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Sign-Based Construction Grammar

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Biography

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Abstract

In Construction Grammar, rules of syntactic combination (descriptions of local trees, e.g., a verb phrase and its daughters) have meanings. These meanings are represented by syntactic, semantic and usage features that attach to the mother or daughter nodes in these trees (Sag 2007, 2008). A construction defines the distinctive properties of a mode of combination that is part of the grammar of a language. More specifically, a construction is a description of *construct*, a combination of a mother node and one or more daughter nodes. The nodes of the trees in such descriptions are not category labels, as in traditional phrase-structure grammar, but feature structures, known as *signs*. Signs include not only phrases but also words and lexemes. I describe Sign-Based Construction Grammar (SBCG), a formal implementation of Construction Grammar based on representational locality. According to the locality constraint, all of the details needed to construct a construct from a construction are to be found in the mother sign, which has not daughters but a daughters *feature*. In SBCG, grammar is viewed, not as a set of abstract constraints, but as a type hierarchy of constructions of varying levels of specificity. I review four sets of linguistic facts that provide evidence for this conception of grammar. First, constructions license arguments and syntactic sisterhood relations (Section 3). Second, there is a continuum of idiomaticity (Section 4). Third, core constructions and peripheral constructions are interleaved during production (Section 5). Fourth, constructions exhibit formal and semantic commonalities that cannot be described in procedural terms (Section 6). A concluding section addresses the question of whether construction-based grammar provides a universal framework for syntax.

1. Introduction

To practice Construction Grammar is to accept a proposition that is anathema to most linguists, whether they be 'formalists' or 'functionalists': many, if not most, of the grammatical facts that people appear to know cannot be resolved into general principles—whether these concern semantics, information processing or conversational practice—but must instead be stipulated. This stipulation takes the form of a grammatical construction. Grammatical constructions are recipes for word combination that speakers use to achieve specific communicative goals, e.g., issuing an order, requesting information, attributing a property to an entity. Constructions determine the linear order of the words—as the English verb-phrase construction requires the direct object to follow the verb—and the forms of the words, as the comparable Latin construction requires its direct object to have an accusative case-ending. A construction cannot be pronounced, but like a word, it is a conventionalized pairing of form and meaning (Fillmore et al. 2008, Goldberg 1995, Michaelis & Lambrecht 1996, Croft 2001). In viewing syntactic patterns as meaningful, Construction Grammar represents a significant departure from phrase-structure-based theories of grammar. In standard generative theory, rules of grammar create word combinations that express composite concepts like predicates and propositions, but these rules do not add any meaning to that contributed by the individual words. Thus, on the standard view of syntax, phrases have meaning but the rules that create phrases do not. On the constructionist view, phrasal patterns not only have meanings but also have the capacity to change the meanings of the words that they group together. In fact, such shifts constitute one of our major lines of evidence for the existence of constructions (Michaelis 2004). As a simple example, consider the rare but attested denominal verb *sister*, as in *We sistered the joints*. In this context the word has a causative interpretation ('cause two things to be sisters'). Fully understanding the meaning of this word in this sentence requires knowledge of the noun *sister*, an image-based metaphorical mapping and perhaps some background in carpentry, but the interpretive affordance that this word represents is ultimately a product of the transitive VP pattern.

What does it take to demonstrate that the grammar must contain a particular construction (e.g., the transitive VP)? One need only show that independently motivated principles fail to predict all of the facts about the use, internal composition, combinatoric potential or meaning of the pattern under study. It could thus be said that constructionists enjoy a lower burden of proof than other syntacticians: like a defense attorney, a construction grammarian need only cast reasonable doubt on the opponent's theory of the case, however coherent and compelling it may be, to win. But what in fact does the constructionist win? Construction-based syntax, at least as practiced in the 60s and 70s, is widely regarded as a failed experiment:

> Although syntactic work within the transformationalist tradition frequently uses the term descriptively, '(grammatical) construction' has been a theoretical taboo at least since the 1980s. Briefly, Chomsky argued that transformations like `passive' and `raising', common in earlier versions of transformational grammar, could be eliminated in favor of general conditions on structures that would allow a single operation—Move NP—to do the work of a family of such transformations. This has guided the

> subsequent evolution of transformational analysis where one now finds discussion of even more general operations, such as 'Move α' or 'Move'. This evolution has tended to move away from construction-specific proposals toward a discussion focused almost exclusively on general principles from which the idiosyncrasies of individual constructions are supposed to be derived. (Ginzburg and Sag 2004: 4)

Certainly, construction-based transformational grammars lacked a satisfying way to express cross-constructional generalizations: for example, each unbounded movement transformation specified the same movement operation operating over the same unbounded context as every other such transformation. But this was so precisely because transformation grammar did not treat grammatical patterns, like relative clauses, information questions and topicalization, as part of grammar. Transformational grammar was designed to represent one type of relationship—that between tree structures—and tree structures are not in grammar. Instead, they are created online through recursive application of phrase-structure rules. The recognition that many transformations, including 'dative movement' and passive, are 'lexically triggered' (restricted to certain classes of lexical items) caused proponents to replace a number of transformations with lexical rules, which place lexical entries into correspondence. But neither lexical rules nor transformations could do their work without a considerable number of provisos, necessary to account for both lexical exceptions and pieces of structure that transformations had to introduce. As an example of a lexical exception, consider those verbs like *ask*, which, while welcoming the ditransitive frame as in (1), do not occur in the putative input frame, the oblique-goal pattern, as in (2):

(1) They asked me a question
(2) *They asked a question to me.

As an example of a structure-adding transformation, consider the passive-voice transformation, whose input and output structures are exemplified in (3-4), respectively:

(3) The committee discussed the proposal.
(4) The proposal was discussed by the committee.

Here is passive, as described by Ginzburg & Sag (2000):

> [As] noted by McCawley (1988) in his review of Chomsky (1986), Chomsky's discussion of the passive construction did not touch on crucial issues like the relevant verb morphology, the choice of the preposition *by*, and the role of the verb *be*. As McCawley pointed out, these properties of the construction followed from nothing under Chomsky's proposals. Rather, they would have to be stated in a fashion that would render Chomsky's proposal comparably stipulative to the alternative it sought to replace (Ginzburg & Sag 2000: 4).

