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Sign-Based Construction Grammar

Editors:

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Making the Case for Construction Grammar

LAURA A. MICHAELIS

2.1 Introduction

The good news¹ for advocates of Construction Grammar (CxG) is that language scholars from a wide array of backgrounds have adopted its fundamental insight: knowledge of language includes grammatical generalizations of varied grains. CxG, or construction-based syntax more generally, informs models of acquisition (Tomasello 2003, Diessel and Tomasello 2000), aphasia (Gahl 2002), syntactic processing (Kaschak and Glenberg 2000, Goldberg and Bencini 2005, Bencini and Valian 2008, Boyd et al. 2009), concept learning by autonomous agents (Steels and De Beule 2006) and mental simulation, the activation of neural motor programs during perception (Feldman 2006). A variety of natural-language processing projects, including the LinGO project and others in the DELPH-IN consortium use construction-based grammars for parsing, generation and profiling applications (Flickinger 2000, Baldwin et al. 2004). In addition, much recent work in corpus linguistics has constructionist foundations, including exemplar-based syntax and phonology (Bybee 2001, 2007) and statistically based collocation analysis (Stefanowitsch and Gries 2005). Finally, constructions, and their adaptive and exaptive properties, have become the focus of recent work on language evolution (Jackendoff

¹Many of the ideas and arguments presented in this chapter were inspired by collaborative work with Charles Fillmore, Paul Kay and Ivan Sag, who also provided incisive criticisms of earlier versions. I gratefully acknowledge their efforts and inspiration. The usual disclaimers apply.

1999, 2002).

The bad news is that CxG has affected neither the theory nor the practice of mainstream syntax: at least as far as the popular imagination is concerned, the Chomskyan revolution of the 1960s, rather than, say, the constructionist correction of the 1990s, is the most recent notable development in the field of syntax:

Chomsky is widely regarded as having retained his place at the center of the discipline. It's his theories that you'll find today in most linguistics textbooks. "When the intellectual history of this age is written, Chomsky is the only linguist whom anybody will remember," says Geoffrey Nunberg, an adjunct professor at the School of Information at the University of California, Berkeley. (Evan Goldberg, 'Who Framed George Lakoff?', *The Chronicle of Higher Education*, 8/15/08)

This passage provides additional reason for pessimism, as it appears in an article about one of Chomsky's most influential detractors.

Why has constructionist thinking thus far failed to capture the hearts and minds of syntacticians? Perhaps because the focus of syntactic theory has long been on defining a possible human language. For Chomsky (1995: 435) and adherents, this has justified a reduction in the range of linguistic facts that the theory should seek to cover. Construction grammarians retain a commitment to thorough description of individual language grammars, and therefore to many, CxG appears to be a demonstration of the infinite diversity of language rather than an explanatory theory of language. But practitioners of CxG also bear responsibility for the theory's marginal status: few published articles in CxG actually talk about the theory, and fewer still about its formal and logical foundations. This information vacuum has allowed misconceptions about CxG to thrive, including the claim that it is designed only to model minor idiomatic phenomena.

In this chapter, I will attempt to remedy this situation by laying out the case for CxG, or, more specifically, the formal version of CxG known as Sign-Based Construction Grammar (SBCG; Sag this volume, 2010). In doing so, I will touch on four major topics: foundations, functionality, facts and falsehoods. In describing the **foundations** of CxG, I will explain what it means to adopt a licensing-based view of syntax rather than one based on negative constraints (Zwicky 1994, Malouf 2003). The focus on **functionality** arises from the recognition that working syntacticians need a robust and elegant formalism. I will argue that SBCG provides such a formalism, by describing three benefits that it offers to practitioners of construction-based syntax: it is localist, it allows for variable-grain description and it captures shared properties of constructions without requiring stipulations about constructional inheritance relations. The **facts** include three major lines of evidence for construction-based syntax: the constructional basis of meaning composition, the role of

constructions in the licensing of complements and the interleaving of core and periphery during production. Finally, I will attempt to counter six entrenched falsehoods about CxG: that it is nonrigorous, that it does not offer generalizations, that it is a theory of linguistic marginalia, that it is opposed to compositional semantics, that it is not constrained and that it does not provide a universal framework for syntax. The remainder of this paper will be structured as follows: section 2 will be devoted to foundations, section 3 to functionality, section 4 to facts and section 5 to falsehoods. Section 6 contains concluding remarks.

2.2 Foundations

To some linguists, Construction Grammar seems to make an obvious point. Why would anyone think that syntax isn't based on constructions? After all, the category of construction has been a part of grammatical discourse since ancient times. But while we find continuations of that tradition in pedagogical and field grammars, as far as syntacticians are concerned, construction-based analysis stopped making theoretical sense when grammar was redefined, according to the transformational tradition, as a mechanism for assembling symbols into phrases. According to this tradition, syntactic rules do only one thing: determine what symbol sequences function as units for syntactic purposes. They cannot add conceptual content to that contributed by the words. If sentence meaning does not come from 'construction meaning', there seems little point in positing constructions. It is clear, however, that the transformational rules of early transformational grammar – among them, passive, raising, dative movement and equi – mentioned so many morphological and lexical constraints on input and output phrase structures, that they were essentially representations of functional oppositions between constructions. It was not until the 1980s, when Chomsky's focus changed to a 'rule free' conception of grammar designed to articulate with Universal Grammar, that grammatical constructions became a 'theoretical taboo' (see Sag 2010 for discussion). According to the rule-free conception, grammatical constructions are 'taxonomic epiphenomena' whose properties are predictable from the interaction of fixed principles with language-particular parameter settings (Chomsky 1989: 43).

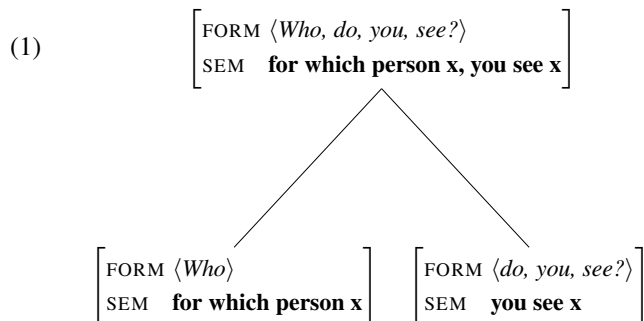
The difference between a construction-based approach to grammar and one based on interacting universal principles can be viewed in part as a distinction between a positive licensing strategy – ruling certain structures in – and a negative suppression-based strategy – ruling certain structures out (Zwicky 1994). The constraints in a suppression-based theory like Government and Binding (GB) theory (Chomsky 1981) include the case filter, the binding principles and restrictions on long-distance dependencies, e.g. subja-

gency. The theory is deemed successful if each of the ill-formed sentences of the language under study violates at least one constraint. Constraints in such theories are inviolable, and in this respect differ from the ‘soft’ constraints of optimality- theoretic (OT) syntax (Legendre et al. 2000, Sells 2001), which are ranked, and violable when higher-ranked constraints are satisfied. In OT, as in GB, however, ‘the challenge is not to account for the grammaticality of the attested forms, but instead to account for the ungrammaticality of all non-attested forms’ (Malouf 2003: 419).

Of course, licensing-based theories like SBCG have constraints too: SBCG describes linguistic expressions using type constraints, which require that instances of a given grammatical or lexical type have certain properties. Likewise, suppression-based theories also license structures. The difference between licensing-based theories and their suppression-based counterparts is rather more subtle. In a suppression-based approach, syntactic well-formedness is determined by operations that create a massive space of potential structures, which must be pruned by grammatical constraints. The licensing-based approach to grammar, by contrast, is described by Malouf (2003: 417) as follows:

Under [the licensing-based] view, the grammar of a language is a declarative set of constraints, organized into a network, which mutually constrain the relationship between form and meaning. Each grammatical representation, rather than being the winner of a Darwinian competition among rival competitors, is licensed by a set of constructions which cooperate to specify its properties.

Constructions interact in the licensing of language objects. That is, a construct can instantiate multiple types at once. For example, the clause exemplified by (1) is classified both by the Interrogative Construction, which requires it to have certain properties common to all interrogative clauses, and by the Filler-Head Construction, which imposes the requirements common to all filler-gap clauses:



These two combinatoric constructions flow together into the Nonsubject *Wh*-Interrogative Construction, which directly licenses constructs like (1), i.e. appropriately interpreted structures consisting of an interrogative *wh*-phrase followed by an auxiliary-initial clause containing an appropriate gap. Constructional interactions of this kind are described in terms of type hierarchies, to be discussed in section 2.3.3.

Why would anyone prefer a licensing-based model? After all, suppression-based syntactic theories offer constraints of potentially universal significance, and they are arguably more economical than licensing-based models, since there are far fewer general constraints than there are constructions. Construction grammarians prefer the licensing model not because it is more elegant, but because it is more realistic, in at least three respects.

First, the licensing-based model, as a static, declarative model of grammar, has greater psychological plausibility. As Malouf (2003) points out,² it is biased neither toward utterance synthesis nor utterance analysis, and avoids the procedural metaphors that form the basis of both transformational and optimality-theoretic grammars (whether the procedures involve movement of constituents from one structural position to another or selection of a least-marked alternative from a set of candidate structures). In addition, since the constructional ‘licensors’ combine syntactic, semantic, pragmatic and phonological information, the licensing-based view articulates closely with models of human sentence processing based on simultaneous constraint-satisfaction, e.g. Spivey’s (2007) ‘continuity of mind’ framework, in which attractor networks are used to simulate the coalescence of distinct neuronal activation

²See also Sag et al. 1986, Fenstad et al. 1987, and Sag and Wasow 2011.

patterns during syntactic ambiguity resolution.

Second, the licensing-based model provides descriptive precision that suppression-based approaches cannot. CxG retains descriptive goals that generative-transformational grammar long ago exchanged for the promise of bright-line tests that would separate the relevant ('core') grammatical phenomena from the irrelevant ('peripheral') ones. If one takes Chomsky's claims seriously, the loss of descriptive coverage that this move entailed is a sign of progress in the 'search for explanatory adequacy' (Chomsky 1995: 435). But, as Sag (2010), observes, the generative-transformational tradition finesses the core phenomena too: when one considers that tradition's signature phenomenon, the English filler-gap dependency, one finds that it is silent concerning obvious parameters of variation among the extraction constructions, including the syntactic categories of the filler and head daughters, the type of *wh*-element within the filler daughter (if any) and the use of the auxiliary-initial pattern in the head daughter. This in turn should lead us to ask: how can a theory that takes cross-linguistic parametric variation seriously overlook intra-linguistic variation of a similar nature?

