

Construction Morphology

Geert Booij*

University of Leiden

Abstract

In construction morphology, complex words are seen as constructions on the word level. The notion ‘construction’, a pairing of form and meaning, as developed in the theory of Construction Grammar, is essential for an insightful account of the properties of complex words. Morphological patterns can be represented as constructional schemas that express generalizations about sets of existing complex words and word forms, and provide the recipes for coining new (forms of) words. Such schemas form part of a hierarchical lexicon with generalizations on different levels of abstraction, they account for holistic properties of complex words that are not derivable from their constituents, and they can be unified into complex schemas that express the co-occurrence of certain types of word formation. The format of constructional schemas is also appropriate for phrasal lexical units with word-like functions such as phrasal names, particle verbs, and periphrastic expressions.

1. Introduction

The theory of construction morphology (CM) aims at a better understanding of the relation between syntax, morphology, and the lexicon, and of the semantic properties of complex words. It provides a framework in which both the differences and the commonalities of word level constructs and phrase level constructs can be accounted for.

There are two basic approaches to the linguistic analysis of complex words. In the morpheme-based approach, which was dominant in post-Bloomfieldian American linguistics, a complex word is seen as a concatenation of morphemes. In this approach, morphological analysis is conceived of as the ‘syntax of morphemes’. For instance, the English word *awareness* can be analyzed as the concatenation of the adjectival morpheme *aware* and the nominalizing suffix *-ness* that evokes the meaning ‘state, property’. Similarly, the past tense form *walked* is analyzed as the concatenation of the morphemes *walk* and *-ed*. This tradition of morphological analysis is manifest in the theory of Distributed Morphology (Harley and Noyer 1999).

Alternatively, we might take a word-based perspective in which words are the starting points of morphological analysis. In this kind of morphological analysis, we compare sets of words like the following:

- (1) a. bald b. baldness
 big bigness
 black blackness
 British Britishness

We then conclude to a formal difference between the words in (1a) and those in (1b) that correlates systematically with a meaning difference: the words in (1b) have an additional sequence *-ness* compared to those in (1a) and denote the property or state expressed by the adjectives (1a). This paradigmatic relationship between these sets of

CE: Shantha		No. of pages: 13	
PE: Sharanya		Dispatch: 9.3.10	
		ToC head: Syntax & Morphology	
		B	
		2 1 3	
		Manuscript No.	
		L N C 3	
		Journal Name	
			

1 words can be projected onto the word *awareness* in the form of word-internal morpho-
 2 logical structure:

3 (2) [[aware]_A ness]_N
 4

5 Moreover, the set of words in (1) may give rise to an abstract schema of the following
 6 form in the mind of the speaker of English:

7 (3) [[*x*]_A ness]_N ‘the property/state of A’
 8

9 This schema expresses a generalization about the form and meaning of existing deadjectival
 10 nouns in *-ness* listed in the English lexicon, and also functions as the starting point for
 11 coining new English nouns in *-ness*. That is, new deverbal nouns in *-ness* are not neces-
 12 sarily coined on analogy with a specific existing word in *-ness*, but may be formed on the
 13 basis of this abstract schema. A new word is formed by replacing the variable *x* in the
 14 schema with a concrete adjective. For instance, the unification of the adjective [*carless*]_A
 15 with schema (3) results in the word construct [[*carless*]_Vness]_N with the meaning ‘the state
 16 of being without a car’ (source: *Time*, October 5, 2009). That is, through unification the
 17 variables in the formal structure and the semantic specification of the schema are turned
 18 into constants. Unification is the basic operation, both at the word level and the phrase
 19 level, to create well formed linguistic expressions.

20 The idea that word formation patterns can be seen as abstractions across sets of related
 21 words is rooted in a venerable tradition. For instance, the German linguist Hermann Paul
 22 wrote in his famous *Prinzipien der Sprachgeschichte*, published in 1880, that the language
 23 learner will start with learning individual words and word forms, but will gradually
 24 abstract away from the concrete words (s)he has learned, and coin new words and word
 25 forms according to abstract schemas. This enables the language user to be creative both in
 26 word formation and in inflection (Paul 1880 [3rd edition 1898]). This tradition is contin-
 27 ued in the paradigmatic approach to word formation (Schultink 1962; Van Marle 1985),
 28 and in recent work in varieties of non-transformational generative grammar such as
 29 Head-driven Phrase Structure Grammar (HPSG) (Riehemann 1998, 2001).

30 As such morphological schemas depend on relationships between words, this morpho-
 31 logical model has been called the network model (Bybee 1995), and the notion ‘network’
 32 is indeed a proper term for conceptualizing the set of relationships between words in a
 33 lexicon (Bochner 1993). Schema (3) may be said to license the individual nouns in *-ness*
 34 in the English lexicon. Complex words, once coined, will be stored in the lexicon of a
 35 language (which generalizes over the lexical memories of the individual speakers of that
 36 language), if they have idiosyncratic properties and/or have become conventionalized.

37 *CM* assumes that complex words, i.e. the outputs of morphological operations, can be
 38 listed in the lexicon. Morphological schemas therefore have two functions: they express
 39 predictable properties of existing complex words and indicate how new ones can be
 40 coined (Jackendoff 1975). This conception of the grammar avoids the well known rule
 41 versus list fallacy (Langacker 1987), the unwarranted assumption that linguistic constructs
 42 are either generated by rule or listed and that being listed excludes a linguistic construct
 43 from being linked to a rule at the same time.

44 The relation between schema (3) and the individual words that conform to this schema
 45 is that of ‘instantiation’: each of the nouns in *-ness* listed in (1) instantiate the schema in
 46 (3). Schema (3) provides a direct account of the fact that *-ness* is a bound morpheme that
 47 does not occur as a word by itself.

48 What is the implication of word-based morphology as outlined above for our concep-
 49 tion of the architecture of the grammar? How does morphology fit into that architecture?

