Lexical Approaches to Argument Structure

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Abstract

In lexical approaches to argument structure, lexical items include argument structures. The argument structure represents essential information about potential argument selection and expression, but abstracts away from the actual local phrasal structure. In contrast, *phrasal approaches*, which are common in Construction Grammar, reject such lexical argument structures. We present evidence for lexical approaches and against phrasal ones: Lexical argument structure is necessary to explain idiosyncratic lexical selection of arguments. Abstraction from phrase structure and word order is shown by passive voice, category conversions, word-level coordination, and partial fronting. Lexical argument structure simplifies the grammar by allowing componential analysis. The phrasal alternative relies on the multiple inheritance of constructions, which is fraught with unsolved problems. Putative evidence for the phrasal approach from acquisition, psycholinguistics, and statistical distribution either fails to distinguish the two approaches, or supports the lexical approach. We conclude in favor of the lexical approach.

1 Introduction

Central to the mastery of a language is knowledge of the predicate-argument relations: an English speaker interpreting the sentence *The rabbit nibbled a carrot* knows that a nominal object following the verb *nibble* represents the food or other solid substance that is consumed, while a subject preceding it fills the role of the consumer of that substance. But the exact nature of that knowledge and how that information is represented within the grammar, remain matters of controversy within linguistics. Simplifying the current debate, one can distinguish *lexical* ver-

[†]This paper grew out of a discussion initiated by our late friend and colleague Ivan Sag. Ivan's important work in lexicalist syntax inspired many of the ideas in this paper. We dedicate this paper to his memory.

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sus *phrasal* approaches.[1] In this paper we argue for a certain class of lexical approaches.

In *lexical* (or *lexicalist*) approaches, words are phonological forms paired with valence structures (also called *predicate argument structures*). A word's predicate argument structure contains descriptions of the argument phrases the word combines with, and specifies the meaning of the combination as a function of the meanings of the parts. Lexical rules grammatically encode the systematic relations between cognate forms and diathesis alternations. Syntactic rules combine the words into larger units: sentences, NPs, APs, and so on. The syntactic combinatorial rules for endocentric structures are usually assumed to be very general and few in number.

In contrast, *phrasal* (or *constructional*; but see footnote 1) approaches eschew the use of lexical rules. Instead, different morphological cognates and diathesis alternants are captured by plugging a single word or root into different constructions. The construction carries a meaning that combines with the word's meaning. In some versions the constructions are phrasal structures, while in others, they are non-phrasal grammatical constructs called *argument structure constructions* that resemble the lexicalist's predicate argument structure, minus the specific verb or other predicator (Goldberg, 1995, p. 3).

The lexical and phrasal approaches differ. The lexicalist's predicate argument structure abstracts away from the phrasal context. This allows it to feed lexical rules such as passivization and conversion to other part of speech categories. It also allows for some arguments to be expressed locally while saving others for expression elsewhere (partial fronting) and for coordination of two or more verbs with matching argument structures. The phrasal approach seeks to avoid such abstract entities. A phrasal construction or argument structure construction is tied to a particular phrasal syntactic structure that results from combining the verb with its dependents. Such a construction is 'grounded' in actual sentences. Also, as noted above, the construction carries a meaning, and so some of the phrasal approaches would replace standard phrase structure rules or syntactic valence frames with meaningful constructions. For both of these reasons, constructional approaches are often affiliated with usage-based theories of human language that deny the existence, or downplay the importance, of 'meaningless' algebraic syntactic rules such as phrase structure rules defined purely on syntactic categories like V and NP. On the usage-based view, the progressive generalization over input patterns that explains language acquisition and use is incapable of abstraction to the point of removing communicative content entirely (Tomasello, 2003, p. 100).

[1] The phrasal approaches are usually called *constructional*, but we use that label cautiously since it is also used for approaches that are explicitly lexical. See for instance Kay (2005); Sag (2012).

Thus the resolution of the lexical-constructional debate has potentially broad theoretical consequences.

In this paper we argue for lexical approaches, on a number of different grounds. As noted, lexical approaches include *lexical rules* to relate lexical items (that is, roots, stems, and words) to each other. We show that the attempts to eliminate lexical rules have been unsuccessful. Sections 2 and 3 lay out these approaches in more detail. Section 4 provides a brief historical overview of the developments in theoretical linguistics of the last century. The development has progressed in waves oscillating between phrasal and lexical approaches. We discuss the reasons for changes and thereby point to problems that still exist in current approaches, or have been reintroduced into them.

We show that considerations of usage-based grammar and coercion have little bearing on the lexical versus phrasal issue, despite claims to the contrary (Sections 5.1–5.2). The misperception that constructions are simpler than lexical rules is dispelled in Section 5.3. We present new evidence for the lexical approach, from verb coordination (Section 6.1). Then we revisit a classic argument for the lexical approach: the output of one lexical rule can appear to feed another (Section 6.2).[2] Neo-Davidsonian and 'exoskeletal' approaches, in which some or all thematic roles are assigned by silent light verbs ('little v'), are critiqued in Section 7. Section 8 discusses the problems with trying to capture interactions between constructions using inheritance hierarchies or mappings between different levels of representations. We answer challenges to lexicalism involving acquisition (Tomasello, 2003; Goldberg, Casenhiser and Sethuraman, 2004), psycholinguistics (Goldberg, 1995, 2006), and statistical distribution (Stefanowitsch and Gries, 2009; Bod, 2009a,b) in Sections 9-11. We conclude in favor of the lexical approach.

2 Lexicalist approaches

2.1 Predicate argument structure

On lexical approaches, a word's predicate argument structure, or valence structure, indicates the number and type of arguments, and specifies the meaning of the combination of the word and its argument phrases as a function of the meanings of the parts. The following entry for the word *nibble* indicates that when it appears together with certain arguments, the combination has a certain semantic CONTENT:

[2]Despite talk of 'inputs' and 'outputs', lexical rules need not be literally formulated as procedures. Our lexical rules are declaratively formulated as unary phrase structure rules.

(1) A predicate argument structure:

$$\begin{bmatrix} \text{PHON} & \langle\ \textit{nibble}\ \rangle \\ \text{ARG-ST} & \left\langle \text{NP}_x\ ,\ \text{NP}_y \right\rangle \\ \text{CONTENT} & \textbf{nibble}(x,\ y) \end{bmatrix}$$

Any lexical specifications of syntactic features of the argument phrases are indicated in the ARG-ST list. The rules of syntax specify the positions for ARG-ST list items, thus interacting with this structure to license a grammatical clause or other phrasal construction with the right meaning. The predicate argument structure is abstract: it does not directly encode the phrase structure or precedence relations between this verb and its arguments. This abstraction captures the commonality across different syntactic expressions of the arguments of a given root.

(2) a. The rabbits were nibbling the carrots.
b. The rabbits were nibbling at/on the carrots.
c. The rabbits were nibbling.
d. The carrots were being nibbled (by the rabbits).
e. a large, partly nibbled, orange carrot
f. the quiet, nibbling, old rabbits
g. the rabbit's nibbling of the carrots
h. The rabbit gave the carrot a nibble.
i. The rabbit wants a nibble (on the carrot).
j. The rabbit nibbled the carrot smooth.

Verbs exhibit variable polyadicity, i. e. direct-oblique and other diathesis alternations (2a,b), argument optionality (2c), and morpholexical operations like passive (2d), as well as antipassive, causative, and applicative in other languages. They have cognates in other parts of speech such as adjectives (2e,f) and nouns (2g,h,i). Verbs have been argued to form complex predicates with resultative secondary predicates (2j), and with serial verbs in other languages.

The same root lexical entry *nibble*, with the same meaning, appears in all of these contexts. The effects of lexical rules together with the rules of syntax dictate the proper argument expression in each context. For example, if we call the first two arguments in an ARG-ST list (such as the one in (1) above) Arg1 and Arg2, respectively, then in an active transitive sentence Arg1 is the subject and Arg2 the object; in the passive, Arg2 is the subject and the referential index of Arg1 is optionally assigned to a *by*-phrase. The same rules of syntax dictate the position of the subject, whether the verb is active or passive. When adjectives are derived from verbal participles, whether active (*a nibbling rabbit*) or passive (*a nibbled*

carrot), the rule is that whichever role would have been expressed as the subject of the verb is assigned by the participial adjective to the referent of the noun that it modifies (Bresnan, 1982c, 2001, Chapter 3).

The point of the predicate argument structure is to provide the right level of abstraction for the information on argument expression that is stored with the verb. If the verb *nibble* were stored together with a small phrase structure such as [NP nibble NP], this would be too rigid. It would allow only for the transitive (2a). At the other extreme, suppose we remove all structure from the verb's representation except its meaning (by omitting the ARG-ST list and leaving only the CONTENT). Then the grammar has no way to pick out the right argument for expression as subject of the active verb, another argument for object of active or subject of passive, and so on. The information in (1), taken in conjunction with the lexical rules of English, is adequate to determine the syntax of all the uses of this stem, such as those in (2).[3]

Summarizing so far, a predicate argument structure specifies the relation between a head word, its arguments, and the meaning that results when they are combined. Rules of syntactic mapping specify the way the arguments are realized (or suppressed) in the syntactic environment of the word.

2.2 Views on lexical rules

The relation between argument expression for active, passive, deverbal adjective, and so on, is highly systematic across the lexicon. Those systematic relations are represented by lexical rules. One goal of this paper is to argue for the existence of lexical rules. But there are various understandings of what lexical rules are, and some of the arguments against lexical rules in the literature seem to be relevant only to certain particular versions of lexical rules, and not others.

In this paper we adopt a view that is currently common in HPSG: A lexical rule is seen as a unary branching structure that has the input item as daughter (Copestake, 1992; Riehemann, 1993, 1998; Briscoe and Copestake, 1999; Meurers, 2001; Müller, 2002a, Section 1.8; Müller, 2006, p, 872, 876). On this view the rule itself forms part of the description of the sentence. We will not attempt to defend this particular view of lexical rules over the alternative views. But it is important to place our view in the context of the various versions of lexical rules to avoid misunderstandings and clarify what is essential and non-essential to the notion of lexical rule.

[3]Some lexicalist theories such as LFG's lexical mapping theory posit an underspecified argument structure that is neutral between the different expressions. The lexical rules then correspond to constraints on how the unspecified values can be filled in. We remain open to such systems but for concreteness we adopt the HPSG approach here, in which the underlying argument structure of the stem is basically specified as that of an active verb.

The first dimension along which lexical rules could be classified was discussed by Jackendoff (1975). Jackendoff distinguishes between two conceptions: (i) lexical rules that relate two stored lexical entries and thereby capture redundancies in the lexicon; and (ii) lexical rules that license new lexical items. On the latter view, lexical rules can apply to stored lexical items (which are called *lexical entries* here) or to lexical items that are licensed by a lexical rule or a chain of lexical rules (see also Müller, 2005a for discussion). If one assumes the option (ii) it is of course possible that the output of a lexical rule is stored in memory. Many criticisms of lexical rules, including some of the arguments presented recently by Goldberg (2013), apply only to lexical rules in the sense (i).[4] Those criticisms have no bearing on lexical rules in the sense (ii) that we favor and that is standard in HPSG (Copestake, 1992; Riehemann, 1993, 1998; Briscoe and Copestake, 1999; Meurers, 2001; Müller, 2002a, Section 1.8; Müller, 2006, p, 872, 876).

The second dimension was discussed in the more formal literature on lexical rules in the 1990s (Copestake, 1992; Riehemann, 1993, 1998; Calcagno, 1995; Briscoe and Copestake, 1999; Meurers, 2001), but as it turns out there seem to be not just formal but also empirical differences between the approaches (Goldberg, 2013). Calcagno (1995) and Calcagno and Pollard (1995) argued for a view on lexical rules that was called the *meta-level* approach by Meurers (2001). This approach can be sketched as in (3):

(3) $L_1 \mapsto L_2$

Here L_1 and L_2 are descriptions of lexical objects. The rule states that if the language contains a lexical object satisfying L_1 then it contains another lexical object satisfying L_2. Thus the rule is not itself a description but a 'meta-description.' An alternative is the *description level* approach suggested by Copestake, Briscoe, Riehemann, and Meurers. In the description level approach the notation in (3) is used as well, but it is seen as an abbreviation for the attribute value matrix in (4):

(4) $\begin{bmatrix} L_2 \\ \text{DTR} \ L_1 \\ \textit{lr-type} \end{bmatrix}$

As suggested by the name of the feature DTR, which stands for DAUGHTER, this type of lexical rule is equivalent to a unary branching tree. In HPSG it is assumed that linguistic objects are modeled by typed feature structures. *lr-type* in (4) stands for *lexical rule type* and is a place holder for a type that is appropriate for a specific rule such as passive.

[4]Goldberg (2013) reserves the term *lexical rules* for the type in (i) and introduces the term *lexical templates* for the type in (ii).

The simplified lexical rule in (5)[5] takes a verb with a nominative and an accusative argument as input and licenses a verb with participle morphology and an argument structure with only one item instead of two.

$$(5)\quad \begin{bmatrix} \text{PHON} & \boxed{1} \\ \text{HEAD} & \textit{verb} \\ \text{ARG-ST} & \langle\ \text{NP}[\textit{nom}]_i, \text{NP}[\textit{acc}]_j\ \rangle \\ \textit{stem} & \end{bmatrix} \mapsto \begin{bmatrix} \text{PHON} & \boxed{1} \oplus \langle\ \textit{ed}\ \rangle \\ \text{HEAD} & \begin{bmatrix} \text{VFORM} & \textit{pass-part} \end{bmatrix} \\ \text{ARG-ST} & \langle\ \text{NP}[\textit{nom}]_j\ \rangle \\ \textit{word} & \end{bmatrix}$$

The accusative argument of the input is the nominative argument of the licensed word. By convention all information that is not mentioned in a lexical rule is carried over from the input of the lexical rule to the licensed object unchanged. Therefore the semantic contribution of the input is also part of the licensed object. The linking of the accusative object in the input stays in place.

In Figure 1 a lexical rule licenses the subtree where the daughter node is the stem NIBBLE and the mother has the 3rd person singular inflected form (*nibbles*) and agreement features (small capitals indicate a stem). In Figure 2 the passive

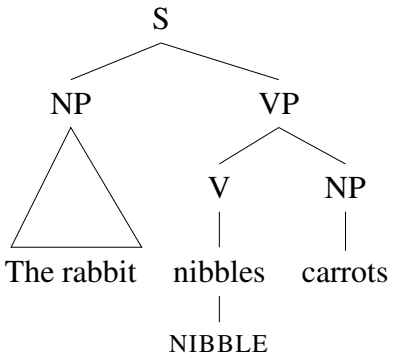


Figure 1: Example of lexical rule for present tense verb.

lexical rule in (5) licenses a structure with the same stem NIBBLE as the sole daughter. The mother is specified for the passive participle form and a valence feature in which the subject's role is equated with the role of the stem's object.[6]

[5]For a fully worked out proposal for passive and attributive adjectives in Danish, German, and English see Müller and Ørsnes, In Preparation. The proposal assumes the distinction between structural and lexical case and suggests a uniform treatment of passive that can account for personal and impersonal passive, expletive subjects in Danish impersonal passives and also for the so-called complex and reportive passive in Danish and the remote passive in German.

[6]Note that the daughter node satisfies the structure on the left of the arrow in (5), while the

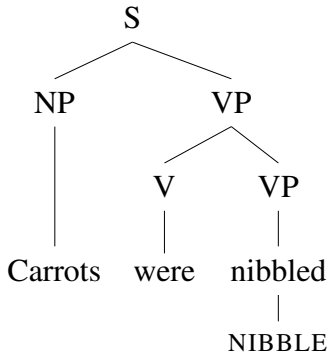


Figure 2: Example of passive lexical rule.

Figure 3 illustrates the participle-to-adjective conversion rule in (6) as applied to a passive verbal participle.[7]

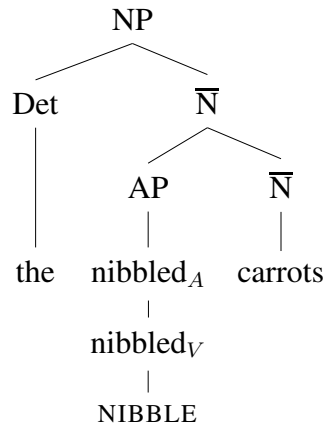


Figure 3: Example of passivization and adjectivalization lexical rules.

mother node satisfies the structure to the right of the arrow, the reverse of the usual convention for phrase structure rules. The arrow represents the direction of implication: if the grammar contains a lexical item matching the description on the left then it contains one matching the right.

[7]As an intermediate step one might first derive the predicate adjective. Evidence for this are examples like *The carrots remained unnibbled.*, in which *unnibbled* is clearly adjectival and derived from the adjectival form *nibbled*.

(6) $$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{VFORM} & \textit{pass-part} \end{bmatrix} \\ \text{ARG-ST} & \langle\ \text{NP}_j\ \rangle \\ \textit{word} & \end{bmatrix} \mapsto \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{MOD} & \overline{\text{N}}_j \\ \textit{adj} & \end{bmatrix} \\ \text{ARG-ST} & \langle\ \rangle \\ \textit{word} & \end{bmatrix}$$

The effect of this rule is that the semantic role that the participle would assign to its subject is assigned by the adjective to the noun it modifies.

2.3 Meaningful phrasal constructions

In addition to predicate argument structures, we assume that grammars include meaningful phrasal constructions. That is, we agree with (Goldberg, 1995; Tomasello, 2003; Goldberg and Jackendoff, 2004; Jackendoff, 2011) that grammars should contain a phrasal component for certain constructions, such as the N-P-N construction of the kind in (7) discussed by Jackendoff (2008) and the verbless directives in (8) mentioned by Jackendoff and Pinker (2005, p. 220) and discussed in detail by Jacobs (2008).[8]

(7) student after student
[$_{\text{NP/advP}}$ N-P-N]

(8) a. Off with his head!
b. Into the trunk with you!

In addition to cases like (7) and (8), the analysis of some idioms seems to call for *phrasal lexical items*, that is, phrases in which more than one word is fixed (Abeillé and Schabes, 1989; Richter and Sailer, 2009). Other classes of idioms can be handled by analyses in which words select particular lexemes in their valence features (Sag, 2007). Some combination of these two is often posited, in order to capture the full range of idiom types, from fixed phrases to syntactically analyzable idioms. See Sailer, 2000; Soehn and Sailer, 2008 for lexical approaches to idioms.

While we think grammars include meaningful phrasal constructions, we do not think lexical rules can or should be eliminated by representing argument structure phrasally.

3 Phrasal approaches

Instead of using lexical rules, non-lexical approaches capture morphological cognates and diathesis alternants for a single word (or root) by plugging the word into

[8] See G. Müller (2011) for a lexical account of Jacobs' data and Müller (2010a, Section 11.11.9.1) for discussion.

different phrasal constructions. The construction carries a meaning that combines with the word's meaning. Phrasal constructions such as the Intransitive, Transitive, and Ditransitive constructions replace the phrase structure rules or valence frames of other syntactic theories; others include the Caused Motion and Resultative constructions. The ditransitive construction means 'X caused Y to receive Z' and can combine with either a 3-argument verb like *fax* (*Pat faxed Bill the letter*) or a 2-argument verb like *bake* (*Pat baked Bill a cake*). In the latter case the construction licenses the recipient argument.

There are two major variants of phrasal approaches. In some versions constructions are phrase structure-like objects, that is, a certain configuration with part of speech and structural information is paired with a certain meaning (Alsina, 1996; Goldberg and Jackendoff, 2004; Bergen and Chang, 2005; Culicover and Jackendoff, 2005; Asudeh, Dalrymple and Toivonen, 2008, 2013; Jackendoff, 2011). On this view the ditransitive construction, for example, would be something like [NP V NP NP], with the meaning 'X caused Y to receive Z'.

Other authors assume non-phrasal grammatical constructs called *argument structure constructions* (ASCs). An ASC contains roughly the same information as a lexicalist's predicate argument structure but without a specific verb or other predicator. Goldberg's ASCs (1995, p. 3) contain grammatical relation names like SUBJ, OBJ, and OBL. Hence her ASC closely resembles an LFG functional structure, only without the particular verb specified. The verb is stored with some of its roles specified as *profiled*, which means they are destined for realization as direct grammatical relations (SUBJ or OBJ). Goldberg assumes that her argument structure constructions just specify grammatical functions that have to be realized together with a certain head. That is, such constructions can be underspecified with regard to linear order. The only requirement is that the parts of the construction have to be realized somewhere in a structure (Goldberg, 1995; Goldberg, 2006, p. 20).[9] How this comes about is not worked out in detail. We use the term phrasal approach for both notions of constructions, as pieces of phrase structure or as ASCs.

The lexicalist's predicate argument structure provides essential information for its potential combination with argument phrases. But it need not immediately combine with its specified arguments. Alternatively it can meet other fates: it can serve as the input to a lexical rule; it can combine first with a modifier in an adjunction structure; it can be coordinated with another word with the same predicate argument structure; instead of being realized locally, one or more of its arguments can be effectively transferred to another head's valence feature (raising

[9] 'Surface form need not specify a particular constituent order, nor even particular grammatical categories, although there are constructions that do specify these features.' (Goldberg, 2006, p. 20) Goldberg's (2006, p. 20) Figure 2.1 for a ditransitive construction shows the terms *agt, rec*, and *theme*, with lines linking them to the terms *Subj, Obj1*, and *Obj2*, respectively.

or argument transfer); or arguments can be saved for expression in some other syntactic position (partial fronting). These phenomena are discussed below.

In other words, the lexicalist's predicate argument structure indicates the verb's *potential* rather than *actual* combination with phrasal arguments. That potential need not always be instantiated since the argument structure can alternatively serve as input to a lexical rule. But on a phrasal approach in which the construction, whether conceived as a piece of phrase structure or an argument structure construction, directly specifies the *actual* syntactic realization of the arguments, that construction cannot serve as input to any rules applying at the word level.

In a sense there is no notion of 'input' or 'output' on the phrasal approach. A single clause can involve many constructions, involving not only basic argument realization such as the passive construction, but also constructions for extraction, raising, and so on. Interactions between these syntactic processes are captured by organizing constructions into inheritance hierarchies, from which a given sentence can inherit multiple constructions. (These hierarchies have never been described precisely, but have been shown to be problematical when applied to phrasal constructions (Müller, 2010b). Further problems for their application to both phrasal and non-lexical argument structure constructions are discussed in Section 8.1 below.) The systematic relationship between alternative realizations of a given root's arguments (active, passive, adjectival, etc.) is not captured by lexical rules, but rather by combining constructions.

Some phrasal proposals of the former type, where constructions are phrase structure-like objects, can be rejected for empirical reasons right away. Constituent order is often more flexible than people assume. Consider verb-particle constructions in Dutch and German. Booij (2002, Section 2; To appear) and Blom (2005), working in the frameworks of Construction Grammar and LFG, respectively, assume that particle verbs are licensed by phrasal constructions (pieces of phrase structure) in which the first slot is occupied by the particle.

(9) $[\ X\ [\ ]_V\ ]_{V'}$ where X = P, Adv, A, or N

Examples for specific Dutch constructions are:

(10) a. $[\ \text{af}\ [\ ]_V\ ]_{V'}$
b. $[\ \text{door}\ [\ ]_V\ ]_{V'}$
c. $[\ \text{op}\ [\ ]_V\ ]_{V'}$

This suggestion comes with the claim that particles cannot be fronted. This claim is made frequently in the literature, but it is based on introspection and wrong for languages like Dutch and German. On Dutch see Hoeksema, 1991, p. 19, on German Müller, 2002a,b, 2003b, 2007c.[10] A German example is given in (11);

[10]Some more fundamental remarks on introspection and corpus data with relation to particle verbs can also be found in Müller, 2007c; Meurers and Müller, 2009.

several pages of attested examples can be found in the cited references.

(11) *Los* damit *geht* es schon am 15. April.[11]
PART there.with went it already at.the 15 April
'It already started on April the 15th.'

Particle verbs allow for a certain flexibility in order, so they should not be represented as phrasal configurations describing adjacent elements. See Sag, 2007 for a lexical analysis of idioms that allow such flexibility.[12]

4 The pendulum of lexical and phrasal approaches

In the following subsection we discuss various frameworks that were suggested in the past 75 years of theoretical linguistics. Many assumptions of these frameworks play a role in current theories. We will zoom in on one clearly phrasal approach (GPSG) and discuss its problems in further subsections.

4.1 Historical context and the development of an earlier phrasal approach: GPSG

A phrasal approach was proposed in the 1980s in the form of Generalized Phrase Structure Grammar (GPSG). It is instructive to consider the problems that it faced and why it was abandoned, since those critiques also apply to current approaches. We begin with a brief background on theories prior to GPSG.

Categorial Grammar (CG) (Ajdukiewicz, 1935; Steedman, 2000) is the prototype for a lexical model. Every word (every functor) comes with descriptions of its arguments and the rules that combine functors with their arguments are very general and few in number. For instance an English transitive verb like *read* is assigned the lexical entry (s\np)/np. This means that *reads* takes an NP to its right and an NP to its left. The rules for combination do not contain any part of speech information. For instance the rule that combines a verb like *read* with its object has the form X/Y * Y = X. Such general combinatory rules have a component for semantic combination (for instance, functional application or composition).

Another branch of theoretical linguistics assumed phrase structure rules as base component in a transformational setting (Chomsky, 1957). While the rules of CG are binary branching and rather abstract, the early phrase structure rules were not. There were rules for VPs with ditransitive verbs that had three daughters (for

[11] taz, 01.03.2002, p. 8, see also Müller, 2005b, p. 313.

[12] Note also that the German example is best described as a clause with a complex internally structured constituent in front of the finite verb and it is doubtful whether linearization-based proposals like the ones in Kathol, 1995, p. 244–248 or Wetta, 2011 can capture this.

examples see Chomsky, 1965, p. 72, 96, 107). On some analyses phrase structure rules introduced rich semantic features directly into the phrase structure, such as CAUSE for causation (Chomsky, 1970, p. 192), an approach greatly expanded in the Generative Semantics school (Lakoff, 1969)

There were different answers on the question of how to integrate semantics into Generative Grammar: Transformational Grammar started out assigning semantics on the level of Deep Structure but problems quickly became apparent, which led to modifications of the framework and to interpretation rules that took into account Surface Structure as well (see Bach, 1976 for an overview). An alternative to the prevalent view in Transformational Grammar was proposed by Montague (1973), who assumed that interpretation is combined with the rules of syntactic combination. Bach (1976, p. 184) called this the *rule-to-rule assumption*. Also in the 1970s other non-transformational theories like TAG (Joshi, Levy and Takahashi, 1975), LFG (Bresnan and Kaplan, 1982), and GPSG (Gazdar, Klein, Pullum and Sag, 1985) were developed and some of them came with detailed semantic representations. For instance Gazdar (1982) and Gazdar, Klein, Pullum and Sag (1985, Chapter 10) are very explicit about the semantic representations and the combination rules for GPSG. They allow for rule-specific semantic interpretation and in fact propose a quite specific composition rule for passivized sentences (p. 219). That is, they share the rule-to-rule assumption.