Third, suppression-based approaches fail to account for speakers' structural preferences, as revealed by speech corpora. As an illustration, consider relative clauses with subject relative-pronouns, as illustrated by the bracketed portion of (2):

(2) the people [who read the paper]

The subject relative appears to be the prevalent type both across languages (Keenan and Comrie 1977), and in conversational speech: subject relative clauses account for 65 percent of the relative clauses in the American National Corpus (Reali and Christiansen 2007) and 67 percent of the relative clauses in the Switchboard corpus of American English telephone conversations (Duffield and Michaelis 2009). This pattern could be the result of processing constraints, as per Hawkins (1999, 2004): subject extractions feature the shortest structural distance between filler and gap of any long-distance dependency, and are therefore the easiest to interpret.³

³This processing account appears to find support in psycholinguistic studies. For example, in a series of eye-movement tracking experiments, Traxler et al. (2002) found that sentences containing object-relative clauses were more difficult to process than sentences containing subject-relative clauses during the relative clause and the matrix verb. However, Mak et al. (2008) suggest that this effect is modulated by discourse factors: in a reading-time study of Dutch relative clauses, they find that object relative clauses actually have a processing advantage over subject relatives when the object relative contains a pronominal or otherwise discourse-old subject (e.g. that I like). Accordingly, they conclude that '[r]eaders choose the entity that is most topically worthy as the subject of the relative clause' (p. 181). These results suggest that the putative processing advantage for subject relatives is instead a processing disadvantage for object relatives containing discourse-new or lexical subjects (e.g. that my sister likes). When subject

Certainly, there is reason to question the presumed unity among ‘subject extractions’: the subject *wh*-interrogative (e.g. *Who called?*) is structurally identical to the subject relative, and yet it is both highly marked typologically (Aissen 1999, Van Valin and La Polla 1997: Chapter 5) and exceedingly rare in English conversation (Homer 2000). But even when confined to subject relatives, the processing explanation appears inadequate. In conversational data, as has been widely observed, subject relatives are not preferred across the board. They are in fact rare among modifiers of subject nominals; for example, as shown by Duffield and Michaelis 2009, only 8 percent of the finite subject relatives in the Switchboard corpus are modifiers of subjects (see also Geisler 1999). Subject relatives are preferred only by object nominals. For example, as Duffield and Michaelis (2009) report, 74 percent of the finite relative clauses that modify object or oblique nominals are subject relatives. Because lexically headed object NPs are far more common than lexically headed subject NPs in conversation (Michaelis and Francis 2007), this ensures that subject relatives (the relative-clause type preferred by object nominals) will prevail overall. But this preference for subject relatives lacks a discourse-pragmatic explanation akin to that used by Fox and Thompson (1990) to explain the inverse pattern among subject nominals. Subject nominals prefer to be modified by object or oblique relative clauses, as in (3):

- (3) [Our friend the President right now says no new taxes [but] at the same time], the budget he sent to Congress has tax and fee increases, [so uh I know the politicians uh aren’t straightforward]. (Michaelis and Francis 2007, example (48))

In (3) we see the most common object-relative configuration in conversational speech: the relative clause modifies a subject nominal (*budget*) and contains an anaphoric subject (*he*). The function of such object relatives, according to Fox and Thompson, is related to the function of subjects. Subjects are prototypically clause topics (Mithun 1999), and for this reason the referents of subjects are generally discourse-old. When a speaker chooses the marked strategy of introducing a referent in subject position, an object relative eases referent recoverability. It does so by linking the referent of the head nominal to an already introduced referent (in (3), the President). This account makes excellent discourse-pragmatic sense, but it says nothing about subject relatives. Is there an equally principled explanation for the affinity between object nominals and subject relatives? The answer is probably ‘no’, at least if the principles sought are constraints that rule out other relative-clause patterns. Instead, it would appear, there is a construction that rules in subject

relatives are compared with object relatives that contain pronominal or discourse-old subjects, subject relatives no longer have a processing edge. The Mak et al. findings thus undercut a processing explanation for the prevalence of subject relatives.

relatives. That construction is the Pseudorelative Construction (McCawley 1981, Lambrecht 1987, 1988, 2002). Attested examples of this construction are given, for English and French, respectively, in (4)–(5):

- (4) I have my mother who is an Irish-Italian, and my father who is African, [so I have the taste buds of an Italian and the spice of an African]. (Google)
- (5) J'ai ma mère qui a également des problèmes d'alcoolisme. 'I have my mother who has the same problems with alcoholism'. (Google)

In the Pseudorelative Construction, the relative clause conveys an assertion otherwise conveyed by a matrix clause (e.g. 'My mother is Irish-Italian'), while the matrix clause conveys the restriction on the existential quantifier, e.g. 'mother (x)' in (4)–(5). Consequently, a pseudo-relative clause, unlike a restrictive relative clause, is obligatory: in uttering (5)–(6), for example, one does not assert 'I have my mother'. If the prevalence of subject relatives is in fact an artifact of Pseudorelative usage, we would expect that subject-relative modifiers of objects (i.e. OS structures) will bear more lexical and morphosyntactic hallmarks of presentational function than do object-relative modifiers (i.e. OO structures). Using annotated data from the Switchboard corpus, Duffield and Michaelis (2009) confirm this expectation. They find, first, that the relative clause in an OS token is significantly more likely to be obligatory (crucial to semantic coherence) than that in an OO token; second, that the matrix verb of a clause containing an OS token is significantly more likely to be *have* or *be* than those in clauses containing OO tokens; and third, that the nominal head in an OS token is significantly more likely to be indefinite (and hence discourse-new) than in an OO nominal head. Duffield and Michaelis's findings, like those of Diessel and Tomasello (2000), reveal a close connection between subject relatives and presentational function. Diessel and Tomasello find that children's first relative-clause productions contain copular matrix verbs and intransitive relative clauses. Duffield and Michaelis's results show that this bias is preserved in adult speech. This in turn suggests that specialized communicative routines are as crucial to grammatical explanation as are general interpretive and encoding constraints, and abstract syntactic configurations like the Filler-Head Construction (Bybee 2007, Goldberg 2006). The bottom line is that structural preferences do not necessarily arise from the suppression of structures that are undesirable on general, principled grounds; some, if not most, of the structural preferences revealed by speech corpora fall out from the properties of fine-grained constructions.

2.3 Functionality

For many years, the only formal reference work available to construction grammarians has been an unpublished (but widely circulated) course reader, Fillmore and Kay (1995). It outlines a model that has come to be known as Berkeley Construction Grammar (BCG). This work contains a compelling treatment of interactions between argument-structure constructions (e.g. passive and ditransitive) and demonstrates that the mechanism of lexeme-construction unification enables one to describe English nominal and verbal syntax without recourse to the overly complex phrase structures containing many ‘inaudible’ elements that are commonplace within GB or MP approaches based on \bar{X} -Theory. However, Fillmore and Kay use a cumbersome nested-box notation for construction descriptions that permits an undefined degree of recursion, and an open-ended and loosely organized repertoire of features. In addition, while Fillmore and Kay argue persuasively that formal and semantic commonalities among constructions can be captured by means of inheritance relations (rather than, say, transformations), the work does not provide a precise formal theory of such taxonomic relationships. Construction grammarians seeking a more comprehensive and principled system of formal representation were inclined to look to an allied declarative model, Head-Driven Phrase-Structure Grammar (HPSG; Pollard and Sag 1987, 1994). Like BCG, HPSG treats words and phrasal patterns uniformly in terms of constraints on form-meaning pairings, uses feature structures to model semantic and syntactic classes of grammar objects, and presumes a structured inventory of types (not just types of signs) that streamlines the formulation of constraints and constraint inheritance.

SBCG is an attempt to blend the insights of BCG with those of HPSG. It qualifies as a theory of constructional meaning because it assumes that combinatoric constructions (the rules for combining sequences of signs into larger units) are directly associated with interpretive and use conditions, expressed by semantic and pragmatic features (see Kay and Michaelis forthcoming and Sag 2010) that attach to the mother or daughter nodes in these structures, which are called ‘constructs’. This amounts to the claim that syntactic rules have associated meanings. This claim sets CxG apart from prevailing models of meaning composition. Such theories are based on a principle that Jackendoff (1997: 48) describes as the ‘doctrine of syntactically transparent composition’. According to this doctrine, ‘[a]ll elements of content in the meaning of a sentence are found in the lexical conceptual structures [. . .] of the lexical items composing the sentence’ and ‘pragmatics plays no role in determining how [lexical conceptual structures] are combined’. To propose a construction-based model of semantic composition like SBCG is not, however, to deny the existence of syntactically transparent composition. It is instead to treat it,

in accordance with Jackendoff (1997: 49), as a ‘default in a wider array of options’. Constructions may include specifications requiring that the daughters’ meanings be assembled in some particular way to form an idiosyncratic meaning or that the resulting sign be subject to a particular felicity condition absent from any of the daughter signs.

In this section, we will discuss three properties that make SBCG a useful formalism for construction-based syntax. The properties are: **localism**, **variable-grain description** and **a model of inheritance** that captures the family resemblance relationships described in earlier versions of CxG while offering both reduced stipulation and enhanced data coverage.

2.3.1 Localism

In SBCG, the phrase types in the target language are described by means of combinatoric constructions. Combinatoric constructions describe constructs – signs that are built from one or more distinct signs. Constructions in SBCG take the form of type constraints. A type constraint is a conditional statement that tells what properties a construct will have if it is an instance of the type in question. Intuitively, constructs are local trees (mother-daughter configurations) with feature structures (specifically, signs) at the nodes. Constructions can describe only such mother-daughter dependencies and not, e.g. mother-granddaughter dependencies (Sag 2007, 2010).

A local tree is distinct from an analysis (or ‘derivation’) tree. Analysis trees record the process of phrase construction through the recursive expansion of phrasal nodes, and can, of course, have many more than two levels. While analysis trees can be used to describe the recursive licensing of constructs, such trees are not objects of grammatical description in SBCG. Only those trees that qualify as constructs are in the language model. A construct is modeled in SBCG as a feature structure that contains a MTR (MOTHER) feature and a DTRS (DAUGHTERS) feature. The value of the MTR feature is a sign and the value of the DTRS feature a list of one or more signs. What then is a sign? A sign, as in the Saussurean tradition, is a form-meaning pairing, but it includes quite a bit more. A sign is modeled as a type of feature structure (attribute-value matrix) that specifies values for five features:

- PHON (PHONOLOGY): a phonological structure (however this is defined)
- FORM: a list of formatives that is realized as the PHON value
- ARG-ST (ARGUMENT-STRUCTURE): a list of a lexical expression’s arguments
- SYN (SYNTAX): CAT (CATEGORY) and VAL (VALENCE)
- SEM: INDEX and FRAMES⁴

⁴See Fillmore et al. this volume for discussion of some of the frame-semantic requirements of particular constructions.