1 My starting point is that each word is a linguistic sign, a pairing of form, and meaning.
 2 The form of a word in its turn comprises two dimensions, its phonological form, and its
 3 morpho-syntactic properties. Hence, each word is a pairing of three types of information.
 4 Morphology affects all three dimensions of words. That is why we need a 'tripartite
 5 parallel architecture' of the grammar (Jackendoff 2002, 2007; Culicover and Jackendoff
 6 2005, 2006). In sum, a word is a complex piece of information, and morphology deals
 7 with the systematic pairing of form and meaning at the word level. In the next sections, I
 8 will adduce a number of observations and arguments in favor of the claim that the notion
 9 'construction' and the related notion of 'hierarchical lexicon' are indispensable for an
 10 insightful analysis of complex words. In this article I will focus on the relevance of the
 11 constructional approach for word formation, but it is equally relevant for inflectional
 12 phenomena, as I will briefly explain at the end of this article.

14 2. Constructions

16 The notion construction (defined as a pairing of form and meaning) is a traditional notion
 17 used in thousands of linguistic articles and books. In most cases, it refers to a syntactic
 18 pattern in which particular formal properties correlate with specific semantics that is not
 19 completely compositional, but yet predictable. For instance, many linguists of English
 20 speak of the passive construction because sentences with passive meaning in English have
 21 a specific syntactic form that correlates with a specific passive meaning.

22 A famous example of a syntactic construction is the caused motion construction exem-
 23 plified by sentence (4) (Goldberg 2006):

24 (4) Pat sneezed the foam off the cappuccino

26 In this sentence, the verb *to sneeze* is used as a transitive verb, although it is normally an
 27 intransitive verb. Its use as a transitive verb correlates with the presence of an object that
 28 moves along a path specified by a PP. The transitivity of the verb *to sneeze*, and the
 29 meaning component that the sneezing caused the foam to move is therefore to be seen as
 30 a property of this construction as a whole.

31 The notion 'construction' plays an important role in a number of recent linguistic mod-
 32 els: Construction Grammar (Goldberg 1995, 2006; Croft 2001; Fried and Östman 2004),
 33 the Simpler Syntax Model (Culicover and Jackendoff 2005, 2006), Cognitive Linguistics
 34 (Langacker 1999), and HPSG (Sag et al. 2003; Sag 2007). The following features of the
 35 constructional approach are of high relevance for the further articulation of CM:

36 (5) Pieces of syntactic structure can be listed in the lexicon with associated meanings,
 37 just as individual words are; these are the MEANINGFUL CONSTRUCTIONS of the
 38 language.

39 Construction grammar makes no principled distinction between words and rules: a
 40 lexical entry is more word-like to the extent that it is fully specified, and more
 41 rule-like to the extent that it contains variables [...].

42 Lexical entries are arranged in an inheritance hierarchy. (Jackendoff 2008).

44 It should be clear by now that the notion 'construction' has relevance for the theory
 45 of word structure because complex words, like syntactic constructs, are instantiations of
 46 constructional schemas. The view that complex words instantiate morphological
 47 constructions is also stated explicitly in Croft (2001), Goldberg (2006: 5), and Inkelas and
 48 Zoll (2005). An example of a constructional analysis of prefixed words is the analysis
 49 of English *be*-verbs in Petré and Cuyckens (2008). Yet, the investigation of the

1 constructional aspects of word structure is still in its beginnings (Culicover and Jackendoff
 2 2006). The next sections will present a number of arguments in favor of the construc-
 3 tional approach to word formation, and its relevance for inflection will be briefly argued
 4 for at the end of this article.

5 6 3. *The hierarchical lexicon*

7
8 Let us return to the schema for English deadjectival nouns in (3). This schema can be
 9 qualified as a constructional idiom at the word level, that is, a word level construction
 10 with one fixed position, that of the suffix. Constructional idioms are schemas in which
 11 one or more positions are lexically fixed. For instance, in the English construction N_i *after*
 12 N_j exemplified by *year after year*, *book after book*, etc. with the meaning ‘Ns in succession’
 13 the preposition slot is lexically fixed as *after* whereas the N positions are variables. The
 14 individual deadjectival nouns in *-ness* are morphological constructs that instantiate
 15 construction schema (3). Each individual noun in *-ness* listed in the English lexicon is
 16 dominated by this schema and inherits its predictable properties from schema (3) and
 17 from its adjectival base word. Hence, if a listed complex word is completely regular, all
 18 information concerning this word counts as redundant, except for the information that it
 19 exists, that is, belongs to the lexical convention of English.

20 Schema (3) is a case of derivation, word formation by means of an affix. Patterns of
 21 compounding, the other main type of word formation in English, can also be represented
 22 straightforwardly as constructions, as illustrated in schema (6) for nominal compounds
 23 which, like most English compounds, are right-headed:

24 (6) $[[a]_{Xk} [b]_{Ni}]_{Nj} \leftrightarrow [\text{SEM}_i \text{ with relation } R \text{ to } \text{SEM}_k]$

25
26 This kind of notation is used in Jackendoff (2002). The double arrow symbolizes the
 27 relationship between a particular form and a particular meaning. The variable X stands
 28 for the major lexical categories (N, V, A, and P). The variables a and b in this schema
 29 stand for arbitrary sound sequences. The variables i , j , and k stand for the lexical indexes
 30 on the phonological, syntactic, and semantic (SEM) properties of words. The use of pho-
 31 nological variables indicates that phonological information does not play a restrictive role
 32 in this type of word formation. In (6), the meaning contribution of the compound
 33 schema is specified, as morphology deals with the correlation between form and meaning
 34 in sets of complex words. The nature of R , the semantic relation between the two parts
 35 of a compound, is not specified in the schema but has to be determined for each individ-
 36 ual compound on the basis of the meaning of the compound constituents, and encyclope-
 37 dic and contextual knowledge (Downing 1977); for a discussion of the semantic
 38 regularities involved, see Jackendoff (2009). Schema (6) thus specifies only the very gen-
 39 eral meaning contribution of the compound construction that it establishes a semantic
 40 relation of some sort between the two constituents, and also that the right constituent,
 41 which is the formal head of a compound, is its semantic head as well: a *towel rack*, for
 42 instance, is a kind of rack, not a kind of towel.