While Montague's proposal was in the spirit of Categorial Grammar and assumed binary branching structures, GPSG was not. The authors of GPSG assume classical context free phrase structure rules, for example a VP rule with a verb and two objects on the right-hand side. Uszkoreit (1987) assumes (derived) rules for clauses in German that licenses a verb together with all of its arguments. While no interpretation rules are given in his book, it is clear that the respective rules would be combined with a semantic representation in a fully worked out version of the theory.

The GPSG of the 1980s resembled some current versions of Construction Grammar in its adoption of what we call a *plugging proposal*: a verb that is semantically compatible with a certain phrasal construction is plugged into this construction. Valence information is not represented as part of lexical items in GPSG. Instead lexical items had a number assigned to them and could be inserted into phrasal rules that had the same number. It is only in interaction between rules and these numbers that lexical items are paired with certain arguments. For instance *laugh* is of category 2 so it can form a VP if used with rule (12a) and *read*, of category 3, can form a VP with rule (12b).

(12) a. VP $\rightarrow$ H[2]
b. VP $\rightarrow$ H[3], NP

(The H stands for head, that is, for the verb in (12)).[13] On this model lexical rules are impossible because the verb has no valence feature to which lexical rules could apply. Alternations like the passive, for example, were captured entirely within the phrase structure component, through *meta-rules* that expanded the stock of phrase structure rules.

In the next subsections we look at some of the problems that this proposal faced in order to understand why it was finally given up and replaced by theories that assume a lexical representation of valence information. We will look at two phenomena here: morphological derivation, and partial frontings.

4.2 Morphological derivation

The first problem with the GPSG model is that there are morphological processes that are sensitive to valence (Müller, 2010a, p. 129). For instance *-able* derivation (and German *-bar* derivation) is possible with transitive verbs only as the examples in (13) show. To the right of each adjective is the set of arguments selected by the root verb, such as *lösen* ('solve') in (13a):

(13)	a.	lösbar solveable	(NP[nom], NP[acc])
	b.	vergleichbar comparable	(NP[nom], NP[acc], PP[mit])
	c.	* schlafbar sleepable	(NP[nom])
	d.	* helfbar helpable	(NP[nom], NP[dat])

The verbs have to have at least a nominative and an accusative argument (13a,b), intransitive verbs like *sleep* or *help* do not allow for the *-bar* derivation.[14]

[13](i) shows some rules for German, corresponding to the ones provided by Uszkoreit (1987, p. 165):

(i) a. VP → H[6], NP[+ACC]
b. VP → H[7], NP[+DAT]

The case information is specified in the rules. Lexical items just contain a number: 6 for verbs like *kennen* ('know') and *suchen* ('search') and 7 for verbs like *helfen* ('to help') and *vertrauen* ('to trust').

[14]A reviewer pointed out that there are intransitive verbs in English that allow *-able* derivation: *dependable* (*depend on*), *dispensable* (*dispense with*), *laughable* (*laugh at*), and even nouns as *knowledgeable*. The same is true for German, which has adjectives like *brennbar* ('inflamable', lit: 'burnable') and even the recent *unkaputtbar* ('unbreakable') which is derived from the adjective *kaputt*. Hoever, the point is that these cases are not productive. For instance, there is no * *countable*

Moreover, it will not work to say that *-bar* derivation applies only to verbs with certain category numbers (recall (12)). For example, *lösen* ('to solve') and *vergleichen* ('to compare') have different valence frames. This means that a GPSG rule for *-bar* derivation would have to mention several numbers that correspond to different valence frames that allow for *-bar* derivation. Since the numbers by themselves do not contain any information about the presence of a direct object, such a formulation of the *-bar* derivation rule would amount to stipulating a seemingly arbitrary set of numbers, and thereby miss an important generalization. This should be contrasted with models that assume a lexical representation of valence: the *-bar* suffix can be specified to attach to verbs whose valence list starts with two NPs, one in the nominative and one in the accusative. The generalization is captured easily in such models. See Müller, 2003b for a fully worked out analysis using lexical rules for *-bar* derivation.

4.3 Partial fronting

Another reason for needing valence information is to allow for variation in where in the sentence structure the arguments are discharged. For example, German allows for partial frontings like (14):

(14) a. [Erzählen] wird er seiner Tochter ein Märchen
tell will he.NOM his daughter.DAT a fairy.tale.ACC
können.
can
'He will be able to tell his daughter a fairy tale.'

b. [Ein Märchen erzählen] wird er seiner Tochter können.
a fairy.tale.ACC tell will he his daughter.DAT can

c. [Seiner Tochter ein Märchen erzählen] wird er
his daughter.DAT a fairy.tale.ACC tell will he.NOM
können.
can

The non-finite verb *erzählen* may be realized together with all its complements (14c) or with proper subsets of its complements (14a,b) in the so-called prefield to the left of the finite verb (subjects can also be fronted with non-finite verbs, but this is rather restricted). The problem for GPSG-like approaches is that the arguments are licensed by a certain phrase structure rule. To be able to analyze (14a) and (14b) one needs phrase structure rules that license the verb without any argument and with a single argument, respectively. In addition it has to be ensured

based on *count on* and no * *scoffable* based on *scoff at*. See Riehemann, 1993, 1998 for the integration of non-productive cases of *-bar* derivation into a construction network.

that the arguments that are missing in the prefield are realized in the remainder of the clause. It is not legitimate to omit obligatory arguments or realize arguments with other properties like a different case, as the examples in (15) show:

(15) a. Verschlungen hat er es nicht.
devoured has he it.ACC not
'He did not devour it.'

b. * Verschlungen hat er nicht.
devoured has he not

c. * Verschlungen hat er ihm nicht.
devoured has he him.DAT not

The obvious generalization is that the fronted and unfronted arguments must add up to the total set belonging to the verb. This shows that the verb has a lexical valence structure, unless some other explanation can be found.

There were various attempts to solve the partial fronting problem within GPSG. A review of those attempts reveals that the only successful one crucially adopted aspects of the lexical approach. Nerbonne (1986) and Johnson (1986) suggest GPSG analyses that can deal with the data. However, they assume a valence representation that uses binary features like NPacc and NPdat. This makes it possible to represent the fact that the accusative object is realized in the prefield in (14b) and may not be realized in the remainder of the clause (in the so-called middle field). Similarly the dative object in (14b) is realized in the middle field and hence may not be realized in the prefield. As both authors state clearly, this incorporates ideas from Categorial Grammar into GPSG. Theories like HPSG (Pollard and Sag, 1987, 1994) that were developed after GPSG, also explicitly borrow from CG and use the technique of argument composition that was developed by Geach (1970). See for instance (Pollard, 1996; Meurers, 2000; Müller, 1996, 2002a; Kathol, 2000) and also (Nerbonne, 1994).

If one does not want to go with the lexical specification of valence frames, there seem to be just two alternatives: remnant-movement analysis as often assumed in the transformational literature (G. Müller, 1998) and linearization-based approaches that allow for discontinuous constituents (Reape, 1994). In remnant-movement-based approaches it is assumed that the prefield is filled by a VP. The elements that are not realized in the prefield are moved out of the VP before the (remnant of the) VP is fronted. Such movement-based analyses are usually not assumed in non-transformational frameworks,[15] but apart from theoretical considerations there are also empirical facts that argue against remnant movement (See

[15] See Hinrichs and Nakazawa, 1994 for a notable exception. This work shows that a remnant movement analysis is possible even in a framework that does not make use of transformations to empty a VP and then move it.

Haider, 1993, p. 281, De Kuthy, 2002, Chapter 4.2.5, De Kuthy and Meurers, 2001, Section 2, and Fanselow, 2002 for details), and hence such analyses should not be adopted.

Linearization approaches allow for discontinuous linearization of the parts of a constituent such as a VP (Reape, 1994). The linearization idea seems to be what Goldberg (2006, p. 10) has in mind when she writes that some constructions (such as ASCs) do not specify word order, while others (such as the 'VP construction') do specify word order, and the 'overt order of arguments' is determined by combining them. To our knowledge the details of such an analysis have not been worked out within the Construction Grammar setting, so we will discuss explicit linearization proposals (Reape, 1994).

The linearization proposal by Reape (1994) was criticized by Kathol (2000, Section 8.6), who argued on the basis of agreement, case assignment, and passive for a CG-like analysis of German verbal complexes. Reape assumed that a raising verb like *scheinen* ('to seem') embeds a full clause and allows for a discontinuous linearization of the parts of this clause. Similarly verbs that allow for the formation of a verbal complex as for instance the control verb *verprechen* ('to promise') allowed the parts of its verbal argument to be serialized discontinuously. Kathol argued that such an approach fails to capture local agreement relations between the finite verb and the subject of a clause that is embedded under a raising verb. Consider his example in (16):

(16) Du scheinst /* scheint nicht zu verstehen.
you seem.2SG seem.3SG not to understand
'You don't seem to understand.'

The problem with a purely linearization-based account is that the verb that selects the subject (namely *verstehen*) does not agree with it, since it is an infinitive with *zu*. Instead we have agreement with the finite verb one level up (namely *scheinst*). An approach that assumes that *du* ('you') is an argument of *scheinen* ('seem') can account for the agreement relation locally. Similarly, there are so-called remote passives in German. The object of a deeply embedded verb gets assigned nominative (Höhle, 1978, p. 175–176):

(17) weil der Wagen oft zu reparieren versucht wurde
because the car.NOM often to repair tried was
'because many attempts were made to repair the car'

This is explained by an analysis that assumes that *zu reparieren versucht* behaves like a complex word with respect to passive and hence the accusative object of *zu reparieren versucht* has to be realized as nominative. See (Kathol, 1994; Pollard, 1994; Müller 1999, Chapter 15.3.6; 2002a, Chapter 3.2.5) for argument composition analyses.

Concluding this section, we have seen how the pendulum has swung between lexical and phrasal approaches. The evidence against the GPSG phrasal model from morphological derivation and partial fronting are still valid and the problems are not addressed by current phrasal approaches. On the other hand there is evidence that purely lexical approaches in the spirit of basic Categorical Grammar without any complex valence representations are not sufficient either. Of the theories on offer, the best place for that pendulum to come to rest, in our view, is at a theory in which words are equipped with valence information that is subject to the effects of lexical rules.[16]

5 Some putative advantages of phrasal models

In this section we examine certain claims to purported advantages of phrasal versions of Construction Grammar over lexical rules. Then in the following section we turn to positive arguments for lexical rules.

5.1 Usage-based theories

For many practitioners of Construction Grammar, their approach to syntax is deeply rooted in the ontological strictures of *usage-based* theories of language (Langacker, 1987; Goldberg, 1995; Croft, 2001; Tomasello, 2003). Usage-based theorists oppose the notion of 'linguistic rules conceived of as algebraic procedures for combining symbols that do not themselves contribute to meaning' (Tomasello, 2003, p. 99). All linguistic entities are symbolic of things in the realm of denotations; 'all have communicative significance because they all derive directly from language use' (*ibid*). Although the formatives of language may be rather abstract, they can never be divorced from their functional origin as a tool of communication. The usage-based view of constructions is summed up well in the following quote:

> The most important point is that constructions are nothing more or less than patterns of usage, which may therefore become relatively abstract if these patterns include many different kinds of specific linguistic symbols. But never are they empty rules devoid of semantic content or communicative function. (Tomasello, 2003, p. 100)

Thus constructions are said to differ from grammatical rules in two ways: they must carry meaning; and they reflect the actual 'patterns of usage' fairly directly.

Consider first the constraint that every element of the grammar must carry meaning, which we call the *semiotic dictum*. Do lexical or phrasal theories hew

[16] Specifically we formulate those lexical rules as unary branching trees (see Section 2.2 above).

the most closely to this dictum? Categorial Grammar, the paradigm of a lexical theory (recall Section 4), is a strong contender: it consists of meaningful words, with only a few very general combinatorial rules such as X/Y * Y = X. Given the rule-to-rule assumption those combinatorial rules specify the meaning of the whole as a function of the parts. Whether such a rule counts as meaningful in itself in Tomasello's sense is not clear.

What does seem clear is that the combinatorial rules of Construction Grammar, such as Goldberg's Correspondence Principle for combining a verb with a construction (1995, p. 50), have the same status as those combinatorial rules:

(18) The Correspondence Principle: Each participant that is lexically profiled and expressed must be fused with a profiled argument role of the construction. If a verb has three profiled participant roles, then one of them may be fused with a non-profiled argument role of a construction. (Goldberg, 1995, p. 50)

Both verbs and constructions are specified for participant roles, some of which are *profiled*. Argument profiling for verbs is 'lexically determined and highly conventionalized' (Goldberg, 1995, p. 46). Profiled argument roles of a construction are mapped to direct grammatical functions, i. e., SUBJ, OBJ, or OBJ2. By the Correspondence Principle the lexically profiled argument roles must be direct, unless there are three of them, in which case one may be indirect.[17] With respect to the semiotic dictum, the Correspondence Principle has the same status as the Categorial Grammar combinatorial rules: a meaningless algebraic rule that specifies the way to combine meaningful items.

Turning now to the lexicalist syntax we favor, some elements abide by the semiotic dictum while others do not. Phrase structure rules for intransitive and transitive VPs (or the respective HPSG ID schema) do not. Lexical valence structures clearly carry meaning since they are associated with particular verbs. In an English ditransitive, the first object expresses the role of 'intended recipient' of the referent of the second object. Hence *He carved her a toy* entails that he carved a toy with the intention that she receive it. So the lexical rule that adds a benefactive recipient argument to a verb adds meaning. Alternatively, a phrasal ditransitive construction might contribute that 'recipient' meaning.[18] Which structures have meaning is an empirical question for us.

In contrast, in Construction Grammar meaning is assumed *a priori* for all constructions. But while the ditransitive construction plausibly contributes meaning,

[17] We assume that the second sentence of (18) provides for exceptions to the first sentence.

[18] In Section 6.1 we argue that the recipient should be added in the lexical argument structure, not through a phrasal construction. See Wechsler (1991, p. 111–113; 1995, p. 88–89) for an analysis of English ditransitives with elements of both constructional and lexical approaches. It is based on Kiparsky's notion of a *thematically restricted positional linker* (1987; 1988).

no truth-conditional meaning has yet been discovered for either the intransitive or (mono)transitive constructions. Clearly the constructionist's evidence for the meaningfulness of *certain* constructions such as the ditransitive does not constitute evidence that *all* phrasal constructions have meaning. So the lexical and phrasal approaches seem to come out the same, as far as the semiotic dictum is concerned.

Now consider the second usage-based dictum, that the elements of the grammar directly reflect patterns of usage, which we call *the transparency dictum*. The Construction Grammar literature often presents their constructions informally in ways that suggest that they represent surface constituent order patterns: the transitive construction is 'X VERB Y' (Tomasello) or 'Subj V Obj' (Goldberg, 1995, 2006)[19]; the passive construction is 'X *was* VERB*ed by* Y' (Tomasello, 2003, p. 100) or 'Subj aux Vpp (PPby)' (Goldberg, 2006, p. 5). But a theory in which constructions consist of surface patterns was considered in detail and rejected by (Müller, 2006, Section 2), and does not accurately reflect Goldberg's actual theory.[20] The more detailed discussions present *argument structure constructions*, which are more abstract and rather like the lexicalists' grammatical elements (or perhaps an LFG f-structure): the transitive construction resembles a transitive valence structure (minus the verb itself); the passive construction resembles the passive lexical rule.

With respect to fulfilling the desiderata of usage-based theorists, we do not find any significant difference between the non-lexical and lexical approaches.

5.2 Coercion

Researchers working with plugging proposals usually take coercion as showing the usefulness of phrasal constructions. For instance, Anatol Stefanowitsch (Lecture in the lecture series *Algorithmen und Muster — Strukturen in der Sprache*, 2009) discussed the example in (19):

(19) Das Tor zur Welt Hrnglb öffnete sich ohne Vorwarnung und verschlang [sie] ... die Welt Hrnglb wird von Magiern erschaffen, die Träume zu Realität formen können, aber nicht in der Lage sind zu träumen. Haltet aus, Freunde. Und ihr da draußen, bitte träumt ihnen ein Tor.[21]

[19] Goldberg et al. (2004, p. 300) report about a language acquisition experiment that involves an SOV pattern. The SOV order is mentioned explicitly and seen as part of the construction.

[20] This applies to argument structure constructions only. In some of her papers Goldberg assumes that very specific phrase structural configurations are part of the constructions. For instance in her paper on complex predicates in Persian (Goldberg, 2003) she assigns V^0 and $\overline{V}$ categories. See Müller, 2010b, Section 4.9 for a critique of that analysis.

[21] http://www.elbenwaldforum.de/showflat.php?Cat=&Board=Tolkiens_Werke&Number=1457418&page=3&view=collapsed&sb=5&o=&fpart=16. 27.02.2010.

The crucial part is *bitte träumt ihnen ein Tor* ('Dream a gate for them'). In this fantasy context the word *träumen*, which is intransitive, is forced into the ditransitive construction and therefore gets a certain meaning. This forcing of a verb corresponds to overwriting or rather extending properties of the verb by the phrasal construction.

In cases in which the plugging proposals assume that information is overwritten or extended, lexical approaches assume mediating lexical rules. Briscoe and Copestake (1999, Section 4) have worked out a lexical approach in detail.[22] They discuss the ditransitive sentences in (20), which either correspond to the prototypical ditransitive construction (20a) or deviate from it in various ways.

(20) a. Mary gave Joe a present.
b. Joe painted Sally a picture.
c. Mary promised Joe a new car.
d. He tipped Bill two pounds.
e. The medicine brought him relief.
f. The music lent the party a festive air.
g. Jo gave Bob a punch.
h. He blew his wife a kiss.
i. She smiled herself an upgrade.

For the non-canonical examples they assume lexical rules that relate transitive (*paint*) and intransitive (*smile*) verbs to ditransitive ones and contribute the respective semantic information or the respective metaphorical extension. The example in (20i) is rather similar to the *träumen* example discussed above and is also analyzed with a lexical rule (page 509). Briscoe and Copestake note that this lexical rule is much more restricted in productivity than other lexical rules that were suggested by them. They take this as motivation for developing a representational format in which lexical items (including those that are derived by lexical rules) are associated with probabilities, so that differences in productivity of various patterns can be captured.

Looking narrowly at such cases, it is hard to see any rational grounds for choosing between the phrasal analysis and the lexical rule. But if we broaden our view, the lexical rule approach can be seen to have much wider application. Coercion is a very general pragmatic process, occurring in many contexts where no construction seems to be responsible (Nunberg, 1995). Nunberg cites many

'The gate to the world Hrnglb opened without warning and swallowed them. The world Hrnglb is created by magicians that can form reality from dreams but cannot dream themselves. Hold out, freinds! And you out there, please, dream a gate for them.'

[22] Kay (2005), working in the framework of CxG, also suggests unary constructions.

cases such as the restaurant waiter asking *Who is the ham sandwich?* (Nunberg, 1995, p. 115). Copestake and Briscoe (1992, p. 116) discuss the conversion of terms for animals to mass nouns (see also Copestake and Briscoe (1995, p. 36–43)). Example (21) is about a substance, not about a cute bunny.

(21) After several lorries had run over the body, there was rabbit splattered all over the road.

The authors suggest a lexical rule that maps a count noun onto a mass noun. This analysis is also assumed by Fillmore (1999, p. 114–115). Such coercion can occur without any syntactic context: one can answer the question *What's that stuff on the road?* or *What are you eating?* with the one-word utterance *Rabbit.* Some coercion happens to affect the complement structure of a verb, but this is simply a special case of a more general phenomenon that has been analyzed by rules of systematic polysemy.

5.3 Simplicity and polysemy

Much of the intuitive appeal of the plugging approach stems from its apparent simplicity relative to the use of lexical rules. But the claim to greater simplicity for Construction Grammar is based on misunderstandings of both lexical rules and Construction Grammar (specifically of Goldberg's (1995, 2006) version). It draws the distinction in the wrong place and misses the real differences between these approaches. This argument from simplicity is often repeated and so it is important to understand why it is incorrect.

Tomasello (2003) presents the argument as follows. Discussing first the lexical rules approach, Tomasello (2003, p. 160) writes that

> One implication of this view is that a verb must have listed in the lexicon a different meaning for virtually every different construction in which it participates [...]. For example, while the prototypical meaning of *cough* involves only one participant, the cougher, we may say such things as *He coughed her his cold*, in which there are three core participants. In the lexical rules approach, in order to produce this utterance the child's lexicon must have as an entry a ditransitive meaning for the verb *cough*. (Tomasello, 2003, p. 160)

Tomasello (2003, p. 160) then contrasts a Construction Grammar approach, citing Fillmore et al. (1988), Goldberg (1995), and Croft (2001). He concludes as follows:

> The main point is that if we grant that constructions may have meaning of their own, in relative independence of the lexical items involved, then we do not need to populate the lexicon with all kinds

> of implausible meanings for each of the verbs we use in everyday life. The construction grammar approach in which constructions have meanings is therefore both much simpler and much more plausible than the lexical rules approach. (Tomasello, 2003, p. 161)

This reflects a misunderstanding of lexical rules, as they are normally understood. There is no implausible sense populating the lexicon. The lexical rule approach to *He coughed her his cold* states that when the word *coughed* appears with two objects, the whole complex has a certain meaning. See Müller (2006, p. 876). Furthermore we explicitly distinguish between listed elements (lexical entries) and derived ones. The general term subsuming both is *lexical item*.

The simplicity argument also relies on a misunderstanding of a theory Tomasello advocates, namely the theory due to Goldberg (1995, 2006). For his argument to go through, Tomasello must tacitly assume that verbs can combine freely with constructions, that is, that the grammar does not place extrinsic constraints on such combinations. If it is necessary to also stipulate which verbs can appear in which constructions then the claim to greater simplicity collapses: each variant lexical item with its 'implausible meaning' under the lexical rule approach corresponds to a verb-plus-construction combination under the phrasal approach.

Passages such as the following may suggest that verbs and constructions are assumed to combine freely:[23]

> Constructions are combined freely to form actual expressions as long as they can be construed as not being in conflict (invoking the notion of construal is intended to allow for processes of accommodation or coercion). (Goldberg, 2006, p. 22)

> Allowing constructions to combine freely as long as there are no conflicts, allows for the infinitely creative potential of language. [...] That is, a speaker is free to creatively combine constructions as long as constructions exist in the language that can be combined suitably to categorize the target message, given that there is no conflict among the constructions. (Goldberg, 2006, p. 22)

But in fact Goldberg does not assume free combination, but rather that a verb is 'conventionally associated with a construction' (Goldberg, 1995, p. 50): verbs specify their participant roles and which of those are obligatory direct arguments (*profiled*, in Goldberg's terminology; see Section 3). In fact Goldberg herself (2006, p. 211) argues against Borer's 2003 putative assumption of free combination on the grounds that Borer is unable to account for the difference between *dine*

[23] The context of these quotes makes clear that the verb and the argument structure construction are considered constructions. See Goldberg (2006, p. 21, ex. (2)).

(intransitive), *eat* (optionally transitive), and *devour* (obligatorily transitive).[24] Despite Tomasello's comment above, Construction Grammar is no simpler than the lexical rules.

The resultative construction is often used to illustrate the simplicity argument. For example, Goldberg (1995, Chapter 7) assumes that the same lexical item for the verb *sneeze* is used in (22a) and (22b). It is simply inserted into different constructions:

(22) a. He sneezed.
b. He sneezed the napkin off the table.

The meaning of (22a) corresponds more or less to the verb meaning, since the verb is used in the Intransitive Construction. But the Caused-Motion Construction in (22b) contributes additional semantic information concerning the causation and movement: His sneezing caused the napkin to move off the table. *sneeze* is plugged into the Caused Motion Construction, which licenses the subject of *sneeze* and additionally provides two slots: one for the theme (*napkin*) and one for the goal (*off the table*). The lexical approach is essentially parallel, except that the lexical rule can feed further lexical processes like passivization (*The napkin was sneezed off the table*), and conversion to nouns or adjectives (see Sections 6.2 and 9).

In a nuanced comparison of the two approaches, Goldberg (1995, p. 139–140) considers again the added recipient argument in *Mary kicked Joe the ball*, where *kick* is lexically a 2-place verb. She notes that on the constructional view, 'the composite fused structure involving both verb and construction is stored in memory'. The verb itself retains its original meaning as a 2-place verb, so that 'we avoid implausible verb senses such as "to cause to receive by kicking".' The idea seems to be that the lexical approach, in contrast, must countenance such implausible verb senses since a lexical rule adds a third argument.

But the lexical and constructional approaches are actually indistinguishable on this point. The lexical rule does not produce a verb with the 'implausible sense' in (23a). Instead it produces the sense in (23b):

(23) a. **cause-to-receive-by-kicking**(*x, y, z*)
b. **cause**(**kick**(*x, y*),**receive**(*z,y*))

The same sort of 'composite fused structure' is assumed under either view. With respect to the semantic structure, the number and plausibility of senses, and the polyadicity of the semantic relations, the two theories are identical. They mainly

[24]Goldberg's critique cites a 2001 presentation by Borer with the same title as Borer, 2003. See Section 7.4 for more discussion of this issue. As far as we know, the *dine / eat / devour* minimal triplet originally came from Dowty (1989, p. 89–90).

differ in the way this representation fits into the larger theory of syntax. They also differ in another respect: on the lexical theory, the derived three-argument valence structure is associated with the phonological string *kicked*. Next we present evidence for that claim.

6 Evidence for lexical approaches

6.1 Valence and coordination

On the lexical account, the verb *paint* in (20b), for example, is lexically a 2-argument verb, while the unary branching node immediately dominating it is effectively a 3-argument verb. On the constructional view there is no such predicate seeking three arguments that dominates only the verb. Coordination provides evidence for the lexical account.

A generalization about word coordination is that two constituents that select the same number and type of dependents can be coordinated. The result of coordination is an object that has the selectional properties of each conjunct. The German examples in (24) show that the case requirement of the involved verbs has to be observed. In (24b,c) the coordinated verbs require accusative and dative respectively and since the case requirements are incompatible with unambiguously case marked nouns both of these examples are out.