If stipulation is required anyway, the reasoning goes, there is no reason to retain transformations and other mapping procedures, and a good reason to eliminate them: since procedures are not grammar objects, they have no ontology. Constructions, by contrast, are objects (or, more accurately, descriptions of objects); as such, they are subject to typing and taxonomic organization. The idea that syntactic rules can be made

amenable to taxonomic organization—an idea that links Construction Grammar to an allied theory, Head-Driven Phrase-Structure Grammar (Sag et al. 2003)—has been central to Construction Grammar argumentation from its earliest incarnations (Fillmore et al. 1988 and Lakoff 1987). The taxonomies (called *inheritance hierarchies*) are offered as tools for describing shared semantic, pragmatic and grammatical properties of syntactic patterns, in much the same way that category members are said to be linked by family-resemblance relations (Lakoff 1987). If there is a theme running through all construction-based syntactic research it is this: we do not sacrifice linguistic generalizations by stipulating idiosyncratic properties of constructions, because detailed constructions are instances of more abstract constructions.

One can in fact view construction-based theories of syntax as upholding standards of grammar coverage that the original proponents of generative grammar have abandoned, as they sought to reduce the theory's dependence on linguistic facts:

> A look at the earliest work from the mid-1950s will show that many phenomena that fell within the rich descriptive apparatus then postulated, often with accounts of no little interest and insight, lack any serious analysis within the much narrower theories motivated by the search for explanatory adequacy, and remain among the huge mass of constructions for which no principled explanation exists—again, not an unusual concomitant of progress (Chomsky 1995:435).

It seems safe to say that most proponents of construction-based syntax would not consider the loss of insightful grammatical descriptions a mark of progress. Further, it is questionable whether narrower properly describes the relationship between Chomsky's program and the formalized version of Construction Grammar to be described in this chapter: Sign-Based Construction Grammar (SBCG). It seems reasonable to assert that a formal theory like SBCG is *ipso facto* "narrower" than an informal one, like the Minimalist Program, if only because formalism imposes a limit on potential predictions. The SBCG formalism will be the focus of the following section. In subsequent sections, I will discuss the evidence in favor of a construction-based view of grammar. I will focus on four claims:

- Constructions license arguments and syntactic sisterhood relations (Section 3)
- There is a continuum of idiomaticity (Section 4)
- Core and periphery are interleaved during production (Section 5)
- Constructions have formal and interpretive conditions that cannot be captured by mapping procedures (Section 6)

In the concluding section, Section 7, I will discuss the role of construction-based syntax in the search for syntactic universals.

2. The History and Formal Architecture of SBCG

The origins of Construction Grammar Common can be traced to a series of case studies published by Berkeley linguists in the late 1980s. These papers focus on idiomatic grammatical patterns that, while falling outside the descriptive mechanisms of phrase-structure-based grammar, are nonetheless highly productive. Among these papers are Lakoff's 1987 study of presentational and existential *there* constructions, Fillmore et al.'s

1988 study of the conjunction *let alone* and Lambrecht's 1987 study of presentational cleft sentences in spoken French. Each promotes a vision of grammar as a structured inventory of form-meaning pairings and, while providing few formal details, advocates a single-format representation for patterns at all points on the gradient from frozen idiom to fully productive rule. One extension of this tradition is found in Goldberg's seminal work on argument-structure constructions (Goldberg 1995, 2002, 2006), Michaelis & Lambrecht's (1996) analysis of exclamatory constructions and Michaelis & Ruppenhofer's (2001) analysis of German *be*-prefixation. These works, based in part on Langacker's Cognitive Grammar (1987), focus on patterns of semantic extension in constructional meaning, and the semantic shifts that occur when constructions combine with words. This focus on semantic networks is also present in Croft's (2001) Radical Construction Grammar, which uses event-structure representations as the basis for syntactic typology. Croft, like Van Valin & LaPolla (1997), treats grammatical functions and syntactic categories as construction-specific rather than universal roles.

While the foregoing works focus on the structure of the grammar, other work in the Construction Grammar tradition has focused on concerns closer to the hearts of generative syntacticians: the licensing of word strings by rule of syntactic and semantic composition. This research stream is represented by Fillmore & Kay (1995) and Kay & Fillmore (1999). These works, inspired by Generalized Phrase Structure Grammar (Gazdar et al. 1985), outline a unification-based implementation of Construction Grammar in which the grammar is an inventory of syntactic trees with feature structures (rather than syntactic-category labels) at their nodes. These trees are represented as nested (box-within-box) feature structures, the limiting case of which is a single-node feature structure. Feature structures of the latter type are used to describe lexeme classes (e.g., the ditransitive verb construction). Constructions and lexical items are combined by means of unification, which allows the combination of nonconflicting feature structures. Computationally implemented versions of this formalism designed to articulate with sensory-motor schemas include Embodied Construction Grammar (*this volume*) and Fluid Construction Grammar (Steels & De Beule 2006).

Despite strong interest in construction-based grammar within computational and cognitive linguistics, Construction Grammar has had little effect on the way that syntacticians do business. This must be attributed, at least in part, to the fact that Construction Grammar does not yet provide a fully elaborated or axiomatized system of sentence representation. To remedy this situation, some of the original proponents of Construction Grammar have begun to collaborate on a formalized version of the theory, SBCG (Fillmore et al. *in prep*, Sag 2007, 2008). This is the variety of Construction Grammar that I will focus on in this article. In SBCG, a construction is a description of a *construct*, which might intuitively be described as a 'local tree'. The nodes of the trees in such descriptions are not category labels, as in traditional phrase-structure grammar, but *signs*. The notion of sign employed here is close to that of Saussure (1916): a conventionalized pairing of form and meaning. But in SBCG signs have a specific formal realization. One can think of a sign as a node in a syntactic tree, to which certain syntactic and semantic properties accrue. However, signs are more accurately described as feature structures that specify values for the attributes listed in (5-8):

(5) SYN is used to distinguish signs from one another. Its values are the features CAT and VAL(ENCE). The value of CAT is a syntactic category. The VAL feature represents the objects with which a given sign can combine. The VAL value of pronouns, proper nouns and most common nouns is an empty list. The VAL value of a verb is its combinatoric potential (e.g., the VAL value of a transitive verb is <NP, NP>).