43 The following English compounds exemplify the various options defined by schema
 44 (6):

45 (7) NN book shelf, desk top, towel rack
 46 VN drawbridge, pull tab
 47 AN blackbird, greenhouse
 48 PN afterthought, overdose, inland
 49

1 The four patterns listed in (7) are subcases of schema (6). They differ in certain ways. For
 2 instance, whereas in NN compounding the modifier N can be a compound itself, this is
 3 not the case for AN compounds:

- 4 (8) NN recursive modifier: [[reference book] [shelf]], [[kitchen towel] [rack]]
 5 AN recursive modifier: *[[snow white] [book]], *[light-green] [house]
 6

7 Therefore, we need subschemas of (6) in which such specific restrictions are specified.

8 A clear advantage of this representation of English nominal compounds is that we do
 9 not need a Right-hand Head Rule (Williams 1981) to express the generalization that the
 10 word class of an English nominal compound is the same as that of its right constituent.
 11 Schema (6) will in its turn be dominated by a more general right-headed schema for all
 12 English compounds including those with a verbal or adjectival head (*brain-wash*, *light-*
 13 *green*), in which the head position is specified as Y (Y = N, V, A). Thus, the necessity of
 14 both schemas and subschemas for English compounds illustrates the importance of the
 15 notion 'hierarchical lexicon' for morphological analysis.
 16

17 4. Holistic properties of morphological constructions

18 An important argument for using the notion 'morphological construction' is that it
 19 enables us to specify predictable semantic properties of sets of derived words that cannot
 20 be deduced from the semantic properties of their constituent parts. An example is the use
 21 of full reduplication for the expression of the plural meaning on nouns in Malay:
 22

- 23 (9) ana 'child' ana-ana 'children'
 24 rumah 'house' rumah-rumah 'houses'
 25

26 In such reduplication constructions, the notion 'plurality' is not expressed by one of the
 27 constituents of the plural noun; it is the construction as such, a configuration with two
 28 identical constituents, that evokes this meaning.

29 Another example comes from Romance languages. French, Italian, and Spanish have
 30 nominal compounds of the form VN such as:

- 31 (10) a. *French*
 32 chauffe-eau 'water heater'
 33 coupe-ongles 'nail clipper'
 34 garde-barrière 'gate keeper'
 35 grille-pain 'toaster'
 36 b. *Italian*
 37 lava-piatti 'dish washer'
 38 mangia-patate 'potato eater'
 39 porta-lettere 'postman'
 40 rompi-capo 'brain teaser, puzzle'
 41 c. *Spanish*
 42 lanza-cohetes 'rocket launcher'
 43 come-curas 'lit. eat priests, anti-clerical'
 44 mata-sanes 'lit. kill healthy people, quack doctor'
 45 limpia-botas 'lit. clean boots, boot black'
 46

47 These VN compounds are all nominal compounds, consisting of a verbal stem followed
 48 by a noun in either the singular or the plural form. These are exocentric compounds, as
 49 the noun on the right is neither the formal nor the semantic head of the compound. For

instance, the Italian compound word *lava-piatti* does not denote a certain type of *piatti* ‘plates’, but an instrument that washes dishes. So there is no constituent to which the meaning component ‘agent/instrument’ of these compounds can be assigned, even though this meaning component is systematically present in these compounds. This is why one finds analyses in the linguistic literature in which a nominalizing zero-suffix is postulated, on analogy with overt agentive/instrumental noun-creating suffixes such as English deverbal *-er*. The problem of such analyses is that there is no other motivation for such zero-elements than the agent/instrument meaning, and the fact that the relevant complex words are nouns. The position of such a zero-affix (is it a prefix or a suffix?) is completely arbitrary. In a constructional analysis, the agent/instrument meaning is specified as a semantic property of the VN construction as a whole. Thus, the following schema can be assumed for such Romance VN compounds:

(11) $[[V_k][N_i]_{N_j} \leftrightarrow [AGENT/INSTRUMENT_j \text{ OF ACTION}_k \text{ ON OBJECT}_i]_j]$

Schema (11) represents a morphological construction in which a specific morphological form (exocentric compounds of the form VN) correlates with a non-compositional, but predictable meaning. An additional predictable but non-compositional property of the French exocentric VN-compounds is that they have masculine gender, irrespective of the gender of the N-constituent. Exocentric compounds thus provide a strong argument in favor of a constructional analysis of word formation.

5. Semantic subpatterns

The morphological schemas introduced above form part of a hierarchical lexicon, in which schemas dominate individual complex words. By default, complex words inherit the information specified in a schema, but a particular piece of information may be overruled by an individual lexical item that instantiates that schema. For instance, the Dutch suffix *-baar* ‘-able’ attaches to transitive verbs to form adjectives with the meaning ‘can be V-ed’, for instance *lees-baar* ‘read-able’ derived from the transitive verb *lees* ‘to read’. Yet, there are a few adjectives in *-baar* attached to intransitive verbs, such as *werk-baar* ‘work-able’ derived from the intransitive verb *werk* ‘to work’. By making use of the notion of default inheritance (Briscoe et al. 1993; Kilbury et al. 2006), we allow for exceptional properties of words to be expressed without giving up the generalizations that hold for most words of that class. In the specification of *werkbaar* as an existing adjective of Dutch, the inherited specification that its verbal base is a transitive verb is overruled.