(24) a. Ich kenne und unterstütze diesen Mann.
I know and support this man.ACC

b. * Ich kenne und helfe diesen Mann.
I know and help this man.ACC

c. * Ich kenne und helfe diesem Mann.
I know and help this man.DAT

Interestingly, it is possible to coordinate basic ditransitive verbs with verbs that have additional arguments licensed by the lexical rule. (25) provides examples in English and German ((25b) is quoted from Müller, 2013, p. 420):

(25) a. She then offered and made me a wonderful espresso — nice.[25]

b. ich hab ihr jetzt diese Ladung Muffins mit den Herzchen
I have her now this load Muffins with the little.heart
drauf gebacken und gegeben.[26]
there.on baked and given
'I have now baked and given her this load of Muffins with the little

[25] http://www.thespinroom.com.au/?p=102. 07.07.2012

[26] http://www.musiker-board.de/diverses-ot/35977-die-liebe-637-print.html. 08.06.2012

heart on top.'

These sentences show that both verbs are 3-argument verbs at the V^0 level, since they involve V^0 coordination:

(26) [$_{V^0}$ offered and made] [$_{NP}$ me] [$_{NP}$ a wonderful espresso]

This is expected under the lexical rule analysis but not the non-lexical constructional one.[27]

Summarizing the coordination argument: Coordinated verbs generally must have compatible syntactic properties like valence properties. This means that in (25b), for example, *gebacken* ('baked') and *gegeben* ('given') have the same valence properties. In the lexical approach the creation verb *gebacken*, together with a lexical rule, licenses a ditransitive verb. So it can be coordinated with *gegeben*. In the phrasal approach however, the verb *gebacken* has two argument roles and is not compatible with the verb *gegeben*, which has three argument roles. In the phrasal model, *gebacken* can only realize three arguments when it enters the ditransitive phrasal construction or argument structure construction. But in sentences like (25) it is not *gebacken* alone that enters the phrasal syntax, but rather the combination of *gebacken* and *gegeben*. On that view the verbs are incompatible as far as the semantic roles are concerned.

To fix this under the phrasal approach, one could posit a mechanism such that the semantic roles that are required for the coordinate phrase *baked and given* are shared by each of its conjunct verbs and that they are therefore compatible. But this would amount to saying that there are several verb senses for *baked*, something that the anti-lexicalists claim to avoid, as discussed in the next section.

A reviewer correctly observes that a version of the ASC approach could work in the exactly same way as our lexical analysis. Our ditransitive lexical rule would simply be rechristened as a 'ditransitive ASC'. This construction would combine with *baked*, thus adding the third argument, prior to its coordination with *gave*. As long as the ASC approach is a non-distinct notational variant of the lexical rule approach then of course it works in exactly the same way. But the literature on the ASC approach represents it as a radical alternative to lexical rules, in

[27] One might wonder whether these sentences could be instances of Right Node Raising (RNR) out of coordinated VPs (Bresnan, 1974; Abbott, 1976):

(i) She [offered ___] and [made me ___] a wonderful espresso.

But this cannot be right. Under such an analysis the first verb has been used without a benefactive or recipient object. But *me* is interpreted as the recipient of both the offering and making. Secondly, the second object can be an unstressed pronoun (*She offered and made me it*, which is not possible in RNR. Note that *offered and made* cannot be a pseudo-coordination meaning 'offered to make'. This is possible only with stem forms of certain verbs such as *try*.

which constructions are combined through inheritance hierarchies, instead of allowing lexical rules to alter the argument structure of a verb prior to its syntactic combination with the other words and phrases.

The reviewer also remarked that examples like (27) show that the benefactive argument has to be introduced on the phrasal level.

(27) I designed and built him a house.

Both *designed* and *built* are bivalent verbs and *him* is the benefactive that extends both *designed* and *built*. However, we assume that sentences like (27) can be analyzed as coordination of two verbal items that are licenced by the lexical rule that introduces the benefactive argument. That is, the benefactive is introduced before the coordination.

The coordination facts illustrate a more general point. The output of a lexical rule such as the one that would apply in the analysis of *gebacken* in (25b) is just a word (an X^0), so it has the same syntactic distribution as an underived word with the same category and valence feature. This important generalization follows from the lexical account while on the phrasal view it is at best mysterious. The point can be shown with any of the lexical rules that the anti-lexicalists are so keen to eliminate in favor of phrasal constructions. For example, active and passive verbs can be coordinated, as long as they have the same valence properties, as in this Swedish example:

(28) Golfklubben begärde och beviljade-s marklov för
golf.club.DEF requested and granted-PASS ground.permit for
banbygget efter en hel del förhandlingar och kompromisser med
track.build.DEF after a whole part negotiations and compromises with
Länsstyrelsen och Naturvårdsverket.[28]
county.board.DEF and nature.protection.agency.DEF
'The golf club requested and was granted a ground permit for fairlane construction after a lot of negotiations and compromises with the County Board and the Environmental Protection Agency.'

(English works the same way, as shown by the grammatical translation line.) The passive of the ditransitive verb *bevilja* 'grant' retains one object, so it is effectively transitive and can be coordinated with the active transitive *begära* 'request'.

Moreover, the English passive verb form, being a participle, can feed a second lexical rule deriving adjectives from verbs (see Figure 3 above). All categories of English participles can be converted to adjectives (Bresnan, 1982c, 2001, Chapter 3):

(29) a. active present participles (cp. The leaf is falling): *the falling leaf*

[28] http://www.lyckselegolf.se/index.asp?Sida=82

b. active past participles (cp. The leaf has fallen): *the fallen leaf*

c. passive participles (cp. The toy is being broken (by the child).): *the broken toy*

That the derived forms are adjectives, not verbs, is shown by a host of properties, including negative *un-* prefixation: *unbroken* means 'not broken', just as *unkind* means 'not kind', while the *un-* appearing on verbs indicates, not negation, but action reversal, as in *untie* (Bresnan, 1982c, p. 21, 2001, Chapter 3). Predicate adjectives preserve the subject of predication of the verb and for prenominal adjectives the rule is simply that the role that would be assigned to the subject goes to the modified noun instead (*The toy remained (un-)broken.*; *the broken toy*). Being an A^0, such a form can be coordinated with another A^0, as in the following:

(30) a. The suspect should be considered [armed and dangerous].

b. any [old, rotting, or broken] toys

In (30b), three adjectives are coordinated, one underived (*old*), one derived from a present participle (*rotting*), and one from a passive participle (*broken*). Such coordination is completely mundane on a lexical theory. Each A^0 conjunct has a valence feature (in HPSG it would be the SPR feature for predicates or the MOD feature for the prenominal modifiers), which is shared with the mother node of the coordinate structure. But the point of the phrasal (or ASC) theory is to deny that words have such valence features.

The claim that lexical derivation of valence structure is distinct from phrasal combination is further supported with evidence from deverbal nominalization (Wechsler, 2008b). To derive nouns from verbs, *-ing* suffixation productively applies to all declinable verbs (*the shooting of the prisoner*), while morphological productivity is severely limited for various other suffixes such as *-(a)tion* (**the shootation of the prisoner*). So forms such as *destruction* and *distribution* must be retrieved from memory while *-ing* nouns such as *looting* or *growing* could be (and in the case of rare verbs or neologisms, must be) derived from the verb or the root through the application of a rule (Zucchi, 1993). This difference explains why *ing*-nominals always retain the argument structure of the cognate verb, while other forms show some variation. A famous example is the lack of the agent argument for the noun *growth* versus its retention by the noun *growing*: **John's growth of tomatoes* versus *John's growing of tomatoes* (Chomsky, 1970).[29]

But what sort of rule derives the *-ing* nouns, a lexical rule or a phrasal one? On Marantz's (1997) phrasal analysis, a phrasal construction (notated as *vP*) is responsible for assigning the agent role of *-ing* nouns such as *growing*. For him, none of the words directly selects an agent via its argument structure. The *-ing*

[29] See Section 7.3 for further discussion.

forms are permitted to appear in the *vP* construction, which licenses the possessive agent. Non-*ing* nouns such as *destruction* and *growth* do not appear in *vP*. Whether they allow expression of the agent depends on semantic and pragmatic properties of the word: *destruction* involves external causation so it does allow an agent, while *growth* involves internal causation so it does not allow an agent.

However, a problem for Marantz is that these two types of nouns can coordinate and share dependents (example (31a) is from Wechsler, 2008b, Section 7):

(31) a. With nothing left after the soldier's [destruction and looting] of their home, they reboarded their coach and set out for the port of Calais.[30]

b. The [cultivation, growing or distribution] of medical marijuana within the County shall at all times occur within a secure, locked, and fully enclosed structure, including a ceiling, roof or top, and shall meet the following requirements.[31]

On the phrasal analysis, the nouns *looting* and *growing* occur in one type of syntactic environment (namely *vP*), while forms *destruction*, *cultivation*, and *distribution* occur in a different syntactic environment. This places contradictory demands on the structure of coordinations like those in (31). As far as we know, neither this problem nor the others raised by Wechsler (2008b) have even been addressed by advocates of the phrasal theory of argument structure.

Consider one last example. In an influential phrasal analysis, Hale and Keyser (1993) derived denominal verbs like *to saddle* through noun incorporation out of a structure akin to [PUT a saddle ON x]. Again, verbs with this putative derivation routinely coordinate and share dependents with verbs of other types:

(32) Realizing the dire results of such a capture and that he was the only one to prevent it, he quickly [saddled and mounted] his trusted horse and with a grim determination began a journey that would become legendary.[32]

As in all of these X^0 coordination cases, under the phrasal analysis the two verbs place contradictory demands on a single phrase structure.

A lexical valence structure is an abstraction or generalization over various occurrences of the verb in syntactic contexts. To be sure, one key use of that valence structure is simply to indicate what sort of phrases the verb must (or can) combine with, and the result of semantic composition; if that were the whole story then the phrasal theory would be viable. But it is not. As it turns out, this lexical valence

[30] http://www.amazon.com/review/R3IG4M3Q6YYNFT, 21.07.2012

[31] http://www.scribd.com/doc/64013640/Tulare-County-medical-cannabis-cultivation-ordinance#page=1, 22.10.2012

[32] http://www.jouetthouse.org/index.php?option=com_content&view=article&id=56&Itemid=63, 21.07.2012

structure, once abstracted, can alternatively be used in other ways: among other possibilities, the verb (crucially including its valence structure) can be coordinated with other verbs that have a similar valence structure; or it can serve as the input to lexical rules specifying a new word bearing a systematic relation to the input word. The coordination and lexical derivation facts follow from the lexical view, while the phrasal theory at best leaves these facts as mysterious and at worst leads to irreconcilable contradictions for the phrase structure.

6.2 Valence and derivational morphology

Goldberg and Jackendoff (2004), Alsina (1996), and Asudeh, Dalrymple and Toivonen (2008, 2013) suggest analyzing resultative constructions and/or caused motion constructions as phrasal constructions. As was argued in Müller, 2006 this is incompatible with the assumption of Lexical Integrity, that is, that word formation happens before syntax (Bresnan and Mchombo, 1995).[33]

Let us consider a concrete example, such as (33):

(33) a. Er tanzt die Schuhe blutig / in Stücke.
he dances the shoes bloody into pieces

b. die in Stücke / blutig getanzten Schuhe
the into pieces bloody danced shoes

c. * die getanzten Schuhe
the danced shoes

The shoes are not a semantic argument of *tanzt*. Nevertheless the referent of the NP that is realized as accusative NP in (33a) is the element the adjectival participle in (33b) predicates over. Adjectival participles like the one in (33b) are derived from a passive participle of a verb that governs an accusative object. If the accusative object is licensed phrasally by configurations like the one in (33a) it cannot be explained why the participle *getanzte* can be formed despite the absence of an accusative object. See Müller, 2006, Section 5 for further examples of the interaction of resultatives and morphology.

The conclusion, which was drawn in the late 70s and early 80s by Dowty (1978, p. 412) and Bresnan (1982c, p. 21), is that phenomena that feed morphology should be treated lexically. The natural analysis in frameworks like HPSG, CG, CxG, and LFG is therefore one that assumes a lexical rule for the licensing of resultative constructions. See Verspoor, 1997, Wechsler, 1997, Wechsler and

[33] Asudeh et al. (2013, p. 14) claim that the Swedish Directed Motion Construction does not interact with derivational morphology. However, the parallel German construction does interact with derivational morphology. The absence of this interaction in Swedish can be explained by other factors of Swedish grammar and given this we believe it to be more appropriate to assume an analysis that captures both the German and the Swedish data in the same way.

Noh, 2001, Wunderlich 1992, p. 45; 1997, p. 120–126, Kaufmann and Wunderlich, 1998, Müller, 2002a, Chapter 5, Kay, 2005, and Simpson, 1983 for lexical proposals in some of these frameworks.

This argument is similar to the one that was discussed in connection with the GPSG representation of valence in Section 4.2: morphological processes have to be able to see the valence of the element they attach to. This is not the case if arguments are introduced by phrasal configurations after the morphology level.

7 Radical underspecification: the end of argument structure?

7.1 Neo-Davidsonianism

In the last section we examined proposals that assume that verbs come with certain argument roles and are inserted into prespecified structures that may contribute additional arguments. While we showed that this is not without problems, there are even more radical proposals that the construction adds all agent arguments, or even all arguments. The notion that the agent argument should be severed from its verbs is put forth by Marantz (1984, 1997), Kratzer (1996), Embick (2004) and others. Others suggest that no arguments are selected by the verb. Borer (2003) calls such proposals *exoskeletal* since the structure of the clause is not determined by the predicate, that is, the verb does not project an inner 'skeleton' of the clause. Counter to such proposals are *endoskeletal* approaches, in which the structure of the clause is determined by the predicate, that is, lexical proposals. The radical exoskeletal proposals are mainly proposed in Mainstream Generative Grammar (Borer, 1994, 2003, 2005; Schein, 1993; Hale and Keyser, 1997; Lohndal, 2012) but can also be found in HPSG (Haugereid, 2009). We will not discuss these proposals in detail here, but we review the main issues insofar as they relate to the question of lexical argument structure.[34] We conclude that the available empirical evidence favors the lexical argument structure approach over such alternatives.

Davidson (1967) argued for an event variable in the logical form of action sentences (34a). Dowty (1989) coined the term *neo-Davidsonian* for the variant in (34b), in which the verb translates to a property of events, and the subject and complement dependents are translated as arguments of secondary predicates such as **agent** and **theme**. (Dowty (1989) called the system in (34a) an *ordered argument system*.) Kratzer (1996) further noted the possibility of mixed accounts such as (34c), in which the agent (subject) argument is severed from the **kill** relation,

[34] See Müller, 2010a, Section 11.11.3 for a detailed discussion of Haugereid's approach.

but the theme (object) remains an argument of the **kill** relation.[35]

(34) a. *kill*: $\lambda y \lambda x \exists e[\textbf{kill}(e, x, y)]$ (Davidsonian)
b. *kill*: $\lambda y \lambda x \exists e[\textbf{kill}(e) \wedge \textbf{agent}(e, x) \wedge \textbf{theme}(e, y)]$ (neo-Davidsonian)
c. *kill*: $\lambda y \lambda x \exists e[\textbf{kill}(e, y) \wedge \textbf{agent}(e, x)]$ (mixed)

Kratzer (1996) observed that a distinction between Davidsonian, neo-Davidsonian and mixed can be made either 'in the syntax' or 'in the conceptual structure' (Kratzer, 1996, p. 110–111). For example, on a lexical approach of the sort we advocate here, any of the three alternatives in (34) could be posited as the semantic content of the verb *kill*. A lexical entry for *kill* on the mixed model appears in (35).

(35)
$$\begin{bmatrix} \text{PHON} & \langle\, \textit{kill} \,\rangle \\ \text{ARG-ST} & \left\langle \text{NP}_x, \text{NP}_y \right\rangle \\ \text{CONTENT} & \textbf{kill}(e, y) \wedge \textbf{agent}(e, x) \end{bmatrix}$$

In other words, the lexical approach is neutral on this question of the 'conceptual structure' of eventualities, as noted already in a different connection in Section 5.3. For that reason, certain semantic arguments for the neo-Davidsonian approach, such as those put forth by Schein (1993, Chapter 4) and Lohndal (2012), do not directly bear upon the issue of lexicalism, as far as we can tell.

But Kratzer (1996), among others, has gone further and argued for an account that is neo-Davidsonian (or rather, mixed) 'in the syntax'. Kratzer's claim is that the verb specifies only the internal argument(s), as in (36a) or (36b), while the agent (external argument) role is assigned by the phrasal structure. On the 'neo-Davidsonian in the syntax' view, the lexical representation of the verb has no arguments at all, except the event variable, as shown in (36c).

(36) a. *kill*: $\lambda y \lambda e[\textbf{kill}(e, y)]$ (agent is severed)
b. *kill*: $\lambda y \lambda e[\textbf{kill}(e) \wedge \textbf{theme}(e, y)]$ (agent is severed)
c. *kill*: $\lambda e[\textbf{kill}(e))]$ (all arguments severed)

On such accounts, the remaining dependents of the verb receive their semantic roles from silent secondary predicates, which are usually assumed to occupy the positions of functional heads in the phrase structure. An Event Identification rule identifies the event variables of the verb and the silent light verb Kratzer (1996, p. 22); this is why the existential quantifiers in (34) have been replaced with lambda operators in (36). A standard term for the agent-assigning silent

[35]The event variable is shown as existentially bound, as in Davidson's original account. As discussed below, in Kratzer's version it must be bound by a lambda operator instead.

predicate is 'little *v*'. These extra-lexical dependents are the analogues of the ones contributed by the constructions in Construction Grammar.

In the following subsections we address arguments that have been put forth in favor of the 'little v' hypothesis, from idiom asymmetries (Section 7.2) and deverbal nominals (Section 7.3). We argue that the evidence actually favors the lexical view. Then we turn to problems for exoskeletal approaches, from idiosyncratic syntactic selection (Section 7.4) and expletives (Section 7.5). We conclude with a look at the treatment of idiosyncratic syntactic selection under Borer's exoskeletal theory (Section 7.6), and a summary (Section 7.7).

7.2 Little *v* and idiom asymmetries

Marantz (1984) and Kratzer (1996) argued for severing the agent from the argument structure as in (36a), on the basis of putative idiom asymmetries. Marantz (1984) observed that while English has many idioms and specialized meanings for verbs in which the internal argument is the fixed part of the idiom and the external argument is free, the reverse situation is considerably rarer. To put it differently, the nature of the role played by the subject argument often depends on the filler of the object position, but not vice versa. To take Kratzer's examples (Kratzer, 1996, p. 114):

(37) a. kill a cockroach
b. kill a conversation
c. kill an evening watching TV
d. kill a bottle (i.e. empty it)
e. kill an audience (i.e., wow them)

On the other hand, one does not often find special meanings of a verb associated with the choice of subject, leaving the object position open (examples from Marantz, 1984, p. 26):

(38) a. Harry killed NP.
b. Everyone is always killing NP.
c. The drunk refused to kill NP.
d. Silence certainly can kill NP.

Kratzer observes that a mixed representation of *kill* as in (39a) allows us to specify varying meanings that depend upon its sole NP argument.

(39) a. *kill*: $\lambda y \lambda e[\textbf{kill}(e, y)]$

b. If *a* is a time interval, then kill(e, a) = truth if e is an event of wasting *a*
If *a* is animate, then kill(e, a) = truth if e is an event in which *a* dies
. . . etc.

On the polyadic (Davidsonian) theory, the meaning could similarly be made to depend upon the filler of the agent role. On the polyadic view, 'there is no technical obstacle' (Kratzer, 1996, p. 116) to conditions like those in (39b), except reversed, so that it is the filler of the agent role instead of the theme role that affects the meaning. But, she writes, this could not be done if the agent is not an argument of the verb. According to Kratzer, the agent-severed representation (such as (39a)) disallows similar constraints on the meaning that depend upon the agent, thereby capturing the idiom asymmetry.

But as noted by Wechsler (2005), 'there is no technical obstacle' to specifying agent-dependent meanings even if the Agent has been severed from the verb as Kratzer proposes. It is true that there is no variable for the agent in (39a). But there is an event variable *e*, and the language user must be able to identify the agent of *e* in order to interpret the sentence. So one could replace the variable *a* with 'the agent of *e*' in the expressions in (39b), and thereby create verbs that violate the idiom asymmetry.

While this may seem to be a narrow technical or even pedantic point, it is nonetheless crucial. Suppose we try to repair Kratzer's argument with an additional assumption: that modulations in the meaning of a polysemous verb can only depend upon arguments of the *relation* denoted by that verb, and not on other participants in the event. Under that additional assumption, it makes no difference whether the agent is severed from the lexical entry or not. For example, consider the following (mixed) neo-Davidsonian representation of the semantic content in the lexical entry of *kill*:

(40) *kill*: $\lambda y \lambda x \lambda e[\mathbf{kill}(e, y) \wedge \mathbf{agent}(e, x)]$

Assuming that sense modulations can only be affected by arguments of the *kill(e,y)* relation, we derive the idiom asymmetry, even if (40) is the lexical entry for *kill*. So suppose that we try to fix Kratzer's argument with a different assumption: that modulations in the meaning of a polysemous verb can only depend upon an argument of the lexically denoted function. Kratzer's 'neo-Davidsonian in the syntax' lexical entry in (36a) lacks the agent argument, while the lexical entry in (40) clearly has one. But Kratzer's entry still fails to predict the asymmetry because, as noted above, it has the *e* argument and so the sense modulation can be conditioned on the 'agent of *e*'. As noted above, that event argument cannot be eliminated (for example through existential quantification) because it is needed in order to undergo event identification with the event argument of the silent light verb that introduces the agent Kratzer (1996, p. 22).

Moreover, recasting Kratzer's account in lexicalist terms allows for verbs to vary. This is an important advantage, because the putative asymmetry is only a tendency. Following are examples in which the subject is a fixed part of the idiom and there are open slots for non-subjects:

(41) a. A little bird told X that S.
'X heard the rumor that S' (Nunberg et al., 1994, p. 526)

b. The cat's got x's tongue.
'X cannot speak.' (Bresnan, 1982a, p. 349–350)

c. What's eating x?
'Why is X so galled?' (Bresnan, 1982a, p. 349–350)

Further data and discussion of subject idioms in English and German can be found in Müller, 2007a, Section 3.2.1.

The tendency towards a subject-object asymmetry plausibly has an independent explanation. Nunberg, Sag and Wasow (1994) argue that the subject-object asymmetry is a side-effect of an animacy asymmetry. The open positions of idioms tend to be animate while the fixed positions tend to be inanimate. Nunberg et al. (1994) derive these animacy generalizations from the figurative and proverbial nature of the metaphorical transfers that give rise to idioms. If there is an independent explanation for this tendency, then a lexicalist grammar successfully encodes those patterns, perhaps with a mixed neo-Davidsonian lexical decomposition, as explained above (see Wechsler (2005) for such a lexical account of the verbs *buy* and *sell*). But the 'little v' hypothesis rigidly predicts this asymmetry for all agentive verbs, and that prediction is not borne out.

7.3 Deverbal nominals

An influential argument against lexical argument structure involves English deverbal nominals and the causative alternation. It originates from a mention in Chomsky (1970), and is developed in detail by Marantz (1997); see also Pesetsky (1996) and Harley and Noyer (2000). The argument is often repeated, but it turns out that the empirical basis of the argument is incorrect, and the actual facts point in the opposite direction, in favor of lexical argument structure (Wechsler, 2008a,b).

Certain English causative alternation verbs allow optional omission of the agent argument (42), while the cognate nominal disallows expression of the agent (43):

(42) a. that John grows tomatoes

b. that tomatoes grow

(43) a. * John's growth of tomatoes
b. the tomatoes' growth, the growth of the tomatoes

In contrast, nominals derived from obligatorily transitive verbs such as *destroy* allow expression of the agent, as shown in (45a):

(44) a. that the army destroyed the city
b. * that the city destroyed

(45) a. the army's destruction of the city
b. the city's destruction

Following a suggestion by Chomsky (1970), Marantz (1997) argued on the basis of these data that the agent role is lacking from lexical entries. In verbal projections like (42) and (44) the agent role is assigned in the syntax by little *v*. Nominal projections like (43) and (45) lack little *v*. Instead, pragmatics takes over to determine which agents can be expressed by the possessive phrase: the possessive can express 'the sort of agent implied by an event with an external rather than an internal cause' because only the former can 'easily be reconstructed' (quoted from Marantz (1997, p. 218)). The destruction of a city has a cause external to the city, while the growth of tomatoes is internally caused by the tomatoes themselves (Smith, 1970). Marantz points out that this explanation is unavailable if the noun is derived from a verb with an argument structure specifying its agent, since the deverbal nominal would inherit the agent of a causative alternation verb.

The empirical basis for this argument is the putative mismatch between the allowability of agent arguments, across some verb-noun cognate pairs: e.g. *grow* allows the agent but *growth* does not. But it turns out that the *grow/growth* pattern is rare. Most deverbal nominals precisely parallel the cognate verb: if the verb has an agent, so does the noun. Moreover, there is a ready explanation for the exceptional cases that exhibit the *grow/growth* pattern (Wechsler, 2008b). First consider non-alternating theme-only intransitives ('unaccusatives'), as in (46) and non-alternating transitives as in (47). The pattern is clear: if the verb is agentless, then so is the noun:

(46) *arriv(al), disappear(ance), fall* etc.:
a. A letter arrived.
b. the arrival of the letter
c. * The mailman arrived a letter.
d. * the mailman's arrival of the letter

(47) *destroy/destruction, construct(ion), creat(ion), assign(ment)* etc.:
a. The army is destroying the city.

b. the army's destruction of the city

This favors the view that the noun inherits the lexical argument structure of the verb. For the anti-lexicalist, the badness of (46c) and (46d), respectively, would have to receive independent explanations. For example, on Harley and Noyer's 2000 proposal, (46c) is disallowed because a feature of the root ARRIVE prevents it from appearing in the context of *v*, but (46d) is instead ruled out because the cause of an event of arrival cannot be easily reconstructed from world knowledge. This exact duplication in two separate components of the linguistic system would have to be replicated across all non-alternating intransitive and transitive verbs, a situation that is highly implausible.

Turning to causative alternation verbs, Marantz's argument is based on the implicit generalization that noun cognates of causative alternation verbs (typically) lack the agent argument. But apart from the one example of *grow/growth*, there do not seem to be any clear cases of this pattern. Besides *grow(th)*, Chomsky 1970, examples (7c) and (8c) cited two experiencer predicates, *amuse* and *interest*: *John amused (interested) the children with his stories* versus **John's amusement (interest) of the children with his stories*. But this was later shown by Rappaport (1983) and Dowty (1989) to have an independent aspectual explanation. Deverbal experiencer nouns like *amusement* and *interest* typically denote a mental state, where the corresponding verb denotes an event in which such a mental state comes about or is caused. These result nominals lack not only the agent but all the eventive arguments of the verb, because they do not refer to events. Exactly to the extent that such nouns can be construed as representing events, expression of the agent becomes acceptable.

