label *SM-determination* refers to the construction which combines the unstressed determiner *some* with a nominal head denoting a mass type, as in (2b) above.

7. The category of state phase should not be confused with that of stage-level predications, as described by Partee (1991), *inter alia*. State-level predications denote temporary states like being on sale, on fire or angry. Stage-level predications, unlike state phases, have stative syntactic and interpretive behaviors, e.g., they are reportable by means of the simple Present in English (e.g., *Tomatoes are on sale*) and interpretable as including a past reference time, as in (a):

(a) When I got to the supermarket, all the tomatoes were on sale.

8. The mapping which shifts states to state phases, while unproblematic at the level of causal structure, presents a problem for temporal representation. At the level of causal structure this mapping involves the addition of the operator HOLD, a single component of causal representation. This mapping conforms to the constraint on minimal transitions. At the level of temporal representation, however, this mapping violates the constraint on minimal transitions, since it involves the addition of two components of temporal representation: the onset and offset transitions. Bickel (1997: 124–126) solves this problem by assuming that the temporal representations of states include an onset transition. Under this assumption, the shift to an episodic reading involves only the addition of a single (terminal) transition. Since, however, this solution neutralizes the grammatically relevant distinction between state and achievement representations, I do not adopt it here.

9. As observed by Dowty (1986: 43–44) and Van Valin & LaPolla (1997), among others, aspectual types are expressed by predicate-argument combinations, rather than lexical verbs. However, I will assume, following Dowty, that the aspectual type of the verb is derivable from the type of its projection, whether this projection be a verb phrase or sentence. Because all information conveyed by attribute-value matrices is available at every node in a construct (a licensed combination of constructions), the semantic type information contributed by the verb's arguments is in the valence set of the verb. Therefore, the information necessary to perform aspectual categorization will always be available at the level of the verb. Information sharing obviates the need for us to propose that aspectually sensitive adjuncts are adjoined to sentences or VPs. This move would have no obvious rationale in the syntax and would serve solely to ensure that the adjunct has a sister to which the relevant aspectual features can accrue.

10. While the complement of the Progressive auxiliary *be* belongs to the syntactic category VP, its semantic type is that of event. Via coinstantiation, the subject requirement of the head verb of the VP complement is satisfied, i.e., 'accounted for', since it unifies with the NP which serves as subject of the finite auxiliary. Notice that we need not assume, as is traditional in the transformational tradition, that the complement of the auxiliary is 'syntactically' a sentence.

11. As we have seen, the activity class includes not only homogeneous activities of the *sleep*-type but also events of the *run*-type, consisting of iterated subevents. This division within the activity class leads us to predict that Progressive-form stative predications may have readings otherwise associated with heterogeneous activity sentences. It would appear at first glance that progressivized state sentences which express the accretion of a property have such readings:

(a) I'm believing your story more and more.

(b) I'm seeing the picture with increasing clarity.

(c) I'm liking each song more than the last one.

The fact that the stative verbs in (a–c) are paired with comparative adverbials, e.g., *more and more*, suggests that they have heterogeneous-activity readings, since ordinarily only heterogeneous activities are compatible with such adverbials, as in (d):

(d) She ran faster and faster.

Adverbials denoting 'accretion' of a gradient property are incompatible with telic predications, as shown by the ill formedness of (e):

(e) *She broke the glass faster and faster.

Such adverbials are also incompatible with state radicals, as shown by the ill formedness of (f):

(f) *She is a French professor more and more.

However, the comparative adverbials in (a–c) need not be taken as symptomatic of a construal imposed by the Progressive construction. Instead, these adverbials can be viewed as themselves coercing activity readings. For example, a predication whose head is a state verb denotes a set of iterated episodes (i.e., an event chain) when combined with a comparative adverb:

(g) She liked that song more each time she heard it.

It could be argued that (g) constitutes a state sentence rather than an activity sentence, since it could as easily be presented in the simple present tense, as in (h):

(h) She likes that song more each time she hears it.

As I will argue below, however, the mere fact of co-occurrence with the Present tense is not evidence of stativity, since the Present tense can coerce stative readings of otherwise perfective predications. For this reason, I will reject Langacker's (1994) division between habitual sentences, as in (h), and repeated-event sentences, as in (g). Both (g) and (h) represent iterated-event sentences, i.e., activities. In the case of (h), however, the Present construction has imposed a state reading on what would otherwise be an activity radical.

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Chapter 4

Frames, profiles and constructions

Two collaborating CGs meet the Finnish Permissive Construction

Jaakko Leino

1. Introduction[1]

This study presents a notation for describing both syntactic and semantic structure simultaneously, and for making explicit the connections between the two. The framework is essentially a combination of two well-established linguistic frameworks: Cognitive Grammar and Construction Grammar. This study makes the claim that these two theories are virtually in complementary distribution as far as their descriptive potential is concerned; theoretical evidence justifying this claim is discussed towards the end of the chapter.

Due to the complementary relationship between the theories, combining them results in a framework which is able to handle much more information than either one of its two component theories. This can, in principle, be done in a number of ways. In the present case, descriptions based on the two theories are combined at the level of individual morphemes and sememes, as this is the level at which form and meaning meet. As a test of the descriptive potential of the notation, the study presents a brief diachronic analysis of the Finnish permissive construction.

1.1 About the problem: The Finnish permissive construction

The descriptive problem that I indend to address is the history of the Finnish permissive construction. In present-day Finnish, this construction consists of a main clause that has one of four verbs as the predicate – *antaa* 'give', *käskeä* 'order, command', *sallia* 'permit' or *suoda* 'grant, allow' – and an infinitival clause complement that may contain, aside from the infinitive, a subject, an object, and other arguments and adjuncts of the infinitive. A few examples are given in (1):

(1) a. Anna minun olla!
give-imp-2sg I-gen be-inf[2]
'Let me be!', i.e. 'Leave me alone!'

b. Äiti käski pojan siivota
mother-nom command-pst-3sg boy-gen tidy-inf
huoneensa.
room-poss3sg
'The mother told the boy to clean up his room.'

c. En sallinut hänen puhua juhlassa.
not-1sg allow-1pc he/she-gen talk-inf party-ine
'I did not allow him/her to talk at the party.'

This construction clearly resembles the object control patterns found in several languages, including English. However, this construction does not involve object control: the subject of the infinitive is invariably marked with the genitive case,[3] not with the accusative case. Thus, despite the superficial similarity, this construction is structurally quite different from object control structures: the subject of the infinitive is not an argument of the main-clause predicate, and we are, therefore, not faced with a case of raising/equi. Rather, the construction includes an infinitival clause with an overt subject of its own.

However, in old written Finnish, it is quite common for the 'subject' of the infinitive to be marked as the object of the main predicate:

(2) Alastomat andawat he maata pacaisesa peittämätä.
naked-pl-acc give-3pl they-nom lay-inf frost-ine cover-inf3-abe
(Job 24:7, Finnish translation of 1642)
'They cause the naked to lodge without clothing, that [they have] no covering in the cold.' (Job 24:7, King James Bible 1769)

But this appears to be possible only when the infinitive is intransitive; if it is transitive, the subject is marked with the genitive case, as in (1), or sometimes with the allative case:

(3) teille on annettu tuta Taiwan waldacunnan
you[pl]-all be-3sg give-2pc know-inf heaven-gen kingdom-gen
salaisudet (Matt. 13:11, Finnish 1642)
secret-pl-acc
'it is given to you to know the mysteries of the kingdom of heaven'
(Matt. 13:11, King James Bible 1769)

Furthermore, when the main predicate in this construction is *antaa* 'give', the sentence may have two different readings. The verb 'antaa' may be understood as 'let, allow' or 'command, have someone do something'. In modern Finnish, these two meanings are not differentiated in form at all. In old written Finnish, however, when the meaning is 'have someone do something', the subject of the infinitive is always left out.

(4)	Herodes	anda	Johannexen	caulan	leicata.
	Herod	give-3SG	John-GEN	neck-ACC	cut-INF
	'Herod has John beheaded.'			(Preface to Matt. 14, Finnish 1642)	

Thus, in old Finnish, there were three different constructions.[4] One of them was, at least superficially, similar to the modern-day permissive construction [S + V + Gen + Inf] (i.e. Subject + main Verb + subject of the infinitive in the Genitive case + Infinitive). A second construction had the form [S + $V_{intransitive}$ + O + Inf], and had object control. And the third construction had the form [S + *antaa* + Inf] and the meaning 'S has [someone, his/her inferiors] do Inf' – i.e. the person indicated by the subject has an implicit other person perform the action expressed by the infinitive. The third construction could only have *antaa* as the main predicate.

During the era of written Finnish – which began some four and a half centuries ago – these three different constructions merged together, forming the present-day permissive construction. This process involved several reanalyses of the parts of the constructions, and an overall restructuring that led to the present-day construction. The aim of this study is to shed light on this somewhat complicated process. I shall concentrate on the [S + V + Gen + Inf] construction, however; the other two constructions are dealt with in Leino (2001c, 2003).

1.2 About the framework: Why two theories?

In order to carry out my analysis, I need a syntactic framework that can capture the different reanalyses involved. Furthermore, the framework must be able to capture the different constructions as existing wholes, since the object of study is a specific type of expression, and the restructurings being studied specifically involve this expression type as a whole. Construction Grammar is certainly a very good tool for this task, as it is capable of describing both the 'as-a-whole' nature of the constructions and the structural features of their component parts.

Yet, Construction Grammar alone is not sufficient for my task since I also need a way to capture the semantic or conceptual factors that have made the changes possible. In other words, I also need a framework for analysing the conceptual structure of the constructions. This is necessary in order to be able to point out the motivation of change: what is the new conceptualization, new analysis, being applied to an already-existing structure. For this task, Cognitive Grammar is an ideal candidate. But Cognitive Grammar is not the ideal tool for the syntactic analysis.

Thus, the ideal framework for my task is one that puts together the type of syntactic analysis provided by Construction Grammar and the kind of semantic analysis represented by Cognitive Grammar. Alas, to my knowledge, such a theory does not exist. Therefore, I am inclined to take from each theory what suits me best and build a framework out of that.

This may sound like theoretical herecy at first, but in fact, outside of linguistics – or perhaps science more generally – it is quite usual to use different tools simultaneously and make the best use of each one. Similarly, the parts of a given theory can be used to complement another theory, if the corresponding part in that other theory is not satisfactory for one reason or another. The main point is that by taking the actual (surface) structure of linguistic data as the starting point of description, arguably any two descriptions of that data may be combined with each other to produce a description which is more informative than either one of its two component parts alone.

Obviously, combining any given parts of any given theories is neither very useful nor always possible.[5] But, intuitively, combining descriptions of any actual sentence produced by any given theories should be possible, since the elements of those descriptions conceivably should meet each other at the elements of that sentence that they correspond to. This will not lead to a very deep combination of theories, true; but it does give a starting point for deeper collaboration.

The present study uses a combinatory notation which brings together the notations of Cognitive Grammar[6] and Construction grammar. The notations have been somewhat modified for two reasons: first, to remove redundancy (mostly by leaving out details from one notation because it is present in the other as well), and secondly, to add some information that would not turn up in the mainstream versions (notably, aspects of constituent structure, morphological details, and the like).

This approach may be seen as an attempt to replace the 'traditional' semantic correlate of Construction Grammar, Frame Semantics (cf. Fillmore 1982; 1985; Petruck 1996) with Cognitive Grammar. This is not the aim of this study, however. I do not intend to replace FS but rather complement it: Frame Semantics works fine with Construction Grammar, but in its current state it cannot capture all the details of the history of the Finnish Permissive construction. What Cognitive Grammar adds to the picture are the building blocks of conceptualization such as things and relations, processes, and the like. These may be seen as basic building blocks of frames as well, and therefore using Cognitive Grammar does not mean leaving FS behind, rather bringing something new into it.

To avoid another misunderstanding that certainly offers itself, it must be stated at the outset that I am not suggesting autonomous and independent syntax and semantics. What I am suggesting is rather a way to incorporate linguistic form and the corresponding conceptualization in a single description in which the syntactic description does not work properly without the semantic description, or vice versa. In other words, those properties of constructions which affect their unification with other constructions include both 'syntactic' and 'semantic' properties, and the grammar will, therefore, have to take both into account.

The decisions as to what is placed in the 'syntactic' description and what is placed in the 'semantic' description should not be seen as drawing a strict line between syntax and semantics; the only line that is drawn is one between two perhaps arbitrary sides of a linguistic description (arbitrary in the sense that the line is based more on the line between the two theories involved than by properties of the object being described). What goes in which side of the dual notation that I will suggest below is thus not ultimately dictated by theoretical assumptions about what is syntax and what is semantics, although this does affect many of the choices.

2. Overview: Two CGs

It has been noted within both Cognitive Grammar and Construction Grammar that the two theories have a lot in common. For example, Langacker (1991: 8) states that "anything statable in construction grammar has a direct analog in cognitive grammar"; Langacker (2001) includes a more detailed discussion on the relationship between Construction Grammar and Cognitive Grammar from the point of view of the latter. Goldberg (1995) makes a number of references to Cognitive Grammar, and so do certain other scholars working in the Construction Grammar framework (e.g. Boas 2000, and several of the authors in this volume). The two theories also share some theoretical concepts that one does not find in any arbitrarily chosen theory of language, even though the 'same' concept often has a different name in each theory; Table 1 lists only some of the most prominent ones:

Table 1. Terminological correspondences between the two CGs.

Construction Grammar	**Cognitive Grammar**
grammatical construction	grammatical construction; (constructional) schema
license	sanction
instantiation	elaboration
construct	composite structure

However, there is a notable difference between the two theories: Cognitive Grammar focuses primarily on meaning, whereas Construction Grammar places major weight on describing form and formal structure.[7] Put differently, the notation of Cognitive Grammar works according to the conditions set by meaning, and it is often difficult to see the (morpho)syntactic information contained in the semantic description. In contrast, Construction Grammar apparently employs only as much semantic information as is necessary for the syntactic description to work properly, and, accordingly, the notation of Construction Grammar works according to the needs of syntax.

For the purposes of the present study, the most important common feature of the two CGs is the fact that they both are unification-based theories of grammar (cf. Shieber 1986). This has been made explicit about Construction Grammar by Kay (1997: 123–126), and about Cognitive Grammar by Langacker (1991: 532).

From the unification-based nature of these frameworks it follows that the basic units of linguistic structure posited in the two CGs are essentially of the same nature, despite their different names and differences in detail. In both theories they necessarily are pieces that are fitted together, not categories that are arranged and re-arranged according to a set of rules, for example. In Construction Grammar, the basic unit is a *construction:*

> By **grammatical construction** we mean any syntactic pattern which is assigned one or more conventional functions in a language, together with whatever is linguistically conventionalized about its contribution to the meaning or the use of structures containing it. (Fillmore 1988: 36)

Thus in Construction Grammar, building larger wholes out of their component parts – constructions – is done based on their compatibility, not by derivational rules; this is true for both syntactic and semantic wholes and their parts. Cognitive Grammar also uses the notion of grammatical construction:

> Grammar involves the syntagmatic combination of morphemes and larger expressions to form progressively more elaborate symbolic structures. These structures are called **grammatical constructions**. (Langacker 1987: 82)

These basic units are more often called *schemas* in Cognitive Grammar, however. The following quote illustrates the importance of this notion to the overall system of Cognitive Grammar:

> On the one hand, it [i.e. Cognitive Grammar] accepts the basic tenet of generative theory that a linguistic system comprises a large number of regularities reasonably called 'rules' (using that term quite broadly). At the same time, it conceives of these rules in such a way – as *schemas* – that a plausible connectionist interpretation is readily envisaged. (Langacker 1991: 532)

Thus, both the schemas of Cognitive Grammar and the constructions of Construction Grammar may be seen as analogs of the rules of traditional generative approaches. And the idea behind both of these is the same: combining linguistic units to form larger wholes is not a process of turning something into something else, as in most rule-based accounts of grammar, but rather a process of fitting different (but overlapping)[8] pieces together. This is, in essence, the basic idea of unification – as well as the basis of the combination of these frameworks that this study suggests.

In addition, both of the theories make the claim that the basic units – constructions, schemas, and linguistic units in general – are bipolar in the sense that both 'syntactic' and 'semantic'[9] information is incorporated in them. However, as already noted, the theories differ as to which pole of the linguistic units they focus on.

3. Complementary problems, complementary strong points

It is quite clear that the theories in question place major focus on different aspects of linguistic description. But in so doing they also leave aside other facets of language, as noted above. This is quite understandable, since language – and communication by means of language – has far too many facets to it to be totally and completely captured in any single and coherent account. But for the descriptive linguist who wants to explain a given linguistic phenomenon, such focusing on certain things and backgrounding others may cause problems.

The problem for Cognitive Grammar is the lack of an adequate notation for linguistic **structure;** and the problem for Construction Grammar is the lack of a truly expressive way of describing linguistic **meaning.**[10] Two brief examples will illustrate this claim, and show why these are real problems.

The Cognitive Grammar apparatus turns out to be very difficult to use when one wants to describe such a basic structural phenomenon as constituent structure. For example, a simple Finnish sentence like (5) may be described with Figure 1.

(5) Kalle antaa omenan Villelle.
Kalle-NOM give-3SG apple-ACC Ville-ALL
'Kalle gives a/the apple to Ville.'

The notation used in Figure 1 is based on the conventions of Cognitive Grammar. The double arrow expresses transitivity; it corresponds to an element in the sentence that profiles a transitive process (i.e. a finite transitive verb). The

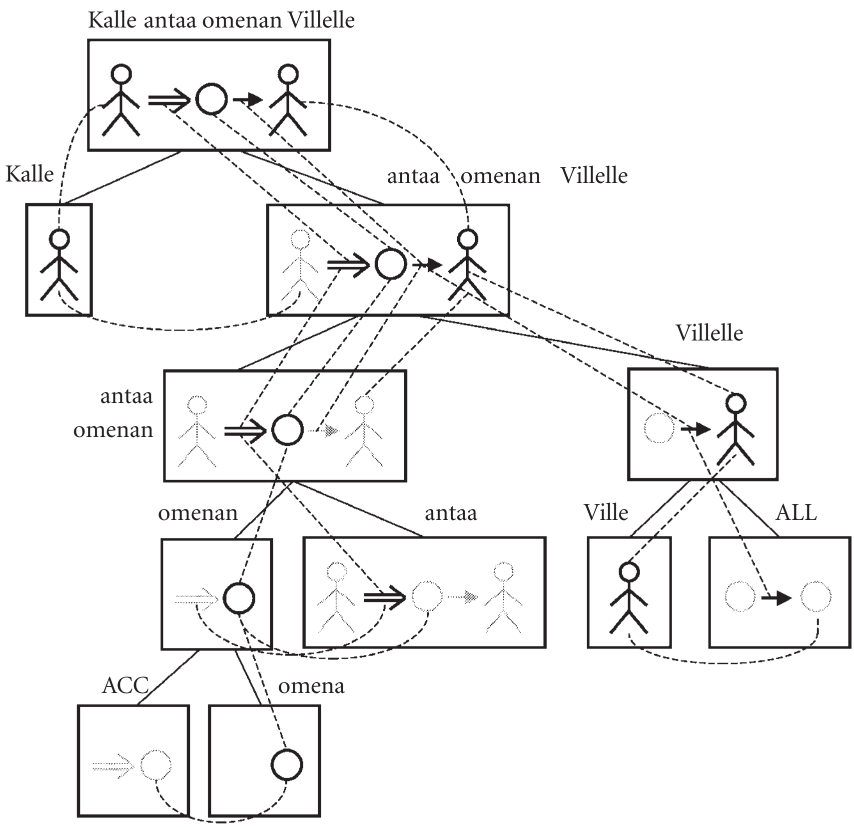

Figure 1. Cognitive Grammar: A problem with constituent structure.

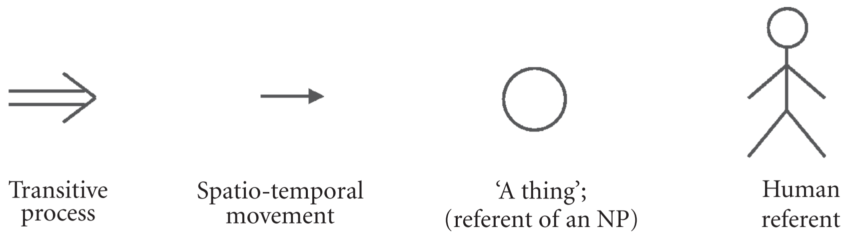

Figure 2. Parts of the notation used in Figure 1.

single arrow expresses movement in space or time; it corresponds to an element that profiles an atemporal relation. The circle is a 'thing' (the apple in this case); it corresponds to an NP. And the stick figures are human participants (Kalle and Ville in this case), and they correspond to NPs with human referents. These are shown in Figure 2.

In Cognitive grammar teminology, the arrows express different kinds of relations, and the circles and stick figures express different kinds of things. The lines connecting the boxes indicate constituency relations between them. The dashed lines between the elements inside different boxes indicate identity: the entity (i.e. thing or relation) referred to with the element at one end of a dashed line is the same as the one referred to with the element at the other end of the line.

The same information could be expressed in a number of ways in Cognitive Grammar. The notation used here is very comfortable to use in describing the giving event; e.g. Tuggy (1997) uses a very similar notation for illustrating the act of giving. But the choice of the notation variant is not crucial: the fact remains that the structure of the sentence is most probably difficult to spell out in any variant of Cognitive Grammar notation.

It must be pointed out here that Langacker has recently (1997) argued against the importance of constituency, claiming it to be epiphenomenal and of minor importance, if not even irrelevant, to syntactic description. Therefore, the present argument is apparently not a very strong one according to Cognitive Grammar standards. However, Langacker's argument does not wipe away the notational problem; constituent structure is only one kind of structural grouping, and the same problem will arise with any other grouping as well. Moreover, it appears to be both useful and even necessary to describe constituent structure; one reason for this will be discussed towards the end of this study.

Figure 1 is not only complicated, it also lacks a lot of information about the morphosyntactic features of the sentence it describes. For example, the object *omenan* could be in the partitive case (*omenaa*) instead of the accusative, which would give an unbounded interpretation to either the situation or the referent of the object. However, Figure 1 contains no information (aside from the informal label ACC) that indicates that the object is indeed in the accusative and not in the partitive case.

As for Construction Grammar, a major problem arises in the description of meaning and conceptual structure. And yet, the description must include an account of how the language user conceptualizes the event described by the sentence; such an account is essential to the explanation of the diachrony of the Finnish permissive construction below. It is quite clear that a description like the following does not say much about the meaning of the sentence described:[11]

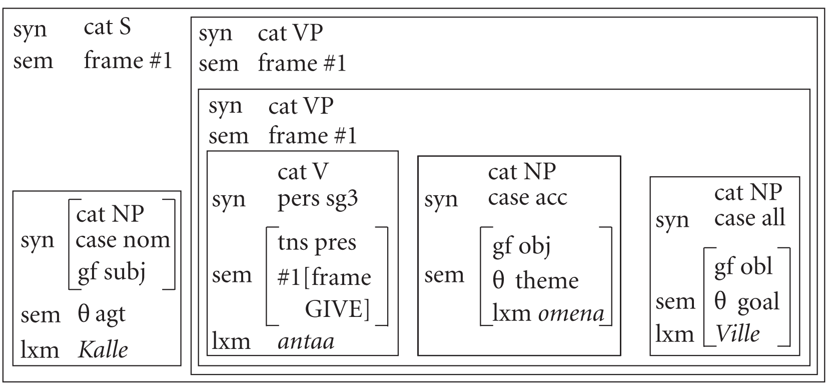

Figure 3. Construction Grammar: A problem with conceptual meaning.[12]

The description in Figure 3 does include some semantic information, namely the θ roles and a frame specification. What is missing is merely a description of the GIVE frame. Hence, the conceptual meaning remains obscure. Apparently, Construction Grammar used to be more intimately connected to Frame Semantics (cf. Fillmore 1975, 1982, 1985) than it is in the present-day version (e.g. Kay & Fillmore 1999) – however, the recent trend appears to be to bring these two closer to each other again, but at present their relation is still somewhat unclear.

What I will suggest below may be seen, in part, as an effort to bring Frame Semantic information back to the description of constructions, and also as an effort to spell out that information in a detailed, compositional fashion – though with the concepts and notation of Cognitive Grammar. In fact, there is great similarity between Cognitive Grammar and Frame Semantics (to the extent that they might even be claimed to be almost the same thing looked at from two different angles). For example, Goldberg (1995: 26) uses Cognitive Grammar to exemplify some of the basic tenets of Frame Semantics, without even discussing the justification of equating the two.

I would like to stress, however, that the problems brought forth here are mostly of a *practical* nature – that is, I do not take them primarily as theoretical problems, although they may turn out to be of a theoretical nature as well. The fact remains that the view of language, as well as several fundamental assumptions, behind the two theories are essentially the same. In other words, the two CGs are not very far apart. Moreover, the problems relate to areas that appear to be backgrounded in the theories. Therefore, it comes as no surprise that problems do arise in these areas when describing linguistic phenomena which specifically focus on both syntactic and semantic structure and composition.

4. A solution: Combining two CGs

My solution to these problems is very simple: I combine the two notations. More specifically, I use the Cognitive Grammar notation to describe meaning, and the Construction Grammar notation to describe structure. Behind the idea of doing this is the realization that linguistics is, as a field of research, rather scattered, but often quite neatly modular.[13] Put bluntly: take the modules you need and put them together, and you end up with a more complete description.

A preliminary version of such a combinatory notation is shown in Figure 4. The dashed lines between the two sides of the figure indicate correspondencies; the parts of the figure that these lines connect describe the same parts of the sentence. The sentence described is the same as in the previous figures, i.e. example (5). The dashed lines indicate identity again: the descriptions at each end of a dashed line are descriptions of the same entity and the same element in the sentence.

The two descriptions have a notable combining factor: the sentence that they describe. Therefore, combining them is rather straightforward, since they both represent the same thing. However, the notation must sometimes go all the way to morphology for the combining process to succeed – for, ultimately, it is at the level of morphemes that the smallest building blocks of form and meaning meet.

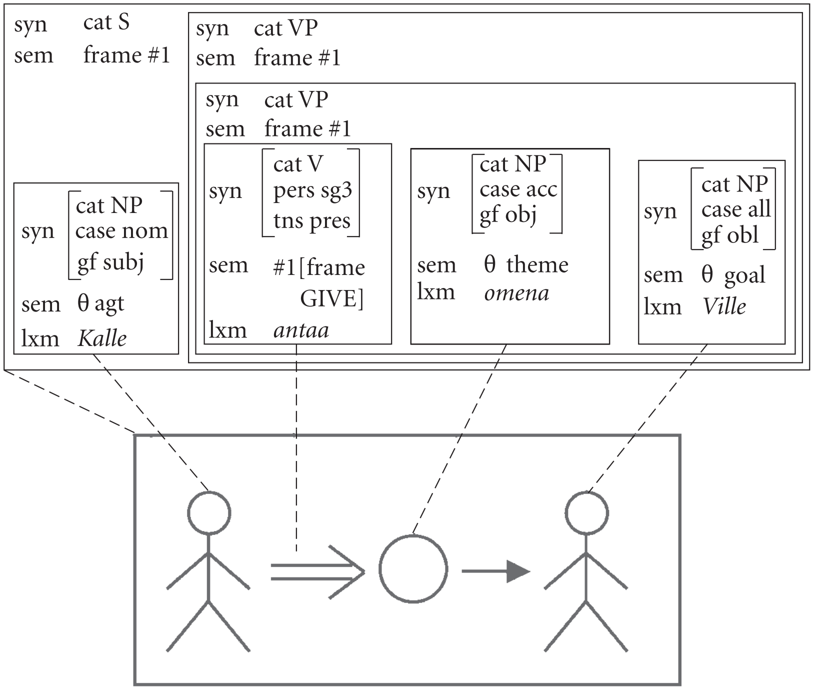

Figure 4. Combinatory notation: A first draft.

An important caveat is needed here: this is true of expressions that involve *compositional* syntax and semantics. However, this is not true of all expressions; any human language is loaded with idiomatic expressions that have meanings that do not follow from the meanings of the morphemes that the idiom contains (cf. Fillmore, Kay, & O'Connor 1988). Thus, it might be more adequate to say that it is at the level of *constructions* that form and function meet. The point remains, however: the description may have to go all the way to morpheme-sized constructions for the combination process to succeed.

And, indeed, morphology is involved in a notable problem with this description. There is clearly not a one-to-one correspondence between the parts of the two sides of the figure. Most notably, the right side arrow in the 'semantic' figure does not correspond to anything in the 'syntactic' notation. That is due to the way that morphology is described in most theories of syntax: such entities as morphological cases are treated merely as markers of syntactic relations between nominals and a governing predicate. However, the Finnish

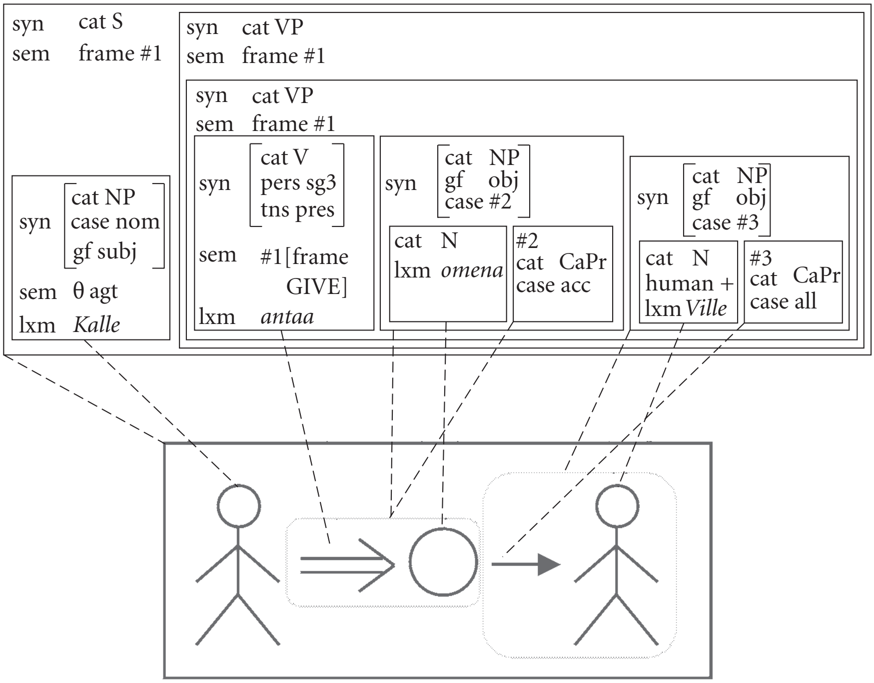

Figure 5. Combinatory notation with morphology added.[14]

allative case, for example, very clearly expresses a *semantic* relationship – the one expressed by the right-side arrow of the lower part of Figure 4.

Thus, this is a case where form and meaning meet not only at the level of words or of syntactic patterns but also at the level of morphemes: the allative case connects morphological material with distinct semantic content. Thus, we need a new version of the figure, one that spells out morphemes one by one.

Figure 5 contains a new category specification, *CaPr,* which stands for Case Predicate (the term goes back to Siro's 1964 term *kvasipredikaatti,* quasi-predicate; see also Leino & Onikki 1992). With this notion, I mean whatever the case in question predicates. As noted above, several Finnish cases express a semantic relationship: they predicate essentially what Langacker (1987) calls *atemporal relations* (i.e. most Finnish cases *profile* an atemporal relation). A case predicate is, thus, a symbolic unit whose 'phonological pole' consists of the formal properties of the case morpheme, and the 'semantic pole' is the atemporal relation. Since nominative is the unmarked case in Finnish, i.e. it has no overt morphology and it certainly cannot be said to profile an atemporal relation, it has no corresponding case predicate in Figure 5.

More generally, in order to satisfactorily describe syntactic phenomena that include morphological details, the framework should be prepared to give a unified account of morphology. Working with languages that have a rich morphology, such as Finnish, this is best accomplished by describing morphology within the syntactic description, using essentially the same notation that is used in describing syntactic phenomena (for a more detailed suggestion of how rich morphology may be accomplished in unification-based accounts, see Orgun 1996); in other words, syntax and morphology should be no more separated from each other than syntax and semantics, and the framework should be able to capture the numerous interconnections between syntax and morphology – i.e. the whole range of morphosyntax. And for this to succeed, syntax and morphology should be accounted for with the same kind of knowledge structures, i.e. constructions.

Figure 5 does not contain all that can be included in the combined notation, however. Different kinds of background knowledge can be added to it, for example. To continue with the same example with Kalle, Ville and the apple, there is, other things being equal, probably a reason why Kalle gives the apple to Ville. As John Newman puts it, "often there is [in the complex matrix of GIVE predicates] a later act involving the RECIPIENT and the THING. That is to say, we normally give things to a RECIPIENT so that the RECIPIENT can make some use of the object." (Newman 1996: 53)

In other words, it is very common for GIVE predicates to occur with expressions that state what the GIVER anticipates the RECIPIENT to do with the GIFT after the giving act. Newman's example is *I gave Kim the book to read.* And Newman takes this to be an aspect of the complex matrix of GIVE predicates – a statement that is essentially equal to saying that it is a part of the (broad) lexical meaning of such verbs, including Finnish *antaa.*

If we want to include such an implication in the description, we may say, using Cognitive Grammar terminology, that the *base* of the Finnish verb *antaa* includes a PURPOSE and a process the subject of which corresponds to the RECIPIENT of the giving act, and the object to the GIFT of the giving act. If we were to use the concepts of Frame Semantics, we would say that this information is included in the giving frame.

We may then add this information to the description by drawing background information in grey as in Figure 6.

The arrow between the 'giving box' and the 'PURPOSE box' is different from the transitive arrow. It is a 'purposive arrow', expressing an 'in order to' type

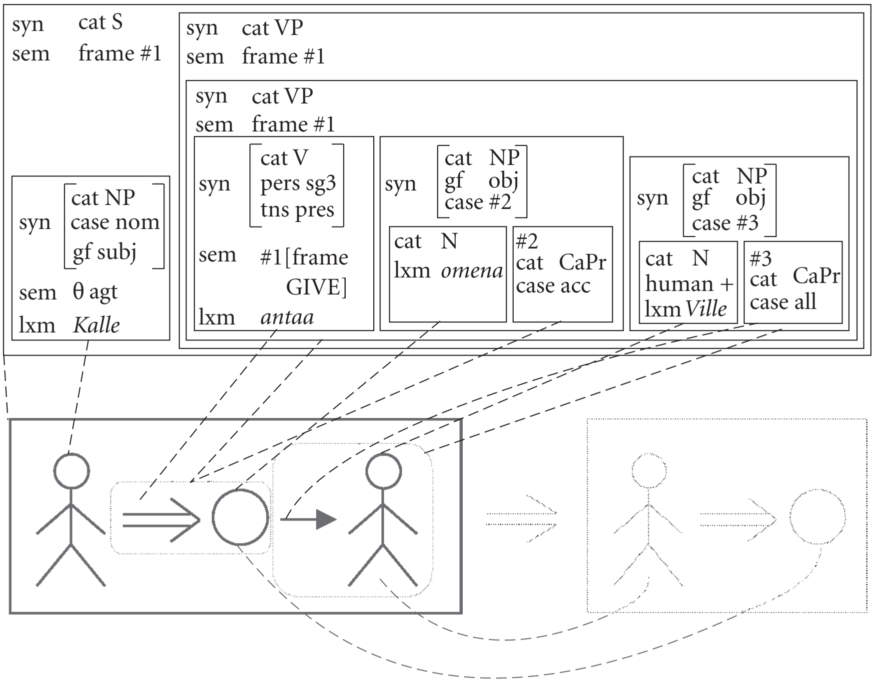

Figure 6. Background ('base') information included.

of relationship between the two events: the giving act takes place so that the subsequent event will (or may) take place.

Those elements of the base of the verb *antaa* (or the GIVE frame) that correspond to the grey part of Figure 6 can be spelled out – *instantiated* in Construction Grammar terminology, or *elaborated* in Cognitive Grammar terminology – with an appropriate adverbial. We may add, for example, *välipalaksi* to the sentence, and thus get (6):

(6)	Kalle	antaa	omenan	Villelle	välipalaksi.
	Kalle-NOM	give-3SG	apple-ACC	Ville-ALL	snack-TRA

'Kalle gives an/the apple to Ville as a snack.'
(i.e. so that the apple would serve as Ville's snack)

The word *välipalaksi* 'as a snack' states a purpose for which Kalle gives the apple. It remains unspecified whether it is Kalle's or Ville's (or the speaker's, for that matter) idea that that is the purpose of the giving act, but it is clear that there is an anticipated 'snacking event' after the giving act.

Purpose is often expressed with a terminal case NP in Finnish, typically a translative NP. There are, of course, other ways of expressing purpose as well. It may, for instance, be expressed as a subordinate clause. This possibility fits well together with the description of purpose in Figure 6: that description is essentially a description of the semantics of a transitive clause whose object is the object of the give sentence.

Different ways to express purpose correspond, to some degree, to different kinds of purposes, of course. In example (6), the word *välipalaksi* brings in the background knowledge that we have about snacking, i.e. the 'snacking frame'.[15] If purpose is expressed with a finite clause, as in example 7, there will of course be more explicit information about the subsequent act involving the apple, and it is normally the predicate verb that establishes the overall frame of that act:

(7) Kalle antaa omenan Villelle, jotta tämä ei
Kalle-nom give-3sg apple-acc Ville-all that this not-3sg
nääntyisi.
starve-cond-3sg
'Kalle gives an/the apple to Ville so that he would not starve.'

It may also become clear whose intentions are at stake, i.e. whether the subsequent act is something that the giver wants the recipient to do, or whether it is the recipient who wants that act to be performed. For example, Kalle may give Ville an apple so that Ville would not starve, as in example 7, or he may do so, so that Ville would give Kalle something that he wants in exchange.

An important detail to note here is that although the description of purpose in Figure 6 includes a double arrow which, by its definition, should correspond to a finite transitive verb, there does not need to be a corresponding verb in the actual sentence. First of all, the elements that are drawn in grey are parts of the base, not the profile, of the verb *antaa* 'give' or the giving frame.[16] Thus, they do not need to be profiled, i.e. made explicit in the sentence. And, secondly, there is no structural information attached to them. The grey parts should be seen as approximations of meaning, with little structural implications. In some cases it will be useful to include structural descriptions in the grey parts as well, as there is no reason why this could not be done. But in the case of the purpose of the giving event, this is not the optimal way to handle the form. Rather, there must be a number of different constructions which may be used to express purpose, and these constructions must both specify the form involved and be compatible with the meaning included in the giving frame.

I pointed out above (Footnote 11) that I have left the *val(ency)* attribute out of the Construction Grammar side of the notation. This is because I see valency as more than just a list of arguments required by a head element. I am influenced by the Cognitive Grammar conception of the notion of valency, which describes valency as primarily a semantic feature, to the extent that the 'grey parts' of the notation used in this study will, taken into sufficient detail, contain all the necessary semantic information which would go into the *val* attribute.

Valency is not claimed to be purely semantic, neither by the proponents of Cognitive Grammar nor those of Construction Grammar. The semantics of a given unit predicts its *valence potential,* but it is not predictable which parts of this potential are actually made use of. This depends to some degree on linguistic conventions, of course (cf. Langacker 1988): there are, naturally, conventions concerning the form in which a given meaning is expressed in a given context. Therefore, leaving out the *val* attribute needs further justification.

The obvious way to describe valency in the present framework is precisely to include structural specifications in the grey parts of the description: if a given part of the base (or frame) is profiled (or elaborated, or instantiated),[17] it will have that structure – or, conversely, if an element turns up in the present context with this structural manifestation, it will have this meaning. The base information, 'grey semantics', would then correspond to valence potential, and the structural specifications associated with that base information would correspond to valency proper.

This is, as it happens, the essence of *linking constructions* in the Construction Grammar tradition. However, the whole point of linking constructions is to "connect grammatical functions to semantic roles in the valence elements of predicators" (Fillmore & Kay 1995: 8–1). This does not satisfy the needs of the present study, as noted above: to explain the development of the Finnish permissive construction, one must be able to separate certain semantic relations from the semantic roles in which they are incorporated in the Construction Grammar approach.

Moreover, the present approach, outlined above, is able to handle much more than merely connect grammatical functions to semantic roles in valence elements. In this approach, things do not have to be fully specified in the *val* attribute, but certain phenomena – like the PURPOSE in the giving case – may be explained in far less detail, to allow for a wider variety of forms than a valence description would allow.

For the present purposes, this is a much more suitable way to describe valency than the *val* attribute of Construction Grammar. The *val* attribute leaves out quite a deal of frame semantic information brought in by the arguments, despite the fact that that information is essential to the process of building up sentences, as well as understanding them. Moreover, the *val* attribute will not allow us to point out the different conceptual *construals* of the situation that the different variants of the permissive construction in different times have been associated with. An odd shift from valency *a* to valency *b* is not very interesting; the shift from plain *giving* + PURPOSE to *granting permission* makes a lot more sense.

If valency is described this way, it will be necessary to distinguish in some detail between 'obligatory' and 'optional' elements, arguments and adjuncts. However, as this is not crucial to the present purposes (i.e. explaining the development of the permissive construction), I shall not attempt to make that distinction here. However, it may be pointed out that the approach to valency outlined here does not *require* a strict division between obligatory and optional, the way that traditional approaches to valency – as well as the Construction Grammar approach – do. This is a useful feature, since this division *is* not very strict, and since it makes it easier to account for gradual shifts from occasionally co-occurring element to frequent collocation to obligatory argument, or vice versa.

5. A test case: A brief history of the Finnish permissive construction

So far, I have sketched out – quite roughly – an outline of a framework that combines some of the central ideas of Cognitive Grammar and Construction Grammar. In what follows, I shall present a brief diachronic analysis of the Finnish permissive construction, as a test of the descriptive potential – and explanative power – of this framework.

The present-day permissive construction typically has the verb *antaa* as the main predicate, although there is no actual giving involved. The permissive construction is exemplified by the following sentence:

(8)	Kalle	antaa	Villen	syödä	omenan.
	Kalle	give-3SG	Ville-GEN	eat-INF	apple-ACC

'Kalle lets Ville eat the/an apple.'

Example (8) has no allative (i.e. 'to X') argument. Yet, it is obviously similar to the giving sentences in examples (5) and (6). Despite this similarity, when the verb *antaa* is used in the permissive construction, it does not mean 'give'; rather, it means 'let' or 'permit'. Furthermore, in (8), the object of the verb *antaa* is no longer the apple, *omena*, but the infinitive construction *Villen syödä omenan.*

The infinitive that is used in the permissive construction is historically a lative form. That is, it is marked for a terminal case (i.e. a local case which expresses the end point of some path), albeit one which is no longer productive in present-day Finnish.[18] The lative case disappeared from the Finnish language several hundred years ago, at the very latest. But before that happened, the lative infinitive could very well be used as the kind of adverbial that would 'fill in the grey part' in Figure 6 – in other words, as a final adverbial, expressing the PURPOSE for which Kalle gives the apple to Ville. Conceivably, then, the permissive construction is linked to the giving construction historically. In fact, it used to be a very common subtype of the giving construction.[19] A description of sentence (8) in the present framework will look very much like Figure 6 – indeed, the only notational difference is that the grey part is now (partially) spelled out. A difference in the content is that the word *Ville* is now marked for the genitive case, instead of the allative.

The strong connection between the permissive construction and the 'give' sense of the verb *antaa* is further exemplified by the fact that the object of the

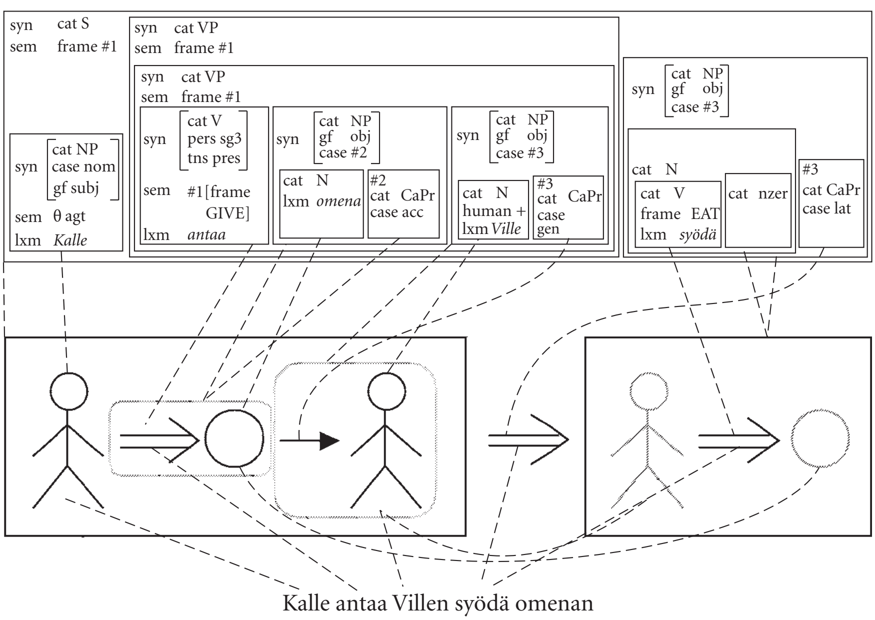

Figure 7. The Old Finnish counterpart of the permissive construction.[20]

infinitive construction, *omenan,* behaves morphosyntactically as if it were the object of the verb *antaa.* In a negative version of (8), the object is marked with the partitive case, as objects of negative predicates always are in Finnish. In this context, the accusative case would be ungrammatical:

(9) Kalle ei anna Villen syödä omenaa (*omenan).
Kalle not-3SG give Ville-GEN eat-INF apple-PAR (*apple-ACC)
'Kalle does not let Ville eat the/an apple.'

However, it is clearly the matrix predicate *antaa,* not the infinitive *syödä,* which is negative: the meaning of the sentence is 'Kalle does not let Ville eat the apple', and under no circumstances can it be interpreted as 'Kalle lets Ville not eat the apple'. Thus, the object of the infinitive still carries, in its case marking pattern, a relic from a time when it still was the object of the matrix predicate. Yet, the object is clearly not the object of the matrix predicate. One reason for this is obvious semantic implausibility; some more formally-oriented (and more complicated) reasons are discussed in Leino (2003).

In the era of early written Finnish and before, the genitive case could be used to mark the 'dative adverbial'[21] in ordinary GIVE sentences. In modern Finnish, the adverbial must be marked with the allative case (cf. Hakulinen 1961: 68–69 for the historical situation). Hence, at that time, the following sentences would all have been quite normal:[22]

(10) Kalle antaa Villen omenan.
Kalle give-3SG Ville-GEN apple-ACC
'Kalle gives Ville an apple.'

(11) Kalle antaa Villen syödä omenan.
Kalle give-3SG Ville-GEN eat-INF apple-ACC
'Kalle gives Ville the/an apple to eat.'

(12) Kalle antaa Villen omenan syödä.
Kalle give-3SG Ville-GEN apple-ACC eat-INF
'Kalle gives Ville the/an apple to eat.'

The difference between (11) and (12) is not crucial for present purposes – suffice it to say that Finnish word order is relatively free, and expresses different information structures rather than grammatical relations. What is crucial is that both word order variants were possible, although the unmarked one was that in (12). This variation is important, since it made possible the reanalysis that subsequently took place in this construction. (12) is clearly more natural for the ordinary giving interpretation, whereas (11), in which the *Villen syödä omenan* part can be analyzed as having an ordinary SVO word order, is more natural for the modern-day interpretation. "More natural" is to be understood in terms of information structure, which is the key factor in Finnish word order; the above is based on the apparently very well-justified assumption that the mechanisms behind Finnish word order have remained essentially the same for centuries.

Later on, the lative case disappeared from the Finnish language. There are still some relics left of it so we can tell it was there (cf. Hakulinen 1961: 76–78), but it disappeared well before the era of written Finnish, which began in the early 16th century. However, the infinitive remained to be understood as a purposive, 'in order to' type of adverbial long after that. There is a large body of evidence for this in old written Finnish (cf. Saukkonen 1965; Leino 2001c); to give an example, consider sentence (13), taken from Setälä (1921: 99):

(13) Minulla ei ole mitään sinulle antaa.
I-ADE not-3SG be anything-PAR you-ALL give-INF
'I have nothing to give you.'

This sentence would strike the modern-day Finnish speaker as odd and old-fashioned, if not ungrammatical. This kind of use of the infinitive has become at best very marginal, and it is at the edge of becoming entirely extinct. In old written Finnish, up to the 19th century, such usage was quite common, however. Even when used with the verb *antaa,* the infinitve could very often be interpreted either as an 'in order to' adverbial or as the predicate of a separate clause which functioned as the object of the verb *antaa.*

Some centuries after the lative case had become unproductive, the genitive case lost its dative function to the allative case. This battle is still going on in early written Finnish, so we can be quite confident about this detail.

If syntactic change were as systematic, the *antaa* + infinitive construction should not have survived. After all, it contained a case morpheme that had disappeared from the language (the lative) and a case morpheme that was used in a way that had become extinct (the 'dative' genitive).

By the time these changes took place, however, the sentence type *Subject*+ antaa + *Object* + *genitive* + *Infinitive* was conventionalized in the Finnish language. It had even aquired a meaning that was not the sum of its component parts, a meaning of enabling or permission. This is probably because the 'grey process' in Figure 6 cannot be performed without the giving act; that is, Ville cannot eat the apple unless Kalle gives it to him. Hence, the act of giving enables the process denoted by the infinitive.[23]

According to this analysis, examples (11–12) are instances of what Talmy (1976) calls enabling causation. He describes this type of causation as "the circumstance that where there has been a blockage, this now disappears, and that what has been restrained is now released from that restraint as a consequence of the unblocking." In order to interpret the situation at hand as being an instance of enabling causation, all we need to do is to make the claim that Ville's lack of the apple restrains him from eating the apple, which seems like a reasonable assumption.[24]

Bye virtue of being conventionalized, the sentence type in question was ambiguous prior to the two case changes. It had the 'sum of component parts' type of reading, according to which the genitive argument was a dative adverbial and the infinitive was an adverbial of the 'in order to' type. But it also had a constructional 'as a whole' type of reading, one that had developed over centuries of use. In this latter reading, the original syntactic relations gradually became opaque, and they were no longer crucial to the interpretation of expressions that instantiated this construction, since the construction was understood as a whole, not by analyzing it into its component parts. It no longer required external motivation from other uses of its component parts; notably, it was not dependent upon the functions of the lative and genitive cases outside this construction.

So, when the lative case and dative genitive disappeared, the permissive construction remained. It was slightly modified, however. Its unmarked, or 'basic' word order changed to reflect the new situation. The former dative adverbial had now become the subject of the infinitive, and the object that used to be the object of *antaa* had now become the object of the infinitive. The infinitive, or rather the infinitive construction with its subject and object, had become the object of *antaa*. Thus, the sentence took the form *Kalle antaa Villen syödä omenan,* with the meaning 'Kalle lets Ville eat the/an apple'.

When the construction still had a strict connection with the GIVE construction, the unmarked word order was Subject – Verb – Dative adverbial – Object – Infinitive (Kotilainen 2001; Leino 2001c), which was normal to an ordinary 'giving' sentence with a purpose clause. In terms of the infinitive clause, however, this would have meant a clearly marked SOV word order. After the reanalysis took place, the infinitive, the object and the former dative adverbial formed an infinitive structure that had an ordinary SVO word order, as pointed out above.

To summarize, at one point, the permissive construction was structurally ambiguous: there were two different ways to analyze its syntax, and two alternative conceptualizations could be paired with it.

There were several instances of restructuring involved. They have already been mentioned above, but it may be convenient to summarize them here:

- the genitive case loses its dative function
- consequently, the NP bearing the genitive case becomes associated with the infinitive instead of the main predicate (because it is no longer structurally analyzable, and semantically it is much more prominently connected to the infinitive than to the matrix predicate)
- the object of the main predicate becomes the object of the infinitive
- at this point, the infinitive, the genitive argument and the object form a clausal complement with an overt subject
- the infinitive structure is interpreted as the object of the main predicate (according to the Finnish grammar tradition; it might simply be called a complement clause as well)

Thus, what used to be [Kalle [[antaa [omenan]] Villen] syödä] 'Kalle gives the/an apple for Ville to eat' has become [Kalle [antaa [Villen [syödä [omenan]]]]] 'Kalle lets Ville eat the/an apple'. The ambiguity between these two analyses is illustrated in Figure 8.

Figure 8 looks somewhat complicated at first glance. However, the upper half of it is already familiar, as it is identical to Figure 7 above. This part corresponds to the historical 'give + purpose clause' interpretation of the construction, involving actual giving and a lative case infinitive. The lower part of the figure corresponds to the modern-day interpretation of the construction, in which the infinitive construction as a whole is interpreted as the object of the matrix predicate.