In the domain of compounding, we also need subschemas because certain words may receive a specific interpretation when they form part of a compound that they do not have when used as independent words. This is, for instance, the case for a number of nouns in Dutch NA compounds that have an intensifier meaning:

(12) Intensifying lexemes in Dutch X A compounds

<i>Noun</i>	<i>Example</i>
ber-e ‘bear’	bere-sterk ‘very strong’, bere-aardig ‘very kind’
bloed ‘blood’	bloed-serieus ‘very serious’, bloed-link ‘very risky’
dood ‘death’	dood-eng ‘very scary’, dood-gewoon ‘very ordinary’
kei ‘boulder’	kei-goed ‘very good’, kei-gaaf ‘very nice’
pis ‘piss’	pis-nijdig ‘very angry’, pis-woedend ‘very angry’
poep ‘shit’	poep-heet ‘very hot’, poep-lekker ‘very pleasant’

1 ret-e ‘ass’ rete-leuk ‘very nice’, rete-spannend ‘very exciting’
 2 reuz-e ‘giant’ reuze-leuk ‘very nice’, reuze-tof ‘very good’

3
 4 (The *-e*'s in *ber-e*, *ret-e*, and *reuz-e* denote schwas that function as a linking element.) This
 5 productive use of lexemes as intensifiers can be expressed by subschemas for adjectival
 6 compounding in which the first position is lexically fixed. Hence, these are constructional
 7 idioms at the word level, such as:

8 (13) [[bere]_N [x]_{Ai}]_A ↔ ‘very SEM_i’

9
 10 Schema (13) is a subschema of the NA compounding schema for Dutch; it will inherit all
 11 properties of this general schema such as its right-headedness. However, the normal mean-
 12 ing contribution of the modifier noun *ber-e* ‘bear’ is overruled by the meaning of the modi-
 13 fying constituent as specified in (13), in accordance with the principle of default inheritance.

14 This type of semantic development can be found in many languages. Here is an
 15 example from Maale, a North Omotic language spoken in Southern Ethiopia. The noun
 16 *nayi* ‘child’ has developed the general meaning ‘agent’, as illustrated by the following
 17 complex words (Amha 2001):

- 18 (14) a. bayi nayi
 19 cattle child
 20 ‘one who brings cattle to the grazing area’
 21 b. waari nayi
 22 goat child
 23 ‘one who takes care of goats’
 24 c. móótsi naya
 25 cattle.camp child
 26 ‘one who lives in a cattle camp and takes care of cattle there’

27 Because cattle herding is historically a task of children in the Maale-speaking society, the
 28 word for child has acquired a more general agent meaning. Therefore, a specific compound
 29 schema with *naya* as its right constituent, and with this agent meaning is required.

32 6. Schema unification

33 The Dutch deverbal adjectives in *-baar* ‘-able’ mentioned above form a productive deriva-
 34 tional category, which can be subsequently prefixed with the negative prefix *on-* ‘un-’. In
 35 many cases, the intermediate adjective is only a possible word, and not listed in the lexi-
 36 con. This is the case for, among many others, the following adjectives:

37

38 (15) <i>Verb</i>	<i>Deverbal adjective</i>	<i>On-adjective</i>
39 bedwing ‘suppress’	bedwing-baar ‘suppressable’	on-bedwing-baar ‘unsuppressable’
40 bestel ‘deliver’	bestel-baar ‘deliverable’	on-bestel-baar ‘undeliverable’
41 blus ‘extinguish’	blus-baar ‘extinguishable’	on-blus-baar ‘unextinguishable’

42
 43 This pattern suggests that two word formation schemas can be unified into one complex
 44 schema that licenses multiply complex adjectives without the existence of the intermedi-
 45 ate positive adjective being required. The data in (15) imply that the following schema
 46 unification applies:
 47
 48
 49

(16) $[\text{on } A]_A + [\text{Vbaar}]_A = [\text{on}[[\text{Vbaar}]_A]]_A$

The unification of word formation templates accounts for the possibility of simultaneous use of two or more word formation patterns (in the example above the formation of deverbal adjectives and *on*-adjectives). The availability of such unified templates is the result of the language user's ability to establish a direct relation between a base word and a complex word that is two or more derivational steps away from that base word. Such unified schemas do not complicate the grammar, because their properties follow from the unification of independently established word formation schemas. Thus, language users may coin a new multiply complex negative adjective such as Dutch *onbedwingbaar* 'unsuppressable' directly from a verbal base *bedwing* 'suppress' without an intermediate step.

An example of the use of a unified word formation schema from English is the simultaneous attachment of the prefix *de(s)* and the verbalizing suffix *-ate* or *-ize* to nouns or adjectives, as in:

(17)	<i>Noun</i>	<i>Verb</i>
	caffeine	de-caffein-ate
	moral	de-moral-ize
	mythology	de-mytholog-ize
	nuclear	de-nuclear-ize
	Stalin	de-stalin-ize

An intermediate verb like *to stalinize* is certainly a possible verb. Yet, we should not require the existence of this verb as a necessary intermediate step in the coining of *destalinization*, as it is not the case that the use of the verb *destalinize* presupposes that the object involved has first been subject to a process of stalinization. That is, we assume a unified template of the following form for verbs such as *destalinize*:

(18) $[\text{de } [[x]_{N_i} \text{ize}]_{V}]_V \leftrightarrow \text{REMOVE PROPERTY RELATED TO SEM}_i$

In sum, by representing word formation processes as constructional schemas that can be unified, it is possible to express that a multiply complex word can be derived in one step from a base word that is two degrees less complex.

7. Word-like phrasal expressions

The lexicon is the repository of all simplex words and of all complex words that are idiosyncratic and/or conventionalized. In addition, the lexicon has to specify multi-word units that are idiomatic. The unpredictable properties of a linguistic construct have to be learned and memorized by the speaker. The size of idiomatic constructs may vary from sentences (for instance, proverbs) to phrases consisting of two words, the minimal size for lexical phrases (for instance, the NP *red tape* as idiom for bureaucracy, or *black death* for 'pest').