In a response to Chomsky 1970, Carlota Smith (1972) surveyed Webster's dictionary and found no support for Chomsky's claim that deverbal nominals do not inherit agent arguments from causative alternation verbs. She listed many counterexamples, including '*explode, divide, accelerate, expand, repeat, neutralize, conclude, unify*, and so on at length.' (Smith, 1972, p. 137). Harley and Noyer (2000) also noted many so-called 'exceptions': *explode, accumulate, separate, unify, disperse, transform, dissolve/dissolution, detach(ment), disengage-(ment)*, and so on. The simple fact is that these are not exceptions because there is no generalization to which they can be exceptions. These long lists of verbs represent the norm, especially for suffix-derived nominals (in *-tion, -ment*, etc.). Many zero-derived nominals from alternating verbs also allow the agent, such as *change, release*, and *use*: *My constant change of mentors from 1992–1997. The frequent release of the prisoners by the governor. The frequent use of sharp tools by underage children.* (examples from Borer (2003, fn. 13)).[36]

[36]Pesetsky (1996, p. 79, ex. (231)) assigns a star to *the thief's return of the money*, but it is

Like the experiencer nouns mentioned above, many zero-derived nominals lack event readings. Some reject all the arguments of the corresponding eventive verb, not just the agent: **the freeze of the water, *the break of the window*, and so on. In the judgment of the second author, *his drop of the ball* is slightly odd, but *the drop of the ball* has exactly the same degree of oddness. The locution *a drop in temperature* matches the verbal one *The temperature dropped*, and both verbal and nominal forms disallow the agent: **The storm dropped the temperature. *the storm's drop of the temperature*. In short, the facts seem to point in exactly the opposite direction from what has been assumed in this oft-repeated argument against lexical valence. Apart from the one isolated case of *grow/growth*, event-denoting deverbal nominals match their cognate verbs in their argument patterns.

Turning to *grow/growth* itself, we find a simple explanation for its unusual behavior (Wechsler, 2008b). When the noun *growth* entered the English language, causative (transitive) *grow* did not exist. The OED provides these dates of the earliest attestations of *grow* and *growth*:

(48) a. intransitive *grow*: c725 'be verdant' ... 'increase' (intransitive)
b. the noun *growth*: 1587 'increase' (intransitive)
c. transitive *grow*: 1774 'cultivate (crops)'

Thus *growth* entered the language at a time when transitive *grow* did not exist. The argument structure and meaning were inherited by the noun from its source verb, and then preserved into present-day English. This makes perfect sense if, as we claim, words have predicate argument structures. Nominalization by *-th* suffixation is not productive in English, so *growth* is listed in the lexicon. To explain why *growth* lacks the agent we need only assume that a lexical entry's predicate argument structure dictates whether it takes an agent argument or not. So even this one word provides evidence for lexical argument structure.

7.4 Idiosyncratic syntactic selections

The notion of lexical valence structure immediately explains why the argument realization patterns are strongly correlated with the particular lexical heads selecting those arguments. It is not sufficient to have general lexical items without valency information and let the syntax and world knowledge decide about argument realizations, because not all realizational patterns are determined by the meaning. The form of the preposition of a prepositional object is sometimes loosely semantically motivated but in other cases arbitrary. For example, the valence structure

acceptable to many speakers, the *Oxford English Dictionary* lists a transitive sense for the noun *return* (definition 11a), and corpus examples like *her return of the spoils* are not hard to find.

of the English verb *depend* captures the fact that it selects an *on*-PP to express one of its semantic arguments:

(49) a. John depends on Mary. (*counts, relies,* etc.)

b. John trusts (*on) Mary.

c. $\begin{bmatrix} \text{PHON} & \langle\, \textit{depend} \,\rangle \\ \text{ARG-ST} & \left\langle \text{NP}_{\boxed{x}} \text{ , PP}[\textit{on}]_{\boxed{y}} \right\rangle \\ \text{CONTENT} & \textbf{depend}(x,y) \end{bmatrix}$

Such idiosyncratic lexical selection is utterly pervasive in human language. The verb or other predicator often determines the choice between direct and oblique morphology, and for obliques, it determines the choice of adposition or oblique case. In some languages such as Icelandic even the subject case can be selected by the verb (Zaenen, Maling and Thráinsson, 1985).

Selection is language-specific. English *wait* selects *for* (German *für*) while German *warten* selects *auf* ('on') with an accusative object:

(50) a. I am waiting for my man.

b. Ich warte auf meinen Mann.
I wait on my man.ACC

It is often impossible to find semantic motivation for case. In German there is a tendency to replace genitive (51a) with dative (51b) with no apparent semantic motivation:

(51) a. dass der Opfer gedacht werde
that the victims.GEN remembered was
'that the victims would be remembered'

b. daß auch hier den Opfern des Faschismus gedacht werde
that also here the victims.DAT of.the fascism remembered was
[...][37]

'that the victims of fascism would be remembered here too'

The synonyms *treffen* and *begegnen* ('to meet') govern different cases (example from Pollard and Sag (1987, p. 126)).

(52) a. Er traf den Mann.
he.NOM met the man.ACC

b. Er begegnete dem Mann.
he.NOM met the man.DAT

[37] Frankfurter Rundschau, 07.11.1997, p. 6.

One has to specify the case that the respective verbs require in the lexical items of the verbs.[38] A radical variant of the plugging approach is suggested by Haugereid (2009). Haugereid (pages 12–13) assumes that the syntax combines a verb with an arbitrary combination of a subset of five different argument roles. Which arguments can be combined with a verb is not restricted by the lexical item of the verb.[39] A problem for such views is that the meaning of an ambiguous verb sometimes depends on which of its arguments are expressed. The German verb *borgen* has the two translations *borrow* and *lend*, which basically are two different perspectives on the same event (see Kunze, 1991, 1993 for an extensive discussion of verbs of exchange of possession). Interestingly, the dative object is obligatory only with the *lend′* reading (Müller, 2010a, p. 403):

(53) a. Ich borge ihm das Eichhörnchen.
I lend him the squirrel
'I lend the squirrel to him.'

b. Ich borge (mir) das Eichhörnchen.
I borrow me the squirrel
'I borrow the squirrel.'

If we omit it, we get only the *borrow′* reading. So the grammar must specify for specific verbs that certain arguments are necessary for a certain verb meaning or a certain perspective on an event.

Synonyms with differing valence specifications include the minimal triplet mentioned earlier: *dine* is obligatorily intransitive (or takes an *on*-PP), *devour* is transitive, and *eat* can be used either intransitively or transitively (Dowty, 1989, p. 89–90). Many other examples are given in Levin (1993) and Levin and Rappaport Hovav (2005).

In a phrasal constructionist approach one would have to assume phrasal patterns with the preposition or case, into which the verb is inserted. For (50b), the pattern includes a prepositional object with *auf* and an accusative NP, plus an entry for *warten* specifying that it can be inserted into such a structure (see Kroch and Joshi, 1985, Section 5.2 for such a proposal in the framework of TAG). Since there are generalizations regarding verbs with such valence representations, one would be forced to have two inheritance hierarchies: one for lexical entries with their valency properties and another one for specific phrasal patterns that are needed for the specific constructions in which these lexical items can be used.

[38] Or at least mark the fact that *treffen* takes an object with the default case for objects and *begegnen* takes a dative object in German. See Haider, 1985, Heinz and Matiasek, 1994, and Müller, 2001 on structural and lexical case.

[39] Haugereid has the possibility to impose valence restrictions on verbs, but he claims that he uses this possibility just in order to get a more efficient processing of his computer implementation (p. 13).

More often, proponents of neo-constructionist approaches either make proposals that are difficult to distinguish from lexical valence structures (see Section 7.6 below) or simply decline to address the problem. For instance Lohndal (2012) writes:

> An unanswered question on this story is how we ensure that the functional heads occur together with the relevant lexical items or roots. This is a general problem for the view that Case is assigned by functional heads, and I do not have anything to say about this issue here. (Lohndal, 2012)

We think that getting case assignment right in simple sentences, without vast overgeneration of ill-formed word sequences, is a minimal requirement for a linguistic theory.

7.5 Expletives

A final example for the irreducibility of valence to semantics are verbs that select for expletives and reflexive arguments of inherently reflexive verbs in German:

(54) a. weil es regnet
because it rains

b. weil (es) mir (vor der Prüfung) graut
because EXPL me.DAT before the exam dreads

c. weil er es bis zum Professor bringt
because he EXPL until to.the professor brings
'because he made it to professor'

d. weil es sich um den Montag handelt
because EXPL REFL around the Monday trades
'It is about the Monday.'

e. weil ich mich (jetzt) erhole
because I myself now recreate
'because I am relaxing'

The lexical heads in (54) need to contain information about the expletive subjects/objects and/or reflexive pronouns that do not fill semantic roles. Note that German allows for subjectless predicates and hence the presence of expletive subjects cannot be claimed to follow from general principles. (54c) is an example with an expletive object. Explanations referring to the obligatory presence of a subject would fail on such examples in any case. Furthermore it has to be ensured that *erholen* is not realized in the [Sbj IntrVerb] construction for intransitive

verbs or respective functional categories in a Minimalist setting although the relation *erholen*′ (*relax*′) is a one-place predicate and hence *erholen* is semantically compatible with the construction.

7.6 Is there an alternative to lexical valence structure?

The question for theories denying the existence of valence structure is what replaces it to explain idiosyncratic lexical selection. In her exoskeletal approach, Borer (2005) explicitly rejects lexical valence structures. But she posits post-syntactic interpretive rules that are difficult to distinguish from them. To explain the correlation of *depend* with an *on*-PP, she posits the following interpretive rule Borer (2005, Vol. II, p. 29):

(55) MEANING $\Leftrightarrow \pi_9 + [\langle e^{on} \rangle]$

Borer refers to all such cases of idiosyncratic selection as idioms. In a rule such as (55), 'MEANING is whatever the relevant idiom means.' (Borer, 2005, Vol. II, p. 27) In (55), π_9 is the 'phonological index' of the verb *depend* and e^{on} 'corresponds to an open value that must be assigned range by the f-morph *on*' (Borer, 2005, Vol. II, p. 29), where f-morphs are function words or morphemes. Hence this rule brings together much the same information as the lexical valence structure in (49c). Discussing such 'idiom' rules, Borer writes

> Although by assumption a listeme cannot be associated with any grammatical properties, one device used in this work has allowed us to get around the formidable restrictions placed on the grammar by such a constraint—the formation of idioms. [...] Such idiomatic specification could be utilized, potentially, not just for *arrive* and *depend on*, but also for obligatorily transitive verbs [...], for verbs such as *put*, with their obligatory locative, and for verbs which require a sentential complement.
>
> The reader may object that subcategorization, of sorts, is introduced here through the back door, with the introduction, in lieu of lexical syntactic annotation, of an articulated listed structure, called an *idiom*, which accomplishes, de facto, the same task. The objection of course has some validity, and at the present state of the art, the introduction of idioms may represent somewhat of a concession.
> (Borer, 2005, Vol. II, p. 354–355)

Borer goes on to pose various questions for future research, related to constraining the class of possible idioms. With regard to that research program it should

be noted that a major focus of lexicalist research has been narrowing the class of subcategorization and extricating derivable properties from idiosyncratic subcategorization. Those are the functions of HPSG lexical hierarchies, for example.

7.7 Summary

In Sections 7.2–7.5 we showed that the question of which arguments must be realized in a sentence cannot be reduced to semantics and world knowledge or to general facts about subjects. The consequence is that valence information has to be connected to lexical items. One therefore must either assume a connection between a lexical item and a certain phrasal configuration as in Croft's approach (2003) and in LTAG or assume our lexical variant. In a Minimalist setting the right set of features must be specified lexically to ensure the presence of the right case assigning functional heads. This is basically similar to the lexical valence structures we are proposing here, except that it needlessly introduces various problems discussed above, such as the problem of coordination raised in Section 6.1.

8 Relations between constructions

On the lexical rules approach, word forms are related by lexical rules: a verb stem can be related to a verb with finite inflection and to a passive verb form; verbs can be converted to adjectives or nouns; and so on. The lexical argument structure accompanies the word and can be manipulated by the lexical rule. In this section we consider what can replace such rules within a phrasal or ASC approach.

8.1 Inheritance hierarchies for constructions

For each valence structure that the lexicalist associates with a root lexeme (transitive, ditransitive, etc.), the phrasal approach requires multiple phrasal constructions, one to replace each lexical rule or combination of lexical rules that can apply to the word. Taking ditransitives, for example, the phrasal approach requires an active-ditransitive construction, a passive-ditransitive construction, and so on, to replace the output of every lexical rule or combination of lexical rules applied to a ditransitive verb. (Thus Bergen and Chang, 2005, p. 169–170 assume an active-ditransitive and a passive-ditransitive construction and Kallmeyer and Osswald, 2012, p. 171–172 assume active and passive variants of the transitive construction.) On that view some of the active voice constructions for German would be:

(56) a. Nom V

b. Nom Acc V
c. Nom Dat V
d. Nom Dat Acc V

The passive voice constructions corresponding to (56) would be:

(57) a. V V-Aux
b. Nom V V-Aux
c. Dat V V-Aux
d. Dat Nom V V-Aux

Merely listing all these constructions is not only uneconomical but fails to capture the obvious systematic relation between active and passive constructions. Since phrasalists reject both lexical rules and transformations, they need an alternative way to relate phrasal configurations and thereby explain the regular relation between active and passive. The only proposals to date involve the use of inheritance hierarchies, so let us examine them.

Researchers working in various frameworks, both lexical and constructional, have tried to develop inheritance-based analyses that could capture the relation between valency patterns such as those in (56) and (57) (see for instance Kay and Fillmore, 1999, p. 12; Michaelis and Ruppenhofer, 2001, Chapter 4; Candito, 1996; Clément and Kinyon, 2003, p. 188; Kallmeyer and Osswald, 2012, p. 171–172; Koenig, 1999, Chapter 3; Davis and Koenig, 2000; Kordoni, 2001 for proposals in CxG, TAG, and HPSG). The idea is that a single representation (lexical or phrasal, depending on the theory) can inherit properties from multiple constructions. In a phrasal approach the description of the pattern in (56b) inherits from the transitive and the active construction and the description of (57b) inherits from both the transitive and the passive constructions. Figure 4 illustrates the inheritance-based lexical approach: a lexical entry for a verb such as *read* or *eat* is combined with either an active or passive representation. The respective representations for the active and passive are responsible for the expression of the arguments.

While these analyses work for the phenomena that were discussed by the respective authors, the approach is not powerful enough to account for valency changing processes in general (Müller, 2006, Section 4; 2007b, Section 5), since processes like passivization and causativization can be applied several times. We will first look at languages which allow for double passivization, such as Lithuanian (Timberlake, 1982, Section 5), Irish (Noonan, 1994), and Turkish (Özkaragöz, 1986; Knecht, 1985, Section 2.3.3). We will use Özkaragöz's Turkish examples in (58) for illustration (1986, p. 77):

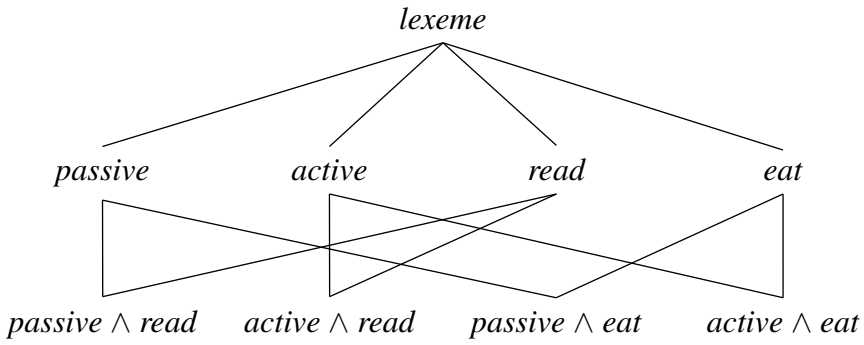


Figure 4: Inheritance Hierarchy for active and passive

(58) a. Bu şato-da boğ-ul-un-ur.
this chateau-LOC strangle-PASS-PASS-AOR
'One is strangled (by one) in this chateau.'

b. Bu oda-da döv-ül-ün-ür.
this room-LOC hit-PASS-PASS-AOR
'One is beaten (by one) in this room.'

c. Harp-te vur-ul-un-ur.
war-LOC shoot-PASS-PASS-AOR
'One is shot (by one) in war.'

-In, *-n*, and *-Il* are allomorphs of the passive morpheme. According to Özkaragöz the data is best captured by an analysis that assumes that the passive applies to a passivized transitive verb and hence results in an impersonal passive. This cannot be explained with a simple hierarchy as the one in Figure 4, since one cannot inherit from *passive* two times. Either a certain object inherits a certain property or not. Either a verb is passive or not. If we inherit one time, we get information about inflection and argument realization, so we can account for simple passives as we find them in English and German, but in order to account for the cases in (58), we need a linguistic object with passive argument structure and morphology and apply the passive to this linguistic object.

An example for multiple causativization is Turkish, which allows double and even triple causativization (Lewis, 1967, p. 146):

(59) Öl-dür-t-tür-t-
'to cause somebody to cause somebody to kill somebody'

The *t* and *tür* is the causative morpheme (-t-/-d- after vowels or sonorants and -tVr-/-dVr after consonants, where V stands for a vowel in vowel harmony). Such recursive application of valence-changing rules has been observed in a number of languages. The iterative causativization cannot be modeled by inheritance, since

information can only be inherited once. Krieger and Nerbonne (1993) make the same point with respect to derivational morphology in cases like *preprepreversion*.

So assuming phrasal models, the only way to capture the generalization with regard to (56) and (57) seems to be to assume GPSG-like meta-rules that relate the constructions in (56) to the ones in (57). If the constructions are lexically linked as in LTAG, the respective mapping rules would be lexical rules. For approaches that combine LTAG with the Goldbergian plugging idea such as the one by Kallmeyer and Osswald (2012) one would have to have extended families of trees that reflect the possibility of having additional arguments and would have to make sure that the right morphological form is inserted into the respective trees. The morphological rules would be independent of the syntactic structures in which the derived verbal lexemes could be used. One would have to assume two independent types of rules: GPSG-like meta-rules that operate on trees and morphological rules that operate on stems and words. We believe that this is an unnecessary complication and apart from being complicated the morphological rules would not be acceptable as form-meaning pairs in the CxG sense since the aspect of the form that additional arguments are required is not captured in these morphological rules. If such morphological rules were accepted as proper constructions then there would not be any reason left to require that the arguments have to be present in a construction in order for it to be recognizable, and hence, the lexical approach would be accepted. Compare the discussion of *Totschießen* ('shoot dead') in example (72) below.

8.2 Mappings between different levels of representations

Culicover and Jackendoff (2005, Chapter 6.3) suggest that passive should be analyzed as one of several possible mappings from the Grammatical Function tier to the surface realization of arguments. Surface realizations of referential arguments can be NPs in a certain case, with certain agreement properties, or in a certain position. While such analyses that work by mapping elements with different properties onto different representations are common in theories like LFG and HPSG (Koenig, 1999; Bouma, Malouf and Sag, 2001), a general property of these analyses is that one needs one level of representation per interaction of phenomena (ARG-ST, SEM-ARG, ADD-ARG in Koenig's proposal, ARG-ST, DEPS, SPR, COMPS in Bouma, Malouf, and Sag's proposal). This was discussed extensively in Müller, 2007a, Section 7.5.2.2 with respect to extensions that would be needed for Koenig's analysis.

Since Culicover and Jackendoff argue for a phrasal model, we will discuss their proposal here. Culicover and Jackendoff assume a multilayered model in which semantic representations are linked to grammatical functions, which are linked to tree positions. Figure 5 shows an example for an active sentence. GF

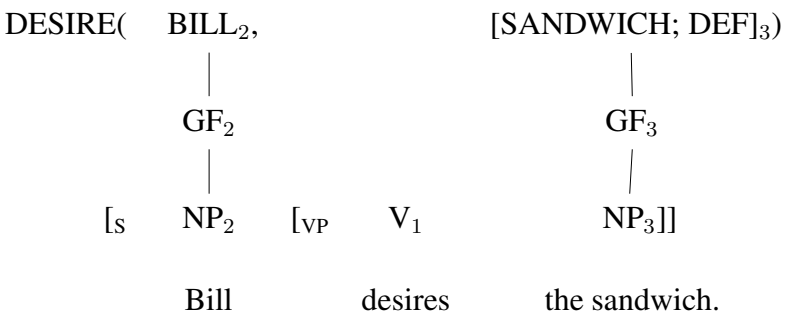


Figure 5: Linking grammatical functions to tree positions: active

stands for Grammatical Function. Culicover and Jackendoff (2005, p. 204) explicitly avoid names like Subject and Object since this is crucial for their analysis of the passive to work. They assume that the first GF following a bracket is the subject of the clause the bracket coresponds to (p. 195–196) and hence has to be mapped to an appropriate tree position in English. Note that this view on grammatical functions and obliqueness does not account for subjectless sentences that are possible in some languages, for instance in German.[40]

Regarding the passive, the authors write:

> we wish to formulate the passive not as an operation that deletes or alters part of the argument structure, but rather as a piece of structure in its own right that can be unified with the other independent pieces of the sentence. The result of the unification is an alternative licensing relation between syntax and semantics. (Culicover and Jackendoff, 2005, p. 203)

They suggest the following representation of the passive:

(60) $[GF_i > [GF \ldots]]_k \Leftrightarrow [\ \ldots \mathrm{V}_k + \text{pass} \ldots (\text{by } \mathrm{NP}_i) \ldots]_k$

The italicized parts are the normal structure of the sentence and the non-italicized parts are an overlay on the normal structure, that is, additional constraints that have to hold in passive sentences. Figure 6 shows the mapping of the example discussed above that corresponds to the passive.

Although Culicover and Jackendoff emphasize the similarity between their approach and Relational Grammar (Perlmutter, 1983), there is an important difference: In Relational Grammar additional levels (strata) can be stipulated if additional remappings are needed. In Culicover and Jackendoff's proposal there is

[40] Of course one could assume empty expletive subjects, as was suggested by Grewendorf (1993, p. 1311), but empty elements and especially those without meaning are generally avoided in the constructionist literature. See Müller, 2010a, Section 3.4, Section 11.1.1.3 for further discussion.

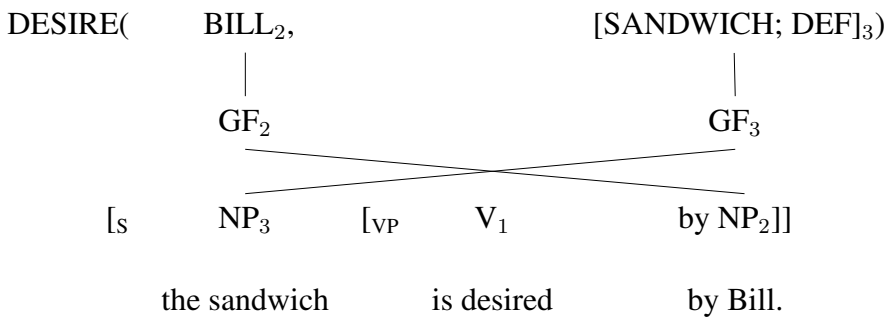


Figure 6: Linking grammatical functions to tree positions: passive

no additional level. This causes problems for the analysis of languages which allow for double passivization. Examples for such languages were already given in (58) in the previous subsection and specific examples from Turkish were provided in (58). Approaches that assume that the personal passive is the unification of a general structure with a passive-specific structure will not be able to capture this, since they committed to a certain structure too early. The problem for approaches that state syntactic structure for the passive is that such a structure, once stated, cannot be modified. Culicover and Jackendoff's proposal works in this respect since there are no strong constraints in the right-hand side of their constraint in (60). But there is a different problem: When passivization is applied the second time, it has to apply to the innermost bracket, that is, the result of applying (60) should be:

(61) $[GF_i > [GF_j \ldots]]_k \Leftrightarrow [\ \ldots \mathrm{V}_k + \mathrm{pass} \ldots (\mathrm{by\ NP}_i) \ldots (\mathrm{by\ NP}_j) \ldots]_k$

This cannot be done with unification, since unification checks for compatibility and since the first application of passive was possible it would be possible for the second time as well. Dots in representations are always dangerous and in the example at hand one would have to make sure that NP_i and NP_j are distinct, since the statement in (60) just says there has to be a *by* PP somewhere. What is needed instead of unification would be something that takes a GF representation and searches for the outermost bracket and then places a bracket to the left of the next GF. But this is basically a rule that maps one representation onto another one, just like lexical rules do.

If Culicover and Jackendoff want to stick to a mapping analysis, the only option to analyze the data seems to be to assume an additional level for impersonal passives from which the mapping to phrase structure is done. In the case of Turkish sentences like (62), which is a personal passive, the mapping to this level would be the identity function.

(62) Arkada-şım bu oda-da döv-ül-dü.
friend-my this room-LOC hit-PASS-AOR
'My friend is beaten (by one) in this room.'

In the case of double passivization the correct mappings would be implemented by two mappings between the three levels that finally result in a mapping as the one that is seen in (58b). Note that the double passivization is also problematic for purely inheritance based approaches. What all these approaches can suggest though is that they just stipulate three different relations between argument structure and phrase structure: active, passive, double passive. But this misses the fact that (58b) is a further passivization of (62).

In contrast, the lexical rule-based approach suggested by Müller (2003a) does not have any problems with double passivization: The first application of the passivization lexical rule suppresses the least oblique argument and provides a lexical item with the argument structure of a personal passive. The second application suppresses the now least oblique argument (the object of the active clause) and results in an impersonal passive.

8.3 Is there an alternative to lexical rules?

In this section we have reviewed the attempts to replace lexical rules with methods of relating constructions. Those attempts have not been successful, in our assessment. We believe that the essential problem with them is that they fail to capture the derivational character of the relationship between certain word forms. Alternations signaled by passive voice and causative morphology are relatively simple and regular when formulated as operations on lexical valence structures that have been abstracted from their phrasal context. But non-transformational rules or systems formulated on the phrasal structures encounter serious problems that have not yet been solved.

9 Arguments from language acquisition

9.1 The acquisition of patterns

Tomasello (2003) argues for a surface-oriented, pattern-based view on language acquisition. According to him a child hears sentences like (63) and realizes that certain slots can be filled freely (see also Dąbrowska, 2001 for analogous proposals in Cognitive Grammar).

(63) a. Do you want more juice/milk?
b. Mommy/The juice is gone.

c. The man/the woman sees the dog/the rabbit.

From such utterances so-called *pivot schemata* are derived. Such schemata contain open slots into which words can be inserted. Examples of schemata that are abstracted from utterances like (63) are shown in (64):

(64) a. more juice/milk → more ___
b. mommy/juice gone → ___ gone
c. The man/the woman sees the dog/the rabbit → ___ sees ___

At this stage (about 2 years old) children do not generalize over such schemata. The schemata are relatively isolated, item-based constructional islands. At first they do not have syntax, but later children begin to use syntactic marking such as word order or case to indicate explicitly some participant roles in scenes (Tomasello et al., 1997; Tomasello, 2003). These early syntactic constructions are still verb-specific (*the Verb Island Hypothesis*, Tomasello (2003, p. 117)).