The above may also be rephrased as follows. The historical counterpart of the permissive construction was 'regular' in the sense that it was transparent and analysable, and it consisted of parts that were commonly used elsewhere in the language as well. Gradually, it became more opaque, and eventually it turned into an 'idiom chunk', what Fillmore, Kay and O'Connor (1988) call a *formal idiom.* If we grant idiom status to the permissive construction, the syntactic relations within the construction do not necessarily need to be worked out; we may simply say that the Finnish grammar contains this construction, it contains these parts, it behaves like this, and its meaning is this.

However, as we have seen above, we can do better than that. It is indeed possible to analyse the syntactic relations within the construction, and point out the conceptualization which underlies these relations. This is something that we would not be able to capture by merely saying that the permissive construction is a chunk-like formal idiom.

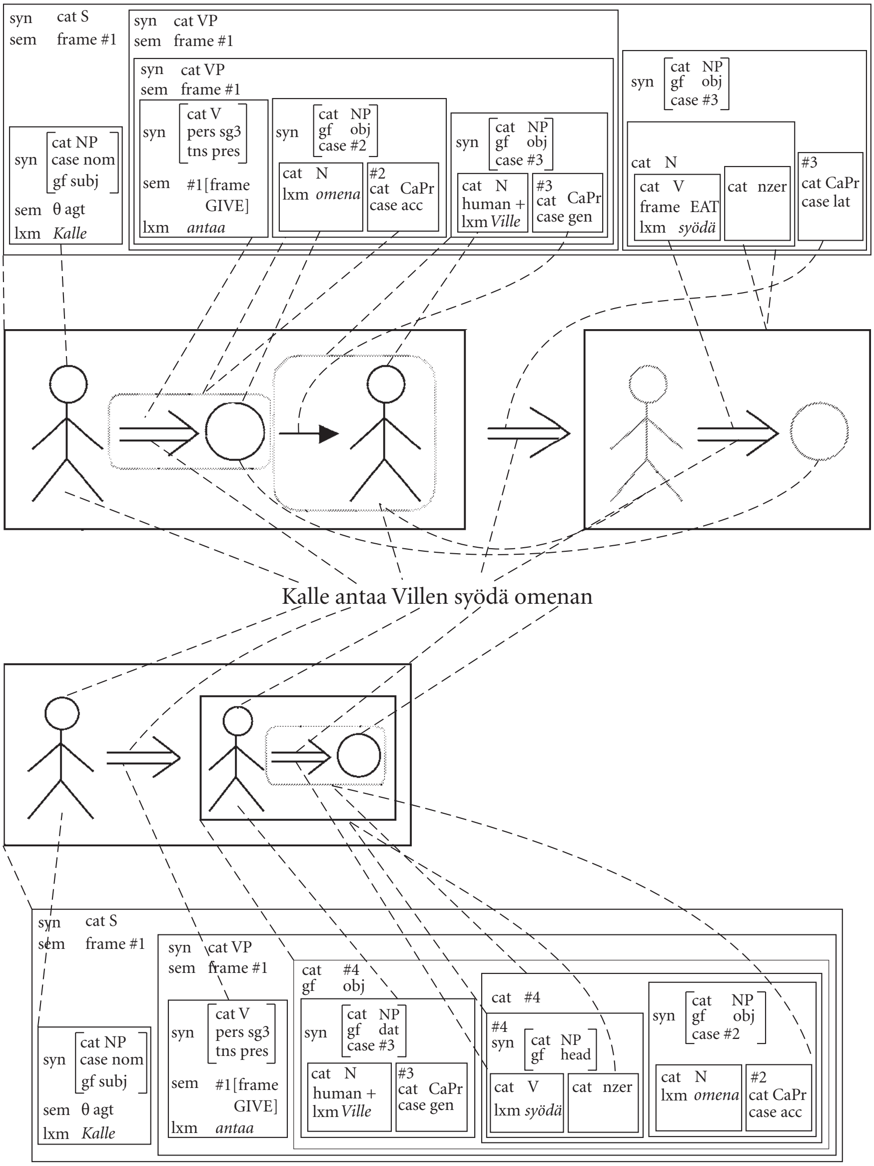

Figure 8. Two conceptualizations of *Kalle antaa Villen syödä omenan.*

6. A corollary: Syntactic structure and conceptual structure

Clearly, one thing that has changed in the construction is constituency. The infinitive, a former adjunct of the matrix predicate, has become the head of a non-finite complement clause, and formed a constituent together with the former object and dative adverbial of the matrix predicate. This restructuring would be very difficult to capture without using the notion of constituency (cf. the reference to Langacker 1997 above).

While it is true that a notable part of this restructuring can be captured with the broader notion of *conceptual grouping* proposed by Langacker (id.), it is equally true that the essential points can be captured with the more basic – and better-established – notion of constituency as well. By *conceptual groups* Langacker means not only grouping according to classical constituent structure, but also somewhat similar grouping according to such factors as mental spaces (cf. Fauconnier 1985), idiom chunks (cf. Fillmore, Kay, & O'Connor 1988), information structure (cf. Lambrecht 1994) and the like.

In the case of the Finnish permissive construction, the Old Finnish version consists of two apparent conceptual groups: the giving act with its participants, on the one hand; and the later act involving the RECIPIENT and the GIFT of the giving act, on the other. In the modern-day permissive construction, two conceptual groupings may also be distinguished: the act of granting permission, on the one hand, and the permitted act, on the other.

However, it is not sufficient to say that the former object and dative adverbial of the matrix predicate have moved from the (historical) conceptual group corresponding to the giving act to the (modern-day) conceptual group corresponding to the permitted act. This would lead to the false conclusion that these two participants are not present in the (historical) conceptual group corresponding to the later act, which is obviously untrue: even in the historical interpretation, the infinitive expresses an act that the RECIPIENT performs on the GIFT.

In this case, the two crucial participants of the whole scene are involved in two different conceptual groups in the historical interpretation.[25] Yet, they only have one structural interpretation. Thus, the conceptual grouping overlaps the constituent structure to some extent, but to correctly describe the diachronic changes in both syntactic and conceptual structure, these two need to be kept apart. To rephrase: although syntax and semantics should not be seen as autonomous modules, the cognitive, or conceptual, foundings of grammatical constructions must be, at some level, separated from the formal properties of those constructions: we must maintain some distinction between *syn* and *sem.* This has proved to be crucial to the diachronical analysis of the Finnish permissive construction.

The brief account of the permissive construction given here is, of course, far from being complete. As the account given here requires that the former object of the matrix predicate has come to be interpreted as the object of the infinitive, this account is only good for those cases in which the infinitive is transitive. In modern Finnish, this is not always the case – and there is little evidence that this has ever been the case. Furthermore, the permissive construction is not limited to expressions that can be traced back to giving. There are four verbs that can be used as the matrix predicate in this construction, and not all of them express giving, even historically.[26]

Such other facets of the history of the permissive construction could well be explained and described in the present framework (and, indeed, have been, in Leino 2001c). Since the main point of this study is not to explain the history of this construction, but rather to make a more theoretical point, I shall not go into any more detail on this test case. It does seem, though, that the present framework is capable of making explicit all the syntactic and semantic factors that are relevant to the grammaticization – or, perhaps, 'constructionization' – of the permissive construction.

7. Conclusion

This study may be given (at least) three somewhat different interpretations, all of which are 'right' in a sense. First, it is a statement of a claim that linguistic theories – specifically, the two CGs – need not, and should not, be taken to be totally separate from one another, but may be combined and used together. This is mostly a methodological matter that has more to do with the descriptive than the theoretical side of linguistic research. Such a view reduces to a claim that a linguist does not have to force the results of a given piece of research into one given framework, but may use suitable parts of different frameworks when necessary or useful.

Secondly, this study is a rough outline of one linguistic framework, not just a piece of research as described with the tools of two different frameworks. Obviously the outline given here is very preliminary, and it begs for a lot of further formulation. Whether this framework should be seen as a variant of either Cognitive Grammar or Construction Grammar, or as something else, is unclear. In actual real-life research, it started out as an extension to Cognitive Grammar, but it appears to have ended up closer to Construction Grammar.

Thirdly, this study is an attempt to bring the two CGs closer together. Judging by the existing literature, there is a somewhat surprising discrepancy between the amount of insight shared between the two CGs and their references to each other. In other words, the two CGs are surprisingly alike, but there seems to be surprisingly little collaboration between them. Yet, I feel, there is quite a lot that the two theories could gain from each other.

Notes

1. This chapter is based on a paper presented at the 6th International Cognitive Linguistics Conference (Leino 1999). I thank all the discussants who commented on my paper, asked questions about it and suggested modifications that have – or would have – made this chapter better than the previous version.
Foundations of this work were laid in the research project "Description of morphosyntax in the cognitive grammar of Finnish", funded by the Academy of Finland. A preliminary version of the present framework was developed for a joint monograph on the argument structure of give verbs in old written Finnish (Leino et al. 2001). I am very grateful to all the participants of that project for fruitful discussions and enjoyable co-operation during the project. I am especially indebted to Maija Vilkkumaa, who had a major role in developing the semantic side of the notation used in this work. Last but not least, I am grateful to the two anonymous referees of this volume for their valuable feedback. All remaining errors and omissions are, naturally, due to myself.

2. I shall use the following abbreviations in the glosses: imp = imperative, pst = past tense (somewhat misleadingly called 'the imperfect tense' in traditional Finnish grammars), 1sg = 1st person singular, 2pl = 2nd person plural (etc.), inf = 'first infinitive' (i.e. the Finnish -*TA* infinitive), nom = nominative case, gen = genitive case, acc = accusative case, par = partitive case, all = allative case, ine = inessive case, tra = translative case, poss3sg = possessive clitic for the 3rd person singular (etc.), pc1 = the 'first participle', i.e. the present participle.

3. Or with the partitive case in some rare 'existential' cases in which the referent of the subject of the infinitive is an unbounded entity, e.g. *annoin ammeeseen valua* ***vettä*** 'I let **water** (partitive) flow into the bath tub'.

4. Or perhaps four, but the one with allative subject is quite sporadical and, aside from the case marking of the subject of the infinitive, identical to the one with the genitive subject.

5. Combining *descriptions* or *notations* is not exactly the same as combining *theories*, of course. However, since descriptions and notations inevitably bring with them theoretical concepts, there is no clear boundary between combining theories and combining notations.

6. The notation variant used in this study is one developped for Leino et al. (2001). The choice of the variant is not critical, however; what is important is to be able to bring in some of the central *concepts* of Cognitive Grammar, and to be able to combine these with those of Construction Grammar.

7. However, it may be that the prominence of syntax in the existing works does not tell the whole truth about Construction Grammar. Furthermore, the somewhat unclear role of Frame Semantics in the Construction Grammar tradition complicates this issue as well. At any rate, so far semantics has not played nearly as important a role in Construction Grammar as it has in Cognitive Grammar. One obvious reason for this is that Cognitive Grammar adopts the hypothesis that form and meaning are isomorphic and bound together into 'symbolic structure' (cf. Langacker 1987: 76–86, as well as Haiman's 1983 ideas about iconicity) and therefore claims form to be (to some extent at least) predictable from meaning. Construction Grammar, however, makes no such commitment.

8. Overlapping in the sense that several constructions may together provide the 'same' information. For example, a determination construction which combines a noun and a determiner must include the information that one of the words (lexical constructions) being combined belongs to the category *noun,* but the lexical construction itself must also include this same information. The basic requirement for unification is that such overlapping information must be identical in all of the constructions being unified.

9. I have put the terms 'syntactic' and 'semantic' in scare quotes, because in both of the two CGs, what is called *semantics* not only contains semantic material, but also information that is traditionally labeled as pragmatic. Moreover, in the Cognitive Grammar terminology, the former is called the *phonological* pole of a linguistic unit, and, accordingly, it contains phonological information in addition to (morpho)syntactic information. The terms *form* and *meaning/function* might therefore be more adequate.

10. Granted, Frame Semantics can be given the status of 'the semantic correlate of Construction Grammar'. However, this raises two further problems. First, the relationship between FS and Construction Grammar has not been worked out in sufficient detail. And secondly, FS lacks the machinery to express the contents of a frame in sufficient detail. Cognitive Grammar provides far more concepts for pointing out semantic units corresponding to, say, the relationships between different participants of an event. In FS, such relations are incorporated into semantic roles (θ-roles) together with the participant itself. This makes it unnecessary, but also impossible, to refer to the relation itself.

11. The notation used in Figure 3 is put together from different sources of Construction Grammar (e.g. Fillmore 1988; Fillmore & Kay 1995; Kay & Fillmore 1999), but it does not strictly conform to any current or previous 'standard'. Notably, I have chosen to include constituent structure, I use more 'classical' labels for categories (VP instead of V [hsbj +] or [srs +], for example) than in most of the current works. One reason for this is that the feature [hsbj] is not useful in Finnish: a verb may or may not have a subject, and this is not a useful way to make the S ~ VP distiction. Also, I have left out the *val(ency)* attribute for reasons to be discussed below.The fact that the *val* attribute has been left out makes this an oversimplification: this attribute would, in fact, contain some of the information which is now lacking. However, the *val* attribute would not contain nearly all of the relevant information either.

12. Most of the attributes used in Figure 3 are introduced in Fillmore and Kay (1995). The feature *case* refers to the case form of a noun; its values are *nom* = nominative, *acc* = accusative and *all* = alltive. The feature *pers* refers to person; 3*sg* stands for 3rd person singular. the feature *tns* refers to tense; *pres* = present tense. A further detail to note about Figure 3 is that it represents a *construct* – a “a grammatically organized piece of language”, as Fillmore and Kay (1995: 2–31) put it – and not a construction.

13. This should not be taken to mean that the object of study, language itself, is modular. Thus, I am not claiming autonomous ‘parts’ of language such as syntax and semantics (cf. above). I am only claiming that (parts of) different descriptions of language or linguistic data can be treated as modules that may be put together to form new combinations. These modules need not be delineated by such notions as ‘syntax’, ‘semantics’ or ‘morphology’; rather, they may be called, for example, ‘the Construction Grammar part’ and ‘the Cognitive Grammar part’ of the whole description.

14. This notation should, in fact, be developed further so that it would point out the difference between words and morphemes in the notation. However, as that is not central to my main points here, I have omitted that detail. I am also aware of the fact that this kind of notation is better suited for those languages that have agglutinative morphology than for those that use a lot of fusion. For the Finnish case morphology this kind of notation is quite satisfactory.

15. While the idea of a distinct ‘snacking frame’ may sound ad hoc, there certainly is a lot of common knowledge about having a snack that the word *snack* (or Finnish *välipala*) brings forth. That background knowledge may well be claimed to form a coherent frame. Different aspects of this frame will naturally include eating, but a different kind of eating than, say, a ‘dining frame’. The frame also includes information about the social circumstances involved, and so forth.

16. The notions *profile* and *base* belong to the Cognitive Grammar tradition; they have no direct counterpart in the Frame Semantics tradition. However, since these notions refer to a very useful conceptual distinction, I shall use them also in the context of frames.

17. Equating *base* with *frame,* or *profiling* with *instantiation* or *elaboration,* may need some justification as well. The case of base and frame is rather straightforward: both of these concepts have their roots in the gestalt psychology notion of *ground* (as opposed to *figure,* see Koffka 1935: 177–210), and they both refer to a very similar *holistic* semantic entity against which some more specific entity is brought into attention. This “bringing into attention”, in turn, may be called either profiling or elaboration, as in Cognitive Grammar, or instantiation, as in Construction Grammar.

18. A word of warning to the uninitiated reader: Finnish infinitive forms are inflected for case, basically the same way that Finnish nouns are. However, the case inflection of infinitives is not as productive as that of nouns, and none of the different infinitive forms is inflected for all of the cases.

19. The history of the Finnish terminal case infinitives has been studied extensively by Saukkonen (1965, 1966). The description I present here owes a lot to his work.

20. The value of the *cat* feature in the second small box from the right, *nzer,* is an abbreviation of ***n**omin**a**li**zer***. That box stands for the infinitive affix. At this level of specificity, it has no correlate in the figure. However, its conceptual contribution is clear: it turns the process depicted by the verb into a thing; in slightly different terms, it turns a verb into a noun.

21. *Dative adverbial* (Finnish *datiiviadverbiaali*) is a term used in traditional Finnish grammars for an adverbial “which indicates an object to which something is done or happening, which something becomes a part of", as Penttilä (1958: 584) puts it [translation J.L.]; specifically, the NP indicating the recipient of the verb *antaa* is explicitly called dative adverbial by Penttilä and numerous others.

22. In modern-day Finnish, only (11) would sound natural, and it would receive an interpretation that differs from the one given here. I will return to this sentence shortly. (10) would be simply ungrammatical, and (12) would be very odd, at the very least.

23. Newman (1996) lists several different motivations for the permissive use of give verbs cross-linguistically. It may well be that more than one of these have influenced the semantic extension *antaa* 'give' > 'permit', but it seems clear that the motivation spelled out here has been the primary one in the case of the Finnish permissive construction.

24. In Talmy (1988) he uses the notion of force dynamics to express essentially the same concept. With this notion, he distinguishes between several kinds of situations which may all be labeled as 'permitting' or 'letting'. One crucial distinction is that of *onset causation* (and letting) vs. *extended causation* (and letting). The former corresponds to the characterization of enabling causation above. The latter corresponds to a situation in which the blockage stays away (as opposed to moving away). *Onset letting* is quite naturally linked to giving, but – quite understandably – *extended letting* is not. Apparently the history of the Finnish permissive construction involves an extension from the former to the latter; in modern Finnish both types of letting are quite naturally expressed with the permissive construction.

25. But not in the modern-day interpretation: the person who grants the permission needs to have no access whatsoever to the referent of the object (e.g. the apple in the examples), and the person receiving the permission does not even need to know that (s)he is being 'granted permission'. For example, sentence (11) could be used about a situation in which Kalle sees that Ville is about to eat an apple, but Ville does not see Kalle at all. The apple might be one that Ville is not supposed to eat (say, because it is actually John's apple, or because Ville is not supposed to eat apples at all because he is allergic to them). Kalle could tell Ville not to eat the apple, but he does not, thus letting Ville eat it. Hence, Ville and the apple are not present in the 'granting of the permission group' directly; what this group consists of is Kalle, a second conceptual group depicting the event of Ville eating the apple, and Kalle's letting this happen. Ville and the apple only come in as participants of the 'embedded conceptual group' ("embedded" in the sense of being subordinate to the one depicting the act of granting permission).

26. The verbs in question are *antaa* 'give; let', *käskeä* 'order, command', *sallia* 'permit' and *suoda* 'grant, allow'. Of these, *antaa* and *suoda* still have a 'give' type of meaning, and *sallia* may have had one – although this is not very likely. In contrast, *käskeä* does not have that kind of meaning, nor has it ever had one.

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Chapter 5

Construction Discourse

A prolegomenon

Jan-Ola Östman

1. The issue: The need for discourse study

This chapter makes a proposal for integrating systematic and conventionalized discourse phenomena into Construction Grammar (CxG).[1] It provides an outline of the main issues involved in such an enterprise, bringing together two fundamentally related, but traditionally not often enough connected approaches to analyzing language: the grammarian's focus on the internal properties of individual sentences and the discourse analyst's focus on the internal properties of larger texts. The equally important aspects of how the external properties of discourse (in terms of genre, discourse-pragmatics, interdiscursivity, interactional sequentiality, and other specifications) can be approached in a constructional framework is not dealt with explicitly in this study. (For attempts in that direction, see, e.g., Östman forthcoming; Fried & Östman 2003, forthcoming.)

The main argument of this chapter is that certain 'discourse patterns' represent conventionalizations of specific linguistic properties, which places them on an equal footing with the conventionalized patterns known as 'grammar', at least with respect to capturing speakers' knowledge of a language as a symbolic system. The N+N title of the chapter, 'Construction Discourse' is thus to be read on a par with that of Construction Grammar.

2. Setting the scene: Headlines and determiners

In the manuscript version of the forthcoming textbook on Construction Grammar, Fillmore & Kay (1996: 1–21, 3–11) predictably consider sequences like (1) and (2) ungrammatical.

(1) *Shoe fits.

(2) *Emelda likes shoe.

At the same time we – unfortunately, but quite often – have to read headlines like that in (3) in our daily newspapers.

(3) Mother drowned baby

The sequence in (3) is clearly an acceptable construct in English, and it is not even a very infrequent type of headline, as shown in Simon-Vandenbergen's (1981) meticulous study of headlines in *The Times*, from where the headline in (3) was picked.[2] The construct in (3) has an everyday simplicity to it, but it is just as clearly an example of what in early Construction Grammar was referred to as a peripheral construct; it is not licensed by any of the 'core' constructions like the Determination construction, the Subject-Predicate construction and the Phrasal Verb Phrase construction, which together would license constructs with the structure of (4).

(4) A mother drowned a baby.

What is special about (3) is that it is not easily licensed by general grammatical, sentence-level rules which allow us to leave out articles and other determiners in certain situations. For instance, there are mechanisms in Construction Grammar (cf. the discussion in Fried & Östman 2004: 6.3) which turn a proper noun into a common noun, or a count noun like *shoe* into a mass noun. Thus, if Emelda is a termite or a dog, then (2) may easily evoke a scene with a fast-chewing Emelda, and in that sense (2) would be licensed by the grammar and thus grammatical. But it might be slightly more difficult to assign an interpretation to (5), whoever Emelda is.

(5) Emelda likes vase.

It is also possible to leave out the article if the referent is in some sense unique, as in (6) (cf. Fillmore 1988), and we could plausibly argue that in (3), too, the mother and the baby are unique members of a family, and do not need a definite or indefinite article. That may well be the case, and in another context

(3) could thus be used felicitously to describe a particular situation. But in headlines virtually any noun with a human agent as subject and an animate patient as object are acceptable without articles or other determiners, as in (7).

(6) Chairman of the Board resigned.

(7) Carpenter drowned cat

Despite all of this, we would like to be able to say to a foreign-language learner of English that he or she should not produce sentences like (3) and (7) in exams, nor in letters to his/her pen-pal in England.

As these simple examples show, context matters greatly when we are faced not only with linguistic acceptability judgments, but also with respect to making judgments of grammaticality. In this study I want to argue in favor of taking seriously discourse phenomena like the specification that (3) and (7) are acceptable as headlines, but (most often) not in expository prose. Such specifications need to be incorporated into Construction Grammar in order for us to be able to account not only for aspects of sentence grammar that are constrained or licensed by discourse phenomena, but also in order to give a holistic account of the cognitive basis of Construction Grammar.

3. The setting: On discourse and Construction Grammar

Construction Grammar has not only a respectable history, but also an equally important prehistory. Construction Grammar and Frame Semantics may be seen today as complementary perspectives forming the basis of a full-fledged theory of language that has grown out of Charles Fillmore's Case Grammar as developed at the end of the 1960s and in the early 1970s (cf. Dirven & Radden 1987; Fillmore 2002b), in combination with his interest in lexical semantics (including frames and scenes) in the 1970s (for an overview, see Petruck 1996). But this development has not taken place only by way of a constant and simple quest for finding the most appropriate way to account for the relationship between form and meaning.

Once we make reference to large-scale frames of understanding and situational scenes, we also have to tackle the multitude of linguistic aspects that are dependent on and governed by the restraints that the functionality of language imposes on linguistic behavior; these aspects are dealt with in the subfields of linguistics known as pragmatics and discourse analysis. Thus, in a number of studies in the 1960s, 1970s and early 1980s, Fillmore carried out important systematic research on deixis (1966, 1971a, 1973, 1975, 1982a, 1983), on presuppositions (1969, 1971b), and on text, discourse and pragmatics (1974). It was thus natural that when the time came to propose a view of how form and meaning cooperate in language, reference to pragmatic and discourse notions had its place in this enterprise.

Seen in this light, Construction Grammar has the ingredients to become not only a theory of grammar, but a theory of language, on a par – and 'competing' with – other full-scale theories of language, notably the tagmemic approach of Pike (e.g. 1967) that has continued to be systematically developed within and outside of SIL; and the systemic-functional approach of Halliday (e.g., 1978), building on the insights of Firth (cf. e.g., 1957). Both of these approaches have taken aspects of discourse seriously from the very start, and recognized discourse as contributing to, constraining, and construing meaning at sentence level and below.[3]

Construction Grammar combines into one holistic type of representation – and as 'equal partners' – the kinds of information and theorizing that we typically associate with such labels as 'phonology', 'morphology', 'lexicology', 'syntax', 'semantics', 'prosody', and 'pragmatics'. What is particularly intriguing about Construction Grammar is that although it does not have separate 'components' or 'levels' of analysis and understanding, it does not do away with the insights that research within such fields of study has attained throughout the last half century.

Thus, the need to establish some feature of language as decidedly belonging in, say, morphology rather than in syntax, is not present to the same extent in CxG as such decisions would be required in many other theories of grammar. The CxG view tallies well both with typological facts (cf. also Croft 2001, this volume; and Zwicky 2001, on what they, independently, have dubbed a 'radical' view of Construction Grammar), and also with the kind of empirical data we are up against in studying signed languages. It is often futile to arbitrarily attempt to assign features of signed languages to phonology, morphology, or syntax on the basis of our knowledge of spoken and written languages, and on the basis of linguistic tradition. Certain aspects of language have of tradition been assigned to, or treated in components like syntax, giving the impression that syntax is a well-defined component or level, specifiable in terms of necessary and sufficient conditions. Although there are, indeed, attributes like *syn* and *sem* in Construction Grammar, the instability of these attributes in the Construction Grammar formalism might be disturbing to the uninitiated: the attributes may turn up as *synsem*, as *rel*, etc. Arguably, this can be construed as being due to a temporary situation, where the theory and its formalism is still evolving, in search of the best way to represent and handle linguistic data. Controversial as it may sound, my own view is rather that this apparent wavering is one of the many strengths of Construction Grammar.

In the areas of pragmatics, register, and discourse, Construction Grammar has so far not established any rigid notion of what belongs where. In fact, it is not even clear that all practitioners of Construction Grammar are in favor of taking Construction Grammar beyond the sentence. However, a move beyond the sentence is not at odds with the original motivations for devising the CxG model. This chapter argues that such a move is a necessary move.

Very little has been done on pragmatics proper and discourse proper in relation to Construction Grammar. It is often recognized that there is 'something' more out there, but what it is has largely remained a waste-paper basket. Issues of information structure, like topic and focus, have indeed been dealt with, notably in studies by Lambrecht (1994), and Kuningas (Forthcoming), but even here, not much is being said about context and discourse as such. Notions like topic and focus do make reference to activities and text outside the sentence proper, but the point of view is still very much that of the sentence or utterance.[4]

This is indeed all in the spirit of how Construction Grammar has been conceived of from the very start. In the manuscript versions of the forthcoming introduction to Construction Grammar by Charles Fillmore and Paul Kay, the restriction to sentence-level characteristics is explicitly endorsed:

> . . . as presently conceived, the patterns that may exist for combining sentences into larger structures ("paragraphs" or whatever) are not being included in the set of grammatical constructions. (Fillmore & Kay 1993: 1.10)

The phrasing does give the innocent discourse analyst some hope, however, not only in the wording "as presently conceived", but also in the indirect acknowledgment that discourse "patterns . . . may exist".

For somebody working on language function and discourse, patterns 'above' the sentence are naturally just as central and deserving of attention as are 'grammatical' aspects of language. It is therefore only natural that a discourse analyst will ask what CxG can do for him or her; or at least, whether what is known about text and discourse fits in with the perspective on language adopted within CxG. The view put forward in this study is that CxG methodology can be fruitfully extended to account for discourse phenomena, and in so doing will enhance our understanding of how discourse works, and will allow us to explicate discourse structures and processes in a more systematic manner.

Furthermore, the CxG approach to language is not *a priori* at odds with what we know about discourse.

It is thus clearly of primary importance to integrate pragmatic and discourse phenomena with what we know about grammar from a constructional perspective. At the same time, it is crucial that detailed accounts of the architecture and attributes of grammar be attuned to what we know about discourse. This argumentation is in line with any integrationist attempts at reaching a holistic view of how language works. Various strands of research within CxG have already shown themselves to gravitate toward this way of thinking. For instance, the features of the *syn* attribute in Construction Grammar has been developed in view of developments in other generative models, particularly in HPSG, which uses a very similar formalism. Correspondingly, research on the *phon* attribute has incorporated a number of insights from another constraint-based model, Optimality Theory; and the semantics of Construction Grammar has from the very start been developed in close connection with research advances in Frame Semantics. It is thus only natural that the pragmatics and discourse perspective of Construction Grammar needs to take into account and be attuned to recent approaches and models in pragmatics and discourse analysis.

4. Complicating action: Four claims

In this section I will advance four claims which support the move from sentence level to discourse in Construction Grammar: (i) much of discourse is conventionalized; (ii) discourse is not in opposition to syntax – the two complement each other; (iii) acceptability and conventionality are relative to context; and (iv) CxG needs to recognize the usefulness of holistic frames, which are akin to genres.

In the rest of this study I will talk about 'discourse' rather than about 'pragmatics'. The reason for this is purely terminological; I want to avoid confusion with the attribute *prag* (or variably *pragm*), which is used in Construction Grammar literature to refer to issues of information structure, and memory accessibility and activation. (Cf. in particular Lambrecht 1995; Michaelis & Lambrecht 1996.)

4.1 Conventionalized discourse

I would submit that the main factor which keeps Construction Grammar within the bonds of the sentence is tradition. The degree of conventionality and native speaker acceptability between what is 'grammatical' as a sentence, and what is 'grammatical' as a paragraph or text/discourse is a gradient phenomenon. There is no ontological, methodological, nor cognitive basis for accepting morphemes and words as having constructions associated with them – as, indeed, being licensed by constructions – but not to accept combinations of sentences, paragraphs, and whole texts/discourses. Size does not matter.

Accepting discourse phenomena into Construction Grammar is also warranted by general cognitive requirements of economy in conceptualization and in order to account for multi-level categorization in language; daring the step beyond the sentence is thus essential for the purpose of capturing generalizations.

In Construction Grammar, constructions are seen as conventional associations of form and meaning. But conventionalization is a matter of degree. It is true that once conventionalization is stretched beyond 'grammatical', it becomes more difficult to account for. But especially as applied to longer stretches of language, the lines between 'grammatical', 'acceptable', and 'appropriate' are very unstable.

4.2 *Syntax* and *discourse*

There is a general view within Construction Grammar and other generative grammars that the formulation of form-meaning constellations is the primary concern for linguistics. Phrased in 'traditional' terminology: we should let syntax do what it can do, and let it go as far as it can go into the realms of language function; only when the systematicity of the 'core' has been developed do we know what else is out there, and whether we need to consult other 'components' like pragmatics and discourse.

My take on this is that these two areas of research are in some very important respects very different from each other, and they can therefore not be evaluated with the same yardstick. In order to account for how implicit anchoring works in language (cf. e.g., Östman 1986, 1995; Fried & Östman 2003), a completely different, dialogical, methodology needs to be the basis for research in discourse. It is therefore not the pragmaticist's duty to wait for the syntactician to work out his or her theory first; both work in their own back-yard, but look over the fence every so often to take into account what is happening in the other's sandbox. And as we grow older, we tear down the fence and live happily ever after. The important point is not who is allowed to go first, but what joint results we manage to achieve – and for that, both 'partners' need to be taken as equal companions.

4.3 Context dependency

One of the most basic tenets of Construction Grammar is that it aims at 'full coverage' of the data, full coverage of the constructs of particular languages. To know a language means precisely to have access to the repertory of the formal resources, constructions, of that language. In particular, the peripheral data, including stock phrases like *Thank you, Goodbye*, and various kinds of formulas and idioms (cf. Fillmore, Kay, & O'Connor 1988) are just as important and just as central to language and grammar as are the traditional objects of study in syntax, like the SVO sentence.

If this is taken seriously as it stands, it means not only that the syntax-semantics of, say, newspaper headlines is a central concern for Construction Grammar, but we also potentially need to describe the structures and functions of, say, abbreviations; sign-post language; social, geographical, and psychological variation; sentence fragments; and maybe even foreign-language learners' 'erroneous' language – since learner-language interference and other contact phenomena constitute some of the major factors in language change.

If every type of sentence is to be part of the object of study – in order to accomplish 'full coverage' of the data – we need some kind of device in Construction Grammar which will indicate in what kinds of settings and contexts something is acceptable and/or conventional.

4.4 Frames as genres

The notion of 'frame' is very central to Construction Grammar. Frames have been talked about in at least two different ways. One is to approach the issue from the point of view of what phrase-mates – in terms of valence specifications – a particular word requires in order to be felicitously used in a sentence. This is the use that is in accordance with the notion of case frames of Fillmore (1968). The other perspective is to build up frames as belonging to specific domains in the spirit of the work done within FrameNet (cf. Fillmore et al. 2000; Johnson et al. 2001). For instance, frames within the domain of Communication will include those of Gesture and Noise, each with their own set of situational or participant roles, known as Frame Elements.

But in addition to these types of frames, we also need to be able to make reference to discourse-level frames: We need to be able to refer to 'frames as genres', to indicate how we know that what we say is appropriate in that setting. Such holistic frames restrict the interpretational possibilities, and draw borders around the sphere of understanding the way discourse topics, schemata, or knowledge of the particular discourse genre do.

5. Frames of understanding

The four points brought up in Section 4 suggest that Construction Grammar decidedly needs a further notion to be included either as an attribute on a par with other 'sentence-level' attributes, or as a separate additional formalization that can enhance the Construction Grammar framework. (The issue of representation will be dealt with in more detail in Section 7.) What is needed are specifications to account for pragmatic and discourse phenomena and their effect on the grammaticality and interpretation of sentences.

The importance of more holistic frames has also been recognized for instance in Fillmore (1982b), as the following set of quotations reveals. I take these quotes to further support the move in the direction of discourse, without abandoning the crucial insights offered by Construction Grammar methodology and representation of linguistic structure and of how language is understood.

> ... knowing that a text is, say, an obituary, a proposal of marriage, a business contract, or a folktale, provides knowledge about how to interpret particular passages in it, how to expect the text to develop, and how to know when it is finished. It is frequently the case that such expectations combine with the actual material of the text to lead to the text's correct interpretation. And once again this is accomplished by having in mind an abstract structure of expectations which brings with it roles, purposes, natural or conventionalized sequences of event types, and all the rest of the apparatus that we wish to associate with the notion of 'frame'. (Fillmore 1982b: 117)

> ... in the process of using a language, a speaker 'applies' a frame to a situation, and shows that he intends this frame to be applied by using words recognized as grounded in such a frame. (Fillmore 1982b: 120)

> ... there is a very tight connection between lexical semantics and text semantics, or, to speak more carefully, between lexical semantics and the process of text comprehension. (Fillmore 1982b: 122)

> It is necessary to distinguish two important different ways in which the cognitive frames we call on to help us interpret linguistic texts get introduced into the interpretation process. On the one hand, we have cases in which the lexical and grammatical material observable in the text 'evokes' the relevant frames in the mind of the interpreter by virtue of the fact that these lexical forms or

> these grammatical structures or categories exist as indices of these frames; on the other hand, we have cases in which the interpreter assigns coherence to a text by 'invoking' a particular interpretive frame. (Fillmore 1982b: 123–124)

Thus, in addition to information about what frame a word brings along with it when the word is used, we also need knowledge of frames 'as such'. Such comprehensive frames can be conceived of as 'framing constructions', 'framing patterns', 'discourse constructions', or simply, as I will call them here: *discourse patterns*. The importance of the notion discourse pattern for the study of understanding discourse is dealt with in Östman (1999) and Halmari and Östman (2001); the latter also indicates the similarity between discourse patterns and the dialogically defined notion 'activity type'.

6. Discourse patterns as conventional constructions

If constructions in Construction Grammar are conglomerates of phonological, syntactic, semantic, and pragmatic information which as wholes – as gestalts – license constructs, and if discourse patterns are devised as discourse-level constructions, we need to define discourse-pattern conventionality more precisely.

It is clear that, once the larger cotext and context of sentences/utterances are taken into account, cognitive and interactive aspects related to understanding and sociocultural behavior have to be taken more seriously. A text or discourse is more than the combination of the syntactically definable parts that can be seen as its 'constituents'. There are basically two ways to approach the question of how to devise a Construction Grammar for discourse, of how to define a Construction Discoure. One is to investigate complex sentences, and combinations of sentences, and add on more material to make up larger chunks. This work has been part of the Construction Grammar enterprise from the beginning.

The other approach is to start from discourse notions like *text type* and *genre* and ask how knowledge of such structures interacts with our grammatical knowledge. This is the approach favored in this study. If a discourse pattern is to be the discourse-level notion comparable to that of construction on the sentence level, it should combine the characteristics of form, meaning, and function of a text/discourse into one 'construction/pattern'.

But we cannot simply use the notions of 'genre' and/or 'text type' for this purpose. In the following (cf. also Östman 1999) I will spell out some of the reasons why we need a particular discourse-level notion for capturing the constructional peculiarities of discourse.

First and foremost, the notion of 'discourse pattern' is an abstract entity, as is the notion of construction; it is also a cognitive phenomenon, on a par with framing. Both genre and text type are clearly important notions, as is the need to differentiate between the two. Recent work both in linguistics and in literary studies has indicated the complexity of these notions; for instance, they have to be related to social practices, to intertextuality, and to the processual construal of discourse. Nevertheless, genre and text type are very often seen to form a dichotomy, as being two perspectives on discourse: genre zooms in on the external relations that a text/discourse displays in relation to social and communicative settings; and text type focuses on the internal relations in a text or discourse.

We talk about different genres as contextual settings that are suggested on the basis of different activities that people engage in for different purposes: recipes, obituaries, death notices, dinner-table conversations, fairy tales, medical councelling, etc. (On genres, see Swales 1990; Bhatia 1993; Halmari & Virtanen, in press.) In contrast, text types are defined on the basis of the manner in which sentences are organized as parts of a piece of discourse in relation to each other. We talk about argumentative, narrative, instructive, expository, and descriptive text types. (Cf. e.g., Werlich 1976.) Thus, in a narrative text type, we would typically find foregrounded units (like sentences, utterances, information units, or prosodic units) to be sequentially ordered so as to correspond to the order in which the events described in a narrative took place in 'real life'.

Despite the fact that genre studies and text type studies have very similar concerns, they are not the same. Thus, a novel (i.e., an instantiation of the genre 'novel') can be written in the form of a narrative text type, but it can also be in the form of, say, an argumentative or expository text type. Similarly, narrative text types are not restricted to fairy tales and novels. For instance, a recipe can be given in a narrative manner, as can an horoscope text. Genre and text type are clearly two approaches we can take on text and discourse.

Text type and genre are in a sense akin to, respectively, form and function on sentence level. But, as we know from constructional work, it is not enough to just recognize that language has form and function. The crucial issue is how the two are mediated; in the CxG view, they are mediated by way of constructions. In the same way as we need a cognitive 'meaning' filter to fit form and function together, we also need a filter to mediate between genre and text-type descriptions. This is where the notion *discourse pattern* comes in – as the cognitive discourse correlate of 'meaning' on sentence level. Discourse patterns are conventionalized associations between text type and genre. It is important to note, though, that this approach to discourse does not neglect genre and text type; rather, it incorporates both of them as form-meaning constellations. Similarly, in its concern for grammaticality at the sentence level, Construction Grammar does not neglect form and function simply because it stresses the importance of meaning and cognition in the form-meaning constellations known as constructions.

What 'traditional' discourse analyses in terms of genre and text type lack is reference to cognitive aspects like understanding of discourse codification. A viable characterization of discourse has to take into account the way participants and interactants in discourse themselves conceptualize discourse. The claim is that conceptualization on discourse level takes place primarily in terms of discourse patterns, rather than (or, at least, in addition to) in terms of genres and text types.

In fact, as I show in Östman (1999), discourse-level conceptualization defined in these terms is for all intents and purposes what we talk about as coherence: textual and discourse coherence is best seen in terms of the socio-cognitive understanding which holds texts and discourses together for members in a speech community.

For instance, when the topic of a conversation is recipes, what comes to mind (in a large subset of cultures) is not that recipes are typically couched in an instructive text type, nor that activities surrounding a recipe take place in a kitchen. These aspects do play a role in conceptualization, but neither of them by itself, nor taken together, give a full and satisfactory account. Understanding

SDKJD JSJDKSJDD JDDSSK J

2 tbl fdjkfjfd
2½ dl lkfdlkjf sdjklfdsjkl
30 g kjdfsjklfdiop

Asälkfj V-IMP oksd jfdkfjfj dsklfj dfjsd fjsdfjfjf
söä df kskflsdkfd V-IMP dsfkdsf kdfkd fkdfkdsfl
öls kd V-IMP flösd kfsdl kfsfksfk s dlfk IMP äd f
sö ldkfs dlkflösdköl s fks dlfksd IMP sdl kfsd ui
lsdk fsdk flsd V-IMP dfksd k fsdfk dslfk lfkds fk.
Eighr ds oi hhre e mmmererp ppfde V-IMP-Neg.

Figure 1. A schematization of the recipe image.

Heading name of product-to-be cultural information
Ingredients list of ingredients specific amounts temperature amount of final product; e.g., 'serves four'
Instructions sequentially ordered directive mode alternative paths

Figure 2. The recipe pattern; [dp recipe].

and categorizing a recipe *as* a recipe, takes place in terms of the visual, graphic display in Figure 1, further abstracted as Figure 2.

We have an image of the prototypical shape of a recipe: Certain specifications about measures of the ingredients in a list-like fashion, followed by a text giving the instructions for preparing the dish in question.

My proposal is that such discourse patterns – cf. Lakoff's (1987) Idealized Cognitive Models – constitute an additional tool in understanding and using texts. The schematizations given in Figures 1 and 2 are manifestations of the visual perception of the Recipe pattern as cognitively defined. This pattern is constitutive of the coherence of recipes in general. When cooking instructions are presented in some other manner, more processing work will be demanded from the reader or addressee in order for him/her to understand and conceptualize these instructions *as* a recipe.

Östman (1999) gives minimal pairs and triplets to indicate that discourse patterns are not the same as text types or genres; i.e. that the categorization they perform is not reducible to any of the other two. For instance, although contact ads (a genre) all take the form of a descriptive text type, they do so in different manners in different (sub)cultures: Finnish contact ads are instances of the commercial-advertisement discourse pattern; English contact ads are of two subtypes, related to different sub-cultures, one being an instance of the story-with-a-plot discourse pattern, the other being an instance of the human-interest discourse pattern, which we often find in news reporting. This possibility of differentiating a discourse construction both from its form and from its function is equivalent to cases where a particular form (say, the imperative) can combine with a particular codified meaning (e.g., that of the main predicate of that form) to produce a constellation with a specific conventionalization as a sentence-level construction; a case in point being the *Let alone* construction (formally, an imperative form coupled with a permissive meaning) as discussed in Fillmore, Kay and O'Connor (1988).

Östman (1999) contains descriptions of a number of different discourse patterns, and discussions on their universality and their culture-specificity and on the number of discourse patterns needed for linguistic analysis.[5] That study also addresses the cognitive and linguistic status of the visual representation of patterns, as exemplified in Figure 2, arguing that discourse patterns should be seen as basic-level terms on the level of discourse categorization, and that even the graphic display itself is no more arbitrary than the use of formulae in propositional logic – vision being a versatile cognitive domain. Halmari and Östman (2001) discuss a non-prototypical execution story and show how discourse patterns are strongly adhered to despite overt attempts to indicate the contrary.

In the same way as constructional boxes are notations, the important thing with drawings like that in Figure 2, which is merely a first non-formalized approximation, is not what they look like *per se*, but what they look like in relation to other discourse patterns. Discourse patterns pertain to the holistic perception of text/discourse; they are not simply shape, but they function as frames for understanding. And if discourse patterns are directly associated with coherence in terms of understanding, discourse pattern similarity implies similarity in the manner of cognitive understanding, and similarity in how we perceive and process texts. Thus, the recipe, the guide-book, and direction-giving as interaction have a very similar structure: first a presentation of the ingredients (Recipe), the places worth seeing (Guide book), and the joint establishment of mutually known landmarks and means of transportation (Direction giving); then a step-by-step account of the process by which one gets from ingredients to the finished product, or from point A to point B.

As in discussions of the degree of abstractness we would want to impute to constructions, and of how far we want to base our representation of grammatical constructions on the workings of elaborate inheritance mechanisms, a similar set of questions pertains to the inheritance relations between discourse patterns. Should we, for instance, establish an abstract Instruction pattern to be inherited by the more specific patterns Recipe, Guide book, and Direction giving? Establishing such an inheritance relation between the patterns would underline their similarity, and would propose similarity in conceptualization.

The force of the inheritance mechanism can be seen in the analysis of discourse patterns that are related only to a certain extent to a general Instruction pattern. For instance, horoscopes have certain things in common with other Instructions: a Horoscope pattern will need to specify ingredients like money, love, and work – and some horoscopes do this in a list-like fashion – and there will also be an explication of how much can be expected (that day, week, month, year) in each category. Horoscopes also give instructions, but instructions as related to a not-so-immediate-nor-concrete future. In fact, the Horoscope pattern will not only have to inherit the Instruction pattern, but it will also have to inherit the general pattern of Future prospects, which is inherited most directly by discourse on the development of Economics and Market speculations.

The single point we have been leading up to is precisely that understanding on discourse level can best be understood in relation to the concept discourse pattern. Part of what we conceive of as the coherence of text/discourse is anchored in the kind of holistic, cognitive, partly codified understanding we have of how to categorize the text/discourse in question and how to hook this text/discourse onto the cognitive frame of understanding that I call a discourse pattern.

7. Resolution: dp representation

There are three alternative ways of representing discourse patterns and the information that needs to be specified under the general *dp* ('discourse pattern') attribute in Construction Grammar. One alternative is to add the *dp* specification within the same external 'box' alongside the sentence-level attributes – including the attribute *prag*; another alternative is to have *dp*s in a larger box 'around' the sentence-level 'box'; and a third alternative is to give the *dp* specifications in a completely separate 'box'. These alternatives are given as (a), (b), and (c), respectively, in Figure 3.

I suggest that the (c) alternative is to be preferred. This might seem surprising, since detaching the specification of discourse constraints from sentence-level analyses will create the need for an interface between the 'boxes'. However, within Construction Grammar, different aspects of grammar are already being developed to some extent on their own. Frame Semantics, although always to be thought of as applicable, and referable to, in parallel with Construc-

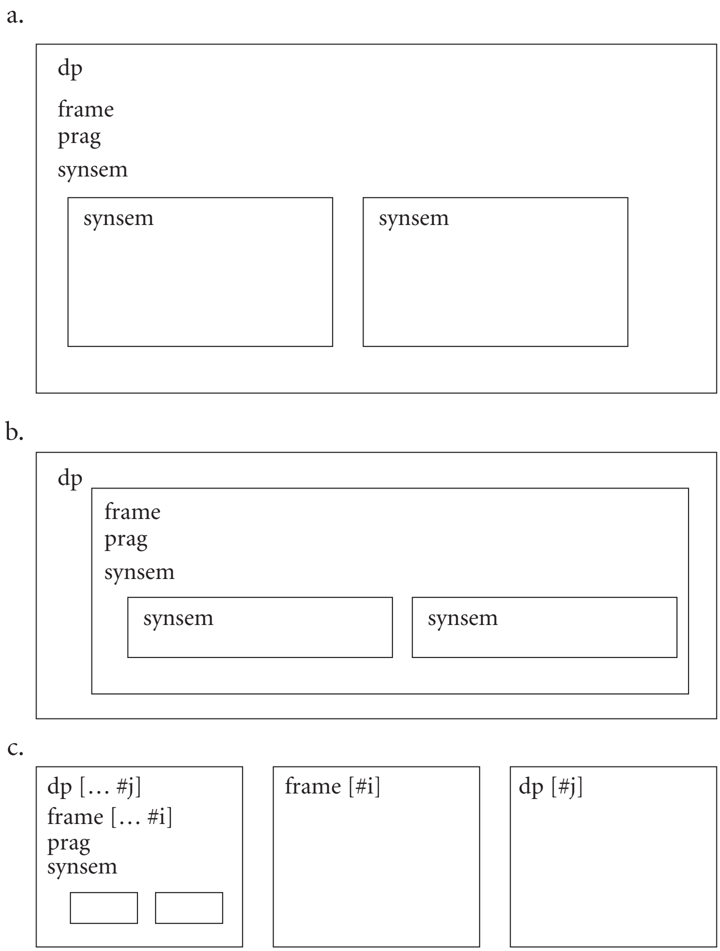

Figure 3. Alternative representations for the attribute *dp*.

tion Grammar, is being developed almost as a separate theory. For instance, although Construction Grammar and Frame Semantics are devoted to being worked out in parallel, Frame Semantics has not until very recently (cf. Fillmore 2002a), been represented in a box-notation format with attributes and values. As another sign that the development of CxG and Frame Semantics does not always go hand in hand, we can note that the attribute *frame* is typically added to the Construction Grammar boxes with a descriptive account of the characteristics of the frame within square brackets – rather than as values of an attribute. This is no doubt seen as an interim solution by practitioners, but it does give the Construction Discourse analyst the possibility to utilize similar types of tools.

Alternative (c) is thus the route I suggest be taken with respect to discourse patterns: Discourse aspects can be developed in parallel with specifications of frames and *synsem* values, with unification indices indicating cross-reference.

The parallel with Frame Semantics can be made even stronger in that the very fact that Frame Semantics is being developed as a separate theory underlines the possibility – the fact – that frames (as particular semantic entities) exist independently of syntactic constructions. That, in turn, means that they can be studied on their own, as can discourse patterns, but both frames and discourse patterns nevertheless have a relationship to constructions: discourse pattern specifications are needed for many grammatical constructions, but by no means for all constructions. The micro-level information needed for an adequate account of 'grammar' may or may not have anything to do with a particular *dp*, but since every sentence, utterance or turn appear as part of some discourse, which in turn computes information about its semantics, it is only to be expected that the utterance needs to inherit information from frames and discourse patterns. It also goes without saying that many constructions will be usable across discourse patterns, which is another argument in favor of alternative (c).[6]

Generalizing on the basis of the discussion above, we can now say that the 'meaning' or 'function' end of constructions has several dimensions, each of which has its own internal properties and contributes in its own way.

8. Evaluation: *Mother drowned baby*

Finally, we need to show why Construction Grammar needs to be able to make reference to discourse patterns, to 'discourse constructions'.[7] Let me bring up construct (3) for renewed discussion.

(3) Mother drowned baby

We saw in Section 1 that adherence to general principles of grammar in accounting for (3) is cumbersome at best, whereas if there was a possibility to specify that constructs like (3) are acceptable in certain types of discourse, this would seem to be a very straightforward way of handling the matter.

If we focus on (3) as a piece of text on its own, we can then ask: What would be the situations in which (3) could be felicitously uttered or written? At least three different situations suggest themselves: as a Headline, which is the attested source of (3); as an utterance in a Family conversation; and as something a non-native speaker would produce as part of his/her Interlanguage.

8.1 Headline

If the construct is licensed with reference to [dp headline], a variant of the form *The mother drowned baby* would not be a very likely headline, nor would *Mother drowned the baby* or *Mother drowned a baby*. Even a headline of the form *The mother drowned the baby* would not be an obvious choice. If the relation between the mother and the baby was made more explicit, as in *(A) Mother drowned her baby*, we get a more plausible headline. In other words, we have fairly clear intuitions about what can be a headline and what does not work well. Since these intuitions are available, albeit for 'peripheral' constructs, such constructs need to be licensed by a grammar that is committed to accounting for all the constructions in the grammar of a language.

8.2 Family conversation

It would be a somewhat macabre dinner-table conversation among the members of a family where (3) could be uttered naturally. But if we use another verb, like *bathed*, the possible inappropriateness should go away. In this case the words *mother* and *baby* are used as proper names, as they often are within a family, indicating *My/Our mother*, and *Our/Your/My baby*. If we indicate the construction as being constrained by [dp family], the construct would be unacceptable, even ungrammatical, if it was uttered in the form *The mother drowned baby*; even *Mother drowned her baby* would be awkward unless we have a situation where the rest of the family are not related by blood to the baby. And if around the dinner table somebody simply said *A mother drowned a/her baby*, the statement would be taken as a report of what somebody outside the family had done. We thus see that the constraints imposed by different *dp*s are not the same; as a matter of fact, this is precisely why we need to set up very specific discourse patterns.

8.3 Interlanguage

Since Standard Finnish does not have articles, it is conceivable that a Finnish speaker could produce (3) in an attempt to say or write something like *The mother drowned the baby*. If the construct in (3) is an instance of [dp interlanguage], it will have to be seen in a wholly different manner than if it is an instance of [dp headline] or [dp family]. From the point of view of standard English it would be 'ungrammatical', but from the point of view of comprehensibility and interpretability in a particular context it might score fairly high with respect to its degree of acceptability.

Some readers may be appalled at the fact that I bring in language learners' language – and from a grammatical point of view rightly so. But the ultimate question is: What is learner language if it is not English? Naturally, we can discard the utterance completely, but if we see it in relation to a discourse as a whole in which it may have occurred, we know that such a construct is not something extraordinary. For instance, people (nowadays) code-switch abundantly; people who do not speak several languages code-switch between registers or dialects. In such situations, if we want to give a full account of a language, would we then have to see *dp*-marked constructs like (3) as being the result of unifications and inheritances that cut across languages? This is an area of research that has not been explored at all so far.[8]

8.4 On the feasibility of alternative solutions

We have seen that it makes a big difference how a construct like (3) is handled and described in Construction Grammatical terms depending on the situation, i.e. depending on the *dp* that is activated and made reference to.