(6) SEM describes the meaning of a sign; its values are the features INDEX and FRAMES. INDEX is the extension of a sign. The FRAMES feature is used to enumerate the predications that together specify the meaning of a sign. Among the frames that we will consider here are *quantifier frames*. For example, the meaning of the indefinite article *a* in English is represented by means of an existential-quantifier frame.

(7) FORM is used to specify the morphological properties of a given sign; the value of FORM is a (possibly empty) list of morphological entities.

(8) CONTEXT is used to specify features of context that are relevant to the interpretation and use of a given sign.

The subtypes of sign are *word*, *lexeme* and *phrase*. According to a principle that Sag (2007) refers to as the *sign principle*, signs are licensed in two ways: by a lexical entry or by a construction. Accordingly, the grammar is viewed as consisting of a lexicon—a finite set of lexical descriptions (descriptions of feature structures whose type is either *lexeme* or *word*) and a set of constructions. In (9) we see an example of a lexeme sign:

(9)
$$\begin{bmatrix} \textit{lexeme} \\ \text{FORM} \ \langle \textit{drink} \rangle \\ \text{SYN} \left\langle \text{NP} \begin{bmatrix} \text{overt} \\ \text{INST i} \end{bmatrix}, \text{NP} \begin{bmatrix} \text{(ini)} \\ \text{INST x} \end{bmatrix} \right\rangle \\ \text{SEM} \mid \text{FRAMES} \left\langle \begin{bmatrix} \textit{drink - fr} \\ \text{DRINKER i} \\ \text{DRAFT x} \end{bmatrix}, \begin{bmatrix} \textit{animate – fr} \\ \text{INST i} \end{bmatrix}, \begin{bmatrix} \textit{liquid – fr} \\ \text{INST x} \end{bmatrix} \right\rangle \end{bmatrix}$$

The lexeme represented in (9) is *drink*. The semantic properties of this lexeme are represented by a series of frames (e.g., the frame abbreviated as *drink-fr*). Frames are used to capture the requirement that the drinker be animate and that the consumed item be a liquid. The combinatoric properties of this lexeme are represented in its valence set, which includes two noun phrases—the first of which is coindexed with the 'drinker' participant in the drink semantic frame and the second of which is coindexed with the 'draft' participant in the drink frame. In addition, each valence member (or valent) is tagged with a feature that represents its instantiation properties: the first valent (the subject NP) is obligatorily instantiated, while the second is optionally null instantiated. As indicated, the second valent, when null instantiated, has an indefinite or, equivalently, existential interpretation. For example, (10) means something like 'She drank *some liquid substance* from a plastic mug' (Fillmore 1986):

(10) She drank from a plastic mug

Words and lexemes are signs all by themselves, while constructions describe sign combinations, which are called *constructs*, as mentioned in Section 7.2. It is important to realize, however, that constructions are not trees, or even descriptions of trees, in the

sense of traditional phrase-structure grammar. A construction describes only the mother sign of a construct. This mother sign has not daughters but a *daughters* feature: a list-valued attribute. An illustration of a construction, consider the subject-predicate construction, as described by Sag (2007):

$$subjpred-cxt \Rightarrow \begin{bmatrix} phrase \\ \text{MTR [SYN [VAL } < \ > \text{]]} \\ \text{DTRS } < \text{X, H} > \\ \text{HD - DTR H} \begin{bmatrix} \text{SYN [CAT [VF } fin \text{]]} \\ \text{VAL} < \text{X} > \end{bmatrix} \end{bmatrix} \quad (11)$$

The subject-predicate construction describes the mother sign of a specific type of phrase, a basic clause. Like all constructions, (11) is an implicational statement. This implicational statement says that if a feature structure is the mother sign of a subject-predicate construct, it will contain a mother (MTR) feature with an empty valence list, a daughters (DTRS) feature with two items on its valence list, and a head daughter (H) that is a finite verb and has one item on its valence list (X). X represents the subject of the clause. Like its close congener Head-Driven Phrase-Structure Grammar (Sag et al. 2003), SBCG models the combinatoric properties of words and their phrasal expansions by means of *valence cancellation*. Predicators like verbs and prepositions have valence sets, a list-valued feature that represents the arguments (participant roles) that the predicator requires. As a predicator is combined with the argument(s) that it seeks, that argument is 'crossed off' the predicator's valence list. Thus, the mother sign of a subject-predicate construct has an empty valence list: by definition, such a construct contains a daughter (X) that completes the argument requirements of its head daughter, the predicate.

While traditional generative syntax sees syntax, semantics and lexicon as independent modules, and characterizes the lexicon as a bag of idiosyncratic particulars, SBCG sees the lexicon as having a taxonomic structure, which is referred to as an *inheritance hierarchy* or *type hierarchy*. The items that are organized by such a hierarchy are signs, or, equivalently, feature structures. Signs have a taxonomic organization because each sign belongs to several different grammatical types at once. For example, the verb *discusses* belongs to the types *verb*, *transitive verb*, *present-tense verb* and *third-person verb*. In an inheritance hierarchy, a type B inherits from (is a subtype of) another type A, if and only if the set of feature structures picked out by B is a subset of the set of feature structures described by A. The inheritance hierarchies of SBCG are referred to as *multiple inheritance hierarchies*, because a given type can inherit properties from multiple dominating types (e.g., *present tense* and *transitive*).

Crucially for our purposes, SBCG generalizes the lexical-inheritance model as the appropriate model for the relations among constructions. The rationale is that, as observed by Jackendoff (1997: Chapter 7) and Croft & Cruse (2002: Chapter 9), constructions mean what they mean in the same way that words do. Like words, constructions can 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 & 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. Examples of the Antitopic Exclamative are given in (12-14):

(12) GOD it's hot.
(13) MAN that's loud.
(14) DAMN I'm good.

The point here is that, as Croft & 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 & Jackendoff (2005: 15) is that there is "a continuum of grammatical phenomena from idiosyncratic (including words) to general rules of grammar".