More abstract syntactic and semantic generalizations emerge in the course of time: after a sufficient amount of encounters, the child can generalize over the patterns. Children exposed to English acquire the capability to use novel verbs with a subject and an object in the SVO order slowly in their third or fourth year of life (Tomasello, 2003, p. 128–129).

(65) a. The man/the woman sees the dog/the rabbit.
b. The man/the woman likes the dog/the rabbit.
c. The man/the woman kicks the dog/the rabbit.

According to Tomasello (2003, p. 107) the abstraction of the patterns in (65) is [Sbj TrVerb Obj], the so-called *transitive construction*. Constructions such as the transitive construction continue to carry meaning. Language acquisition consists of learning such meaningful patterns at different levels of generality.

The inventory of constructions at various levels of generality is organized into a network of some sort, such as an inheritance hierarchy (Langacker, 1987; Goldberg, 1995, Chapter 3; Croft, 2001, p. 26; Tomasello, 2003, p. 106–107). In language production a number of such constructions combine to form a sentence (Goldberg, 2006, p. 10).

A key empirical finding is that children first acquire the item-specific patterns such as (64)—the ones involving specific verbs are called *verb islands*—and only later generalize to the broader syntactic patterns such as the transitive construction. From the lexicalist perspective, verb islands are perfect precursors to the acquisition of lexical valence structures. From schemata such as those in (64), the child acquires not just a pattern but a small network of dependencies between the verb and its arguments. The valence structure represents those dependencies. The lexicalists need only assume that children hold onto the lexical valence structures

for which the verb island stage provides such striking evidence. When they notice alternative verb islands for a particular verb, they discover patterns relating those variant realizations of a given verb. In other words, they acquire lexical rules.

Next we contrast the two approaches.

9.2 Discontinuities and unexpressed arguments

A purely pattern-based approach may work for certain very simple sentences, but such sentences form only a small part of what speakers learn to produce and interpret. The pattern-based approach faces difficulties, first of all, from discontinuities in the realization of a head and its arguments. For instance, adjuncts can be serialized between the subject and the verb. Bergen and Chang (2005, p. 170), who implement the phrasal approach, suggest an active-ditransitive construction with the pattern in (66):

(66) [RefExpr Verb RefExpr RefExpr]

RefExpr stands for referential expression. Their formalization allows a discontinuity between the first referential expression and the verb. This makes it possible to analyze (67a,b), but excludes (67c), since in (67c) the adverb intervenes between verb and the first object:

(67) a. Marry tossed me a drink.
b. Marry happily tossed me a drink.
c. * Marry tossed happily me a drink.

However, by enforcing the adjacency between verb and object the analysis of coordinations like (68) becomes impossible.

(68) Marry tossed me a juice and Peter a water.

One part of the meaning of this sentence is contributed by the ditransitive construction for *Marry tossed Peter a water*. However, *tossed* and *Peter* are discontinuous. Similarly, one can construct examples with a discontinuity between the two objects of the ditransitive construction:

(69) He showed me and bought for Mary the book that was recommended in the Guardian last week.

The noun phrases *me* and *the book that was recommended in the Guardian last week* are not adjacent, although they are part of the ditransitive construction. If one does not use empty elements and dislocation, one cannot maintain the claim that the items of the ditransitive construction have to be contiguous. The point here is that it is not a certain fixed configuration that has to be acquired but rather the fact that there is a certain dependency between material in a clause. If material

is realized together in a certain syntactic environment, a certain meaning can be observed.

Note also that a purely pattern-based approach is weakened by the existence of examples like (70):

(70) a. John tried to sleep.
b. John tried to be loved.

Although no argument of *sleep* is present in the phrase *to sleep* and neither a subject nor an object is realized in the phrase *to be loved*, both phrases are recognized as phrases containing an intransitive and a transitive verb, respectively.[41]

The same applies to arguments that are supposed to be introduced/licensed by a phrasal construction: in (71) the resultative construction is passivized and then embedded under a control verb, resulting in a situation in which only the result predicate (*tot* 'dead') and the matrix verb (*geschossen* 'shot') are realized overtly within the local clause, bracketed here:

(71) Der kranke Mann wünschte sich, [tot geschossen zu werden].[42]
the sick man wished SELF dead shot to be
'The sick man wanted to be shot dead.'

Of course passivization and control are responsible for these occurrences, but the important point here is that arguments can remain unexpressed or implicit and nevertheless a meaning that is usually connected to some overt realization of arguments is present (Müller, 2007b, Section 4). So, what has to be acquired by the language learner is that when a result predicate and a main verb are realized together, they contribute the resultative meaning. To take another example, NP arguments that are usually realized in active resultative constructions may remain implicit in nominalizations like the ones in (72):

(72) a. dann scheint uns das Totschießen mindestens ebensoviel Spaß zu
then seems us the dead-shooting at.least as.much fun to
machen[43]
make
'then the shooting dead seems to us to be as least as much fun'
b. Wir lassen heut das Totgeschieße, Weil man
we let today the annoying.repeated.shooting.dead since one
sowas heut nicht tut. Und wer einen Tag sich ausruht, Der
such.thing today not does and who a day SELF rests this

[41] Constructionist theories do not assume empty elements. Of course, in the GB framework the subject would be realized by an empty element. So it would be in the structure, although inaudible.

[42] Müller, 2007b, p. 387.

[43] https://www.elitepartner.de/forum/wie-gehen-die-maenner-mit-den-veraenderten-anspruechen-der-frauen-um-26421-6.html. 26.03.0212.

schießt morgen doppelt gut.[44]
shoots tomorrow twice good
'We do not shoot anybody today, since one does not do this, and those who rest a day shoot twice as well tomorrow.'

The argument corresponding to the patient of the verb (the one who is shot) can remain unrealized, because of the syntax of nominalizations. The resultative meaning is still understood, which shows that it does not depend upon the presence of a resultative construction involving Subj V Obj and Obl.

The upshot is that phrasal constructions are too rigid to replace lexical valence structures. In the next section we review a lexical alternative that is minimally different from the phrasal view, but has the necessary flexibility.

9.3 The acquisition of dependencies

Children surely acquire some fixed phrasal patterns. But as we saw in the previous section, children must develop a representation of head-argument dependencies that is more flexible than what is allowed by rigid schemata such as (66). Discontinuities between heads and their arguments have to be allowed. Lexical theories seem to provide representations at the right place on the spectrum between the rigid and the flexible.

Consider Categorial Grammar (Ajdukiewicz, 1935; Steedman, 2000). A transitive item-based construction (verb island) like '___ *likes* ___' corresponds in Categorial Grammar to a lexical entry for the transitive verb *likes* containing the expression (s\np)/np. This expresses the fact that *likes* takes an NP to its right (marked by the direction of the slash '/') and an NP to its left (marked by the direction of the slash '\'). The lexical item licenses structures like the one that is displayed as a tree in Figure 7. The combinations are licensed by combinatorial rules that combine a functor with an argument. So all lexical items that are assigned to the category (s\np)/np can appear in configurations like the one shown in Figure 7. A child who has acquired some structures of this kind is at the verb island stage. As she observes unknown words in the position of the verb, she can infer that the unknown words must belong into the same lexical class as *likes*.

The child who has acquired such a verb has acquired more than just a linear concatenation of words coupled with a meaning. She also has acquired dependencies between the words that correlate with relations in the world. On the other hand, if we assume that she *only* acquires these dependencies, without regard to ordering, then the result is too flexible. She will not learn to put the words and phrases in the right order.

[44] http://home.arcor.de/finishlast/indexset.html?dontgetmestarted/091201-1.html. 26.03.2012.

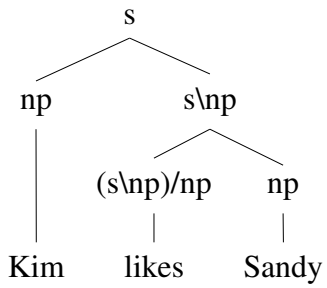


Figure 7: Categorial Grammar analysis of *Kim likes Sandy*

The CG representation seems to capture the right degree of flexibility. The structure in Figure 7 is not the only one that is possible for items of the category (s\np)/np. For instance an adjunct of the category (s\np)/(s\np) may intervene between the subject and the combination of verb and object. This is shown in Figure 8. The adjunct *probably* takes a VP (s/np) to its right and the result of the

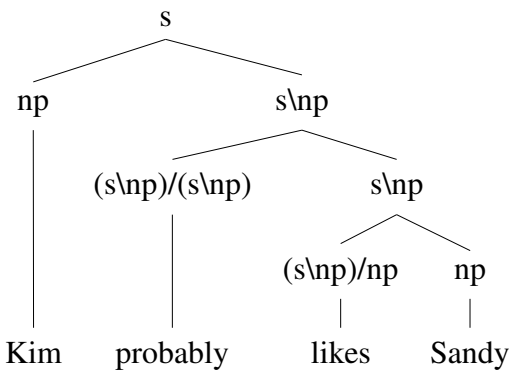


Figure 8: Categorial Grammar analysis of *Kim probably likes Sandy*

combination is a VP again. Similarly, lexical items like *likes* can appear in coordination structures of the kind discussed above. See Steedman, 1991 for details on coordination.

The bracketing in (s\np)/np ensures that the rightmost np in the expression is combined with the verb first and then the combination with the second np takes place. This results in the SVO order that can be observed for languages like English. For languages with a freer constituent structure Steedman and Baldridge (2006) suggest a generalized representation. The arguments are represented in a set and for the combination of a head with an argument, one element from this set

is chosen. This results in different orders. For a head final language the lexical item of a transitive verb would be s { \np, \np }. See also Hoffman (1995, Section 3.1) for a similar proposal for Turkish. Such a lexical item stands for trees in which the two np arguments precede their head in any order. Such an approach to constituent order was also suggested by Gunji (1986) in the framework of HPSG and by Fanselow (2001) in the framework of Minimalism.

Concluding the section on language acquisition, we assume that a valence representation is the result of language acquisition, since this is necessary for establishing the dependency relations in various possible configurations in an utterance. See also Behrens, 2009, p. 439 for a similar conclusion.

10 Arguments from psycholinguistics

This section deals with psycholinguistic arguments involving light verb constructions.[45]Wittenberg, Jackendoff, Kuperberg, Paczynski, Snedeker and Wiese (To appear) report on a number of experiments that test predictions that are made by various approaches to light verb constructions. (73a) shows a typical light verb construction: *take* is a light verb that is combined with the nominal that provides the main predication.

(73) a. take a walk to the park
b. walk to the park

Wittenberg and Piñango (2011) examined two psychologically plausible theories of light verb constructions. The phrasal approach assumes that light verb constructions are stored objects associated with semantics (Goldberg, 2003). The alternative compositional view assumes that the semantics is computed as a fusion of the semantics of the event noun and the semantics of the light verb (Grimshaw, 1997; Butt, 2003; Jackendoff, 2002; Culicover and Jackendoff, 2005; Müller, 2010b; Beavers et al., 2008). Since light verb constructions are extremely frequent (Piñango, Mack and Jackendoff, 2006; Wittenberg and Piñango, 2011, p. 399), the phrasal approaches that assume that light verb constructions are stored items with the object and verb fixed predict that light verb constructions should be retrievable faster than non-light verb constructions like (74) (Wittenberg and Piñango, 2011, p. 396).

(74) take a frisbee to the park

[45]Due to space limitations we do not discuss neurolinguistic evidence, but point the reader to Müller, 2013, Section 11.11.8.3 instead. Müller shows that the neurolinguistic evidence provided by Pulvermüller et al. (2013) and Cappelle et al. (2010) is compatible with lexical approaches.

This is not the case. As Wittenberg and Piñango found, there is no difference in processing at the licensing condition (the noun in VO languages like English and the verb in OV languages like German).

However, Wittenberg and Piñango (2011) found an increased processing load 300ms *after* the light verb construction is processed. The authors explain this by assuming that semantic integration of the noun with the verbal meaning takes place after the syntactic combination. While the syntactic combination is rather fast, the semantic computation takes additional resources and this is measurable at 300ms. The verb contributes aspectual information and integrates the meaning of the nominal element. The semantic roles are fused. The resource consumption effect would not be expected if the complete light verb construction were a stored item that is retrieved together with the complete meaning (p. 404). We can conclude that Wittenberg and Piñango's results are compatible with the lexical proposal, but are incompatible with the phrasal view.

11 Arguments from statistical distribution

In this section, we want to look at arguments from statistics that have been claimed to support a phrasal view. We first look at data-oriented parsing, a technique that was successfully used by Bod (2009b) to model language acquisition and then we turn to the collostructional analysis by Stefanowitsch and Gries (2009). Lastly we argue that these distributional analyses cannot decide the question whether argument structure constructions are phrasal or lexical.

11.1 Unsupervised Data-Oriented Parsing

Rens Bod (2009b) demonstrated that a simple statistical procedure can learn quite elaborate linguistic structures that are reasonably close to what linguists assume. In particular he showed that such a technique can learn auxiliary inversion and gets the inversion facts right even for complex examples containing relative clauses with auxiliaries and even if this type of clause was not in the data that was used for learning. Chomsky (1971, p. 29–33) has used (and is still using, see Berwick, Pietroski, Yankama and Chomsky, 2011 and Chomsky, 2013[46]) auxiliary inversion as his key example of a Poverty of the Stimulus in the language acquisition debate, but Bod has shown that six examples are sufficient to acquire complex auxiliary inversion structures. The examples that are needed do not include the data that Chomsky considered crucial for a language acquisition device that relies on input alone. Bod's procedure works as follows: An utterance is partitioned into

[46]The first article appeared in the same journal as Bod's work and discusses computational approaches, but ignores Bod's proposal.

(binary branching) trees. It is then checked how likely each of the subtrees is, that is, it is checked whether an identical subtree occurred in previous utterances. If this is the case, this renders the subtree under consideration more likely. To take an example, consider the corpus in (75). Figure 9 shows the unlabeled trees for the two sentences.

(75) a. Watch the dog.
b. The dog barks.

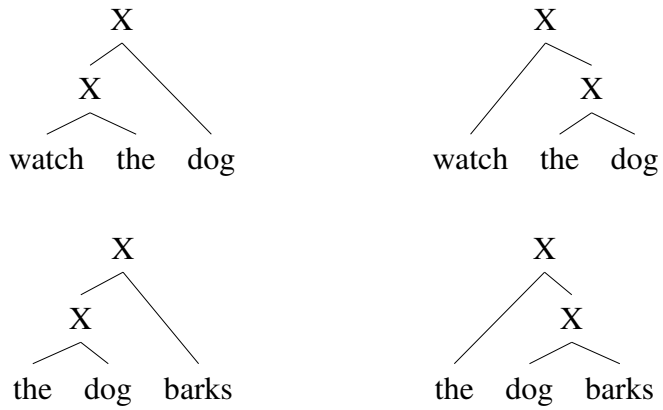


Figure 9: Possible binary branching structures for *Watch the dog* and *The dog barks*.

Some of these trees do not correspond to structures that linguists would assume, but the good news is that the subtree for *the dog* appears more often than for instance *watch the* and this renders the correct structures for *watch the dog* and *the dog barks* more likely in Bod's procedure.

If one assumes that language acquisition is based on input alone and involves extracting distributional regularities from that input, then Bod's procedure provides evidence for the actual sentence structures that children acquire (part of speech information, meaning, and context are currently not included in Bod's computations, but of course this can be done). The structures that Bod's procedure extracts from the input can be used as desiderata for linguists in search of the correct analysis.[47]

What distributional analyses cannot determine is how the meaning is represented in a structure. Bod (2009a, p. 132) claims that his procedure is *a testable*

[47]Since Bod did not have sufficient data to do the computations with flat structures and arbitrary branchings, he arbitrarily restricted the system to binary branching structures (p. 760). This means that his experiments do not answer the question if rules should license flat structures or binary branching ones. But we probably can expect interesting results in the future.

As an aside note the assumption of binary branching structures corresponds to the assumption of a given binary Merge as it is assumed by Hauser, Chomsky and Fitch (2002).

realization of CxG in Goldberg's sense, but the trees that he constructs do not help deciding between phrasal and lexical analyses or analyses that involve empty elements.

The constituent structure of (76) could be identical under the lexical approach and the phrasal approach, namely the structure in Figure 10.

(76) [dass] er ihn leer fischt
that he it empty fishes
'that he fishes it empty'

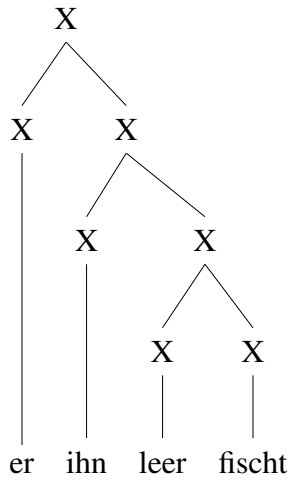
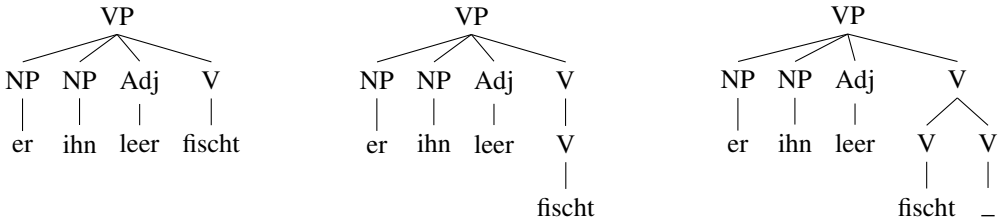


Figure 10: Tree structure that will be the outcome of a U-DOP analysis

If Bod's procedure extracts this structure then this is equally good news for either approach. The approaches differ in how they derive the resultative semantic interpretation, that is, where the fishing causes the emptying. On the phrasal approach (left tree in Figure 11), the causal semantics is contributed by the environment itself, and a system of correspondence rules identifies the arguments of the verb with the arguments of the construction (see (18)).[48] On the lexical approach, this

[48]The figures could be recast with flat structures as follows:



The discussion may be easier to grasp if flat structures are used for explanation: The first structure corresponds to a phrasal Goldbergian analysis with flat structure. The semantics of the whole

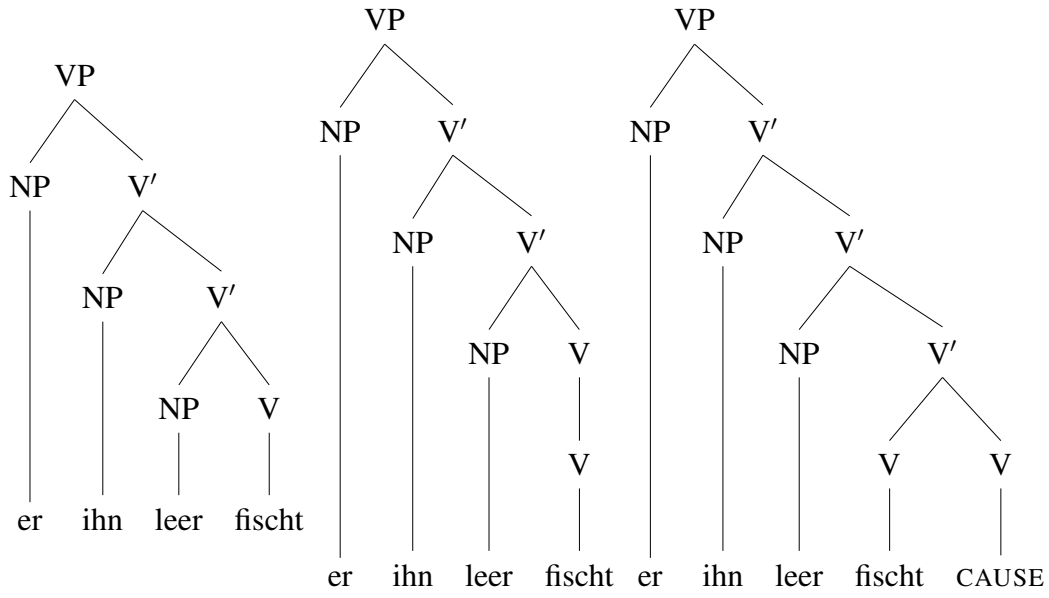


Figure 11: Three possible analyses for resultative constructions: Holistic construction, lexical rule, empty head

causal relation is contributed by the verb *fischt* ('fishes') when it appears in a syntactic environment of this kind (middle tree in Figure 11). A distributional analysis cannot differentiate between these approaches. The distribution is computed with regard to the words. The meaning of the words is not considered. One can observe that the utterance contains the word *fischt* ('fishes'), but one cannot see whether this word contributes the causal semantics or not.

An alternative to lexical rule-based proposals may assume an empty verbal head that selects for the intransitive verb *fischt* and projects a transitive verb with causal semantics (tree at the right in Figure 11). Empty heads are often the choice in mainstream generative grammar, but as shown in Müller, 2010a, Section 11.10, some of them can be converted into lexical rules by known techniques of grammar conversion (Bar-Hillel, Perles and Shamir, 1961). As with the left and the middle tree, a distributional analysis cannot differentiate between this and the other proposals: The empty head is naturally not recognizable in the signal. It is a the-

construction is represented at the top node. The arguments are licensed by the construction. The second structure is the lexical rule-based one. Semantics and valence information are contributed by the lexical rule. In the third structure an empty head is combined with the verb and the empty head contributes the meaning and licenses the arguments.

Both in the second and third structure the combination of the four daughters into a larger VP would not contribute anything to the meaning of the whole structure but just combine the semantics of the daughter constituents to yield the one of the mother VP.

oretical construct and as was mentioned above an analysis with an empty head of the kind in Figure 11 can be automatically converted into one with a lexical rule. So Bod's analysis does not differentiate between the three proposals and it is the theoretical linguists who have to find evidence that could be used to argue for the left or the middle tree and it is the linguists who should argue for or against empty elements.

Concluding this subsection, we contend that Bod's paper is a milestone in the Poverty of the Stimulus debate, but it does not and cannot show that a particular version of constructionist theories, namely the phrasal one, is correct.

11.2 Collostructions

Stefanowitsch and Gries (2009, Section 5) assume a plugging analysis: *words occur in (slots provided by) a given construction if their meaning matches that of the construction*. The authors claim that their *collostructional analysis has confirmed* [*the plugging analysis*] *from various perspectives*. Stefanowitsch and Gries are able to show that certain verbs occur more often than not in particular constructions, while other verbs never occur in the respective constructions. For instance, *give*, *tell*, *send*, *offer* and *show* are attracted by the Ditransitive Construction, while *make* and *do* are repelled by this construction, that is they occur significantly less often in this construction than what would be expected given the overall frequency of verbs in the corpus. Regarding this distribution the authors write:

> These results are typical for collexeme analysis in that they show two things. First, there are indeed significant associations between lexical items and grammatical structures. Second, these associations provide clear evidence for semantic coherence: the strongly attracted collexemes all involve a notion of 'transfer', either literally or metaphorically, which is the meaning typically posited for the ditransitive. This kind of result is typical enough to warrant a general claim that collostructional analysis can in fact be used to identify the meaning of a grammatical construction in the first place. (Stefanowitsch and Gries, 2009, p. 943)

We hope that the preceding discussion made clear that the distribution of words in a corpus cannot be seen as evidence for a phrasal analysis. The corpus study shows that *give* usually is used with three arguments in a certain pattern that is typical for English (Subject Verb Object1 Object2) and that this verb forms a cluster with other verbs that have a transfer component in their meaning. The corpus data does not show whether this meaning is contributed by a phrasal pattern or by lexical entries that are used in a certain configuration.

12 Conclusion

The essence of the lexical view is that a verb is stored with a valence structure indicating how it combines semantically and syntactically with its dependents. Crucially, that structure is abstracted from the actual syntactic context of particular tokens of the verb. Once abstracted, that valence structure can meet other fates besides licensing the phrasal structure that it most directly encodes: it can undergo lexical rules that manipulate that structure in systematic ways; it can be composed with the valence structure of another predicate; it can be coordinated with similar verbs; and so on. Such an abstraction allows for simple explanations of a wide range of robust, complex linguistic phenomena. We have surveyed the arguments against the lexical valence approach, and in favor of a phrasal representation instead. We find the case for a phrasal representation of argument structure to be unconvincing: there are no compelling arguments in favor of such approaches, and they introduce a number of problems:

- They offer no account for the interaction of valence changing processes and derivational morphology.
- They offer no account for the interaction of valence changing processes and coordination of words.
- They offer no account for the iteration of valence changing processes.
- They overgenerate, unless a link between lexical items and phrasal constructions is assumed.
- They offer no account of distribution of arguments in partial fronting examples.

Assuming a lexical valence structure allows us to solve all the problems that arise for phrasal approaches.

References

Abbott, Barbara. 1976. Right Node Raising as a Test for Constituenthood. *Linguistic Inquiry* 7(4), 639–642.

Abeillé, Anne and Schabes, Yves. 1989. Parsing Idioms in Lexicalized TAG. In H. Somers and M. M. Wood (eds.), *Proceedings of the Fourth Conference of the European Chapter of the Association for Computational Linguistics*, pages 1–9, Manchester, England: ACL.

Ajdukiewicz, Kasimir. 1935. Die syntaktische Konnexität. *Studia Philosophica* 1, 1–27.

Alsina, Alex. 1996. Resultatives: A Joint Operation of Semantic and Syntactic Structures. In M. Butt and T. H. King (eds.), *Proceedings of the LFG '96 Conference, Rank Xerox, Grenoble*, Stanford: CSLI Publications. http://cslipublications.stanford.edu/LFG/1/lfg1.html, 06.07.2002.

Asudeh, Ash, Dalrymple, Mary and Toivonen, Ida. 2008. Constructions with Lexical Integrity: Templates as the Lexicon-Syntax Interface. In M. Butt and T. H. King (eds.), *Proceedings of the LFG 2008 Conference*, Stanford: CSLI Publications. http://cslipublications.stanford.edu/LFG/13/, 27.09.2012.

Asudeh, Ash, Dalrymple, Mary and Toivonen, Ida. 2013. Constructions with Lexical Integrity. *Journal of Language Modelling* 1(1), 1–54.

Bach, Emmon. 1976. An Extension of Classical Transformation Grammar. In *Problems in Linguistic Metatheory, Proceedings of the 1976 Conference at the Michigan State University*, pages 183–224.

Bar-Hillel, Yehoshua, Perles, Micha A. and Shamir, Eliahu. 1961. On Formal Properties of Simple Phrase-Structure Grammars. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 14(2), 143–172.