Notice, finally, that I am not necessarily saying that a modification of the 'standard' set of constructions established within Construction Grammar could not handle (3). The word *mother* could perhaps be seen as polysemous, with its different senses dragging different contextual settings with them, which in turn specify whether the word could be used with or without a definite or indefinite article. This would end up meaning that virtually all words in a language have to be specified as *a priori* polysemous. This is clearly not a view that the majority of linguists would endorse; such a view would also present analysts with difficulties in making meaningful generalizations about language structure and use.

Alternatively, we could say that there are two or a multiple number of Determination constructions (or NP constructions), all with different article specifications, which could be inherited by varying constructs. But even then, we would need to refer to some abstract discourse schema or the like in order to be able to specify which Determination construction a construct inherits.

In any case, the gist of my argument is not so much that Construction Grammar cannot handle (3); the point is rather that there are more intuitive, and there are less intuitive ways to deal with constructs like (3). If we take seriously the view that Construction Grammar has its basis in cognition, any mechanism for handling (3) will not do. The specification in terms of discourse patterns is at least a viable alternative, so that by specifying a construct as [dp headline], we indicate that articles do not unify in the manner they would by default.[9] This manner of analysis would also be discourse-cognitively appealing.

9. Coda

This has been a prolegomenon for Construction Discourse, a 'position paper', which has attempted to stake out some of the preliminaries for what should minimally be involved when doing Construction Discourse. The suggestion is that we need to have a category called *dp* (for discourse pattern) in order to account for, precisely, the kinds of issues that I have here illustrated with the acceptability and unacceptability of the use of the definite and/or indefinite article in examples like (3).

Once general principles for how to deal with discourse patterns in Construction Grammar have been set up, a specific choice of one parameter within a *dp* specification should ultimately be able to indicate and license, for instance, a specific kind of topic-comment articulation, or a specific type of foregrounding and backgrounding manifestations. That is, the choice of *dp* will have an effect on how such phenomena are to be accounted for on sentence and utterance level.

I have shown that it is indeed feasible to develop a description of larger and/or more functionally defined texts/discourses on the basis of the basic insights of Construction Grammar; and I want to argue that such an enterprise can easily be made an integral part of Construction Grammar, without negatively affecting the advances that Construction Grammar has made in other areas of grammar and language. What is more, this direction of development into the realm of discourse will underscore the all-encompassing feasibility of Construction Grammatical insights in general with respect to human behavior: in particular, such a move will make it possible to retain – and strengthen – the ties of Construction Grammar to its roots in human cognition.

Notes

1. The study has benefited extensively from both more general and very specific comments by Mirjam Fried and Jaakko Leino.

2. The headline appeared in the September 2 issue of *The Times* 1976. (Simon-Vandenbergen 1981: 278.)

3. Here I only mention two very well-known approaches that have had the stated holistic aim from their inception; overall, there is an abundance of approaches that in some form or other aim at complete coverage of language, including both European and American Structuralism, the Prague School, Stratificational Grammar, Glossematics, Cognitive Grammar, to name but a few.

4. Important work is indeed being carried out in recent attempts to apply constructional insights to the study of interaction; cf. e.g., Auer (2000); Thompson and Fox (2002); and many studies in Östman & Fried (forthcoming).

5. We might even be tempted to suggest that there is an inventory of discourse patterns, a discursicon, that a language has as part of the repertoire that native speakers will be familiar with, and that they can refer to at will. The discursicon (cf. lexicon, constructicon) will be part of the native speaker's 'communicative competence'.

6. Note also that not every grammatical construction needs to carry specifications about, say, phonological or phonetic properties of its elements or about the construction as a whole. There is thus a clear precedent in CxG for not having to specify every detail of form or every detail of meaning in every construction. This precedent is not only a notational tradition, but has a clear theoretical and methodological basis.

7. Particular paragraphs and texts can then be talked about as 'discourse constructs'.

8. The question is clearly much more complicated than I have made it out to be. Still, if CxG aspires to be able to account for all aspects of language, language learning is indeed one of the most pertinent areas to address. Constructional approaches to child language acquisition have proven extremely illuminating (cf. e.g. studies by Tomasello 2002), but so far not much has been done in the areas of second-language and foreign-language acquisition, and in the field of bilingualism in general. My suggestion here brings up for renewed discussion issues of whether interlanguages do exist, and what the whole notion of 'conventionalization' means in relation to an interlanguage.

9. That is, as already hinted at, and implied in Note 6, I suggest that the *dp* attribute can be left out of a representation where such a *dp* specification is not required in order to license a construct for a particular kind of discourse.

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Part II

Construction Grammars

Chapter 6

Embodied Construction Grammar in simulation-based language understanding

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1. Overview

This chapter introduces a construction grammar formalism that is designed specifically for integration into an embodied model of language understanding. We take as starting point for Embodied Construction Grammar many of the insights of mainstream Construction Grammar (Goldberg 1995; Fillmore 1988; Kay & Fillmore 1999; Lakoff 1987) and Cognitive Grammar (Langacker 1991). Foremost among these is the observation that linguistic knowledge at all levels, from morphemes to multi-word idioms, can be characterized as CONSTRUCTIONS, or pairings of form and meaning. Along with other construction grammarians, we assume that language users exploit constructions at these various levels to discern from a particular utterance a corresponding collection of interrelated conceptual structures.

We diverge from other construction grammar research in our concern with precisely how constructional knowledge facilitates conceptually deep language understanding.[1] Understanding an utterance in this broader sense involves not only determining the speaker's intended meaning but also inferring enough information to react appropriately, whether with language (e.g., by answering a question) or some other kind of action (e.g., by complying with an order or request). These processes involve subtle interactions with variable general knowledge and the current situational and discourse context; static associations between phonological and conceptual knowledge will not suffice. Our model addresses the need for a dynamic inferential semantics by viewing the conceptual understanding of an utterance as the internal activation of EMBODIED SCHEMAS – cognitive structures generalized over recurrent perceptual and

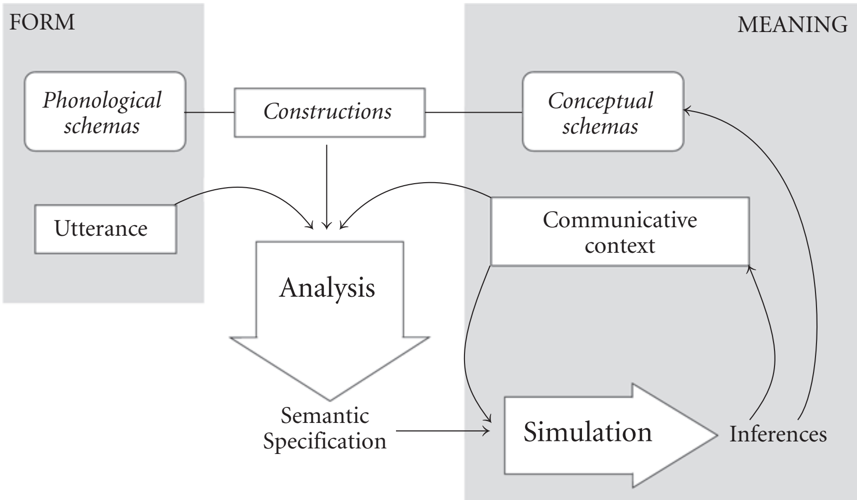

Figure 1. Overview of the simulation-based language understanding model, consisting of two primary processes: ANALYSIS and SIMULATION. Constructions play a central role in this framework as the bridge between phonological and conceptual knowledge.

motor experiences – along with the mental SIMULATION of these representations in context to produce a rich set of inferences.

An overview of the structures and processes in our model of language understanding is shown in Figure 1. The main source of linguistic knowledge is a large repository of constructions that express generalizations linking the domains of FORM (typically, phonological schemas) and MEANING (conceptual schemas). We also distinguish two interacting processes (shown as block arrows) that draw on these schematic structures to interpret an utterance appearing in a particular communicative context:

– The ANALYSIS process determines which constructions the utterance instantiates. The main product of analysis is the SEMANTIC SPECIFICATION (or SEMSPEC), which specifies the conceptual schemas evoked by the constructions involved and how they are related.
– The SIMULATION process takes the semspec as input and exploits representations underlying action and perception to simulate (or enact) the specified events, actions, objects, relations, and states. The inferences resulting from simulation shape subsequent processing and provide the basis for the language user's response.

The embedding of construction grammar in a simulation-based language understanding framework has significant representational consequences. Constructions in ECG need specify only enough information to launch a simulation using more general sensorimotor and cognitive structures. This division of labor reflects a fundamental distinction between conventionalized, schematic meanings that are directly associated with linguistic constructions, and indirect, open-ended inferences that result from detailed simulation. In effect, constructions provide a limited means by which the discrete tools of symbolic language can approximate the multidimensional, continuous world of action and perception.

An adequate construction grammar formalism for our model must therefore provide a coherent interface between the disparate structures and processes needed in analysis and simulation; it must also be defined precisely enough to support a computational implementation. The remainder of this section provides an introductory tour of the ECG formalism – in particular, our representations of embodied schemas (Section 1.1) and constructions (Section 1.2) – using a simplified possible analysis of the phrase *into Rome*, as in *We drove into Rome on Tuesday*. We illustrate the formalism in greater detail with an extended analysis in Section 2, and address issues related to the overarching simulation-based framework in Section 3.

1.1 Embodied schemas

What does *into* mean, and how can we represent it? We take the central meaning of *into* to involve a dynamic spatial relation in which one entity moves from the exterior to the interior of another (as informally depicted in Figure 2). In the cognitive linguistics literature, such perceptually grounded concepts have been defined in terms of IMAGE SCHEMAS – schematic idealizations that capture recurrent patterns of sensorimotor experience (Johnson 1987; Lakoff & Johnson 1980). The relation captured by *into* can be seen as combining several image schemas, including the following:

– The ***Trajector-Landmark*** schema (Langacker 1987) captures an asymmetric spatial relationship involving a ***trajector***, whose orientation, location, or motion is defined relative to a ***landmark***.
– The ***Source-Path-Goal*** (or simply ***SPG***) schema (Johnson 1987) structures our understanding of directed motion, in which a ***trajector*** moves (via some ***means***) along a ***path*** from a ***source*** to a ***goal***.

– The ***Container*** schema (Johnson 1987) structures our knowledge of enclosed (or partially enclosed) regions. It consists of a ***boundary*** separating the ***interior*** of the container from its ***exterior***, and can also include a ***portal*** through which entities may pass.

Each image schema specifies structured relationships among a set of participants, often called ROLES; roles can be instantiated by particular values (or FILLERS). Bottles, houses, and cities, for example, differ in many salient respects, but at a structural level they can all be interpreted as instances of the ***Container*** schema; the other schemas likewise provide a level of structural abstraction over different situations. Roles within and across schemas may share their fillers, resulting in more complex composite structures like that associated with *into*. In our example phrase *into Rome*, the city of Rome serves as the landmark with respect to which a general locative event takes place; the destination of the motion; and the container within which the moving entity is ultimately located.

Image schemas are part of a long tradition in linguistic analysis of schematic structures associated, at least implicitly, with richer underlying structures; these include Fillmore's (1982) semantic FRAMES (script-like structures relating sets of interdefined participants and props); Talmy's (1988) FORCE-DYNAMIC schemas (capturing interactions involving the application or exertion of force); and Langacker's (1987) SEMANTIC SCHEMAS (the basic unit for meaning representation in Cognitive Grammar). It appears to be this schematic level, and not the more detailed sensorimotor level, that is encoded

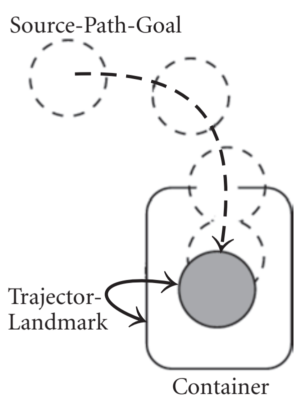

Figure 2. An iconic representation of some of the schemas involved in the meaning of *into*, including 'Container', 'Trajector-Landmark', and 'Source-Path-Goal'.

```
schema Trajector-Landmark
  roles
    trajector
    landmark
```

```
schema Container
  roles
    interior
    exterior
    portal
    boundary
```

```
schema SPG
  roles
    trajector
    source
    path
    goal
    means
```

Figure 3. ECG formalism for schemas involved in the meaning of '*into*'. Keywords of the notation are shown in **bold**. The initial header line names the embodied **schema** being defined, followed by an indented **roles** block listing the schema role names.

```
schema Into
    subcase of Trajector-Landmark
    evokes
      SPG as s
    roles
      trajector: Entity
      landmark: Container
    constraints
      trajector ⟷ s.trajector
      s.source  ⟷ landmark.exterior
      s.goal    ⟷ landmark.interior
```

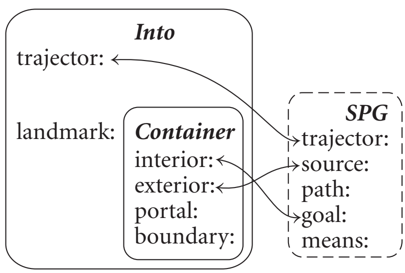

Figure 4. The '*Into*' schema, defined using the ECG formalism (left) and informally depicted as a set of linked schemas (right). '*Into*' is defined as a **subcase of** '*Trajector-Landmark*' that **evokes** an instance of the *SPG* schema (shown with a dashed boundary at right). Type constraints on roles require their fillers to be instances of the specified schemas, and identification bindings (⟷) indicate which roles have common fillers.

crosslinguistically in grammatical systems (Talmy 2000). In ECG, we refer to such schematic structures as EMBODIED SCHEMAS (or SCHEMAS). The simplest embodied schemas can, like their predecessors, be depicted as a list of roles, as shown in Figure 3. These roles allow external structures (including other schemas as well as constructions) to refer to the schema's key variable features, providing a convenient degree of abstraction for stating diverse linguistic generalizations. More importantly for our purposes, schema roles are also intended to serve as PARAMETERS to more detailed underlying structures that can drive active simulations; Section 3.2 describes how a broad range of embodied meanings can be simulated using a dynamic representation called EXECUTING SCHEMAS (Bailey 1997; Narayanan 1997).[2]

More complex embodied schemas like ***Into*** involve the interaction of multiple schemas and their roles. Figure 4 draws on several additional representational devices to formalize our earlier prose description:

– The **subcase of** *x* tag asserts that the schema being defined is a specific case of a more general schema *x*; all of *x*'s roles are accessible and its constraints apply. In the example, ***Into*** is marked as a subcase of the asymmetric relation between two entities captured by the ***Trajector-Landmark*** schema.
– The **evokes** block allows the schema to be defined against the background of other schemas; each line *x* **as** *y* gives the evoked schema *x* a local name (or ALIAS) *y* for internal reference.[3] Here, an instance of the ***SPG*** schema is evoked and labeled as ***s***.
– TYPE constraints (indicated with a colon, as $x : y$) restrict role *x* to be filled by an instance of schema *y*. The fillers of the ***Into*** schema's ***trajector*** and ***landmark*** roles are required to be instances of the ***Entity*** (not shown) and ***Container*** schemas, respectively.[4,5]
– Slot-chain notation is used to refer to a role *y* of a structure *x* as *x.y*; thus ***landmark.exterior*** refers to the ***exterior*** role of the ***Into*** schema's ***landmark*** role (itself a ***Container*** instance).
– IDENTIFICATION constraints (indicated with a double-headed arrow, as $x \longleftrightarrow y$) cause fillers to be shared between *x* and *y*. The **constraints** block IDENTIFIES (or BINDS) the schema's inherited ***trajector*** role with the evoked ***SPG*** instance's trajector. The other identifications assert that the trajector's path takes it from the interior to the exterior of the container. (Note that the same evoked schemas with a different set of bindings would be needed to express the meaning of *out of*.)

Other notational devices not illustrated by this example include:

– FILLER constraints (expressed using a single-headed arrow, as $x \longleftarrow y$) indicate that the role *x* is filled by the element *y* (a constant value).
– The keyword **self** refers to the structure being defined. This self-reference capability allows constraints to be asserted at the level of the entire structure.

Overall, the ECG schema formalism provides precise but flexible means of expressing schematic meanings, ranging from individual schemas to structured scenarios in which multiple schemas interact. The notational devices also allow us to assert that various relations hold among schemas (subcase, evokes) and their roles (identification, filler). Some of these bear a resemblance to notions familiar from object-oriented programming languages and constraint-based grammars (Shieber 1986; Pollard & Sag 1994); these include features, inheritance, typing, and unification/coindexation. But, as suggested by some of our terminological choices,[6] the formal tools used for representing schemas must be viewed in light of their main function in the present context: providing means for external structures to set simulation parameters. These external structures include not just schemas but also, more importantly, constructions represented using similar mechanisms, as we describe in the next section.

1.2 A first look at constructions

Constructional approaches to grammar take the basic unit of linguistic knowledge to consist of form-meaning pairings, called CONSTRUCTIONS. This characterization crosscuts many traditional linguistic divisions, applying equally well to constructions of varying sizes (from morphological inflections to intonational contours) and levels of concreteness (from lexical items and idiomatic expressions to clausal units and argument structure patterns). In this section, we analyze our example *into Rome* as involving several such form-meaning mappings – including lexical constructions for *into* and *Rome* and a phrasal construction licensing their combination – and show how to represent them in the ECG construction formalism.

We begin with the simpler lexical constructions. The construction corresponding to *into* presumably links the ***Into*** schema described in Section 1.1 with some appropriate form representation. Although potential forms are not as open-ended as potential meanings, they nevertheless include such diverse elements as acoustic schemas, articulatory gestures, orthographic form(s), and stress or tone patterns. To ease exposition, we will rely here on a reduced notion of form including only phonological information, represented (as noted earlier) using the ECG schema formalism previously applied only to the meaning domain. Figure 5 shows the two form schemas used to define constructions in this chapter: a highly abstract ***Schematic-Form*** schema of which all other form schemas are subcases; and a ***Word*** schema with one role ***phon*** intended to contain specific phonological strings. (We assume that all words in spoken languages have this role.)

Figure 6 shows how the relevant form-meaning associations for *into* are expressed in the ECG construction formalism. We define two constructions: a general SPATIAL-RELATION construction, and a more specific INTO-CXN con-

schema Schematic-Form

schema Word
  subcase of Schematic-Form
  roles
    phon

Figure 5. The ***Schematic-Form*** schema is the most general form schema; its (simplified) subcase ***Word*** schema has a ***phon*** role for specifying phonological strings.

construction SPATIAL-RELATION
  form: Schematic-Form
  meaning: Trajector-Landmark

construction INTO-CXN
  subcase of Spatial-Relation
  form: Word
    phon ⟵ /Intu^{w}/
  meaning: Into

Figure 6. The SPATIAL-RELATION pairs a ***Schematic-Form*** as its form pole with a ***Trajector-Landmark*** as its meaning pole; its subcase INTO-CXN further restricts these types. In particular, its form pole is constrained to be a ***Word*** whose ***phon*** role is filled with the specified phonological string.

struction for our example. The notation is similar in many respects to that in the schema formalism, with initial header lines naming the **construction**s being defined (shown in SMALL CAPS, both in the figure and in text), and a **subcase** tag in INTO-CXN relating the two constructions. In fact, the construction formalism includes all the representational devices introduced for schemas. But to fulfill their basic function, constructions also include two indented blocks, labeled **form** and **meaning**, which stand for their two linked domains, or POLES. These poles list the elements and constraints (if any) within each domain, but they should also be considered special components of the construction that can be referred to and constrained, roughly analogous to schema roles. As shown in the figure, SPATIAL-RELATION's type constraints restrict its form pole to be an instance of ***Schematic-Form*** and its meaning pole to be an instance of ***Trajector-Landmark*** (from Figure 3). This constructional category is thus general enough to include a variety of spatial relations expressions that denote ***Trajector-Landmark*** relationships, including not just single words (like *into* and *over*) but also multiword expressions (like *out of* and *to the left of*). These type constraints apply to all subcases of the construction; INTO-CXN imposes even stricter requirements, linking an instance of ***Word*** (a subcase of

construction Ref-Expr
form: Schematic-Form
meaning: Referent

construction Rome-Cxn
subcase of Ref-Expr
form: Word
phon $\longleftarrow$ /ro^{w}m/
meaning
resolved-referent $\longleftrightarrow$ Rome

Figure 7. The Ref-Expr construction underlying all referring expressions pairs a schematic form with a ***Referent*** schema. Its subcase Rome-Cxn identifies the resolved-referent role of its meaning pole with the known place specified by the ***Rome*** schema, and pairs this with the appropriate phonological string.

Schematic-Form) with an instance of ***Into*** (a subcase of ***Trajector-Landmark***). The form block also includes a filler constraint on its ***phon*** role, specifying /Intu^{W}/ as the particular phonological string associated with the construction,

The other lexical construction in our example is similarly represented using a pair of related constructions, one a subcase of the other. The constructions shown in Figure 7 are intended to capture the basic intuition that the Rome construction is a specific referring expression (Ref-Expr) that picks out a known place in the world. Referring expressions will be discussed in more detail in Section 2.1. For now we need only stipulate that Ref-Expr's meaning pole, an instance of the ***Referent*** schema, includes a ***resolved-referent*** role whose filler is the entity picked out by the expression. In our example, Rome-Cxn is defined as a subcase of the general construction that, besides specifying an appropriate phonological string, binds this role to the (conceptual schema) ***Rome***, a known entity in the understander's ontology.[7]

The final construction used in our example phrase illustrates how constructions may exhibit constituent structure. The phrase *into Rome* exemplifies a pattern in which a spatial relation with a particular landmark is associated with two expressions: a Spatial-Relation and a Ref-Expr, in that order. Despite the relatively abstract nature of these elements, this pattern can be expressed using the same representational mechanisms as the more concrete constructions we have already seen, with one addition. As shown in Figure 8, we introduce a **constructional** block listing two constituent elements, ***sr*** and ***lm***, which are typed as instances of the Spatial-Relation and Ref-Expr constructions, respectively.[8] (Instances of constructions are also called constructs.) These constituents, and their form and meaning poles, may be referenced and constrained just like other accessible elements. In the formalism, a subscripted f (for form) or m (for meaning) on a construct's name refers to the appropriate pole. Moreover, since the **self** notation refers to the construction being defined,

construction Spatial-Phrase
constructional
sr: Spatial-Relation
lm: Ref-Expr
form: Schematic-Form
sr_f `before` lm_f
meaning: Trajector-Landmark
$\mathrm{sr}_m.\mathrm{landmark} \longleftrightarrow \mathrm{lm}_m$
$\mathbf{self}_m \longleftrightarrow \mathrm{sr}_m$

Figure 8. The Spatial-Phrase construction has two constituents specified in the **constructional** block. The form and meaning poles of these constituents are subject to both a word order constraint (in the form block) and an identification constraint (in the meaning block). The meaning of the overall construction is also bound to the meaning of its *sr* constituent.

$\mathbf{self}_f$ and $\mathbf{self}_m$ can be used to refer to the form and meaning poles, respectively, of the construction in which they appear. We can thus assert relations that must hold among constituents, or between a construction and its constituents.

The form and meaning blocks of the Spatial-Phrase construction impose several such relational constraints. The single form constraint expresses the word order requirement mentioned earlier: the form pole of ***sr*** must precede that of ***lm***, though not necessarily immediately (since modifiers, for example, might intervene). We notate this constraint with the interval relation `before`, one of many possible binary relations between intervals set out in Allen's (1984) Interval Algebra. (Immediate precedence is expressed using the `meets` relation.) The meaning block similarly relates the two constituents: the ***landmark*** role of the ***sr*** constituent's meaning pole (an instance of the ***Trajector-Landmark*** schema) is identified with the ***lm*** constituent's meaning pole. The other constraint uses the $\mathbf{self}_m$ notation to identify the overall construction's meaning pole (also an instance of the ***Trajector-Landmark*** schema) with that of its ***sr*** constituent. In other words, the meaning of the entire construction is essentially the same spatial relation specified by its ***sr*** constituent, but with the particular landmark specified by its ***lm*** constituent.

For the Spatial-Relation construction to license our example phrase *into Rome*, instances of the lexical Into and Rome constructions must satisfy all the relevant type, form, and meaning constraints on the ***sr*** and ***lm*** constituents. Note that the particular constructs involved may impose constraints not directly specified by Spatial-Phrase. In this case, the ***Into*** schema constrains its ***landmark*** – identified by the first meaning constraint with the ***Rome*** schema – to be an instance of a ***Container***. Assuming, as suggested earlier (though not formally depicted), that cities and other geographical regions may serve at least abstractly as instances of the ***Container*** schema, the binding succeeds, resulting in a set of interrelated semantic structures resembling that depicted in Figure 4 with the ***Rome*** schema serving as the landmark container.

Our brief introduction to Embodied Construction Grammar has highlighted the formal representations of both schemas and constructions. Embodied schemas capture generalizations over experience in the domains of form or meaning; we represent them as role description structures that can parameterize simulations. Schemas may be subcases of more general schemas, or evoke and constrain instances of other schemas; their roles may be required to have fillers of specific types, or they may be identified with other roles or filled by particular values. Constructions are in some sense a special bipolar schematic structure that captures generalizations over form-meaning pairs; they thus employ a similar range of representational mechanisms. Constructions may also have internal constructional constituents upon which they may assert relational constraints. In the next section, we illustrate the interaction of these conceptual and linguistic representations in greater detail, deferring until the third section larger issues involved in the processes of constructional analysis and simulative inference.

2. A detailed analysis

This section shows our construction formalism at work in a more complex example. We present a collection of constructions that together license an analysis of the utterance in (1):

(1) Mary tossed me a drink.

Our analysis follows that of Goldberg (1995) in presuming that the ditransitive argument structure (in this example, the active ditransitive argument structure) imposes an interpretation in which one entity takes some action that causes another entity to receive something. Thus, although the verb *toss* appears with a variety of argument structures, its appearance in the example sentence is allowed only if its meaning pole can be understood as contributing to a transfer event of this kind.

Figure 9 is a simplified depiction of the analysis we develop in this section. The form and meaning domains linked by constructional knowledge are shown as gray rectangles on either side of the figure. Form elements – including phonological schemas (shown simply as phonological strings in rounded rect-

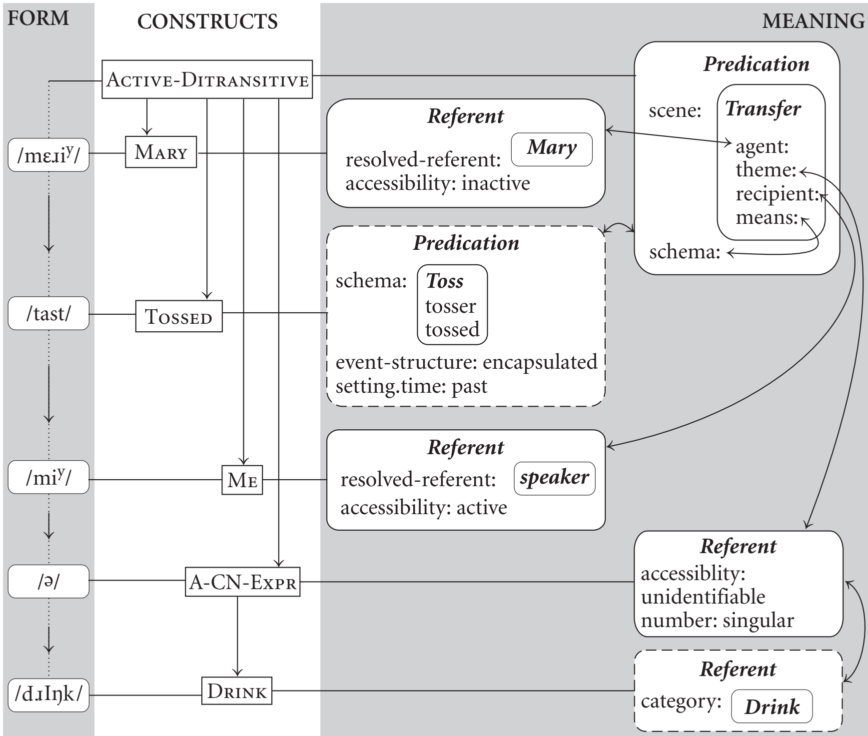

Figure 9. A depiction of a constructional analysis of *Mary tossed me a drink*. Constructs involved are shown in the center, linking elements and constraints in the domains of form and meaning; schemas are shown as rounded rectangles. (Some details not shown; see text.)

angles) and word order relations (shown as arrows on a schematic time line) – appear in the form domain. Meaning elements – including schemas (shown as rounded rectangles) and bindings among their roles (shown as double-headed arrows) – appear in the meaning domain. The six rectangles lying between these domains correspond to the six constructs involved in the analysis. Each construct is labeled according to the construction it instantiates and is linked to other elements in the analysis in various ways. Horizontal lines link each construct with its form and meaning poles, while vertical arrows between the boxes express constructional constituency. For example, the box for the MARY construct has a (form) link to the phonological form /mɛɹiʸ/ (residing in the form domain) and a (meaning) link to ***Referent*** schema (residing in the meaning domain), which resolves to a ***Mary*** schema; in this analysis it is also a constructional constituent of the ACTIVE-DITRANSITIVE construct.

The constructions and schemas shown in the diagram (as well as several others not shown) are defined in this section using the ECG formalism. As will become clear, many of the details of the analysis – such as the specific constructions and schemas involved, as well as the subcase relations among them – are subject to considerable debate. Our current purpose, however, is not to offer the most general or elegant definition of any particular construction, but rather to demonstrate how the ECG formalism can express the choices we have made. The analysis also highlights the interaction between lexical and clausal semantics, suppressing details of how the formalism could represent sub-lexical constructions and more significant interactions with the discourse context; alternative analyses are mentioned where relevant.

We broadly divide the constructions to be defined in this section into those that allow the speaker to REFER and those that allow the speaker to PREDICATE. This division reflects the differing communicative functions of reference (typically associated with entities) and predication (typically associated with events). Following Croft (1990, 1991, 2001), we take reference and predication to be primary propositional acts that motivate many traditional grammatical categories and relations; they also have natural interpretations in our framework as the main schemas structuring the simulation (Section 3.1). We organize our analysis accordingly: the referring expressions in our example – *Mary*, *me*, and *a drink* – are defined in Section 2.1, followed by expressions involved in predication – both the main verb *tossed* and the ditransitive argument structure construction – in Section 2.2.

2.1 Referring expressions

The act of making REFERENCE (to some REFERENT or set of referents) is a central function of linguistic communication. Speakers use language to evoke or direct attention to specific entities and events. A wide range of constructions is used for this function, including pronouns (*he*, *it*), proper names (*Harry*, *Paris*), and complex phrases with articles, modifiers, and complements (e.g., *a red ball*, *Harry's favorite picture of Paris*). But while the forms used in these constructions are highly variable, they all rely on the notion of reference as a core part of their meaning. The REF-EXPR (referring expression) construction defined in Section 1.2 and repeated here, is thus relatively schematic, linking a ***Schematic-Form*** with a ***Referent*** (Figure 10).

schema Referent
roles
category
restrictions
attributions
number
accessibility
resolved-referent

construction Ref-Expr
form: Schematic-Form
meaning: Referent

Figure 10. The ***Referent*** schema, the meaning pole of all referring expressions (Ref-Expr, repeated from Figure 7), contains information related to an active reference resolution process, including the number and accessibility of the intended referent.

The roles of the ***Referent*** schema correspond to information that a referring expression may convey about a referent. These include its ontological ***category*** (e.g., human, ball, picture); ***restrictions*** and ***attributions*** that apply to various open-class characteristics of the referent (e.g., size or color); the ***number*** of the referent (e.g., singular or plural), and its default level of ***accessibility*** (Lambrecht 1994) in the current discourse context (active, accessible, inactive, unidentifiable, etc.).[9,10] Specific subcases of Ref-Expr may place further constraints on these roles, which are used in a separate reference resolution procedure that finds the most likely referent in context (for example, a particular known individual or event); this actual referent, when determined, is the filler of the ***resolved-referent*** role. Some referring expressions, such as proper nouns (like *Rome*) and local deictic pronouns (like *I* and *me*) assert a direct binding on the ***resolved-referent*** role.

Our example includes three different referring expressions: *Mary*, *Me*, and *a drink*. We will analyze these as involving three constructions that are all subcases of the Ref-Expr construction – Mary, Me, and A-CN-Expr – as well as Common-Noun and its subcase Drink-Cxn. Some constraints in the constructions we show could be expressed instead in more general constructions corresponding to proper nouns, pronouns, and determined phrases. To simplify the analysis, we have opted for more specific constructions that make fewer commitments with respect to subcase relations. Note, however, that the two approaches can be viewed as informationally equivalent with respect to the utterance under consideration.

We begin with the Mary and Me constructions (Figure 10). Both of these are specified as subcases of Ref-Expr, and have form and meaning poles that are structurally similar to the Rome construction from Section 1.2. Each form pole is an instance of the ***Word*** schema with the appropriate phonological string, and each meaning pole constrains the ***resolved-referent*** role and specifies the referent's level of ***accessibility***. The differences in meaning pole constraints reflect the differing functions of proper nouns and pronouns: proper nouns like *Mary* refer to known ontological entities (here, the ***Mary*** schema is intended to correspond to an individual conventionally named "Mary") and thus can be used with no prior mention; they need only a minimal ***inactive*** level of accessibility. In contrast, pronouns like *me* and *you* identify referents for which the interlocutors have ***active*** representations in the current discourse; in this case, the Me construction makes deictic reference to the ***speaker*** role in the current context (notated here as ***current-space.speaker***; see Section 4 for discussion of how this role relates to work in *mental spaces*).

The Me construction also differs from the Mary construction in having a **constructional** block, whose single ***case*** role is assigned the value ***object***. In the Spatial-Phrase construction, this block was used only to list constructional constituents. Here, however, we illustrate its more general function of specifying any elements or constraints applicable to the construction as a whole – that is, information residing in neither the form nor meaning domain alone. The ***case*** role (also termed a constructional feature) distinguishes the Me construction from the constructions for *I* (***subject*** case) and *my* (***possessive*** case) (as discussed further in Section 2.2.3). Note that in a more complete analysis of English, the ***case*** feature would be defined in a general Pronoun construction; for other languages with wider use of case, this feature might be defined in the more abstract Ref-Expr construction.

The final referring expression in our example, the phrase *a drink*, has more internal structure than the other ones we have considered. In traditional analyses, each word in the phrase – the article *a* and the common noun *drink* – corresponds to a constituent of the overall expression. But we elect here to treat the article as semantically and formally inseparable from the referring expression – that is, as tied to the context in which it precedes some category-denoting expression (traditionally called a common noun) and refers to an individual of the specified category. We formalize this analysis in Figure 11 with three constructions: a Common-Noun construction, its subcase Drink-Cxn construction, and the A-CN-Expr construction (or *a*-common noun expression, to contrast with a similar *the*-common noun expression, not shown). As usual, other alternatives are possible, but this analysis captures the constraints present in our example while demonstrating the flexibility of the ECG formalism as used for referring expressions.

The overall intuition captured by the analysis is that common nouns provide categorical information about a referent, and expressions involving common nouns place further restrictions on the reference resolution process. The

construction Mary
subcase of Ref-Expr
form: Word
phon ⟵ /mɛɹiʸ/
meaning
resolved-referent ⟷ Mary
accessibility ⟵ inactive

construction Me
subcase of Ref-Expr
constructional
case ⟵ object
form: Word
phon ⟵ /miʸ/
meaning
resolved-referent ⟷ current-space.speaker
accessibility ⟵ active

Figure 11. The Mary and Me constructions, both subcases of Ref-Expr, bind the ***Referent*** schema's resolved-referent role to the ***Mary*** schema and the current speaker, respectively, and set different default levels of accessibility. The Me construction also constrains its case constructional feature.

construction Common-Noun
form: Schematic-Form
meaning
evokes Referent **as** ref
self$_m$ ⟷ ref.category

construction Drink-Cxn
subcase of Common-Noun
form: Word
phon ⟵ /dɹɪŋk/
meaning: Drink

construction A-CN-Expr
subcase of Ref-Expr
constructional
com-noun: Common-Noun
form
a-form ⟵ /ə/
a-form before com-noun$_f$
meaning
self$_m$ ⟷ com-noun$_m$.ref
accessibility ⟵ unidentifiable
number ⟵ singular

Figure 12. Constructions underlying *a drink*: Common-Noun and its subcase Drink-Cxn supply a referent's category by bindings its meaning pole (for Drink-Cxn, the ***Drink*** schema) to its evoked ***Referent*** schema's ***category*** slot. The A-CN-Expr construction has one constructional constituent, typed as a Common-Noun, which it constrains to follow the ***form*** element it introduces (/ə/). Its meaning pole, a ***Referent*** schema, is identified with the evoked ***Referent*** of its constituent and further constrained.

Common-Noun construction thus evokes a ***Referent***, whose ***category*** role is identified with the entire construction's meaning pole. Its subcase Drink-Cxn specializes both its form pole (with a particular phonological string) and its meaning pole (typed as a ***Drink***). In sum, these two constructions assert that the common noun *drink* has as its meaning pole the ***Drink*** schema, which is the category of the ***Referent*** schema it evokes by virtue of being a common noun (as depicted in Figure 9). The A-CN-Expr construction unifies the ***Referent*** evoked by its ***com-noun*** constituent – which, as an instance of Common-Noun, supplies categorical information – with its own ***Referent*** meaning pole. The form block introduces an internal form element ***a-form*** and constrains it to appear before the ***com-noun*** constituent. The meaning block imposes additional constraints on the overall ***Referent***, corresponding to the traditional functions of the indefinite singular determiner *a*: the ***accessibility*** is set as ***unidentifiable***, which among other effects may introduce a new referent into the discourse context; and its ***number*** is set as ***singular***.

Our treatment of reference, though preliminary, nevertheless suffices for the simple lexical and phrasal referring expressions in our example. Further research is necessary to account for the full range of referential phenomena, including modifiers, complements, and relative clauses. But we believe that even these complex referring expressions can be approached using the basic strategy of evoking and constraining a ***Referent*** schema that serves as input for reference resolution.

2.2 Predicating expressions

The act of predication can be considered the relational counterpart to reference. Speakers make attributions and assert relations as holding of particular entities; and they locate, or ground, these relations (in time and space) with respect to the current speech context. Central cases of constructions used to predicate include Goldberg's (1995) basic argument structure constructions and other clausal or multiclausal constructions. But many other kinds of construction – including the traditional notion of a *verb* as designating a relation between entities, as well as both morphological constructions and larger verb complexes that express tense, aspect, and modality – provide information relevant to making predications.

Figure 13 shows an ECG schema that organizes predicative content, the ***Predication*** schema. As usual, the roles given here are not intended to be exhaustive, but they suffice for describing a wide range of predications, including the one in our example, in precise enough terms to simulate. The schematic Pred-Expr (predicating expression) construction is analogous to the Ref-Expr construction in covering a wide range of expressions that predicate; it pairs a ***Schematic-Form*** instance with a ***Predication*** instance. (Other predica-

schema Predication
  roles
    scene
    schema
    event-structure
    setting

construction Pred-Expr
  form: Schematic-Form
  meaning: Predication

Figure 13. The Predication schema and Pred-Expr construction are the analogs in the domain of predication to the Referent schema and Ref-Expr construction. The Predication schema captures major aspects of predicating, including the overall scene and the primary schema involved.

tive constructions, like the verbal constructions to be considered later, may simply evoke a ***Predication*** instance in their meaning poles.)

The first two roles of ***Predication*** together specify the main conceptual content and participant structure being asserted, in terms of both the overall ***scene*** (typically set by clausal constructions) and a main ***schema*** involved (typically set by verbal constructions). In general, the underlying semantics associated with these two roles must be understood as part of one coherent event. The ***scene*** role can be filled by a relatively limited set of schemas that describe basic patterns of interaction among a set of participants. These correspond roughly to what Goldberg (1995: 39) refers to as "humanly relevant scenes", as well as to the basic scenes associated with children's cross-linguistically earliest grammatical markings (Slobin 1985); examples include ***Force-Application*** (one participant exerting force on another), ***Self-Motion*** (a self-propelled motion by a single participant), ***Caused-Motion*** (one participant causing the motion of another), or, as in our example sentence, ***Transfer*** (a participant transfers an entity to a second participant). These overall scenes generalize over the particular concrete actions involved – whether, for example, the participant in an instance of ***Self-Motion*** sustains the motion by walking, hopping, or pushing through a crowd; the concrete schemas are bound instead to the ***schema*** role. As we shall see, the relation between ***scene*** and ***schema*** is at the crux of the analysis process, since many factors influence their interaction. Their separation in the ***Predication*** schema provides some useful representational flexibility: individual constructions may specify as much or as little as needed about these roles and how they are related.

The remaining roles of the ***Predication*** schema supply additional information about how the event is to be understood. The ***event-structure*** role constrains the shape of the event asserted in the predication or the particular stage it profiles; cross-linguistically, markers of linguistic aspect typically affect this role. The event may also be located in a particular ***setting*** in time or space; tense markings, for example, generally affect a substructure ***time*** of the ***setting*** role.

We analyze our example sentence as involving two main constructions that interact to define the overall predication: the verbal Tossed construction and the clausal Active-Ditransitive construction. These constructions exemplify the pattern mentioned above: the verbal construction binds a particular action schema (the ***Toss*** schema) to the ***schema*** role, while the clausal construction binds a ***Transfer*** schema to the ***scene*** role.[11] In the analysis we will develop, these separately contributed schemas are directly related in the final predication: the tossing action is understood as the *means* by which a transfer is effected.[12] We examine first the schemas needed to represent the meanings involved in our example sentence (Section 2.2.1) and then use these to define the relevant verbal (Section 2.2.2) and clausal (Section 2.2.3) constructions.

2.2.1 *Representing scenes*

In this section we consider some schemas needed to represent the meanings predicated by our example sentence, *Mary tossed me a drink*. We interpret the sentence as asserting that at some point before speech time, the referent of *Mary* applied a tossing action to the referent of *a drink*, which as a result is received by the referent of *me* (the speaker in the current context). Prototypically, the action of tossing is a low-energy hand action that causes an entity to move through the air; since it intrinsically causes motion, we will define it relative to the general ***Caused-Motion*** schema. Our example has the further implication that the referent of *a drink* is received by the speaker. That is, it depicts an overall scene of ***Transfer***, in which one entity acts to cause another to receive a third entity, irrespective of the particular action involved.

We follow Goldberg (1995) in attributing this ***Transfer*** semantics to the ditransitive clausal pattern, or argument structure construction, where the subject encodes the causer of transfer, the first postverbal object encodes the recipient of transfer, and the second postverbal object the transferred entity. We base this analysis on evidence such as that in (2):

(2) a. Mary spun/broomed me a drink. (*transfer*)
b. ?Mary tossed the floor a drink. (?*transfer*)
c. Mary tossed a drink to the floor. (*caused motion*)

Sentence (2a) shows that ditransitive syntax can impose an intended transfer reading even on verbs not prototypically associated with transfer, including transitive verbs like *spin* as well as novel denominal verbs like *broom*. This transfer sense is distinct from the semantics associated with caused motion clausal syntax, as demonstrated by the differing acceptability of the sentences in (2b) and (2c). The referent of the first object in a ditransitive sentence must serve as a recipient – that is, it must be categorized or construed as something that can receive the transferred object. Thus (2b) has an acceptable reading only under a (metaphorical, anthropomorphized) construal of *the floor* as a possible receiver and possessor of objects. This requirement does not apply to the caused-motion argument structure in (2c), which implies only that the agent causes motion of the entity along some path, without any entailment of receiving.[13]

These intuitions can be made concrete using the representational tools of ECG to define the two relevant scenes, ***Caused-Motion*** and ***Transfer*** (Figure 14), each defined in terms of several other schemas (Figure 15). The two

```
schema Caused-Motion
  evokes
    Force-Application as fa
    SPG as s
    Cause-Effect as ce
  roles
    agent ⟷ fa.energy-source
    theme ⟷ fa.energy-sink ⟷ s.trajector
    path ⟷ s
    means ⟷ fa.means
  constraints
    ce.cause ⟷ fa
    ce.effect ⟷ s
```

```
schema Transfer
  evokes
    Force-Application as fa
    Receive as rec
    Cause-Effect as ce
  roles
    agent ⟷ fa.energy-source
    theme ⟷ rec.received
    recipient ⟷ rec.receiver
    means ⟷ fa.means
  constraints
    ce.cause ⟷ fa
    ce.effect ⟷ rec
```

Figure 14. The structurally similar ***Caused-Motion*** (in which an ***agent*** acts on a theme via some ***means*** such that it moves along a ***path***) and ***Transfer*** (in which an ***agent*** acts on a ***theme*** via some ***means*** such that it is received by a ***recipient***) capture scenes relevant to the example.

```
schema Force-Application
  roles
    energy-source
    instrument
    energy-sink
    force-type
    force-amount
    means
```

```
schema Cause-Effect
  roles
    cause
    effect
```

```
schema Receive
  roles
    receiver
    received
```

Figure 15. Embodied schemas contributing to the example sentence: ***Force-Application*** captures scenarios in which an ***energy-source*** exerts force on an ***energy-sink***; ***Cause-Effect*** captures causal relations; and the ***Receive*** schema has roles for a ***receiver*** and a ***received*** entity.

scenes are structurally parallel: each involves a forceful action on the part of an ***agent*** entity, which causes some effect on a ***theme*** entity. The forceful action is captured by the ***Force-Application*** schema, which involves an ***energy-source*** that exerts force on an ***energy-sink*** via some ***means***, possibly through an ***instrument***; the type and amount of force may also be specified.[14] The causal structure is captured by the simple ***Cause-Effect*** schema, which lists only a ***cause*** and a resulting ***effect***. Each of the schemas in Figure 14 evokes both the ***Force-Application*** and ***Cause-Effect*** schemas and asserts constraints that identify the ***agent*** in each scene with the ***energy-source*** of the forceful action, the overall ***means*** of the scene with the ***means*** of the forceful action, and the forceful action itself with the ***Cause-Effect***'s ***cause***.

Where the two scenes differ is in their effects – that is, in the particular schemas bound to the ***effect*** role of their evoked ***Cause-Effect*** schemas. In the ***Caused-Motion*** scene, the result of the forceful action is the motion of the ***theme*** entity along a path; this is captured by an evoked ***SPG*** schema (defined earlier), whose ***trajector*** is bound to the ***theme***. (Note that the formalism allows multiple identifications to be expressed at once, in either the roles or constraints block.) In the ***Transfer*** scene, the ***effect*** is bound not to an ***SPG*** but rather to an evoked ***Receive*** schema, with the ***receiver*** and the ***received*** bound to the ***Transfer*** scene's ***recipient*** and ***theme*** roles, respectively.

Both scenes we have defined are abstract in that the particular action (or ***means***) involved is not specified; indirectly, however, they both require some action that is construable as applying force, and that the ***agent*** role's filler must be capable of performing. The concrete actions are typically supplied by specific verbs. These indirect constraints thus play a key role in determining how verbs interact with clausal constructions evoking these scenes, as we will show for the particular verb *tossed* in the remainder of this section.

2.2.2 Tossed *as a* Verb

We first consider how the action of tossing can be represented using embodied schemas before defining the construction for the verb *tossed*. As noted earlier, the ***Toss*** schema needed for our example is semantically compatible with either of the scenes we have described, but it is intrinsically associated with caused motion and thus defined here against the backdrop of the ***Caused-Motion*** schema (Figure 16). Specifically, ***Toss*** evokes both a ***Caused-Motion*** schema and a ***Fly*** schema (not shown); it identifies itself with the ***means*** role of the evoked ***Caused-Motion***, as expressed by the first line in the constraints block. The remaining constraints straightforwardly identify the ***Toss*** schema's two roles, a ***tosser*** and a ***tossed*** object, with appropriate roles in the evoked schemas; restrict the degree of force used in the causal action to ***low***; and bind the ***means*** of the associated resulting motion to the evoked ***Fly*** action. In sum, the action of tossing is a (somewhat) forceful action on an entity that causes it to fly. (As usual, this schema should be viewed as summarizing the motor parameters for a more detailed representation of the tossing action schema, to be discussed in Section 3.2.1.)

We now turn to the verb *tossed*, which is linked to the ***Toss*** schema described in the last section, but also carries aspect and tense information that applies to the larger predication associated with the overall sentence. Loosely following Langacker (1991), we define the Verb construction as a word that evokes a ***Predication*** instance, such that its subcases (including the Tossed

```
schema Toss
  evokes
    Caused-Motion as cm
    Fly as f
  roles
    tosser ⟷ cm.agent
    tossed ⟷ cm.theme ⟷ f.flyer
  constraints
    cm.means ⟷ self
    cm.fa.force-amount ⟵ low
    cm.path.means ⟷ f
```

Figure 16. The ***Toss*** schema is identified with the means of its evoked ***Caused-Motion***. It also constrains the associated ***Force-Application*** to be a low-force action that results in a flying motion.

construction Verb
  form: Word
  meaning
    evokes Predication **as** pred

construction Tossed
  subcase of Verb
  form
    phon: /tast/
  meaning: Toss
    self$_m \longleftrightarrow$ pred.schema
    pred.event-structure $\longleftarrow$ encapsulated
    pred.setting.time $\longleftarrow$ past

Figure 17. The Verb construction evokes a ***Predication*** schema. Its subcase Tossed construction identifies its meaning pole, typed as a ***Toss*** schema, with the evoked ***Predication*** schema's main ***schema*** role and asserts aspect and tense constraints.

construction) may assert further constraints (both constructions are shown in Figure 17). Specifically, the Tossed construction associates the phonological form /tast/ with a meaning pole typed as an instance of the ***Toss*** schema. This entire meaning pole is bound to ***pred.schema***, indicating that it serves as the main schema of its evoked ***Predication***. The remaining constraints affect ***Predication*** roles related to aspect and tense. First, as discussed further in Section 3.2.1, the English simple past tense can be modeled using executing schemas that suppress, or encapsulate, details of their internal structure during simulation; the ***Predication***'s ***event-structure*** is thus set as ***encapsulated***. Second, the constraint setting the ***pred.setting.time*** as ***past*** indicates that the time during which the relational predication holds, corresponding to Reichenbach's (1947) Event Time, must be prior to the (contextually specified) Speech Time.

2.2.3 *The* Active-Ditransitive *construction*

The only remaining construction to define is the argument structure construction spanning the entire utterance, the Active-Ditransitive construction. As suggested earlier, we analyze this construction (Figure 18), as well as other ditransitive constructions like Passive-Ditransitive and Imperative-Ditransitive, as a subcase of the Pred-Expr construction whose associated predication is based on a scene of ***Transfer***. The close relation between this clausal construction and the ***Transfer*** scene is reflected by its four constituents,

```
construction ACTIVE-DITRANSITIVE
  subcase of PRED-EXPR
  constructional
    agent: REF-EXPR
    action: VERB
    recipient: REF-EXPR
    theme: REF-EXPR
    recipient.case ⟵ object
    agent.case ⟵ subject
    theme.case ⟵ object
  form
    agent_f before action_f
    action_f meets recipient_f
    recipient_f meets theme_f
  meaning
    evokes Transfer as tr
    self_m. scene ⟷ tr
    tr.agent ⟷ agent_m
    tr.theme ⟷ theme_m
    tr.recipient ⟷ recipient_m
    tr.means ⟷ action_m
    self_m ⟷ action_m.pred
```

Figure 18. The ACTIVE-DITRANSITIVE construction has four constituents, including three referring expressions with specified case values. Besides imposing order constraints, the construction binds its meaning pole (a Predication), with its verbal constituent's evoked predication; its evoked Transfer schema with its scene role; and the meaning poles of its constituents with roles of the Transfer schema.

which are deliberately given aliases parallel to those of the ***Transfer*** schema's roles.

Constructional constraints enforce case restrictions on pronouns filling the ***agent***, ***theme***, and ***recipient*** constituents (discussed in Section 2.1), accounting for the judgments in (3):[15]

(3) a. *Mary tossed I/my a drink.
b. *Me/my tossed Mary a drink.

The three order constraints reflect intuitions suggested by the examples in (4):

(4) a. Mary tossed me a drink.
b. Mary happily tossed me a drink.
c. *Mary tossed happily me a drink.

d. *Mary tossed me happily a drink.
e. Mary tossed me a drink happily.

That is, the ***agent*** must precede the ***action*** (though not necessarily immediately), and no intervening material is allowed between the ***action*** and ***recipient*** constituents, nor between the ***recipient*** and ***theme*** constituents.