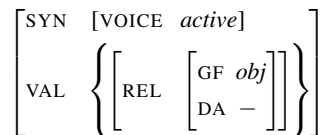


FIGURE 1 The Transitive Construction in Berkeley Construction Grammar
(Fillmore and Kay 1995)

- CNTXT (CONTEXT): TOPIC and FOCUS, indexical coordinates, felicity conditions...

By treating phrases as feature structures, SBCG captures properties common to lexemes and phrase types in a way that BCG did not. As already mentioned, according to the BCG vision, the grammar is an inventory of trees (nested boxes) with an indefinite depth of recursion. By contrast, argument structure constructions like the Transitive Construction are represented by feature structures, as in Figure 1.

The construction shown in Figure 1 expresses a constraint on transitive lexemes: each such lexeme assigns the grammatical relation object to one argument in its valence set, provided that this argument is not the highest ranking or ‘distinguished’ argument. The Transitive construction presumably represents a class of lexemes (those that take direct objects), but it is unclear why a lexeme description like that in Figure 1 should qualify as a construction, as it does not contain nested boxes. SBCG, by contrast, proposes two types of constructions: the aforementioned combinatoric constructions, which describe properties of phrase types, and lexical-class constructions, which describe properties shared by classes of lexemes (like *devour*) and words (like *devoured*). Formally, the only difference between lexical-class constructions and combinatoric constructions is the type name in the antecedent of the type constraint. Because both words and phrases are signs, the two can be described uniformly. This is shown by Figures 2–3, which illustrate, respectively, a lexical-class construction and a combinatoric construction.⁵

The Applicative construction, shown in Figure 2, describes the lexeme class to which the verbs *fill* and *cover* belong (as in, e.g. *She filled the bathtub with champagne* and *They covered the wall with a sheet*): this lexeme class is a subtype of the transitive-lexeme class, as guaranteed by the type hierarchy specified in the grammar’s signature. As shown by the ARG-ST list, verbs of this lexeme class express the theme argument as a PP headed by *with*. The semantic constraints associated with this lexeme class are as indicated by the frame labeled *loc-motion-fr* in the FRAMES list. This frame

⁵Throughout I make minor simplifications in the formulation of particular constructions. For a more detailed formulation, see Sag this volume.

$$\text{trans-with-lxm} \Rightarrow \left[\begin{array}{l} \text{ARG-ST} \langle \text{NP}_x, \text{NP}_z, \text{PP}[\text{with}]_y \rangle \\ \text{SEM} \left[\begin{array}{l} \text{FRAMES} \left\langle \begin{array}{l} \text{loc-motion-fr} \\ \text{AGENT } x \\ \text{THEME } y \\ \text{GOAL } z \end{array} \right\rangle \end{array} \right] \end{array} \right]$$

FIGURE 2 The (lexical-class) Applicative Construction (based on Sag this volume, (99b))

$$\text{subj-pred-cl} \Rightarrow \left[\begin{array}{l} \text{MTR} \left[\begin{array}{l} \text{phrase} \\ \text{SYN} \left[\begin{array}{l} \text{VAL} \langle \rangle \\ \text{MRKG } \textit{unmk} \end{array} \right] \end{array} \right] \\ \text{DTRS} \langle X, H \rangle \\ \text{HD-DTR } H : \left[\begin{array}{l} \text{SYN} \left[\begin{array}{l} \text{CAT} \left[\begin{array}{l} \text{VF } \textit{fin} \\ \dots \end{array} \right] \\ \text{VAL} \langle X \rangle \\ \text{MRKG } \textit{unmk} \end{array} \right] \end{array} \right] \end{array} \right]$$

FIGURE 3 The (Combinatoric) Subject-Predicate Construction (Sag this volume, (110))

is intended to capture the resultant-state entailment that the theme occupies a critical mass of points in a planar region (see, e.g. Michaelis and Ruppenhofer 2001). The Applicative construction also describes one of the classes to which the verbs *spray* and *load* belong: the lexical entries (listemes) of these verbs lack an ARG-ST specification, making them compatible with the Applicative and Transitive-Locative Constructions (both lexical-class constructions). The Subject-Predicate Construction, shown in Figure 3, licenses basic declarative clauses. As described in Figure 3, a subject-predicate clause consists of two daughter signs, the second of which is a finite verbal sign that selects for the first sign by means of its VAL feature. As shown in this figure, the mother of a subject-predicate construct has an empty VAL set, indicating that it is a complete (or ‘saturated’) predication.

Thus, SBCG captures properties common to lexical items and phrases by describing both as feature structures. It is true that combinatoric constructions describe sign configurations (via the MTR and DTRS features), while lexical-class constructions describe single signs. But signs and sign configurations are the same thing as far as the licensing mechanism is concerned. The principle that governs the licensing of linguistic objects in SBCG is the Sign Principle. According to the Sign Principle of SBCG (Sag this volume, (46)), a sign is **listemically licensed** only if it satisfies some listeme, and **constructionally licensed** only if it is the mother sign of some well-formed construct.⁶ This means that one can verify the grammaticality of a phrase based only on the properties of its topmost (MTR) feature structure, since these properties include identifying information about that node’s daughters (e.g. the frames on the MTR’s FRAMES list).

2.3.2 Variable Granularity

As is widely recognized by proponents of CxG and exemplar-based approaches (e.g. Bybee 2007), many grammatical generalizations are not very general. The ISIS construction, exemplified in (6) below, is a case in point (small caps indicate points of prosodic prominence; ‘|’ indicates a pause):

- (6) See I – I agree with that, but my whole PROBLEM is | is that I really DON’T like Bush.

As discussed by Brenier and Michaelis (2005), ISIS is one of several strategies that speakers use to announce a forthcoming proposition (e.g. *I really don’t like Bush*) by means of a ‘set up’ clause (e.g. *my whole problem is*) whose subject is an informationally light noun phrase like *the main thing, the*

⁶Note that according to the Sign Principle, a lexical sign can be constructionally licensed, if it corresponds to the MTR sign of a derivational or inflectional construct. In fact, the only lexical signs that are licensed by lexical entries are those that are not ‘produced’ by derivational or inflectional constructions.

problem, the real issue, or the question. Analyzed as a syntactic amalgam by Brenier and Michaelis, ISIS contains two adjacent tensed forms of the verb *be*, the first of which is typically accented. Brenier and Michaelis argue that this idiomatic pattern is designed to solve a syntax-to-phonology mapping problem: ISIS contains an unbroken verb phrase and an unaccented copula, unlike the standard alternative structure (7):

(7) The thing IS | I always carry my checkbook.

But in solving a phonological problem, ISIS creates a syntactic one: the ISIS ‘set up’ has no identifiable syntactic category – it is more than a verb phrase but less than a full clause. While functionally motivated, the ISIS construction features several fine-grained constraints that are inexplicable on semantic or syntactic grounds. One of these concerns possible tense combinations: while the BE₁ slot may be filled by the words *was*, *is* or *being*, the BE₂ slot is invariantly filled by the word *is*.

(8) The real question was is are we getting a reasonable return on our investment.

Independent-clause (IC) exclamatives provide another example of a fine-grained constraint:

(9) GOD, *(I can’t believe) who they HIRED/where they WENT!

As (9) shows, IC and subordinate-clause exclamatives differ with regard to the syntactic category of the filler daughter: *who* and *where* are not possible filler daughters of IC exclamatives in English, although they are in some other languages (Michaelis 2001). A grammar that provides no mechanism for imposing these category restrictions will greatly overgenerate.

How does SBCG avoid overgeneration? It treats nodes, and in particular the MTR nodes of constructs, as feature structures, not category labels.⁷ A description of a feature structure specifies a set of properties. Hence, feature-structure descriptions follow the logic of set inclusion: the more properties in the description, the smaller the class of language objects that description picks out. For example, the feature set that describes an IC exclamative (e.g. *What fools!*) includes that which defines the Filler-Head Construction, shown in Figure 4. Inclusion relations among feature-structure descriptions allow us to model constructs at each step along the idiomaticity continuum, with an array of constructions of correspondingly graded generality.

⁷Of course, \bar{X} -Theory involves using feature structures in place of category labels, but the relevant feature inventories in GB and MP analyses do not offer much descriptive power: the features are limited to syntactic ones, and the feature values are all atomic, in fact, binary. This means, in particular, that there is no embedding of feature structures in other feature structures.

$$\text{filler-head-cxt} \Rightarrow \left[\begin{array}{l} \text{MTR} \quad \left[\text{SYN} \quad \left[\begin{array}{l} \text{VAL} \quad L_1 \\ \text{GAP} \quad L_2 \end{array} \right] \right] \\ \text{DTRS} \quad \langle [\text{SYN } X], H \rangle \\ \text{HD-DTR} \quad H : \left[\begin{array}{l} \text{phrase} \\ \text{SYN} \quad \left[\begin{array}{l} \text{CAT} \quad \text{verbal} \\ \text{VAL} \quad L_1 \\ \text{GAP} \quad \langle [\text{SYN } X] \rangle \end{array} \right] \end{array} \right] \end{array} \right]$$

FIGURE 4 The Filler-Head Construction (Sag 2010)

2.3.3 Inheritance Without Stipulation

A leading insight of CxG from its inception is that grammar rules are not procedures but category descriptions, and as such, subject to taxonomic organization. Such taxonomies, which have come to be known in the CxG literature as inheritance networks, provide for cross-cutting generalizations about constructions. The idea, simply put, is that a construction can be an instance of multiple types at once. Goldberg (1995) simplified the description of inheritance networks by conflating two major inheritance relations: the instance relation and the subpart relation. Both relations are illustrated by the Extraposed Exclamative Construction, as in (10):

(10) It's amazing what she said.

The Extraposed Exclamative can be regarded as an instance of the Extraposition Construction that contains as a subpart the *Wh*-Interrogative Clause Construction described by Sag (2010).

While inheritance networks offer a way to describe semantic and syntactic commonalities among constructions without recourse to derivations, it has remained unclear just how such transconstructional generalizations are to be represented. Should they be represented by a stipulation in a construction x , 'inherit construction y ', as per Fillmore & Kay 1995? Or should they be represented by typed links in radial-category diagrams, as per Lakoff 1987, Goldberg 1995 and Michaelis & Lambrecht 1996? Both strategies have an ad hoc flavor. The 'inherit' stipulation looks like a feature, but it is never made clear what types of feature structures contain it. Typed links do not appear in the feature structures used to represent constructions, so one cannot know from looking at a given construction what its 'relatives' are.