As an example of an inheritance hierarchy for constructions, consider the following functions of the pattern commonly referred to as subject-auxiliary inversion (SAI), taken from Fillmore (1999):

(15) Yes-no question: Has he left?
(16) Inverted exclamation: Am I tired!
(17) Negative adverb preposing: Never will I harm you.
(18) Information question: What would you do?
(19) Optative: May it be so!
(20) Conditional: Had we been there, we could have stopped him.

In SBCG, as described by Sag (2007), the auxiliary-initial clausal pattern is a type (of construct), and various constructions, like those exemplified above, mention this type in their consequent clauses. For example, the exclamative SAI construction illustrated in (16), has *inverted-exclamative-construct* (*inv-excl-cxt*) as its antecedent, while its consequent invokes the more general construction *auxiliary-initial-construct* (*ai-cxt*), as illustrated in (21):

(21) $$inv - excl - cxt \Rightarrow \begin{bmatrix} ai - cxt \\ \dots \end{bmatrix}$$

In (21), the type to which the inverted exclamative belongs is represented by the label *ai-cxt* at the top of the feature matrix; this label represents the sign type. The additional features required to capture the properties unique to the inverted exclamative are not mentioned here, and are represented by ellipses […]. The property common to all of the constructions in (21) is the use of an auxiliary-initial clause, but each construction also has idiosyncratic properties; for example, (17) requires a negative adverb in clause-initial position. In addition, each construction has an idiosyncratic communicative function (e.g., requesting information, exclaiming). These are functions that one would not know simply by knowing that a given construction is an instance of the SAI pattern.

3. Constructions License Arguments and Complements

3.1. Constructions as a Source of Valence Variability

Where does a verb's frame come from? The obvious answer is the verb itself, and this is the answer that syntacticians have traditionally provided, whether they view predicate-argument relations as syntactic sisterhood (as per constituent-structure-based models) or as a lexical property (the verb's combinatoric potential). Thus, Haegeman, in her introduction to Government and Binding theory, states, "the thematic structure of a predicate, encoded in the theta grid, will determine the minimal components of the sentence" (Haegeman 1994:55). Similarly, Bresnan, in her introduction to Lexical Functional Grammar, states, "On the semantic side, argument structure represents the core participants events (states, processes) designated by a single predicator. […] On the syntactic side, argument structure represents the minimal information needed to characterize the syntactic dependents of an argument-taking head" (Bresnan 2001:304). It is difficult, however, to square this view with the observation, made by Goldberg 1995, 2006, Partee and Borschev 2007 and Michaelis & Ruppenhofer 2001, among others, that a verb can often be found in unexpected frames, which nonetheless make sense in context. For example, as shown in (22-24), single-argument activity verbs like *melt* and *sparkle*, which have nothing intrinsically to do with location, can appear in the 'locative inversion' pattern:

(22) In Maria's sticky hand **melted** a chocolate-chip ice-cream cone. (Birner & Ward 1998: 193)

(23) And in this lacey leafage **fluttered** a number of grey birds with black and white stripes and long tails. (Levin & Rappaport Hovav 1995: 226)

(24) Down at the harbor there is teal-green clubhouse for socializing and parties. Beside it **sparkles** the community pool. (*Vanity Fair*, 8/01)

In (22-24), the verb appears to describe what an entity is doing while in its location (melting, fluttering, sparkling) rather than a location state *per se*. Looking at a similar class of examples in Russian, Partee and Borschev (2007:158) observe, "[o]ne could say that THING and LOC are roles of the verb [*be*], but it is undoubtedly better to consider them roles of the participants of the situation (or state) of existing or of being located". If one were to alter the preceding quote by replacing the words *situation (or state) of existing or of being located* with the words *locative-inversion construction*, it would express the constructional view of verbal argument-structure, first articulated by Goldberg (1995, 2002, 2006). Goldberg argues that argument-structure patterns are constructions that denote situation types, and that a verb's meaning and combinatory potential can change to fit the meaning of a given construction (see also Michaelis & Ruppenhofer 2001 and Michaelis 2004). The construction-based model of argument structure proposed by Goldberg is based on the idea that verb meanings are combined with construction meanings via a fixed number of semantic relations (including *instance*, *means* and *manner*) and the semantic-role list licensed by the verb may accordingly be augmented up to that licensed by the construction. Examples are given in (25-26):

(25) Most likely they were fellow visitors, just **panting** up to the sky-high altar out of curiosity. (L. Davis, *Last Act in Palmyra*, p. 28)

(26) When a visitor passes through the village, young lamas stop picking up trash to mug for the camera. A gruff 'police monk' **barks** them back to work. (*Newsweek* 10/13/97)

In (25), *pant*, a verb that otherwise licenses only a single argument, appears with two: it denotes the *manner* of the directed-motion event denoted by the construction. In (26), *bark*, another otherwise monovalent activity verb, has two additional arguments, a direct object and an oblique expression that indicates direction; in this context, the verb denotes the *means* by which a metaphorical caused-motion event, denoted by the construction, occurs. Rather than presuming a nonce lexical entry for *pant* in which it means 'move toward a goal while panting' and for *bark* in which it means 'move something from one place to another by barking', a constructionist presumes that the verbs in (25-26) mean what they always mean; arguments not licensed by the verb are licensed by the construction with which the verb combines. The constructional model of verbal syntactic variability is therefore more parsimonious than a lexicalist one: by using a small number of argument-structure constructions, it limits the number of lexical entries needed for each verb.

3.2. Weird Sisterhood

A number of argument-structure patterns involve verbal complementation patterns that are not licensed by the general-purpose head-complement or specifier-head phrase-building rule schemas. Many of these patterns have specialized communicative functions. A look at these phenomena suggests that fine-grained construction, rather than non-category-specific phrase-structure rules, pair predicates and their complements. In this subsection, we will look at three cases of weird sisterhood found in English: Nominal Extraposition, *Just because* and Hypotactic Apposition. The data are taken from one of two corpora of English telephone conversations that are available through the Linguistic Data Consortium (www.ldc.upenn.edu): the Switchboard corpus and the Fisher corpus.

3.2.1. Nominal Extraposition

In Nominal Extraposition, an exclamatory adjective, e.g., *amazing*, licenses an NP complement:

(27) I know it's just it's unbelievable the different things that are happening in America today.
(28) I know. I love that game. It's amazing the words they come up with.