The meaning constraints are more complicated. The entire meaning pole is a ***Predication***, as specified by the Pred-Expr construction, but it also evokes an instance of the ***Transfer*** schema. This schema is bound to **self**$_m$.scene – that is, the ***scene*** role of the overall construction's meaning pole, which is itself an instance of ***Predication*** – and its roles are in turn bound to the meaning poles of the various constituents. A final complication is dealt with by the last meaning constraint, which identifies the entire meaning pole with the ***Predication*** evoked by the verbal ***action*** constituent. (This binding corresponds to the double-headed arrow linking the two ***Predication*** schemas in Figure 9.) This constraint allows the overall predication to incorporate any relevant constraints expressed by the verb.

We can now examine the interaction of verbal and clausal semantics in our example, in which the ***Active-Ditransitive*** construction's ***action*** constituent is filled by the verb *tossed*. The verbal and clausal constructions both assert constraints on the overall predication: Tossed supplies aspect and tense information and the main schema involved (***Toss***), while ***Active-Ditransitive*** specifies the scene (***Transfer***) and binds its roles. Crucially, the ***Toss*** schema provided by the verb is required to serve as a means of transfer (since it is bound to the ***Transfer*** schema's ***means*** role). This binding succeeds, since both ***Toss*** and the ***Transfer*** schema's ***means*** role are bound to the ***means*** of a ***Force-Application*** schema (see Figure 14 and Figure 16). As a result, the forceful action involved in a transfer event is identified with the forceful action involved in a tossing action, which in turn causes the ***agent*** of transfer to be bound to the ***tosser***. Similar propagation of bindings also leads the ***tossed*** object to be identified with the ***theme*** of the transfer event, although we have not shown the relevant internal structure of the ***Receive*** schema.[16]

As just shown, the formalism permits the expression (and enforcement) of bidirectional constraints between verbal and clausal semantics – in this case, for example, a restriction on ditransitive construction to verbs that entail some force-dynamic transfer (Langacker 1991). Failure to fulfill such restrictions can result in reduced acceptability and grammaticality of particular combinations of clausal constructions with particular verbs or referring expressions:

(5) *Mary slept me a drink. (*Her sleeping gave the speaker a drink.*)

In an attempted analysis of (5) as an instance of the Active-Ditransitive construction, the construction filling the ***action*** constituent would be that corresponding to *slept*. The lack of the requisite force-dynamic semantics in the schema associated with sleeping accounts for the sentence's questionable acceptability. Section 3.3.1 discusses related phenomena arising during analysis that likewise depend on semantic compatibility.

We have now completed our extended tour through the constructions licensing one analysis of *Mary tossed me a drink.* As should be clear from the disclaimers along the way, some details have been simplified and complications avoided for ease of exposition. But while the resulting analysis may not capture all the linguistic insights we would like, we believe that issues related to the content of the construction are separable from our primary goal of demonstrating how a broad variety of constructional facts can be expressed in the Embodied Construction Grammar formalism. The next section situates the formalism in the broader context of language understanding, using the constructions and schemas we have defined to illustrate the analysis and simulation processes.

3. ECG in language understanding

Now that we have shown how constructions and schemas can be defined in the ECG formalism, we shift our attention to the dynamic processes that use the formalism for language understanding. Section 3.1 shows how the analysis process finds relevant constructions and produces a semantic specification, and Section 3.2 then shows how the simulation can use such a semspec, along with its associated embodied structures, to draw inferences that constitute part of the understanding of the utterance. In Section 3.3, we consider issues that arise in attempting to account for wider linguistic generalizations and sketch how they might be handled in our framework.

3.1 Constructional analysis

Constructional analysis is a complex undertaking that draws on diverse kinds of information to produce a semantic specification. In particular, since constructions carry both phonological and conceptual content, a construction analyzer – essentially, a parser for form-meaning constructions – must respect both kinds of constraint. Analysis consists of two interleaved procedures: the search for candidate constructions that may account for an utterance in context; and the unification of the structures evoked by those constructions in a coherent semspec. Bryant (2003) provides technical details of an implemented ECG analyzer along these lines; here we illustrate both procedures in the vastly simplified situation in which the known constructions consist *only* of the constructions defined in Section 2. The search space is thus extremely limited, and the unification constraints in the example are relatively straightforward.

A typical analysis begins with the phonological forms in an utterance triggering one or more constructions in which they are used. Given our reduced search space, this happens unambiguously in our example: the lexical constructions underlying the words *Mary*, *tossed*, *me*, and *drink* (ignoring the possible verb stem construction with the same form) each trigger exactly one construction; since no additional form constraints remain to be satisfied, the various schemas evoked by the constructions are added to the semspec. The word *a* similarly cues the A-CN-Expr construction (since the phonological form corresponding to *a* is part of its form pole). The cued construction has an additional ***com-noun*** constituent to fill; fortunately, the relevant form and meaning constraints are easily satisfied by the previously cued Drink construct. The Active-Ditransitive is triggered by the presence of the other analyzed constructs in the observed order; its constraints are then checked in context. As mentioned in Section 2.2.3, it is this step – in particular, ensuring that the construction's semantic requirements are compatible with those of its verbal constituent – that poses the main potential complication. In our example, however, the schemas as defined are enough to license the bindings in question, and the utterance is successfully analyzed.

We mention in passing some issues that arise when constructional analysis is not restricted to a carefully orchestrated example sentence. The search for candidate constructions grows much harder with larger sets of constructions and their attendant potential ambiguities. The number of constraints to be satisfied – and ways in which to satisfy them – may also make it difficult to choose among competing analyses. Approaches to these essentially computational problems vary in cognitive plausibility, but a few properties are worth noting as both cognitively and computationally attractive. As in our example, analysis should proceed in both bottom-up and top-down fashion, with surface features of the utterance providing bottom-up cues to the constructions involved, and cued constructions potentially supplying top-down constraints on their constituents. An equally important principle (not explicit in our example constructions) is that processing should reflect the graded nature of human categorization and language processing. That is, constructions and their constraints should be regarded not as deterministic, but as fitting a given utterance and context to some quantifiable degree; whether several competing analyses

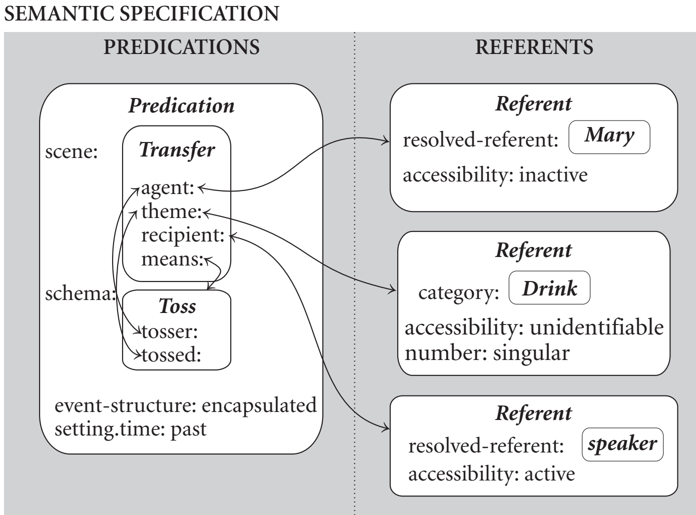

Figure 19. Semantic specification showing predications and referents produced by the analysis of *Mary tossed me a drink*. The overall predication has a ***Transfer*** schema as its scene, and a ***Toss*** schema (which is also the means of transfer) as its schema. The ***Transfer*** schema's ***agent*** is bound to the ***Mary*** schema, its ***recipient*** to the ***speaker***, and its ***theme*** to an ***unidentifiable***, ***singular*** referent of ***category Drink***.

fit the utterance equally well, or whether no analysis fits an utterance very well, the result of processing is the *best-fitting* set of constructions.[17]

The semantic specification resulting from the unification process described above is shown in Figure 19. Predications and referents are shown in separate sections; in a coherent semspec, all schemas are eventually bound to some predication or referent structure. The depicted schemas and bindings illustrate the main ways in which the constructions instantiated in a successful analysis contribute to the semspec:

– Constructions may include schemas (and the bindings they specify) directly in their meaning poles, or they may evoke them. The three referents and single predication shown can each be traced to one or more constructions, and each schema effects various bindings and type constraints on its subparts and roles.
– Constructions may effect bindings on the roles of their schemas and constituents. Most of the bindings shown in the figure come from the Active-Ditransitive construction and its interaction with its constituents. Note also that the figure shows a single predication, the result of unifying the

predications in the Tossed and the Active-Ditransitive constructions; the ***Drink*** category has likewise been unified into the appropriate referent schema.

– Constructions may set parameters of their schemas to specific values; these values have fixed interpretations with respect to the simulation. The Tossed construction, for example, sets its associated predication's ***setting.time*** to be ***past*** (shorthand for locating the entire event previous to speech time) and its ***event-structure*** to be ***encapsulated*** (shorthand for running the simulation with most details suppressed, to be discussed in the next section).

The figure does not show other schemas evoked by several of the schemas, including the instances of ***Force-Application*** in both the ***Transfer*** and ***Toss*** actions that are unified during analysis. It also does not show how the semspec interacts with discourse context and the reference resolution process. Nevertheless, the semspec contains enough information for an appropriate simulation to be executed, based primarily on the ***Toss*** schema and the embodied motor schema it parameterizes. In Section 3.2 we describe how such dynamic knowledge is represented and simulated to produce the inferences associated with our example.

3.2 Simulative inference

We have claimed that constructional analysis is merely a crucial first step toward determining the meaning of an utterance, and that deeper understanding results from the simulation of grounded sensorimotor structures parameterized by the semspec. This section first describes active representations needed for the tossing action of our example (Section 3.2.1), and then discusses how these representations can be simulated to produce fine-grained inferences (Section 3.2.2).

3.2.1 *An execution schema for tossing*

Executing schemas, or x-schemas, are dynamic representations motivated in part by motor and perceptual systems (Bailey 1997; Narayanan 1997), on the assumption that the same underlying representations used for executing and perceiving an action are brought to bear in understanding language about that action. The x-schema formalism is an extension of Petri nets (Murata 1989) that can model sequential, concurrent, and asynchronous events; it also has natural ways of capturing features useful for describing actions, including parameterization, hierarchical control, and the consumption and production of resources. Its representation also reflects a basic division into primitives that correspond roughly to stative situations and dynamic actions.

We use tossing, the central action described by our example utterance, to illustrate the x-schema computational formalism. The ***Toss*** schema evoked by the Tossed construction parameterizes the ***Tossing-Execution*** schema, which is the explicit, grounded representation of the sensorimotor pattern used (by an implicit ***tosser***) to perform a tossing action, shown in Figure 20. Informally, the figure captures a sequence of actions that may be performed in tossing an object (the ***tossed*** parameter), including possible preparatory actions (grasping the object and moving it into a suitable starting position) and the main tossing action of launching the object (shown in the hexagon labeled ***nucleus***). This main event may include subsidiary actions that move the object along a suitable path before releasing the object, all with low force. A number of perceptual conditions (shown in the area labeled percept vector) must also hold at specific stages of the event: the ***tossed*** object must be in the hand (of the ***tosser***) before the action takes place, and afterward it will be flying toward some ***target***.

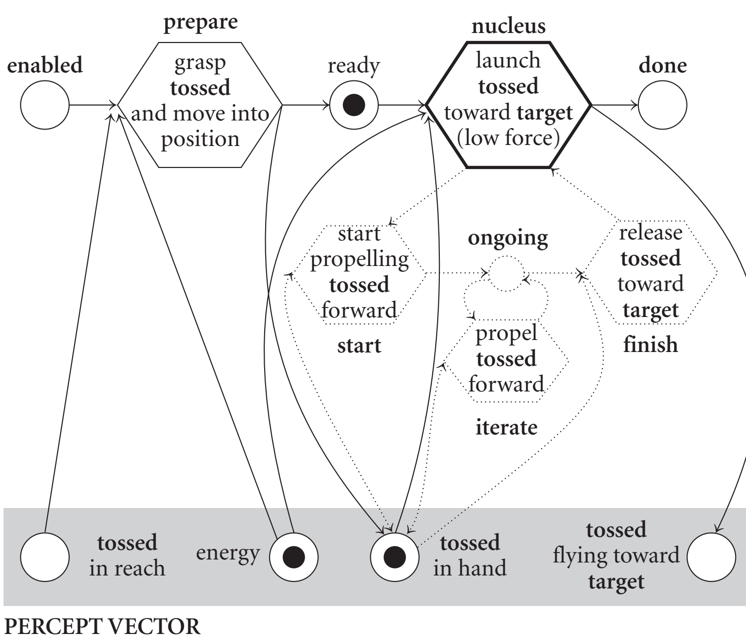

Figure 20. A simplified x-schema representing motor and perceptual knowledge of the tossing action, defined relative to the tosser. (Not all arcs are shown.)

(The ***target*** role was not shown in the ***Toss*** schema definition from Figure 16, but would be bound to its ***spg.goal***.)

The x-schema formalism provides a graphical means of representing the actions and conditions of the dynamic event described. An x-schema consists of a set of PLACES (drawn as circles) and TRANSITIONS (drawn as hexagons) connected by ARCS (drawn as arrows). Places typically represent perceptual conditions or resources; they may be MARKED as containing one or more TOKENS (shown as black dots), which indicate that the condition is currently fulfilled or that the resource is available. In the stage depicted in the figure, for example, two places in the percept vector are marked, indicating that the object to be tossed is currently in the tosser's hand, and that the tosser currently has some energy. (The figure does not show incoming arcs from separate perceptual input mechanisms that detect whether the appropriate conditions hold.) The other places in the figure are control states for the action (e.g., ***enabled***, ***ready***, ***ongoing***, ***done***, which we discuss in Section 3.2.2). The overall state of the x-schema is defined as the distribution of tokens to places over the network; this assignment is also called a MARKING of the x-schema.

Transitions typically represent an action or some other change in conditions or resources; the ones shown here each correspond to a complex action sequence with subordinate x-schemas whose details are suppressed, or ENCAPSULATED, at this level of granularity. The figure shows how the tossing x-schema's main launching action could be expanded at a lower level of granularity; the subordinate schemas are drawn with dotted lines to indicate that they are encapsulated. Note that these transitions also have labels relevant to the overall control of the action (***prepare***, ***start***, ***finish***, ***iterate***, ***nucleus***); again, these will be discussed in Section 3.2.2. Directed arcs (depicted in the figure as arrows) connect transitions to either INPUT PLACES (i.e., places from which it has an incoming arc) or OUTPUT PLACES (i.e., places to which it has an outgoing arc).

X-schemas model dynamic semantics by the flow of tokens. Tokens flow through the network along EXCITATORY arcs (single-headed arrows), according to the following rules: When each of a transition's (excitatory) input places has a token, the transition is ENABLED and can FIRE, consuming one token from each input place and producing one token in each output place. An x-schema EXECUTION corresponds to the sequence of markings that evolve as tokens flow through the net, starting from an initial marking. Given the initial marking shown in the figure, the transition labeled ***nucleus*** can fire, consuming tokens from each input place. The firing of this transition causes the execution of the subordinate sequence of actions; once these have completed, the transition's firing is complete and tokens are placed in its output places, asserting that the tossed object is now on its trajectory. The overall token movement can be interpreted as the expenditure of energy in a movement that results in the tossed object leaving the tosser's hand and flying through the air.

Most of the arcs shown in the ***Toss-Execution*** schema are excitatory; places and transitions may also be connected by INHIBITORY and ENABLING arcs. Inhibitory arcs (not shown in the figure), when marked, prevent the firing of the transitions to which they have an outgoing connection. Enabling arcs (shown as double-headed arrows) indicate a static relationship in which a transition requires but does not consume tokens in enabling places. The figure shows two of the subschemas encapsulated within the ***nucleus*** transition as having enabling links from the place indicating that the object is in the tosser's hand; this makes sense since contact with the object is maintained throughout the action of propelling the tossed object. (Again, the arcs are drawn using dotted lines to indicate their encapsulated status.)

The x-schema formalism has just the properties needed to drive simulation in our framework. X-schemas can capture fine-grained features of complex events in dynamic environments, and they can be parameterized according to different event participants. Constructions can thus access the detailed dynamic knowledge that characterizes rich embodied structures merely by specifying a limited set of parameters. Moreover, the tight coupling between action and perception allows highly context-sensitive interactions, with the same x-schema producing strikingly different executions based on only slight changes in the percept vector or in the specified parameters. In the next section we show how x-schemas can be used for fine-grained inference on the basis of an analyzed utterance.

3.2.2 *Simulation-based inferences*

We complete the discussion of our example sentence by summarizing how the active representations just described are used during simulation. The semspec in Figure 19 contains all of the parameters necessary to run the simulation, including the ***Toss-Execution*** schema shown in Section 3.2.1, a ***Transfer*** schema for the overall event, and the relevant referents. We assume that the semspec referents are resolved by separate processes not described here; we simply use the terms *MARY*, *SPEAKER*, and *DRINK* to refer to these resolved referents. Our example semspec asserts that the specified tossing execution takes place (in its entirety) before speech time. In other words, the ***nucleus*** transition is asserted to have fired, placing a token in the ***done*** place, all before speech time.

TRANS.ready		SPEAKER does not have DRINK
TRANS.nucleus		MARY exerts force via TOSS
	TOSS.enabled	DRINK in reach of MARY
	TOSS.ready	DRINK in hand of MARY
	TOSS.nucleus	MARY launches DRINK toward SPEAKER
		MARY expends energy (force-amount = low)
	TOSS.done	DRINK flying toward SPEAKER
		DRINK not in hand of MARY
TRANS.nucleus		MARY causes SPEAKER to receive DRINK
TRANS.done		SPEAKER has received DRINK

Figure 21. Some inferences resulting from simulating *Mary tossed me a drink*.

The dynamic semantics described in the last section give x-schemas significant inferential power. The parameterization and marking state asserted by the semspec can be executed to determine subsequent or preceding markings. The asserted marking thus implies, for instance, that the ***object in hand*** place was marked at an earlier stage of execution (shown in the figure as part of ***TOSS.ready***), and that the ***energy*** place has fewer tokens after execution than it did before (not shown in the figure). Part of the inferred trace of evolving markings is shown in Figure 21, organized roughly chronologically and grouped by the different stages associated with the event-level TRANSFER schema and the action-level TOSSING schema. We use the labels ***TRANS*** and ***TOSS*** to refer to the particular schema invocations associated with this semspec.

The stages singled out in the table are, not coincidentally, the same as in the bold labels in Figure 20. These labels play an important structuring role in the event: many actions can be viewed as having an underlying process semantics characterized by the identified stages. The common structure can be viewed as a generalized action controller that, for a particular action, is bound to specific percepts and (subordinate) x-schemas. This generalized action controller captures the semantics of event structure and thus provides a convenient locus for constructions to assert particular markings affecting the utterance's aspectual interpretation. The resulting inferences have been used to model a wide range of aspectual phenomena, including the interaction of inherent aspect with tense, temporal adverbials, and nominal constructions (Narayanan 1997; Chang et al. 1998). For current purposes, it is sufficient to note that certain constructions can effect specific markings of the tossing x-schema:

(6) a. Mary is about to toss me a drink. (***ready*** *place marked*)
b. Mary is in the middle of tossing me a drink. (***ongoing*** *place marked*)
c. Mary has tossed me a drink. (***done*** *place marked*)

As previously mentioned, tense and aspect markers can also force an entire x-schema to be viewed as encapsulated within a single transition, much like the subordinate x-schemas in Figure 20. This operation has the effect of suppressing the details of execution as irrelevant for a particular level of simulation. In our example sentence, this encapsulated aspect is imposed by the Tossed construction described in Section 2. As a result, while the full range of x-schematic inferences are available at appropriate levels of simulation, the default simulation evoked by our example may eschew complex details such as how far the tosser's arm has to be cocked and at what speed a particular object flies.

3.3 Scaling up

In this section we venture outside the safe haven of our example and show how the semantic expressiveness of the ECG formalism can be exploited to model some of the remarkable flexibility demonstrated by human language users. The key observation is that the inclusion of detailed semantic information adds considerable representational power, reducing ambiguities and allowing simple accounts for usage patterns that are problematic in syntactically oriented theories. Section 3.3.1 explores the use of semantic constraints from multiple constructions to cope with ambiguous word senses, while Section 3.3.2 addresses creative language use by extending the formalism to handle metaphorical versions of the constructions we have defined.

3.3.1 *Sense disambiguation*

Section 2 showed how verbal and clausal constructions interact to determine the overall interpretation of an event, as well as to license (or rule out) particular semantic combinations. As mentioned in Section 2.2.3, this account provides a straightforward explanation for the differing behavior of *tossed* and *slept* with respect to the ditransitive construction, as illustrated by (7a); a similar pattern is shown in (7b) (exemplifying Goldberg's (1995) Caused-Motion construction, not shown here):

(7) a. Mary tossed/*slept me a drink. (*transfer*)
b. Mary tossed/*slept the drink into the garbage. (*caused motion*)

In both examples, the acceptability of the verb *toss* hinges directly on the fact that its associated semantic schema for tossing – unlike that for sleeping – explicitly encodes an appropriate force-dynamic interaction. The examples in (7) involving *tossed* also illustrate how the same underlying verb semantics can be bound into different argument structures. Thus, in (7a) the tossing action is the means by which a transfer of the drink is effected; in (7b) the tossing action is used as part of an event of caused motion.

The same mechanisms can help select among verb senses that highlight different event features:

(8) a. Mary rolled me the ball. (*caused motion*)
b. The ball rolled down the hill. (*directed motion*)

The verb *rolled* as used in (8a) is quite similar to the use of *tossed* in our example sentence, referring to the causal, force-dynamic action taken by Mary to cause the speaker to receive an object. However, (8b) draws on a distinct but intimately related sense of the verb, one that refers to the revolving motion the trajector undergoes. A simple means of representing these two senses within the ECG framework is to hypothesize two schemas associated with rolling – one evoking the ***Caused-Motion*** schema shown in Figure 14 and the other evoking a ***Directed-Motion*** schema (not shown). Each of the two senses of the verb *rolled* could identify its meaning pole with the ***means*** of the appropriate schema. The requisite sense disambiguation would depend on the semantic requirements of the argument structure construction involved. Thus, the Active-Ditransitive construction's need for a sense involving force-dynamic interaction will select for the caused-motion sense. Although we have not shown the Directed-Motion construction that accounts for the use in (8b), it could be defined as requiring a verbal argument whose meaning pole binds with the means of a ***Directed-Motion*** schema. Note that the differences between the two verb senses are purely semantic: the particular schemas they evoke determine the clausal constructions in which they can participate.

We have focused so far on the interactions between verbal and clausal requirements, but in fact, semantic constraints imposed by features of entities also play a decisive role in constructional sense disambiguation:

(9) a. Mary poured me some coffee. (*pour = means of transfer*)
b. Mary poured me a drink. (*pour = means of creation, with intent to transfer*)

The surface similarities between the sentences in (9) obscure their rather different interpretations. Sentence (9a) can be analyzed much as our example from

Section 2, with pouring the means by which the transfer of coffee is effected. But in sentence (9b), pouring – which we assume requires a pourable liquid or mass – isn't a direct means of a transfer; in fact, no drink exists until the pouring action has happened. Rather, the pouring action is interpreted as an act of creation, and it is the resulting drink – and not its liquid contents – whose transfer is intended. In this creation variant of the ditransitive construction, the verb specifies not the means of transfer but the means of creation (a precondition for an intended transfer).

Although this situation is more complex than the other sense disambiguation cases, we can still address the inherent ambiguity of the combination of the verb *pour* with ditransitive expressions by examining the interacting constraints posed by its meaning pole and that of its accompanying nominal expressions. In particular, we can define the pouring schema definition as evoking a ***Creation*** schema relating the pouring action to a resulting bounded mass; the creation sense of *pour* would have this ***Creation*** schema as its meaning pole. The creation variant of the ditransitive construction would also involve a ***Creation*** schema, and require the potential nominal filler (*drink*) to be identified with the created object.

3.3.2 *Metaphor: A case study in construal*

The examples discussed in the last section demonstrate some relatively limited means of applying semantic constraints to problems that resist clean purely syntactic solutions. These mechanisms exploit static properties of the schema formalism, such as subcase relations, evokes relations, constituency and type constraints. By themselves, however, such static properties can encode only conventionalized patterns of meaning. They cannot capture unexpected or unusual patterns of usage; they cannot account for the ubiquity of creative language use, nor for the relative ease with which humans understand such usages. Lexical and phrasal constructions can occur in novel configurations that are nevertheless both meaningful and constrained. Ultimately, in a full-scale language understanding system intended to be robust to varying speakers and contexts, it would be neither possible nor desirable to pre-specify all potential uses of a semantic schema: under the right circumstances, constructs that do not explicitly satisfy a given semantic requirement may still be treated as if they do. Creative linguistic production must be mirrored by creative linguistic understanding. We use the general term CONSTRUAL to refer to a widespread set of flexible processing operations that license creative language use, including novel metaphorical and metonymic expressions (Lakoff & Johnson 1980), as well as implicit type-shifting processes that have been termed COERCION

(Michaelis, this volume). In this section we highlight metaphorical construal as a case study of how construal might be treated by a simple extension to the ECG formalism.

Metaphors are a pervasive source of creative language use, allowing speakers to structure a more abstract TARGET DOMAIN in terms of a more concrete SOURCE DOMAIN (Lakoff & Johnson 1980). Metaphors can be characterized as conventionalized mappings spanning domains of knowledge, typically linking a perceptually and motorically embodied source domain (such as object manipulation, physical proximity, or physical force) onto a relatively more abstract target domain (such as reason, emotional connection, or social action). Some metaphorical uses might be treated simply as conventionalized linguistic units; the use of *delivered* in (10a) below exemplifies a conventionalized use of a metaphor in which the verbal communication of ideas is interpreted as the physical transfer of objects. But metaphors can also structure novel uses of constructions, as shown by the use of *tossed* in (10b). It is this second, creative use of metaphor that we consider an instance of construal and attempt to address in this section.

(10) a. Our president has just delivered the most important speech of his short career.
b. Mary tossed *The Enquirer* a juicy tidbit.

Sentence (10b) bears a surface resemblance to the example sentence analyzed in Section 2, employing several of the same constructions, including the MARY, TOSSED, and A-CN-EXPR. We assume that suitable constructions can be defined to license the remaining (sub)expressions: a *The Enquirer* referring expression whose meaning is a specific news agency; a common noun *tidbit* with two conventionalized senses referring to a small but high-quality unit of food or information, respectively; a similarly polysemous modifier *juicy* that can characterize the consistency of a unit of either information or sustenance; and a construction that licenses the combination of a modifier and a common noun. Given such constructions, could sentence (10b) be analyzed as instantiating the ACTIVE-DITRANSITIVE construction? This potential analysis yields some apparent type mismatches: the food sense of *juicy tidbit* fits the needs of the ***Transfer*** and ***Toss*** schemas better than the information sense, but the news institution *The Enquirer* cannot be a literal recipient (though not shown earlier, the ***Receive*** schema requires a physical entity as its ***Receiver***).

A potential solution to the analyzer's problems is to introduce a metaphorical map capturing the intuitions described earlier. Figure 22 defines a ***Conduit*** metaphor that allows a target domain involving ***Communication*** to be

```
map Conduit
  roles
    source : Object-Transfer
    target : Communication
  pairs
    source.sender ⟶ source.object
    source.recipient ⟶ target.hearer
    source.object ⟶ target.information
```

Figure 22. Example map definition: The ***Conduit*** metaphor links a source domain of ***Object-Transfer*** to a target domain of ***Communication***.

structured in terms of a corresponding source domain of ***Object-Transfer***; the schemas are not defined here, but their relevant roles are shown in the figure, using notation similar to that used in the schema and construction formalisms. The mappings listed in the **pairs** block assert that a speaker communicating some information to a hearer can be construed as a physical agent sending a physical recipient some object.

We assume the analyzer has access to ontological information categorizing *The Enquirer* as an institution that can collect verbal information, making it a suitable ***hearer*** in the ***Communication*** schema. (We ignore for now the additional metonymy that could link *The Enquirer* to an associated reporter.) Access to the ***Conduit*** metaphor could help the analyzer deal with the sentence in (10b) by allowing *The Enquirer* to be construed as a suitable ***recipient*** in an ***Object-Transfer*** schema. Further analysis is affected by this mapping: If the recipient is metaphorical, then in the most likely analysis the object is metaphorical as well, leading to the selection of the information-related senses of *juicy* and *tidbit*. Similarly, both the overall event and the means by which it was asserted to have taken place must be interpreted as verbal, rather than physical, acts of transfer.

A hallmark of metaphorical language use is that the mapping of inferences from source to target domain can involve relatively subtle simulative detail. For example, we know from Section 3.2 that *toss*, when used in a ditransitive context, implies that the launching action involves low force. Mapped to the target domain of communication, this inference becomes one of casualness on the part of the speaker. (For a technical description of how metaphorical inference can be performed and propagated to a target domain, the reader is directed to Narayanan (1997).) The inclusion of metaphor maps in the formalism, along with appropriate interfaces to the active simulation, opens the door to creative metaphorical inferences of this kind.

4. Concluding remarks

In this chapter, we have formalized and extended ideas from the construction grammar literature to accommodate the requirements of a larger simulation-based model of language understanding. Constructions in this model serve to evoke and bind embodied semantic structures, allowing language understanding to depend on both specifically linguistic knowledge and general conceptual structures. We have attempted to illustrate the representational properties of our formalism for a variety of linguistic phenomena, including straightforward issues that arise in our example analysis, as well as more complex issues surrounding sense disambiguation and metaphorical inference.

The ECG formalism diverges in several respects from other construction grammars in the literature, in large part due to its non-trivial interactions with both the analysis and simulation processes. It is also motivated and constrained by the need to develop a computational implementation of the overall model, which explains similarities it bears to object-oriented programming languages, as well as to some implementation-oriented versions of HPSG (Pollard & Sag 1994). As we have noted, the presentation in the current work has focused on the formalism itself, simplifying many details to highlight how particular analyses can be expressed within the overall framework. We thus conclude by briefly expanding on some of the issues that motivate ongoing and future research.

Our example constructions use a somewhat restricted set of formal elements. But constructions can have formal realizations that span levels of description, including syntactic, lexical, morphological, phonological, and prosodic cues (for examples, see the discussion of *there*-constructions in Lakoff (1987)). In other work, we have shown how minor extensions allow the formalism to cover a broader range of phenomena in a common notation. For example, the same set of interval relations we use to express syntactic order can be applied to enforce word-internal order of morphemes and to align prosodic contours with lexical hosts.

Our discussion has also deliberately sidestepped complications related to situational and discourse context, but work in progress is exploring how the mechanisms we have introduced can be extended to address discourse-level phenomena in general and mental spaces phenomena (Fauconnier 1985) in particular. The notion of a *space* as a domain of reference and predication fits in especially well with semantic specifications, which are described here as likewise containing referents and predications. We can thus view semspecs as being situated in some space, and these spaces can be evoked, introduced, and constrained by constructions called SPACE BUILDERS. Other constructions – and their corresponding semspecs – can then be defined relative to the currently active space. For example, a space-building construction X-SAID-Y might be defined to handle reported speech:

(11) Frank said, "Mary tossed me a drink."

Such a construction would presumably introduce an embedded space for the reported speech and require the corresponding constituent to associate its semspec with that embedded space. Given such a constraint, the ME construction – defined in Section 2.1 as identifying its referent with the speaker in the *current* space – would correctly designate the speaker in the embedded space (Frank), and not the global speaker. A more general treatment of mental spaces phenomena awaits further research, but Chang et al. (2002) offer a preliminary sketch of how the formal tools of ECG can be extended to capture interactions between constructions and multiple spaces.

Another dimension of ongoing research focuses on neural (or connectionist) modeling of our computational architectures. Previous models have explicitly related the conceptual structures and mechanisms mentioned here – including image schemas (Regier 1996), x-schemas (Bailey 1997), and metaphor maps (Narayanan 1997) – to neural structures. X-schemas, for example, are defined at the computational level as representing abstractions over neural motor control and perceptual systems (Bailey 1997). At a more detailed connectionist level of representation, Shastri et al. (2002) implement x-schemas as interconnected clusters of nodes. The binding of roles to other roles and to fillers has also been subject to extensive connectionist modeling, in particular as part of the SHRUTI model (Shastri et al. 1993). Although we have not emphasized this point here, the representational and inferential mechanisms used in the ECG formalism have been restricted to those that can be realized in a connectionist architecture.

As the strands of research mentioned here might suggest, the goals and methods driving both the formalism we have introduced and our broader approach to language understanding are inherently interdisciplinary. Our main goal has been to show how an embodied construction grammar formalism permits fine-grained interactions between linguistic knowledge and detailed world knowledge. The work presented here also, however, exemplifies the methodology of applying converging computational, cognitive, and biological constraints to flesh out in formal detail insights from theoretical linguistics. Although many challenges remain, we are hopeful that the ideas we have explored will help to stimulate the continued integration of diverse perspectives on language understanding.

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Notes

1. Although we focus here on processes involved in language comprehension, we assume that many of the mechanisms we discuss will also be necessary for meaningful language production.

2. Schematic representations in the form domain can also be viewed as schemas and represented using the same formalism, as we will show in the next section.

3. The evokes relation has some antecedents (though not previously formalized) in the literature: In combination with the **self** notation to be described, it can be used to raise some structure to prominence against a larger background set of structures, effectively formalizing the notion of PROFILING used in frame semantics (Fillmore 1982) and Cognitive Grammar (Langacker 1991).

4. Though no type constraints are shown in the other schemas, more complete definitions could require the relevant roles to be categorized as, for example, entities or locations.

5. Determining whether a given entity can satisfy a type constraint may require active CONSTRUAL that depends on world knowledge and the current situational context, discussed further in Section 3.3.2.

6. The subcase relation, for example, does not presume strict monotonic inheritance, and is thus more appropriate for capturing radial category structure (Lakoff 1987). Similarly, the **evokes** notation encompasses a more general semantic relation than either inheritance or containment; this underspecification allows needed flexibility for building semantic specifications.

7. This direct binding of the ***resolved-referent*** effectively captures the commonsense generalization that proper nouns (by default) pick out specific known entities. Other kinds of

referring expressions typically require a dynamic REFERENCE RESOLUTION process, parameterized by the ***Referent*** schema, to determine the relevant entity; see Section 2.1.

8. Note that this view of constituency extends the traditional, purely syntactic notion to include form-meaning pairings.

9. Though not shown, the context model includes speaker and hearer roles, discourse context (referents and predications in previous utterances), situational context (entities and events in the actual or simulated environment), and shared conceptual context (schema instances known to both speaker and hearer). We use a simplified version of Lambrecht's (1994) terminology for referential identifiability and accessibility, though other discourse frameworks could be substituted.

10. Other roles of this schema that may be relevant for particular languages include ***gender*** and ***animacy***; they are not relevant to the current example and thus are not discussed here.

11. Both constructions can be viewed as combining two other constructions: the finite verb TOSSED could result from a morphological construction combining the verbal stem *toss* with an *-ed* marker; and the information in the ACTIVE-DITRANSITIVE construction could be separately specified in a DITRANSITIVE argument structure construction and an ACTIVE clausal construction, which could also impose constraints on the predication's information structure (not included in the current analysis). These more compositional analyses are consistent with the approach adopted here and can be expressed in the ECG formalism.

12. Other possible relations mentioned by Goldberg (1995) include subtype, result, precondition, and manner.

13. See Goldberg (1995) for further motivation of details of the analysis, such as the choice of the action of receiving rather than a state of possession as the result of the transfer action.

14. This schema can be seen as one of many types of force-dynamic interaction described by Talmy (1988).

15. Our use of a formal case attribute does not preclude the possibility that case patterns may be motivated by semantic regularities (Janda 1991). The current analysis is intended to demonstrate how constraints on such a constructional feature could be imposed; a more detailed analysis would involve defining constructions that capture the form and meaning regularities related to case marking.

16. A fuller definition of the ***Receive*** schema would evoke an ***SPG*** as (part of) the ***effect*** of the ***Transfer*** schema's evoked ***Force-Application***. Since the forceful actions of the ***Toss*** and ***Transfer*** schemas are identified, their respective effects are as well, resulting in a binding between their ***tossed*** and ***theme*** roles.

17. Both probabilistic and connectionist models have some of the desired properties; either approach is theoretically compatible with the ECG formalism, where constructions and their constraints could be associated with probabilities or connection weights. See Narayanan and Jurafsky (1998) for a probabilistic model of human sentence processing that combines psycholinguistic data involving the frequencies of various kinds of lexical, syntactic and semantic information. The resulting model matches human data in the processing of garden path sentences and other locally ambiguous constructions.

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Chapter 7

Constructions in Conceptual Semantics

Urpo Nikanne

Introduction[1]

In this chapter, I will discuss the treatment of constructions in the framework of conceptual semantics. In Section 1, I will introduce the main features and goals of the conceptual semantics approach. In Section 2, I will discuss the main similarities and differences between conceptual semantics and Construction Grammar, and in Section 3, I will introduce the relevant parts of the theory of conceptual structure formation. In Section 4, I show how lexical entries function in syntactico-semantic mapping. Sections 5, 6, and 7 are analyses of two sets of constructions in Finnish. In Section 5, I will discuss a set of Finnish constructions in which the elative case is used as an instrument marker. These constructions are syntactically different but they all express a rather similar semantic content: the NP marked with the elative case refers to an instrument that is used for hitting someone hard and on purpose. I will not describe the semantics of these constructions in any formal way. Another set of constructions will be discussed in Sections 6 and 7. These constructions have the same syntax – they are all adjuncts that consist of an NP marked with the elative case – but different semantics. These constructions will be given formal descriptions as well.

1. Conceptual semantics

Conceptual semantics is a theory based on Ray Jackendoff's work dating back to the early 1970s (Jackendoff 1972, 1976, 1983, 1987, 1990, 1997). Although the term 'conceptual semantics' was used for the first time in Jackendoff (1983), I will also use it to refer to Jackendoff's earlier work and to other scholars' work that has been inspired by Jackendoff's ideas.

The following features have been characteristic for conceptual semantics throughout its development:

a. Representations of different domains (phonology, syntax, semantics, and conceptual structure) are kept apart.
b. Representations are kept simple in the sense that they should contain as few primitives as possible and the principles of their combination should be as simple as possible.
c. There is a set of correspondence principles that govern the possible mapping relations between representations of different domains.

When the general principles (a) and (b) are combined, it follows that we should carefully study what is the most natural representation of each phenomenon. For instance, according to Jackendoff (since 1972), semantic roles belong to semantics and, thus, should not be placed in syntactic structure (it is common practice in mainstream generative syntax to operate with semantic roles as if they were syntactic primitives). The principle in (c) is a consequence of (a): since the representations are kept as simple as possible, the correspondence rules or principles play a very central role in the theory. In addition, in conceptual semantics there has never been any tendency to assume that the mapping between representations is trivial or even very simple. This property of conceptual semantics leaves the door open for constructions as understood in Goldberg's (1995) version of Construction Grammar.

The organization of grammar – and the human mind – assumed in conceptual semantics can be characterized as 'representational modularity' (Jackendoff 1997). This means that each representation – phonological, syntactic, conceptual, spatial, etc. – is governed by the formation principles of a separate module. Since the human mind functions, above all, as a whole, the modules must be systematically linked to each other. Otherwise, we would not be able to link phonological structures to syntactic or semantic structures. The correspondence principles mentioned in (c) above serve this function (for arguments against putting everything in a single module, see van der Zee & Nikanne 2000). Jackendoff (1990: 156–157) introduces a Correspondence Rules Strategy for syntactico-semantic linking as follows (I will be using the terms *correspondence*, *mapping*, and *linking* very much as synonyms):

> One can localize the complexity of correspondence rules external to the lexical item. Under this approach, the lexical entry does not completely specify in which syntactic frames it appears and how these frames are matched to conceptual structure. Rather, various extra-lexical rules help establish this mapping.

It is not difficult to see that these extra-lexical rules can be understood to be constructions.

The general form for correspondence rules, according to Jackendoff (1997: 24) is as follows:

(1) Configuration X in BIL_A
{must/may/preferably does} correspond to
Configuration Y in AIL_B.
where
BIL_A = the/a system B interface level of system A
AIL_B = the/a system A interface level of system B

For instance, in syntactico-semantic correspondence, the correspondence rules are of the following form:

(2) Syntactic configuration X
{must/may/preferably does} correspond to
conceptual structure configuration Y.

Here we assume that there is only one level of syntactic representation and one level of conceptual representation, amounting to a monostratal theory of representations. This is in contrast to Jackendoff (1997), who leaves it open as to whether there is a D-structure in addition to the S-structure.

The form of the correspondence rules does not make any claims about the idiosyncrasy or regularity of mapping. What they say is that the relation between representations is not based on derivation but on mapping. However, according to Jackendoff (especially 1990), there are both general and idiosyncratic correspondences between syntax and conceptual structure. One general correspondence rule is given in Figure 1, following Jackendoff (1990: 25), but using a modified notation: XP stands for any major syntactic constituent; X^0 stands for any lexical item whose complements are (optionally) YP and ZP; the elements in angle brackets <> are optional; the dotted lines indicate correspondences between different levels of representation.

Figure 1 thus shows that syntactic constituents generally correspond to conceptual constituents (XP to Entity), the syntactic heads to conceptual heads (X^0 to FUNCTION), and syntactic complements to conceptual arguments (YP to E_2 and ZP to E_3).

In addition to the general correspondence principles, there are correspondences between syntax and semantics that do not completely follow the general ones. We can assume that general linking rules tell us how to predict mapping between syntax and conceptual structure in a default case. Under that assump-

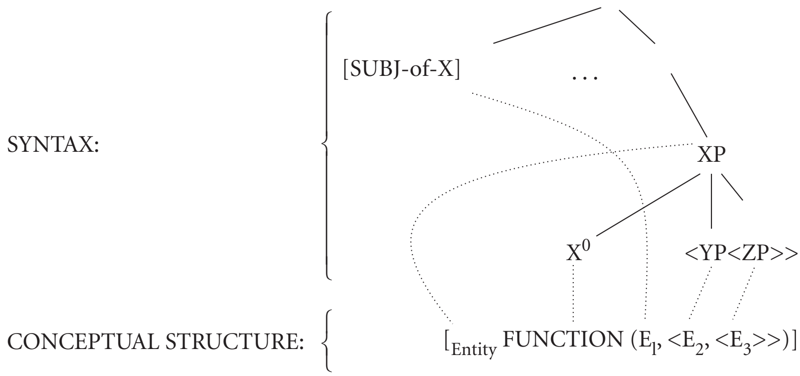


Figure 1. A general correspondence rule.

tion, idiosyncratic correspondences are the same things as constructions given the definition by Goldberg (1995), discussed in Section 2 below. Jackendoff (1990) argues that there is a set of correspondence rules that resemble lexical entries in that they are construction-specific and include both syntactic, conceptual, and often also phonological information (in a particular sense, to which we will return shortly). These correspondences often govern the conceptual interpretation of adjuncts, i.e. syntactic elements that are not licensed by selection.

One example of an adjunct is the so-called *with*-theme adjunct (for details, see Jackendoff 1990). For instance, in the sentence *John painted the house [with blue paint],* the core sentence (cf. Chomsky's 1986 term 'Main Functional Complex') is *John painted the house.* The core sentence is the part of the sentence that consists of the predicate verb and its obligatory complements. The *with*-theme adjunct is the part in the brackets ([*with blue paint*]). The *with*-theme adjunct has the following properties:

a. The syntactic form of the adjunct is restricted to [VP . . . V. . . [PP with NP] . . .] where V is the predicate verb of the sentence.
b. V has a lexical conceptual structure in which the theme argument is specified as implicit (i.e. not having a counterpart in syntactic representation).
c. The conceptual structure interpretation of the NP governed by the preposition *with* is fused with the conceptual structure interpretation of the implicit theme argument of V.

The 'phonological' part of the adjunct consists in the fact that it mentions the particular preposition *with*. The lexical item *with* is specified in the ad-

$$\left(\begin{array}{ll}\text{Phonology:} & \text{(X-weak vowel stem)-}\textit{ssA} \\ \text{Syntactic function of } \textit{X-ssA}\text{:} & \text{adverbial} \\ \text{Semantics:} & \text{IN}\end{array}\right)$$

Figure 2. Basic use of Finnish inessive case.

junct, and because it is not used in its productive sense, the recognition of the phonological word does not lead to using the lexical entry of *with* as the basis of interpretation. In that sense, the adjunct construction has specific phonological properties (put differently, I do not assume that the construction refers to phonology). The preposition *with* is, however, the head of a prepositional phrase in the *with*-theme construction. The adjuncts seem to retrieve lexical items from the lexicon and use them in an exceptional way.

Morphology is yet another linguistic system that exhibits certain arbitrariness normally associated with the lexicon and constructions. A typical morphological affix links together phonological, syntactic, and semantic information. For instance, the basic use of the inessive case in Finnish could be described roughly as in Figure 2, as a brief illustration. X stands for N, A, P, or a non-finite V; 'weak vowel stem' indicates that the stem of X must end with a vowel and, if the consonant gradation rule applies, the grade must be weak (consonant gradation is treated in any basic grammar of Finnish; for the view that consonant gradation is morphologically based, see Karlsson 1983). The symbol '-' indicates morpheme boundary. 'A' can be realized as [a] or [æ] (ä), following the rules of vowel harmony.

Even though morphology resembles constructions in the sense that it links together more or less arbitrary fragments of representation of different levels, I would like to keep it separate from constructions and the lexicon. To be sure, it is possible to have a construction with a case form or some other morphological category that is used in an atypical way; we will see such examples in the use of the Finnish elative case in Section 5 and the ablative case in Section 6. However, the morphological categories used in such constructions exist independently of them as well. Thus, just as I assume a separate lexicon, I also assume a separate morphological module.

There is a difference between representational modules (e.g. syntactic, phonological, and conceptual modules) and the mapping modules (e.g. lexicon, morphology, constructions; I assume other mapping modules as well, e.g. the DA-system discussed in Section 4). Representational modules define well-formed representations and mapping modules define which mappings between these representations are allowed in the language in question. Thus in con-

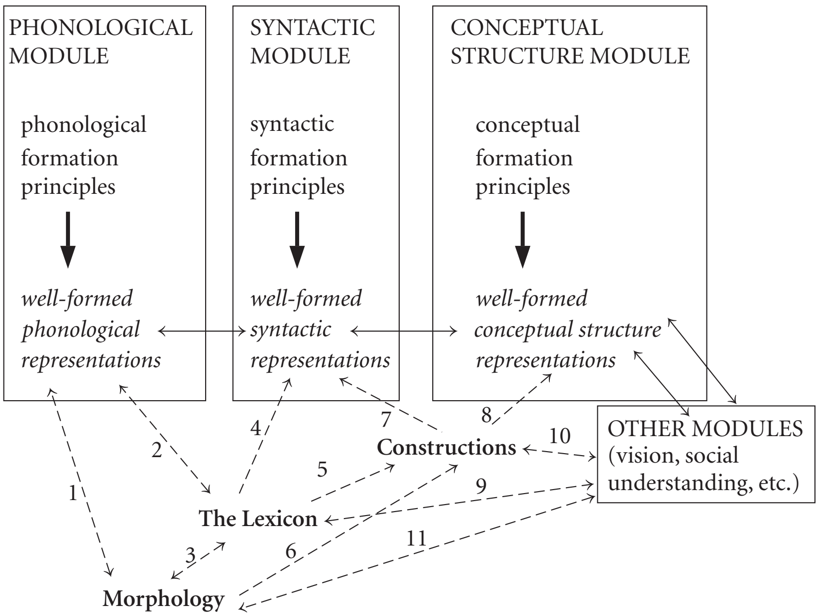


Figure 3. The status of constructions in the conceptual semantics model of grammar.

structions, lexical items do not define – or generate – representations. They just specify how to map particular kinds of fragments at different levels of representation onto each other. The organization of grammar in conceptual semantics can be illustrated as in Figure 3. The thick arrows indicate that the formation principles govern the form of the well-formed representation. The formation principles of each module include a list of primitive categories and their possible combinations. For instance, the primitive categories of syntax include N, V, P, A, Adv, Art; these form phrases and sentences and enter into relations such as dependency. Phonological categories include distinctive features (voiced, nasal, back, front, etc.), tonal primitives (high, low), etc.

The mapping between different levels of representation may take place either directly (continuous thin arrows) or via the lexicon, morphology or constructions (dashed arrows). As regards the latter kind of mapping, below are some examples of the phenomena I have in mind – the numbers correspond to the numbers in Figure 3.

1. Morphemes have a phonological form. In addition, many phonological rules refer to morphological information (e.g. consonant gradation in Finnish, see Karlsson 1983).

2. Lexical stems have a phonological form. In addition, many phonological rules refer to word boundaries (e.g. stress, phonotactic restrictions, etc.).
3. Derivational morphology links together lexical items: root-words to derived words and derived words together.
4. Most lexical items have syntactic restrictions (e.g. belong to a certain syntactic category or a part of speech).
5. Constructions make use of existing lexical items.
6. Constructions make use of existing morphological categories.
7. Constructions specify a restricted syntactic configuration.
8. Constructions specify a particular conceptual configuration.
9. In addition to fragments of phonological, syntactic, and conceptual structure representations, lexical items may include information about other cognitive levels of representation (social, spatial, emotional etc.). For instance, understanding words such as *friend*, *embarrass*, *trust*, etc. requires that we understand the social (and emotional) content that is lexicalized in these words.
10. Constructions may include other information in addition to the lexical, morphological, syntactic, and conceptual information. For instance, the English construction *one {hell/heck} of a(n) X* can only be used to express certain kinds of emotions (admiration, fear, etc.).
11. Morphological categories – especially derivational ones – can express for instance speed, frequency etc. For example, the Finnish derivational suffix *AhtA* productively expresses that the activity of the root verb is done fast and only once: *huuta* 'shout' : *huudahta* 'give out a shout'.

The lexicon differs from the construction module in that linking via lexical items is less fixed than linking via constructions. In order to see this difference, we will discuss regular lexical linking between syntax and conceptual structure in Section 4.

Another difference between the lexicon and the construction module is that a lexical item typically links together both phonological, syntactic, and conceptual structures. A typical construction, on the other hand, links together only syntactic and conceptual structures plus, perhaps, some pragmatic information (a construction can only be used in a particular situation etc.). In addition, a construction may include specific lexical items, e.g. *with* in the *with*-theme construction, *way* in the so-called *way*-construction (Jackendoff 1990: 211–223; Goldberg 1995: 199–218), the ablative or elative case forms in the Finnish constructions we will discuss in Sections 5 and 6, etc. There may be cases in which constructions include phonological information, e.g. a fixed stress pattern, as in the English idiom X *is one tough cookie*. This idiom must be pronounced following a particular rhythm pattern. As far as I can see, the phonological properties of constructions are limited to these kinds of phenomena. All segmental phonology used in a construction is taken from the lexicon.

Lexical and morphological items are all mappings between different kinds of information (semantic, syntactic, phonological, pragmatic), and that – as far as I can see – has been the main reason for Construction Grammar (e.g. Fillmore & Kay 1996) to see all of them as constructions. This is correct if we only consider the form of the item. As constructions are – in the present approach – atypical combinations of lexical and morphological categories, it is at least for methodological reasons helpful to keep the "lower level" items (lexical items and morphological categories) apart from the "higher level" items (constructions).

2. Is there a difference between conceptual semantics and Goldberg's Construction Grammar?

According to the definition in Goldberg (1995: 4),

> C is a CONSTRUCTION iff$_{def}$ C is a form-meaning pair $<F_i, S_i>$ such that some aspect of F_i or some aspect of S_i is not strictly predictable from C's component parts or from other previously established constructions.

The problem with Goldberg's definition is that it does not make it clear how the meaning of a complex syntactic form *could* be predictable from its component parts in those cases when the pair $<F_i, S_i>$ is *not* a construction. Actually, any kind of mapping rule, once it is established, predicts the meaning of those forms that fulfill the criteria defined in that rule. In order for the definition of construction to make sense, there should be a syntactico-semantic mapping system that is more straightforward than constructions. Otherwise, the definition of construction could be just as follows: C is a CONSTRUCTION iff$_{def}$ C is a form-meaning pair $<F, S>$.

The way conceptual semantics treats constructions is very similar to that of Goldberg (1995). The main difference between conceptual semantics and constructional approaches is that in conceptual semantics, all linking is not governed by constructions. Thus, in conceptual semantics, there is a possibility to keep constructions separate from regular linking patterns.

As pointed out above, Goldberg's definition of construction also implies that there is a straightforward way to map forms and meanings onto each other.

With respect to this regular mapping, constructions are exceptional mapping rules. If that is correct, there seems to be no principled difference between a construction grammar and conceptual semantics. Constructions in Construction Grammar are meant to be generalizations about mapping. As far as I can see, the descriptions of constructions in Construction Grammar tend to express (i) those parts in form and in meaning that are enough for recognizing that particular construction and (ii) a generalization of the mapping between these parts. This is self-evident and it would not make any sense to just list concrete sentences and say what they mean without trying to generalize over those concrete cases.

Even if all mapping between form and meaning is understood to be governed by constructions, the difference is not very significant. If we assume some very schematic constructions to govern transitive and intransitive sentences, as for instance Fillmore and Kay (1996) do, they can be seen as regular linking principles. According to this view, a construction does not need to be considered to be a linking device. It could also be a basic syntactic pattern.