Lexical units may be construed productively by means of syntactic principles, although they are word-like. Such constructs are sometimes referred to as 'loose compounds'. The advantage of a constructional approach to the analysis of such lexical units is that the similarities with complex words can be expressed, without losing sight of the fact that they reflect the syntactic principles of the language involved. Such loose compounds are characteristic of Romance languages. For instance, the following French phrases are all used as lexical units (Fradin 2003):

- (19) a. N de N: fil de fer ‘iron wire’
 b. N à N: moulin à vent ‘wind mill’
 c. N à Det N: sauce à l’ail ‘garlic sauce’
 d. AN : moyen âge ‘Middle Ages’
 e. NA: poids lourds ‘heavyweight’

The patterns exemplified in (19) have a certain degree of productivity. In particular, the French construction *N à N* is very productive for coining new names for objects, as illustrated in (20):

- (20) moulin à poivre ‘pepper mill’
 verre à vin ‘wine glass’
 bois à feu ‘firewood’
 fruit à confiture ‘jam fruit’
 moteur à essence ‘petrol engine’

Note the difference between *verre à vin* ‘wine glass’ and *verre de vin* ‘glass of wine’. The constructs with *à* have typically the role of classifying labels for entities.

As has been pointed out in the recent literature, multi-word expressions (MWEs) are not just fixed sequences of words with an atomic meaning but differ in their degree of compositionality and syntactic flexibility (Pitt and Katz 2000; Sag et al. 2002). The notion ‘constructional idiom’ introduced above can be used to do justice to certain aspects of this flexibility, in particular to the fact that idiomatic constructions can receive new instantiations. The *N á N* construction reflects the syntax of French: in French NPs, the head N precedes its complement, and PP complements begin with a preposition, such as *à*. Yet, the *N à N* constructs are special in that the preposition is followed by a bare noun, whereas normally in a PP, the N must be preceded by a determiner. The use of bare nouns is tied to using nouns for non-referential, classificatory purposes. In sum, the *N à N* construction is a subschema of the French NP construction [N PP], with the specific properties that the preposition is fixed as *à*, and the complement of the preposition is a bare noun. The semantics of the construction is similar to that for the English nominal compounds discussed above. The semantic role of the preposition *à* is establishing some semantic relationship between the head noun on the left and the right noun that functions as a modifier.

Another class of word-like phrasal units is the phrasal verbs of Germanic languages, usually referred to as particle verbs. Examples from English are *to put down* and *to phone up*. The Dutch equivalents of these particle verbs are *neer-leggen* and *op-bellen*, respectively, with the particle preceding the verb (written as one word, even though they are phrasal and other words can come in between the particle and the verb) (Blom and Booij 2003; Blom 2005a,b). The separability of these particles is illustrated by the following example:

- (21) a. Ik hoorde dat Jan zijn moeder op belde
 I heard that John his mother up phoned
 ‘I heard that John phoned his mother’
 b. Jan belde zijn moeder op
 John phoned his mother up
 ‘John phoned his mother’

In the embedded clause in (21a), the particle appears right in front of the verb; but in main clause (21b), the finite verb has to appear in second position, whereas the particle

occurs at the end of the sentence. This shows that particle verbs are phrasal in nature, in accordance with the principle of Lexical Integrity that syntactic rules cannot move parts of words. Hence, we have to assume phrasal constructional schemas for the various types of particle verbs, in which the specific meaning contribution of each particle is specified. For instance, the specific meaning of the word *op* 'up' used as a particle is that of cognitive activation:

(22) $[[op]_P [x]_{Vi}]_{V'} \leftrightarrow \text{ACTIVATE COGNITIVELY BY SEM}_i$

(V' indicates a syntactic projection of V, expressing that particle verbs are minimal phrases.)

These particle verbs function as alternatives for prefixation in the coinage of complex predicates, and this explains the restricted productivity of deverbal prefixation in Germanic languages: there is strong competition from particle verb formation which is a functionally equivalent means of creating complex predicates. Particle verbs can thus be seen as instantiations of phrasal constructional idioms, whereas prefixed verbs are instantiations of constructional idioms at the word level. This distinction is illustrated here by means of the following minimal pairs from Dutch:

(23)	<i>Particle verb</i>	<i>Prefixed verb</i>
	over komen 'to come over'	over-komen 'to happen to'
	door leven 'to continue living'	door-leven 'to live through'

Prefixed verbs are not split in main clauses, unlike particle verbs. Hence, the difference between the following two sentences:

(24) a. Jan komt het weekend over
 John comes the weekend over
 'John comes over for the weekend'
 b. Jan over-kwam een ongeluk
 John over-came an accident
 'An accident happened to John'

In sum, particle verbs are lexical, yet phrasal units, and we can do justice to their properties by analyzing them as being formed according to phrasal constructional schemas. By using the notion 'constructional idiom' for the analysis of particle verbs, we can maintain the boundary between phrasal and morphological constructs, and yet do justice to the word-like properties of particle verbs.

8. Inflection

Inflectional phenomena provide strong arguments for the constructional approach. The classical problem of inflectional morphology is the complicated relation between form and meaning. It is often impossible to assign a specific meaning to an inflectional affix, because its actual value depends on the kind of stem it combines with, and the properties of that stem, unless one allows for large sets of homonymous inflectional affixes. Consider, for instance, the paradigm of masculine and neuter nouns (declension I) in Russian (Gurevich 2006: 51):

(25)	<i>Masculine</i>		<i>Neuter</i>	
	SG	PL	SG	PL
	NOM stol	stol-y	bljud-o	bljud-a

1	ACC	stol-a	stol-y	bljud-a	bljud-a
2	GEN	stol-a	stol-ov	bljud-a	bljud
3	DAT	stol-u	stol-am	bljud-u	bljud-am
4	INST	stol-om	stol-ami	bljud-om	bljud-ami
5	LOC	stol-e	stol-ax	bljud-e	bljud-ax
6		‘table’		‘dish’	

As these paradigms illustrate, the same ending, for instance *-a*, may have different interpretations depending on the class of the noun. Moreover, the particular value expressed is a combination of properties, such as [ACC.SG] or [NOM.PL]. That is, there is no one-to-one correspondence between form and morpho-syntactic properties. One also finds elements in inflectional forms such as the thematic vowels of verbal conjugation in Latin and the Romance languages that do not contribute by themselves to the meaning of the inflected forms; they are ‘morphomic’ properties (Aronoff 1994). Hence, the morpho-syntactic properties of each word form in the paradigm are best considered as constructional properties, that is, as properties of the word form as a whole. This may be expressed by morphological schemas that abstract, for instance, over words of the same declension class such as the Russian ACC/GEN.SG word forms *stola* and *bljuda* in (25):

$$(26) (x-a)_{\omega i} \leftrightarrow [N]_{i, \text{masc.sg, acc/gen}} \leftrightarrow \text{SEM}_i$$

where x is a phonological variable for nominal stems, and ω is a phonological word. The meaning SEM_i mentioned here is that of the lexeme. The semantic interpretation of the morpho-syntactic features is not specified here, because this interpretation depends on the syntactic contexts in which a word occurs.