In SBCG, by contrast, constraint inheritance is modulated by the hierarchy of types. Grammatical objects of all kinds, including phrase types, are analyzed as feature structures, and these feature structures are organized by the

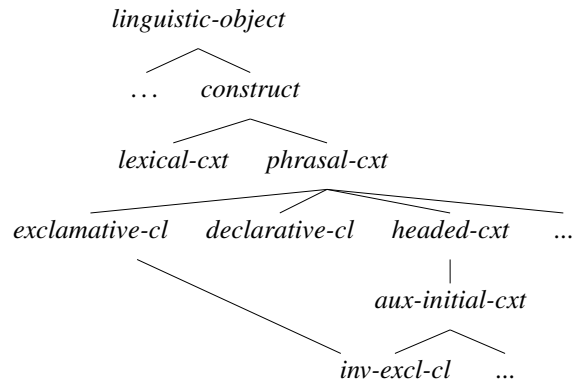


FIGURE 5 The Classification of Inverted Exclamative Clauses (Sag 2010)

hierarchy of types specified in the grammar’s signature. One can therefore determine what constraints are shared by what constructs by consulting the particular constructions together with the type hierarchy. Rather than being stipulated, inheritance relations are encoded in each construction’s ‘DNA’. To understand how this works, we must recall that a construction is a conditional statement defining the properties that are common to all instances of a given feature-structure type. The general schema for a combinatoric construction is shown in (11):

$$(11) \ x\text{-cxt} \Rightarrow [\dots]$$

Thus, rather than positing instance links, SBCG allows a construction to define the characteristic properties of a construct type A , and another construction to define the relevant properties of a type B . The type hierarchy tells us that B is a subtype of A and hence that all feature structures of type B must also obey the constraints that the grammar places on type A .⁸ Figure 5 illustrates the position of inverted exclamative clauses, e.g. (12), in the hierarchy of clausal constructs.

(12) (Man,) was I ever wrong about that one!

As indicated in Figure 5, all inverted exclamative constructs are a kind of (belong to a subtype of) auxiliary-initial construct. That construct type is described by the type constraint in Figure 6, according to which an auxiliary-initial construct (a headed construct according to Figure 5) must consist of a head daughter that is a finite auxiliary verb (the only kind that can be [INV +])

⁸I am ignoring the possibility of default inheritance here.

$$aux\text{-}initial\text{-}cxt \Rightarrow \left[\begin{array}{l} \text{MTR} \quad [\text{SYN} [\text{VAL} \langle \rangle]] \\ \text{DTRS} \quad \langle H, X_1, \dots, X_n \rangle \\ \text{HD-DTR} \quad H : \left[\begin{array}{l} \text{word} \\ \text{SYN} \left[\begin{array}{l} \text{CAT} \quad [\text{INV} +] \\ \text{VAL} \quad \langle X_1, \dots, X_n \rangle \end{array} \right] \end{array} \right] \end{array} \right]$$

FIGURE 6 Auxiliary-Initial Construction (Sag 2010)

followed by all its valents. Because a clause like (12) is an instance of the inverted exclamative construct, it must also be an auxiliary-initial construct, and hence must satisfy all the constraints imposed by the Auxiliary-Initial Construction, as well as the additional constraints included in the Inverted Exclamative Construction, e.g. that the mother’s meaning is the appropriate exclamation constructed from the meanings of the daughters.

Because SBCG is a localist theory of syntax, as described in section 3.1, its treatment of subpart relations will necessarily diverge significantly from that found in BCG works. Constructions are configurations of signs rather than configurations of constructs; therefore, a construction cannot include another construction in its DTRS list, and a construction – a description of a class of constructs – can make no reference to the daughters of a construct’s daughters. Such a practice would be no more acceptable in SBCG than would placing a phrase-structure rule in the expansion of another phrase-structure rule in a context-free grammar. How then are ‘subpart’ relations to be represented in SBCG? The example in (13) will serve to illustrate SBCG’s approach to ‘subpart’ relations:

(13) Never have I seen one.

Looking at the construct type illustrated in (13), Inverted Negative Adverb Preposing, we might intuitively say that it contains two daughters, the first of which is a negative adverb and the second of which is the Auxiliary-Initial construct type. However, as discussed above, constructions cannot contain other constructions. Instead, we would say that the head daughter of a particular construct type shares one or more features with the MTR of some other construct type. To see how this works, let us look at the Inverted Negative Adverb Preposing construction, shown in Figure 7.

The construct type shown in Figure 7 has a head-daughter sign with the property [INV +]. This feature is shared by the Auxiliary Initial construct type, shown in Figure 6: its head daughter is [INV +], as is its mother (this is guaranteed by a general constraint of HPSG/SBCG called the Head Feature Principle). Because the mother of any auxiliary-initial construct is so spec-

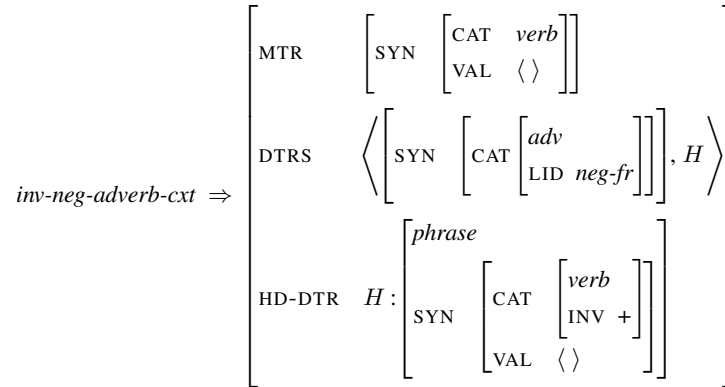


FIGURE 7 The Inverted Negative Adverb Preposing Construction

ified, these phrases are suited to serve as the head daughter of a negative adverb preposing construct. Thus, SBCG captures daughter properties shared by constructions in a manner that is consistent with localist assumptions. But adhering to locality is not the only reason to replace a conception of inheritance based on subpart relations with one based on head-daughter features. One cannot apply the subpart-based conception of inheritance to the (bracketed) head daughters in (14)–(16):

- (14) How many books [[you read __] and [I buy __]]!
- (15) Never before [[have so many people attended] [that we ran out of room]].
- (16) She [[fortunately] [almost never complains]].

Under a subpart-based conception of inheritance, the Interrogative Exclamative Construction (e.g. *How nice it was!*) would inherit its second daughter from the Subject-Predicate Construction. This analysis would not, however, cover examples like (14), in which the second daughter consists of conjoined clauses. How is the head daughter of the Interrogative Exclamative characterized in SBCG? It simply has the features [VFORM *fin*] and [INV *-*]. Similarly, under a BCG conception of inheritance, the Inverted Negative Adverb Preposing Construction, exemplified by (13) above, would inherit its second daughter from the Auxiliary-Initial construction, depicted in Figure 6. Such an analysis would not, however, work for (15), whose right daughter is licensed not by the Auxiliary-Initial Construction but by the Head-Extrapolation Construction (Kay and Sag this volume).

Examples like (15) are not problematic for analyses of the sort required within SBCG. These simply require that the second daughter of the Negative Adverb Preposing construction is a clause specified as [INV +]. Finally, example (16) undermines the BCG assumption that the Subject-Predicate Construction inherits the Head-Complement Construction as its head daughter. Because in (16) there are adverbial expressions preceding the matrix verb (complains), the head daughter would be licensed by a modification construction, and not the Head-Complement construction. If, however, we assume, in line with SBCG, that the Subject-Predicate Construction merely constrains its second daughter to be [VFORM *fin*], (16) is unproblematic. In sum, while it may be conceptually appealing to refer to clauses like (14)–(16) as inheriting (or even ‘containing’) other constructions as their head daughters, accounting for the full array of head-daughter phrases that we actually encounter requires a feature-based formulation of the relevant constraints.

2.4 Facts

On what grounds do we claim that constructions are the basis of grammar? One major line of evidence has come from the productivity of idiomatic patterns, as described by Fillmore et al. (1988), Michaelis and Lambrecht (1996), and Kay and Fillmore (1999), Kay (2002). However, because most syntacticians are already willing to concede the existence of partially productive idioms, idiom studies, however insightful, are unlikely to persuade anyone to adopt CxG. The descriptive goals of modern syntacticians are broad, and concern general phenomena like the discourse-syntax interface, meaning composition, and argument realization. Thus, the challenge for proponents of construction-based syntax is to demonstrate that constructions figure in the most basic functions that grammar performs. In this section, I will discuss several ways in which constructions play just such a role, highlighting three fundamental grammar functions: semantic composition, complement licensing and sentence production. In section 2.4.1, I will argue that a sensible model of semantic composition requires recourse to constructional meaning. In section 2.4.2, I will give evidence that constructions are licensors of complements. In section 2.4.3, I will argue that core and periphery cannot be treated as separate modules, owing to their interaction during sentence production.

2.4.1 Composition Requires Constructions

Consider first a class of expressions that would be appropriately analyzed in the tradition of Generalized Phrase Structure Grammar (Gazdar et al. 1985) in terms of a context-free phrase-structure rule paired with an interpretive rule that composes the semantics of the mother from the semantics of the daughters. Such pairings are in fact constructions and are treated as such in

CxG. Obviously, we have not validated a constructionist approach by simply showing that it replicates what other theories do under another name. But CxG can also describe linguistic structures in which the mother of a given local tree allows more than one interpretation. Can a syntactic theory based on strict composition do the same thing? It appears that the answer is ‘no’, at least if we use the following definition of compositionality, taken from Szabó (2007, *Stanford Encyclopedia of Philosophy*): ‘If a language is compositional, it cannot contain a pair of non-synonymous complex expressions with identical structure and pairwise synonymous constituents’. The problem with this understanding of meaning composition is that it yields a counterintuitive result for syntactically regular idioms of the type described by Fillmore et al. (1988). Two examples of such idioms are given in (17)–(18):

- (17) **Pseudoimperative:** Now watch me be somehow unable to make it out there.
- (18) **Pseudoconditional:** If you’re Obama, you might not like the idea of the Clintons in the White House.