Beavers, John, Ponvert, Elias and Wechsler, Stephen. 2008. Possession of a Controlled Substantive. In T. Friedman and S. Ito (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) XVIII*, pages 108–125, Ithaca, NY: Cornell University.

Behrens, Heike. 2009. Konstruktionen im Spracherwerb. *Zeitschrift für Germanistische Linguistik* 37(3), 427–444.

Bergen, Benjamin K. and Chang, Nancy. 2005. Embodied Construction Grammar in Simulation-Based Language Understanding. In J.-O. Östman and M. Fried (eds.), *Construction Grammars: Cognitive Grounding and Theoretical Extensions*, pages 147–190, Amsterdam: John Benjamins Publishing Co.

Berwick, Robert C., Pietroski, Paul, Yankama, Beracah and Chomsky, Noam. 2011. Poverty of the Stimulus Revisited. *Cognitive Science* 35(7), 1207–1242.

Blom, Corrien. 2005. *Complex Predicates in Dutch. Synchrony and Diachrony*. LOT Dissertation Series, No. 111, Utrecht University. http://www.lotpublications.nl/publish/issues/BlomC/, 31.08.2005.

Bod, Rens. 2009a. Constructions at Work or at Rest? *Cognitive Linguistics* 20(1), 129–134.

Bod, Rens. 2009b. From Exemplar to Grammar: Integrating Analogy and Probability in Language Learning. *Cognitive Science* 33(4), 752–793. http://staff.science.uva.nl/~rens/analogy.pdf, 15.07.2008.

Booij, Geert E. 2002. Separable Complex Verbs in Dutch: A Case of Periphrastic Word Formation. In Dehé et al. (2002), pages 21–41.

Booij, Geert E. To appear. Construction Morphology. In A. Spencer and A. Zwicky (eds.), *The Handbook of Morphology*, London: Blackwell Publishing Ltd, second edition. http://www.hum2.leidenuniv.nl/booijge/pdf/

Spencer%20Zwicky%20handbook%20Construction%20morphology.pdf, 30.05.2012.

Borer, Hagit. 1994. The Projection of Arguments. In E. Benedicto and J. Runner (eds.), *Functional Projections*, UMass Occasional Papers in Linguistics (UMOP), No. 17, pages 19–47, Massachusetts: University of Massachusetts Graduate Linguistic Student Association.

Borer, Hagit. 2003. Exo-Skeletal vs. Endo-Skeletal Explanations: Syntactic Projections and the Lexicon. In J. Moore and M. Polinsky (eds.), *The Nature of Explanation in Linguistic Theory*, pages 31–67, Stanford: CSLI Publications.

Borer, Hagit. 2005. *Structuring Sense*, volume I. In Name Only. Oxford: Oxford University Press.

Bouma, Gosse, Malouf, Robert and Sag, Ivan A. 2001. Satisfying Constraints on Extraction and Adjunction. *Natural Language and Linguistic Theory* 19(1), 1–65. http://ftp-linguistics.stanford.edu/sag/bms-nllt.pdf, 31.05.2010.

Bresnan, Joan. 1974. The Position of Certain Clause-Particles in Phrase Structure. *Linguistic Inquiry* 5(4), 614–619.

Bresnan, Joan. 1982a. Control and Complementation. *Linguistic Inquiry* 13(3), 343–434.

Bresnan, Joan (ed.). 1982b. *The Mental Representation of Grammatical Relations*. MIT Press Series on Cognitive Theory and Mental Representation, Cambridge, MA/London: MIT Press.

Bresnan, Joan. 1982c. The Passive in Lexical Theory. In Bresnan (1982b), pages 3–86.

Bresnan, Joan. 2001. *Lexical-Functional Syntax*. Oxford, UK/Cambridge, USA: Blackwell.

Bresnan, Joan and Kaplan, Ronald M. 1982. Introduction: Grammars as Mental Representations of Language. In Bresnan (1982b), pages xvii–lii.

Bresnan, Joan and Mchombo, Sam A. 1995. The Lexical Integrity Principle: Evidence from Bantu. *Natural Language and Linguistic Theory* 13, 181–254.

Briscoe, Ted J. and Copestake, Ann. 1999. Lexical Rules in Constraint-Based Grammar. *Computational Linguistics* 25(4), 487–526. http://acl.ldc.upenn.edu/J/J99/J99-4002.pdf, 06.04.2004.

Butt, Miriam. 2003. The Light Verb Jungle. In *Papers from the Harvard/Dudley House Light Verb Workshop*, Harvard Working Papers in Linguistics, No. 9, pages 1–49, Harvard University, Department of Linguistics.

Calcagno, Mike. 1995. Interpreting Lexical Rules. In G. V. Morrill and R. T. Oehrle (eds.), *Proceedings of the Formal Grammar Conference*, Barcelona, Spain.

Calcagno, Mike and Pollard, Carl J. 1995. Lexical Rules in HPSG: What are they?, Department of Linguistics, Ohio State University, Columbus, ms.

Candito, Marie-Hélène. 1996. A Principle-Based Hierarchical Representation of

LTAGs. In J. Tsuji (ed.), *Proceedings of Coling-96. 16th International Conference on Computational Linguistics (COLING96). Copenhagen, Denmark, August 5–9, 1996*, pages 194–199, Copenhagen, Denmark: ACL.

Cappelle, Bert, Shtyrov, Yury and Pulvermüller, Friedemann. 2010. *Heating up* or *cooling up* the Brain? MEG Evidence that Phrasal Verbs are Lexical Units. *Brain and Language* 115, 189–201.

Chomsky, Noam. 1957. *Syntactic Structures*. Janua Linguarum / Series Minor, No. 4, The Hague/Paris: Mouton.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1970. Remarks on Nominalization. In R. A. Jacobs and P. S. Rosenbaum (eds.), *Readings in English Transformational Grammar*, Chapter 12, pages 184–221, Waltham, MA/Toronto/London: Ginn and Company.

Chomsky, Noam. 1971. *Problems of Knowledge and Freedom*. London: Fontana.

Chomsky, Noam. 2013. Problems of Projection. *Lingua* 130, 33–49.

Clément, Lionel and Kinyon, Alexandra. 2003. Generating Parallel Multilingual LFG-TAG Grammars from a MetaGrammar. In E. Hinrichs and D. Roth (eds.), *Proceedings of the 41st Annual Meeting of the Association for Computational Linguistics*, pages 184–191, Sapporo, Japan: ACL.

Copestake, Ann. 1992. The Representation of Lexical Semantic Information. Cognitive Science Research Papers 280, University of Sussex.

Copestake, Ann and Briscoe, Ted. 1995. Semi-Productive Polysemy and Sense Extension. *Journal of Semantics* 12(1), 15–67.

Copestake, Ann and Briscoe, Ted J. 1992. Lexical Operations in a Unification Based Framework. In J. Pustejovsky and S. Bergler (eds.), *Lexical Semantics and Knowledge Representation*, Lecture Notes in Artificial Intelligence, No. 627, pages 101–119, Berlin: Springer Verlag. http://www.cl.cam.ac.uk/Research/NL/acquilex/papers.html, 18.08.2002.

Croft, William. 2001. *Radical Construction Grammar. Syntactic Theory in Typological Perspective*. Oxford University Press.

Croft, William. 2003. Lexical Rules vs. Constructions: A False Dichotomy. In H. Cuyckens, T. Berg, R. Dirven and K.-U. Panther (eds.), *Motivation in Language: Studies in Honour of Günter Radden*, pages 49–68, Amsterdam: John Benjamins Publishing Co.

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

Dąbrowska, Ewa. 2001. From Formula to Schema: The Acquisition of English Questions. *Cognitive Linguistics* 11(1–2), 83–102.

Davidson, Donald. 1967. The Logical Form of Action Sentences. In N. Rescher (ed.), *The Logic of Decision and Action*, pages 81–95, Pittsburg University Press.

Davis, Anthony R. and Koenig, Jean-Pierre. 2000. Linking as Constraints on Word Classes in a Hierarchical Lexicon. *Language* 76(1), 56–91.

De Kuthy, Kordula. 2002. *Discontinuous NPs in German*. Studies in Constraint-Based Lexicalism, No. 14, Stanford: CSLI Publications.

De Kuthy, Kordula and Meurers, Walt Detmar. 2001. On Partial Constituent Fronting in German. *Journal of Comparative Germanic Linguistics* 3(3), 143–205. http://www.ling.ohio-state.edu/~kdk/papers/dekuthy-meurers-jcgs.html, 19.08.2002.

Dehé, Nicole, Jackendoff, Ray S., McIntyre, Andrew and Urban, Silke (eds.). 2002. *Verb-Particle Explorations*. Interface Explorations, No. 1, Berlin: Mouton de Gruyter.

Dowty, David R. 1978. Governed Transformations as Lexical Rules in a Montague Grammar. *Linguistic Inquiry* 9(3), 393–426.

Dowty, David R. 1989. On the Semantic Content of the Notion 'Thematic Role'. In G. Chierchia, B. H. Partee and R. Turner (eds.), *Properties, Types and Meaning*, volume 2 of *Studies in Linguistics and Philosophy*, pages 69–130, Dordrecht/Boston/London: Kluwer Academic Publishers.

Embick, David. 2004. On the Structure of Resultative Participles in English. *Linguistic Inquiry* 35(3), 355–392.

Fanselow, Gisbert. 2001. Features, θ-Roles, and Free Constituent Order. *Linguistic Inquiry* 32(3), 405–437.

Fanselow, Gisbert. 2002. Against Remnant VP-Movement. In A. Alexiadou, E. Anagnostopoulou, S. Barbiers and H.-M. Gärtner (eds.), *Dimensions of Movement. From Features to Remnants*, Linguistik Aktuell/Linguistics Today, No. 48, pages 91–127, Amsterdam: John Benjamins Publishing Co.

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*, Studies in Constraint-Based Lexicalism, No. 1, pages 113–128, Stanford: CSLI Publications.

Fillmore, Charles J., Kay, Paul and O'Connor, Mary Catherine. 1988. Regularity and Idiomaticity in Grammatical Constructions: The Case of *Let Alone*. *Language* 64(3), 501–538.

Gazdar, Gerald. 1982. Phrase Structure Grammar. In P. Jacobson and G. K. Pullum (eds.), *The Nature of Syntactic Representation*, Synthese Language Library, No. 15, Dordrecht/Boston/London: D. Reidel Publishing Company.

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

Geach, Peter Thomas. 1970. A Program for Syntax. *Synthese* 22, 3–17.

Goldberg, Adele E. 1995. *Constructions. A Construction Grammar Approach to Argument Structure*. Cognitive Theory of Language and Culture, Chicago/London: University of Chicago Press.

Goldberg, Adele E. 2003. Words by Default: the Persian Complex Predicate Construction. In E. J. Francis and L. A. Michaelis (eds.), *Mismatch: Form-function Incongruity and the Architecture of Grammar*, CSLI Lecture Notes, No. 163, pages 117–146, Stanford: CSLI Publications.

Goldberg, Adele E. 2006. *Constructions at Work. The Nature of Generalization in Language*. Oxford Linguistics, Oxford, New York: Oxford University Press.

Goldberg, Adele E. 2013. Argument Structure Constructions vs. Lexical Rules or Derivational Verb Templates. *Mind and Language* 28(4), 435–465.

Goldberg, Adele E., Casenhiser, Devin and Sethuraman, Nitya. 2004. Learning Argument Structure Generalizations. *Cognitive Linguistics* 15(3), 289–316.

Goldberg, Adele E. and Jackendoff, Ray S. 2004. The English Resultative as a Family of Constructions. *Language* 80(3), 532–568.

Grewendorf, Günther. 1993. German. A Grammatical Sketch. In J. Jacobs, A. von Stechow, W. Sternefeld and T. Vennemann (eds.), *Syntax – Ein internationales Handbuch zeitgenössischer Forschung*, volume 9.2 of *Handbücher zur Sprach- und Kommunikationswissenschaft*, pages 1288–1319, Berlin: Walter de Gruyter Verlag.

Grimshaw, Jane. 1997. Projections, Heads, and Optimality. *Linguistic Inquiry* 28, 373–422.

Gunji, Takao. 1986. Subcategorization and Word Order. In W. J. Poser (ed.), *Papers from the Second International Workshop on Japanese Syntax*, pages 1–21, Stanford: CSLI Publications.

Haider, Hubert. 1985. The Case of German. In J. Toman (ed.), *Studies in German Grammar*, Studies in Generative Grammar, No. 21, pages 23–64, Dordrecht: Holland, Cinnaminson: U.S.A.: Foris.

Haider, Hubert. 1993. *Deutsche Syntax – generativ. Vorstudien zur Theorie einer projektiven Grammatik*. Tübinger Beiträge zur Linguistik, No. 325, Tübingen: Gunter Narr Verlag.

Hale, Kenneth and Keyser, Samuel Jay. 1993. On Argument Structure and the Lexical Expression of Syntactic Relations. In K. Hale and S. J. Keyser (eds.), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, Current Studies in Linguistics, No. 24, pages 53–109, Cambridge, MA/London: MIT Press.

Hale, Kenneth and Keyser, Samuel Jay. 1997. On the Complex Nature of Simple Predicators. In A. Alsina, J. Bresnan and P. Sells (eds.), *Complex Predicates*, CSLI Lecture Notes, No. 64, pages 29–65, Stanford: CSLI Publications.

Harley, Heidi and Noyer, Rolf. 2000. Formal versus Encyclopedic Properties of Vocabulary: Evidence from Nominalizations. In Peeters (2000), pages 349–374.

Haugereid, Petter. 2009. *Phrasal Subconstructions: A Constructionalist Grammar Design, Exemplified with Norwegian and English*. Ph. D.thesis, Norwegian

University of Science and Technology.

Hauser, Marc D., Chomsky, Noam and Fitch, W. Tecumseh. 2002. The Faculty of Language: What Is It, Who Has It, and How Did It Evolve? *Science* 298, 1569–1579. http://www.chomsky.info/articles/20021122.pdf, 17.08.2007.

Heinz, Wolfgang and Matiasek, Johannes. 1994. Argument Structure and Case Assignment in German. In Nerbonne et al. (1994), pages 199–236.

Hinrichs, Erhard W. and Nakazawa, Tsuneko. 1994. Partial-VP and Split-NP Topicalization in German—An HPSG Analysis. In E. W. Hinrichs, W. D. Meurers and T. Nakazawa (eds.), *Partial-VP and Split-NP Topicalization in German—An HPSG Analysis and its Implementation*, Arbeitspapiere des SFB 340, No. No. 58, Eberhard-Karls-Universität Tübingen.

Hoeksema, Jack. 1991. Theoretische Aspekten van Partikelvooropplaatsing. *TABU Bulletin voor Taalwetenschap* 21(1), 18–26.

Hoffman, Beryl Ann. 1995. *The Computational Analysis of the Syntax and Interpretation of "Free" Word Order in Turkish*. Ph. D.thesis, University of Pennsylvania.

Höhle, Tilman N. 1978. *Lexikalische Syntax: Die Aktiv-Passiv-Relation und andere Infinitkonstruktionen im Deutschen*. Linguistische Arbeiten, No. 67, Tübingen: Niemeyer.

Jackendoff, Ray S. 1975. Morphological and Semantic Regularities in the Lexikon. *Language* 51(3), 639–671.

Jackendoff, Ray S. 2002. *Foundations of Language*. Oxford: Oxford University Press.

Jackendoff, Ray S. 2008. Construction after Construction and Its Theoretical Challenges. *Language* 84(1), 8–28.

Jackendoff, Ray S. 2011. What is the human language faculty? Two views. *Language* 87(3), 586–624.

Jackendoff, Ray S. and Pinker, Steven. 2005. The Nature of the Language Faculty and its Implications for Evolution of Language (Reply to Fitch, Hauser, and Chomsky). *Cognition* 97(2), 211–225.

Jacobs, Joachim. 2008. Wozu Konstruktionen? *Linguistische Berichte* 213, 3–44.

Johnson, Mark. 1986. A GPSG Account of VP Structure in German. *Linguistics* 24(5), 871–882.

Joshi, Aravind K., Levy, Leon S. and Takahashi, Masako. 1975. Tree Adjunct Grammar. *Journal of Computer and System Science* 10(2), 136–163.

Kallmeyer, Laura and Osswald, Rainer. 2012. A Frame-Based Semantics of the Dative Alternation in Lexicalized Tree Adjoining Grammars. In C. Piñón (ed.), *Empirical Issues in Syntax and Semantics*, volume 9, pages 167–184, Paris: CNRS.

Kathol, Andreas. 1994. Passives without Lexical Rules. In Nerbonne et al. (1994), pages 237–272.

Kathol, Andreas. 1995. *Linearization-Based German Syntax*. Ph. D.thesis, Ohio State University.

Kathol, Andreas. 2000. *Linear Syntax*. New York, Oxford: Oxford University Press.

Kaufmann, Ingrid and Wunderlich, Dieter. 1998. Cross-linguistic Patterns of Resultatives. SFB 282: Theorie des Lexikons 109, Heinrich Heine Uni/BUGH, Düsseldorf.

Kay, Paul. 2005. Argument Structure Constructions and the Argument-Adjunct Distinction. In M. Fried and H. C. Boas (eds.), *Grammatical Constructions: Back to the Roots*, Constructional Approaches to Language, No. 4, pages 71–98, Amsterdam: John Benjamins Publishing Co. http://www.icsi.berkeley.edu/~kay/ASCs.pdf, 07.11.2006.

Kay, Paul and Fillmore, Charles J. 1999. Grammatical Constructions and Linguistic Generalizations: the What's X Doing Y? Construction. *Language* 75(1), 1–33.

Kiparsky, Paul. 1987. Morphology and Grammatical Relations. Unpublished paper, Stanford University, Stanford.

Kiparsky, Paul. 1988. Agreement and Linking Theory. Unpublished paper, Stanford University, Stanford.

Knecht, Laura. 1985. *Subject and Object in Turkish*. Ph. D.thesis, M.I.T.

Koenig, Jean-Pierre. 1999. *Lexical Relations*. Stanford Monographs in Linguistics, Stanford: CSLI Publications.

Kordoni, Valia. 2001. Linking Experiencer-Subject Psych Verb Constructions in Modern Greek. In D. P. Flickinger and A. Kathol (eds.), *Proceedings of the HPSG-2000 Conference, University of California, Berkeley*, pages 198–213, CSLI Publications. http://cslipublications.stanford.edu/HPSG/1/, 11.10.2003.

Kratzer, Angelika. 1996. Severing the External Argument from Its Verb. In J. Rooryck and L. Zaring (eds.), *Phrase Structure and the Lexicon*, pages 109–137, Dordrecht/Boston/London: Kluwer Academic Publishers.

Krieger, Hans-Ulrich and Nerbonne, John. 1993. Feature-Based Inheritance Networks for Computational Lexicons. In T. Briscoe, A. Copestake and V. de Paiva (eds.), *Inheritance, Defaults, and the Lexicon*, pages 90–136, Cambridge, UK: Cambridge University Press, a version of this paper is available as DFKI Research Report RR-91-31. Also published in: Proceedings of the ACQUILEX Workshop on Default Inheritance in the Lexicon, Technical Report No. 238, University of Cambridge, Computer Laboratory, October 1991. http://www.dfki.de/lt/publications_show.php?id=342, 31.10.2004.

Kroch, Anthony S. and Joshi, Aravind K. 1985. The Linguistic Relevance of Tree Adjoining Grammar. Technical Report MS-CIS-85-16, University of Pennsylvania. http://repository.upenn.edu/cgi/viewcontent.cgi?article=1706&context=cis_reports, 04.06.2014.

Kunze, Jürgen. 1991. *Kasusrelationen und semantische Emphase*. studia grammatica XXXII, Berlin: Akademie Verlag.

Kunze, Jürgen. 1993. *Sememstrukturen und Feldstrukturen*. studia grammatica, No. 36, Berlin: Akademie Verlag, unter Mitarbeit von Beate Firzlaff.

Lakoff, George. 1969. On Generative Semantics. Reproduced by the Indiana University Linguistics Club.

Langacker, Ronald W. 1987. *Foundations of Cognitive Grammar*, volume 1. Stanford: Stanford University Press.

Levin, Beth. 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. Chicago, Illinois: University of Chicago Press.

Levin, Beth and Rappaport Hovav, Malka. 2005. *Argument Realization*. Cambridge University Press.

Levin, Lori S., Rappaport, Malka and Zaenen, Annie (eds.). 1983. *Papers in Lexical Functional Grammar*. Indiana University Linguistics Club.

Lewis, Geoffrey L. 1967. *Turkish Grammar*. Oxford: Clarendon Press.

Lohndal, Terje. 2012. Toward the End of Argument Structure. In M. C. Cuervo and Y. Roberge (eds.), *The End of Argument Structure?*, volume 38 of *Syntax and Semantics*, pages 155–184, Bingley, UK: Emerald Group Publishing.

Lüdeling, Anke and Kytö, Merja (eds.). 2009. *Corpus Linguistics. An International Handbook*, volume 29.2 of *Handbücher zur Sprach- und Kommunikationswissenschaft*. Berlin: Mouton de Gruyter.

Marantz, Alec. 1984. *On the Nature of Grammatical Relations*. Linguistic Inquiry Monographs, No. 10, Cambridge, MA: MIT Press.

Marantz, Alec. 1997. No Escape from Syntax. Don't Try Morphological Analysis in the Privacy of Your Own Lexicon. *U. Penn Working Papers in Linguistics* 4(2), 201–225. http://www.ling.upenn.edu/papers/v4.2-contents.html, 30.05.2010.

Meurers, Walt Detmar. 2000. Lexical Generalizations in the Syntax of German Non-Finite Constructions. Arbeitspapiere des SFB 340 No. 145, Eberhard-Karls-Universität, Tübingen. http://www.sfs.uni-tuebingen.de/~dm/papers/diss.html, 19.08.2002.

Meurers, Walt Detmar. 2001. On Expressing Lexical Generalizations in HPSG. *Nordic Journal of Linguistics* 24(2), 161–217. http://www.sfs.uni-tuebingen.de/~dm/papers/lexical-generalizations.html, 30.11.2006.

Meurers, Walt Detmar and Müller, Stefan. 2009. Corpora and Syntax. In Lüdeling and Kytö (2009), Chapter 42, pages 920–933.

Michaelis, Laura A. and Ruppenhofer, Josef. 2001. *Beyond Alternations: A Constructional Model of the German Applicative Pattern*. Stanford Monographs in Linguistics, Stanford: CSLI Publications.

Montague, Richard. 1973. The Proper Treatment of Quantification in Ordinary English. In R. H. Thomason (ed.), *Formal Philosophy. Selected Papers of*

Richard Montague, pages 247–270, Yale University Press.

Müller, Gereon. 1998. *Incomplete Category Fronting. A Derivational Approach to Remnant Movement in German*. Studies in Natural Language and Linguistic Theory, No. 42, Dordrecht/Boston/London: Kluwer Academic Publishers.

Müller, Gereon. 2011. Regeln oder Konstruktionen? Von verblosen Direktiven zur sequentiellen Nominalreduplikation. In S. Engelberg, A. Holler and K. Proost (eds.), *Sprachliches Wissen zwischen Lexikon und Grammatik*, Institut für Deutsche Sprache, Jahrbuch 2010, pages 211–249, Berlin: de Gruyter. http://www.uni-leipzig.de/~muellerg/mu242.pdf, 13.05.2010.

Müller, Stefan. 1996. Yet another Paper about Partial Verb Phrase Fronting in German. In J. Tsuji (ed.), *Proceedings of Coling-96. 16th International Conference on Computational Linguistics (COLING96). Copenhagen, Denmark, August 5–9, 1996*, pages 800–805, Copenhagen, Denmark: ACL. http://hpsg.fu-berlin.de/~stefan/Pub/pvp.html, 04.06.2014.

Müller, Stefan. 1999. *Deutsche Syntax deklarativ. Head-Driven Phrase Structure Grammar für das Deutsche*. Linguistische Arbeiten, No. 394, Tübingen: Niemeyer. http://hpsg.fu-berlin.de/~stefan/Pub/hpsg.html, 04.06.2014.

Müller, Stefan. 2001. Case in German – Towards an HPSG Analysis. In W. D. Meurers and T. Kiss (eds.), *Constraint-Based Approaches to Germanic Syntax*, Studies in Constraint-Based Lexicalism, No. 7, pages 217–255, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/case.html, 04.06.2014.

Müller, Stefan. 2002a. *Complex Predicates: Verbal Complexes, Resultative Constructions, and Particle Verbs in German*. Studies in Constraint-Based Lexicalism, No. 13, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/complex.html, 04.06.2014.

Müller, Stefan. 2002b. Syntax or Morphology: German Particle Verbs Revisited. In Dehé et al. (2002), pages 119–139. http://hpsg.fu-berlin.de/~stefan/Pub/syn-morph-part.html, 04.06.2014.

Müller, Stefan. 2003a. Object-To-Subject-Raising and Lexical Rule. An Analysis of the German Passive. In S. Müller (ed.), *Proceedings of the 10th International Conference on Head-Driven Phrase Structure Grammar, Michigan State University, East Lansing*, volume 4, pages 278–297, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/passiv-da.html, 04.06.2014.

Müller, Stefan. 2003b. Solving the Bracketing Paradox: an Analysis of the Morphology of German Particle Verbs. *J. of Linguistics* 39(2), 275–325. http://hpsg.fu-berlin.de/~stefan/Pub/paradox.html, 04.06.2014.

Müller, Stefan. 2005a. Resultative Constructions: Syntax, World Knowledge, and Collocational Restrictions. Review of Hans C. Boas: A Constructional Approach to Resultatives. *Studies in Language* 29(3), 651–681. http://hpsg.fu-berlin.de/~stefan/Pub/boas2003.html, 04.06.2014.

Müller, Stefan. 2005b. Zur Analyse der scheinbar mehrfachen Vorfeldbeset-

zung. *Linguistische Berichte* 203, 297–330. http://hpsg.fu-berlin.de/~stefan/Pub/mehr-vf-lb.html, 04.06.2014.

Müller, Stefan. 2006. Phrasal or Lexical Constructions? *Language* 82(4), 850–883. http://hpsg.fu-berlin.de/~stefan/Pub/phrasal.html, 04.06.2014.

Müller, Stefan. 2007a. *Head-Driven Phrase Structure Grammar: Eine Einführung*. Stauffenburg Einführungen, No. 17, Tübingen: Stauffenburg Verlag, first edition. http://hpsg.fu-berlin.de/~stefan/Pub/hpsg-lehrbuch.html, 04.06.2014.

Müller, Stefan. 2007b. Phrasal or Lexical Constructions: Some Comments on Underspecification of Constituent Order, Compositionality, and Control. In S. Müller (ed.), *Proceedings of the 14th International Conference on Head-Driven Phrase Structure Grammar*, pages 373–393, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/phrasal-2.html, 04.06.2014.