The pattern exemplified in (27-28) is idiosyncratic in two respects. First, adjectives are not case-assigning predicators and should not therefore license direct objects. Second, this NP complement is interpreted as denoting a scalar degree (Michaelis & Lambrecht 1996). In (28), for example, the NP *the words they come up* stands in for a scalar expression like 'the number of words they come up with'. The fact that the complement of *amazing* in (28) has a scalar interpretation follows from the fact that (28) is an exclamation, 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.

3.2.2. Just Because

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

(29) Just because they use primitive means of doing things does not mean that they can't expand.
(30) Just because they say it doesn't mean that's the only way to look at it.

Clausal subjects are ordinarily introduced by the complementizer *that*, not by a subordinating conjunction. For this reason, one cannot use the phrase-structure rule that pairs a specifier with a head to account for the pattern illustrated in (29-30). Instead, as Bender & 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*.

3.2.3. Hypotactic Apposition

When English speakers announce forthcoming propositional content using a cataphoric demonstrative pronoun, they may do so by means of either the paratactic construction exemplified in (31) or the subordinating construction illustrated in (32–33), in which the asserted proposition is expressed by a clausal complement of the copula:

(31) Yeah, well, that's another problem: I think to really correct the judicial system you have to get the lawyers out of it.
(32) That's the problem is that they just hate us so much and I never re- I never really realized.
(33) That's the main thing is that I can't tell whether the thing is going to fit.

Sentence (33) is an example of the construction that Brenier and Michaelis (2005) refer to as Hypotactic Apposition. In Hypotactic Apposition, the verb *be* combines with two arguments that it would not ordinarily: a clause containing the pronoun *that* (in (32), e.g., *that's the problem*) and a clausal complement to which this *that* refers (in (32), *they just hate us so much*). This is not the ordinarily combinatoric behavior of equational *be*, as illustrated in (34):

(34) The problem is that they just hate us so much.

In (34), *be*, as expected, combines with a subject NP and a clause. Thus, the combinatoric behavior of *be* in (32-33) cannot be attributed to the lexeme *be* but must instead be attributed to the Hypotactic Apposition construction.

3.3. Lexical-Class Constructions

The constructions needed to account for valence augmentation and weird sisterhood have not yet been described. The constructions in question are referred to in SBCG as *lexical-class constructions*. Lexical-class constructions describe the properties of a class of lexical entries. These properties include but are not limited to: the semantic frame of the lexeme, the syntactic category of the lexeme's semantic roles and contextual attributes like illocutionary force. Lexical-class constructions have the general form shown in (35), where *lex* stands for any subtype of the type *lexeme*:

(35) lex ⇒ […]

As Sag (2007) argues, there is no formal difference between lexical-class constructions and those that describe constructs (the latter of which Sag 2007 refers to as *combinatoric constructions*). The only difference is the nature of the type name that serves as the antecedent of the constraint. How could it be that a construction that describes a mother-daughter combination could be the same as one that describes a word or lexeme? The answer is that both lexical-class and combinatoric constructions describe signs. In the case of a combinatoric construction this sign happens to have a DTRS feature, ensuring that it can license a mother node in a local tree in a construct, but this mother node is a sign like any other. Crucially, lexical-class constructions can combine with one another, creating a highly specific lexeme entry. Among lexical-class constructions are those that allow a required semantic role of the verb to be missing. These constructions are referred to as null-instantiation constructions (Fillmore et al. in prep). Null-instantiation constructions eliminate a semantic role from the verb's valence list while ensuring (through the addition of a quantifier frame to the verb's FRAMES list) that the missing valence member is interpreted as an existentially or anaphorically bound variable (Fillmore et al. in prep.). An example of null instantiation is given in (36):

(36) I cried into my beer [when I saw this story about walruses appearing on the Alaskan coast]. (google)

When we interpret (36), we understand that there is some entity (lachrymal fluid) that the speaker caused to move into the beer, but no such entity is expressed in the sentence. While (36) expresses a caused-motion event akin to the *bark* sentence (26), the theme argument is missing. This is not of course a special fact about (36), since the theme argument of *cry* is not generally expressed: *I cried (many tears) during that movie*. Goldberg (2005) proposes a null-instantiation construction for verbs of emission like *cry*, *spit* and *bleed*. This construction allows such verbs to appear without their theme arguments. Examples like (36) are produced by the interaction of the caused-motion and the emission-verb lexical-class constructions.

4. There is a Continuum of Idiomaticity

As foundation of construction-based syntax is the idea that rules of syntactic combination are directly associated with interpretive and use conditions, in the form of semantic and pragmatic features that attach to the mother or daughter nodes in these descriptions (Sag 2007, 2008). This amounts to the claim that syntactic rules mean things. Meaning, of course, is generally viewed as the exclusive purview of words, and in the prevailing view of meaning composition, syntactic rules do no more than determine what symbol sequences function as units for syntactic purposes. So while syntactic rules assemble words and their dependent elements into phrases, and the phrases denote complex concepts like predicates and propositions, the rules cannot add conceptual content to that contributed by the words; nor can they alter the combinatoric properties of the words. On this view, which Jackendoff (1997:48) describes as the *doctrine of syntactically transparent composition*, "[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 embrace a construction-based model of semantic composition is not to reject the existence of syntactically transparent composition but instead to treat it, as Jackendoff recommends (1997: 49), as a "default in a wider array of options". That is, whenever a class of expressions can be viewed as licensed by a context-free phrase structure rule accompanied by a rule composing the semantics of the mother from the semantics of the daughters, a construction-based approach would propose a construction that is functionally identical to such a form-meaning pairing (Kay & Michaelis *in press*). But constructional approaches also provide a way to represent linguistic structures whose meanings are more than the sum of their parts. A case in point is the negative polar question. An affirmative question like (37) requests an evenhanded evaluation of its propositional content, expressed in (38):

(37) Did the Magna Carta change the way the king behaved?
(38) The Magna Carta changed the way the king behaved.

However, a negative question like (39) is not understood as posing a negative proposition and requesting an evenhanded evaluation of its truth or falsity, as in (40). Instead, the negative question, like the tag question in (40), suggests that the *affirmative* proposition is true:

(39) Didn't the Magna Carta change the way the king behaved?
(40) True or false: The Magna Carta didn't change the way the king behaved.
(41) The Magna Carta changed the way the king behaved, didn't it?