Both the Pseudoimperative and the Pseudoconditional are syntactically regular: the former has a syntactic form indistinguishable from that of a regular imperative sentence and the latter has the syntactic form of an ordinary hypothetical conditional. But (17) does not exhort the hearer to watch the speaker and (18) does not predict a future outcome based on the hearer’s potential to shift identity. If we are to maintain Szabó’s definition of compositionality, we must conclude from these interpretive affordances either that English is not compositional or else that Pseudoimperatives and Pseudoconditionals have distinct hierarchical representations from their transparently interpreted analogs. Neither appears to be an acceptable conclusion. Thus, a conception of composition based exclusively on \bar{X} -syntax leads to a nonsensical result for examples like (17)–(18). By contrast, a constructional approach allows a single phrase-structure analysis for both the idiomatic and transparent readings of (17)–(18) and, for the idiomatic readings, posits constructions that attach semantic interpretations directly to complex syntactic objects. For example, under a constructionist analysis, the Pseudoconditional and the regular conditional have a common supertype that is used to define the properties that the two subtypes have in common. In short, constructional approaches recognize as instances of compositionality cases in which two different meanings for the same syntactic form are licensed by two different form-meaning licensers, i.e. by two different constructions.

2.4.2 Constructions License Complementation Patterns

There are two kinds of evidence supporting the contention that constructions license complementation patterns:

- **Valence variation.** The full range of verb-valence variability, including zero complement realization, cannot be adequately described by augmentative operations on event structure (as proposed in Rappaport Hovav and Levin 1998 [RHL]).
- **Weird sisterhood.** Many verb frames license sisterhood relations not predicted by the general-purpose rule that combines heads and complements.

We will consider each of these concerns in turn.

Valence Variation

According to RHL, valence augmentation and other contextual effects on verb meaning are the products of lexical derivations that build up complex event structures from simpler ones. Unlike the construction-based model of argument structure proposed by Goldberg 1995, the RHL model is based on lexical projection; as they put it: ‘Many aspects of the syntactic structure of a sentence – in particular, the syntactic realization of arguments – are projected from the lexical properties of the verbs’ (RHL: 97). Each of a verb’s syntactic frames is associated with a distinct verb meaning, although every verb has one basic class membership. An implication of this model is that most verbs are polysemous, and many radically so. Since RHL assume (in accordance with Pinker 1989 and others) that aspectual meaning is visible to syntax, the more aspectual representations a verb has the more syntactic variation it will display, and vice versa. To represent verb meaning and semantic operations on verb meaning, RHL propose (a) a set of Aktionsart-based template and (b) an operation that augments one such schema up to another one. The RHL model assumes that verbs unify with event-structure templates based on Aktionsart class. According to this model, activity verbs like *sweep* are lexically intransitive, although such verbs can gain a second argument by combining with an accomplishment template, as in, e.g. *She swept the floor*. Arguments supplied by templates are referred to as **nonstructural arguments**.

The RHL model makes three predictions about null complements (Ruppenhofer 2004, ch. 4; Goldberg 2005, 2006: 195-198):

- (19) As nonstructural arguments, the second arguments of bivalent state, achievement and activity verbs should always be omissible, e.g. *Have you eaten?*.
- (20) Nonstructural participants are subject only to a recoverability condition based on prototypicality (p. 115); therefore all null complements should have existential (indefinite) interpretations, as in, e.g. *She reads*.

(21) As structural arguments, patient arguments of accomplishment verbs, e.g. *kill* and *break*, should never be omissible.

However, each of these predictions is demonstrably false. First, the second argument of a bivalent state, achievement or activity verb is not always omissible, as shown by (22)–(24):

(22) She resembles *(people).

(23) She found *(something).

(24) We discussed *(issues).

Second, null instantiated second arguments need not have indefinite interpretations; they may instead be interpreted as definite anaphors, as in (25)–(27):

(25) I remember (that).

(26) I prepared (for that event) for weeks.

(27) She arrived (there).

Third, as shown by Goldberg (2005), accomplishment verbs do allow null instantiated patient arguments. For example, verbs of emission and ingestion license indefinite null complements, as in (28)–(29):

(28) He cried (lachrymal fluid) into his beer.

(29) He swallowed (saliva) nervously.

In addition, as observed by Ruppenhofer (2004: 372-375), almost any accomplishment verb in an iterated-event context allows an existential null complement, as in (30)–(32):

(30) The police only arrest \emptyset if there is a high-profile situation.

(31) You just take \emptyset and take \emptyset .

(32) She has never failed to impress \emptyset .

The problem of accounting for null complements as both a syntactic and interpretive affordance becomes all the more significant when we consider that even if one were to accept the RHL model of null instantiated verbal arguments, null complements of nouns, prepositions, adjectives, as in (33)–(35), would remain unaccounted for:

(33) I made a copy (of that).

(34) She walked out (of the room).

(35) I'm afraid (of that).

We will now look at how a construction-based model of null complementation circumvents the problems described above. Instead of defining a class of ‘structurally intransitive’ verbs, the constructionist model I have in mind posits a Null-Complementation Construction. This construction licenses a lexeme whose ARG-ST list contains one more sign than its VAL list does. That is, one of the arguments on the ARG-ST list lacks a corresponding valence member. Among the frames in the FRAMES list of this lexeme is a quantifier frame, which represents the construal (existential or anaphoric) of the missing valence member. The null-complementation construction is a type of derivational construction, i.e. one whose mother and daughters are all feature structures of type *lexeme* (Sag this volume). The null-complementation construction builds a lexeme with a covert valence member from a lexeme with an optionally covert valence member.

As a result of this construction, we have two kinds of lexemes for a word like *eat*: one where both arguments are overt and the semantics is unrestricted, as shown in (36); another where the second argument is covert and the semantics is restricted as shown in (37):

(36)

| | |
|--------|---|
| FORM | $\langle eat \rangle$ |
| ARG-ST | $\langle NP_i, NP_x \rangle$ |
| SYN | $\left[VAL \langle NP[overt]_i, NP[overt]_x \rangle \right]$ |
| SEM | FRAMES $\left\langle \left[\begin{array}{l} eat-fr \\ EATER \quad i \\ FOOD \quad x \end{array} \right] \right\rangle$ |

(37)

| | |
|--------|--|
| FORM | $\langle eat \rangle$ |
| ARG-ST | $\langle NP_i, NP[ini]_x \rangle$ |
| SYN | $\left[VAL \langle NP[overt]_i \rangle \right]$ |
| SEM | FRAMES $\left\langle \left[\begin{array}{l} eat-fr \\ EATER \quad i \\ FOOD \quad x \end{array} \right], \left[\begin{array}{l} timed-meal-fr \\ ENTITY \quad x \end{array} \right], \left[\begin{array}{l} exist-fr \\ BV \quad x \end{array} \right] \right\rangle$ |

Because the VAL list of (36) includes both the subject and the direct object, words realizing this lexeme will have to combine with an NP complement to construct a VP. By contrast, words realizing (37) cannot combine with any object NP. Thus the affordance made available through application of the Null-Complementation Construction is what ensures that a sentence like (38) must have the indefinite interpretation:

(38) I've eaten \emptyset .

Sentence (38) means something like 'I've eaten some food at a canonical meal time' rather than 'I've eaten that food at a canonical meal time'.⁹ Described in procedural terms, the Null-Complementation Construction ultimately licenses the lexeme in (38), where the food argument is missing from the verb's VAL list but remains part of its FRAMES list, where it is the bound variable of an existential quantifier. It is important to note, however, that while the mother and daughter lexemes have distinct VAL lists, they have the same ARG-ST list: the food participant appears on the ARG-ST list of the MTR lexeme even though it does not appear on the MTR lexeme's VAL list. As a result, the food argument can be a 'controller' of a secondary predicate in contexts like (39)–(40):

(39) Her dog eats \emptyset from a china bowl.

(40) Eat \emptyset chilled.¹⁰

In both (39) and (40), the food argument is covert (i.e. missing from the verb's VAL list), but it nevertheless shares its referential index with the argument of a nonverbal predicate – the PP *from a china bowl* in (39) and the AP *chilled* in (40). This type of coindexation is referred to as coinstantiation in the CxG tradition. Coinstantiation lexemes are described by the type constraint in (41):¹¹

$$(41) \text{ coin-lexeme} \Rightarrow \left[\begin{array}{l} \text{lexeme} \\ \text{ARG-ST} \quad \langle \dots, XP_i, \dots [\text{VAL} \langle Y_i \rangle] \rangle \end{array} \right]$$

The lexeme *eat* can satisfy the constraint in (41) because its ARG-ST list is the same whether it has an overt or covert second argument. Additional null-

⁹The 'canonical meal time' implication associated with null-complement predications like (38) is captured by the specifics of the Null-Complementation Construction. In fact, this construction schematizes across the various patterns of null complementation discussed by Fillmore (1986).

¹⁰The fact that such predications are limited to recipe contexts, as described by Culy (1996) and Bender (1999), does not detract from the main point here: the null-instantiated 'food' argument must be construed as the argument of the secondary predicate.

¹¹The type constraint in (41) has been simplified for expository purposes. While only lexical items have the feature ARG-ST, coinstantiation constructions commonly contain phrasal secondary predicates.

complementation constructions are required to account for the fact that null-complementation restrictions on verbs can be overridden in certain contexts. As already mentioned, patient arguments of accomplishment verbs are not generally subject to null instantiation. For example, sentences like (42)–(44) sound awkward:

(42) The police arrested *(someone) last night.

(43) Sam took *(something) without permission.

(44) I just impressed *(someone)!

However, as observed by Goldberg (2005), accomplishment verbs that do not allow unexpressed patient arguments in episodic contexts invariably allow them in habitual-generic predications and existential-perfect predications. This is shown by (45)–(47), repeated from (30)–(32) above:

(45) The police only arrest \emptyset if there is a high-profile situation.

(46) You just take \emptyset and take \emptyset .

(47) She has never failed to impress \emptyset .

The contexts illustrated here map neatly to constructions – the (inflectional) Habitual Present-Tense Construction in (45)–(47) and the (derivational) Perfect-Participle Construction in (47).¹² Let us presume that the MTR lexemes of these constructions resemble the lexeme daughter *eat* in the derivational construct shown in Figure 8, in that the second valence member has the type (*ini*). This means that constructions like the Habitual-Present Tense Construction can ‘feed’ the Null-Complementation Construction, thus licensing null-object *arrest* and null-object *take* in (45)–(46), respectively.

Weird Sisterhood

Many verb frames specify sisterhood relations that are not predicted by the general-purpose constituency rules that are usually assumed to combine heads and complements and heads and specifiers.¹³ Many of these patterns have

¹²The perfect participle produced by this derivational construction heads the second valence member of the *have* auxiliary; it is only the combination of *have* auxiliary and perfect participle that produces the complex of semantic, pragmatic and semantic properties identified with the ‘perfect construction’ in works like Michaelis 2004. However, the null-complementation affordance exemplified in (47) is ultimately attributable to the participial lexeme, where it is represented as a sign type of a valence member, in accordance with the analysis described in this section.