However, there is one principled difference between the regular linking procedure and constructions in general in conceptual semantics. In constructions, links are specified separately for each construction even if the same pattern repeats itself regularly. Regular linking, introduced in Section 4, specifies as little as possible; the idea is to find general principles that govern linking in regular cases. This way, the regularities in linking are kept apart from arbitrary and construction-specific linking.

To summarize, in conceptual semantics, constructions are *linking devices* (correspondence rules between different levels of representation) that license *irregular* linking patterns. In Sections 3 and 4 I will discuss the system of regular syntactico-semantic linking. The purpose of these sections is to clarify the picture of the difference between regular and construction-specific linking.

3. Conceptual structure

Before we can see concretely what constructions are made of and how they are treated in conceptual semantics, it is necessary to introduce some basic terminology and notation that will be used in the analyses that follow. I also want to show the status of the different parts of the conceptual structure, and that they are needed independently in the semantic theory. This is all the more important because the conceptual structure is assumed to be universal (Jackendoff 1983). Thus, there is no room for assuming a language-specific semantic level between the linguistic form and the conceptual structure. Moreover, the different levels of representation are by definition (see Section 1) based on different primitive categories and we cannot mix the levels. Thus in conceptual semantics, it is not possible to assume that there is a "continuum" between different levels of representation. Each level of representation and its formation rules must be motivated independently from the other levels of representation.

According to the conceptual semantics version developed in Nikanne (1990, 1995, 1997), the global internal structure of the category SITUATION (i.e. STATE or EVENT) is the basis of the well-formedness at conceptual structure. (It should be kept in mind that the present version of conceptual semantics is slightly different from the one described in Jackendoff 1983, 1990, 1997.) Different "aspectual" relations, normally called "(semantic) functions" (Jackendoff 1972, 1976, 1983, 1990) between participants, can be divided into three groups according to their scope. The scope groups are called zones (Nikanne 1987, 1990). The properties of the relations of the three zones list the following components: the complements in their immediate scope, the thematic role of each zone, and the Jackendovian functions that belong to each zone. In the representations in (3), f1, f2, and f3 stand for any relation of zone 1, zone 2, and zone 3, respectively. The arrows indicate selection (valence): X → Y means 'X selects Y'. Angle brackets <> indicate optionality (<X> means 'X is optional') and curly brackets and a slash / indicate alternatives ({X/Y} means 'X and Y are alternatives').

(3) a. **Causative and inchoative relations** (f3)

Immediate scope: Immediate scope over SITUATION and possibly a thematic argument.
Thematic role: Causer

Jackendovian functions:	non-monadic:	CAUSE, LET
	monadic:	INCH

Structure of a causative or inchoative SITUATION:

<Causer>
↑
f3 → SITUATION

b. **Non-causative Event or State relations** (f2)

Immediate scope: Monadic f2s select only Theme. Monadic functions are selectional heads of the lexical conceptual structure of most intransitive verbs (*laugh*, *dance*, etc.). Non-monadic f2s have immediate scope over at least one PLACE or PATH (*go somewhere*, *be/stay somewhere*, *turn into something*, etc.).

Thematic role: Theme

Jackendovian functions: monadic: MOVE, CONF; non-monadic: GO, BE, STAY, ORIENT, EXT

Structure of a non-causative SITUATION:

$$\begin{array}{l} \text{Theme} \\ \uparrow \\ \text{f2} \rightarrow < \{\text{PLACE/PATH}\} > \end{array}$$

c. **Place and path relations** (f1)

Immediate scope: If not taking an argument, it has immediate scope over another PLACE or PATH.

Thematic role: Landmark (= Location, Goal, Source, or Route)

Jackendovian functions: non-monadic: (none)
monadic: AT, IN, ON, UNDER; TO, TOWARD, FROM, AWAY-FROM, VIA

Structure of a PLACE or PATH:

f1 → {PLACE/ PATH/ Landmark}

The well-formedness principles of conceptual structure are very simple and they are based on selection (dependency). The most important well-formedness principle is the one that determines the mutual dependencies of the relations. This principle, called f-scheme, is given in (4); the asterisk indicates that there is zero or more functions of the kind in the dependency chain:

(4) **The f-chain scheme:** f3* → f2 → f1*

The f-scheme states that causative relations can select each other, i.e., a causative situation can be in the scope of a causative relation as, for example, in *Angelica* ***got*** *Tommy* ***make*** *Spike* ***fetch*** *the ball*. The analysis of this sentence is in (5). The Greek letters in the figure indicate binding: X^{α} binds α. The subscript numbers indicate the correspondence between lexical items and fragments of conceptual structure: all the parts of the conceptual structure that are marked with the same index correspond to parts of the lexical conceptual structure of the lexical item marked with the same index. For instance, all parts of the conceptual structure that are marked with index 3 have a counterpart in the lexical conceptual structure of the verb *fetch*.)

(5) Angelica$_4$ got$_1$ Tommy$_5$ make$_2$ Spike$_6$ fetch$_3$[the ball]$_7$
ANGELICA$_4$ TOMMY$_5^{\alpha}$ SPIKE$_6$ BALL$_7$ α
$\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$
CAUSE$_1$ $\rightarrow$ CAUSE$_2$ $\rightarrow$ CAUSE$_3$ $\rightarrow$ GO$_3$ $\rightarrow$ TO$_3$

As (6) shows, paths and places can also be in each other's immediate scope (e.g., *Chuckie went into the bath tub*):

(6) Chuckie$_3$ went$_1$ into$_2$[the bath tub]$_4$
CHUCKIE$_3$ BATH-TUB$_4$
$\uparrow$ $\uparrow$
GO$_1$ $\rightarrow$ TO$_2$ $\rightarrow$IN$_2$

Thematic arguments are not primitives in this theory. They are defined as elements selected by particular functions (Jackendoff 1983) and the f-chain selects the thematic arguments according to the Argument Selection principles given in (7):

(7) a. Each non-monadic function must select a thematic argument.
b. Each f2 must select a thematic argument.
c. No f can select more than one thematic argument.

Notice further that each zone has its own primitive (causer, theme, or landmark).

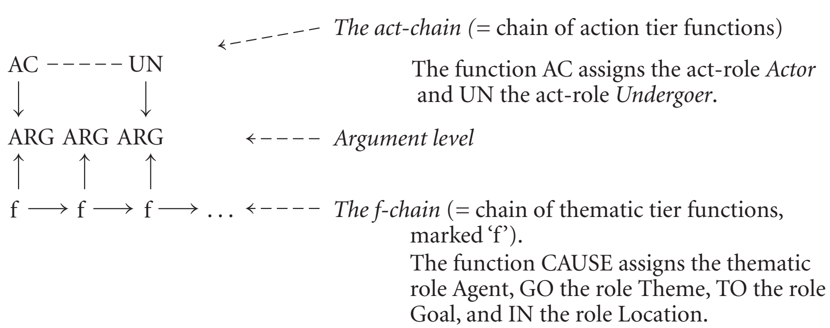


Figure 4. Organization of conceptual structure.

The organization of the conceptual structure has three layers that are all interconnected by selection principles. These layers are the act-chain, the f-chain, and the argument level, as illustrated in Figure 4.

The functions AC and UN select actor and undergoer arguments, respectively (Nikanne 1995). Actor is an active and undergoer a passive participant. If both actor and undergoer are present, the actor dominates the undergoer (see Jackendoff 1990; for more details on action tier formation, see Nikanne 1995). According to Jackendoff, the action tier may express positive, negative, or neutral effect. Nikanne (1995) argues that this feature is a property of the undergoer function UN. The undergoer is the affected participant and the effect may be either pleasant (e.g. *enjoy something*, *be helped by someone*), negative (*suffer from something*, *be picked on by someone*), or neutral. Thus, the function UN can have three values – plus (+), minus (–), or neutral (neither + nor –), as exemplified in (8a), (8b), and (8c), respectively:

(8) a. UN– selects a malefactive undergoer:
e.g. ***John** suffers from headache*; *Mary picks on **John**.*

b. UN+ selects a benefactive undergoer:
*e.g. **John** enjoys his life*; *Mary helps **John** with his homework.*

c. UN selects a neutral undergoer:
e.g. **John** fell asleep; Mary touched **John**; Mary sent **John** to the *supermarket.*

We will need these features in Section 6 in which we will discuss Finnish ablative adjunct constructions.

4. Lexical linking

As mentioned in Section 1, there is good reason to keep lexical items and constructions apart even though they both are structure-specific linking devices. In this section, I will briefly show how linking works in lexical items (for discussion on the rules that make lexical items accessible for the grammar, see Nikanne 1998).

4.1 General tendencies

There seems to be a tendency in Finnish (and English) that the following correspondences between the lexical f-chain and the syntactic category hold (f>1 stands for f2 or f3):

(9) f>1... corresponds to V
f1... corresponds to P

The main point of linking is that the f-chain is linked to syntactic predicates and theta-arguments are linked to syntactic arguments (thematic tier arguments are arguments selected by the thematic tier functions). The argument linking theory is rather complicated and presented in more detail in Nikanne (1995, 1997b, 1998). In this section, I will give an overview of the properties of the argument linking theory.

The idea is that the lexical conceptual structure determines, to a large extent, which conceptual argument is linked to which syntactic argument. Nikanne (1997b) calls this "lexical argument linking". However, the relationship between the conceptual and syntactic arguments is not direct and the lexicon is a linking device between the conceptual and syntactic arguments. First, it must be determined which conceptual arguments selected by the lexical f-chain of the predicate may in principle appear as syntactic arguments and which may not. Nikanne (1997b) suggests the following two principles.

(10) *Potential syntactic arguments*
a. If a function in the lexical f-chain requires a theta-argument, this theta-argument is a potential Direct Argument (DA).
b. If a theta-argument is marked implicit ($[\ldots]^I$) in the Lexical Conceptual Structure (LCS), it is not a potential DA.

Thus, as the fragment of an f-chain is an incomplete part of conceptual structure, it must be complemented with other conceptual elements, for instance thematic arguments. This is what the valence and selection are about. Those thematic arguments that the lexical f-chain selects (those that belong to its valence) are potential syntactic arguments. If an argument is marked as implicit, it is, by definition, not expressed in syntax.[2]

The next step is to find out which potential syntactic argument of the predicate will actually appear in syntax as an argument of that predicate. Pre- and postpositions in Finnish only have one argument and also the f1s can only select one theta argument. Verbs are more complicated and linking to the syntactic argument is determined in two steps. First, the potential arguments are ordered according to the hierarchy in (11).

(11) Take potential DAs from left to right and mark the first one DA1 and the second one DA2. The maximal number of direct arguments of a predicate in Finnish is 2.

Thus, there is a hierarchy DA1 > DA2, as follows from the f-chain schema in (4). Second, DA1 and DA2 are linked to subject and object, respectively, by the default linking principle in (12).

(12) *Default linking to syntactic arguments*

$$\begin{array}{ccc} \text{DA1} & \text{———} & \text{DA2} \\ | & & | \\ \text{subject} & & \text{object} \end{array}$$

DA1 and DA2 correspond, respectively, to the terms "logical subject" and "logical object" known from traditional grammar. The lexical argument linking theory gives some motivation to those traditional terms.

In addition to default linking, the DA1 and DA2 may be linked to subject and object in exceptional ways. For instance with the verbs *get* and *receive,* whose subject is the goal selected by the LCS and the object is the theme, violates the linking principle in (12). The theme comes higher than goal in the thematic role hierarchy based on (4) and (11), for example in ***John*** [goal] *got* ***a letter*** [theme]. Nikanne (1997b) assumes that in these cases the exceptional argument linking is specified in the lexicon. This suggests that DA1 and DA2 are not completely reducible to the form of the LCS and they must be treated as primitives of some kind.

In the notation used in Fillmore and Kay (1996) direct arguments are called argument #1 and argument #2. The difference between the present approach and their constructional approach is that Fillmore and Kay specify the direct arguments (#1 and #2) in the lexical item (lexical construction). In the present approach this is only done in exceptional cases. In regular cases, the relationship between the form of the LCS and the syntactic argument structure is calculated using general principles such as (10), (11), and (12).

To make the idea of linking more concrete, I will now give three examples of syntactico-semantic linking that is not based on constructions.[3]

4.2 Send

A very typical and simple example of a transitive verb is the verb *send.* The lexical entry of *send* is as given in Figure 5.

The verb *send* means roughly 'make go'. The causative function CAUSE and the zone 2 function GO must have a theta argument, according to the principles in (3). In addition, as GO is a non-monadic function, it selects an f1, which, for directional zone 2 functions, must be a path-function (see Nikanne 1990). The functions AC and UN select arguments according to principles explained

$$\begin{pmatrix} \text{send} \\ \\ \text{V} \\ \\ \begin{bmatrix} \text{AC} - \text{UN} \\ \text{CAUSE} \longrightarrow \text{GO} \end{bmatrix} \end{pmatrix}$$

Figure 5. Lexical entry of *send*.

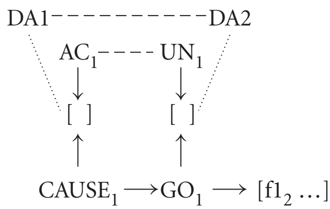


Figure 6. The conceptual structure based on the LCS of *send.*

in Nikanne (1995), but I will not discuss them here. Thus, the lexical entry in Figure 5 will automatically lead to the structure in Figure 6. The brackets indicate those parts that are not specified in the lexical conceptual structure but whose presence is required because of conceptual well-formedness principles. The DA1 and DA2 are derived from the form of the lexical f-chain of *send,* according to the principles in (10–12).

According to the default linking of DAs and syntactic functions in (12), the DA1 will be linked to the subject of the sentence and the DA2 to the object of the sentence. Figure 7 illustrates the linking of conceptual structure to syntax, without specifying all the syntactic detail, which is independent of the conceptual semantics theory.

4.3 Give

The verb give is often analyzed as having three arguments: causer, theme, and goal. In my analysis, I will assume that English has the same limitation of maximally two DAs in all clauses as Finnish does. (According to Goldberg 1992, 1995, the double object pattern is a construction and therefore is not subject to those principles that govern regular/general linking.) The lexical entry of *give* is in Figure 8. I am leaving out the action tier functions here as they are not relevant to argument linking; the action tier functions were intro-

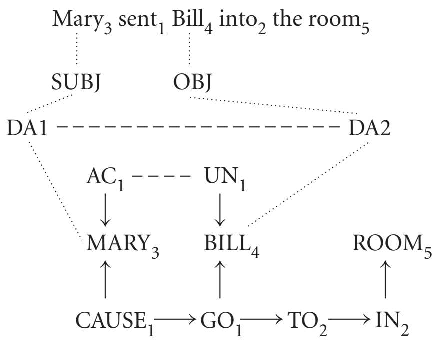


Figure 7. Analysis of the sentence *Mary sent Bill into the room.*

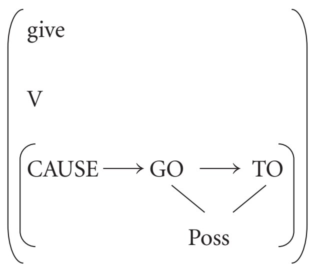


Figure 8. Lexical entry of *give.*

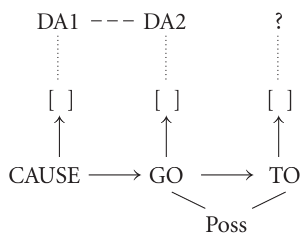


Figure 9. The conceptual structure based on the LCS of *give.*

duced in the previous example only because they will be needed in some of the constructions in Section 5.

The problem with *give* is that there are three potential DAs, but the maximal number of actual DAs is two, as shown in Figure 9.

How is the function TO to be incorporated? The solution is to employ a new lexical predicate, one that is compatible with the predicate that selects the unlinked, extra argument. In the case of *give,* this must be one having the func-

$$\begin{pmatrix} \text{to} \\ \text{P} \\ \text{[TO]} \end{pmatrix}$$

Figure 10. Lexical entry of *to*.

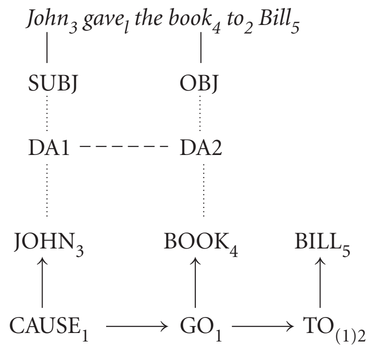


Figure 11. Analysis of the sentence *John gave the book to Bill.*

tion TO with either the possessive semantic field or no semantic field associated with it as its lexical f-chain. Such a word is for instance the preposition *to.* Its lexical entry is as given in Figure 10.

Now we can fuse (i.e. unify) the lexical entries of *give* and *to* and have a licensed selector for the goal argument. Note that licensing a syntactic element in this model always requires a licensed linking configuration (for more details on this requirement, see Nikanne 1997a.) The syntactico-semantic linking in the sentence *John gave the book to Bill* is given in Figure 11. The function TO has two conceptual lexical indices (1 and 2), one referring to the verb *give* and one referring to the preposition *to.* The one that refers to *give* (index 1) is suppressed by the one that refers to the preposition *to* (index 2).

4.4 Paint

The third example of regular linking is the verb *paint,* whose lexical entry is in Figure 12. It has an implicit argument as part of its lexical conceptual structure. Following Jackendoff (1990), I treat *paint* as meaning roughly 'put paint on something'.

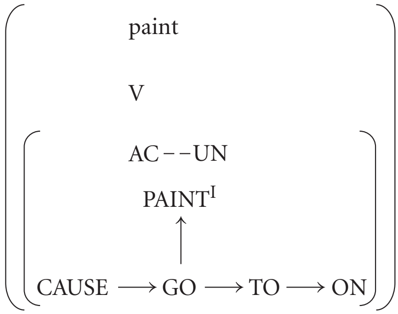


Figure 12. Lexical entry of the verb *paint*.

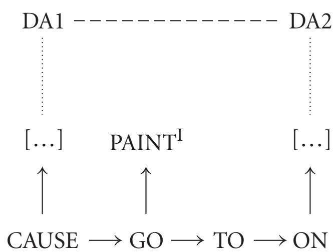


Figure 13. The conceptual structure based on the LCS of *paint*.

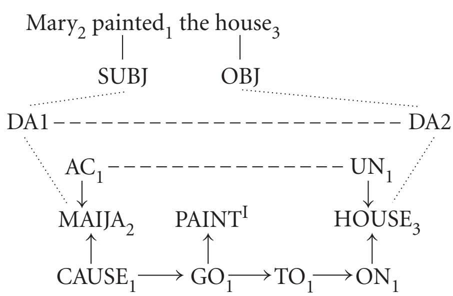


Figure 14. Analysis of the sentence *Mary painted the house.*

The implicit theme PAINT has the index I and is not a potential DA. The potential DAs are the causer (the argument of CAUSE) and the landmark (the argument of ON), as shown in Figure 13.

The full linking of the sentence *Mary painted the house* is in Figure 14.

For more details and examples of this linking theory, see Nikanne (1997b, 1995).

4.5 Conclusion

Thus, even if there were no sharp distinction between lexical items, syntactic rules, and constructions (Fillmore 1989: 24; Goldberg 1995), I prefer, at least for methodological reasons, to treat these as distinct systems. As our examples show, lexical linking, even though it is structure-specific, follows to a very large extent productive linking principles. The regular linking principles do not refer to any particular combination of syntactic or semantic categories and they do not refer to any particular lexical items or morphological forms; thus, they define the default mappings between syntactic and conceptual structures. The linking between conceptual structure and syntax is based on the interaction between different kinds of extremely simple subsystems, such as the f-chain schema in (4), the DA-system in (8–10), etc. This kind of a dynamic system is a constrained system which gives us the regularities in linking, and in my model represents the basic grammar in an even more striking manner than in what can be found in Jackendoff (1990), for example.

Why do we need two linking systems, differentiating between constructions and regular linking? The reason is methodological. It is – as far as I can understand – a widely accepted goal of linguistics to find the regularities of language (known as the core grammar in the generative models). But it is also important to identify and understand the irregularities (by which I mean constructions etc.). A model that can describe the irregularities cannot be as constrained as the one that describes the regularities ("regularity" implies that rules are followed). The formalism that must be used for constructions can, no doubt, also be used for describing regular syntactico-semantic linking. However, that would mean that there is no formal way to keep the regularities and irregularities apart.

In Sections 5 and 6 I will discuss my treatment of constructions, and it will become clear that, unlike lexical items, constructions require a rather strictly specified linking between syntax and semantics.

5. The instrumental elative constructions in Finnish

In Finnish, there is a set of constructions to which I refer with the term *instrumental elative constructions.* Interestingly, these elatives have not received much attention in Finnish linguistics, even though they are very common in everyday language. For instance, the otherwise very thorough grammar book by Penttilä (1957) does not mention them. Nor does Leino (1993) in his study of the elative case. It is not mentioned in Setälä (1952) nor Hakulinen and Karlsson (1979). (A brief description of the Finnish case system is given in the Appendix.)

The basic meaning of the elative is 'from (inside)', while the productive instrument marker is the adessive case, whose basic meaning is 'on/at'.[4] Examples of the productive use of these case forms are below; the elative is in (13) and adessive in (14), including its possessive use in (14c–d).[5]

(13) a. *Poika tuli pihasta.*
boy come-PAST yard-ELA
'The boy came out from the yard.'

b. *Nenästä tuli verta.*
nose-ELA came blood-PAR
'There was some blood coming out of the nose.'

(14) a. *Poika on katolla.*
boy is roof-ADE
'The boy is on the roof.'

b. *Pöydällä on leipää.*
table-ADE is bread-PAR
'There is some bread on the table.'

c. *Pojalla on kirja.*
boy-ADE is book
'The boy has a book.'

d. *Kirja on pojalla.*
book is boy-ADE
'The book is in the boy's possession.'

5.1 The NP-construction [isku NP-ELA]

First consider the example in (15), which shows the way the nominal expression *isku puukosta* 'a strike/hit out of a knife' can be used in context.

(15) *Isku puukosta tappoi uhrin.*
hit knife-ELA killed victim-ACC
'The victim was killed by hitting him with a knife.'

We must note that the verb *iskeä* 'hit/strike', which is related to the noun *isku* 'hit/strike', does not normally mark the instrument with the elative case, and the elative case is not normally used as an instrument marker. But in (15), the elative case together with the particular noun *isku* 'hit' can express an instrument. It seems clear that the combination [*isku* NP-ELA] is a construction in which the NP in the elative case expresses an instrument of hitting. Note that it is ungrammatical to use the elative as an instrument marker with a synonymous noun *lyönti* 'hit' (derived from the verb *lyödä* 'hit'), as shown in (16a, b) below, but both nouns can co-occur with adessive-marked instruments, as in (18). In contrast, both verbs *iskeä* 'hit' and *lyödä* 'hit' behave in the same way with respect to instruments: the instrument is marked with the adessive case, which is the productive way to mark instruments in Finnish; this is shown in (17a). The example in (17b) shows that the elative case cannot be used as an instrument marker of either of these verbs (or, for that matter, with any verb in Finnish).

(16) a. *isku puukosta/nyrkistä*
hit knife-ELA/fist-ELA
'a hit/strike out of a knife/fist'
b. **lyönti puukosta/nyrkistä*
hit knife-ELA/fist-ELA

(17) a. *Pekka iski/löi varasta puukolla/nyrkillä.*
Pekka hit/hit thief-PAR knife-ADE/fist-ADE
'Pekka hit the thief with a knife/[his] fist.'
b. **Pekka iski/löi varasta puukosta/nyrkistä.*
Pekka hit/hit thief-PAR knife-ELA/fist-ELA

(18) *isku/lyönti puukolla/nyrkillä*
hit/hit knife-ADE /fist-ADE
'a hit/strike with a knife/fist'

The set of nouns that can be used as elative complement is very limited. Only *kirves* 'axe', *nyrkki* 'fist', *pamppu* 'baton', *puukko* '(particular kind of) knife' and perhaps some other nouns are completely grammatical in this construction, as long as they express typical tools for violent behavior: for instance, the word *maila* '(hockey) stick' may also be used. The point is, however, that the construction is not very productive in the sense that it could allow any noun to take the position of the NP-ELA. Even the noun *veitsi* '(any kind of) knife' is not very good in this construction. Native speakers' judgments vary when it comes to the noun *veitsi* but not when it comes to the noun *puukko* in this construction.

5.2 The VP-constructions [saa/otta-NP-ELA GOAL], [saa/otta-NP-ELA], and [anta-NP-ALL NP-ELA]

There are other constructions that are related to the clause level construction *TIME tule- NP-ELA* that will be discussed in Section 5.3. These are of a different type. Note that there is a difference between the sentences in (19a) and (19b).

(19) a. *Ville sai {kirveen / kiven / puukon / sanomalehden / …}*
Ville got {axe- /stone- /knife- /newspaper-ACC}
päähänsä.
head-ILL-3Px
'Ville got {an axe /stone/ knife/newspaper/…} on his head.'

b. Ville *sai {kirveestä / kivestä / puukosta / sanomalehdestä /…}*
Ville got {axe- / stone- / knife- / newspaper-ELA /…}
päähänsä.
head-ILL-3Px
'Ville was hit with {an axe / stone / knife / newspaper / …} on his head.'

The elative construction can only be used with the verb *saada* 'get' and sometimes *ottaa* 'take':

(20) *Ville otti {kirveestä / kivestä / puukosta / sanomalehdestä / …}*
Ville took {axe- /s tone- / knife- / newspaper- ELA / …}
päähänsä.
head-ILL-3Px
'Ville was hit with an axe / stone / knife / newspaper on his head.'

The verb *ottaa* in this construction is stylistically marked: it sounds tough and is almost a slang expression. The subject argument of the verb *saada* 'get, receive' has the thematic role goal. The verb *ottaa* 'take' is more complicated because it indicates that the subject argument is not only a goal but also a causer and an actor.

The elative in (20) indicates that someone hit Ville on his head with an axe/stone/etc. whereas the accusative in (19a) has no such implication. The illative adjunct in (19) is an example of a "spatial resultative" adjunct of one type. The core sentence is *Ville sai kirveen/…* 'Ville got an axe/…' and the illative *päähänsä* 'head-ILL' is an adjunct that indicates the place where the theme argument ends up. The verbs *saada* 'get' and *ottaa* 'take' are basically possessive verbs. The spatial resultative adjunct can be used to express the goal of the spatial movement that is involved with the possessive change:

(21) a. [*Ville sai kirveen*] *kotiinsa*.
Ville got-3sg axe-acc home-ill-3Px
'Ville got an axe to his home'
b. [*Ville otti kirveen*] *olallensa*.
[Ville took-3sg axe-acc] shoulder-ill-3Px
'[Ville took an/the axe] on his shoulder.'
c. [*Ville piirsi kuvan*] *pöytään*.
[Ville draw-past-3sg picture-acc] table-ill
'[Ville drew a picture] on the table.'

Using the elative case instead of the accusative, indicates that someone was using the theme argument (axe, stone, knife, etc.; see the definition in Section 3) as a tool when s/he hits the victim expressed by the subject of the sentence. In that case, the illative (or allative) phrase must be a body part:

(22) **Ville sai kirveestä kotiinsa.*
Ville got-3sg axe-ela head-ill-3Px

The elative construction can also be used without the goal expression:

(23) a. *Ville sai* {kirveestä/nyrkistä/puukosta}.
Ville got-3sg {axe- / fist- / knife- / father's hand-ela}
'Ville was hit {with an axe/ fist/ knife.}'
b. *Ville sai isän kädestä*.
Ville got father-gen hand-ela
'Ville was hit hard.'

In this case, the range of nouns that can appear as the elative NP is limited, and very much the same as can appear in the clause level construction *TIME tule NP-ELA* discussed below. One interesting detail is that the idiomatic expression *isän kädestä* (father-GEN hand-ELA) in (23b) meaning 'hard and with the purpose to punish the victim' can be used only without the goal adjunct.

(24) **Ville sai isän kädestä päähänsä.*
Ville got father-gen hand-ela head-ill-Px3

The reason is obvious: the goal adjunct – which is a secondary predicate – predicates the theme argument of the matrix sentence such that the theme of the matrix sentence is understood as the theme of a motion to the goal expressed by the goal adjunct (see Nikanne 1997a). The expression *isän kädestä* is an abstract one and thus not a possible theme for a concrete movement.

The relationship between these different constructions is such that we can start with a structure that includes both the *isku NP-ELA* construction and the spatial goal adjunct:

(25) [*Ville sai iskun puukosta*] *jalkaansa.*
Ville got hit knife-ELA leg-ILL-Px3
'Ville was hit in his leg with a knife.'

In (25), the illative adjunct *jalkaansa* '(in)to his leg' predicates the noun *isku* 'hit' (the hit was aimed at the leg). The elative modifier *puukosta* 'with [lit. 'from'] the knife' is an adjunct to the noun *isku.* Since the word *isku* 'hit' is the only noun that can mark its instrument modifier with the elative case, the elative case reveals the head noun completely. As the word *isku* is redundant, it can be left out (Emonds 1987), yielding the sentence in the (26):

(26) [*Ville sai puukosta*] *jalkaansa.*
Ville got knife-ELA leg-ILL-Px3
'Ville was hit in his leg with a knife.'

As we have seen, the goal adjunct (e.g. *jalkaansa* in the example above) is limited to nouns that indicate body parts. Consequently, when the elative construction is used, the hit must be directed to the body of the victim expressed in the subject of the sentence.

(27) [*Ville sai puukosta].*
Ville got knife-ELA
'Ville was hit with a knife'.

Only a handful of nouns can be used naturally as elative adjuncts: *puukko* 'knife', *nyrkki* 'fist', *pamppu* 'baton' etc. The set is very much the same as with the NP-construction *isku NP-ELA*.

There is one more construction that is related to the elative constructions discussed above. The verb *antaa* 'give' can be used with the instrumental elative, which in itself is not surprising as it belongs to the same group of verbs indicating possessive transition as *saada* 'get' and *ottaa* 'take':

(28) *X anta-* (*Y:Ile*) {*nyrkistä / puukosta / isän kädestä / . . .*}.
X give (Y-ALL) {fist/ knife/ father's hand}
'X hit (Y) {with his fist/with a knife/real bad/ . . .}'

For instance, (29a) is a typical example of a sentence in which this construction is used. Interestingly, the goal adjunct is a bit odd (at least to many speakers) with the verb *antaa*, as illustrated in (19b).

(29) a. *Poliisi antoi (mielenosoittajalle) pampusta.*
police gave-3SG (demonstrator-PL-ALL) baton-ELA
'The police gave it to the demonstrators with a baton.'
b. ?*Poliisi antoi (mielenosoittajalle) pampusta päähän.*
police gave (demonstrator-ALL) baton-ELA head-ILL
Intended meaning: 'The police gave it to the demonstrator on the head with a baton.'

In (30), the adessive case *pampulla* 'baton-ADE' must be used in order to express the instrument grammatically (recall that the adessive case is the most productively used case in possessive expressions):

(30) *Poliisi antoi mielenosoittajalle pampulla päähän.*
police gave demonstrator-ADE baton-ADE head-ILL
'The police gave it to the demonstrator on the head with a baton.'

5.3 The clause-level construction [TIME tule-NP-ELA]

There is one clause level construction in Finnish that belongs to the instrumental elative constructions:

(31) TIME *tule-* NP-ELA

(32) *Joskus/nyt/eilen tuli*
sometimes/now/yesterday came-3SG
{*puukosta / nyrkistä / isän kädestä*}.
{knife- / fist-ELA / father-GEN hand-ELA}

It is difficult to translate this construction. It means that someone hits on purpose someone else with a knife, fist, etc. The verb *tuli* 'came' is in the past tense even if it refers to the future or is combined with the adverb *nyt* 'now'. This is because in Finnish the past tense can be used in strict impolite demands or threats (see Yli-Vakkuri 1986: 172.)

Only certain words are allowed in the slot of the elative NP, such as *puukosta* 'knife-ELA', *nyrkistä* 'fist-ELA', *isän kädestä* 'father's hand-ELA, *kirveestä* 'axe-ELA', and possibly *kepistä* 'cane-ELA' and *halosta* 'log-ELA'. There may be some more, but the set is very limited. Interestingly, for instance, *veitsestä* 'knife-ELA' sounds odd, even though the word *puukosta* 'knife-ELA' (a particular kind of traditional Finnish knife) is perhaps the most typical example of this construction.

Note further that no goal argument is allowed in this construction, as shown in (33); an object is not possible either, but it is ruled out already by the fact that *tulla* 'come' is an intransitive verb.

(33) **Nyt sinuun / minuun / häneen / mieheen tuli puukosta.*
now you- / I- / (s)he- / man-ILL came knife-ELA

If the subject *isku* 'a hit' is used, as is done in (34), the sentence is less idiomatic. In addition, the goal argument is then allowed (34b):

(34) a. *Nyt tuli isku puukosta.*
now came hit(NOM) knife-ELA
'Now (someone) gets hit with a knife'
b. *Nyt sinuun tuli isku puukosta.*
now you-ILL came hit(NOM) knife-ELA
'Now (you) got hit with a knife.'

The subject and goal arguments must be understood from the context. For instance, consider the sentence in (35).

(35) *Nyt tuli puukosta!*
Now came-3SG knife-ELA

Depending on a particular situation, (35) may have, for instance, the following interpretations: 'Now I hit you with a knife!', 'Oh no, now that ugly looking guy soon will hit us with a knife!', 'Wow, now John Wayne will finally hit Gary Cooper with a knife!', etc.[6]

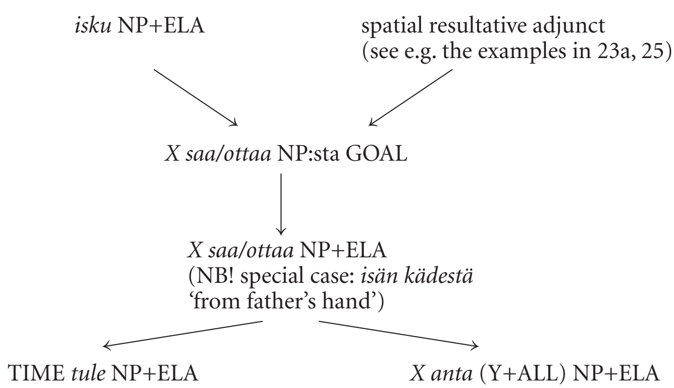


Figure 15. The relationships between the instrumental elative constructions.

The mutual relations between the instrument elative constructions are summarized in Figure 15. Similar relations are called "inheritance relations" by Goldberg (1995). Notice that the "degree of idiomaticity" increases as we go downwards, following the direction of the arrows.

Note that the abstract expression *isän kädestä* 'from father's hand' can be used in the constructions below the X *saa/ottaa NP-ELA* construction but not above it:

(36) a. **Pekka sai iskun isän kädestä.*
Pekka got hit-ACC father-GEN hand-ELA
(OK if 'father's hand' is understood literally.)
b. **Pekka sai isän kädestä päähänsä.*
Pekka got father-GEN hand-ELA head-ILL-Px3
(OK if 'father's hand' is understood literally.)
c. *Pekka sai isän kädestä.*
Pekka got father-GEN hand-ELA
'Pekka was seriously punished.'
d. *Ville antoi Pekalle isän kädestä.*
Ville gave Pekka-ALL father-GEN hand-ELA
'Ville punished Pekka seriously.'
e. *Nyt tuli isän kädestä.*
now came father-GEN hand-ELA
'Now X will punish Y seriously.'

This fact supports the analysis that the relationships between the constructions are one-directional.

6. Ablative case adjuncts in Finnish

6.1 General

In this section, I will discuss ablative adjuncts that are syntactically similar to each other but each of them licenses (i.e. specifies and allows) linking to a different kind of conceptual configuration. In brief, these constructions are of the form schematically shown in (37); A -/-> Y, stands for 'Y is independent of X', i.e. 'Y is not selected by X directly or indirectly'.

(37) V -/-> NP-ABL

The adjuncts I discuss may express either time of clock, causer of the event, loser of some property, or someone whose fault the event is.

6.2 A simple example of the formal analysis: The o'clock ABL Adjunct

Before going to more challenging ablative constructions, we can go through one simple example to see how the system works. It is very common in languages that the clock time is expressed through a particular construction. In English, the preposition *at* and optionally the expression *o'clock* are used.

(38) a. *Bill came home at* ***five*** (***o'clock***).
b. *Bill came home five o'clock

In Norwegian, the word *klokka* 'clock' must precede the numeral that expresses the actual time.

(39) a. *Magnus kom hjem* ***klokka fem.***
Magnus came home clock five
'Magnus came home at five o'clock'.
b. **Magnus kom hjem fem.*
Magnus came home five

In Finnish, the ablative case corresponds to the English preposition *at* in these time expressions. Finnish resembles English also in that the word *kello* 'clock' is optional if the ablative case is present (as shown for English in 38a). However, if the time expression includes another clock-related word such as *kello* 'clock', *puoli* 'half', Num-PARTITIVE *vaille/yli* 'Num to/past', etc., the ablative case is optional because it is clear without the ablative that the phrase is expressing clock time (40b). However, if no such word is present, the ablative case is obligatory (40c); for more details, see Nikanne (1987).

(40) a. *Pekka tuli kotiin*
Pekka came home-ILL
{(*kello*) *viideltä / puoli viideltä / puolelta / tasalta.*}
{(clock) 5-ABL / half 5-ABL / half-ABL / sharp-ABL}
'Pekka came home at {5 o'clock / half past 4 / half past / sharp}.'
b. *Pekka tuli kotiin*
Pekka came home-ILL
{*kello viisi / puoli viisi / tasan viisi /kymmentä vaille viisi.*}
{clock 5 / half 5 / sharp 5 / ten to 5}
'Pekka came home {at five o'clock/half past 4/five sharp/ten to five}.'
c. *Pekka tuli kotiin* {**viisi* / **puoli* / *tasan*}.
Pekka came home-ILL {*five / *half / sharp-INS}.

In this respect, English works the same way as Finnish. If an expression like *half past*, *ten to,* etc. is present, the preposition *at* is optional *John came home*

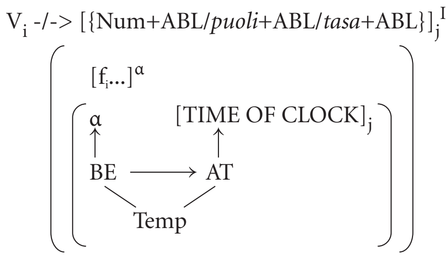


Figure 16. The O'Clock-ABL construction.

(at) {*half past five / ten to five}*. However, even though the expression *o'clock* does reveal that the numeral is a time expression and refers to the clock, the preposition *at* is obligatory also when it is present.

The construction that licenses the Finnish ablative adjunct in these time expressions is given in Figure 16.

The abbreviations and notation should be understood as follows. The abbreviation "X -/-> Y" indicates that X is independent of the V (i.e. X is not selected by the V directly or indirectly). The indices *i, j,* etc. indicate linking between syntactic and conceptual elements of the constructions. In the construction in Figure 16, the f-chain of the matrix conceptual structure is governed by a function marked with f. If the function *f* is not followed by any number, it stands for an f-chain function whose zone is unspecified. (According to the principle in (7), the zone must be greater than one as the *f* corresponds to the lexical conceptual structure of a verb.) If the conceptual structure part of the adjunct has some specified content, the content of the lexical conceptual structure of the syntactic part is fused (i.e. unified) with it (see Jackendoff 1987, 1990: 53). E.g. here the meaning of the numeral or the words *puoli* 'half' and *tasa* 'sharp' are fused with the meaning 'clock time'. The Greek-letter indices α, β, etc. indicate binding within conceptual structure (X^{α} binds α); if argument A is bound by argument B, then A and B are co-referential. Thus in Figure 16, the structure marked as $[f\ldots]^{\alpha}$ binds the theme (the theta-argument of the f2) in the embedded conceptual clause (marked with a normal size α).

A specific instantiation of the time adjunct construction in Figure 16 is in (41), which has its full representation in Figure 17.

(41) *Pekka tuli kotiin kolmelta.*
Pekka came home-ILL three-ABL
'Pekka came home at three o'clock.'

[[Pekka$_3$ tuli$_1$ koti$_4$-in$_2$][$_{\mathrm{Num}}$ kolmelta$_5$]]

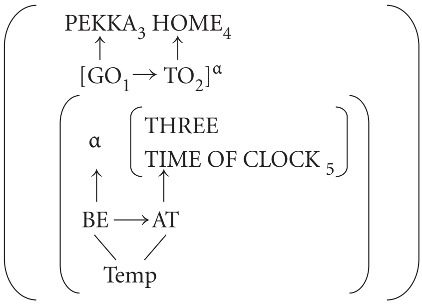


Figure 17. Analysis of sentence (41).

The indices 1, 2, 3, etc. indicate linking between syntactic and conceptual representations, just like the indices *i*, *j*, etc. in (44).[7] As required by that representation, the numeral in the ablative case is linked to the landmark in the temporal field and the content [TIME OF CLOCK] is unified (fused) with the content of the word *kolme* 'three'. The result is that the event that is expressed in the core sentence is temporally located at three o'clock.

The reason to introduce the O'Clock Ablative adjunct was to familiarize the reader with the notation, and I will not discuss this construction in more detail here.[8]

6.3 An example of an ambiguous sentence

The sentence in (42) has several readings:

(42) *Tuolta* *teurastajalta* *siat* *kuolevat.*
that-ABL butcher-ABL pigs die-3PL
a. 'That butcher sure can kill pigs.'
b. 'That butcher's pigs die.'
c. 'Pigs die on that butcher when it is his responsibility to take care of them.'

(42a) shows that an ABL-adjunct used with a certain type of non-causative verb gives the reading that the NP marked with the ablative case is a skillful causer of the kind of activity expressed by the matrix verb. It is easier to get this reading if an adverbial like *kivuttomasti* 'without pain' is added. The reading in (42b) indicates that despite of his profession, the butcher may also be a pig owner. It is, then, possible to interpret (42b) in such a way that the pigs die and the butcher suffers from that. (42c) is different in that the butcher may be just a nice man and try to help his friend by taking care of his pigs. But the poor butcher is not very good at taking care of pigs, and they die. In this case, the reading is that of Losing Control.

I assume that these readings are licensed by different adjunct constructions. In Sections 6.4 and 6.6, I will discuss the constructions that lead to the readings (b) and (c). The construction behind the reading in (a) is treated in Nikanne (in progress).

6.4 Malefactive owner ABL adjunct

The ablative phrases in (43a–b) are typical ablative adjuncts expressing a loser of a property. The verb in itself already expresses a loss; verbs meaning 'lose', 'disappear', etc. are typical examples. Note that it is also possible to express the ownership using the genitive case, in the same manner as is done in the English glosses in (43c, d).

(43) a. *Tommylta* {*katosi / hävisi*} *ruuvimeisseli.*
Tommy-ABL {disappear- / get.lost-PAST-3SG} screwdriver(NOM)
'Tommy's screwdriver got lost.'
b. *Phil ja Lil hävittivät Tommylta ruuvimeisselin.*
Phil and Lil lost-3PL Tommy-ABL screwdriver-ACC
'Phil and Lil lost Tommy's screwdriver.'
c. *Tommyn ruuvimeisseli*
Tommy-GEN screwdriver(NOM)
{*katosi / hävisi*}.
{disappear-PAST-3SG / get.lost-PAST-3SG}
'Tommy's screwdriver got lost.'
d. *Phil ja Lil hävittivät Tommyn ruuvimeisselin.*
Phil and Lil lose-PAST-3PL Tommy-GEN screwdriver
'Phil and Lil lost Tommy's screwdriver.'

However, the ablative adjunct is not a modifier of the noun *ruuvimeisseli* 'screwdriver' in (43a–b). The examples in (45) and (46) illustrate the difference between the use of the genitive and ablative case (on Finnish word order, see Vilkuna 1989; Holmberg & Nikanne 1994, 2002).

(44) a. *Tommylta hävittivät Phil ja Lil ruuvimeisselin.*
Tommy-ABL lost-3PL Phil and Lil screwdriver
(*Tommy* is the topic of the sentence.)

b. *Tommylta Phil ja Lil hävittivät ruuvimeisselin.*
Tommy-ABL Phil and Lil lost-3PL screwdriver
(*Tommy* carries a contrastive focus and *Phil ja Lil* is the topic of the sentence.)

(45) a. **Tommyn hävittivät Phil ja Lil ruuvimeisselin.*
Tommy-GEN lost-3PL Phil and Lil screwdriver
b. **Tommyn Phil ja Lil hävittivät ruuvimeisselin.*
Tommy-GEN Phil and Lil lost-3PL screwdriver

In some dialects, including my own, it is possible to say (46a), but that is a rather fixed expression in itself. For instance, it is not possible to topicalize the word *ruuvimeisseli* as is done in (46b). The grammatical sentence with the ablative construction in (46c), in contrast to (46b), shows that the ablative and genitive are not paraphrases of each other.

(46) a. *Tommyn hävisi ruuvimeisseli.*
Tommy-GEN get.lost-PAST-3SG screwdriver(NOM)
'Tommy's screwdriver got lost.'
b. **Ruuvimeisseli Tommyn hävisi.*
screwdriver(NOM) Tommy-GEN get.lost-PAST-3SG
(Intended meaning: 'It was the SCREWDRIVER of Tommy's that got lost.')
c. *Ruuvimeisseli Tommylta hävisi.*
screwdriver(NOM) Tommy-ABL get.lost-PAST-3SG
'It was a screwdriver that Tommy lost.' (*Ruuvimeisseli* carries the contrastive focus and *Tommy* is the topic of the sentence.)

The verb used with the ablative adjuncts does not always mean losing, getting lost, disappearing, etc. The ablative adjunct can be used in a more abstract sense as well:

(47) a. *Angelicalta sotkeutui kirja.*
Angelica-ABL get.dirty-PAST-3SG book(NOM)
'Angelica's book got dirty.'
b. *Angelicalta sotki Spike kirjan.*
Angelica-ABL make.dirty-PAST-3SG Spike(NOM) book-ACC
'Spike ruined Angelica's book by making it dirty.'

(48) *Chuckielta kastuivat sukat.*
Chuckie-ABL get.wet-PAST-3PL sock-PL-NOM
'Chuckie's socks got wet.'

Even if the ablative in (47) could be analyzed as a loser adjunct assuming that the book is so badly ruined that it is not worth anything (cf. Nikanne 1986, 1987), that interpretation is not very appealing for the example in (48). The ablative indicates that the socks were Chuckie's and that he did not like the fact that they got wet. The examples in (49) and (50) make this point clearer:

(49)	*Angelicalta*	*kastuivat*	*hiukset.*
	Angelica-ABL	get.wet-PAST-3PL	hair-PL-NOM

‘Angelica's hair got wet.’

(50)	*Phil*	*ja*	*Lil*	*{värjäsivät / kastelivat}*	*Angelicalta*	*hiukset.*
	Phil	and	Lil	{tint- / make.wet-PAST-3PL}	Angelica-ABL	hair-PL-ACC

‘Phil and Lil {tinted / wettened} Angelica's hair.’

There are test questions that can reveal actors and undergoers in syntactic structures. These are given in (51) and (52). The tests are based on the meaning of the verbs *tehdä* ‘do, make’ (in 51) and *tapahtua* ‘happen’ (in 52) and their argument structures. (51) reveals both actor and undergoer of the same act-chain if they are both present. The test in (52) can reveal the undergoer. In the answer sentence, the NPs whose act-roles are tested are pronouns that refer to those NPs in the question sentence that are known to be actors or undergoers (Nikanne 1995.)

(51) Actor | Undergoer |

Mitä X tekee Y:lle?
what X(NOM) does Y-ALL
‘What does X do to Y’

(52) Undergoer |

Mitä Y:lle tapahtuu?
What Y-ALL happens?
‘What's happening to Y?’

Now we can test the sentences with an ablative adjunct. In (53), the tested sentence is of the form of that in (51):

(53) Actor | Undergoer |

Q:	*Mitä*	[*Phil*	*ja*	*Lil*]$_i$	*tekivät*	*Angelicalle$_j$?*
	What	Phil	and	Lil	did-3PL	Angelica-ALL?

‘What did Phil and Lil do to Angelica?’

A: *He*$_i$ *kastelivat* *häneltä*$_j$ *hiukset*.
They make.wet-PAST-3PL she-ABL hair-PL-ACC
'They made her hair wet.'

It turns out that the NP in the ablative is the undergoer. The result is the same with the intransitive sentence of the form of the sentence in (49):

(54) Undergoer

Q: *Mitä* *Angelicalle*$_i$ *tapahtui*?
What Angelica-ALL happen-PAST-(3SG)
'What happened to Angelica?'
A: *Häneltä*$_i$ *kastuivat* *hiukset*.
she-ABL get-wet-PAST-3PL hair-PL-NOM
'Her hair got wet.'

Notice that 'hair' cannot be understood as an undergoer if the ablative adjunct is present (55a) even though it is the undergoer when there is no ablative adjunct in the sentence (55b):

(55) a. Q: *Mitä* *hiuksille*$_i$ *tapahtui*?
what hair-PL-ALL happened?
'What happened to the hair?'
A: **Angelicalta* *kastuivat* *ne*$_i$.
Angelica-ABL get.wet-PAST-3PL they
b. Q: *Mitä* *hiuksille*$_i$ *tapahtui*?
what hair-PL-ALL happened?
'What happened to the hair?'
A: *Ne*$_i$ *kastuivat*.
they get-wet-PAST-3PL.
'It got wet.'

The same holds for transitive sentences:

(56) a. Q: *Mitä* [*Phil* *ja* *Lil*]$_i$ *tekivät* *hiuksille*$_j$?
what Phil and Lil do-PAST-3PL hair-PL-ALL
'What did Phil and Lil do to the hair?'
A: **He*$_i$ *kastelivat* *ne*$_j$ *Angelicalta*.
they make.wet-PAST-3PL them Angelica-ABL
b. Q: *Mitä* [*Phil* *ja* *Lil*]$_i$ *tekivät* *hiuksille*$_j$?
what Phil and Lil do-PAST-3PL hair-PL-ALL
'What did Phil and Lil do to the hair?'

A: *He*$_i$ *kastelivat* *ne*$_j$.
they make.wet-PAST-3PL them
'They made it wet.'

In the examples of hair getting wet, Angelica does not lose her hair, nor does it go unusable. It is clear that the NP in the ablative case expresses a maleficiary and the owner of the theme argument of the main verb of the sentence. For instance, consider the following pair of sentences:

(57) a. *Minulta tyhjeni lompakko.*
I-ABL got.empty-3SG wallet
'My wallet went empty.'
b. **Minulta täyttyi lompakko.*
I-ABL got.full-3SG wallet
'My wallet turned full.'
c. **Stu korjasi Tommylta lelun.*
Stu fixed-3SG Tommy-ABL toy-ACC
'Stu fixed Tommy's toy.'

However, when the ownership is inalienable or we are talking about a disease, a benefactive ablative adjunct is grammatical. The sentences in (58) and (59) are all grammatical.[9]

(58) a. *Chuckielta parani haava.*
Chuckie-ABL healed-3SG wound(NOM)
'Chuckie's wound healed.'
b. *Chuckielta parani sormi.*
Chuckie-ABL healed-3SG finger(NOM)
'Chuckie's finger healed.'

(59) *Koiralta {katosivat / lähtivät} kirput.*
dog-ABL {disappeared-3PL / left-PL} fleas.
'The dog's fleas disappeared.' 'The fleas disappeared from the dog.'

The examples in (60) show that the benefactive reading in causative sentences requires that we are talking about healing a disease (in a broad sense). (60a) is grammatical because a wound is a (kind of) disease. If we are talking about healing a finger (as in 60b), the ablative adjunct cannot be used with a benefactive reading:

(60) a. *Stu paransi Chuckielta haavan.*
Stu healed Chuckie-ABL wound-ACC
'Stu healed Chuckie's wound.'

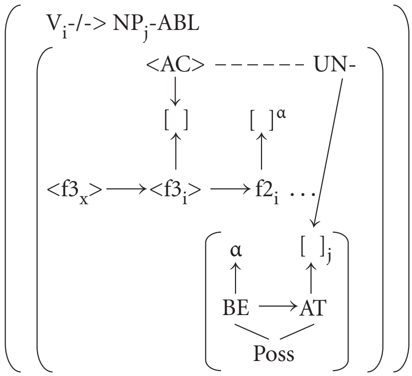


Figure 18. The Malefactive Owner ABL Adjunct Construction.

b. **Stu paransi Chuckielta sormen.*
Stu healed Chuckie-ABL finger-ACC
'Stu healed Chuckie's finger.'

The malefactive Owner ABL Adjunct Construction can be formalized as in Figure 18. The description is simplified to the extent that the discussion of the sentences in (58–60) is not included in the formalism. It is only given as an additional condititition. This does not mean that it could not (or should not) be better integrated in the formal description itself.