Another argument for the constructional approach to inflection is formed by periphrastic expressions. For instance, in English the word combination ‘*have* + past participle’ is used to express the perfect tense of verbs. In this construction, the verb *have* does not express the meaning ‘to possess’, but a grammatical meaning of perfectivity, in combination with the past participle. The grammatical meaning of perfect tense is a property of this construction as a whole (Sadler and Spencer 2001; Ackerman and Stump 2004; Spencer 2004). Hence, periphrastic inflectional forms are to be treated as constructional idioms in which the auxiliary is lexically fixed, whereas the slot for the participle is a variable. The semantic properties of periphrastic forms, such as perfectivity, are holistic properties that are specified as properties of the construction.

9. Conclusion

In this article, I have argued that the notion ‘construction’ should be used for insightful analyses of morphological phenomena. In this approach, the distinction between syntax and morphology is maintained. Yet, the similarities between syntactic and morphological constructs can be expressed as well. In particular, we find constructional idioms at both the syntactic and the word level and thus, we can account for the word-like function of productive phrasal constructions such as the ‘loose compounds’ of Romance languages and the particle verbs of Germanic languages. Constructional schemas form part of a hierarchical lexicon, which makes it possible to express subgeneralizations about sets of complex words without obliterating the properties they share with other complex words.

Short Biography

Geert Booij (1947) is professor of Linguistics at the University of Leiden, where he holds the chair for 'Morphology and the lexicon'. His present research focuses on the structure of the lexicon and the place of morphology in the architecture of the grammar. After his BA and MA studies in Dutch and general linguistics at the University of Groningen (1965–1971), he obtained his PhD degree at the University of Amsterdam (1977) where he taught until 1981. From 1981–2005, he was professor of general linguistics at the Vrije Universiteit Amsterdam. He published a number of scholarly articles in linguistic journals and books on phonology and morphology, and three books at Oxford University Press (*The phonology of Dutch*, 1995; *The morphology of Dutch*, 2002; and the textbook *The grammar of words*, 2005, 2007²). Together with Christian Lehmann and Joachim Mugdan, he edited the *Handbook on Inflection and Word formation* (2 vols, 2000/2004, published by De Gruyter, Berlin). He is the founder and editor of the *Yearbook of Morphology* (1988–2005) and its successor, the journal *Morphology*. In 2010, his monograph *Construction morphology* will appear at Oxford University Press. He served as the Dean of the Faculty of Letters of the Vrije Universiteit Amsterdam (1988–1991, 1998–2002) and the University of Leiden (2005–2007), and as member and chair of the Dutch Research Council for the Humanities (1997–2004). Homepage with downloadable publications: <http://www.hum2.leidenuniv.nl/booijge/>.

Notes

* Correspondence address: Geert Booij, Faculty of Humanities, Leiden University Centre of Linguistics, University of Leiden, PO Box 9515, 2300 RA Leiden, The Netherlands. E-mail: g.e.booij@hum.leidenuniv.nl

Works Cited

- Ackerman, Farrell, and Gregory S. Stump. 2004. Paradigms and periphrastic expression: a study in realization-based lexicalism. *Projecting morphology*, ed. by Louisa Sadler and Andrew Spencer, 111–57. Stanford: CSLI.
- Amha, Azeb. 2001. The Maale language. Leiden: University of Leiden, Research School of Asian, African, and Amerindian Studies.
- Aronoff, Mark. 1994. *Morphology by itself: stems and inflectional classes*. Cambridge Mass: MIT Press.
- Blom, Corrien. 2005a. The demarcation of morphology and syntax: a diachronic perspective on particle verbs. *Morphology and its demarcations*, ed. by Wolfgang U. Dressler, Dieter Kastovsky, Oskar E. Pfeiffer and Franz Rainer, 53–66. Amsterdam/Philadelphia: Benjamins.
- . 2005b. Complex predicates in Dutch. *Synchrony and diachrony*. Utrecht: LOT.
- , and Geert Booij. 2003. The diachrony of complex predicates in Dutch: a case study in grammaticalization. *Acta Linguistica Hungarica* 50. 61–91.
- Bochner, Harry. 1993. *Simplicity in generative morphology*. Berlin/New York: Mouton de Gruyter.
- Briscoe, Edward, Ann Copestake, and Valeria de Paiva (eds). 1993. *Inheritance, defaults and the lexicon*. Cambridge: Cambridge University Press.
- Bybee, Joan. 1995. Regular morphology and the lexicon. *Language and Cognitive Processes* 10. 425–55.
- Croft, William. 2001. *Radical construction grammar. Syntactic theory in typological perspective*. Oxford: Oxford University Press.
- Culicover, Peter W., and Ray Jackendoff. 2005. *Simpler syntax*. Oxford: Oxford University Press.
- , and —. 2006. The simpler syntax hypothesis. *Trends in Cognitive Science* 10. 413–8.
- Downing, Pamela. 1977. On the creation and use of English compound nouns. *Language* 53. 810–42.
- Fradin, Bernard. 2003. *Nouvelles approches en morphologie*. Paris: Presses Universitaires de France.
- Fried, Mirjam, and Jan-Ola Östman. 2004. *Construction grammar: a thumbnail sketch. Construction grammar in a cross-linguistic perspective*, ed. by Mirjam Fried and Jan-Ola Östman, ???–???. Amsterdam/Philadelphia: Benjamins.
- Goldberg, Adele. 1995. *Constructions. A construction grammar approach to argument structure*. Chicago: Chicago University Press.
- . 2006. *Constructions at work. The nature of generalization in language*. Oxford: Oxford University Press. .