Müller, Stefan. 2007c. Qualitative Korpusanalyse für die Grammatiktheorie: Introspektion vs. Korpus. In G. Zifonun and W. Kallmeyer (eds.), *Sprachkorpora – Datenmengen und Erkenntnisfortschritt*, Institut für Deutsche Sprache Jahrbuch 2006, pages 70–90, Berlin: Walter de Gruyter. http://hpsg.fu-berlin.de/~stefan/Pub/intro-korpus.html, 04.06.2014.

Müller, Stefan. 2010a. *Grammatiktheorie*. Stauffenburg Einführungen, No. 20, Tübingen: Stauffenburg Verlag. http://hpsg.fu-berlin.de/~stefan/Pub/grammatiktheorie.html, 04.06.2014.

Müller, Stefan. 2010b. Persian Complex Predicates and the Limits of Inheritance-Based Analyses. *Journal of Linguistics* 46(3), 601–655. http://hpsg.fu-berlin.de/~stefan/Pub/persian-cp.html, 04.06.2014.

Müller, Stefan. 2013. *Grammatiktheorie*. Stauffenburg Einführungen, No. 20, Tübingen: Stauffenburg Verlag, second edition. http://hpsg.fu-berlin.de/~stefan/Pub/grammatiktheorie.html, 04.06.2014.

Müller, Stefan and Ørsnes, Bjarne. In Preparation. *Danish in Head-Driven Phrase Structure Grammar*. Empirically Oriented Theoretical Morphology and Syntax, Berlin: Language Science Press. http://hpsg.fu-berlin.de/~stefan/Pub/danish.html, 04.06.2014.

Nerbonne, John. 1986. 'Phantoms' and German Fronting: Poltergeist Constituents? *Linguistics* 24(5), 857–870.

Nerbonne, John. 1994. Partial Verb Phrases and Spurious Ambiguities. In Nerbonne et al. (1994), pages 109–150.

Nerbonne, John, Netter, Klaus and Pollard, Carl J. (eds.). 1994. *German in Head-Driven Phrase Structure Grammar*. CSLI Lecture Notes, No. 46, Stanford: CSLI Publications.

Noonan, Michael. 1994. A Tale of Two Passives in Irish. In B. Fox and P. J. Hopper (eds.), *Voice: Form and Function*, Typological Studies in Language, No. 27, pages 279–311, Amsterdam: John Benjamins Publishing Co.

Nunberg, Geoffrey. 1995. Transfers of Meaning. *Journal of semantics* 12(2), 109–

132.

Nunberg, Geoffrey, Sag, Ivan A. and Wasow, Thomas. 1994. Idioms. *Language* 70(3), 491–538.

Özkaragöz, İnci. 1986. Monoclausal Double Passives in Turkish. In D. I. Slobin and K. Zimmer (eds.), *Studies in Turkish Linguistics*, Typological Studies in Language, No. 8, Amsterdam: John Benjamins Publishing Co.

Peeters, Bert. 2000. *The Lexicon–Encyclopedia Interface*. Amsterdam: Elsevier.

Perlmutter, David M. (ed.). 1983. *Studies in Relational Grammar*, volume 1. University of Chicago Press.

Pesetsky, David. 1996. *Zero Syntax: Experiencers and Cascades*. Cambridge, MA: MIT Press.

Piñango, Maria Mercedes, Mack, Jennifer and Jackendoff, Ray S. 2006. Semantic Combinatorial Processes in Argument Structure: Evidence from Light-Verbs. In *Proceedings of the 32nd Annual Meeting of the Berkeley Linguistics Society: Theoretical Approaches to Argument Structure*, volume 32, Berkeley, CA: BLS.

Pollard, Carl J. 1994. Toward a Unified Account of Passive in German. In Nerbonne et al. (1994), pages 273–296.

Pollard, Carl J. 1996. On Head Non-Movement. In H. Bunt and A. van Horck (eds.), *Discontinuous Constituency*, Natural Language Processing, No. 6, pages 279–305, Berlin: Mouton de Gruyter, veröffentlichte Version eines Ms. von 1990.

Pollard, Carl J. and Sag, Ivan A. 1987. *Information-Based Syntax and Semantics*. CSLI Lecture Notes, No. 13, Stanford: CSLI Publications.

Pollard, Carl J. and Sag, Ivan A. 1994. *Head-Driven Phrase Structure Grammar*. Studies in Contemporary Linguistics, Chicago, IL and London: University of Chicago Press.

Pulvermüller, Friedemann, Cappelle, Bert and Shtyrov, Yury. 2013. Brain Basis of Meaning, Words, Constructions, and Grammar. In G. Trousdale and T. Hoffmann (eds.), *The Oxford Handbook of Construction Grammar*, Oxford: Oxford University Press.

Rappaport, Malka. 1983. On the Nature of Derived Nominals. In Levin et al. (1983), pages 113–42.

Reape, Mike. 1994. Domain Union and Word Order Variation in German. In Nerbonne et al. (1994), pages 151–198.

Richter, Frank and Sailer, Manfred. 2009. Phraseological Clauses as Constructions in HPSG. In S. Müller (ed.), *Proceedings of the 16th International Conference on Head-Driven Phrase Structure Grammar, University of Göttingen, Germany*, pages 297–317, Stanford: CSLI Publications.

Riehemann, Susanne. 1993. *Word Formation in Lexical Type Hierarchies: A Case Study of* bar*-Adjectives in German*. Masters Thesis, Eberhard-Karls-Universität Tübingen, also published as SfS-Report-02-93, Seminar für Sprachwissen-

schaft, University of Tübingen.

Riehemann, Susanne Z. 1998. Type-Based Derivational Morphology. *Journal of Comparative Germanic Linguistics* 2(1), 49–77. http://doors.stanford.edu/~sr/morphology.ps, 05.04.2009.

Sag, Ivan A. 2007. Remarks on Locality. In S. Müller (ed.), *Proceedings of the 14th International Conference on Head-Driven Phrase Structure Grammar*, pages 394–414, Stanford: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2007/, 29.07.2007.

Sag, Ivan A. 2012. Sign-Based Construction Grammar: An Informal Synopsis. In H. C. Boas and I. A. Sag (eds.), *Sign-based Construction Grammar*, CSLI Lecture Notes, No. 193, pages 69–202, Stanford: CSLI Publications. http://lingo.stanford.edu/sag/papers/theo-syno.pdf, 23.10.2007.

Sailer, Manfred. 2000. *Combinatorial Semantics and Idiomatic Expressions in Head-Driven Phrase Structure Grammar*. Dissertation, Eberhard-Karls-Universität Tübingen. http://w210.ub.uni-tuebingen.de/dbt/volltexte/2003/916/, 18.11.2004.

Schein, Barry. 1993. *Plurals and Events*. Current Studies in Linguistics, No. 23, Cambridge, MA: MIT Press.

Simpson, Jane. 1983. Resultatives. In Levin et al. (1983), Reprint: Simpson, 2005.

Simpson, Jane. 2005. Resultatives. In M. Butt and T. H. King (eds.), *Lexical Semantics in LFG*, pages 149–161, Stanford: CSLI Publications.

Smith, Carlota S. 1970. Jespersen's "move and change" Class and Causative Verbs in English. In Peeters (2000), pages 101–109.

Smith, Carlota S. 1972. On Causative Verbs and Derived Nominals in English. *Linguistic Inquiry* 3(1), 136–138.

Soehn, Jan-Philipp and Sailer, Manfred. 2008. At First Blush on Tenterhooks. About Selectional Restrictions Imposed by Nonheads. In G. Jäger, P. Monachesi, G. Penn and S. Wintner (eds.), *Proceedings of Formal Grammar 2003, Vienna, Austria*, pages 149–161, Stanford: CSLI Publications. http://cslipublications.stanford.edu/FG/2003/soehn.pdf, 04.06.2010.

Steedman, Mark J. 1991. Structure and Intonation. *Language* 67(2), 260–296.

Steedman, Mark J. 2000. *The Syntactic Process*. Language, Speech, and Communication, Cambridge, MA/London, England: MIT Press.

Steedman, Mark J. and Baldridge, Jason. 2006. Combinatory Categorial Grammar. In K. Brown (ed.), *Encyclopedia of Language and Linguistics*, pages 610–621, Oxford: Elsevier, second edition.

Stefanowitsch, Anatol and Gries, Stephan Th. 2009. Corpora and Grammar. In Lüdeling and Kytö (2009), Chapter 43, pages 933–952.

Timberlake, Alan. 1982. The Impersonal Passive in Lithuanian. In *Proceedings of the Eighth Annual Meeting of the Berkeley Linguistics Society*, pages 508–524, Berkeley: University of California.

Tomasello, Michael. 2003. *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.

Tomasello, Michael, Akhtar, Nameera, Dodsen, Kelly and Rekau, Laura. 1997. Differential Productivity in Young Children's Use of Nouns and Verbs. *Journal of Child Language* 24(2), 373–387.

Uszkoreit, Hans. 1987. *Word Order and Constituent Structure in German*. CSLI Lecture Notes, No. 8, Stanford: CSLI Publications.

Verspoor, Cornelia Maria. 1997. *Contextually-Dependent Lexical Semantics*. Ph. D.thesis, University of Edinburgh. ftp://ftp.cogsci.ed.ac.uk/pub/kversp/thesis.ps.gz, 04.06.2010.

Wechsler, Stephen Mark. 1991. *Argument Structure and Linking*. Ph. D.thesis, Stanford University.

Wechsler, Stephen Mark. 1995. *The Semantic Basis of Argument Structure*. Dissertations in Linguistics, Stanford: CSLI Publications.

Wechsler, Stephen Mark. 1997. Resultative Predicates and Control. In R. C. Blight and M. J. Moosally (eds.), *Texas Linguistic Forum 38: The Syntax and Semantics of Predication. Proceedings of the 1997 Texas Linguistics Society Conference*, pages 307–321, Austin, Texas: University of Texas Department of Linguistics.

Wechsler, Stephen Mark. 2005. What is Right and Wrong about Little v. In *Grammar and Beyond—Essays in Honour of Lars Hellan*, pages 179–195, Oslo, Norway: Novus Press.

Wechsler, Stephen Mark. 2008a. A Diachronic Account of English Deverbal Nominals. In C. B. Chang and H. J. Haynie (eds.), *Proceedings of the 26th West Coast Conference on Formal Linguistics*, pages 498–506, Somerville, MA: Cascadilla Proceedings Project.

Wechsler, Stephen Mark. 2008b. Dualist Syntax. In S. Müller (ed.), *Proceedings of the 15th International Conference on Head-Driven Phrase Structure Grammar*, pages 294–304, Stanford: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2008/, 31.10.2008.

Wechsler, Stephen Mark and Noh, Bokyung. 2001. On Resultative Predicates and Clauses: Parallels between Korean and English. *Language Sciences* 23(4), 391–423.

Wetta, Andrew C. 2011. A Construction-based Cross-linguistic Analysis of V2 Word Order. In S. Müller (ed.), *Proceedings of the 18th International Conference on Head-Driven Phrase Structure Grammar, University of Washington*, pages 248–268, Stanford: CSLI Publications.

Wittenberg, Eva, Jackendoff, Ray S., Kuperberg, Gina, Paczynski, Martin, Snedeker, Jesse and Wiese, Heike. To appear. The Processing and Representation of Light Verb Constructions. In A. Bachrach, I. Roy and L. Stockall (eds.), *Structuring the Argument*, Amsterdam: John Benjamins Publishing Co.

Wittenberg, Eva and Piñango, Maria Mercedes. 2011. Processing Light Verb Constructions. *The Mental Lexicon* 6(3), 393–413.

Wunderlich, Dieter. 1992. CAUSE and the Structure of Verbs. Arbeiten des SFB 282 No. 36, Heinrich Heine Uni/BUGH, Düsseldorf/Wuppertal.

Wunderlich, Dieter. 1997. Argument Extension by Lexical Adjunction. *Journal of Semantics* 14(2), 95–142.

Zaenen, Annie, Maling, Joan and Thráinsson, Höskuldur. 1985. Case and Grammatical Functions: The Icelandic Passive. *Natural Language and Linguistic Theory* 3(4), 441–483. http://www2.parc.com/istl/members/zaenen/publications/Passive.pdf, 04.12.2006.

Zucchi, Alessandro. 1993. *The Language of Propositions and Events: Issues in the Syntax and the Semantics of Nominalization*. Studies in Linguistics and Philosophy, No. 51, Berlin: Springer Verlag.

References

Abbott, Barbara. 1976. Right Node Raising as a Test for Constituenthood. *Linguistic Inquiry* 7(4), 639–642.

Abeillé, Anne and Schabes, Yves. 1989. Parsing Idioms in Lexicalized TAG. In H. Somers and M. M. Wood (eds.), *Proceedings of the Fourth Conference of the European Chapter of the Association for Computational Linguistics*, pages 1–9, Manchester, England: ACL.

Ajdukiewicz, Kasimir. 1935. Die syntaktische Konnexität. *Studia Philosophica* 1, 1–27.

Alsina, Alex. 1996. Resultatives: A Joint Operation of Semantic and Syntactic Structures. In M. Butt and T. H. King (eds.), *Proceedings of the LFG '96 Conference, Rank Xerox, Grenoble*, Stanford: CSLI Publications. http://cslipublications.stanford.edu/LFG/1/lfg1.html, 06.07.2002.

Asudeh, Ash, Dalrymple, Mary and Toivonen, Ida. 2008. Constructions with Lexical Integrity: Templates as the Lexicon-Syntax Interface. In M. Butt and T. H. King (eds.), *Proceedings of the LFG 2008 Conference*, Stanford: CSLI Publications. http://cslipublications.stanford.edu/LFG/13/, 27.09.2012.

Asudeh, Ash, Dalrymple, Mary and Toivonen, Ida. 2013. Constructions with Lexical Integrity. *Journal of Language Modelling* 1(1), 1–54.

Bach, Emmon. 1976. An Extension of Classical Transformation Grammar. In *Problems in Linguistic Metatheory, Proceedings of the 1976 Conference at the Michigan State University*, pages 183–224.

Bar-Hillel, Yehoshua, Perles, Micha A. and Shamir, Eliahu. 1961. On Formal Properties of Simple Phrase-Structure Grammars. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 14(2), 143–172.

Beavers, John, Ponvert, Elias and Wechsler, Stephen. 2008. Possession of a Controlled Substantive. In T. Friedman and S. Ito (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) XVIII*, pages 108–125, Ithaca, NY: Cornell University.

Behrens, Heike. 2009. Konstruktionen im Spracherwerb. *Zeitschrift für Germanistische Linguistik* 37(3), 427–444.

Bergen, Benjamin K. and Chang, Nancy. 2005. Embodied Construction Grammar in Simulation-Based Language Understanding. In J.-O. Östman and M. Fried (eds.), *Construction Grammars: Cognitive Grounding and Theoretical Extensions*, pages 147–190, Amsterdam: John Benjamins Publishing Co.

Berwick, Robert C., Pietroski, Paul, Yankama, Beracah and Chomsky, Noam. 2011. Poverty of the Stimulus Revisited. *Cognitive Science* 35(7), 1207–1242.

Blom, Corrien. 2005. *Complex Predicates in Dutch. Synchrony and Diachrony*. LOT Dissertation Series, No. 111, Utrecht University. http://www.lotpublications.nl/publish/issues/BlomC/, 31.08.2005.

Bod, Rens. 2009a. Constructions at Work or at Rest? *Cognitive Linguistics* 20(1), 129–134.

Bod, Rens. 2009b. From Exemplar to Grammar: Integrating Analogy and Probability in Language Learning. *Cognitive Science* 33(4), 752–793. http://staff.science.uva.nl/~rens/analogy.pdf, 15.07.2008.

Booij, Geert E. 2002. Separable Complex Verbs in Dutch: A Case of Periphrastic Word Formation. In Dehé et al. (2002), pages 21–41.

Booij, Geert E. To appear. Construction Morphology. In A. Spencer and A. Zwicky (eds.), *The Handbook of Morphology*, London: Blackwell Publishing Ltd, second edition. http://www.hum2.leidenuniv.nl/booijge/pdf/Spencer%20Zwicky%20handbook%20Construction%20morphology.pdf, 30.05.2012.

Borer, Hagit. 1994. The Projection of Arguments. In E. Benedicto and J. Runner (eds.), *Functional Projections*, UMass Occasional Papers in Linguistics (UMOP), No. 17, pages 19–47, Massachusetts: University of Massachusetts Graduate Linguistic Student Association.

Borer, Hagit. 2003. Exo-Skeletal vs. Endo-Skeletal Explanations: Syntactic Projections and the Lexicon. In J. Moore and M. Polinsky (eds.), *The Nature of Explanation in Linguistic Theory*, pages 31–67, Stanford: CSLI Publications.

Borer, Hagit. 2005. *Structuring Sense*, volume I. In Name Only. Oxford: Oxford University Press.

Bouma, Gosse, Malouf, Robert and Sag, Ivan A. 2001. Satisfying Constraints on Extraction and Adjunction. *Natural Language and Linguistic Theory* 19(1), 1–65. http://ftp-linguistics.stanford.edu/sag/bms-nllt.pdf, 31.05.2010.

Bresnan, Joan. 1974. The Position of Certain Clause-Particles in Phrase Structure. *Linguistic Inquiry* 5(4), 614–619.

Bresnan, Joan. 1982a. Control and Complementation. *Linguistic Inquiry* 13(3), 343–434.

Bresnan, Joan (ed.). 1982b. *The Mental Representation of Grammatical Relations*. MIT Press Series on Cognitive Theory and Mental Representation, Cambridge, MA/London: MIT Press.

Bresnan, Joan. 1982c. The Passive in Lexical Theory. In Bresnan (1982b), pages 3–86.

Bresnan, Joan. 2001. *Lexical-Functional Syntax*. Oxford, UK/Cambridge, USA: Blackwell.

Bresnan, Joan and Kaplan, Ronald M. 1982. Introduction: Grammars as Mental Representations of Language. In Bresnan (1982b), pages xvii–lii.

Bresnan, Joan and Mchombo, Sam A. 1995. The Lexical Integrity Principle: Evidence from Bantu. *Natural Language and Linguistic Theory* 13, 181–254.

Briscoe, Ted J. and Copestake, Ann. 1999. Lexical Rules in Constraint-Based Grammar. *Computational Linguistics* 25(4), 487–526. http://acl.ldc.upenn.edu/J/J99/J99-4002.pdf, 06.04.2004.

Butt, Miriam. 2003. The Light Verb Jungle. In *Papers from the Harvard/Dudley House Light Verb Workshop*, Harvard Working Papers in Linguistics, No. 9, pages 1–49, Harvard University, Department of Linguistics.

Calcagno, Mike. 1995. Interpreting Lexical Rules. In G. V. Morrill and R. T. Oehrle (eds.), *Proceedings of the Formal Grammar Conference*, Barcelona, Spain.

Calcagno, Mike and Pollard, Carl J. 1995. Lexical Rules in HPSG: What are they?, Department of Linguistics, Ohio State University, Columbus, ms.

Candito, Marie-Hélène. 1996. A Principle-Based Hierarchical Representation of LTAGs. In J. Tsuji (ed.), *Proceedings of Coling-96. 16th International Conference on Computational Linguistics (COLING96). Copenhagen, Denmark, August 5–9, 1996*, pages 194–199, Copenhagen, Denmark: ACL.

Cappelle, Bert, Shtyrov, Yury and Pulvermüller, Friedemann. 2010. *Heating up* or *cooling up* the Brain? MEG Evidence that Phrasal Verbs are Lexical Units. *Brain and Language* 115, 189–201.

Chomsky, Noam. 1957. *Syntactic Structures*. Janua Linguarum / Series Minor, No. 4, The Hague/Paris: Mouton.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1970. Remarks on Nominalization. In R. A. Jacobs and P. S. Rosenbaum (eds.), *Readings in English Transformational Grammar*, Chapter 12, pages 184–221, Waltham, MA/Toronto/London: Ginn and Company.

Chomsky, Noam. 1971. *Problems of Knowledge and Freedom*. London: Fontana.

Chomsky, Noam. 2013. Problems of Projection. *Lingua* 130, 33–49.

Clément, Lionel and Kinyon, Alexandra. 2003. Generating Parallel Multilingual

LFG-TAG Grammars from a MetaGrammar. In E. Hinrichs and D. Roth (eds.), *Proceedings of the 41st Annual Meeting of the Association for Computational Linguistics*, pages 184–191, Sapporo, Japan: ACL.

Copestake, Ann. 1992. The Representation of Lexical Semantic Information. Cognitive Science Research Papers 280, University of Sussex.

Copestake, Ann and Briscoe, Ted. 1995. Semi-Productive Polysemy and Sense Extension. *Journal of Semantics* 12(1), 15–67.

Copestake, Ann and Briscoe, Ted J. 1992. Lexical Operations in a Unification Based Framework. In J. Pustejovsky and S. Bergler (eds.), *Lexical Semantics and Knowledge Representation*, Lecture Notes in Artificial Intelligence, No. 627, pages 101–119, Berlin: Springer Verlag. http://www.cl.cam.ac.uk/Research/NL/acquilex/papers.html, 18.08.2002.

Croft, William. 2001. *Radical Construction Grammar. Syntactic Theory in Typological Perspective*. Oxford University Press.

Croft, William. 2003. Lexical Rules vs. Constructions: A False Dichotomy. In H. Cuyckens, T. Berg, R. Dirven and K.-U. Panther (eds.), *Motivation in Language: Studies in Honour of Günter Radden*, pages 49–68, Amsterdam: John Benjamins Publishing Co.

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

Dąbrowska, Ewa. 2001. From Formula to Schema: The Acquisition of English Questions. *Cognitive Linguistics* 11(1–2), 83–102.

Davidson, Donald. 1967. The Logical Form of Action Sentences. In N. Rescher (ed.), *The Logic of Decision and Action*, pages 81–95, Pittsburg University Press.

Davis, Anthony R. and Koenig, Jean-Pierre. 2000. Linking as Constraints on Word Classes in a Hierarchical Lexicon. *Language* 76(1), 56–91.

De Kuthy, Kordula. 2002. *Discontinuous NPs in German*. Studies in Constraint-Based Lexicalism, No. 14, Stanford: CSLI Publications.

De Kuthy, Kordula and Meurers, Walt Detmar. 2001. On Partial Constituent Fronting in German. *Journal of Comparative Germanic Linguistics* 3(3), 143–205. http://www.ling.ohio-state.edu/~kdk/papers/dekuthy-meurers-jcgs.html, 19.08.2002.

Dehé, Nicole, Jackendoff, Ray S., McIntyre, Andrew and Urban, Silke (eds.). 2002. *Verb-Particle Explorations*. Interface Explorations, No. 1, Berlin: Mouton de Gruyter.

Dowty, David R. 1978. Governed Transformations as Lexical Rules in a Montague Grammar. *Linguistic Inquiry* 9(3), 393–426.

Dowty, David R. 1989. On the Semantic Content of the Notion 'Thematic Role'. In G. Chierchia, B. H. Partee and R. Turner (eds.), *Properties, Types and Meaning*, volume 2 of *Studies in Linguistics and Philosophy*, pages 69–130, Dor-

drecht/Boston/London: Kluwer Academic Publishers.
Embick, David. 2004. On the Structure of Resultative Participles in English. *Linguistic Inquiry* 35(3), 355–392.
Fanselow, Gisbert. 2001. Features, θ-Roles, and Free Constituent Order. *Linguistic Inquiry* 32(3), 405–437.
Fanselow, Gisbert. 2002. Against Remnant VP-Movement. In A. Alexiadou, E. Anagnostopoulou, S. Barbiers and H.-M. Gärtner (eds.), *Dimensions of Movement. From Features to Remnants*, Linguistik Aktuell/Linguistics Today, No. 48, pages 91–127, Amsterdam: John Benjamins Publishing Co.
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*, Studies in Constraint-Based Lexicalism, No. 1, pages 113–128, Stanford: CSLI Publications.
Fillmore, Charles J., Kay, Paul and O'Connor, Mary Catherine. 1988. Regularity and Idiomaticity in Grammatical Constructions: The Case of *Let Alone*. *Language* 64(3), 501–538.
Gazdar, Gerald. 1982. Phrase Structure Grammar. In P. Jacobson and G. K. Pullum (eds.), *The Nature of Syntactic Representation*, Synthese Language Library, No. 15, Dordrecht/Boston/London: D. Reidel Publishing Company.
Gazdar, Gerald, Klein, Ewan, Pullum, Geoffrey K. and Sag, Ivan A. 1985. *Generalized Phrase Structure Grammar*. Cambridge, MA: Harvard University Press.
Geach, Peter Thomas. 1970. A Program for Syntax. *Synthese* 22, 3–17.
Goldberg, Adele E. 1995. *Constructions. A Construction Grammar Approach to Argument Structure*. Cognitive Theory of Language and Culture, Chicago/London: University of Chicago Press.
Goldberg, Adele E. 2003. Words by Default: the Persian Complex Predicate Construction. In E. J. Francis and L. A. Michaelis (eds.), *Mismatch: Form-function Incongruity and the Architecture of Grammar*, CSLI Lecture Notes, No. 163, pages 117–146, Stanford: CSLI Publications.
Goldberg, Adele E. 2006. *Constructions at Work. The Nature of Generalization in Language*. Oxford Linguistics, Oxford, New York: Oxford University Press.
Goldberg, Adele E. 2013. Argument Structure Constructions vs. Lexical Rules or Derivational Verb Templates. *Mind and Language* 28(4), 435–465.
Goldberg, Adele E., Casenhiser, Devin and Sethuraman, Nitya. 2004. Learning Argument Structure Generalizations. *Cognitive Linguistics* 15(3), 289–316.
Goldberg, Adele E. and Jackendoff, Ray S. 2004. The English Resultative as a Family of Constructions. *Language* 80(3), 532–568.
Grewendorf, Günther. 1993. German. A Grammatical Sketch. In J. Jacobs, A. von Stechow, W. Sternefeld and T. Vennemann (eds.), *Syntax – Ein internationales Handbuch zeitgenössischer Forschung*, volume 9.2 of *Handbücher zur Sprach- und Kommunikationswissenschaft*, pages 1288–1319, Berlin: Walter de Gruyter

Verlag.

Grimshaw, Jane. 1997. Projections, Heads, and Optimality. *Linguistic Inquiry* 28, 373–422.

Gunji, Takao. 1986. Subcategorization and Word Order. In W. J. Poser (ed.), *Papers from the Second International Workshop on Japanese Syntax*, pages 1–21, Stanford: CSLI Publications.

Haider, Hubert. 1985. The Case of German. In J. Toman (ed.), *Studies in German Grammar*, Studies in Generative Grammar, No. 21, pages 23–64, Dordrecht: Holland, Cinnaminson: U.S.A.: Foris.

Haider, Hubert. 1993. *Deutsche Syntax – generativ. Vorstudien zur Theorie einer projektiven Grammatik*. Tübinger Beiträge zur Linguistik, No. 325, Tübingen: Gunter Narr Verlag.

Hale, Kenneth and Keyser, Samuel Jay. 1993. On Argument Structure and the Lexical Expression of Syntactic Relations. In K. Hale and S. J. Keyser (eds.), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, Current Studies in Linguistics, No. 24, pages 53–109, Cambridge, MA/London: MIT Press.

Hale, Kenneth and Keyser, Samuel Jay. 1997. On the Complex Nature of Simple Predicators. In A. Alsina, J. Bresnan and P. Sells (eds.), *Complex Predicates*, CSLI Lecture Notes, No. 64, pages 29–65, Stanford: CSLI Publications.

Harley, Heidi and Noyer, Rolf. 2000. Formal versus Encyclopedic Properties of Vocabulary: Evidence from Nominalizations. In Peeters (2000), pages 349–374.

Haugereid, Petter. 2009. *Phrasal Subconstructions: A Constructionalist Grammar Design, Exemplified with Norwegian and English*. Ph. D.thesis, Norwegian University of Science and Technology.

Hauser, Marc D., Chomsky, Noam and Fitch, W. Tecumseh. 2002. The Faculty of Language: What Is It, Who Has It, and How Did It Evolve? *Science* 298, 1569–1579. http://www.chomsky.info/articles/20021122.pdf, 17.08.2007.

Heinz, Wolfgang and Matiasek, Johannes. 1994. Argument Structure and Case Assignment in German. In Nerbonne et al. (1994), pages 199–236.

Hinrichs, Erhard W. and Nakazawa, Tsuneko. 1994. Partial-VP and Split-NP Topicalization in German—An HPSG Analysis. In E. W. Hinrichs, W. D. Meurers and T. Nakazawa (eds.), *Partial-VP and Split-NP Topicalization in German—An HPSG Analysis and its Implementation*, Arbeitspapiere des SFB 340, No. No. 58, Eberhard-Karls-Universität Tübingen.

Hoeksema, Jack. 1991. Theoretische Aspekten van Partikelvooropplaatsing. *TABU Bulletin voor Taalwetenschap* 21(1), 18–26.

Hoffman, Beryl Ann. 1995. *The Computational Analysis of the Syntax and Interpretation of "Free" Word Order in Turkish*. Ph. D.thesis, University of Pennsylvania.

Höhle, Tilman N. 1978. *Lexikalische Syntax: Die Aktiv-Passiv-Relation und andere Infinitkonstruktionen im Deutschen*. Linguistische Arbeiten, No. 67, Tübingen: Niemeyer.

Jackendoff, Ray S. 1975. Morphological and Semantic Regularities in the Lexikon. *Language* 51(3), 639–671.

Jackendoff, Ray S. 2002. *Foundations of Language*. Oxford: Oxford University Press.

Jackendoff, Ray S. 2008. Construction after Construction and Its Theoretical Challenges. *Language* 84(1), 8–28.

Jackendoff, Ray S. 2011. What is the human language faculty? Two views. *Language* 87(3), 586–624.

Jackendoff, Ray S. and Pinker, Steven. 2005. The Nature of the Language Faculty and its Implications for Evolution of Language (Reply to Fitch, Hauser, and Chomsky). *Cognition* 97(2), 211–225.

Jacobs, Joachim. 2008. Wozu Konstruktionen? *Linguistische Berichte* 213, 3–44.

Johnson, Mark. 1986. A GPSG Account of VP Structure in German. *Linguistics* 24(5), 871–882.

Joshi, Aravind K., Levy, Leon S. and Takahashi, Masako. 1975. Tree Adjunct Grammar. *Journal of Computer and System Science* 10(2), 136–163.

Kallmeyer, Laura and Osswald, Rainer. 2012. A Frame-Based Semantics of the Dative Alternation in Lexicalized Tree Adjoining Grammars. In C. Piñón (ed.), *Empirical Issues in Syntax and Semantics*, volume 9, pages 167–184, Paris: CNRS.

Kathol, Andreas. 1994. Passives without Lexical Rules. In Nerbonne et al. (1994), pages 237–272.

Kathol, Andreas. 1995. *Linearization-Based German Syntax*. Ph. D.thesis, Ohio State University.

Kathol, Andreas. 2000. *Linear Syntax*. New York, Oxford: Oxford University Press.

Kaufmann, Ingrid and Wunderlich, Dieter. 1998. Cross-linguistic Patterns of Resultatives. SFB 282: Theorie des Lexikons 109, Heinrich Heine Uni/BUGH, Düsseldorf.

Kay, Paul. 2005. Argument Structure Constructions and the Argument-Adjunct Distinction. In M. Fried and H. C. Boas (eds.), *Grammatical Constructions: Back to the Roots*, Constructional Approaches to Language, No. 4, pages 71–98, Amsterdam: John Benjamins Publishing Co. http://www.icsi.berkeley.edu/~kay/ASCs.pdf, 07.11.2006.

Kay, Paul and Fillmore, Charles J. 1999. Grammatical Constructions and Linguistic Generalizations: the What's X Doing Y? Construction. *Language* 75(1), 1–33.

Kiparsky, Paul. 1987. Morphology and Grammatical Relations. Unpublished pa-

per, Stanford University, Stanford.
Kiparsky, Paul. 1988. Agreement and Linking Theory. Unpublished paper, Stanford University, Stanford.
Knecht, Laura. 1985. *Subject and Object in Turkish*. Ph. D.thesis, M.I.T.
Koenig, Jean-Pierre. 1999. *Lexical Relations*. Stanford Monographs in Linguistics, Stanford: CSLI Publications.
Kordoni, Valia. 2001. Linking Experiencer-Subject Psych Verb Constructions in Modern Greek. In D. P. Flickinger and A. Kathol (eds.), *Proceedings of the HPSG-2000 Conference, University of California, Berkeley*, pages 198–213, CSLI Publications. http://cslipublications.stanford.edu/HPSG/1/, 11.10.2003.
Kratzer, Angelika. 1996. Severing the External Argument from Its Verb. In J. Rooryck and L. Zaring (eds.), *Phrase Structure and the Lexicon*, pages 109–137, Dordrecht/Boston/London: Kluwer Academic Publishers.
Krieger, Hans-Ulrich and Nerbonne, John. 1993. Feature-Based Inheritance Networks for Computational Lexicons. In T. Briscoe, A. Copestake and V. de Paiva (eds.), *Inheritance, Defaults, and the Lexicon*, pages 90–136, Cambridge, UK: Cambridge University Press, a version of this paper is available as DFKI Research Report RR-91-31. Also published in: Proceedings of the ACQUILEX Workshop on Default Inheritance in the Lexicon, Technical Report No. 238, University of Cambridge, Computer Laboratory, October 1991. http://www.dfki.de/lt/publications_show.php?id=342, 31.10.2004.
Kroch, Anthony S. and Joshi, Aravind K. 1985. The Linguistic Relevance of Tree Adjoining Grammar. Technical Report MS-CIS-85-16, University of Pennsylvania. ftp://babel.ling.upenn.edu/papers/faculty/tony_kroch/papers/relevance3.pdf, 21.03.2008.
Kunze, Jürgen. 1991. *Kasusrelationen und semantische Emphase*. studia grammatica XXXII, Berlin: Akademie Verlag.
Kunze, Jürgen. 1993. *Sememstrukturen und Feldstrukturen*. studia grammatica, No. 36, Berlin: Akademie Verlag, unter Mitarbeit von Beate Firzlaff.
Lakoff, George. 1969. On Generative Semantics. Reproduced by the Indiana University Linguistics Club.
Langacker, Ronald W. 1987. *Foundations of Cognitive Grammar*, volume 1. Stanford: Stanford University Press.
Levin, Beth. 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. Chicago, Illinois: University of Chicago Press.
Levin, Beth and Rappaport Hovav, Malka. 2005. *Argument Realization*. Cambridge University Press.
Levin, Lori S., Rappaport, Malka and Zaenen, Annie (eds.). 1983. *Papers in Lexical Functional Grammar*. Indiana University Linguistics Club.
Lewis, Geoffrey L. 1967. *Turkish Grammar*. Oxford: Clarendon Press.
Lohndal, Terje. 2012. Toward the End of Argument Structure. In M. C. Cuervo

and Y. Roberge (eds.), *The End of Argument Structure?*, volume 38 of *Syntax and Semantics*, pages 155–184, Bingley, UK: Emerald Group Publishing.

Lüdeling, Anke and Kytö, Merja (eds.). 2009. *Corpus Linguistics. An International Handbook*, volume 29.2 of *Handbücher zur Sprach- und Kommunikationswissenschaft*. Berlin: Mouton de Gruyter.

Marantz, Alec. 1984. *On the Nature of Grammatical Relations*. Linguistic Inquiry Monographs, No. 10, Cambridge, MA: MIT Press.

Marantz, Alec. 1997. No Escape from Syntax. Don't Try Morphological Analysis in the Privacy of Your Own Lexicon. *U. Penn Working Papers in Linguistics* 4(2), 201–225. http://www.ling.upenn.edu/papers/v4.2-contents.html, 30.05.2010.

Meurers, Walt Detmar. 2000. Lexical Generalizations in the Syntax of German Non-Finite Constructions. Arbeitspapiere des SFB 340 No. 145, Eberhard-Karls-Universität, Tübingen. http://www.sfs.uni-tuebingen.de/~dm/papers/diss.html, 19.08.2002.

Meurers, Walt Detmar. 2001. On Expressing Lexical Generalizations in HPSG. *Nordic Journal of Linguistics* 24(2), 161–217. http://www.sfs.uni-tuebingen.de/~dm/papers/lexical-generalizations.html, 30.11.2006.

Meurers, Walt Detmar and Müller, Stefan. 2009. Corpora and Syntax. In Lüdeling and Kytö (2009), Chapter 42, pages 920–933.

Michaelis, Laura A. and Ruppenhofer, Josef. 2001. *Beyond Alternations: A Constructional Model of the German Applicative Pattern*. Stanford Monographs in Linguistics, Stanford: CSLI Publications.

Montague, Richard. 1973. The Proper Treatment of Quantification in Ordinary English. In R. H. Thomason (ed.), *Formal Philosophy. Selected Papers of Richard Montague*, pages 247–270, Yale University Press.

Müller, Gereon. 1998. *Incomplete Category Fronting. A Derivational Approach to Remnant Movement in German*. Studies in Natural Language and Linguistic Theory, No. 42, Dordrecht/Boston/London: Kluwer Academic Publishers.

Müller, Gereon. 2011. Regeln oder Konstruktionen? Von verblosen Direktiven zur sequentiellen Nominalreduplikation. In S. Engelberg, A. Holler and K. Proost (eds.), *Sprachliches Wissen zwischen Lexikon und Grammatik*, Institut für Deutsche Sprache, Jahrbuch 2010, pages 211–249, Berlin: de Gruyter. http://www.uni-leipzig.de/~muellerg/mu242.pdf, 13.05.2010.

Müller, Stefan. 1996. Yet another Paper about Partial Verb Phrase Fronting in German. In J. Tsuji (ed.), *Proceedings of Coling-96. 16th International Conference on Computational Linguistics (COLING96). Copenhagen, Denmark, August 5–9, 1996*, pages 800–805, Copenhagen, Denmark: ACL. http://hpsg.fu-berlin.de/~stefan/Pub/pvp.html, 04.06.2014.

Müller, Stefan. 1999. *Deutsche Syntax deklarativ. Head-Driven Phrase Structure Grammar für das Deutsche*. Linguistische Arbeiten, No. 394, Tübingen: Nie-

meyer. http://hpsg.fu-berlin.de/~stefan/Pub/hpsg.html, 04.06.2014.

Müller, Stefan. 2001. Case in German – Towards an HPSG Analysis. In W. D. Meurers and T. Kiss (eds.), *Constraint-Based Approaches to Germanic Syntax*, Studies in Constraint-Based Lexicalism, No. 7, pages 217–255, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/case.html, 04.06.2014.

Müller, Stefan. 2002a. *Complex Predicates: Verbal Complexes, Resultative Constructions, and Particle Verbs in German*. Studies in Constraint-Based Lexicalism, No. 13, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/complex.html, 04.06.2014.

Müller, Stefan. 2002b. Syntax or Morphology: German Particle Verbs Revisited. In Dehé et al. (2002), pages 119–139. http://hpsg.fu-berlin.de/~stefan/Pub/syn-morph-part.html, 04.06.2014.

Müller, Stefan. 2003a. Object-To-Subject-Raising and Lexical Rule. An Analysis of the German Passive. In S. Müller (ed.), *Proceedings of the 10th International Conference on Head-Driven Phrase Structure Grammar, Michigan State University, East Lansing*, volume 4, pages 278–297, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/passiv-da.html, 04.06.2014.

Müller, Stefan. 2003b. Solving the Bracketing Paradox: an Analysis of the Morphology of German Particle Verbs. *J. of Linguistics* 39(2), 275–325. http://hpsg.fu-berlin.de/~stefan/Pub/paradox.html, 04.06.2014.

Müller, Stefan. 2005a. Resultative Constructions: Syntax, World Knowledge, and Collocational Restrictions. Review of Hans C. Boas: A Constructional Approach to Resultatives. *Studies in Language* 29(3), 651–681. http://hpsg.fu-berlin.de/~stefan/Pub/boas2003.html, 04.06.2014.

Müller, Stefan. 2005b. Zur Analyse der scheinbar mehrfachen Vorfeldbesetzung. *Linguistische Berichte* 203, 297–330. http://hpsg.fu-berlin.de/~stefan/Pub/mehr-vf-lb.html, 04.06.2014.

Müller, Stefan. 2006. Phrasal or Lexical Constructions? *Language* 82(4), 850–883. http://hpsg.fu-berlin.de/~stefan/Pub/phrasal.html, 04.06.2014.

Müller, Stefan. 2007a. *Head-Driven Phrase Structure Grammar: Eine Einführung*. Stauffenburg Einführungen, No. 17, Tübingen: Stauffenburg Verlag, first edition. http://hpsg.fu-berlin.de/~stefan/Pub/hpsg-lehrbuch.html, 04.06.2014.

Müller, Stefan. 2007b. Phrasal or Lexical Constructions: Some Comments on Underspecification of Constituent Order, Compositionality, and Control. In S. Müller (ed.), *Proceedings of the 14th International Conference on Head-Driven Phrase Structure Grammar*, pages 373–393, Stanford: CSLI Publications. http://hpsg.fu-berlin.de/~stefan/Pub/phrasal-2.html, 04.06.2014.

Müller, Stefan. 2007c. Qualitative Korpusanalyse für die Grammatiktheorie: Introspektion vs. Korpus. In G. Zifonun and W. Kallmeyer (eds.), *Sprachkorpora – Datenmengen und Erkenntnisfortschritt*, Institut für Deutsche Sprache Jahrbuch 2006, pages 70–90, Berlin: Walter de Gruyter. http://hpsg.fu-berlin.

de/~stefan/Pub/intro-korpus.html, 04.06.2014.

Müller, Stefan. 2010a. *Grammatiktheorie*. Stauffenburg Einführungen, No. 20, Tübingen: Stauffenburg Verlag. http://hpsg.fu-berlin.de/~stefan/Pub/grammatiktheorie.html, 04.06.2014.

Müller, Stefan. 2010b. Persian Complex Predicates and the Limits of Inheritance-Based Analyses. *Journal of Linguistics* 46(3), 601–655. http://hpsg.fu-berlin.de/~stefan/Pub/persian-cp.html, 04.06.2014.

Müller, Stefan. 2013. *Grammatiktheorie*. Stauffenburg Einführungen, No. 20, Tübingen: Stauffenburg Verlag, second edition. http://hpsg.fu-berlin.de/~stefan/Pub/grammatiktheorie.html, 04.06.2014.

Müller, Stefan and Ørsnes, Bjarne. In Preparation. *Danish in Head-Driven Phrase Structure Grammar*. Empirically Oriented Theoretical Morphology and Syntax, Berlin: Language Science Press. http://hpsg.fu-berlin.de/~stefan/Pub/danish.html, 04.06.2014.

Nerbonne, John. 1986. 'Phantoms' and German Fronting: Poltergeist Constituents? *Linguistics* 24(5), 857–870.

Nerbonne, John. 1994. Partial Verb Phrases and Spurious Ambiguities. In Nerbonne et al. (1994), pages 109–150.

Nerbonne, John, Netter, Klaus and Pollard, Carl J. (eds.). 1994. *German in Head-Driven Phrase Structure Grammar*. CSLI Lecture Notes, No. 46, Stanford: CSLI Publications.

Noonan, Michael. 1994. A Tale of Two Passives in Irish. In B. Fox and P. J. Hopper (eds.), *Voice: Form and Function*, Typological Studies in Language, No. 27, pages 279–311, Amsterdam: John Benjamins Publishing Co.

Nunberg, Geoffrey. 1995. Transfers of Meaning. *Journal of semantics* 12(2), 109–132.

Nunberg, Geoffrey, Sag, Ivan A. and Wasow, Thomas. 1994. Idioms. *Language* 70(3), 491–538.

Özkaragöz, İnci. 1986. Monoclausal Double Passives in Turkish. In D. I. Slobin and K. Zimmer (eds.), *Studies in Turkish Linguistics*, Typological Studies in Language, No. 8, Amsterdam: John Benjamins Publishing Co.

Peeters, Bert. 2000. *The Lexicon–Encyclopedia Interface*. Amsterdam: Elsevier.

Perlmutter, David M. (ed.). 1983. *Studies in Relational Grammar*, volume 1. University of Chicago Press.

Pesetsky, David. 1996. *Zero Syntax: Experiencers and Cascades*. Cambridge, MA: MIT Press.

Piñango, Maria Mercedes, Mack, Jennifer and Jackendoff, Ray S. 2006. Semantic Combinatorial Processes in Argument Structure: Evidence from Light-Verbs. In *Proceedings of the 32nd Annual Meeting of the Berkeley Linguistics Society: Theoretical Approaches to Argument Structure*, volume 32, Berkeley, CA: BLS.

Pollard, Carl J. 1994. Toward a Unified Account of Passive in German. In Ner-

bonne et al. (1994), pages 273–296.

Pollard, Carl J. 1996. On Head Non-Movement. In H. Bunt and A. van Horck (eds.), *Discontinuous Constituency*, Natural Language Processing, No. 6, pages 279–305, Berlin: Mouton de Gruyter, veröffentlichte Version eines Ms. von 1990.

Pollard, Carl J. and Sag, Ivan A. 1987. *Information-Based Syntax and Semantics*. CSLI Lecture Notes, No. 13, Stanford: CSLI Publications.

Pollard, Carl J. and Sag, Ivan A. 1994. *Head-Driven Phrase Structure Grammar*. Studies in Contemporary Linguistics, Chicago, IL and London: University of Chicago Press.

Pulvermüller, Friedemann, Cappelle, Bert and Shtyrov, Yury. 2013. Brain Basis of Meaning, Words, Constructions, and Grammar. In G. Trousdale and T. Hoffmann (eds.), *The Oxford Handbook of Construction Grammar*, Oxford: Oxford University Press.

Rappaport, Malka. 1983. On the Nature of Derived Nominals. In Levin et al. (1983), pages 113–42.

Reape, Mike. 1994. Domain Union and Word Order Variation in German. In Nerbonne et al. (1994), pages 151–198.

Richter, Frank and Sailer, Manfred. 2009. Phraseological Clauses as Constructions in HPSG. In S. Müller (ed.), *Proceedings of the 16th International Conference on Head-Driven Phrase Structure Grammar, University of Göttingen, Germany*, pages 297–317, Stanford: CSLI Publications.

Riehemann, Susanne. 1993. *Word Formation in Lexical Type Hierarchies: A Case Study of* bar-*Adjectives in German*. Masters Thesis, Eberhard-Karls-Universität Tübingen, also published as SfS-Report-02-93, Seminar für Sprachwissenschaft, University of Tübingen.

Riehemann, Susanne Z. 1998. Type-Based Derivational Morphology. *Journal of Comparative Germanic Linguistics* 2(1), 49–77. http://doors.stanford.edu/~sr/morphology.ps, 05.04.2009.

Sag, Ivan A. 2007. Remarks on Locality. In S. Müller (ed.), *Proceedings of the 14th International Conference on Head-Driven Phrase Structure Grammar*, pages 394–414, Stanford: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2007/, 29.07.2007.

Sag, Ivan A. 2012. Sign-Based Construction Grammar: An Informal Synopsis. In H. C. Boas and I. A. Sag (eds.), *Sign-based Construction Grammar*, CSLI Lecture Notes, No. 193, pages 69–202, Stanford: CSLI Publications. http://lingo.stanford.edu/sag/papers/theo-syno.pdf, 23.10.2007.

Sailer, Manfred. 2000. *Combinatorial Semantics and Idiomatic Expressions in Head-Driven Phrase Structure Grammar*. Dissertation, Eberhard-Karls-Universität Tübingen. http://w210.ub.uni-tuebingen.de/dbt/volltexte/2003/916/, 18.11.2004.

Schein, Barry. 1993. *Plurals and Events*. Current Studies in Linguistics, No. 23, Cambridge, MA: MIT Press.

Simpson, Jane. 1983. Resultatives. In Levin et al. (1983), Reprint: Simpson, 2005.

Simpson, Jane. 2005. Resultatives. In M. Butt and T. H. King (eds.), *Lexical Semantics in LFG*, pages 149–161, Stanford: CSLI Publications.

Smith, Carlota S. 1970. Jespersen's "move and change" Class and Causative Verbs in English. In Peeters (2000), pages 101–109.

Smith, Carlota S. 1972. On Causative Verbs and Derived Nominals in English. *Linguistic Inquiry* 3(1), 136–138.

Soehn, Jan-Philipp and Sailer, Manfred. 2008. At First Blush on Tenterhooks. About Selectional Restrictions Imposed by Nonheads. In G. Jäger, P. Monachesi, G. Penn and S. Wintner (eds.), *Proceedings of Formal Grammar 2003, Vienna, Austria*, pages 149–161, Stanford: CSLI Publications. http://cslipublications.stanford.edu/FG/2003/soehn.pdf, 04.06.2010.

Steedman, Mark J. 1991. Structure and Intonation. *Language* 67(2), 260–296.

Steedman, Mark J. 2000. *The Syntactic Process*. Language, Speech, and Communication, Cambridge, MA/London, England: MIT Press.

Steedman, Mark J. and Baldridge, Jason. 2006. Combinatory Categorial Grammar. In K. Brown (ed.), *Encyclopedia of Language and Linguistics*, pages 610–621, Oxford: Elsevier, second edition.

Stefanowitsch, Anatol and Gries, Stephan Th. 2009. Corpora and Grammar. In Lüdeling and Kytö (2009), Chapter 43, pages 933–952.

Timberlake, Alan. 1982. The Impersonal Passive in Lithuanian. In *Proceedings of the Eighth Annual Meeting of the Berkeley Linguistics Society*, pages 508–524, Berkeley: University of California.

Tomasello, Michael. 2003. *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Cambridge, MA: Harvard University Press.

Tomasello, Michael, Akhtar, Nameera, Dodsen, Kelly and Rekau, Laura. 1997. Differential Productivity in Young Children's Use of Nouns and Verbs. *Journal of Child Language* 24(2), 373–387.

Uszkoreit, Hans. 1987. *Word Order and Constituent Structure in German*. CSLI Lecture Notes, No. 8, Stanford: CSLI Publications.

Verspoor, Cornelia Maria. 1997. *Contextually-Dependent Lexical Semantics*. Ph. D.thesis, University of Edinburgh. ftp://ftp.cogsci.ed.ac.uk/pub/kversp/thesis.ps.gz, 04.06.2010.

Wechsler, Stephen. 2008a. Dualist Syntax. In S. Müller (ed.), *Proceedings of the 15th International Conference on Head-Driven Phrase Structure Grammar*, pages 294–304, Stanford: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2008/, 31.10.2008.

Wechsler, Stephen Mark. 1991. *Argument Structure and Linking*. Ph. D.thesis, Stanford University.

Wechsler, Stephen Mark. 1995. *The Semantic Basis of Argument Structure*. Dissertations in Linguistics, Stanford: CSLI Publications.

Wechsler, Stephen Mark. 1997. Resultative Predicates and Control. In R. C. Blight and M. J. Moosally (eds.), *Texas Linguistic Forum 38: The Syntax and Semantics of Predication. Proceedings of the 1997 Texas Linguistics Society Conference*, pages 307–321, Austin, Texas: University of Texas Department of Linguistics.

Wechsler, Stephen Mark. 2005. What is Right and Wrong about Little v. In *Grammar and Beyond—Essays in Honour of Lars Hellan*, pages 179–195, Oslo, Norway: Novus Press.

Wechsler, Stephen Mark. 2008b. A Diachronic Account of English Deverbal Nominals. In C. B. Chang and H. J. Haynie (eds.), *Proceedings of the 26th West Coast Conference on Formal Linguistics*, pages 498–506, Somerville, MA: Cascadilla Proceedings Project.

Wechsler, Stephen Mark and Noh, Bokyung. 2001. On Resultative Predicates and Clauses: Parallels between Korean and English. *Language Sciences* 23(4), 391–423.

Wetta, Andrew C. 2011. A Construction-based Cross-linguistic Analysis of V2 Word Order. In S. Müller (ed.), *Proceedings of the 18th International Conference on Head-Driven Phrase Structure Grammar, University of Washington*, pages 248–268, Stanford: CSLI Publications.

Wittenberg, Eva, Jackendoff, Ray S., Kuperberg, Gina, Paczynski, Martin, Snedeker, Jesse and Wiese, Heike. To appear. The Processing and Representation of Light Verb Constructions. In A. Bachrach, I. Roy and L. Stockall (eds.), *Structuring the Argument*, Amsterdam: John Benjamins Publishing Co.

Wittenberg, Eva and Piñango, Maria Mercedes. 2011. Processing Light Verb Constructions. *The Mental Lexicon* 6(3), 393–413.

Wunderlich, Dieter. 1992. CAUSE and the Structure of Verbs. Arbeiten des SFB 282 No. 36, Heinrich Heine Uni/BUGH, Düsseldorf/Wuppertal.

Wunderlich, Dieter. 1997. Argument Extension by Lexical Adjunction. *Journal of Semantics* 14(2), 95–142.

Zaenen, Annie, Maling, Joan and Thráinsson, Höskuldur. 1985. Case and Grammatical Functions: The Icelandic Passive. *Natural Language and Linguistic Theory* 3(4), 441–483. http://www2.parc.com/istl/members/zaenen/publications/Passive.pdf, 04.12.2006.

Zucchi, Alessandro. 1993. *The Language of Propositions and Events: Issues in the Syntax and the Semantics of Nominalization*. Studies in Linguistics and Philosophy, No. 51, Berlin: Springer Verlag.