It is important to note that if the possessive field in the embedded conceptual clause is inalienable possession and there is no $f3_i$, the owner does not need to be malefactive (i.e. UN does not have to be marked with a minus). However, if the Agent is healing a disease of the X_j, UN does not have to be marked with the minus even if an $f3_i$ is present.

The example in (47a) above is an instantiation of the construction in Figure 18, and the sentence is fully represented in Figure 19.

Similarly, Figures 20 and 21 also show how the sentences (50) above and (61) below, respectively, are represented as different instances of the construction in Figure 18.

(61) *Tommy ja Chuckie piilottivat Angelicalta nuken.*
Tommy and Chuckie hid-3PL Angelica-ABL doll-ACC
'Tommy and Chuckie hid Angelica's doll.'

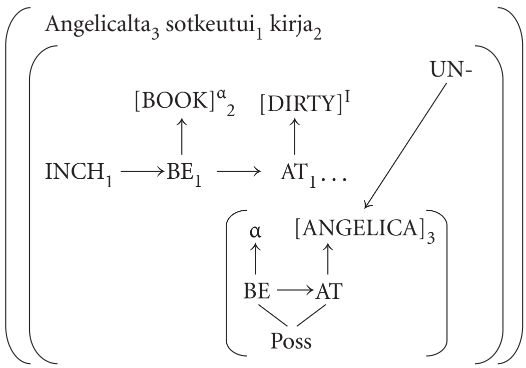


Figure 19. Analysis of sentence (47a).

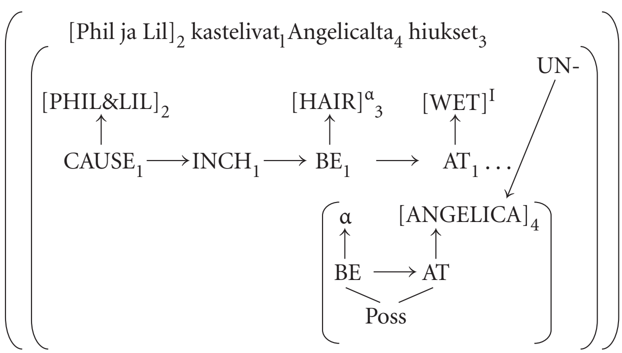


Figure 20. Analysis of sentence (50).

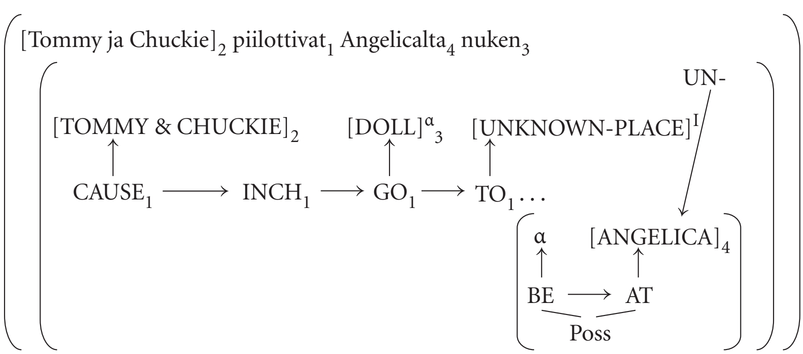


Figure 21. Analysis of sentence (61).

6.5 The Loser ABL Adjunct construction

Now consider the examples in (62):

(62) a. Pekalta {loppuivat / hävisivät} rahat.
Pekka-ABL {end- / get.lost-PAST-3PL} money-PL-(NOM)
'Pekka {ran out of / lost his} money.'
b. *Pekalta* {*loppuivat* / *hävisivät*} *huolet.*
Pekka-ABL {end- / get.lost-PAST-3PL} trouble-PL-(NOM)
'Pekka got rid of his troubles.'

The sentence is neutral with respect to whether the NP in the ablative case is benefactive or malefactive. The verbs like *loppua* 'end' and *hävitä* 'get-lost' do not select the ablative NP. This may suggest that this is an example of another construction, which we could call The Loser ABL Adjunct construction. The set of verbs that are available in this construction seems to be rather limited: in addition to those two that are mentioned, there may not be any others. It seems that the causative counterparts of these verbs *(lopettaa* 'stop/end' and *hävittää* 'make disappear/destroy') cannot be used with a benefactive reading. A benefactive ablative case NP can be used with such causative verbs as *ottaa* 'take', *viedä* 'take', etc., but with these verbs it is a part of the verb's argument structure and not an adjunct. I will not investigate this construction further. But it is worth keeping in mind as we discuss the relationships between the ablative adjuncts.[10]

6.6 The Losing Control ABL Adjunct

In sentences (63–64), the ablative case adjunct indicates a causer that causes the situation expressed in the core sentence by losing the control over the theme argument (the 'ball' in (63a) or the 'oatmeal' in (64a)). The examples in (63b) and (64b) show that a causative verb is not grammatical with this kind of ablative adjunct. These two sentences themselves are not ungrammatical but their only interpretation is that of a malefactive owner because the Malefactive Owner ABL adjunct allows causative verbs in the core sentence.

(63) a. *Tommylta* {*karkasi* / *meni*} *pallo* *Aidan*
Tommy-ABL {escaped-3SG / went-3SG} ball(NOM) fence-GEN
taakse.
to-behind
'The ball went to the other side of the fence because Tommy couldn't control it.'

b. **Tommylta vei Spike pallon aidan taakse.*
Tommy-ABL take-3SG ball-ACC fence-GEN behind-TRA
Intended meaning: 'Spike took the ball behind the fence because Tommy couldn't control it (ball or Spike).'

(64) a. *Minulta paloi kaurapuuro pohjaan.*
I-ABL burnt-3SG oatmeal bottom-ILL
'The oatmeal burnt into the bottom of the kettle because I was not careful enough.'

b. **Minulta poltti oppilas kaurapuuron pohjaan.*
I-ABL burnt-3SG student oatmeal bottom-ILL
Intended meaning: 'The student burnt the oatmeal into the bottom because I couldn't control him/it.'

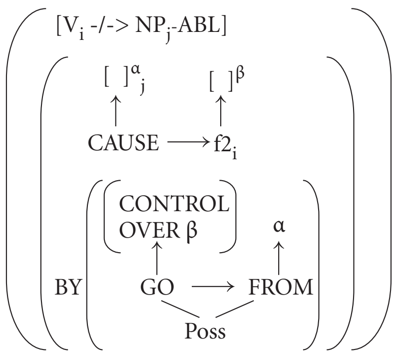


Figure 22. The Losing Control ABL construction

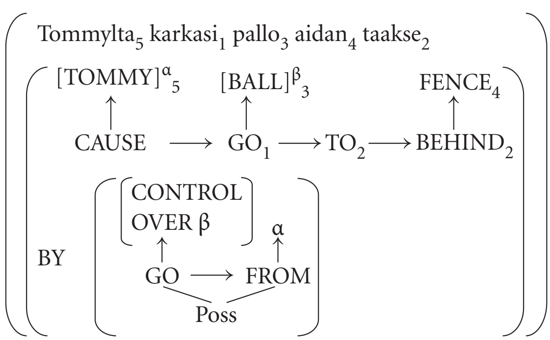


Figure 23. Analysis of sentence (63a).

The construction behind the interpretation is formalized in Figure 22. Note that the index “i” is only marked in the f2 of the main conceptual clause. This rules out causative verbs from being V_is.

Figure 23 illustrates how the construction works, on the example of the sentence in (63a) above.

7. Explaining the relationships between the ABL-constructions

In this section, I try to explain the mutual relationships between the ABL-constructions that were discussed in Section 6.1. I assume that the key to the kind of ablative use of adjuncts as there is, lies in the Finnish possessive construction on the one hand, and the possibility to use locative case adjuncts as (depictive, resultative, etc.) secondary predicates (on secondary predicates in Finnish, see Nikanne 1997a).

7.1 The possessive construction and secondary predicate sentences

Finnish does not have a verb meaning ‘have’. Ownership is expressed by using locative cases. When the possessor is animate, the locative case used in a possessive construction is the adessive (see Nikanne 1990b, in progress b). For instance, the Finnish translation of *John has a book/big eyes* is given in (65):

(65) *Johnilla on* {*kirja / suuret silmät*}.
John-ADE is book(NOM)/big-PL-NOM eye-PL-NOM
‘John has a book big eyes.’

The first step is a reanalysis of sentences that are based on possessive constructions and have a spatial place or path adjunct as in sentences like the one in (66).

(66) core sentence adjunct
[*Pojalla on kirves*] [{*kädessä / kotona*}]
boy-ADE is axe hand-INE / home-ESS
‘The boy has an axe, and it is in (his) hand/at his home’

This is the same kind of spatial adjunct that can be found for instance in (67):

(67) core sentence adjunct
[*Poika luki kirjaa*] [*nojatuolissa*]
[boy read book-PAR] [armchair-INE]
'The boy was reading a book in an armchair.'

A typical locative clause in Finnish is of the form "LOCATION copula SUBJECT" (68a) or "SUBJECT copula LOCATION" (68b).

(68) a. LOC. SUBJ.
Pöydällä on kirja.
table-ADE is book
'There is a book on the table.'

b. SUBJ. LOC.
Kirja on pöydällä.
book is table-ADE
'The book is on the table.'

Because sentence (66) has two locative case forms that can indicate a Place, a subject ('axe') and the copula ('is'), it can be reanalyzed as in (69).[11]

(69) adjunct core sentence
[*Pojalla*] [*on kirves* {*kädessä / kotona*}]
[boy-ADE] [is axe {hand-INE / home-ESS}]
'There is an axe in the hand/at home, which belongs to the boy.'

Notice that the word order is not a problem in a language like Finnish; it is also possible to have the word order *Kirves on pojalla kotona/kädessä* (axe is boy-ADE home-ESS/hand-INE 'The boy has the axe at home/in his hand').

7.2 Holding is controlling

The possessive construction can also be seen as a key to understanding the Losing Control ABL adjunct construction. The idiom in (70) is actually used to express controlling.

(70) *X:llä on homma hanskassa.*
X-ADE is thing glove-INE
Lit: 'X has the thing in (his/her) glove.'
Idiom: 'X has the situation under control.'

Using a metaphor analysis suggested by Lakoff and Johnson (1980; but also Nikanne 1992), we could say that the underlying metaphor that explains the idiom is HOLDING IS CONTROLLING. Sentence (71) is an idiomatic expression that could be used in a context of an ice-hockey game:

(71) *Tuomarilta pääsi mopo käsistä.*
referee-ABL got(3SG) moped hand-PL-ELA
Lit: 'The moped got off from the referee's hands.'
Idiom: 'The referee lost control of the game.'

The construction with the verb *pääse* 'get' and the object *mopo* 'moped' is nowadays very common in Finnish. Basically, this sentence is a metaphor that is using an expression similar to (72a). That expression is used about losing control: when you hold something, you control it, if you let an object go, you lose control of it. The theme in (71), the 'moped', stands for the situation that the referee should be controlling, i.e. the hockey game. Via these kinds of expressions, the ablative case itself may easily be understood as standing for losing control of the situation expressed in the matrix clause.

(72) a. adjunct core sentence
[*Pojalta*] [{*putosi / pääsi / kirposi*} *kirves kädestä*]
[boy-ABL] [fell - / got- / slipped-out-3SG axe hand-ELA]
'The axe fell down / slipped out from the boy's hand'

b. adjunct core sentence
[*Pojalle*] [*lensi kirves käteen*]
[boy-ALL] [flew-3SG axe(NOM) hand-ILL]
'An axe {flew / was thrown} into the boy's {hand / arm}.'

The shift from the adessive case to the ablative and allative cases is a very natural one in Finnish. The Finnish locative cases (see Appendix) form three sets: the internal ones (inessive, elative, illative), external ones (adessive, ablative, allative), and general ones (essive, translative). Thus, whatever concrete or abstract location for instance the adessive case 'at/on' can indicate, the allative indicates transition or motion to that location and the ablative expresses transition or motion from that location. Even though the adessive case in the possessive construction behaves differently in the possessive construction when it comes to, for instance, control phenomena (see Nikanne 1993), the adessive, ablative, and allative cases are all used in possessive expressions, as illustrated in (73):

POSSESSIVE
CONSTRUCTION
[Pojalla on kirja]
boy+ABL is book
'The boy has a book.'

SENTENCE WITH COPULA
AND LOCATION
[Kirja on kädessä]
book is hand+INE
'The book is in the hand.'

SECONDARY PREDICATE
OF LOCATION/PATH
[Poika lukee kirjaa [autossa]
boy reads book car+INE
'The boy is reading a book in the car.'

core sentence — adjunct
[Pojalla on kirja] *[kädessä]*
[boy+ADE is book] [hand+INE]
'The boy has a book in his hand'

adjunct — core sentence
[Pojalla] *[on kirja kädessä]*
[boy+ADE] [is book hand+INE]
'The boy has a book in his hand'

HOLDING IS CONTROLLING
[Pojalla][on homma hanskassa]
[boy] [is thing glove+INE]
'The boy has the situation under control.'
(Lit: 'The boy has the thing in his glove')

THE ABLATIVE (AND ALLATIVE) CASE GOES TOGETHER WITH THE ADESSIVE CASE. (THE EXTERNAL LOCATIVE CASES FORM A SYSTEM IN THE FINNISH GRAMMAR, see Appendix.)

THE ABLATIVE AS A PART
OF ARGUMENT STRUCTURE
[Pojalta vei varas kirjan]
boy+ABL took thief book+ACC
'A thief took a book from the boy.'

THE ABL-PHRASE REANALYZED
AS AN ADJUNCT

adjunct
[Pojalta] *[vei varas kirjan]*
[boy+ABL] [took thief book+ACC]
'A thief took a book from the boy.'

LOSING AND LOSING CONTROL
[Pojalta] *[putosi kirja kädestä]*
[boy+ABL] [fell book hand+ELA]
'The boy let (not on purpose) the book fall out of his hand.'

LOSER & MALEFACTIVE OWNER
[Pojalta][katosi kirja]
[boy+ABL] [disappeared book]
'The boy's book disappeared.'

[Pojalta] *[kastuivat hiukset]*
[boy+ABL] [got-wet+3PL hair+PL-NOM]
'The boy's hair got wet' (and he didn't like it)

[Pojalta] *[paloi kaurapuuro pohjaan]*
[boy+ABL][burnt oatmeal bottom+ILL]
'The boy burnt (not on purpose) the oatmeal
into the bottom.'

Figure 24.

(73) a. *Äiti antoi minu**lle** kirjan.*
Mother gave-1SG I-ALL book-ACC
'(My) mother gave me a book.'

b. *Minu**lla** on kirja.*
I-ADE is book(NOM)
'I have a book.'

c. *Veli otti kirjan minu**lta**.*
brother took book-ACC I-ABL
'(My) brother took the book from me.'

The discussion of the mutual relationships between the ablative adjunct constructions is summarized in Figure 24.

8. Conclusion

In this chapter, I have discussed constructions within the conceptual semantics approach. I have argued that there are two kinds of linking between conceptual and syntactic levels of representation: regular linking and construction-based linking. The difference is that the regular linking does not specify any particular syntactic or conceptual configurations. Nor do the regular linking principles refer to any particular lexical items or morphological categories. Construction-based linking, on the other hand, does all that: links together particular kinds of fragments of syntactic and conceptual representation. In addition, constructions refer to particular words and morphological forms. It would certainly be possible to base the whole grammar on constructions because the formal device is very powerful. The reason to assume the system of regular linking in addition to constructions is mostly methodological: it is a formal way to make a distinction between default cases of linking and those cases that are exceptional.

In addition, I would also like to keep the construction module apart from the lexicon and morphology, even though they all are similar in the sense that they map fragments of different levels of representation (phonological, syntactic, conceptual, etc.) onto each other. This is also a methodologically motivated solution.

I have discussed some constructions in the Finnish language. One set of adjuncts involves the instrumental elative case adjuncts. These adjuncts all mean very much the same thing: someone uses the referent of the elative NP as an instrument for hitting someone else hard and on purpose. There are different syntactic environments in which this kind of elative can occur. The other set of adjuncts involves the ablative adjuncts. Unfortunately I only could discuss some of those adjuncts in the scope of this study. These ablative case adjuncts all have the same syntactic form: they are all just NPs in the ablative case and they are not selected by the matrix verb. These adjuncts may have different kinds of meanings, which often leads to ambiguity. In addition, I have discussed the possessive construction in Finnish. I argued that it is a key to understanding the variety of different kinds of ablative adjuncts. This shows that a different lexicon and grammar – Finnish does not have a verb meaning 'have' – may lead to different kinds of constructions.

Just as in other constructional approaches (Goldberg 1995; Fillmore & Kay 1996, etc.), it is recognized in conceptual semantics that constructions have mutual relations, which should be described in addition to the separate constructions. In this sense and – as Jackendoff (1990, 1997) has argued – in many other senses, constructions should be treated to a large extent in the same way as lexical items even if they are not the same thing.

In general, the conceptual semantics view of language is very similar to that of Construction Grammar. However, conceptual semantics is based on autonomous representational modules and therefore the analyses are based on separate levels of representations. The mapping between different levels of representations has, thus, a slightly different role in conceptual semantics than in Construction Grammar.

Appendix: The case system in Finnish

Grammatical cases

Case	Ending SG	Ending PL	basic function	Example SG	Example PL
NOMinative		*t*	SUBJ, OBJ	talo	talo**t**
PARtitive	*(t)A*	*(t)A*	OBJ	talo**a**	talo**ja**
ACCusative	*n*	*t*	OBJ (telic aspect)	talo**n**	talo**t**
GENitive	*n*	*den/tten/en*	Spec of a nominal category	talo**n**	talo**jen**

A = a or ä, according to vowel harmony. The example word *talo* means 'house/building'

Locative cases

Case	Location	Source	Goal
Internal	INEssive 'in' ending: *ssA* Ex: *talo**ssa***	ELAtive 'from (inside)' ending:*stA* Ex: *talo**sta***	ILLative '(in)to' endings: *Vn, seen, hin* Ex: *talo**on***
External	ADEssive 'on/at' ending: *llA* Ex: *talo**lla***	ABLative 'from (on)' ending: *ltA* Ex: *talo**lta***	ALLative '(on) to' ending: *lle* Ex: *talo**lle***
General	ESSive 'as' ending: *nA* Ex: *talo**na***	TRAnslative 'into' (in abstract sense) ending: *kse/ksi* Ex: *talo**ksi***	

Marginal cases

Case	Meaning	Ending	Example	Meaning of the example
INStructive	instrumental	PL+*n*	*talo**in***	'with houses'
ABEssive	'without'	*ttA*	*talo**tta***	'without a house'
COMitative	'X and X's Y'	*ine*+Px	*talo**ine**ni*	'with my houses'

Notes

1. Different parts of earlier versions of this paper have been presented at various conferences: the annual conference of the Finnish Linguistics Society (SKY) in August 1999, a workshop on conceptual semantics in Trondheim in November 1999, and the annual Finnish Linguistics Conference (Kielitieteen päivät) in Oulu in May 2000. I would like to thank the audiences of these talks for their comments, as well as the reviewers for this series; they read my article thoroughly and suggested many valuable comments and questions that have improved the chapter considerably. In addition, Michaela Pörn has pointed out some errors in my earlier manuscript, for which I am grateful. All the remaining errors and misunderstandings are definitely my own.

2. Note that Jackendoff (1990) marks all those conceptual arguments that are linked to syntax with an index. In my opinion, it is the default case that the conceptual elements are expressed in syntax and implicitness is an exception that must be marked in the lexicon.

3. I am not including lexical entries as constructions here, even though there might be arguments for doing that.

4. One could try to explain the use of the elative case by assuming that it indicates the energy flow from the instrument to the patient. This would be in keeping with Langacker's (1990) idea of energy flow. I am not working with this assumption because, as we will see, the use of the elative as an instrument marker is very limited and the concepts of energy flow would not explain the adessive as an instrument marker either.

5. The following abbreviations are used in the analysis of the Finnish example sentences: ABL = ablative case; ACC = accusative case; ADE = adessive case; ALL = allative case; ELA = elative case; ESS = essive case; GEN = genitive case; ILL = illative case; INE = inessive case; INF = infinitive; INS = instructive case; NOM = nominative case; PAR = partitive case; PAST = past tense; PTC = participle; TRA = translative case; 1SG = 1st person singular; 2PL = 2nd person plural; Px3 = 3rd person possessive suffix ('his/her/its/ their'); Px1SG = 1st person singular possessive suffix ('my').

6. To give the non-native reader an idea how this construction is used, here is an authentic example taken from the song *Pohjoisen taivaan alla* ['Under the Northern Sky'] by Gösta Sundqvist:

Mun isä oli köyhä kirvesmies.	My father was a poor carpenter.
"Ehkä saha oli tylsä,	"Perhaps the saw was blunt,
kenties höylä liian terävä."	maybe the plane was too sharp."
– Sitä kännipäissään heräävä	– This the old man always kept wondering,
äijä pohti ain.	as he woke up drunk.
Joka joulu tuli turpaan	Every Christmas, I was beaten up
Joskus meinas tulla puukosta.	**Sometimes I almost got hit with a knife.**
"Mies voi kuolla suukosta",	"A man can die from a kiss."
– usein kuulla sain.	– I was often told.

The morpheme analysis of the second stanza (the one containing the elative adjunct) is as follows:

every Christmas came-3SG muzzle-ILL
*sometimes was.about.to-3*SG *come*-INF *knife*-ELA
man can-3SG die-INF kiss-ELA
often hear-INF may-1SG

The topic in the relevant part of the song (the second stanza) is the father. So, it is pragmatically clear that the one beating up and threatening with a knife is the father, and it is as clear that the victim is the teller of the story. Note that the excerpt contains other interesting constructions, too, – tulla *turpaan* 'get beaten up' and the elative indicating reason in *suukosta* 'from a kiss' – but I will not discuss them here.

7. The reason to use numbers as indices in concrete examples is on the one hand very practical: in concrete sentences, there are often many elements that should be linked, and it is easier to assign numbers than letters. On the other hand, I would like to keep the intuitive distinction between the more general indices in adjunct descriptions and the concrete indices in concrete analyses.

8. In addition to the clock-ablatives, there is a related construction which consists of the following phrases (the plural marker is often used with the instructive case without particular semantic content):

(i)	*puolelta/puolilta*	*päivin/öin.*
	half-ABL/half-PL-ABL	day-PL-INS/night-PL-INS
	'around noon/midnight'	

(ii)	*Pekka*	*tuli*	*kotiin*	*vasta*	*puolilta*	*öin.*
	Pekka	came	home-ILL	not.before	half-ABL	night-PL-INS
	'It was already around midnight when Pekka came home.'					

In addition, there are uses of the elative case (also meaning 'from') that might be connected to the clock-ablative adjunct, for instance in (iii):

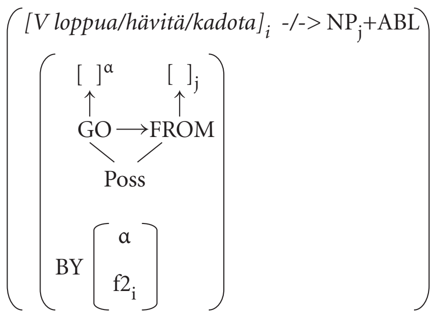
(iii)	*Alan*	*työt*	*heti*	*aamusta.*
	start-1SG	work-PL-ACC	right.away	morning-ELA
	'I will start working already in the morning.'			

9. In German, there is a dative adjunct that to some extent resembles the Finnish Malefactive Owner ABL Adjunct, shown in (i). However, it is not possible to use it with a causative verb, as illustrated in (ii); I thank Lutz Edzard for this information and the examples.

(i)	*Dem*	*Jungen*	*ging*	*sein*	*Schraubenzieher*	*verlosen.*
	the-DAT	boy-DAT	went	his	screwdriver	lost
	'The boy lost his screwdriver.'					

(ii)	**Das*	*Mädchen*	*verlot*	*dem*	*Jungen*	*seinen*	*Schraubenzieher.*
	The	girls	lost	the-DAT	boy-DAT	his	screw.driver

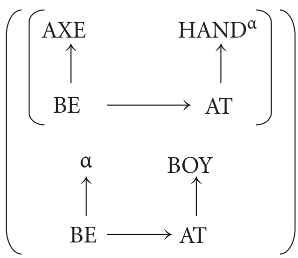
10. A possible formalization of the Loser ABL Adjunct Construction is as follows:



The Loser ABL Adjunct construction

There seems to be a very limited number of verbs that can be used in this construction. The verbs that I have found are *loppua* 'end', *hävitä* 'get lost', and *kadota* 'get lost'.

11. In Nikanne (1987), examples such as (69) or (72) are analyzed in terms of possession of the situation. In the present notation, this would be as follows:



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Chapter 8

Constructions in Word Grammar

Jasper W. Holmes & Richard Hudson

1. Word Grammar and Construction Grammar

Word Grammar (**WG**) shares almost all of the general assumptions of Construction Grammar (**CG**) relating to the nature of language and its place in human knowledge. As a named theory WG has existed for somewhat longer than CG, but of course it has been deeply influenced by the tradition out of which CG grew so the following rather bald list can be taken as evidence of an intellectual debt from WG to CG and its founders. The unattributed quotations are from the article which seems to be most widely accepted as a 'manifesto' for CG, Kay and Fillmore (1999), all of which can be matched in the introduction to the main WG reference (Hudson 1990: 3–14).

- The goal of linguistic theory is "to account for the entirety of each language", including "noncore" patterns as well as the central core.
- No distinction is assumed (or found) between 'rules' and 'lexical items', so a linguistic theory must include "an explicit system of representation, capable of encoding economically and without loss of generalization all the constructions (or patterns) of the language, from the most idiomatic to the most general".
- The list of constructions is the database of "an explicit, nonderivational (constraint based) grammar", so the grammar is generative (explicit) but not derivational (transformational).
- Syntactic patterns are intimately bound to semantic ones so that "syntactic and semantic information is represented within a single feature structure"; each grammatical construction is "a conventional association of linguistic form and content".
- Complex patterns in sentence structure are generated by the interaction of a multiplicity of individually much simpler patterns. In CG the simpler

patterns are called 'constructions', so the grammar must be able to integrate "both constructions and the words, phrases and sentences of the language which they license – which we call 'constructs' ..." (It is true that the terms "construction" and "construct" have not been generally used in WG, but they apply perfectly to the very simple basic patterns of WG and the more complex patterns that they license. In both theories the term 'inherit' is used for the relation of a construct to its licensing constructions.)

– Semantic structures must show the fine grain of lexical semantics as well as the broader structures due to syntax; for example, the analysis of GIVE must include "a set with four members, each ... representing a minimal predication, consisting of a frame plus its participants or arguments ...". The semantic structure must accommodate pragmatic information such as illocutionary force (e.g. request for information) and presupposition (e.g. that the scene described is "incongruous" as in the famous *What's X doing Y?* construction).

All these important assumptions which WG shares with CG will be illustrated below.

The point of this paper is to raise a somewhat technical issue on which WG and CG are different, and to suggest that CG might be even more fruitful if it were to move closer to WG. The question concerns the nature of sentence structure. CG has followed the USA mainstream in assuming, without discussion, that sentences are built box-wise out of phrases, so the assumed model of sentence structure is a version of phrase structure. In contrast, WG stands firmly in the European tradition of dependency grammar in which the basic building block of syntax is not a phrase but a dependency between two words. Ignoring labels, the two models of sentence structure are illustrated in the three diagrams in Figure 1. The first two are exactly equivalent in terms of the information they convey, and both represent a phrase-structure analysis of the kind

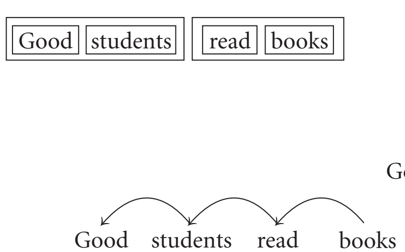

Figure 1. *Good students read books.*

which (we guess) CG might assign; the third is a WG dependency structure. The third is not a mere notational variant of the first two, but embodies a different analysis; for example, the subject is *students* for WG but *good students* for CG; and CG recognises a VP which is not recognised at all (at least not in the syntax) by WG.

In contrast, WG does agree with CG in treating morphological structure in terms of wholes (words) and their parts (morphemes or more complex 'forms'); for example, *students* consists of the morphemes {student} and {s}. We shall not discuss the WG treatment of morphological structure in this paper, but it is worth pointing out one immediate consequence of using dependency structures in syntax: that the word is the meeting point of two quite different kinds of structure: phrase structure within the word, dependency structure between words. This view of grammatical structure is very close to the model that dominated European grammar for centuries (Percival 1990), in which morphological structure ('accidence') was strictly separated from syntax; but it is very different from the phrase-structure view of an undifferentiated continuum from morpheme through word to sentence. The choice between these fundamentally different models is important and is ultimately a matter of fact: which gives the best account of the similarities and differences between patterns and within words. On balance we believe the evidence favours the traditional view: there are syntactic patterns such as free word order which are difficult or even impossible to match within words and morphological patterns such as semitic interdigitation which seem unique to morphology.

What we shall try to defend, therefore, is the claim that syntactic constructions – i.e. patterns of co-occurring words – are best described directly, in terms of co-occurring words, rather than in terms of the abstract phrases of which they are parts.

2. WG notation: Graphs not boxes

We start with a brief introduction to WG syntax and semantics. For a reader familiar with CG the ideas will be quite familiar but the notation is different as it uses a network of arrows rather than boxes. It is true that CG analyses could also be presented as branching arcs (Kay & Fillmore 1999) but boxes are the favoured option, whereas in WG they are not an option for reasons that we shall see. Indeed we believe that the choice between boxes and arrows reflects a choice between two fundamentally different views of cognitive structure – quite the opposite of the view that it is merely a matter of "visual convenience".

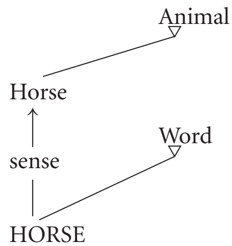

Figure 2. HORSE.

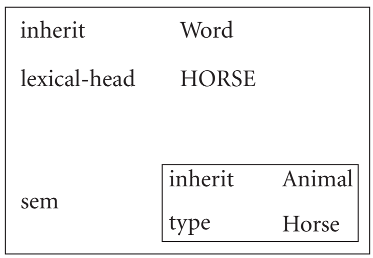

Figure 3. HORSE (CG representation).

The basic units are **nodes** and **links**. The nodes are labelled to distinguish them from one another – for example, the nodes labelled HORSE and Horse belong respectively to the lexeme HORSE (a kind of word) and the concept Horse (a kind of animal). Most links are labelled to show the similarities between them; for example the link between HORSE and Horse is labelled 'sense' in order to show its similarity to other sense links. A link is shown as an arrow which points towards the node which is indicated by the link label – the 'sense' arrow points from the word to its sense. The only links which are not labelled in this way are those which show class membership, which in WG are called 'isa' relations; these are distinguished by a small triangle whose base rests on the super-category. This simple pattern is shown in Figure 2, which shows that Horse isa Animal, HORSE isa Word, and Horse is the sense of HORSE.

It is easy to translate this simple representation into standard CG box notation as in Figure 3, where 'inherit' corresponds to the WG 'isa' link and 'sem' to 'sense'. It is somewhat harder to find a convenient way to identify the 'owner' of each box – HORSE or Horse; Kay and Fillmore identify the lexical item as 'lexical-head' so we adopt this for the word, but we have had to invent 'type' for the animal.

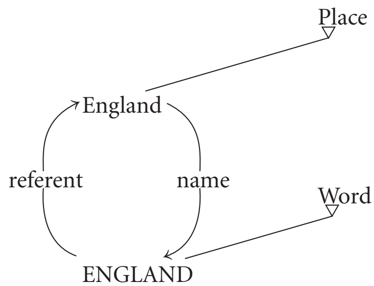

Figure 4. ENGLAND.

Why might one prefer the WG notation to boxes? The weakness of boxes, in our view, is the same as the weakness of phrase structure: excessive rigidity. For example, if the Horse box is part of the HORSE box, this rules out any extension of the analysis which would reverse this relationship so that HORSE was part of Horse. Seen positively this can be seen as a strong and testable hypothesis; but seen negatively, the hypothesis seems implausibly strong, even false. What we are ruling out, for example, is a relationship between Horse and HORSE whereby the latter is the former's 'name'. If we were to change the example from a common noun to a proper noun such as England, this is surely exactly what we do need: a pair of attributes pointing in opposite directions and both linking the word ENGLAND to the place England. According to this analysis, England is the 'sem' (WG 'referent' rather than 'sense' as in Figure 2) of ENGLAND, at the same time that the former is the name of the latter. This is easily shown in the WG graph (see Figure 4), but seems impossible to show in box notation.

The general problem with box notation, as with the basic idea behind phrase structure, is that it is much more simple and rigid than the structures that we wish to diagram, which cannot be squeezed into a simple tree structure. The same is even more true when we consider semantic structures. For example, returning to the HORSE example, we assume (with CG) that its meaning, Horse, must be located in a 'frame' of conceptual information which (in this case) must mention such things as legs and eating grass; at the same time the word itself is located in a frame of linguistic information about nouns, prepositions, morphemes and so on; Figure 5 shows, as an illustration, that HORSE is a noun and that the complement (labelled 'c') of a preposition must be a noun. In network notation it is easy to expand the encyclopedic analysis to bring in cows (which also eat grass) and humans (which also have legs, though not four of them), and to allow Grass in turn to be related to further networks of information about plants and food, and so on and on. However, if each of these

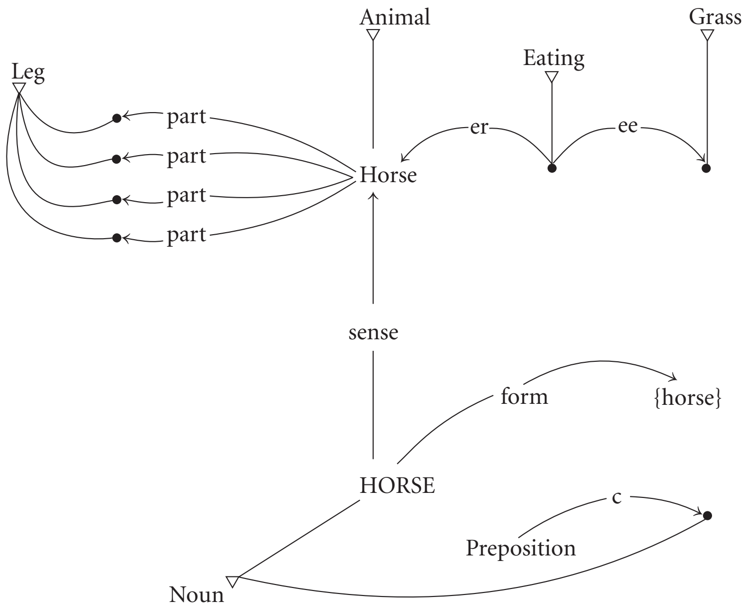

Figure 5. Network surrounding HORSE.

'semantic frames' is contained in a box, it will be necessary to allow boxes to overlap freely – the box for food overlapping with those for plants, animals and humans. It is not clear whether this is permitted in CG notation, but even if it is the diagrams will be much harder to work with than a WG network.

3. Inheritance in WG

Inheritance plays a similar role in WG and in CG, though the relationship which licenses inheritance is called 'isa' rather than 'inherit'. Just as in CG (and other unification-based theories such as HPSG), the inheritance relationship between a sub-category and its super-category is stipulated, but for this small price we gain an enormous increase in generalisation and flexibility. It is true that WG assumes default inheritance – the inheritance of properties only by default, so that potentially inheritable properties can be blocked (overridden) by more specific ones. In contrast, Kay and Fillmore appear to assume that inheritance simply adds all the properties of the supercategory willy-nilly to those of the inheritor. In the terminology of Flickinger, Pollard, and Wasow (1985), WG assumes the 'normal' mode of inheritance whereas Kay and Fillmore seem to assume 'complete' mode. However we are aware that other versions of CG do assume default inheritance (albeit under other names) – for example Goldberg espouses it explicitly (Goldberg 1995: 73) – so we do not see this as a fundamental difference between the theories.

A more important difference is that in CG 'inherit' is applied to a boxful of information, so for example the VP construction inherits from ('isa' in WG terms) the Head-Complement construction. In WG, by contrast, the 'isa' relationship is available more widely and in particular, it applies to other relationships. For example, the syntactic relationship 'object' isa 'complement'. In syntax this allows a great deal of flexibility for stating generalisations at the correct level since it allows any given relationship to be classified simultaneously at the highest level ('dependent') or at lower levels ('object' or 'clausal object' or even, where needed, 'object of the verb …'). That relationship automatically inherits generalisations from all the higher levels including the most general (e.g. regarding word order) to the most specific ones regarding class or lexical selection. Figure 6 shows some of the double inheritance hierarchy around which grammars are built: one hierarchy of words and word-types, and another one containing grammatical relations (dependencies). Once a word or relationship is recognised as an example of some category in the grammar, it automatically inherits from this category, which means that it inherits from all the supercategories in the 'isa' hierarchy; so in Figure 6, *her* inherits from Pronoun, Noun and Word (and in reality, of course, a number of other categories including the lexeme HER); and the link from *like* to *her* inherits from Object, Complement and Dependent.

One of the benefits of organising relationships hierarchically is that it allows multiple inheritance. Just as a word may inherit from two models at the same time (e.g. *students* inherits from both STUDENT and Plural), so may a

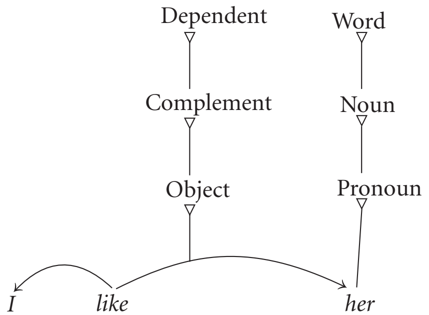

Figure 6. Word and dependent hierarchies.

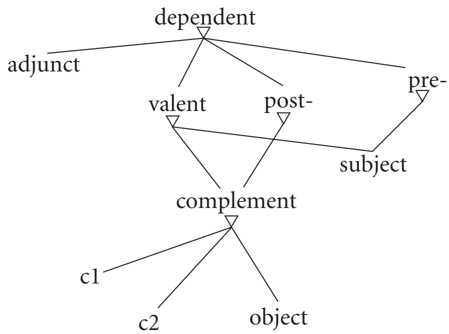

Figure 7. Dependent hierarchy.

grammatical relationship. Take the Subject relationship. On the one hand this is like Complement in as much as it is selected by the verb and expresses one of the verb's arguments: so both Subject and Complement are subsumed under the supercategory Valent. On the other hand, Subject and Complement are very different both in terms of word order and in terms of the way in which they are selected by the verb. In terms of word order, subjects belong with a small number of other clause elements which precede the verb – Wh-phrases and other 'extracted' items and pre-verbal adverbs. To show these similarities we group Subject, Extractee and Pre-adjunct together under Pre-dependent, which of course excludes Complement. The analysis is shown in the partial network in Figure 7. This kind of cross-cutting classification of relationships cannot be shown (so far as we can see) in other theories, including CG.

This hierarchical approach to relationships extends well beyond syntax, and turns out to be useful in other areas of linguistic analysis – both sense and referent can be subsumed under 'meaning', various different kinds of part can be distinguished from one another without thereby denying that they are also parts, and so on. For example, in a detailed analysis of the meaning of the verb CYCLE (Hudson & Holmes 2000) we found it useful to be able to analyse the 'rider' relationship as a sub-type of 'actor' and 'user', and 'pedal-of' as a sub-type of 'part-of'.

4. Syntax without phrase structure

As explained earlier, the most controversial difference between WG and CG lies in their treatment of sentence structure. The aim of this section is to explain how this can be done without invoking any units larger than words, and to suggest some reasons why this is a better way of achieving the goals that WG shares with CG. For reasons of space the discussion will be limited to rather simple syntactic structures but the reader should be aware that detailed WG analyses have been proposed in print for a range of more complex structures including topicalisation and Wh-fronting (Hudson 2000a; Hudson 2002; Hudson 1988; Hudson 1989) and gerunds (Hudson 2000b), all of which are discussed along with other constructions in Hudson (1990).

WG is an example of Dependency Grammar (Anderson 1977; Bröker 2001; Heringer 1993; Kunze 1975; Mel'cuk1988; Percival1990; Tesnière 1959). According to Dependency Grammar, sentence structure is simply a by-product of applying the requirements of 'valency' – the syntactic and semantic co-occurrence requirements of each word in the sentence. WG and CG approach valency in much the same way, except that CG extends the term 'valence' (abbreviated to 'val') to include almost all dependents, and not just those which we call 'valents' (which, as explained above, include subjects and complements).[1] Each pair of a head-word and a dependent is licensed by some fact in the grammar, which in some way limits the head-word and the dependent and their syntactic and semantic relations. For example, the valency of DRINK allows it to have an object noun (NB not noun phrase – we return to this point below) whose referent is the 'Drink-ee' – the liquid consumed – and a subject noun whose referent is the 'Drink-er'. The notation is different, because the valents are brought together by the shared classification as 'valent' rather than by sharing a slot called 'val', but the underlying principle is the same: that words define their own needs in terms of dependents, and these needs must (of course) be satisfied.

Figure 8 shows the syntactic part of the valency of DRINK and how this generates the dependency structure for the sentence *Joe drinks coffee*. In a nutshell, what this figure shows is that DRINK requires both a subject noun and an object noun, and the token *drinks* inherits and satisfies these valency requirements.

The general idea of inheriting a valency set is very familiar in CG, though there are important details which could be pursued here – in particular, how do we distinguish obligatory from optional valents? (This is still a matter of debate and research in WG, but the research question is how to choose among a range of plausible alternatives.) Since the CG valence set corresponds more or less exactly to the set of dependents in WG we can also draw attention to the similarities in the treatment of adjuncts, which are treated in WG, as in CG, as dependents which license themselves, in contrast with valents which

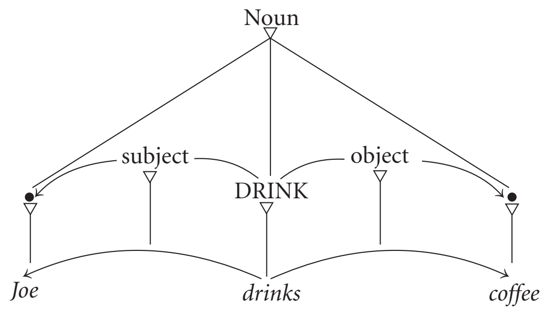

Figure 8. *Joe drinks coffee.*

are licensed by the lexical requirements of the head word. For example, the valency for an adverb such as OFTEN requires it to be an adjunct (a named dependency type) of a verb; and that for NEVER requires it more specifically to be the verb's pre-adjunct. The theories offer different notations and some differences of detail which may turn out to be important, but at present we are struck by the similarities.

However, there is a major difference between the two theories which brings us back to the difference between boxes and arrows. In CG a construction constitutes a phrase whose parts are also either words or phrases; in WG the only units recognised are words. For example, one of the most basic constructions in CG is the Head plus complements construction, which is shown as a box containing the head word plus one or more complements; the equivalent part of a WG grammar is the dependency type Complement, which is shown as an arrow linking two words. Thus to show that *coffee* is the complement of *drinks*, a CG analysis encloses them both in a box and labels the two words 'head' and 'object' – more precisely, 'role: head' and 'gf: obj'; whereas a WG analysis links *drinks* to *coffee* by means of an arrow labelled 'object'. The different ways of classifying the relations may well be mere notational variants, but the two theories seem to be making fundamentally different claims about the sentence structure: for CG the object is a phrase (indicated by the label 'filler', meaning 'a phrasal role'), whereas for WG it is a single word. The difference is not great when the phrase consists of a single word (as in the example *drink coffee*) but it is much more important in other cases. For example, in *drinks black coffee*, it may seem obvious to those familiar with CG that the object is *black coffee*; so the WG claim that it is really just *coffee* may seem downright perverse and needs some explanation.

The explanation involves the WG treatment of semantics. As in any other theory, semantic structures of non-idiomatic phrases are built compositionally out of the meanings of the words in the phrase, and the general principle is that the dependents modify the meaning of the head word. Thus the dependent *black* modifies the meaning of *coffee* from 'Coffee' to 'Black coffee'; so in the phrase *black coffee*, the word *coffee* actually means 'Black coffee'. (More technically, this is its sense; its referent may be a specific item of black coffee.) This means that the head word of a phrase carries the meaning of the entire phrase, so although no node for the whole phrase exists in the syntax, one does exist in the semantics. (This is called 'semantic phrasing'; see Hudson 1990: 146–151.) Figure 9 shows a simplified semantic structure for *Joe drinks black coffee* including the semantic units 'Black coffee', 'x Drinking black coffee' and 'Joe drinking black coffee' as well as the basic senses of the words concerned.

In short, the head word stands for the whole phrase. In this theory, phrases are simply redundant because all the information that they might be carrying is already carried either by the head word's class-membership or by the arrows which show the phrase's internal structure. Phrases can easily be read off dependency structures – each word is the head of a phrase which contains it and the phrases of all its dependents – but there is no point in doing so. This de-

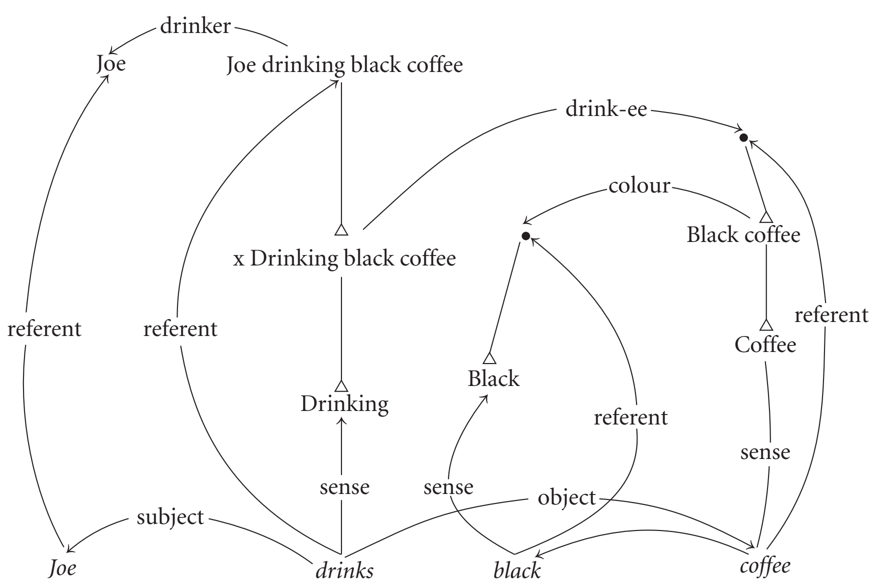

Figure 9. *Joe drinks black coffee.*

pendency approach therefore makes the following elements of CG, as defined by Kay and Fillmore, redundant:

– all phrasal constructions whose head is phrasal, such as the VP construction;
– the head feature principle (the mother shares the daughter's classification);
– the features 'maximality' and 'lexicality' which distinguish phrases from words, together with the maximality principles (heads are non-maximal, fillers and specifiers are maximal);
– the subset principle (the mother's valence and semantics lists must include those of the head, with the possible addition of adjuncts);
– the valence principle (all 'local' dependents must be licensed by the mother's valence);

The prospect of dispensing with these elements should be attractive because they include all the principles that Kay and Fillmore stipulate. All that is left is the very general and natural requirement that all inheritable requirements (including valency ones) should be satisfied.

A further important advantage of a phrase-free analysis is that lexical items are related directly to one another rather than via an intervening phrase node. For example, if a verb selects a specific preposition (as many English verbs do – consider DEPEND ON, ADHERE TO, DERIVE FROM, SMACK OF) this can be stated directly: the complement of such and such verb is such and such preposition. In contrast, if all complements must be phrases then each of these verbs requires a prepositional phrase whose head is the preposition concerned – a much less direct relationship, and therefore a much less natural restriction. In a WG analysis such lexical restrictions are easy to explain and understand, whereas phrase structure turns them into a mystery: why should so many words select a daughter of their sister? Such lexical selection patterns are especially important in the kind of fine-grained analysis that CG is so good for.

In conclusion, therefore, we believe that CG would be better if phrase structure was replaced by dependency structure, because the theory would be simpler (with fewer stipulated principles) and analysis would be more explanatory (with fewer intervening nodes between related words). So far as we can see there are no basic assumptions of CG which require phrase structure rather than dependency structure; nor, so far as we know, has the possibility of adopting dependency structure ever been considered and rejected. Rather we believe that phrase structure is simply a residue of the theory's historical roots in phrase-structure grammar. The remaining sections of this paper will show how a WG analysis can accommodate two constructions that have already been analysed in terms of CG: the *What's X doing Y?* construction and the double-object construction.

5. A WG analysis of the *What's X doing Y?* construction

This construction is analysed exhaustively and insightfully in Kay and Fillmore (1999), and like them we shall reduce its name to WXDY. Kay and Fillmore exemplify it with the following examples (among many others):

(1) a. What is this scratch doing on the table?
    b. What do you think your name is doing in my book?
    c. What is it doing raining?

We have no quarrel with Kay and Fillmore's discussion of this pattern, or with their general conclusion that it is a special combination of a number of smaller constructions:

– interrogative WHAT plus a non-subject question with or without inversion (according to whether or not it is subordinate) – *what is it doing* . . . or *what it is doing* . . .;
– what they call 'left-isolation', which in WG is called by its more common name 'extraction' and which allows long-distance extraction – e.g. *What are you trying to tell me it is doing* . . .;
– the auxiliary *is* combined with a present participle as complement – *is doing*;
– subject-auxiliary inversion when triggered by WHAT – *is it* or *it is*;
– a 'subject-controlled secondary predicate' acting as complement of *doing* – i.e. the Y of WXDY; in WG such predicates are called 'sharers' because they share the higher verb's subject.

As they point out, these five constructions can also combine without special effects – hence the ambiguity of the old joke *Waiter, what's this fly doing in my soup?*. These analytical assumptions can easily be expressed in a WG analysis such as the one for (1c) in Figure 10 which is explained more fully below.

All the dependency patterns in the figure are found outside this construction:

– Comp(lement) is as used in other theories, and as in other theories, the rest of the interrogative clause is the complement of the Wh pronoun *what*. This makes *what* the head of the sentence.[2] The Complement arrow is

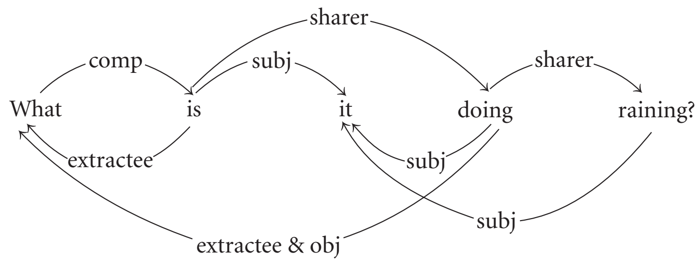

Figure 10. *What is it doing raining?*

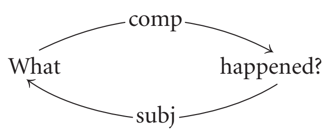

Figure 11. *What happened?*

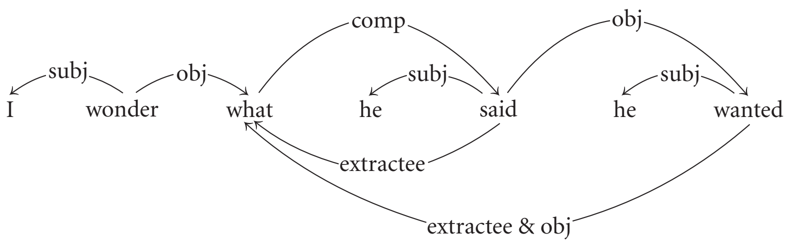

Figure 12. *I wonder what he said he wanted.*

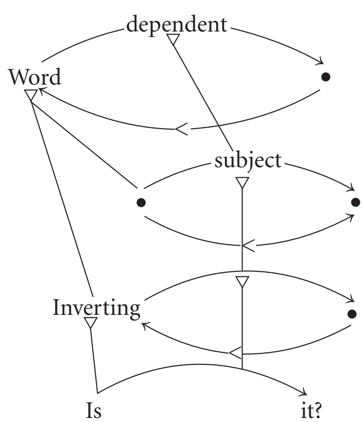

Figure 13. Subject inversion.

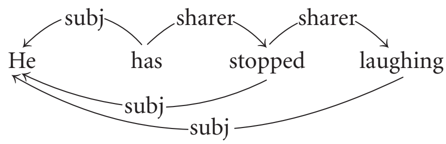

Figure 14. Sharers.

written above the words in order to show that it determines the order of the words connected (a word precedes its complement, as it precedes dependents in general). A general principle requires one order-relevant dependency per word (Hudson 2000a). Figure 11 shows Complement linking *what* and a different tensed verb in a simpler structure.