A constructional approach allows the grammar to capture the straightforward cases of compositionality and also the cases, like negative questions, in which the construction adds to or otherwise changes what simple compositionality might predict. A further illustration of a construction that is syntactically regular and yet semantically opaque is provided by the WXDY construction, exemplified in (42):

(42) What's this fly doing in my soup?

The ambiguity of (42) is known to anyone familiar with the old joke in which it serves as the set up (eliciting the response *the backstroke* from an obtuse waiter). Kay & Fillmore (1999) argue that the sentence pattern in (42) has both a transparent interpretation (in which it inquires about someone's actions) and an idiomatic interpretation, in which it is a *why* questions used to inquire about a situation that strikes the speaker as anomalous. Kay & Fillmore posit a WH-question construction, WXDY, to which the latter interpretation attaches. Among other formal conditions, WXDY fixes the interrogative word as *what* and requires the form of the main verb to be progressive. In WXDY, as in the case of the negative question in (39) and the exclamatory pattern described in 3.2.1, an illocutionary force attaches to a clause pattern rather than to any particular word in that pattern. What this means in SBCG terms is that illocutionary force belongs to the contextual features in such constructions' mother signs (Sag 2008, Ginzburg & Sag 2000).

At the subclausal level, there are many idiomatic constructions that create similarly ambiguous word strings. For example, (43) may mean what it means either because it instantiates an idiomatic VP construction (whose meaning is 'jokingly mislead') or

because it instantiates the more general constructions that combine nominals with possessive determiners, auxiliary verbs with their complements and NPs with VPs:

(43) She's pulling my leg.

Under strictly syntactic composition, the ambiguous (43) would require two different syntactic representations. This is an undesirable result, because the two meanings of (43) cannot be attributed to a bracketing ambiguity like that in (44):

(44) She saw her neighbor with a telescope.

Under a constructional approach, the two meanings of (43) are described by two different collections of constructions. But construction-based composition is still rule-based: an interpreter who knows all of the words, and all of the rules that combine words and phrases into larger units, also knows the forms and meanings of all the larger units, including all the sentences. Constructional approaches focus on the fact that there are a great many rules, and that many of these rules attach semantic interpretations directly to complex syntactic objects.

5. Core and Periphery are Interleaved during Production

As described in Section 4, the construction grammarian conceives of a language as presenting a continuum of idiomaticity, or generality, of expressions; a construction grammar models this continuum with an array of constructions of correspondingly graded generality (Fillmore at al. 1988). Inheritance networks capture the relationships that exist between general constructions of potentially universal significance, like coordination, and inarguably language-particular patterns like the adverbial expression *by and large*—perhaps the only coordinate structure in English that features a conjoined preposition and adjective. But construction grammarians see no obvious point along the continuum from schema to formula where one can draw the line between 'core' and 'periphery'. It seems common practice to include in the core both the obvious cases and as much of the rest of the language as fits the theoretical apparatus at hand (Culicover and Jackendoff 1999). But the resulting models cannot then be portrayed as theories 'of the core' without circularity. Evidence for the inseparability of core and periphery comes from the interleaving of the two during production: stretches of speech licensed by idiomatic constructions can contain within them stretches licensed by 'regular rules' and *vice versa*. This is illustrated in (45):

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

Sentence (45) illustrates the Incredulity Response construction, which, according to Lambrecht (1990), consists of (a) a property predicate (e.g., *pull the leg of a philosopher*) (b) an entity (e.g., *a politician*) and (c) 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 phrase. Lambrecht argues that the Incredulity Response is a topic-comment construction, and that the entity and predicate are detached topics. Evidence for the latter claim comes from the fact that the two constitute distinct intonation units and can be reordered with respect to one another (as in *Pull the leg of a philosopher? A politician?*) While this construction performs a basic communicative function—commenting on the validity of someone's prior assertion—it does so in a way that owes little or nothing to the ordinary

English syntax of predication and subordination. It is equally obvious, however, that both the entity constituent and the predicate constituent are licensed by regular or "core" constructions of English—only their combination in the Incredulity Response construction is idiomatic. Moreover, coterminous with the syntactically transparent VP *try to 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, and 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' appear to be permeable.

6. Constructions have Properties that do not Map

An advantage of modeling constructions in a multiple-inheritance hierarchy is that it provides a succinct way of describing the relations among families of similar constructions, indicating which properties they share and which are peculiar to each maximal (or leaf) construction (that is, each construction that has no sub-constructions). The family of SAI constructions discussed in Section 2 above provides an illustration. While the family of SAI constructions represents a one-to-many form-function mapping, inheritance hierarchies are also used to describe many-to-one form-function mappings, as in Michaelis & Lambrecht's 1996 study of English exclamatory constructions. They analyze a range of English exclamations—including the bare NP exclamative illustrated in (46), nominal extraposition, as described in Section 3.2.1 above, and subordinate-clause exclamations, as in (47):

(46) The nerve!
(47) I can't believe the nerve of some people.

They capture the shared interpretive and use constraints on these patterns by treating each exclamative sentence type as an instance of an abstract exclamatory construction, whose semantico-pragmatic features include scalar meaning, a specific epistemic stance of the speaker and property attribution. Thus, relations of family resemblance are posited both on formal and semantic grounds.

Of course, one might observe that what inheritance networks do is something that procedural approaches have long done: represent those situations in which two different verb frames or syntactic trees structures share a single event-structure representation, as in the transformational accounts of passive, topicalization and raising. Certainly, inheritance networks provide a declarative rather than procedural mechanism for describing this shared structure, but one could legitimately ask whether the type hierarchy of SBCG is a mere notational variant of the familiar lexical and syntactic mapping procedures. The answer is no, for two reasons.