¹³One should note that the phrase-structure rules of HPSG do not specify the nature of complements or specifiers, leaving this to the valence specifications of the head. Therefore, in HPSG,

specialized communicative functions. A look at these phenomena suggests that highly detailed constructions, rather than non-category-specific phrase-structure rules, pair predicates and their complements. In this section, we will look at two cases of weird sisterhood: Nominal Extraposition and *Just Because*. In Nominal Extraposition (Michaelis and Lambrecht 1996), an exclamatory adjective, e.g. *amazing*, licenses an NP complement:

(48) I know it's just it's unbelievable the different things that are happening in America today.

(49) I'll date myself a little bit but it it's remarkable the number of those things they need.

(50) I know. I love that game. It's amazing the words they come up with.

The pattern exemplified in (48)–(50) is idiosyncratic in two respects. First, adjectives are not case assigners and should not therefore license nonoblique NP complements. Second, this NP complement is interpreted as denoting a scalar degree (Michaelis and Lambrecht 1996). In (50), for example, the NP *the words they come up with* stands in for a scalar expression like *the number of words they come up with*; that is, it is not the words themselves but their numerousness that is deemed remarkable. The fact that the complement of *amazing* in (50) has a scalar interpretation follows from the fact that (50) is an exclamation,¹⁴ but the pairing of an exclamatory adjective with an NP sister that denotes a degree, metonymically or otherwise, requires a construction that provides for this syntax and this meaning.

In the *Just Because* construction, a negated epistemic verb, typically *mean*, license a finite clause subject introduced by *just because* (Bender and Kathol 2001):

(51) Just because they use primitive means of doing things does not mean that they can't expand.

(52) Just because they say it doesn't mean that's the only way to look at it.

Clausal subjects are ordinarily introduced by *that*, not a subordinating conjunction like *because*, so we cannot use the general-purpose constituency rule

there is nothing more than unusual lexical properties at stake in cases of weird sisterhood. Weird sisterhood is, however, problematic for syntactic theories built on \bar{X} templates, in which constraints on complements are built into phrase-structure rules.

¹⁴While examples like *Boy is he ever dead!* might seem to undermine the claim that exclamations are intrinsically scalar, such examples can be regarded as cases of coercion, in which a nonscalar property (being dead) is interpreted as a scalar one (offering exceedingly clear evidence of demise) in an exclamative construct.

that pairs a specifier with a head to account for the pattern in (51)–(52). Instead, as Bender and Kathol argue, the grammar of English must contain an argument-structure construction that allows the verb *mean*, when negated, to license a clausal subject introduced by *just because*.

2.4.3 Core and Periphery Are Interleaved During Production

A final argument for a constructional approach comes from the fact that stretches of speech licensed by idiomatic constructions can contain within them stretches licensed by ‘regular rules’ and vice versa. To illustrate this point, let us consider the following example:

(53) A politician pull the leg of a philosopher? No way.

Sentence (53) is an example of the Incredulity Response (IR) Construction. According to Lambrecht (1990), the IR construction consists of a property predicate (e.g. *pull the leg of a philosopher*), an entity (e.g. *a politician*), and an expression of incredulity concerning the entity’s membership in the class of individuals named by the property predicate. Formally, the Entity is expressed by a NP and the predicate by a nonfinite VP or other XP. IR qualifies as a topic-comment construction: the entity and predicate are detached topics. The NP and XP are distinct intonation units and can be reordered with respect to one another, as in (54):

(54) Pull the leg of a philosopher? A politician?

Further, coterminous with the syntactically transparent VP *pull the leg of a philosopher*, we find the VP idiom *pull the leg of a philosopher*, licensed by the idiomatic *pull-someone’s-leg* construction (or listeme). Going further inside the NP *the leg of a philosopher*, which is licensed by the idiomatic *pull someone’s leg* construction, we find the transparent genitive PP *of a philosopher*. Thus, it is unlikely that grammar consists of a set of productive rules, a lexicon and a collection of frozen phrasal idioms. Instead, these ‘modules’ are permeable. Admittedly, modularity of grammar does not entail modularity of processing: a modular theory of grammar can nonetheless allow for interactions between the modules. But constructionist theories make this interaction particularly seamless by providing a single representational format for productive processes, tightly bound idioms, and everything in between.

2.5 Falsehoods

In this section, I will outline rebuttals to six major myths about CxG. The myths are as follows:

- CxG is nonrigorous.
- CxG does not offer generalizations.

- CxG is obsessed with linguistic marginalia.
- CxG is opposed to compositional semantics.
- CxG is not constrained.
- CxG does not provide a universal framework for syntax.

2.5.1 CxG Is Anti-formal And Therefore Nonrigorous

Not all work in CxG is formal, nor should it be. Without descriptive work, there would be nothing to formalize. But CxG also provides tools for formalists. In SBCG, as discussed, the basic units of grammatical description are signs (licensed either by lexical entry or construction). The grammar comprises a set of lexical entries and a set of constructions, structured by a type hierarchy.

2.5.2 CxG Does Not Offer Generalizations

It is widely acknowledged that construction-based generative syntax was a failure. Thus, the reasoning goes, there is no reason to believe it should work now. Admittedly, construction-based transformational grammar lacked cross-constructional generalizations. ~~As Ginzburg and Sag point out (2000: 4), each~~ movement rule specified the same operation operating over the same unbounded context as every other such transformation. But construction-based transformational grammar lacked generalizations over patterns because it modeled patterns (e.g. relative clauses, *wh*-questions, topicalization) as recursive processes rather than as constraints licensing classes of linguistic objects. Transformational grammar was designed primarily to represent relationships between tree structures, and tree structures are not in grammar. In SBCG, the objects of directly described by grammars include local trees (constructs). Local trees are modeled by feature structures in the manner described above, and the types that define classes of local trees can be organized taxonomically, thus yielding statements about the properties shared by multiple classes. These generalizations include statements about the properties that *wh*-questions and *wh*-exclamatives share (Sag 2010). While proponents of the Principles and Parameters approach, which relegates constructions of the latter type to the ‘periphery’, would be unlikely to make such generalizations, this does not detract from their validity or usefulness.

2.5.3 CxG Is A Theory Of Trivial Constructions

According to this myth, CxG is useful only for the description of minor linguistic patterns. Indeed, constructionists have favored the case-study format and they have focused on idiomatic patterns. But it is important to understand why. CxG case studies are designed to show, through detailed analysis of partially productive phrasal patterns, precisely where general-purpose semantic and syntactic constraints fail, and to demonstrate the advantages of an

alternative framework that relates the idiomatic patterns to the general ones through constraint inheritance. Kay's 2002 analysis of subjectless tagged sentences (e.g. *Fooled you, didn't I?*) exemplifies this mode of argumentation. After ruling out an analysis based on verb-phrase fronting, Kay proceeds to show that the covert subjects of subjectless tagged sentences cannot be identified with any of the empty categories proposed to account for sentence-initial missing subjects (e.g. *diary subjects*) in the generative-transformational literature. He then concludes that subjectless tagged sentences are a subtype of tagged sentence, as reflected in shared syntactic, intonational and interpretative behaviors. Kay's account captures shared properties at multiple levels: properties of all headed constructions, properties of all clauses, properties of all tagged sentences and properties of each particular kind of tagged sentence. The point of this and other works in the constructionist tradition is that a general-purpose syntactic theory can accommodate idiosyncratic properties of constructions (by means of construction-specific constraints that must be satisfied along with the more general requirements of their dominating super-types) and that it must do so in order to achieve observational adequacy.

2.5.4 CxG is Opposed to Compositional Semantics

In allowing constructions to specify, when necessary, the idiomatic nature of the mother's meaning, CxG indeed allows conceptual content to come from outside the lexicon, thus violating the doctrine of syntactically transparent composition as described by Jackendoff (1997). According to this doctrine, '[a]ll elements of content in the meaning of a sentence are found in the lexical conceptual structures [...] of the lexical items composing the sentence'. While syntactic rules combine words and their dependent elements into phrases, they cannot add conceptual content to that contributed by the words (Jackendoff 1997: 48). But, as discussed in section 2.4.1, strict composition may not be tenable anyway. We observed there that, according to Szabó's (2007) definition of semantic composition, a compositional language does not contain any paired non-synonymous phrases with identical hierarchical structure and pairwise synonymous constituents. If this definition is valid, however, either English is noncompositional or any phrase with both idiomatic and composed readings (e.g. *spill the beans*) has two different syntactic analyses. This is, to say the least, an undesirable result. For constructionists, however, each of the two meanings (literal and idiomatic) is licensed by a distinct combination of constructions (one of which contains an idiomatic 'listeme'). Construction-based grammars are therefore intuitively compositional: if you know the meanings of the words and all the rules that combine words and phrases into larger formal units, then you know the meanings of all the larger units.

More generally, we can note that Frege's Principle of Compositionality

is stated broadly enough to give constructional meaning a role in composition. According to Linnebo's (2004) translation, Frege's principle states: 'the meaning of a complex expression is determined by the meanings of its constituent parts, *in accordance with their syntactic combination*' (emphasis mine). If, as we presume, rules of syntactic combination are constructions, constructional meaning is 'compositional'.

2.5.5 CxG Is Not Constrained

One of the most common criticisms of CxG is that it is unconstrained, insofar as 'anything can be a construction'. This criticism, unfortunately, reflects a methodological confusion that is pervasive in the field of linguistics. A theory must be distinguished from the general framework it is couched in and from the formalism the framework is expressed in. When seeking explanations for why a given theory is true, one can explore many options, as cognitive linguists have indeed. In the case of language, these include functional, communicative, historical, and cognitive considerations of various kinds. But no physicist would make mistake of appealing to the expressive power of the formalism in which she states her equations as an explanation for why the physical universe is the way it is. No cognitive scientist should make such a mistake, either.¹⁵

2.5.6 CxG Does Not Provide A Universal Framework For Syntax

One of the most pernicious myths about CxG is that it is anti-universalist. In fact, SBCG contains principles that are readily interpreted as universals, including the Sign Principle and the Head-Feature Principle (Sag this volume). And SBCG does not sacrifice descriptive precision in its quest for universal principles: SBCG type hierarchies allow for both potentially universal constraints on constructions and entrenched exemplars of particular constructions. At the same time, constructionists should reserve the right to be choosy about their universals. As Evans and Levinson (2009) observe, while there are major recurrent patterns of grammatical organization across languages, these are best described as adaptive solutions that reflect both cognitive constraints and cultural-historical factors (see also Croft 2001). Further, many putatively universal constraints on grammatical architecture, in particular those advanced within the Principles and Parameters (P&P) approach, appear to be based on circular reasoning, as illustrated by the following quote:

The history of syntactic investigation is marked by a small number of central discoveries which created the syntactician's research agenda. One can divide these discoveries into two groups: the discovery of hierarchical constituent structure, and the discovery that elements may occupy more than one position within this hierarchy, which the literature calls movement. (Pesetsky 1997: 134)

¹⁵For further discussion of this point, see Pollard 1996.