– Extractee is the relation between an extracted (front-shifted) word (*what*) and the word from which it takes its position (*is*), and also between the former and all the words in the dependency chain between it and its 'launching site' (*doing*). In Figure 12 *what* is taken recursively as the extractee of *said* and *wanted*.
– Subject is used as in other theories. Although *it* is the subject of *is*, the normal order is reversed because the auxiliary is classified as 'inverting'; this Subject arrow is again written above the words because it determines the order, in contrast with the others which are irrelevant to order. The rule which inverts subjects is an example where a default word-order rule is overridden by an exception; in fact, it is an example where an exception (an inverting auxiliary precedes its subject) overrides an exception (a word follows its subject) which overrides a default (a word precedes its dependent). Figure 13 shows as simple an example of subject inversion as is possible, together with the hierarchies of word classes and dependences that license it. (In this diagram, the relationship labelled '<' is linear order; the arrow points towards the earlier of the words that it links. The same linear order relationship is used for other kinds of ordering in time, most obviously in the semantics of tense.)
– Object is also used as in other theories. Because the extractee *what* is extractee of *doing*, the rules for extraction allow it also to have some kind of complement relation to the latter – in this case, Object. This possibility is illustrated in a simpler example by Figure 12 above, where *what* is both extractee and object of *wanted*.
– Sharer is the equivalent of the LFG function XCOMP and the traditional subject- or object-complement. It allows 'subject-raising' by both *is* and

doing, each of which shares its subject – *it* – with its sharer. Figure 14 shows this sharing without the other WXDY patterns.

This, then, is the complex syntactic structure which is defined by the WXDY construction.

If each of the components is found outside WXDY, what is special about WXDY?

– The meaning as defined by Kay and Fillmore is 'incongruity-judgement' – i.e. the speaker presents the situation defined by XY (in this case 'It raining') as 'incongruous'. We shall simply accept their analysis and terminology and show how it can be included in a WG analysis. According to the general principle of WG semantics explained earlier, the meaning of the whole construction is a property of the head word, WHAT.
– Given this meaning, the words WHAT, BE and DO are fixed and not lexically variable, and BE must be finite though its tense and agreement inflections are variable (*what they are doing* ...; *what it was doing* ...). As required of a 'sharer' of BE, the inflection of DO must be the present participle.
– Again given this meaning, the verb DO has none of its usual meanings; in fact arguably it has no meaning at all, so *What is it doing raining* is synonymous with *How come it is raining*? Its lack of meaning extends to the usual meaning of the progressive inflection, which again is missing; as evidence, Kay and Fillmore quote the possibility of using it with verbs like UNDERSTAND which normally do not allow a progressive form (e.g. *What is he doing understanding the lecture*? contrasts with **He is understanding the lecture*). We can be sure that this contrast involves meaning because there are other constructions whose meaning also accepts such verbs such as the example in Croft (1998): *He is understanding aspect more and more each day.*
– Perhaps because of this lack of meaning, DO takes two complements: its object *what*, and its sharer Y. Normally DO does not allow a sharer, though a superficially similar subject-sharing adjunct is possible (e.g. *He was doing his homework sitting in front of the TV.)*.

All these characteristics define the WXDY construction, so they must be represented in the grammar in such a way as to show their interconnections.

The WG analysis for a complex construction like this has to distinguish every 'special' part from the default part of which it is an example. In particular we must reflect the following facts:

– The present participle of DO which we find in WXDY is a special case of the default DO which has no meaning and takes two complements, *what* and a sharer. We can call it DO_{WXDY}.
– The form of BE has to take an example of DO_{WXDY} as its sharer, and has to be tensed. We can call it BE_{WXDY}. In other respects, however, it inherits the normal properties of a tensed verb such as the need to have a subject, and as usual the sharer shares this subject so these facts need not be mentioned.
– The WHAT found in WXDY has to have an example of BE_{WXDY} as its complement, and has to be the object of the DO_{WXDY} which is the latter's complement. We can call it $\text{WHAT}_{\text{WXDY}}$. As head of the WXDY construction, $\text{WHAT}_{\text{WXDY}}$ has the meaning 'The referent of Y is incongruous', where Y is the sharer of $\text{WHAT}_{\text{WXDY}}$'s complement's sharer – a complex relationship, but one which is quite easily diagrammed in Figure 15.

Figure 15 is the complete WG representation of the WXDY construction (pending a proper analysis of 'incongruence').

Our main purpose in giving this WG analysis of the WXDY construction is to show that an analysis is not merely possible in WG, but perhaps even more revealing for not being encumbered by redundant phrasal nodes. The construction is defined by three words which are linked directly to one another

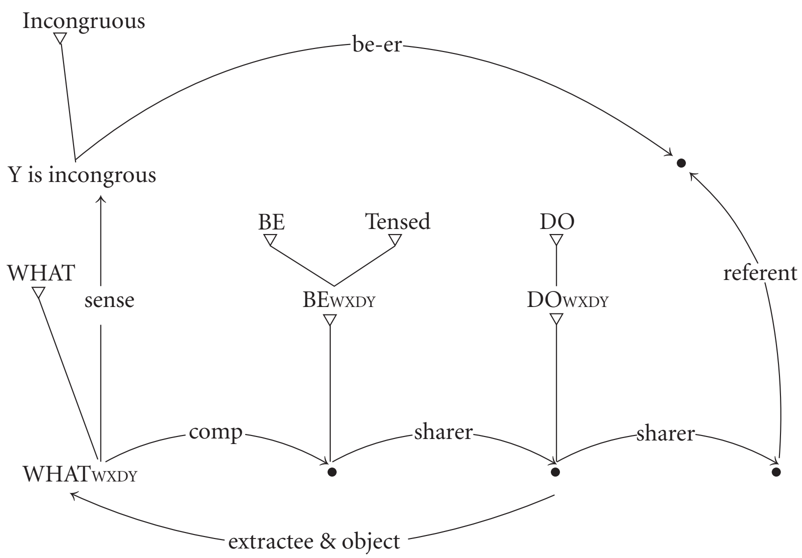

Figure 15. The WXDY construction.

in a simple dependency chain. Each of these words is a version of an ordinary word – WHAT, tensed BE and DO – which has either special restrictions on the usual range of possibilities or special extra possibilities which are not usually available. So far as we can see, the analysis offered here is entirely within the spirit of CG as defined by Kay and Fillmore.

6. A WG analysis of double objects

Whereas the WXDY construction is a specialised intersection of a number of productive patterns, the double object construction is a generalisation of a single pattern to a range of other closely related patterns. In this case we closely follow the CG analysis of Goldberg (1995: 32–39, 141–151), which we find convincing. The only addition that we shall offer is a formal framework which we believe reflects her sensitive analysis better than the mixture of prose and box diagrams that she offers (Holmes 2004). We shall exploit two features of WG theory:

– the possibility of classifying grammatical relations (such as the 'indirect object' relationship) in an indefinitely extensible 'isa' hierarchy;
– the possibility of applying an indefinitely extensible network analysis to word meanings to make interconnections explicit.

As in CG we take grammatical relations as primitives so the relations 'indirect object' and 'direct object' are available in the grammar. However we shall follow the usual practice of calling verbs which take an indirect object 'double-object verbs' because indirect objects always occur with a direct object.

Goldberg's analysis focuses on the semantic analysis so, reasonably enough, she takes the syntactic properties of direct and indirect objects for granted, but in so doing she omits half of the picture. After all, the reason for positing grammatical relations as categories is because they allow us to bring together a cluster of semantic features and a cluster of morpho-syntactic features. Indeed it is the latter rather than the former that delimit the category 'indirect object'; for instance, *gave him the book* and *gave the book to him* have the same or very similar meanings, but the former definitely does contain an indirect object and the latter does not. This interplay between syntax and semantics makes the syntax just as important as the semantics.

Regardless of their semantics, indirect objects have the following syntactic characteristics:

– like other typical dependents they follow the word on which they depend (the verb);
– like other valents, they are limited to one per head-word (which is why we cannot combine, say, a beneficiary indirect object with a recipient one: **I gave her him a present*, meaning 'I gave him a present on her behalf');
– like other typical objects, they are nouns (i.e. in phrase-structure terms, noun-phrases or determiner phrases);
– like other objects, they passivize easily (*She was given a bottle of wine*).

They also have the following syntactic characteristics that distinguish them from direct objects (Hudson 1992):

– they only occur in the company of a direct object (contrast *I gave a present* with **I gave her.*);
– they precede the accompanying direct object;
– they cannot be delayed by 'heavy NP shift' (**I gave the book the student who was working on syntax for a final-year project);*
– they passivize more easily than the accompanying direct object (compare *She was given a bottle of wine* with *The bottle of wine was given her by her boss.)*
– they do not extract easily (**The student who you lent the book; *The officer who you faxed your message*).

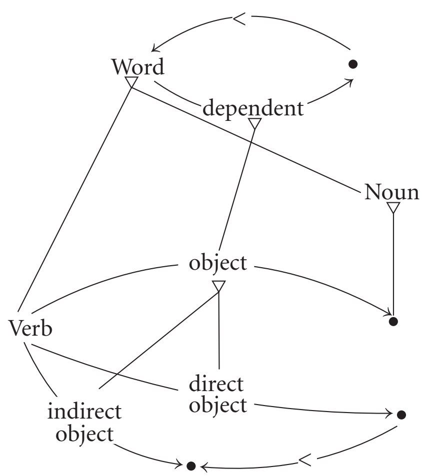

Figure 16. Direct and indirect objects.

All these facts eventually deserve a place in a comprehensive formal grammar – not a trivial task.

We do not claim to have a complete analysis to offer, but we do at least have the beginnings of one. The little network in Figure 16 incorporates some of the easier syntactic facts. It shows that a verb may have both an indirect object and a direct object, both of which inherit from 'object' the property of being a noun. Since 'object' is itself a kind of dependent, indirect objects automatically inherit the characteristics of default dependents – in this case, the characteristic of following the word on which they depend, as shown by the precedence arrow labelled '<' which, again, points at the earlier of the two. In addition, the shorter precedence arrow requires the direct object to follow the indirect one.

One important question that this analysis raises is whether to recognise verb classes that are based on valency – i.e. Transitive and Ditransitive verbs. We have three reasons for rejecting such classes.

– They simply duplicate the distinctions already made in terms of grammatical relations, and for this reason they have always been rejected in WG (Hudson 1984: 110–112).
– They inevitably lead to proliferation of word classes – if we recognise different word classes for direct and indirect objects, why not do the same for all the other types of complement that verbs can take – prepositional objects, particles, 'sharers' (i.e. traditional subject- and object-complements) and so on? If the verb classes play an important role, then these additional classes must be included along with the traditional transitive/intransitive, but if the former are not needed, why have the latter?
– Any such classification based on complementation risks complicating the classification of individual lexemes. For example, the verb GIVE – the 'classic' ditransitive verb – can also be used without an indirect object and even without any object at all, as in the following examples:

(2) a. She is always giving people presents.
b. She is always giving presents.
c. She is always giving.

If the presence of objects is necessarily tied to classification as transitive and ditransitive, then GIVE must be a ditransitive verb in (a), a (mono-)transitive in (b) and an intransitive verb in (c). One counter-argument would be that a verb's classification should be used to show its potential rather than actual complements; according to this kind of analysis, GIVE is just ditransitive, which means that it allows but does not require two objects. To this objection we would reply by pointing out the examples documented by Goldberg (Goldberg 1995: 54) such as KICK which are basically transitive but may also be used with an indirect object (*Joe kicked Bill the ball*). As Goldberg points out, the semantics of KICK does not provide a role for a recipient, so this verb cannot be classified as inherently ditransitive like GIVE. It must be transitive, which ought to rule out an indirect object; but an indirect object is in fact possible, so transitivity classes cannot define potential complements and the counter-argument collapses.

Our view, therefore, is that the possibility of a particular complement pattern is determined in part by the lexical specifics of the verb concerned and in part by the syntax and semantics of the 'construction' which, in our analysis, means the grammatical relation (e.g. 'indirect object'). So far as we can see, this view is just the same as in CG. At one extreme a particular verb may be listed more or less idiosyncratically as requiring some complement pattern:

– HAND requires some overt expression of the recipient (Goldberg 1995: 51), though this may be either an indirect object or a prepositional phrase or even a particle:

(3) a. She handed her friend the parcel.
b. She handed the parcel to her friend.
c. She handed over the parcel.
d. *She handed the parcel.

– ASK allows the recipient of the question to be left implicit, but if there is an overt complement it must be an indirect object rather than a prepositional phrase:

(4) a. She asked her friend a question.
b. She asked a question.
c. She asked a question *to/?of her friend.

These details cannot be predicted from more general facts, even though there may be a general explanation for the choice of one complement pattern rather than another. At the other extreme, a complement pattern may be used freely provided it fits both the intended meaning and the rest of the syntax, as in the example of KICK above. Note that constructions of this kind do have the effect of defining a valency class – the category of verbs (in this case) that have an indirect object; however, individual verbs are not listed as members of this class, except in those cases where their use in the relevant construction is obligatory

Sem	CAUSE-RECEIVE	< agt	rec	pat >
R: instance, means	GIVE	< giver	givee	gift >
Syn	V	SUBJ	OBJ	OBJ2

Figure 17. GIVE (from Goldberg 1995: 50).

(for example, RUMOUR is a passive verb, since it can only be used in passive constructions).

We now turn to the semantic analysis. We accept Goldberg's conclusion (Goldberg 1995: 35) that the semantics of GIVE is the prototype for indirect objects, with the other possible meanings arranged as a radial category around this central pattern; she contrasts this kind of analysis with one in which indirect objects have a very sparse semantics which is compatible, without conflict, with all known examples. We therefore start with the semantics of Giving, the sense of the verb GIVE. We accept Goldberg's prose definition of this meaning (ibid: 33) as "successful transfer of an object to a recipient, with the referent of the subject agentively causing this transfer", but Goldberg's formalisation of the ditransitive construction (ibid: 50) suggests a combined analysis for GIVE as shown in Figure 17 which we find less satisfactory. For example, the term 'CAUSE-RECEIVE' labels a single node in the analysis but implies two nodes – one for causing, the other for receiving; this is confirmed in later analyses for other event types such as 'CAUSE-MOVE' and 'CAUSE-BECOME'. More generally, such semantic analyses are not sufficiently fine-grained to explain the polysemy of the double-object construction – for example, why it accommodates cases where there is no causation but there is ownership (e.g. with verbs such as ENVY). One of the advantages of a WG network analysis is that it does provide the detail that is needed for explaining extensions such as this, as we shall now show.

The next figure (Figure 18) shows a WG analysis of Giving. In this analysis the notions of causing and receiving are separated. The causation is shown by the link to Achieving, which has a purpose which is also a result – i.e. a fulfilled purpose; since Giving isa Achieving, it too has a fulfilled purpose. The receiving is shown as a specification of this purpose – an example of Having, in which a person (the 'er', short for 'have-er') has a thing (the 'ee').[3] These two

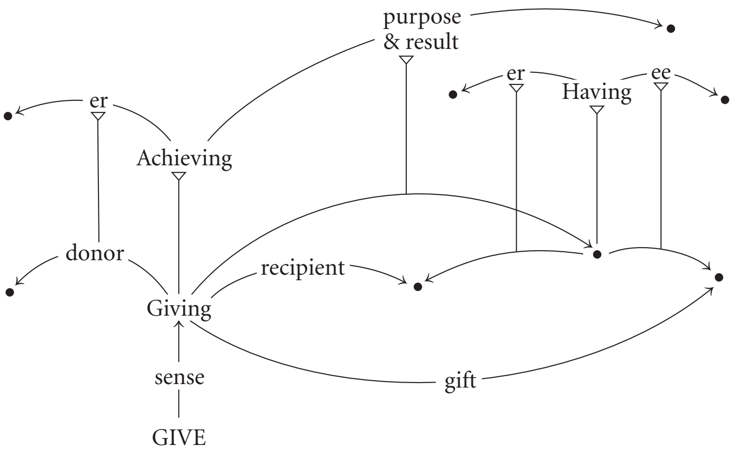

Figure 18. Giving.

participants are also linked to the giving as its recipient and gift. In short, the (intentional) effect of giving is to put the recipient in possession of the gift. For completeness we might also have shown the state of affairs prior to the giving in which the gift belonged to the donor rather than to the recipient – normally something given by A to B previously belonged to A.

As we mentioned in the general introduction, one of the advantages of a network analysis is that it allows 'deep' analyses in the spirit of Frame Semantics, in which meanings are embedded in rich conceptual frames. This advantage is highly relevant to the analysis of Giving because they allow us to enrich the analysis 'for free', so to speak, simply by developing the analysis of the super-categories Achieving and Having. Both of these concepts would certainly be enriched in a complete analysis, but the more relevant for the double-object construction is Having, because this seems to provide the links which underly all the extensions of the prototype. Two aspects of Having are particularly relevant:

– ownership: the have-er has socially recognised rights over the have-ee;
– benefit: the have-er benefits from the have-ee;

We can show these two links (separately) as direct links called 'owner' and 'beneficiary' between the have-er and the have-ee; in a full analysis they would be defined by detailed analyses of Owning and Benefitting. The links are shown in Figure 19, together with their inherited links in the analysis of Giving which show that the recipient is also both the owner and the beneficiary of the gift.

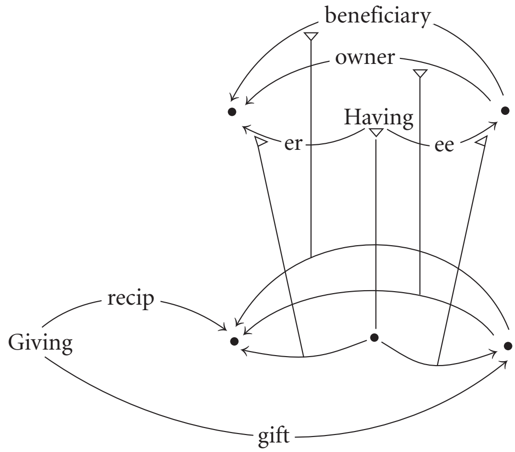

Figure 19. Beneficiary and owner.

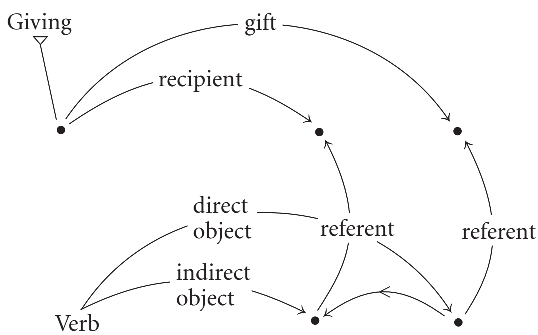

Figure 20. The double object construction.

All that remains is to marry the semantic analysis of Giving in Figures 18 and 19 with the syntactic analysis of indirect objects in Figure 16 in such a way that the former supplies the default interpretation of the indirect object relationship. This is achieved in Figure 20, which shows that the referent of a typical indirect object is the receiver of an act of Giving while that of the direct object is its gift. This, then, is the part of the complete network which defines the default semantics of the 'double-object construction'.

We now turn to some of the non-default indirect objects that Goldberg discusses. In each case the syntax associated with indirect object-hood is the same, but the semantics is different. The challenge is to offer a formal analysis which explains why indirect objects are considered (by native speakers) an appropriate way to express these meanings as an extension of the default meaning.

We start with verbs of creation such as MAKE, as in *He made her a cake*. Unlike giving, making does not inherently involve change of ownership, but it does have a result – an example of Being, the existence of the thing made. This is the first point of similarity to Giving, and the second is that the result states are highly compatible with one another if we make the common assumption that Having is a kind of Being (Lyons 1997: 722–723; Holmes 2004) where existence is combined with some notion of possession or relevance. The similarity between Having and Being can easily be seen in pairs such as (5a) and (5b).

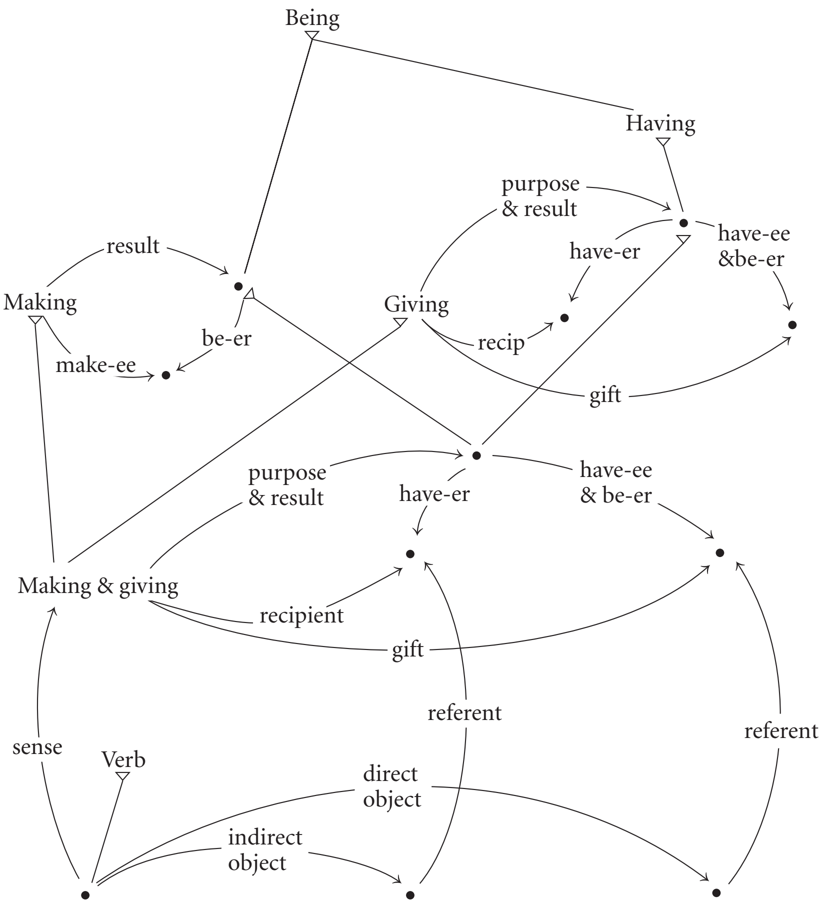

Figure 21. Making & giving.

(5) a. In this sentence there is an example of the double-object construction.
b. In this sentence we have an example of the double-object construction.

On this assumption, then, we can recognise a concept called 'Making & giving' whose result is an example of Having, which in turn isa Being. This is recognised in English grammar as another possible semantic pattern for the indirect object in addition to the default one. Since it is not tied to any particular verb it is generally available whenever the meaning demands it – i.e. whenever the meaning is an example of Making & giving.

All this information is shown in Figure 21. This diagram shows that there is a kind of verb whose sense is Making & giving, and whose indirect object is (as usual) the recipient of the Giving. This much must be stipulated in order to make the construction available, but it is clearly a very natural extension of the default semantics of the indirect object. Of course the verb MAKE can be replaced in this pattern by any other verb of creation such as COOK, PAINT or WRITE since these all have a sense which isa Making.

A different kind of deviation from the default semantics is found in verbs such as DENY, whose sense is Denying. This is roughly negative giving – the deny-er does something whose intended result is that the "recipient" (more accurately, "non-recipient") does **not** have the "gift". The formal similarities to Giving are very clear, and it is clear why the indirect object can be used for the "recipient". In Figure 22 the idea of 'not having' is shown by the crossed out

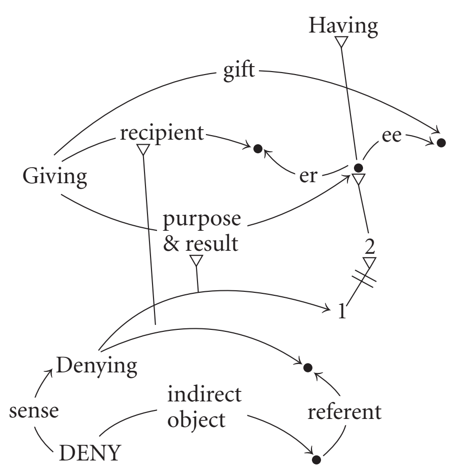

Figure 22. Denying.

'isa' link between the variables numbered 1 and 2, which is the state of affairs in which the "recipient" has the "gift". Once again the syntactic valency of DENY must surely be stipulated, but the semantic analysis explains the motivation behind the use of the indirect object relation.

The main point that we have tried to make is that a fine-grained network analysis of meaning increases the ability of a grammar to explain why the indirect object pattern has extended from its natural home territory in verbs of giving to other verbs. We shall finish with briefer notes on a number of other examples.

– ALLOW (*I allowed them a break*). This is similar to DENY but involves a second negative: for example allowing someone a break means not denying them a break.
– WRITE (*I wrote her a letter but never posted it*). WRITE is a verb of creation, and the example shows that such verbs may describe a purpose which is only partly fulfilled – the thing comes into existence but does not reach the intended recipient. Again it is clear why the indirect object is used for the intended recipient.
– POST (*If you're going up to town, could you post me a letter?*). The point of examples like this (discussed by Goldberg1995: 150) is that the indirect object defines the beneficiary of the whole action; I will not have the letter (on the contrary), less still benefit from the letter itself. What will benefit me is the posting. This use of the indirect object makes some sense if we remember that having implies benefit, so the owner is also the beneficiary (see Figure 19). Although the total semantic structure of *post me a letter* is very different from that for *give me a letter*, the beneficiary relationship is enough to justify the indirect object.
– ENVY (*I envy him his brains*). Unlike all the other examples this does not even describe an action, since envying is a state of mind. However we can explain the use of the indirect object on the grounds that he is the owner of the brains. (No doubt this valency pattern is also supported by the possibility of using a direct object to define the person envied: *I envy him.)*

All these examples show some partial similarity of meaning to Giving, and in particular they all refer to a person who qualifies to some degree as the 'have-er' of the direct object's referent. The main point to emerge from this discussion is that the analysis requires a sensitive and fine-grained model of semantics such as the one offered by WG.

7. Conclusion: What is a construction?

Our point of view throughout this chapter has been total support and acceptance for the aims of CG combined with doubts about some of the technical details of the means currently on offer. We have focussed on the tendency in CG to conceptualise structures in terms of 'boxes' and have argued that networks are much better suited to the general view of language as a complex and sometimes messy assortment of interacting patterns. But we are not suggesting that those working in CG need to go back to square one in order to develop a different formal theory; this is unnecessary because such a theory already exists in WG. We hope to have presented enough explanations and examples to allow readers to judge this claim for themselves.

One question that we have not discussed is precisely what we think a construction is. This may seem to be a fundamental issue in any discussion of how WG can be applied to the analysis of constructions, but it is easier to discuss now that we can refer to some of the details of WG networks. In CG a contrast is drawn between the abstract 'constructions', which are stored templates, and 'constructs' which are the specific structural patterns that are each licensed by a number of interacting constructions (Kay & Fillmore 1999). For example, Kay and Fillmore quote the 'Head plus complements' construction and the 'Verb phrase' construction which unify with each other and also with the construction for a specific verb to define the construct in which this verb is the head of a VP. Constructions range in size from single words to whole phrases and in richness from very sparse (the 'Head plus complements' construction) to very rich (the construction for a specific verb such as GIVE). Indeed, this claim that all kinds of pattern ultimately reduce to a single formal type, the construction, is probably the most important and distinctive feature of CG.

What, then, is a construction in CG? It would seem to include any unit of information which is stored in the grammar, in contrast with constructs, which are built on the fly. A grammar contains nothing but constructions, so the only question is precisely what counts as a 'unit of information' (in our terms). This question is important when boxes are used to demarcate units of information, but it is not one that has received much, if any, attention. In a network analysis, however, the question does not arise. The only 'units' of information are the nodes and the links between them; it is pointless to try to pack these nodes and links into separate boxes. When nouns and verbs combine with one another, which of the links 'belong' to the noun box and which to the verb box? Is this question answered differently for examples like *I had a nice sleep* and *I sold the car*? If two words share a meaning, does this meaning belong to both words or just to one of them? And so on. In formal terms, therefore, we find nothing which could be identified realistically as the WG 'construction' other than the minimal link between two nodes.

On the other hand, we do find total justification in WG for the general CG claim that information is all of a piece, with the most general categories treated in the same way as the most specific and long-distance links in the same way as more local ones. In our discussion of the WXDY construction we showed how *what* can be linked, in the grammar, to *doing*, and also how this particular kind of *what* fits into the total hierarchy of words; and our discussion of the double-object construction showed how fine-grained semantic analysis in a network can explain complex interactions between syntax and semantics. All of these patterns are formalised in the same way, and all kinds of patterns are integrated by the same default inheritance logic.

Notes

1. The exception is the Subject-Predicate construction, whose status in CG is unclear. According to 3.6 in Kay and Fillmore (1999) it is not a member of 'val'; but subjects are included among the complements (sic) of *give* in 3.4.

2. Hudson (2002) argues that Wh-interrogative clauses are generally ambiguous in structure according to whether the Wh pronoun or the finite verb is taken as the head of the whole sentence. However this is only true of main clauses, where the evidence comes from the possibility of extracting adverbials as in *Tomorrow, what shall we do?* In subordinate clauses this front-shifting is not possible because the Wh pronoun is the link-word which has to be the clause head. The same ambiguity applies to the WXDY construction if adverbials can be extracted, but so far as we know this is not possible, so we assume that *what* can always be taken as the head.

3. More accurately, the result of Giving should be shown as an example of Receiving, rather than Having. This can be shown but we omit it to avoid excessive complexity. Receiving isa Changing whose result isa Having, so there should be an additional node between Giving and Having. For more details see Holmes (2004).

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Chapter 9

Logical and typological arguments for Radical Construction Grammar*

William Croft

1. Introduction: Vanilla construction grammar and Radical Construction Grammar

This paper gives a brief overview of some of the primary arguments for Radical Construction Grammar (Croft 2001). Radical Construction Grammar is a theory of syntactic representation which is compatible with – in fact, I believe, is a consequence of – the facts of the grammars of human languages. Radical Construction Grammar proposes an extremely minimalist model of syntax from a universal perspective, as will be seen below.

Radical Construction Grammar, as its name indicates, is a variety of construction grammar. I take construction grammar to be a term that describes a family of theories of syntactic representation found in cognitive linguistics, and which has attracted considerable interest outside cognitive linguistics as well. In this section, I will describe what I believe all varieties of construction grammar to have in common, which I have christened in Silicon Valley style 'vanilla construction grammar' (see Croft & Cruse 2004, Chapters 9–11 for a fuller treatment and comparison of construction grammar theories). I will then present the three additional theses that define Radical Construction Grammar. The following three sections will outline the arguments for each of the theses of Radical Construction Grammar.

Vanilla construction grammar assumes that our grammatical knowledge is organized in constructions. The traditional definition of the term 'construction', as in the passive construction, is a holistic description of a complex syntactic unit. For example, the passive construction consists of a subject noun phrase, the auxiliary verb *be*, a verb in the past participle form, and (optionally) an oblique noun phrase governed by the preposition *by*.

The term 'construction' has been generalized in cognitive linguistics. The general definition of a construction in cognitive linguistics is as a *conventional symbolic unit*, using those terms in Langacker's meaning (Langacker 1987: 57–63). Roughly, a construction is an entrenched routine ('unit'), that is generally used in the speech community ('conventional'), and involves a pairing of form and meaning ('symbolic'; I will return to this aspect of the definition below).

The generalized definition means that there is a single way to describe any sort of symbolic grammatical unit in vanilla construction grammar. Fillmore, Kay & O'Connor (1988) distinguish syntactic constructions by degree of schematicity. A more schematic construction describes a complex structure with few (if any) component units specified as particular morphemes. For example, the Declarative Passive construction, which can be represented as something like [Sbj *be*-tns Verb-*en by* Obl], is largely schematic, except for the specification of the auxiliary verb *be* and the oblique preposition *by*.[1] In contemporary construction grammar, constructions such as the passive need not specify the linear order of their constituent elements; in many cases they do not, linear order being determined by other constructions with which they are combined.

Fillmore et al. were particularly interested in describing what are traditionally called idioms, which are constructions that are less schematic and more substantive than something like the passive construction.[2] An example of an idiom would be the verb phrase [*kick*-tns *the bucket*], in which only the verbal inflection is schematic (i.e. this idiom can be used in different tense-mood forms: *He kicked the bucket, He's gonna kick the bucket,* etc.).

One can also extend the notion of a construction to a maximally schematic syntactic unit, such as the transitive argument linking construction [Sbj Verb Obj] (see Goldberg 1995; Kay & Fillmore 1999; Langacker 1999). In other words, syntactic phrase structure rules are reinterpreted as maximally schematic constructions in vanilla construction grammar.

Cognitive linguists have also extended the notion of construction to smaller units. Morphology represents word forms, including affixes and compounds. These are also complex symbolic units. Morphological structures can be described in varying degrees of schematicity, just as syntactic structures can. The pattern [Verb-tns] describes a fully schematic morphological structure, while the pattern [Noun-*s*] describes a partially substantive, partially schematic morphological structure.

Finally, cognitive linguists have extended the notion of construction to include atomic as well as complex symbolic units. An atomic schematic unit

Table 1. The syntax-lexicon continuum

Construction type	Traditional name	Examples
Complex and (mostly) schematic	**syntax**	[Sbj *be*-tns Verb-*en by* Obl]
Complex and (mostly) substantive	**idiom**	[*kick*-tns *the bucket*]
Complex but bound	**morphology**	[Noun-*s*], [Verb-tns]
Atomic and schematic	**syntactic category**	[Dem], [Adj]
Atomic and substantive	**word/lexicon**	[*this*], [*green*]

would be a syntactic category such as [Dem] or [Adj]. An atomic substantive unit would be a word or lexical item such as [*this*] or [*green*].

This fully generalized notion of construction allows for a uniform representation of grammatical knowledge, subsuming what in other syntactic theories is divided into syntactic rules, idioms, morphology, syntactic categories and the lexicon; see Table 1.

The uniform representation of grammatical knowledge as generalized constructions generally goes under the name *syntax-lexicon continuum* (cf. Langacker 1987: 25–27, 35–36; Langacker does not use this term in his book). The syntax-lexicon continuum is a salient distinguishing feature of vanilla construction grammar in contrast to syntactic theories in the generative tradition, which divides up different formal structures into separate grammatical components (Croft 2001: 14–15).

The second general characteristic of vanilla construction grammar is that the basic units of grammatical representation are symbolic. Grammatical units specify both the form – including morphology and even phonology and prosody as well as syntactic structure – and the function/meaning of that form – semantics and conventional discourse or information-structural properties. (To avoid confusion, I will use the term *element* to refer to parts of the formal or syntactic structure of a construction, and the term *component* to refer to parts of the semantic structure of a construction.) This is another salient distinguishing characteristic of construction grammar theories. Most contemporary syntactic theories in the generative tradition split symbolic units so that the form of symbolic units is represented in formal components of the grammar (syntax, morphology, lexicon) and the conventional function of symbolic units is represented in functional components (semantics and information structure). If one represents symbolic units with the classic Saussurean diagram of a sign with the signifier (form) on top and the signified (function) below, then one can describe construction grammar as offering a "vertical" organization of grammatical knowledge into signs, in contrast to a generative theory's "horizontal" organization of the formal structure and functional structure as separate components (as the components are normally displayed in diagrams).[3]

The third general characteristic of vanilla construction grammar is that the constructions of a language form what Langacker calls a structured inventory (Langacker 1987: 63–76) of a speaker's knowledge of the conventions of their language. This inventory is widely characterized as a network (Lakoff 1987; Langacker 1987; Goldberg 1995). The network has (at least) taxonomic links – links of greater or lesser schematicity – among constructions. The exact nature and structure of this network is a matter of debate: some view it as a knowledge network of the sort pioneered in cognitive science research in the 1970s, while others view it as an activation network of the sort that became popular in cognitive science research from the mid 1980s onward; some advocate complete or at least default inheritance, while others advocate a usage-based model. The nature of the network organization of a speaker's grammatical knowledge in construction grammar will not be examined here. Again, the network structure distinguishes construction grammar theories from most generative theories. Construction grammar's network structure can be thought of as the alternative mode of grammatical organization to a generative theory's system of components and rules encapsulated within components.

Vanilla construction grammar as I have described it does not assume more specific universals of syntactic representation. In particular, vanilla construction grammar is neutral as to any hypotheses as to what types of constructions (if any) are universal, or at least found across languages, or what types of component grammatical categories are universal. Of course, specific theories of Construction Grammar such as Fillmore and Kay's Construction Grammar (Fillmore & Kay 1993; Kay & Fillmore 1999) do make specific claims. And all of the standard formal theories of grammar make specific claims about the inventory of syntactic primitives to be used in describing syntactic structure, and about what complex constructions are universal across languages. Vanilla construction grammar as I have described it also does not specify any more structure to complex constructions other than the part-whole relationship of complex constructions to the units that make them up. (These units may themselves be complex, of course.)

Radical Construction Grammar adds the following three theses to vanilla construction grammar as described above – perhaps they should be thought of as anti-theses. First, constructions – in particular, complex syntactic units – are the primitive elements of syntactic representation; grammatical categories as such are derived from constructions. That is, there are no formal syntactic categories such as 'noun', 'verb', 'subject' or 'object' per se. (In terms of the classification in Table 1, there are no atomic schematic units.) Second, the formal representation of constructions consists only of a (complex) construction and its component parts. That is, there are no syntactic relations at all. Third, there are no universal constructions (e.g. a universal passive). That is, all constructions are language-specific. In other words, virtually all formal grammatical structure is language-specific and construction-specific. This is to say: what I have described as vanilla construction grammar is all that is universal in formal syntactic representation. Vanilla construction grammar, with no toppings, *is* Radical Construction Grammar.

These anti-theses may appear radical, and in fact they are, in comparison to almost all theories of syntactic representation that I am aware of. The next three sections will defend each of these theses. For the first two theses, there are logical as well as typological arguments to support them. For the third thesis, the nonuniversality of constructions, there is chiefly typological evidence to support it. Of course, one must also specify what theoretical constructs do the work of the theoretical constructs whose existence is denied in Radical Construction Grammar. These will be described at the end of each section.

2. From syntactic categories to semantic maps

The argument for the nonexistence of syntactic categories as universal categories or as primitive elements of syntactic representation will be outlined briefly here (see Croft 1999a, 1999b, 2001, Chapter 1).

The basic typological – indeed, empirical – problem is in the application of the distributional method to cross-linguistic data and language-internal data. The distributional method is used explicitly or implicitly in most syntactic research in a wide range of linguistic theories, from cognitive linguistics to various functionalist theories to various formal theories. The distributional method is used to identify a syntactic category such as 'noun' or 'subject' within a language or across languages. The distributional method itself is to examine the occurrence of members of the candidate category in certain constructions, in the general sense of a construction given above.[4] For example, one can distinguish transitive verbs from intransitive verbs in English by the distributional method. Transitive verbs occur in the transitive active construction, while intransitive verbs do not (see examples 1a–b); conversely, intransitive verbs occur in the intransitive construction, while transitive verbs do not (examples 2a–b):

(1) a. *Jack devoured the doughnut.*
b. **Jack slept the doughnut.*

(2) a. **Jack devoured.*
b. *Jack slept.*

The constructions that are used by the analyst are assumed to be *criteria* or *tests* for the syntatic category in question. In many cases, more than one construction is considered to be diagnostic of the syntactic category in question.

In §2.1, I present the typological problems with the applicability of the distributional method. In §2.2, I present a logical inconsistency in using the distributional method to establish syntactic categories, and argue that there is nothing wrong with the distributional method; instead, there is something wrong with the syntactic theory it is being used to justify.

2.1 The typological argument

The first typological problem with the application of the distributional method is that the construction used as a diagnostic for a syntactic category in one language may be absent in another language. For example, many theories of parts of speech use morphological inflections to divide words into the parts of speech: case marking for nouns, person indexation for verbs, etc. However, an analytic language such as Vietnamese lacks these inflections, and so inflections cannot be used to identify nouns, verbs etc. in that language. Likewise, a number of constructions are used to identify "subject" and "object" in a language such as English, for example, the occurrence and behavior of NPs in coordinate clause constructions and in nonfinite complement constructions. Wardaman, an Australian aboriginal language, lacks coordination and infinitival complements, so these tests for subjecthood in English cannot be applied in Wardaman.

In these situations, an analyst appears to have basically two options. The first is to look for other constructions in the language and use those constructions to identify the grammatical category in question. For example, one might look at other constructions in Vietnamese that yield the familiar noun-verb-adjective classes. However, this looks suspiciously like the analyst has already decided that Vietnamese has nouns, verbs and adjectives, and s/he is looking for any construction that will get the results that s/he wants to find. The reason that this illegitimate practice often is used is because there is no a priori means to decide which constructions should be used as the diagnostics for a given syntactic category.

The other option is to deny that the language in question has the category noun or subject, although English and languages similar to English do. For example, one might argue that Vietnamese has no word classes, or at least not the word classes noun, verb, etc. If so, one can ask, why are the English categories considered to be the syntactic primitives of a theory that is intended to describe properties of universal grammar applicable to all languages? Why not use the Vietnamese categories instead? A more legitimate approach, and the one advocated by American structuralists (and Dryer 1997), is that English noun, verb etc. are just language-specific categories, no different in theoretical status than the categories of Vietnamese or of any other language.

A second problem is that when there is an equivalent diagnostic construction in the language in question, its distribution is dramatically different from that in English and similar languages. For example, Makah does have the morphological inflections equivalent to those in European languages to identify the category of verb (aspect and subject indexation), but the word class that allows these inflections includes not only European-type "verbs", but also "nouns", "adjectives" and even "adverbs" (examples from Jacobsen 1979):

(3) *k'upšil* *baˀas* *ˀu:yuq*
point:MOM:INDIC:3 house OBJ
'He's pointing at the house.'

(4) *babaɬdis*
white.man:INDIC:1SG
'I'm a white man.'

(5) *ˀi:ˀi:x̣ʷˀi*
big:INDIC:3
'He's big.'

As with the first problem, two options to deal with such cases are commonly chosen. One option is, again, to look for other constructions that would differentiate the parts of speech in Makah. (This is the option that Jacobsen takes.) This option suffers from the same problems referred to above: there is no a priori means to decide which construction can be used to define parts of speech in a language like Makah (or English, for that matter). In addition, choosing some other construction to differentiate parts of speech in Makah does not explain why verbal inflection does not differentiate parts of speech in that language, unlike European languages.

The other option is to say that Makah has only one part of speech, and it is 'verb', since it is defined by the same construction that defines verb in English and other languages. This option is fine as far as it goes, but it falls into the opposite trap from the first option: there are other constructions that differentiate word classes in Makah, and there is no a priori reason to ignore them either.

But the most direct manifestation of the basic problem is when two constructions that are commonly used to define a single syntactic category in a single language differ in the distributional patterns that they define. For example, some languages appear not to have subjects in the English sense, that is, a category including the one argument of intransitive verbs (labeled S by typologists) and the "subject" argument of transitive verbs (labeled A). Instead, such languages have an *ergative* category consisting only of A, while S falls in the same category as the "object" of transitive verbs (labeled P); this category is called *absolutive*.

In many languages, however, some constructions define an ergative (A) – absolutive (S+P) pair of categories while other constructions define a subject (A+S) – object (P) pair of categories. For example, Tongan case marking defines an ergative-absolutive pattern; it is S and P that have the absolutive preposition *'a*, while A is marked with the ergative preposition *'e* (Anderson 1976: 3–4):

(6) *na'e lea* ***'a*** *etalavou*
PST speak ABS young.man
'The young man spoke.'

(7) *na'e ma'u* ***'e*** *siale* ***'a*** *e me'a'ofa*
PST receive ERG Charlie ABS DEF gift
'Charlie received the gift.'

However, in infinitival complements, it is the S (example (8)) and A (example (9)) that are left unexpressed in the complement, not the P (example (10); all examples from Anderson 1976: 13):

(8) *'oku lava* ***'a*** *mele 'o hū Ø ki hono fale*
PRS possible ABS Mary TNS enter to his house
'Mary can enter his house.'

(9) *'oku lava* ***'e*** *siale 'o taa'i Ø 'a e fefine*
PRS possible ERG Charlie TNS hit ABS DEF woman
'Charlie can hit the woman.'

(10) **'oku lava* ***'a*** *e fefine 'o taa'i 'e siale Ø*
PRS possible ABS DEF woman TNS hit ERG Charlie
*'The woman can Charlie hit'

Thus, there is a conflict between case marking and the infinitival construction as to whether Tongan has the categories subject-object or the categories ergative-accusative.

The option most commonly taken in this case is to choose one construction as diagnostic. For example, Anderson argues that the infinitival construction is diagnostic of grammatical relations in Tongan, and hence Tongan possesses the categories subject and object in the usual European sense. The same problem arises here as in the cross-linguistic examples, however: there is no a priori reason to choose one construction over another, and so choice of construction looks suspiciously like making the language fit the assumptions of the analyst. The same problem holds if one argues instead that case marking is diagnostic and therefore Tongan has ergative-absolutive categories. Whichever construction is chosen as diagnostic, there would remain the problem of explaining why the other construction has a different distribution pattern.

Having chosen one construction as diagnostic, one must then deal with the anomalous distribution pattern by marking it as exceptional in some way. Consider the different distribution of the "object" and "oblique" noun phrases in English:

(11) a. *Jack kissed Janet.*
b. *Janet was kissed by Jack.*

(12) a. *The old man walked with a cane.*
b. **A cane was walked with by the old man.*

(13) a. *Jack weighs 180 pounds.*
b. **180 pounds is weighed by Jack.*

The object NP *Janet* in (11) occurs postverbally without a preposition in (11a), and can be the subject of the counterpart passive construction in (11b). In contrast, an oblique requires a preposition as in (12a), and cannot be passivized; see (12b). However, the NP *180 pounds* occurs postverbally without a preposition in (13a), yet cannot be passivized; see (13b). The usual analysis here is to take passivizability as diagnostic of the direct object. Hence *180 pounds* in (13a) is not a direct object. In this case, some exceptional feature has to be associated with *180 pounds* either to allow it to occur without a preposition, or to block it from passivizing even though it occurs in (13a) without a preposition. Such an account is clearly ad hoc.

These are not the only problems with using the distributional method to identify categories. Analogous difficulties arise in trying to decide whether two distributionally defined classes are separate categories or are subcategories of a more general category; trying to decide whether a particular distributional pattern reflects multiple category membership of a distributional class or a separate category; and in dealing with variable class membership, both in nonce uses and conventional uses of a particular word (The first two problems are discussed in Croft 1999b; all three problems are discussed in Croft 2001: 34–40).

2.2 The logical argument

All of the examples above illustrate one fundamental empirical fact: distributional tests/criteria do not match, both across languages and within languages. That is, different constructions define different distributional patterns, within and across languages. This is a very well known fact; I am not saying anything surprising here, and many interesting syntax articles discuss these conflicts. Nevertheless, the commonest analytical response to this fact is one of two strategies: to look around for distributional patterns that produce the results that the analyst is looking for; or not to look for distributional patterns that might produce results that the analyst is not looking for (i.e., ignore conflicting distributional patterns). But neither of these strategies can be justified without a priori principles for choosing which constructions are diagnostic of which syntactic categories. Yet the distributional method does not give us such principles, and no such principles are generally provided by the analyst.

There is a deeper problem here than has been recognized before. This is that there is a logical inconsistency between the distributional method and the theoretical assumption that the categories/relations defined by constructions are the syntactic primitives used to represent grammatical knowledge, given that distributional variation exists. Constructions are used to define categories – this is the distributional method. But then the categories are taken as primitives which define constructions – this is the syntactic model of representation. This approach is circular. Hence we must discard either the distributional method, or the assumption that syntactic categories are the primitive elements of syntactic representation.

Discarding the distributional method ignores the empirical facts of languages. Yet that is the most common strategy, in essence: ignoring distributional patterns that conflict with the categories that the analyst expects to find violates the distributional method. In other words, for these syntacticians the model of syntactic primitives is more important than the empirical facts of syntactic differences within and across languages.

Radical Construction Grammar takes the opposite position: it discards the assumption that syntactic categories are the primitive elements of syntactic representation. Instead, constructions are the primitive elements of syntactic representation. Constructions are not built up out of a small inventory of atomic categories. Categories are defined by constructions, that is, the elements that can fill the roles defined by the components of a construction. In other words, syntactic categories exist, but only derivatively, since they are defined by the construction(s) that they occur in.

This way of thinking about syntactic categories and constructions is difficult to comprehend at first. Although the purpose of this paper is simply to state the arguments as to why this way of representing grammatical knowledge is to be preferred over other ways, I will say a few words here about how constructions can be primitive elements of syntactic representation.

What occurs in natural discourse are constructions, that is, complex syntactic units: we do not hear individual words with category labels attached to them. Utterances are instances of constructions. In other words, from the point of view of the language learner (and the fieldworker), the larger units come first. Categorizing utterances as instances of constructions is one way of abstracting away from the input. But analyzing constructions into component parts is another way of abstracting from the input.

Constructions can be defined primitively. It is essentially a categorization problem, that is, categorizing the utterances one hears into discrete construction types. There are discontinuities in the input: constructions have distinctive structures and their elements define distinctive distribution classes. For example, there are significant discontinuities between the structure of an active transitive clause and a passive clause in English, so that the two can be reliably separated. There are also other important cues to categorization of constructions. First, many constructions involve some unique combination of substantive morphemes, such as the passive combination of *be*, past participle verb form, and *by*. Finally, and perhaps most important of all, constructions are symbolic units. The semantics of a construction plays a significant role in differentiating constructions for the purpose of categorization and identification. The different participant role of the subject of a passive is a major cue in identifying the passive construction in contrast to the active construction.

Radical Construction Grammar is a *nonreductionist* theory of syntactic representation. A *reductionist* theory begins with the smallest units and defines the larger or more complex units in terms of combinations of atomic primitive units. All contemporary theories of syntactic representation are reductionist; they differ chiefly in the inventory of syntactic primitives and the rules governing their combination. A nonreductionist theory begins with the largest units and defines the smaller ones in terms of their relation to the larger units. The Gestalt theory of perception is a nonreductionist theory. Radical Construction Grammar is another nonreductionist theory. The possibility of a nonreductionist theory demonstrates that the theoretical concepts 'atomic' and 'primitive' are logically independent notions and can be dissociated.

For example there is no construction-independent syntactic category Verb: there are Transitive Verbs in the Transitive Construction, Intransitive Verbs in the Intransitive construction, and so on. Reductionist theories overlook the differences in distribution between, say, the verb category in the intransitive and transitive constructions: some verbs can occur in both constructions, while others can occur in only one (and some ditransitive verbs occur in neither). In Radical Construction Grammar, the Intransitive Verb category is defined in terms of the Intransitive construction, not the other way around: it consists of all and only the words that can occur in the Intransitive Verb role. The same is true of the Transitive Verb category. In terms of Table 1, Radical Construction Grammar rejects the existence of atomic schematic units, because these would be defined independently of the constructions in which they occur.

This is not to say that generalizations over parts of different constructions – e.g. the identical inflections of verbs, no matter whether they are intransitive, transitive or ditransitive – are impossible in Radical Construction Grammar (see Croft 2001: 53–57; Croft & Cruse 2004: Chapter 10). But it is essential to recognize that the commonalities across all verbal subcategories must themselves be justified linguistically. In the case of "verbs", the justification comes from the occurrence of the verb category in another construction, namely the morphological construction of tense-agreement (TA) inflection. I will label the category defined by TA inflection MVerb (mnemonic for "morphological verb"), to remind the reader that this category is not an independent category, but itself defined by another construction (in the generalized concept of construction in construction grammar).

The (morphological) verb category is represented in Radical Construction Grammar as a taxonomically superordinate category to the Intransitive Verb category, the Transitive Verb category, and other verbal categories. The representation of the relationship between these constructions and the verbal categories in Radical Construction Grammar is given in Figure 1 (t = taxonomic link; argument phrase categories are left out of Figure 1 for clarity).

The Radical Construction Grammar analysis in Figure 1 is empirically adequate: it captures both the generalizations across verbal subclasses and the unique distribution defined by each verbal subclass in each construction.

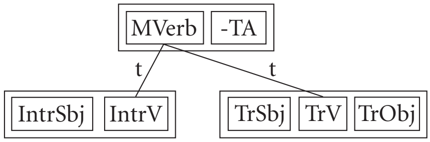

Figure 1. Radical Construction Grammar representation of verbal categories (final version).

(Part/whole relations are represented in constructions by the nesting of the boxes describing conventional grammatical units of the language.)

In fact, the representation of similar parts between constructions by taxonomic relations in Radical Construction Grammar is similar to the representation in Construction Grammar, in which parts of constructions can inherit properties of other constructions (see e.g. Kay & Fillmore 1999: 18).[5] That is, the treatement of meronomic relations is not a distinctive chracteristic of nonreductionist models. The primary difference between a nonreductionist model such as Radical Construction Grammar and a reductionist model such as Construction Grammar is that the latter uses syntactic features and values for roles that are defined independently of the constructions in which the units occur.

The adoption of Radical Construction Grammar would mean the abandonment of the fruitless search for the ideal set of syntactic primitive elements and rules of combination in syntactic theory. Radical Construction Grammar recognizes that categories are construction-specific (and as we will see in §4, language-specific), and no more formal structure is needed than what was specified for vanilla construction grammar in § 1.

Nevertheless, categories defined by constructional roles are similar across constructions, and one must represent the similarities as well as the differences. This is accomplished in Radical Construction Grammar by employing a model that has come into wide use in typology, the semantic map model (Croft 2003, Chapter 5; Haspelmath 2003). A *semantic map* represents the functions of particular constructions and constructional roles in terms of their degree of similarity. In typology, the similarity of functions is defined inductively by comparing the range of functions of similar constructions across languages and constructing an underlying conceptual space of functions and their relations. The conceptual space is constructed in such a way that the semantic map of any construction in any language will bound a connected region in conceptual space (the Semantic Map Connectivity Hypothesis; Croft 2001: 96; Croft 2003). But one can also construct a semantic map of different constructions in

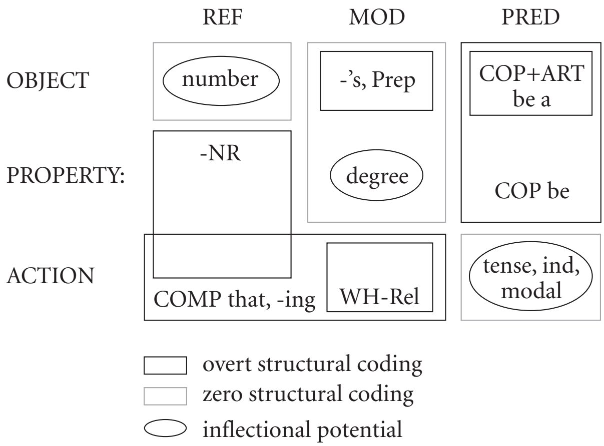

Figure 2. Semantic map of English parts of speech constructions.

a single language. This is done for English parts of speech in Figure 2, using a typologically justified conceptual space defined in terms of lexical semantic class and the propositional act functions of the relevant constructions (adapted from Croft 2001: 99, Figure 2.3).

Figure 2 represents the semantic maps for English constructions for referring expressions (noun phrases), modifying expressions, and predications. English conforms to a number of typological universals for parts of speech constructions, represented by the different shape and shading of the maps in Figure 2. The typological universals of parts of speech include the prototypes for noun, adjective and verb, given in (14) (Croft 2001: 89):

(14) noun = reference to an object
verb = predication of an action
adjective = modification by a property

Constructions with zero structural coding map onto a region that includes the prototypical "point" (actually also a region) in conceptual space. For example, the Verbal predication construction of English uses no copula or auxiliary to encode the predication function. Constructions with overt structural coding map onto a region that includes a nonprototypical point in conceptual space: the copula constructions are found with predication of objects and properties (the Predicate Nominal and Predicate Adjectival constructions respectively). Finally constructions exhibiting behavioral potential, such as the ability to inflect for tense and subject indexation, map onto a region that includes the prototypical point in conceptual space (in this case, action predication). Moreover, in English there is a scale of overt coding of predication such that object predication requires two morphemes (copula *be* and article *a*), property predication only one (copula *be*), and action predication none. This hierarchy of predication is also found cross-linguistically (Croft 1991: 130; Stassen 1997: 168–169). More generally, cross-constructional variation in single languages should reflect the same patterns as cross-linguistic variation in typology (Croft 2001: 107). This observation allows us to integrate typological and language-specific generalizations into a single model of grammar.

It should be noted that the same arguments against reductionist theories of syntactic representation apply to reductionist theories of phonological and semantic representation. In phonology, there are problems in defining vowel vs consonant, in defining the set of primitive features for classifying natural classes of segments, and even in defining segment and syllable from a phonetic point of view. In a nonreductionist phonological theory, which we may call Radical Templatic Phonology, phonetically specified word forms and schematic phonotactic/prosodic templates generalized from them are the representational primitives, and syllable and segment categories would be derivative (Croft & Vihman, submitted).

In semantics, distributional analysis is used to identify semantic categories (see e.g. Cruse 1986). Not surprisingly, problems arise in defining various sorts of semantic categories, and even such basic concepts as identity and distinctness of word senses (Croft & Cruse 2004: Chapter 5). In a nonreductionist semantic theory, complex semantic structures such as frames and the complex semantic structures found in constructions are the representational primitives, and the categories of components of semantic frames and other complex semantic structures are derivative. This, Radical Frame Semantics, is essentially Fillmorean frame semantics (Fillmore 1982, 1985; Fillmore & Atkins 1992).

3. From syntactic relations to symbolic relations

As the reader has no doubt recognized, the first anti-thesis of Radical Construction Grammar, the nonexistence of syntactic categories, was a bit of an overstatement. Radical Construction Grammar does not deny the existence of syntactic categories. It only argues that syntactic categories are derivable from constructions and hence are not the basic building blocks of syntactic representation. The second anti-thesis of Radical Construction Grammar, on the other hand, is not an overstatement. I am going to argue that there really aren't any syntactic relations. This is another respect in which Radical Construction Grammar is radically different from other syntactic theories.

In this section, I will present the logical argument before the typological argument. The logical argument in §3.1 demonstrates that if one accepts vanilla construction grammar (not even Radical Construction Grammar), one doesn't need syntactic relations (well, almost none; see §3.3). The typological arguments in §3.2 – just a selection of a larger range of arguments (see Croft 2001, Chapter 6) – give reasons why one would not want to have syntactic relations in one's theory of syntactic representation.

3.1 The logical argument

The argument against the necessity of syntactic relations in vanilla construction grammar follows from the model of a speaker's knowledge of a construction. Since syntactic relations hold between the elements of a complex construction, references to constructions in this section will pertain to complex constructions.

A construction is a pairing of a complex syntactic structure and a complex semantic structure. In vanilla construction grammar as described in §1, the complex syntactic structure consists of the formal elements of the construction but not any syntactic relations that might hold between the elements of the construction. The complex semantic structure consists of both the components of the semantic structure and the semantic relations that hold between the components of the semantic structure. The representation of a construction must also specify the correspondences between elements of the syntactic structure of a construction with the appropriate components of its semantic structure – *symbolic* relations (compare Langacker 1987: 76–86). These symbolic relations are necessary whether or not the syntactic structure also represents syntactic relations between elements: without correspondence relations, one would not be able to deduce the meaning of the utterance from its form.

The internal structure of a construction in ordinary construction grammar is illustrated in an exploded format in Figure 3 (Croft 2001: 176, Figure 5.1; compare Langacker 1987: 84, Figure 2.8b).

Given that description of a construction, it is straightforward to demonstrate that it is not necessary to assume the existence of syntactic relations for the purpose of communication. If a hearer hears an utterance and is able to identify (i) the construction's form, (ii) its meaning, and (iii) the correspondence between the syntactic elements of the construction and the components of its semantic structure, then he will be able to identify the semantic relations

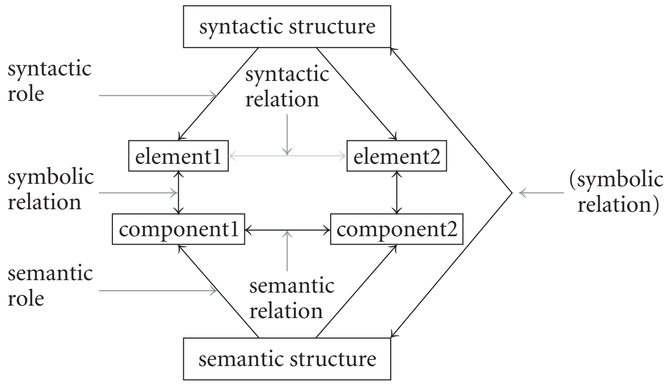

Figure 3. The internal structure of a construction (exploded diagram).

between the components denoted by the syntactic elements. That is, the hearer will have understood what the speaker meant. Understanding the meaning of an utterance is the goal of communication. Syntactic relations are not necessary to achieve this goal.

The argument in the preceding paragraph is an application of Ockham's razor to render an analysis simpler and more elegant: if a theoretical entity is not necessary in the analysis, eliminate it. In this case, the unnecessary theoretical entity are syntactic relations between elements in a construction. However, with constructions we are talking about a psychological entity, namely the speaker's knowledge of a construction. I do not believe that simplicity or elegance of an analysis is a sufficient argument for the nonexistence of some psychological entity. There is a considerable body of psychological research that strongly suggests that psychological representations possess redundant information (see Barsalou 1992 for references). All that the preceding paragraph indicates is that if we have empirical linguistic reasons for abandoning syntactic relations, then doing so will not render our model of grammatical knowledge inadequate for the purposes to which language is put. The next section will offer some empirical reasons why syntactic relations are problematic.

3.2 The typological argument

The argument against syntactic relations is in two parts: first, that many allegedly syntactic relations are in fact semantic, and second, that it is in fact problematic to analyze what remains as syntactic relations.

Nunberg, Sag & Wasow (1994) argue that what I call *collocational dependencies* are essentially semantic. Collocational dependencies represent a continuum from what were called selectional restrictions in earlier versions of generative grammar (illustrated in examples (15)–(16)), to collocations in the British tradition (examples (17)–(18); from Matthews 1981: 5), to the majority of idiomatic expressions, those which Nunberg et al. call *idiomatically combining expressions* (examples (19)–(20)):

(15) a. *Mud oozed onto the driveway.*
b. ?**The car oozed onto the driveway.*

(16) a. *The car started.*
b. ?**Mud started.*

(17) a. *roasted meat*
b. *toasted bread*

(18) a. ?**toasted meat*
b. ?**roasted bread*

(19) a. *Tom pulled strings to get the job.*
b. **Tom pulled ropes to get the job.*
c. **Tom grasped strings to get the job.*

(20) a. *She spilled the beans.*
b. **She spilled the succotash.*

Nunberg et al. argue that the phenomena in (15)–(20) represent a continuum which varies in the degree of conventionality of the forms encoding the semantic relation between the components of the semantic representation. Selectional restrictions are widely recognized to be semantic in nature. Nunberg et al. argue that idiomatically combining expressions also are fundamentally semantic in nature:

> When we hear *spill the beans* used to mean 'divulge the information', for example, we can assume that *spill* denotes the relation of divulging and *beans* the information that is divulged, even if we cannot say why *beans* should have been used in this expression rather than *succotash*. This is not to say, of course, that *spill* can have the meaning 'divulge' when it does not co-occur with *the beans*, or that *beans* can have the meaning 'information' without *spill*. The availability of these meanings for each constituent can be dependent on the presence of another item without requiring that the meaning 'divulge the information' attach directly to the entire VP. Rather it arises through a convention that assigns particular meaning to its parts when they occur together.
>
> (Nunberg et al. 1994: 497)

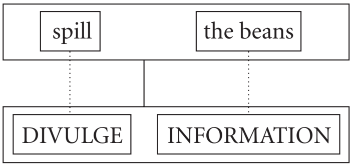

Figure 4. Construction grammar representation of *spill the beans*.

In other words, *spill the beans* is compositional, because *spill* means 'divulge' when it is combined with *(the) beans* and *(the) beans* means 'information' when it is combined with *spill.* Nunberg et al. have demonstrated that the concepts "conventional" and "noncompositional" are logically independent, and they have dissociated them. Idiomatically combining expressions are conventional – their elements have conventional meanings specialized for just that idiomatically combining expression – yet compositional – those conventional meanings combine sensibly to produce the meaning of the whole expression.

Nunberg et al.'s analysis seems odd, but if it is rephrased in construction grammar terms, one can see that it is not really that odd. There is a construction [[*spill the beans*]/[DIVULGE THE INFORMATION]]; *spill* corresponds to DIVULGE, and *beans* corresponds to INFORMATION. The form of the construction is complex and its meaning is complex, and the elements of the syntactic structure correspond to the components of the semantic structure. This construction is illustrated in Figure 4 (dotted lines indicate form-meaning correspondences).

In Radical Construction Grammar, Nunberg et al.'s analysis is even more straightforward. The construction [*spill the beans*] is the primitive syntactic unit and the elements [*spill*] and [*the beans*], including their specialized meanings, are derived from the construction taken as a whole, namely [[*spill the beans*]/[DIVULGE THE INFORMATION]].

One of the consequences of Nunberg et al.'s analysis – one which they explicitly draw – is that many of the arguments for underlying syntactic structures in transformational generative theories are crucially dependent on collocational dependencies. If these dependencies are in fact semantic, then they should be represented in semantic structure and not in syntactic structure, and hence the arguments for underlying syntactic structures (and transformations) disappear. More generally, certain arguments for syntactic relations – the ones captured by underlying structures in transformational syntactic theories – disappear.

If this is the case, and I believe it is, then arguments for syntactic relations must be based on *coded dependencies*: overt morphology – case marking, agreement, classifiers, linkers, etc. – or constituency and word order patterns that are purported to express syntactic relations (Croft 2001, Chapter 5; 2003, Chapter 2). In Croft (2001, Chapter 6), I argue that coded dependencies in fact code symbolic relations, not syntactic relations, and so syntactic relations should be dispensed with. In order to make this case, I argue first that syntactic relations are not simply notational variants of symbolic relations, rendering the two interchangeable. Then I argue that syntactic relations are not simply notational variants of syntactic roles, the part-whole relations of constructions which are assumed in all syntactic theories, including Radical Construction Grammar. These arguments are typological, in that they depend on cross-linguistic empirical evidence.

If symbolic relations and syntactic relations are notational variants, then we could preserve syntactic relations and dispose of symbolic relations. This would lead us back to a componential model of syntax, i.e. not a construction grammar model. In a componential model of syntax, formal structure is represented in one module and semantic (or more broadly, functional) structure in a separate module. Of course, the two modules must be connected. These connections are performed by linking rules in componential models. Linking rules are the equivalent of the symbolic relations in a construction grammar. In fact, if linking rules are associated with specific syntactic structures, then they are indistinguishable from symbolic relations in a construction. Thus, to have any sort of substantive difference between a componential model with linking rules and a construction grammar model, one must have highly general linking rules.

In fact, most componential theories do have highly general linking rules. These rules generally exploit the widespread iconicity of syntactic structure: the linking rules provide one-to-one mappings between syntactic elements and relations on the one hand and semantic components and relations on the other. But many grammatical constructions are not iconic. More specifically, the putative syntactic relations in many grammatical constructions are not iconic. In this case, one must simply specify for the construction what the linking rule is. But this is essentially adopting the construction grammar model. The next few paragraphs offer a sampling of such constructions.

The first example is the phenomenon usually described as possessor ascension, but now also called external possession. In some languages, the semantic possessor of a referent appears to have a syntactic relation to the verb, not the noun phrase expressing the referent. One such language is Tzotzil (Aissen 1980: 95):

(21)	*l-*	***i-***	*k'as*	*-b*	*-at*	*j-*	*k'ob*
	PF-	1SG.ABS-	break	-IND.OBJ	-PASS	1SG.POSS-	hand
	'My hand was broken.'						

In example (21), the first person semantic possessor is encoded as the (passive) subject of the verb, with the indexation prefix *i-*. It is also encoded as a morphosyntactic possessor of the NP denoting the possessum (*j-*).

Possessor ascension with verbs of this type is a common type of possessor ascension across languages. It can plausibly be argued that there really is a semantic relation between the 1st singular referent and the action in (21): the breaking of my hand affects me. Such an iconic analysis is plausible for many such examples in many languages. But in some languages, including Tzotzil, there is a semantic possessor argument of a verb for which a corresponding semantic relationship is much less plausible (ibid.):

(22)	*mi*	*muk'bu*	*x-*	*av-*	*il*	*-b*	***-on***	*j-*
	INTERR	NEG	IMPF-	2SG.ERG-	see	-IND.OBJ	-1SG.ABS	1SG.POSS-
	tzeb							
	daughter							
	'Haven't you seen my daughter?'							

It seems implausible that there might be a semantic relation between the seeing event and the referent first person verbal indexation suffix *-on* in example (22).

A similar observation can be made for the phenomenon usually described as quantifier float. In quantifier float, a quantifier is in a syntactic relation with a verb rather than the NP whose referent it quantifies. A language exhibiting quantifier float is Pima (Munro 1984: 273); the quantifier immediately precedes the verb instead of being contiguous to the other elements of the noun phrase it is associated with semantically:

(23)	*hegai*	*'uuvi*	*'o*	***vees***	*ha-*	*ñeid*	*hegam*	*ceceoj*
	that	woman	3.AUX	**all**	them-	see	those	men
	'The woman saw all the men.'							

As with the possessor ascension example in (21), it is plausible to argue that there is a semantic relation between quantifier and event in example (23): the seeing event is either collective and so 'all' describes its collectiveness, or the verb+quantifier sums up all of the individual seeing events of the woman seeing a man.

Again, the iconic analysis applies to most cases of quantifier float in the literature. But some languages, including Pima, extend quantifier float to cases where it is implausible to assume a corresponding semantic relation (Munro 1984: 275):

(24)	***vees***	*ñei*	*'ant*	*heg*	*heñ-*	*navpuj*	*ha-*	*maakaika*
	all	see	1SG.AUX	ART	my-	friends	their-	doctor

'I saw the doctor of all of my friends.'

It seems implausible that seeing a single doctor can be construed as a collective or summation event that could be described as "all".

In the above cases (and also in anomalous agreement relations and so-called Neg-raising, discussed in Croft 2001: 201–213), it would be difficult to identify a semantic relation corresponding to the putative syntactic relation. But if we abandon the assumption that there is a syntactic relation, the remaining syntactic structure – the part/whole relation – is iconic with the semantic structure. And there is no inherent difficulty in the hearer figuring out the semantic relations: the hearer can find the possessor or quantifier easily enough (verbal indexation affix in Tzotzil, preverbal position in Pima), and construction-specific symbolic relations license the NP argument to whose denotation the possessor referent or quantifier applies.

Finally, there is a plausible explanation as to how these "noniconic" constructions arose. The constructions originated in the cases where there is a plausible semantic link between the possessor/quantifer and the event denoted by the verb; this is why these cases are widely found. Then in some languages, the construction was extended to other verb classes where the possessor/quantifier is not in a semantic relation with the situation denoted by the verb; these examples are found only in languages where the plausibly iconic cases are also found.

Another large class of problematic cases for iconicity if one assumes the existence of syntactic relations is found with "moved" arguments. In all of these examples, a syntactic argument is not found in a putative syntactic relation with the verb describing the state of affairs that the argument's referent participates in. Instead, the syntactic argument is found in a putative syntactic relation with a verb in a different clause, usually the main clause.

The first example given here is an instance of what has been called *Tough*-movement. In English examples of *Tough*-movement such as *Bill is easy to fool*, the referent of the subject *Bill* can be plausibly construed as having a semantic relation to the predicate (*be*) *easy to fool*; this is a way of characterizing some property of the person (see for example Langacker 1990: 199–201). It is less plausible to posit a semantic analysis for the relationship between 'Mary' and 'be hard' in the following example from Moose Cree (James 1984: 210):

(25)

ālimēliht	*-ākosi*	***-w***	***mēri***	*kihči-*	*tot*	*-aw*	*-iyan*	*kihči-*	*tāpwē*	*-ht*	
hard	-AI	**-3**	**Mary**	SUB-	make	-TA	-2→1	SUB-	believe	-TI	
-amān	*ē-*	*āhkosi*	*-t*								
-1	SUB-	sick:AI	-3								

'It is hard for you to make me believe that Mary is sick.'
[lit. 'Mary is hard for you to make me believe is sick.']

On the other hand, a description of the construction indicating just the correspondence relation between the subject of 'be hard' and the undergoer of the sickness, as in Radical Construction Grammar, would enable the hearer to comprehend the sentence.

Another example is the phenomenon called clitic climbing. Napoli gives an attested example (26) to illustrate clitic climbing from Italian (Napoli 1981: 861):

(26)

me	***lo***	*sa*	***dire***?
to.me	it	you.can	tell:INF

'Can you tell it to me?'

In (26), the object clitic pronoun *lo* is apparently in a syntactic relation with the verb *sa* '[you] can'. It is implausible to posit a semantic relation holding directly between the thing said and the ability auxiliary; but it is easy for the hearer to identify the semantic relation between *lo* and *dire*, given knowledge of the construction and the correspondence relations between the syntactic elements and the syntactic components.

Similar arguments can be applied to examples of what has been called raising. In all of the following examples, an argument that semantically "belongs" to the lower clause is found in a putative syntactic relation to a verb in the higher clause, but there is no plausible semantic relationship between the argument's referent and the event denoted by the verb in the higher clause:

Ancash Quechua: argument-raising (Cole 1984: 111)

(27)

noqa	***Huaraz***	***-chaw***	*muna*	*-a*	*wayi*	*-ta*	*rura*	*-y-ta*
I	**Huaraz**	**-in**	want	-1	house	-ACC	make	-INF -ACC

'I want to make a house in Huaraz.' [lit. 'I want in Huaraz to make a house']

Moose Cree: raising across two clauses (James 1984: 210)

(28)	*itēliht*	*-ākosi*	***-w***	***mēri***	*ē-*	*kī-*	*alamotam*	*-ātan*	*ē-*	*ākhkosi*
	seem	-AI	**-3**	**Mary**	SUB-	PST-	tell	-TA:1→2	SUB-	sick:AI
	-t									
	-3									

'It seems that I told you that Mary is sick.'
[lit. 'Mary seems that I told you that (she) is sick.']

Japanese: passive of evidential complement subject (Tsukiashi 1997: 49; attested example)

(29)	***watasi***	***wa***	[*haitte*	*-iru*	*-koto*]	*o*	*satorarenu*	*-yoni*
	I	TOP	be.in	-PROG	-COMP	OBJ	notice:PASS:NEG	so.that

'so that it will not be noticed that I am in'
[lit. 'so that I will not be noticed to be in']

In (27), *Huaraz-chaw* 'in Huaraz' appears to be in a syntactic relation with *muna* 'want'; but I can want to make a house in Huaraz without the wanting event taking place in Huaraz. In (28), it seems implausible to construct an analysis in which my telling you that Mary is sick is an apparent property of Mary. Example (29) seems more plausible, in part because the English construction seems plausible (as a passive of? *They noticed me not to be in*). Nevertheless, I am somewhat reluctant to posit a semantic relationship between the 1st person referent and 'be noticed', since what is being noticed is a state of affairs, not a person (in fact, the person is absent).

In all of these examples, it is pushing commonsense plausibility, to a greater or lesser degree, to posit a semantic relation corresponding to the putative syntactic relation. But in all of these examples, if we assume knowledge of a construction that specifies only symbolic relations between syntactic elements and semantic components, it is not at all difficult for the hearer to identify who did what to whom where, in the commonsense intuition of the meaning of these sentences. And if we dispense with syntactic relations, the elements of the construction map iconically onto the components of the semantic structure.

And again, there is a plausible historical scenario for the occurrence of these noniconic constructions. They are all examples of the early stages of the process of two clauses being reanalyzed as a single clause, with the former matrix verb becoming an auxiliary indicating tense, aspect or modality (possibility, evidentiality, etc.) of the state of affairs denoted by the former subordinate clause. This diachronic change is a gradual process, and the examples in (25)–(29) show that for some languages, one of the first steps in this process is the reassignment of syntactic arguments to the higher clause.

Finally, one should not underestimate the role of discourse/information structure in motivating the constructions in (25)–(29). The assignment of the syntactic argument to the main clause is almost certainly an indicator of the topicality of the argument's referent, regardless of whether or not there is a semantic relationship between the topical referent and the event denoted by the main verb.

The examples of noniconic constructions given in this section can be multiplied (see Croft 2001, Chapter 6). Although a plausible iconic analysis can sometimes be provided for particular cases, and in some cases motivates the creation of the construction, I believe that one cannot always provide a plausible iconic motivation. If on the other hand, we abandon syntactic relations, the remaining syntactic structure – the syntactic elements and the semantic components – is iconic. Most important of all, hearers can still succeed in understanding what the speaker said, with the knowledge of construction structure that remains in Radical Construction Grammar.

The second argument against syntactic relations addresses their relationship to syntactic roles, the part-whole relations that hold between elements of a construction and the construction as a whole. If semantic roles and syntactic relations are notational variants, then again one could use syntactic relations and possibly dispense with syntactic roles. But in fact, syntatic relations are notational variants with semantic roles only when there are two elements in a construction. If there are three or more elements, there are four or more logically possible sets of syntactic relations that hold between the elements. But there is only one semantic role representation, the one that indicates that each element is a part of the construction as a whole. Even worse, a syntactic relation representation assumes the presence of the two elements that are syntactically related, and of the relation itself. Neither of these is commonly the case.

A syntactic relation is a formal relation that holds between two formal elements in a construction. But in many cases, one of the elements in the syntactic relation is absent. A very common case is the absence of the element "agreed with" in a putative syntactic relation encoded by agreement (indexation as I have called it so far). For example, in Warlpiri, the NP "agreed with" does not always appear in the sentence: it is absent from (30) (Jelinek 1984:43; from Hale 1983:6), but present in (31) (ibid., 49, corrected by Ken Hale, pers. comm.):

(30)

wawirri	*-Ø*	*kapi*	***-rna***	*-Ø*	*panti*	*-rni*	*yalumpu*	*-Ø*
kangaroo	-ABS	FUT	-1SG.SBJ	-3SG.OBJ	spear	-NPST	that	-ABS

'I will spear that kangaroo.'

(31)

ngajulu	*-rlu*	*kapi*	***-rna***	*-Ø*	*wawirri*	*-Ø*	*panti*	*-rni*
I	-ERG	FUT	-1SG.SBJ	-3SG.OBJ	kangaroo	-ABS	spear	-NPST
yalumpu	*-Ø*							
that	-ABS							

'I myself will spear that kangaroo.'

A number of proposals have been made to deal with this problem. One is to say that in (30), the "agreement" marker is actually a bound pronominal. If so, then there is a problem in analyzing (31): either one says that it is not a bound pronominal in this sentence, or that it is, and the NP *ngajulu* is then an "adjunct" or "appositive" NP. Another proposal for (30) is to posit a null NP which the verb "agrees" with; the methodological dangers of positing null NPs are fairly obvious. Both of these analyses make a hidden assumption, that there can be only one syntactic argument per clause (or one syntactic argument per phrase, in phrases containing "agreement"). If we abandon this assumption, then the problem disappears; but so does the syntactic relation of "agreement" – we have simply two argument expressions that index the same referent (hence the choice of the term indexation here). And indexation is a symbolic relation.

A further problem is that "agreement" is not actually agreement in the sense of matching features of the agreement marker with features of the "controller" NP; there is a complex interplay of factors between the agreement marker and the "controller" NP (Barlow 1988). Barlow surveys a wide range of complex interactions between "agreement markers" and the NPs to which they are alleged to be syntactically related, and compares them to the relationship between an anaphoric expression and the NP that the anaphorical expression is coreferential with – a relation which is generally not syntactic (especially across clauses). Barlow concludes, "there are many similarities and no major distinction between local and anaphoric agreement" (Barlow 1988: 154). In other words, there is no strong motivation to analyze local agreement any differently than anaphoric agreement. That is, there is no strong motivation to analyze local agreement as a syntactic relation, rather than as two coreferential expressions.

If one assumes there is no syntactic relation between the verbal inflection in examples such as (30)–(31) and an NP as in (31), then comprehension by the hearer in processing is not affected. The construction specifies that the verbal inflection and the NP (if present) in the syntactic structure indexes the relevant participant referent in the semantic structure, and that information is sufficient for the hearer to identify the participant role of the referent in question. In other words, a symbolic relation – indexation – is a superior analysis to "agreement" – a syntactic relation – because of the frequent absence of the "controller" of agreement.

The second common and serious problem for syntactic relations is the optionality or absence of the element alleged to encode the syntactic relation. For example, in Rumanian the preposition *pe* codes the direct object of a verb, but is only obligatory for human and definite referents, or for definite referents in certain constructions; it is optional if the referent is human and specific or nonhuman and pronominal; and it is prohibited if the referent is a nonspecific indefinite, generic or partitive (Nandris 1945: 183–185). Likewise, in Kanuri the "agreement" (indexation) affix is optional for objects (Hutchison 1981: 139):

(32) ***nyí*** *-à* *rú* *-kə́* *-nà*
2SG -ASSOC see -1SG -PF
'I saw/have seen you.'

(33) ***nyí*** *-à* ***nzú-*** *rú* *-kə́* *-nà*
2SG -ASSOC 2SG- see -1SG -PF
'I saw/have seen you.'

Another example is that numeral classifiers, which could be argued to encode the syntactic relation between a numeral and a noun, are often found only on lower numerals, and are often absent from base numerals ('10', '20', etc.; Aikhenvald 2000: 117).

In these cases, one would be forced to say that the syntactic relation appears when the morpheme encoding it appears, and it disappears when the morpheme encoding it disappears. One might object that if the morpheme is absent, there would be other criteria to determine the existence of the syntactic relation. But what other criteria? Most of the other criteria offered for syntactic relations are in fact indicators of collocational dependencies, which I have argued are semantic, not syntactic. There may be some other morphosyntactic coding of the putative syntactic relation, but they do not always match the optional coding in question (Croft 2001: 199–201). Hence we cannot make inferences for the existence of a syntactic relation beyond the type of coding in question.

It is far more natural to conclude that the syntactic relation does not appear and disappear with its encoding, but that there is no syntactic relation and the morphosyntactic means of encoding the "syntactic" relation is encoding something else, namely the symbolic relation between the syntactic element and the semantic component that it denotes or symbolizes (see § 3.3).

There are other problematic aspects of analyzing morphosyntactic coding as encoding syntactic relations, such as using word order for syntactic relations among three or more units, second position elements "breaking up" constituents, and some difficulties analyzing coded dependencies between clauses (see Croft 2001: 221–226). All of these examples indicate that syntactic relations are highly problematic; yet all of these phenomena can easily be represented in a model with syntactic roles and no syntactic relations, such as Radical Construction Grammar.

3.3 Comprehending constructions without relations

The reader who may be willing to accept the arguments in §3.2 on why positing syntactic relations is empirically problematic may still be wondering if a hearer really has enough information to recognize the construction and the correspondence relations that are necessary to understand the speaker's utterance. In this section, I will briefly discuss how the hearer can successfully understand the speaker, given no more structure than is postulated in Radical Construction Grammar.

First, it should be noted that syntactic structure in Radical Construction Grammar is not completely flat, as the absence of syntactic relations may imply. Constructions can be nested inside other constructions. The universal example of this is phrasal constructions nested in clausal constructions. Hence there is some hierarchical structure to constructions in Radical Construction Grammar (though one must not underestimate the extent to which the hierarchical structure can be blurred; see e.g. the phenomena discussed in Sadock 1991). Also, I am specifically arguing against syntactic relations between elements in a construction. A syntactic element still has a formal relation to the construction as a whole, namely the part/whole relation. After all, a hearer must be able to identify which part of the construction is which.

Second, the logical argument against syntactic relations given in §3.1 goes through only if a hearer hears an utterance and is able to identify (i) the construction's form, (ii) its meaning, and (iii) the correspondence between the syntactic elements of the construction and the components of its semantic structure. In the rest of this section, I argue (again) that the formal properties of constructions that are interpreted as evidence for syntactic relations in standard syntactic theories can be analyzed, and are better analyzed, as aid-ing the hearer in identifying (i) and (iii), thereby accessing (ii) and hence understanding the speaker.

What I called coding morphosyntax – morphemes such as case marking, adpositions, agreement markers, classifiers, linkers etc., and groupings based on contiguity, prosody, etc. – is of course present in the world's languages. I argued in §3.2 that coding morphosyntax does not code relations between syntactic elements. However, coding morphosyntax does perform other important functions. First, it helps to identify which part of the construction is which – the first part of (iii). But equally important, coding morphosyntax codes the correspondence relation between a syntactic element and its counterpart semantic component in the construction – the rest of (iii). That is, coding morphosyntax codes symbolic relations, not syntactic relations.

And cross-linguistically, coding morphosyntax tends to be around when you need it, and absent when you don't. For example, overt case marking in clauses is typically found when the referent is unexpected for the participant role it is playing in the event (Croft 1988). The Rumanian 'object preposition' *pe* is present when the object referent is most likely to be mistaken for the subject referent, i.e. when it is human and/or definite. In other words, overt case marking is there when the hearer might mistake the referent's role. Indexation markers index highly salient referents (Givón 1976; Croft 1988), i.e. those referents which are most likely to be left unexpressed as NPs (and thus unavailable to the hearer) because they are highly accessible (Ariel 1990). Referents of objects and especially obliques are less likely to be highly accessible, and so will be typically overtly expressed as NPs; and indexation is much rarer cross-linguistically (or in the case of obliques, virtually absent).

Similar arguments apply for so-called constituency relations. In standard syntactic theories, constituency, like categories, is argued for by using syntactic tests or criteria. These have the same problems as we found for syntactic categories: certain tests don't exist in many (let alone all) languages, two different tests yield different results, etc. (Croft 2001: 185–197). As in §2, we infer from this that there is no unique constituent structure valid across all constructions in a language. But there are many different kinds of clues for identifying syntactic elements in a construction and linking them to the right semantic components. There is physical contiguity of elements, which occurs in greater and lesser degrees of tightness; there are grammatical units defined by their occurrence in intonation units (Chafe 1980, 1994; Croft 1995) and other prosodic properties; there are grammatical units defined by the point where speakers initiate self-repair (Fox & Jasperson 1995); and these are probably not the only clues present. These are all properties of the utterance's actual physical (phonetic) form, and as such are available to the hearer without positing any abstract constituent structure.

Also, despite the fact that I showed in §3.2 that there are many cases of noniconic syntactic structures, I would stress that the great majority of constructions in the world's languages do have a substantially iconic relationship between syntactic structure and semantic structure, even for physical relations between elements (linear order, contiguity, prosodic unity, etc.). Why is syntactic structure mostly iconic? Because that's one of the easiest ways to allow a hearer to identify the semantic components corresponding to the syntactic elements of a construction – item (iii). But as the examples in §3.2 show, it's not the only way. Any reasonable way for the hearer to get the symbolic relations of the speaker's utterance will do.

So far I have discussed how a hearer can identify the elements of the syntactic structure of a construction, and the correspondence relations between syntactic elements of a construction and the semantic components of that construction, thereby identifying the relevant semantic relations without having to have recourse to syntactic relations. This task presupposes that the hearer can identify the construction in the first place – item (i). But there are clues in the structure of constructions that aid the hearer in this task as well.

For example, the English passive construction has rigid word order of its essential elements, and it has two unique parts – the auxiliary verb *be* and the past participle verb form – which jointly specify that this construction is a passive (and not a progressive or a perfect); the agent phrase provides a third unique part, the preposition *by*. These cues taken as a whole provide a structural Gestalt which aids the hearer in identifying the construction, and hence its elements and the correspondence relations to its semantic structure.

Functionalist analyses of grammatical structure have been criticized because language possesses substantial redundancy, and this redundancy is assumed to be dysfunctional. For instance, Durie describes redundancy as a case of functional overkill:

> . . .with respect to *The farmer killed a duckling* it is clear that ducklings don't kill farmers, and if English did have 'free' word order, there would be no need for a speaker to further disambiguate the sentence. Such further disambiguation would be redundant. As a disambiguating device, English SVO word order displays functional over-generalization, or *overkill*: it is there even when you don't need it. (Durie 1995: 278, emphasis original)

But word order and other role-identifying devices have another function besides identifying roles: they identify constructions (in Durie's example, the

English [Nontopicalized] Declarative Transitive Active construction). Without being able to identify constructions, semantic roles would be much harder to identify. Much "functional overkill" in language is not really dysfunctional because it (also) serves the function of identifying constructions; it is there because the hearer still needs it.

Finally, the discourse context and the shared knowledge between speaker and hearer, including knowledge of their immediate surroundings, offers clues as to what the semantic structure of the speaker's utterance is. In other words, even item (ii), in some schematic form, may be identifiable to the hearer in context. What a speaker will say at a certain point in the conversation is not entirely unpredictable. In fact, many aspects of what a speaker will say are probably quite predictable in many cases, to a hearer that has been paying attention to the conversation. To the extent that what a speaker will say is predictable, certain constructions will be primed in the hearer's mind, and that will facilitate recognizing the syntax of the speaker's utterance when it does come.

The abandonment of syntactic relations allows us to escape a number of serious empirical problems in syntactic analysis, some of which were illustrated in §3.2. It also dramatically simplifies the syntactic structure of our grammatical knowledge. Instead, analysis is focused on the correspondence relations of a construction: the relation between the construction as a whole and the complex semantic structure it symbolizes, and the relation between the elements of the syntactic structure and the corresponding components of the semantic structure. This is in fact where the real work by speaker's grammars is done in actual language use, and where the real work should be done in syntactic theory.

4. From universal constructions to syntactic space

The last anti-thesis of Radical Construction Grammar is rather anticlimactic. This is the hypothesis that the formal structures of constructions themselves are not universal. There is no logical argument for this position, of course, only the typological argument. The typological argument is that one cannot find a fixed set of formal syntactic properties that can unambiguously define the "same" construction across languages. Clearly, formulating a set of formal syntactic properties would be quite difficult, given the radically language-particular character of syntactic categories argued for in §2. But even if we leave aside those objections, one still finds a remarkable diversity of syntactic structures employed by languages for similar functions.

Obviously, the only fully definitive argument for the last thesis of Radical Construction Grammar would be to demonstrate that every construction proposed as a universal construction does not hold up under empirical scrutiny. From a typologist's point of view, I must admit that I feel that the burden of proof is on the linguist who wants to argue in favor of a universal construction. My experience suggests that in fact this would be very difficult, and probably impossible, for the reasons to be given at the end of this section. Hence the final anti-thesis. In this section, I will illustrate with just a few examples of the diversity of a subset of voice constructions in the world's languages, focusing on the passive and inverse constructions.[6]

The English passive, illustrated in (34), can be described structurally as in (35), using A as the abbreviation for "transitive subject participant roles" and P for "transitive object participant roles":

(34) *The boy was taken to school (by his parents).*

(35) a. A encoded as oblique (if it can be expressed at all)
b. P encoded as subject
c. Morphology distinguishes passive verb form from active (usually, an overt morpheme for passive contrasting with zero marking of active)

The description in (35) reflects proposals for a universal passive construction that is said to be found across languages. Of course, identifying categories such as "subject", "oblique", "verb" and "active", both within a language and across languages, is highly problematic (see §2); but we will ignore those problems here for the sake of argument (see Croft 2001: 284–288 for further discussion; there will turn out to be problems enough with the definition in (35)).

Some languages have voice constructions which, while similar to the passive, most contemporary linguists would not describe as passive. Instead, a different voice category has been defined, the inverse construction. The inverse construction contrasts with the direct construction just as the passive contrasts with the active. The standard type of an inverse voice construction is taken to be that found in Algonquian languages. Examples of Cree direct and inverse constructions are given in (36)–(37) (Wolfart & Carroll 1981: 69, analysis as in Wolfart & Carroll, ibid.), and the structural description of the inverse in (38):

(36) *ni- wāpam -ā -wak*
1- see -DIR -3PL
'I see them'

(37) *ni-* *wāpam* ***-ikw*** *-ak*
1- see -INV -3PL
'They see me.'

(38) a. A encoded as a direct argument (not unlike P in direct construction)
b. P encoded as a direct argument (not unlike A in direct construction)
c. Morphology distinguishes inverse form from direct (sometimes, overt morpheme for inverse contrasting with zero marking of direct)

Unlike the passive, in the inverse the A argument remains a direct argument of the verb. An additional feature of inverse constructions is that the inverse is typically used when the P argument is higher than the A argument on the person hierarchy 1, 2 < 3.[7] It should be pointed out, however, that there is sometimes a similar constraint on the use of passive constructions, as defined by the structural description in (35); this will become important later.

Field work and typological research on the properties of passives and inverses across languages has yielded a wide range of problematic cases which clearly belong in the same general syntactic domain, but are missing key structural features of the standard type of passive or inverse. Space prevents me from presenting all of the examples found in the literature. I will restrict myself to just two examples.

The first example is the Arizona Tewa construction illustrated in (39)–(40). This construction has been called a passive (Kroskrity 1985; examples from pp. 311, 313) and an inverse (Klaiman 1991, citing the same examples). The structural description of the Arizona Tewa construction is given in (41), following the format of the descriptions of the passive and inverse in (35) and (38) above.

(39) *hę'i* *sen* ***-di*** *nɛ́'i* *kʷiyó* ***'ó:-*** *tų́* *-'án* *-'i* *dó-*
that man -OBL this woman 3SG/3.PASS- say -COMP -REL 1SG/3.ACT-
tay
know
'I know the woman who was spoken to by the man.'

(40) *ų* *kʰóto* *hę'i* *sen* ***-di*** ***wó:-*** *mɛ́gi*
you bracelet that man -OBL **2/3.PASS-** give
'You were given a bracelet by that man.'

(41) a. A is encoded as oblique (case marking; Kroskrity 1985: 314), and with special indexation forms

b. P is encoded as subject (case marking, and also relativization and reference tracking; Kroskrity 1985: 313–314), and with special indexation forms
c. No overt morphology distinguishes Passive verb form from Active

The oblique case marking of A and subject case marking of P invites analysis as a passive. However, the verb is transitive, and it indexes both A and P (albeit with special indexation forms). Also, there are restrictions on the occurrence of the Arizona Tewa construction that are reminiscent of inverse systems:

(42) a. 1, 2 → 3: always Active
b. all → 1, 2: always Passive
c. 3 → 3: either Active or Passive

These latter facts invite analysis of the Arizona Tewa construction as an inverse. In fact, of course, the Arizona Tewa construction is somewhere between the two: it has some structural properties of the standard passive, and some of the standard inverse.

In my survey of voice constructions, a third type that is significantly different from the "passive" and "inverse" types cropped up in various parts of the world. This is a voice system which looks like an inverse system, but has a special set of agreement affixes for P, instead of agreement affixes looking like the A affixes of the direct forms. An example of this system is the Inverse system of Guaraní (data from Gregores & Suárez 1968: 131–132, analysis mine):

Table 2. Distribution of Guaraní agreement forms

sbj	obj 1sg	1pe	1pi	2sg	2pl	3sg	3pl
1SG	–	–	–	ro-	po-	**a-**	**a-**
1PE	–	–	–	ro-	po-	**ro-**	**ro-**
1PI	–	–	–	–	–	**ya-**	**ya-**
2SG	*še-*	*ore-*	–	–	–	**re-**	**re-**
2PL	*še-*	*ore-*	–	–	–	**pe-**	**pe-**
3SG	*še-*	*ore-*	*yane-*	*ne-*	*pene-*	**o-**	**o-**
3PL	*še-*	*ore-*	*yane-*	*ne-*	*pene-*	**o-**	**o-**

The special P "subject" indexation prefixes are those listed under Inverse in Table 3; the forms in the third column are unique (see Footnote 7). Examples of direct and inverse prefixes are given in (43)–(44) (Gregores & Suárez 1968: 156, 131), and the structural description of the construction is given in (45):

Table 3. Analysis of Guaraní agreement forms

Direct	Inverse	Unique
a-: 1SG	še-: 1SG	po-: 1 → 2PL
ro-: 1PE	ore-: 1PE	ro-: 1 → 2SG
ya-: 1PI	yane-: 1PI	
re-: 2SG	ne-: 2SG	
pe-: 2PL	pene-: 2PL	
o-: 3		

(43) *ho-* *ˀú* *soˀó*
3.DIR- eat meat
'He eats meat.'

(44) ***ne-*** *peté*
2.INV- hit
'He/she/it/they hit thee.'

(45) a. A encoded like P (i.e., no indexation)
b. P encoded like A (indexation), but with special forms
c. No morphology distinguishes Inverse verb form from Direct

Anomalous voice constructions are relatively easy to find in the syntactic literature because so much attention has been paid to hypotheses of a universal passive construction and a universal inverse construction that many linguists have published analyses of the anomalous constructions in their native language or field research language. Also, typological surveys of both passive and inverse have been made. In both cases, the typologists who conducted the surveys concluded that there were no identifying structural properties of passives and inverses across languages: "The analysis of the various constructions referred to in the literature as *passive* leads to the conclusion that there is not even one single property which all these constructions have in common" (Siewierska 1984: 1); "I know of no structural features which can define inverse constructions and distinguish them from passives" (Thompson 1994: 61). Hence I believe that it is safe to conclude that there is no universal passive or inverse construction.

This is not to say that there is no pattern in the distribution of structural features of this subdomain of voice constructions. One can construct a *syntactic space* of voice constructions using the structural descriptions given above. The dimensions of this syntactic space include how P is coded (in a "subject-like" fashion, i.e. like A in the active/direct construction, to an "object-like" fashion), and how A is coded (from "subject-like" to "oblique-like" to "prohibited"); case

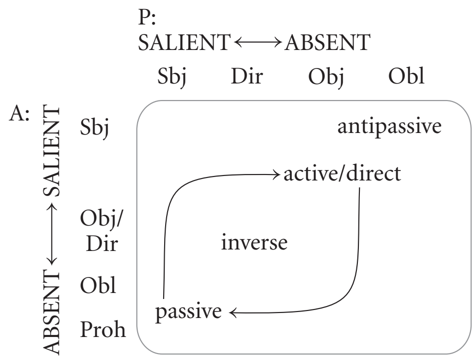

Figure 5. The syntactic and conceptual spaces for voice and transitivity

marking and indexation sometimes do not match. What results is a continuum of voice constructions from the active/direct through inverse-like constructions to passive-like constructions. The syntactic space then maps onto a conceptual space representing the salience or topicality of A and P, which often manifests itself as an animacy or person hierarchy constraint. Figure 5 (adapted from Croft 2001: 317, Figure 8.16) superimposes the syntactic space of the coding of A and P onto the conceptual space of the relative salience of A and P (and extends it to antipassives, not discussed here).

Moreover, there is a clear relationship between the relative topicality of A and P and the typological markedness of the voice construction (see Croft 2003, Chapter 4).[8] The typologically less marked voice constructions are used when A is more topical than P, and the typologically more marked voice constructions are used when P is more topical that A. In other words, although there are no simple (unrestricted) structural universals for particular types of voice constructions, there are structural universals of how the relative topicality of A and P are encoded in the variety of voice constructions found across the world's languages.

In this section, I have presented a few examples to argue that there is no universal structural description of passive or inverse voice constructions that will hold empirically. As mentioned at the beginning of this section, a demonstration of the final thesis of Radical Construction Grammar, that there are no universal constructions in structural terms, would require examining all proposed construction types across languages. While this is an impossible task from a practical point of view, I would like to close this section with two reasons why I believe that the last thesis of Radical Construction Grammar probably holds.

First, language change is gradual; there is overwhelming evidence in support of this view (see e.g. Croft 2000, §3.2 and references therein). The consequence of this for construction grammar is that syntactic change in constructions will also be gradual. Each intermediate step in the process represents an intermediate construction type in structural terms. Hence a cross-linguistic survey that uncovers the intermediate construction types will yield a synchronic continuum of construction types in structural terms. Figure 5 indicates the broad paths of syntactic change of active to passive and back again.

Second, there are usually multiple paths of grammatical change. For example, it is known that there are different paths by which passives arise: from a resultative predicate, from a third person plural construction, from a reflexive construction, etc. (see for example Haspelmath 1990). All of these processes are gradual (see Croft 2001: 314 for a more detailed description of paths of change in voice constructions). The uncovering of the multiple paths of grammatical change and their intermediate stages further fills out the syntactic space of structural possibilities for a given construction type.

5. Conclusion

In this chapter, I have briefly outlined the logical and typological arguments in favor of Radical Construction Grammar. Radical Construction Grammar recognizes that virtually all formal grammatical structure is language-specific and construction-specific. This confirms what some field linguists and typologists have long suspected, having faced the diversity of grammatical structures in the world's languages.

This is not to say that syntactic categories and constructions are random. There are universals underlying the grammatical diversity of the world's languages. But the universals are functional, that is, semantic/pragmatic/discourse-functional. As a number of typologists have now proposed, the distributional patterns of categories defined by constructions can be mapped onto a conceptual space that is hypothesized to hold for all languages (see Croft 2001: 92–102; 2003, Chapters 5–6; Haspelmath 2003 and references therein). Also, structural variation across languages fall into broad patterns of form-function mapping described by such generalizations as typological markedness and typological prototypes.

Radical Construction Grammar also shows how formal syntactic structure is much simpler than is widely believed. One does not need syntactic relations, and therefore one may dispense with both syntactic relations and the various add-ons that are required where the empirical data is problematic for the establishment of syntactic relations. There still exist, of course, the morphological elements and syntactic groupings that are generally taken to indicate syntactic relations. I have argued that these supposed indicators of syntactic relations are really indicators of the correspondence relations between syntactic elements and semantic components in a construction, and (taken as a whole) are indicators of the construction's identity, facilitating understanding by the hearer.

Radical Construction Grammar is in one sense the "syntactic theory to end all syntactic theories". Radical Construction Grammar does not set up yet another representation language to describe syntactic structure, applicable to all languages. There is no such representation language, because syntactic structure is construction-specific and language-specific. On the other hand, there are many important issues in Radical Construction Grammar, and in other construction grammar theories, that remain unresolved.

Of these unresolved issues, one in particular stands out. This is the nature of the network organization of constructions. As mentioned in §1, this is a matter of debate among construction grammarians of all flavors. I know of no large-scale attempt to model the construction network of English or any other language. I am sure that important and interesting problems will arise when this task is finally taken on. For those construction grammarians who support the usage-based model, and I count myself as one, fundamental issues about the establishment of schemas and the interaction between frequency and similarity of utterances in constructing the network need to be addressed both theoretically and empirically.

Thus, the arguments presented here, and in fuller detail in Croft (2001), are only a first step. Nevertheless, I hope that they are a step in the right direction.

Notes

* Versions of this paper were presented to the First Chester Child Language Development Group Workshop at Gregynog, Wales, and the Theme Session on Construction Grammar, 7th International Cognitive Linguistics Conference, Stockholm, Sweden. I would like to thank the audiences at those presentations, the Linguistics-Psychology reading group at the Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany, Chuck Fillmore and Paul Kay for their comments and input. All responsibility for product quality control remains with the author. This chapter was last revised in 2001. The following abbreviations are used in this paper: 1=first person; 2=second person; 3=third person; A=transitive subject; abs=absolutive; acc=accusative; act=active; ActObj=active object phrase; ActSbj=active

subject phrase; ActTrV=active transitive verb; adj=adjective; AI=animate intransitive; art=article; assoc=associative; aux=auxiliary; comp=complement; def=definite marker; dem=demonstrative; dir=direct; erg=ergative case; fut=future; impf=imperfective; ind=indicative; ind.obj=indirect object; inf=infinitive; interr=interrogative; inv=inverse; mom=momentaneous aspect; neg=negative; NP=noun phrase; npst=nonpast; obj=object; obl=oblique; P=transitive object; pass=passive; PassAg=passive agent phrase; PassSbj=passive subject phrase; PassV=passive verb; pe=plural exclusive; pf=perfective; pi=plural inclusive; poss=possessive; PP=past participle; prs=present; pst=past; rel=relative clause marker; S=intransitive subject; sbj=subject; sg=singular; sub=subordinate verb form; tns=tense; TA=transitive animate; TI=transitive inanimate; top=topic; V=verb. Examples are glossed in accordance with the system developed in the Framework for Descriptive Grammars and the EUROTYP projects. In order to make the typological examples easier to follow, the morphemes being discussed and their interlinear gloss is emphasized with boldface.

1. I have chosen the relatively specific example of the Declarative Passive constructon for illustrative purposes. The Declarative Passive could be further abstracted into a Passive argument linking construction, independent of sentence mood and without a specified word order, and a (Nonverbal) Declarative construction, specifying the copula and the order of elements. The circumstances under which such abstractions are made depend on one's model of the organization of construction (e.g. complete inheritance vs. the usage-based model; see below).

2. Fillmore et al. use the term *formal* instead of *schematic*. Since substantive constructions are also formal in the sense of specifying linguistic form, I use Langacker's term *schematic* here.

3. Construction Grammar allows for constructions which have formal values but no semantic value (Fillmore 1999: 121, Fn. 11). However, this is a limiting case in a model that is organized in terms of symbolic units like other construction grammar theories.

4. In transformational syntactic theories, occurrence in a construction such as the passive which is the output of a transformational rule is described as *undergoing* the rule, e.g. undergoing passivization. Hence, distributional analysis in generative grammar is described as testing whether or not the putative category member undergoes the rule.

5. More precisely, Radical Construction Grammar allows parts of constructions to be instances of a part of another construction (as in Figure 2), as well as allowing them to be instances of another whole construction. It does not appear that Construction Grammar allows the former possibility.

6. Croft (2001, Chapter 8) gives fuller details of voice constructions, and also discusses complex sentence constructions (ibid., Chapter 9). Croft 1997 presents the continuum of constructions in the domain of external possession and ditransitive constructions.

7. In Algonquian, the person hierarchy is 2 < 1 < 3; in other languages it is 1 < 2 < 3. In many languages, there are also special unique forms for 1st person acting on 2nd person or vice versa.

8. Ranking on the person hierarchy is a common conventionalized manifestation of argument topicality. The fact that similar restrictions on person ranking exist for "inverse" and "passive" constructions is further evidence of the two voice constructions and their intermediate types as having a single general explanation.

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