- 1 Gurevich, Olga. 2006. Constructional morphology: the Georgian version, PhD dissertation. Stanford: Stanford
 2 University.
- 3 Harley, Heidi, and Rolf Noyer. 1999. Distributed morphology. *Glott International* 4. 3–9.
- 4 Inkelas, Sharon, and Cheryl Zoll. 2005. Reduplication. Doubling in morphology. Cambridge: Cambridge Univer-
 5 sity Press.
- 6 Jackendoff, Ray. 1975. Semantic and morphological regularities in the lexicon. *Language* 51. 639–71.
- 7 ——. 2002. *Foundations of language*. Oxford: Oxford University Press.
- 8 ——. 2007. A parallel architecture perspective on language processing. *Brain Research* 1146. 2–22.
- 9 ——. 2008. Construction after construction and its theoretical challenge. *Language* 84. 8–28.
- 10 ——. 2009. Compounding in the parallel architecture and conceptual semantics. *The Oxford handbook of*
 11 *compounding*, ed. by Rochelle Lieber and Pavol Stekauer, 105–29. Oxford, UK: Oxford University Press.
- 12 Kilbury, James, Wiebke Petersen, and Christoph Rumpf. 2006. Inheritance-based models of the lexicon. *Advances*
 13 *in the theory of the lexicon*, ed. by Dieter Wunderlich, 429–80. Berlin: Mouton de Gruyter.
- 14 Langacker, Ronald. 1987. *Foundations of cognitive grammar*, vol. 1: theoretical prerequisites. Stanford, CA:
 15 Stanford University Press.
- 16 ——. 1999. *Grammar and conceptualization*. Berlin: Mouton de Gruyter.
- 17 Paul, Hermann. 1880 [3rd edition 1898]. *Prinzipien der Sprachgeschichte*. Halle: Max Niemeyer.
- 18 Petré, Peter, and Hubert Cuyckens. 2008. Bedusted, yet not beheaded: the role of be-’s constructional properties in
 19 its conservation. *Constructions and language change*, ed. by Alexander Bergs and Gabriele Diewald, 133–69.
 20 Berlin/New York: Mouton de Gruyter.
- 21 Pitt, David, and Jerrold J. Katz. 2000. Compositional idioms. *Language* 76. 409–32.
- 22 Riehemann, Suzanne Z. 1998. Type-based derivational morphology. *Journal of Comparative Germanic Linguistics*
 23 2. 49–77.
- 24 ——. 2001. A constructional approach to idioms and word formation, PhD dissertation. Stanford: Stanford Univer-
 25 sity.
- 26 Sadler, Louisa, and Andrew Spencer. 2001. Syntax as an exponent of morphological features. *Yearbook of*
 27 *Morphology* 2000, ed. by Geert Booij and Jaap Van Marle, 71–96. Dordrecht: Kluwer.
- 28 Sag, Ivan A. 2007. Sign-based construction grammar. An informal synopsis. Ms., Manuscript. Stanford, CA.
- 29 —, Timothy Baldwin, Francis Bond, Ann Copestake, and Daniel Paul Flickinger. 2002. Multiword expressions:
 30 a pain in the neck for NLP. *Proceedings of CICLING 2002*, ed. by Alexander Gelbukh, ???–???. Dordrecht:
 31 Springer.
- 32 —, Thomas Wasow, and Emily M. Bender. 2003. *Syntactic theory. A formal introduction*. Stanford, CA: CSLI
 33 Publications.
- 34 Schultink, Henk. 1962. *De morfologische valentie van het ongelede adjectief in modern Nederlands*. Den Haag:
 35 Van Goor Zonen.
- 36 Spencer, Andrew. 2004. Morphology – an overview of central concepts. *Projecting morphology*, ed. by Louisa
 37 Sadler and Andrew Spencer, 67–109. Stanford: CSLI.
- 38 Van Marle, Jaap. 1985. *On the paradigmatic dimension of morphological creativity*. Dordrecht: Foris.
- 39 Williams, Edwin. 1981. On the notions ‘lexically related’ and ‘head of a word’. *Linguistic Inquiry* 12. 245–74.

Author Query Form

Journal: LNC3

Article: 213

Dear Author,

During the copy-editing of your paper, the following queries arose. Please respond to these by marking up your proofs with the necessary changes/additions. Please write your answers on the query sheet if there is insufficient space on the page proofs. Please write clearly and follow the conventions shown on the attached corrections sheet. If returning the proof by fax do not write too close to the paper's edge. Please remember that illegible mark-ups may delay publication.

Many thanks for your assistance.

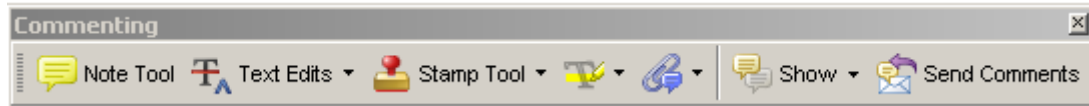
Query reference	Query	Remarks
Q1	AUTHOR: A running head short title was not supplied; please check if this one is suitable and, if not, please supply a short title of up to 40 characters that can be used instead.	
Q2	AUTHOR: Please check the superscript number here.	
Q3	AUTHOR: Please check this website address and confirm that it is correct. (Please note that it is the responsibility of the author(s) to ensure that all URLs given in this article are correct and useable).	
Q4	AUTHOR: Please provide the actual place of the publisher for references Blom (2005a), Bochner (1993), Fried and Östman (2004), Petré and Cuyckens (2008).	
Q5	AUTHOR: Please provide the page range for reference Fried, and Östman (2004).	
Q6	AUTHOR: Please provide the page range for reference Sag et al. (2002).	