The two ‘discoveries’ referenced in the above passage are in fact simply mutually reinforcing assumptions. The need to capture relationships between constructions by relating them transformationally comes from the assumption that syntax is autonomous, which in turn requires that semantic properties play no role in syntactic generalizations. The result is that the syntactician does not relate two constructions (e.g. the passive and active argument-structures) by describing them as alternate syntactic realizations of a given semantic role. Instead, she or he uses procedures to change the position of a given syntactic constituent in hierarchical syntactic structure. And of course transformations are what make it possible to maintain that all languages have hierarchical constituent structure (and that this structure underlies the assignment of morphological case, among other things): in free-word order languages, the lack of observable constituent structure is attributed to permutations called ‘scrambling’. Certainly, Transformational Grammar captured discontinuous dependencies (like complement extraposition) that could not be described by immediate-constituent analysis, as practiced within the then-dominant American structuralist paradigm. But this does not prove that grammar involves movement rules. One need only consult works like Sag’s (2010) analysis of filler-gap constructions and Kay and Sag’s (2009, this volume) analysis of degree-word syntax to see that discontinuous dependencies can be described in a static grammar model based on the combinatoric properties of words and phrases.

Because they rest on theory-particular assumptions like the autonomy thesis, most P&P principles are immune to refutation. The same cannot be said of P&P parameters, which are vulnerable to construction-based counterarguments. Pullum and Zwicky (1991) show, for example, that the prohibition against double-*ing* sequences in English (e.g. **stopping walking*) is not a ‘transconstructional filter’ but a constraint on a single constituency-defining rule. In addition, as Van Valin and LaPolla (1997: Chapter 6) have argued, the patterns of semantic-role neutralization and restriction that define syntactically privileged arguments (e.g. covert arguments in control constructions, controllers of reflexive pronouns) vary not merely from language to language but also from construction to construction within a given language. The English imperative construction (e.g. *Hurry up!*) provides an illustration. The covert addressee argument cannot be identified with ‘subject’, because it represents a more semantically restrictive category than subject: it is necessarily an agentive argument, as shown by the fact that imperatives like *Fall down!* and *Reach the summit!* are anomalous unless their covert arguments are construed agentively via coercion. The pattern of semantic restriction that defines the imperative’s covert argument in fact resembles that identified in the constructions of ‘Split S’ languages like Lakhota. In general, it appears that phenomena traditionally taken as evidence of nominative-accusative or

ergative-absolutive ‘undercurrents’ in a given language are more accurately viewed as effects of construction-particular argument-selection patterns. Such phenomena therefore need not be taken as evidence of instability in a grammatical system, since they are natural consequences of construction-particular constraints. The moral of the story is that syntactic generalizations are not as general as proponents of the P&P framework have led us to believe.

2.6 Conclusion

One measure of the influence of generative-transformational grammar is the fact that even syntacticians who reject its current representational practices (e.g. treating inflectional markers like tense and agreement as the heads of ‘functional’ phrases), and/or its vision of grammar as a set of modules that pass information to one another during a derivation, often proceed by one or more of its core assumptions, e.g. that phrase markers contain ‘empty categories’, that idioms are not part of grammar or that different patterns of argument realization are related to one another by movement rules. Thus, for example, Heine and Kuteva (2007), despite embracing a gradualist theory of grammar evolution at odds with the ‘leap’ model endorsed by many generative-transformational grammarians (see, e.g. Bickerton 1998), evoke the generative-transformational paradigm when they discuss the evolution of ‘syntactic displacement’, which they define as ‘the ability to move constituents from their natural argument positions and place them in other slots in the sentence’ (Heine and Kuteva 2007: 12).

Grammarians are unlikely to shed such practices until they find a system of formal notation as closely connected to a theory of language as is generative-transformational grammar. SBCG is such a system. Its leading insight, simply put, is that the lexicon provides a model for the syntax-semantics interface. Lexical-class constructions, which define classes of lexemes or words, and combinatoric constructions, which define classes of phrases, are both constraints on feature structures. In phrasal constructions, a list-valued feature of the mother is used to represent the property of having the daughters it does. Further, the constructions that embody derivational and inflectional processes are not distinct in kind from the constructions that build phrases. Thus, rather than seeing syntax, semantics, word and lexicon as independent modules, with the lexicon characterized as a bag of idiosyncratic form-meaning pairings, SBCG proposes a lexicon structured by hierarchically organized lexical classes and extends this model to relations among phrasal classes.

In addition to sharing taxonomic organization, words and constructions have similar ways of meaning. Like words, constructions may invoke semantic, pragmatic and phonological conditions simultaneously. As an example of an idiomatic pattern with highly particular intonational phonology, consider

the exclamatory construction that Michaelis and Lambrecht (1996) refer to as the Antitopic Exclamative. In this construction, a preclausal interjection receives prosodic prominence and the following clause receives the intonational contour of a right-dislocated phrase, as in, e.g. GOD *it's hot!*, MAN *I'm tired!*, DAMN *you're good!*. The point here is that, as Croft and Cruse (2002: 247) put it, '[c]onstructions, like the lexical items in the lexicon, are 'vertical' structures that combine syntactic, semantic and even phonological information (for the specific words in a construction), as well as any unique prosodic features that may be associated with a construction'. The more general point, as expressed by Culicover and Jackendoff (2005: 15) is that '[t]here is a continuum of grammatical phenomena from idiosyncratic (including words) to general rules of grammar'.

References

- Aissen, J. 1999. Agent Focus and Inverse in Tzotzil. *Language* 75: 451-485.
- Baldwin, T., J. Beavers, E. M. Bender, D. Flickinger, A. Kim and S. Oepen. 2004. Beauty and the Beast: What Running a Broad-coverage Precision Grammar over the BNC taught us about the Grammar – and the Corpus. *Proceedings of the International Conference on Linguistic Evidence: Empirical, Theoretical, and Computational Perspectives*. Tübingen, Germany.
- Bender, E. 1999. Constituting Context: Null Objects in English Recipes Revisited. *Proceedings of the Twenty-Third Annual Penn Linguistics Colloquium, University of Pennsylvania Working Papers in Linguistics*, eds. J. Alexander, Na-Rae Han, and M. Minnick Fox. 53-66.
- Bender, E. and A. Kathol. 2001. Constructional Effects of *Just Because... doesn't Mean...*. Paper presented at the Twenty-Seventh Annual Meeting of the Berkeley Linguistics Society. Berkeley, CA.
- Bencini, G. and V. Valian, 2008. Abstract Sentence Representation in Three-Year-Olds: Evidence from Comprehension and Production. *Journal of Memory and Language* 59: 97-113.
- Bickerton, D. 1998. Catastrophic Evolution: The Case for a Single Step from Protolanguage to Full Human Language. *Approaches to the Evolution of Language*, eds. J. Hurford, M. Studdert-Kennedy and C. Knight, 341-358. Cambridge: Cambridge University Press.
- Boas, H. 2003. *A Constructional Approach to Resultatives*. Stanford: CSLI Publications.
- Boyd, J., E. Gottschalk and A. Goldberg. 2009. Linking Rule Acquisition in Novel Phrasal Constructions. *Language Learning* 93: 418-429.

- Brenier, J. and L. Michaelis. 2005. Optimization via Syntactic Amalgam: Syntax- Prosody Mismatch and Copula Doubling. *Corpus Linguistics and Linguistic Theory* 1: 45-88.
- Bybee, J. 2001. *Phonology and Language Use*. Oxford: Oxford University Press.
- Bybee, J. 2007. *Frequency of Use and the Organization of Language*. Oxford: Oxford University Press.
- Chomsky, N. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.
- Chomsky, N. 1989. Some Notes on Economy of Derivation and Representation. *MIT Working Papers in Linguistics* 10: 43-74.
- Chomsky, N. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
- Croft, W. 2001. *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Oxford: Oxford University Press.
- Croft, W. and D. A. Cruse. 2002. *Cognitive Grammar*. Cambridge: Cambridge University Press.
- Culicover, P. and R. Jackendoff. 2005. *Simpler Syntax*. Oxford: Oxford University Press.
- Culy, C. 1996. Null objects in English recipes. *Language Variation and Change* 8: 91-124.
- Diessel, H. and M. Tomasello. 2000. The Development of Relative Clauses in Spontaneous Child Speech. *Cognitive Linguistics* 11: 131-51.
- Duffield, J. and L. Michaelis. 2009. Why Subject Relatives Prevail. Paper presented at the Annual Meeting of the Linguistics Society of America. San Francisco, CA. January 2009.
- Evans, N. and S. Levinson. 2009. The Myth of Language Universals: Language Diversity and its Importance for Cognitive Science. *Brain and Behavioral Sciences* 32: 429-492.
- Feldman, J. 2006. *From Molecule to Metaphor: A Neural Theory of Language*. Cambridge, MA: MIT Press.
- Fenstad, J., Halvorsen, P.-K., Langholm, T. and Van Benthem, J. 1987. *Situations, Language and Logic*. Dordrecht: Reidel.
- Fillmore, C. J. 1986. Pragmatically Controlled Zero Anaphora. *Berkeley Linguistics Society Proceedings* 12: 95-107.
- Fillmore, C. J. and P. Kay. 1995. *Construction Grammar Coursebook*. Unpublished ms., Department of Linguistics, University of California, Berkeley.
- Fillmore, C. J., P. Kay and M. C. O'Connor. 1988. Regularity and Idiomaticity in Grammatical Constructions: The Case of *Let Alone*. *Language* 64: 501-538.

- Fillmore, C. J., R. Lee-Goldman and R. Rhodes. this volume. SBCG and the Frame- Net Constructicon.
- Flickinger, D. P. 2000. On Building a More Efficient Grammar by Exploiting Types. *Natural Language Engineering* 6(1): 15-28.
- Fox, B. and S. Thompson. 1990. A Discourse Explanation for the Grammar of Relative Clauses in English Conversation. *Language* 66: 297-316.
- Gahl, S. 2002. The Role of Lexical Biases in Aphasic Sentence Comprehension. *Aphasiology* 16: 1173-1198.
- Gazdar, G., E. Klein, G. Pullum and I. A. Sag. 1985. *Generalized Phrase Structure Grammar*. Oxford: Blackwell and Cambridge, MA: Harvard University Press.
- Geisler, C. 1998. Infinitival Relative Clauses in Spoken Discourse. *Language Variation and Change* 10: 23-41.
- Goldberg, A. 1995. *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.
- Goldberg, A. 2005. Constructions, Lexical Semantics and the Correspondence Principle: Accounting for Generalizations and Subregularities in the Realization of Arguments. *The Syntax of Aspect*, eds. N. Erteschik-Shir and T. Rapoport, 212- 236. Oxford: Oxford University Press
- Goldberg, A. 2006. *Constructions at Work*. Oxford: Oxford University Press.
- Goldberg, A. and G. Bencini. 2005. Support from Processing for a Constructional Approach to Grammar. *Language in Use: Cognitive and Discourse Perspectives on Language and Language Learning*, eds. A. Tyler, M. Takada, Y. Kim, and D. Marinova, 3-18. Washington, DC: Georgetown University Press..
- Hawkins, J. 1999. Processing Complexity and Filler-Gap Dependencies across Grammars. *Language* 75: 244-285.
- Hawkins, J. 2004. *Efficiency and Complexity in Grammars*. Oxford: Oxford University Press.
- Heine, B. and T. Kuteva. 2007. *The Genesis of Grammar*. Oxford: Oxford University Press.
- Homer, K. 2000. *A Discourse Constraint on Subject Information Questions*. Unpublished doctoral dissertation, Department of Linguistics, University of Colorado at Boulder.
- Jackendoff, R. 1997. *The Architecture of the Language Faculty*. Cambridge, MA: MIT Press.
- Jackendoff, R. 1999. Possible Stages in the Evolution of the Language Capacity. *Trends in the Cognitive Sciences* 3: 272-279.

- Jackendoff, R. 2002. *Foundations of Language: Brain, Meaning, Grammar, Evolution*. Oxford: Oxford University Press.
- Kaschak, M. and A. Glenberg. 2000. Constructing Meaning: The Role of Affordances and Grammatical Constructions in Language Comprehension. *Journal of Memory and Language* 43: 508-529.
- Kay, P. 2002. English Subjectless Tag Sentences. *Language* 78: 453-81.
- Kay, P. and C. J. Fillmore. 1999. Grammatical Constructions and Linguistic Generalizations: The 'what's X doing Y' Construction. *Language* 75: 1-33.
- Kay, P. and L. Michaelis. forthcoming. Constructional Meaning and Compositionality. *Semantics: An International Handbook of Natural Language Meaning*, eds. C. Maienborn, K. von Stechow and P. Portner. Berlin: Mouton de Gruyter.
- Kay, P. and I. A. Sag. 2009. How Hard a Problem would this be to Solve?. *Proceedings of the 16th Conference on Head-Driven Phrase Structure Grammar*, ed. S. Müller, pp. 171-191. Stanford: CSLI Publications. Available online at <http://csli-publications.stanford.edu/HPSG/10/>.
- Kay, P. and I. A. Sag. this volume. Discontinuous Dependencies and Complex Determiners.
- Keenan, E. and B. Comrie 1977. Noun Phrase Accessibility and Universal Grammar. *Linguistic Inquiry* 8: 63-69.
- Lakoff, G. 1987. *Women, Fire and Dangerous Things: What Categories Reveal about the Mind*. Chicago: University of Chicago Press.
- Lambrecht, K. 1987. Presentational Cleft Constructions in Spoken French. *Clause Combining in Grammar and Discourse*, eds. J. Haiman and S. Thompson, 135- 179. Amsterdam: John Benjamins.
- Lambrecht, K. 1988. There was a Farmer had a Dog: Syntactic Amalgams Revisited. *Berkeley Linguistics Society Proceedings* 14: 319-339.
- Lambrecht, K. 1990. What, me, worry? Mad magazine sentences revisited. *Berkeley Linguistics Society Proceedings* 16: 215-228.
- Lambrecht, K. 2002. Topic, Focus, and Secondary Predication: The French Presentational Relative Construction. *Romance Languages and Linguistic Theory 2000*, eds. C. Beyssade, R. Bok-Bennema, F. Drijkoningen and P. Monachesi, 171-212. Amsterdam: Benjamins.
- Legendre, G., J. Grimshaw and S. Vikner, eds. 2000. *Optimality-Theoretic Syntax*. Cambridge, MA: MIT Press.
- Linnebo, Ø. 2004. Compositionality and Frege's Context Principle. Unpublished ms., University of Bristol.
- Mak, W., W. Vonk and H. Schriefers. 2008. Discourse Structure and Relative Clause Processing. *Memory and Cognition* 36: 170-181.

- Malouf, R. 2003. Cooperating Constructions. *Mismatch: Form-Function Incongruity and the Architecture of Grammar*, eds. E. Francis and L. Michaelis, 403-424. Stanford: CSLI Publications.
- McCawley, J. 1981. The Syntax and Semantics of English Relative Clauses. *Lingua* 53: 99-149.
- Michaelis, L. 2001. Exclamative Constructions. *Language Universals and Language Typology: An International Handbook*, eds. M. Haspelmath, E. König, W. Östereicher and W. Raible, 1038-1050. Berlin: Walter de Gruyter.
- Michaelis, L. 2004. Type Shifting in Construction Grammar: An Integrated Approach to Aspectual Coercion. *Cognitive Linguistics* 15: 1-67.
- Michaelis, L. and H. Francis. 2007. Lexical Subjects and the Conflation Strategy. *Topics in the Grammar-Pragmatics Interface: Papers in Honor of Jeanette K. Gundel*, eds. N. Hedberg and R. Zacharski, 19-48. Amsterdam: Benjamins.
- Michaelis, L. and K. Lambrecht. 1996. Toward a Construction-Based Model of Language Function: The Case of Nominal Extraposition. *Language* 72: 215-247.
- Michaelis, L. and J. Ruppenhofer. 2001. *Beyond Alternations: A Constructional Account of the Applicative Pattern in German*. Stanford: CSLI Publications.
- Mithun, M. 1991. The Role of Motivation in the Emergence of Grammatical Categories: The Grammaticization of Subjects. *Approaches to Grammaticalization*, vol 2, eds. E. C. Traugott and B. Heine, 159-184. Amsterdam: John Benjamins.
- Pesetsky, D. 1997. Optimality Theory and Syntax: Movement and Pronunciation. *Optimality Theory: An Overview*, eds. D. Archangeli and D.T. Langendoen, 134- 170. Oxford: Blackwell.
- Pollard, Carl J. 1996. The Nature of Constraint-Based Grammar. Paper presented at the Pacific Asia Conference on Language, Information, and Computation. Kyung Hee University, Seoul, Korea. Available at http://195.113.2.21/knihovna/pollard_talk1.pdf.
- Pollard, C. and I. A. Sag. 1987. *Information-based Syntax and Semantics*. Volume 1: Fundamentals. Stanford: CSLI Publications.
- Pollard, C. and I. A. Sag. 1994. *Head-Driven Phrase Structure Grammar*. Chicago: University of Chicago Press
- Pullum, G. and A. Zwicky. 1991. Condition Duplication, Paradigm Homonymy and Transconstructional Constraints. *Berkeley Linguistics Society Proceedings* 17: 252-266.
- Pinker, S. 1989. *Learnability and Cognition*. Cambridge, MA: MIT Press

- Rappaport Hovav, M. and B. Levin. 1998. Building Verb Meanings. *The Projection of Arguments*, eds. M. Butt and W. Geuder, 97-134. Stanford: CSLI Publications.
- Real, F. and M. Christiansen. 2007. Processing of Relative Clauses is Made Easier by Frequency of Occurrence. *Journal of Memory and Language* 53: 1-23.
- Ruppenhofer, J. 2004. *The Interaction of Valence and Information Structure*. Unpublished doctoral dissertation, Department of Linguistics, University of California, Berkeley.
- Sag, I. A. 2007. Remarks on Locality. *Proceedings of the HPSG07 Conference*, Stanford University, ed. S. Müller. Stanford: CSLI Publications.
- Sag, I. A. this volume. Sign-Based Construction Grammar: An Informal Synopsis.
- Sag, I. A. 2010. Feature Geometry and Predictions of Locality. *Features: Perspectives on a Key Notion in Linguistics*, eds. G. Corbett and A. Kibort. Oxford: Clarendon Press.
- Sag, I. A. 2010. English Filler-Gap Constructions. *Language*.
- Sag, I. A., Kaplan, R. M., Karttunen, L., Kay, M., Pollard, C., Shieber, S. and Zaenen, A. 1986. Unification and Grammatical Theory. In *Proceedings of the Fifth West Coast Conference on Formal Linguistics*, pp. 228–254, Stanford University: CSLI Publications/SLA.
- Sag, I. A. and Wasow, T. 2011. Performance-Compatible Competence Grammar. In K. Börjars and R. Borsley (eds.), *Constraints and Correspondences: New Models of Grammar*, Oxford: Blackwell.
- Sells, P. 2001. *Formal and Empirical Issues in Optimality Theoretic Syntax*. Stanford: CSLI Publications.
- Spivey, M. 2007. *The Continuity of Mind*. Oxford: Oxford University Press.
- Stefanowitsch, A. and S. Gries. 2005. Co-varying Collexemes. *Corpus Linguistics and Linguistic Theory* 1: 1-43.
- Steels, L. and J. de Beule. 2006. Unify and Merge in Fluid Construction Grammar. *Symbol Grounding and Beyond: Proceedings of the Third International Workshop on the Emergence and Evolution of Linguistic Communication*, eds. P. Vogt, Y. Sugita, E. Tuci and C. Nehaniv, 197-223. Berlin: Springer.
- Szabó, Z. 2007. Compositionality. *The Stanford Encyclopedia of Philosophy*, Spring 2007 edition, ed. E. Zalta. <http://plato.stanford.edu/archives/spr2007/entries/compositionality/>
- Tomasello, M. 2003. *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.

- Traxler, M., R. Morris and R. Seely. 2002. Processing Subject and Object Relative clauses: Evidence from Eye Movements. *Journal of Memory and Language* 47: 69-90.
- Van Valin, R. and R. LaPolla. 1997. *Syntax*. Cambridge: Cambridge University Press.
- Zwicky, A. 1994. Dealing out Meaning: Fundamentals of Grammatical Constructions. *Berkeley Linguistics Society Proceedings* 20: 611-25.