The first reason is that procedural approaches to argument-structure variability, unlike declarative approaches, presuppose bilateral entailment relationships between argument-structure affordances, as a conceptual necessity: if two verbal argument-structures are to be mediated by a rule, the existence of frame A for a given verb entails the existence of frame B for that verb, and *vice versa*. For example, if a verb takes a direct object, it should also be found in the passive voice. But as scholars ranging from Lakoff (1970) to Pinker (1989) have observed, rules have abundant lexical exceptions. One could argue

that this fact lowers the level of generality that a procedural approach is supposed to achieve. And while this objection would be fair, the objection made by constructionists (e.g., Goldberg 1995, 2002, Michaelis & Ruppenhofer 2001) is actually stronger: there are in fact two classes of lexical exceptions, and only one of these is countenanced by the procedural approach. In the first class are those verbs that fail to undergo a given rule. For example, Latinate verbs like *contribute* do not allow 'dative movement': **She contributed the campaign a donation*. Pinker (1989) suggests that such exceptions are principled, and proposes that certain semantically defined lexical classes block the application of lexical rules. This is certainly a more stipulative approach than one might seek in a grammar based on abstract constraints, but it does increase descriptive adequacy. The second class is more troublesome. It includes 'output' patterns that lack the requisite input structure. The existence of such examples suggests that the derivational approach to verb-valence variability is not the right model of this domain. Examples from this second class are given in (48-50):

(48) Ditransitive (double-object): She begrudges/envies me my success (cf. *She begrudges/envies my success to me.)
(49) Raising: She seems/appears to have left. (cf. *That she has left appears/seems.)
(50) Passive: She is said/rumored to have won. (cf. *They said/rumored her to have won.)

In each of these examples, we see that the putative input structure is ungrammatical, whether it is the oblique-goal frame in (48), the clausal-subject frame in (49) or the active-voice frame in (50). The essential observation is that the lexemes in question (e.g., *begrudge*, *seem*, *say*) lack one of the two argument-structure frames that procedural approaches place into correspondence (lexical or transformational). As we have seen, it is possible to block a verb from undergoing a rule, but if ditransitive, raising and passive lexemes (or trees) are the *products* of rules, the procedural approaches incorrectly predict the ungrammaticality of (48-50). In SCBG, by contrast, invariant lexeme entries, like that of *begrudge*, are represented as more fully specified that those of variable lexeme entries, like *give*. Most typically, the additional specification takes the form of a CASE attribute attached to one of the verb's valence members. Because SBCG is unification-based, the additional feature prevents the entry from combining with combinatoric and lexical-class constructions that contain conflicting specifications. (Sag 2007).

Let us now turn to the second reason that the construction-based approach to argument structure is distinct from one that uses (syntactic or semantic) procedures to alter verb entries: the constructional approach captures semantic and pragmatic conditions that may be unique to each of the two putative structural alternates (Goldberg 1995). Mapping procedures, if they are to operate compositionally, cannot introduce meanings into the output structure. However, as observed by Goldberg (1995: Chapter 5) and Michaelis & Ruppenhofer (2001), a wide array of verb frames held to be the outputs of lexical rules have entailments that they do not share with their input frames. These entailments include the requirement that the goal argument of a ditransitive verb be interpreted as a recipient and that the location argument of an applicative (*be*-prefixed) verb in German be construed as a surface. Because constructions can have as many specialized communicative and interpretive conditions as words do, such idiosyncrasies are easy to

describe if the two verb frames (e.g., ditransitive and oblique goal) are taxonomic sisters in an inheritance hierarchy (Sag 2007).

7. Conclusion

The focus of syntactic theory has long been on determining the range of possible human languages—a goal that for Chomsky (1995:435) and adherents justifies 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. It might therefore appear that they lack interest in explanatory theories of grammar and seek only to demonstrate the infinite diversity of language. In fact, SBCG makes strong universal claims, including the Sign Principle and the Head-Feature Principle (Sag 2007, 2008). But theory comparison in this arena is hindered by the fact that many potential universals cannot be disentangled from the formal conventions of particular theories. This seems particularly true of universals assumed by proponents of the so-called Principles and Parameter model, as in 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)

To view 'movement' as a 'discovery' is to confuse representational conventions with linguistic facts. It is illogical to view construction-based syntax as anti-universalist because it does not assume a universal grammar based on such conventions. The two putative discoveries referred to above 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 features play no role in syntactic generalizations. The result is that the syntactician cannot relate two constructions by describing them as alternate syntactic realizations of a given semantic role, she or he must instead speak of procedures that 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'.

Because the circularity of the Chomskyan principles makes them virtually immune to falsification, constructionists have aimed instead at the other *major* foundation of Chomskyan universal grammar: language-particular parameter settings. Pullum & Zwicky (1991) argue, 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. And Van Valin & LaPolla (1997: Chapter 6) have shown that the patterns of semantic neutralization and restriction that define syntactically privileged arguments (e.g., subjects) vary not merely from language to language but from construction to construction *within* a given language. An illustration is found in English adjectival secondary predicates that denote a resultant state:

(51) She hammered the metal flat.

While one might assume that the entity undergoing the change of state in such sentences is appropriately described as the direct object, this would be an incorrect assessment, because that entity can also be expressed by a subject NP:

(52) The cake fell flat.

What unites the changed entities in (51-52) is that both are patient arguments. This suggests that the English construction that licenses secondary predicates of result semantically features the pattern of semantic-role restriction characteristic of ergative-absolutive case systems. What might otherwise be said to characterize a language (e.g., the nominative-accusative or ergative-absolutive pattern of neutralization) in fact characterizes a construction. Phenomena that have been 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. Syntactic generalizations may not be nearly as general as we have come to believe.

References

Bender, Emily and Andreas Kathol. to appear. Constructional Effects of *Just Because…doesn't Mean… Berkeley Linguistics Society* 27.

Birner, Betty J. and Gregory Ward. 1998. *Information Status and Noncanonical Word Order in English*. Amsterdam/Philadelphia: John Benjamins.

Brenier, Jason M. and Laura A. Michaelis. 2005. Optimization via Syntactic Amalgam: Syntax-Prosody Mismatch and Copula Doubling. *Corpus Linguistics and Linguistic Theory* 1: 45-88.

Bresnan, Joan. 2001. *Lexical-Functional Syntax*. Oxford: Blackwell.

Bybee, Joan. 2001. *Phonology and Language Use*. Cambridge: Cambridge University Press.

Chomsky, Noam. 1986. *Knowledge of Language: its Origin, Meaning and Use*. New York: Praeger Scientific Publishers.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.

Croft, William. 2001. *Radical Construction Grammar*. Oxford: Oxford University Press.

Croft, William and D.A. Cruse. 2002. *Cognitive Grammar*. Cambridge: Cambridge University Press.

Culicover, Peter and Ray Jackendoff. 1999. The View from The Periphery. *Linguistic Inquiry* 40: 543-571.

Culicover, Peter and Ray Jackendoff. 2005. *Simpler Syntax*. Oxford: Oxford University Press.

Fillmore, Charles J. 1986. Pragmatically Controlled Zero Anaphora. *Berkeley Linguistics Society* 12: 95-107

Fillmore, Charles J. 1999. Inversion and Constructional Inheritance. In G. Webelhuth, J.-P. Koenig and A. Kathol, (eds.), *Lexical and Constructional Aspects of Linguistic Explanation*. Stanford: CSLI Publications. 113–128,

Fillmore, Charles J., Paul Kay and Mary C. O'Connor. 1988. Regularity and Idiomaticity in Grammatical Constructions: The Case of Let Alone. *Language* 64: 501-538.

Fillmore, Charles J. and Paul Kay. 1995. *Construction Grammar Coursebook*. Unpublished ms., University of California, Berkeley.

Fillmore, Charles J., Paul Kay, Ivan Sag and Laura A. Michaelis. In prep. *Construction Grammar*. Stanford: CSLI Publications.

Gazdar, Gerald, Ewan Klein, Geoffrey Pullum and Ivan Sag. 1985. *Generalized Phrase Structure Grammar*. Cambridge, MA: Harvard University Press.

Goldberg, Adele. 1995. Constructions: A Construction Grammar Approach to Argument Structure. Chicago: University of Chicago Press.

Goldberg, Adele. 2002. Surface Generalizations: An Alternative to Alternations. *Cognitive Linguistics* 13: 327-356.

Goldberg, Adele. 2005. Constructions, Lexical Semantics and the Correspondence Principle: Accounting for Generalizations and Subregularities in the Realization of Arguments. In N. Erteschik-Shir and T. Rapoport, eds., *The Syntax of Aspect*. Oxford: Oxford University Press. 212-236.

Goldberg, Adele. 2006. *Constructions at Work*. Oxford; Oxford University Press.

Ginzburg, Jonathan and Ivan Sag. 2000. Interrogative Investigations: The Form, Meaning and Use of English Interrogatives. Stanford: CSLI Publications.

Haegeman, Liliane. 1994. *Introduction to Government and Binding Theory*, second edition. Oxford: Blackwell.

Jackendoff, Ray. 1997. *The Architecture of the Language Faculty*. Cambridge, MA: MIT Press.

Kay, Paul and Laura A. Michaelis. in press. Constructions and Compositionality. In C. Maienborn, K. von Heusinger and P. Portner, (eds.), *Semantics: An International Handbook of Natural Language Meaning*, *HSK Handbooks of Linguistics and Communication Science Series: 23: Semantics and Computer Science*. Berlin: Mouton de Gruyter.

Kay, Paul and Charles J. Fillmore. 1999. Grammatical Constructions and Linguistic Generalizations: The What's X Doing Y Construction. *Language* 75: 1-33.

Lakoff, George. 1970. *Irregularity in Syntax*. New York: Holt, Rinehart and Winston.

Lakoff, George. 1987. Women, Fire and Dangerous Things: What Categories Reveal about the Mind. Chicago: University of Chicago Press.

Lambrecht, Knud. 1990. 'What me worry?': Mad Magazine Sentences Revisited. *Berkeley Linguistics Society* 16: 215-228.

Levin, Beth and Malka Rappaport Hovav. 1995. *Unaccusativity*. Cambridge, MA: MIT Press.

McCawley, James D. 1982. The Syntax and Semantics of English Relative Clauses. *Lingua* 53: 99-149.

McCawley, James D. 1988. Review of Chomsky (1986). *Language* 64: 355-366.

Michaelis, Laura A. 2004. Type Shifting in Construction Grammar: An Integrated Approach to Aspectual Coercion. *Cognitive Linguistics* 15: 1-67.

Michaelis, Laura A. and Knud Lambrecht. 1996. Toward a Construction-Based Model of Language Function: The Case of Nominal Extraposition. *Language* 72: 215-247.

Michaelis, Laura A. and Josef Ruppenhofer. 2001. Beyond Alternations: A Construction-Based Approach to the Applicative Pattern in German. Stanford: CSLI Publications.

Partee, Barbara and Vladimir Borschev. 2007. Existential Sentences, BE and the Genitive of Negation in Russian. In K. von Heisenger and I. Comorovski, (eds.), *Existence: Semantics and Syntax*. Berlin: Springer Verlag. 147-190.

Pesetsky, David. 1997. Optimality Theory and Syntax: Movement and Pronunciation. In D. Archangeli and D.T. Langendoen, (eds.), *Optimality Theory: An Overview*. Oxford: Blackwell. 134-170

Pinker, Steven. 1989. Learnability and Cognition: The Acquisition of Argument Structure. Cambridge, MA: MIT Press.

Pullum, Geoffrey and Arnold Zwicky. 1991. Condition Duplication, Paradigm Homonymy and Transconstructional Constraints. *Berkeley Linguistics Society* 17: 252–266.

Sag, Ivan A. 2007. Sign-based Construction Grammar: An Informal Synopsis. Unpublished ms., Stanford University.

Sag, Ivan A. 2008. English Filler-Gap Constructions. Unpublished ms., Stanford University.

Sag, Ivan, Thomas Wasow and Emily Bender. 2003. Syntax: A Formal Introduction. Stanford: CSLI Publications.

Saussure, Ferdinand de. 1916. *Cours de Linguistique Générale*. Lausanne and Paris: Payot.

Steels, Luc and Joachim De Beule. 2006. A (very) Brief Introduction to Fluid Construction Grammar. Paper presented at the Third International Workshop on Scalable Natural Language Understanding (ScaNaLU 2006). New York: NY.

Van Valin, Robert D. and Randy J. LaPolla. 1997. *Syntax*. Cambridge: Cambridge University Press.

Zwicky, Arnold. 1994. Dealing out Meaning: Fundamentals of Grammatical Constructions. *Berkeley Linguistics Society* 20: 611-25.