USING E-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

Required Software

Adobe Acrobat Professional or Acrobat Reader (version 7.0 or above) is required to e-annotate PDFs. Acrobat 8 Reader is a free download: <http://www.adobe.com/products/acrobat/readstep2.html>

Once you have Acrobat Reader 8 on your PC and open the proof, you will see the Commenting Toolbar (if it does not appear automatically go to Tools>Commenting>Commenting Toolbar). The Commenting Toolbar looks like this:



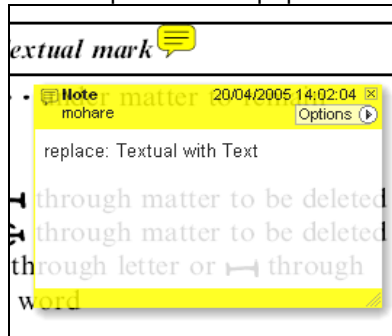
If you experience problems annotating files in Adobe Acrobat Reader 9 then you may need to change a preference setting in order to edit.

In the “Documents” category under “Edit – Preferences”, please select the category ‘Documents’ and change the setting “PDF/A mode:” to “Never”.



Note Tool — For making notes at specific points in the text

Marks a point on the paper where a note or question needs to be addressed.

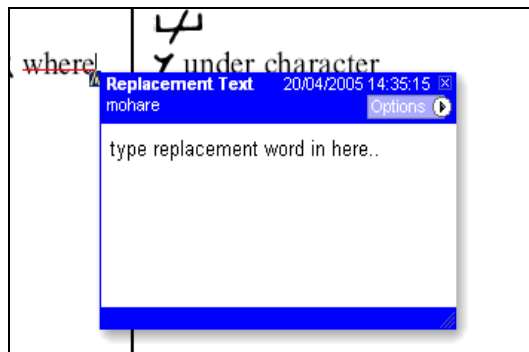


How to use it:

1. Right click into area of either inserted text or relevance to note
2. Select Add Note and a yellow speech bubble symbol and text box will appear
3. Type comment into the text box
4. Click the X in the top right hand corner of the note box to close.

Replacement text tool — For deleting one word/section of text and replacing it

Strikes red line through text and opens up a replacement text box.

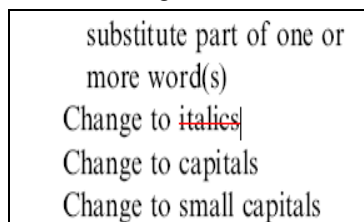


How to use it:

1. Select cursor from toolbar
2. Highlight word or sentence
3. Right click
4. Select Replace Text (Comment) option
5. Type replacement text in blue box
6. Click outside of the blue box to close

Cross out text tool — For deleting text when there is nothing to replace selection

Strikes through text in a red line.



How to use it:

1. Select cursor from toolbar
2. Highlight word or sentence
3. Right click
4. Select Cross Out Text

Approved tool — For approving a proof and that no corrections at all are required.

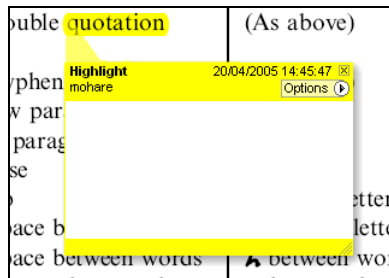


How to use it:

1. Click on the Stamp Tool in the toolbar
2. Select the Approved rubber stamp from the 'standard business' selection
3. Click on the text where you want to rubber stamp to appear (usually first page)

Highlight tool — For highlighting selection that should be changed to bold or italic.

Highlights text in yellow and opens up a text box.

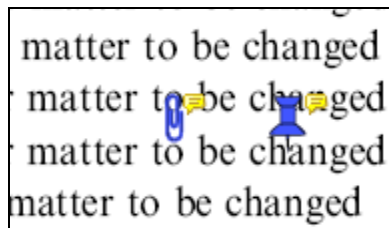


How to use it:

1. Select Highlighter Tool from the commenting toolbar
2. Highlight the desired text
3. Add a note detailing the required change

Attach File Tool — For inserting large amounts of text or replacement figures as a files.

Inserts symbol and speech bubble where a file has been inserted.

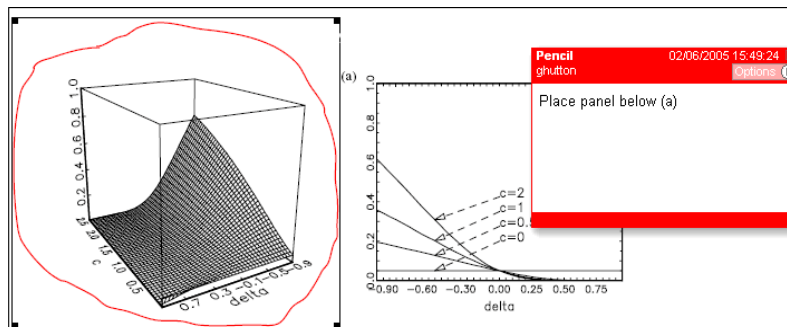


How to use it:

1. Click on paperclip icon in the commenting toolbar
2. Click where you want to insert the attachment
3. Select the saved file from your PC/network
4. Select appearance of icon (paperclip, graph, attachment or tag) and close

Pencil tool — For circling parts of figures or making freeform marks

Creates freeform shapes with a pencil tool. Particularly with graphics within the proof it may be useful to use the Drawing Markups toolbar. These tools allow you to draw circles, lines and comment on these marks.



How to use it:

1. Select Tools > Drawing Markups > Pencil Tool
2. Draw with the cursor
3. Multiple pieces of pencil annotation can be grouped together
4. Once finished, move the cursor over the shape until an arrowhead appears and right click
5. Select Open Pop-Up Note and type in a details of required change
6. Click the X in the top right hand corner of the note box to close.

Help

For further information on how to annotate proofs click on the Help button to activate a list of instructions:

