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The role of schemas in Construction Morphology

Geert Booij

It's de-lovely

[...]

The night is young, the skies are clear
And if you want to go walkin', dear
It's delightful, it's delicious, it's de-lovely

I understand the reason why
You're sentimental, 'cause so am I
It's delightful, it's delicious, it's de-lovely

You can tell at a glance what a swell night this is for romance
You can hear dear mother nature murmuring low "let yourself go"

So please be sweet, my chickadee
And when I kiss ya, just say to me
"It's delightful, it's delicious, it's delectable, it's delirious,
It's dilemma, it's de limit, it's deluxe, it's de-lovely"

[...]

Cole Porter

1. Why schemas?

The text of Cole Porter's famous song from his musical *Red Hot and Blue* (1936) nicely illustrates that language users are pattern finders. The song suggests a new English prefix *de-* that expresses a very positive evaluation, as shown by its use in *de-lovely*. It also shows that the formation of new words may be a matter of intentional playing with language. However, in this case we are not inclined to assume a more abstract morphological construction schema of the form $[de-X_i]_A$ 'high degree of SEM_i', because this use of *de-* is not really productive, and the formation of *de-lovely* in this song is better interpreted as a case of analogy based on phonological similarity between words that also

express a positive evaluation. This example illustrates an important issue in morphological theory, the question when and why we should assume schemas for morphological patterns that we observe in language use, the topic of this special issue of *Word Structure*.

A standard assumption in Construction Morphology (CxM) is that we are justified to assume an abstract schema for a set of complex words with the same morphological structure, if the pattern involved is productive. The abstract schema expresses a generalization about a set of existing complex words, and provides the recipe for coining new words of that type. For instance, the class of Dutch deverbal adjectives ending in *-baar* ‘-able’ can be easily extended, and new coinings of this type are acceptable to language users. Therefore a partially abstract schema, with a variable slot for the base verb, is justified (Mos 2010, Backus & Mos 2011).

However, even when a morphological process is not productive, we may assume an abstract schema in order to express that the meaning of a word is not completely arbitrary, unlike what is the case for simplex words. This applies, for instance, to the large set of diminutive verbs in Dutch ending in *-elen* and *-eren* such as *babbelen* ‘to chatter’, *kibbelen* ‘to bicker’, *bibberen* ‘to shiver’, and *sidderen* ‘to tremble’ that express a diminutive and/or repetitive meaning (Audring et al. 2017, Booij & Audring 2018). Many of these verbs lack a base word, but the patterns $[x-el]_V$ and $[x-er]_V$ of the verbal stems evoke the diminutive meaning.

Another example of the primarily motivating function of abstract schemas comes from Damascus Arabic. As discussed in Davis & Tsujimura (2018: 331), nouns denoting occupations share a templatic schema of the form $C_1aC_2C_2aaC_3$, as illustrated by the following examples:

- (1) xabbaaz ‘baker’, xaddaam ‘servant’, bawwaab ‘doorkeeper’, sammaak ‘fish seller’

The meaning contribution of this templatic shape can be expressed by the following constructional schema that specifies the systematic relationship between phonological form (PHON), morpho-syntactic properties (SYN) and meaning (SEM), the three levels of the Parallel Architecture of grammar (Jackendoff 2002, Booij & Audring 2017).

- (2) $(C_1aC_2C_2aaC_3)_i \leftrightarrow N_i \leftrightarrow [Occupation]_{SEM_i}$

The correspondence between the three levels for this set of occupation nouns may also be notated in the following form:

- (2) PHON: $(C_1aC_2C_2aaC_3)_i$
 SYN: N_i
 SEM: $[OCCUPATION]_i$

Davis & Tsujimura (2018: 331) remark that “[i]t is not clear whether any of these nouns have a specific base word from which they are derived.” Their common meaning component is primarily motivated by their phonological shape, as specified in this schema, even though there may be no base words available. This motivation is expressed by the constructional schema. Schema (2) also shows that phonology is an essential level for the proper characterization of constructions, as also pointed out by Höder (2016, this issue).

Evidence for the psychological reality of higher order schemas can also be found in language change. This kind of evidence can be observed for the Dutch nominalizing suffix *-er* that primarily and productively attaches to verbs and nouns. In addition, it also occurs with ordinal numerals and roots:

(3)	<i>base word</i>	<i>noun in -er</i>
	denk (V) ‘think’	denker ‘thinker’
	schip (N) ‘ship’	schipper ‘skipper’
	tien (Num) ‘ten’	tiener ‘teenager’
	---	priester ‘priest’

This suffix thus creates nouns that denote persons (but it also has other uses; cf. Booij 2019: 119–20). Examples of root-based nouns of this type are:

(4) kabouter ‘gnome’, priester ‘priest’, ridder ‘knight’, slager ‘butcher’, zigeuner ‘gipsy’

These facts suggests a higher order schema that generalizes over these different types of *-er*-nouns:

(5) $(x-\text{ər})_i \leftrightarrow N_i \leftrightarrow [\text{PERSON}]_{\text{SEMI}_i}$

This higher order schema will then have at least four subschemas, one for each of the three types of base words (V, N, Numeral) and one for root-based *-er*-nouns. What schema (5) expresses is the generalization that personal nouns are marked by means of the suffix *-er*. This explains the change of shape that a number of borrowed words underwent in Dutch (Booij & Audring 2018: 78), for instance:

(6)	Latin <i>doctor</i>	Dutch <i>dokter</i> ‘physician’
	Proto-Germanic <i>kobolt</i>	Dutch <i>kabouter</i> ‘gnome’
	Greek <i>presbyter</i>	Dutch <i>priester</i> ‘priest’
	Italian <i>zingaro</i>	Dutch <i>zigeuner</i> ‘gypsy’

Some Middle Dutch nouns were also adapted to schema (5):

- (7) herde ‘shepherd’ > herder (compare German *Hirt(e)*)
 schenke ‘giver’ > schenker (compare German *Schenk*)
 schutte ‘shooter’ > schutter (compare German *Schütze*)

In addition, certain person-denoting nouns got an extra *-er*, even though the base word itself contains a suffix that serves to denote persons (Booij & Audring 2018: 78):

- (8) Afrik-aan ‘African’ > Afrik-an-er
 Sodom-iet ‘Sodomite’ > Sodom-iet-er

These facts show that a higher order schema that generalizes over the various types of nouns ending in *-er* is well motivated.

After this brief introduction on the motivation of higher order schemas I will comment on three specific issues concerning the use and motivation of such schemas in morphology discussed in this issue of *Word Structure*: the importance of second order schemas, the role of phonological patterns in constructions, and the analysis of affixoids.

2. Second order schemas

A second order schema or sister schema (cf. Audring, this issue) represents an additional degree of abstraction, although it is not a higher order schema that dominates other schemas. It expresses systematic correspondences between two or more constructions (Booij & Masini 2015). An example is preverb incorporation in Dutch: preverbs can appear in two different structural configurations, and vary in degree of cohesiveness with the verb (Booij 2010: 135), as illustrated in (9) for the separable complex verb *openmaken* ‘to open; lit. to open-make’.

- (9) a. ... dat ik de deur open wilde maken
 ... that I the door open wanted make
 ‘...that I wanted to open the door’
 b. ...dat ik de deur wilde open-maken
 ... that I the door wanted open-maken
 ‘... that I wanted to open the door’

In (9b) the adjective *open* has been incorporated into the verb, and forms a syntactic compound with the verb in the clause-final verbal cluster, whereas in (9a) the adjective functions as a syntactically independent resultative predicate that does not form a part of the verb cluster. This systematic

relationship can be expressed by considering the relevant constructions as paradigmatically related, that is, as sister schemas:

$$(10) \quad [X^0 V^0]_{V'} \approx [X^0 V^0]_{V^0}$$

The paradigmatic relationship between these two schemas is symbolized by \approx (Booij 2010); a formalization of this correspondence can be given by means of co-indexation, with a and b used as co-indexes for variables:

$$(10)' \quad [X_a^0 V_b^0]_{V'} , [X_a^0 V_b^0]_{V^0}$$

As Audring (this issue) points out, we do not need a more abstract higher order schema that dominates these two sister schemas: the correspondence is adequately expressed by co-indexation of constituents of the sister schemas. Note that correspondence is stated here for one level only, the morpho-syntactic level. If a construction is a systematic correspondence of information on three levels (PHON, SYN, and SEM), we expect that sister constructions differ on one level only, in this example the morpho-syntactic level. The information on the other two levels should be partially or completely identical for two sister constructions, as this is what makes them sisters.

This insight is important for the analysis of phonological correspondence relations between words in different languages. Höder (this issue) argues for Diasystemic Construction Grammar, a model of Construction Grammar (CxG) in which the systematic relations between constructions of two languages used by a bilingual community are specified. I agree that such systematic relationships may be real for bilingual speakers. I grew up as a bilingual speaker of standard Dutch and the Low-Saxon dialect spoken in Drenthe, a province of the Netherlands. One of the systematic phonological correspondences between these two languages (almost the same as noted for German and Danish in Höder (this issue)) is that where Low Saxon has the vowel /i/, standard Dutch has the diphthong /ei/, as in:

(11)	<i>Low Saxon</i>	<i>Standard Dutch</i>	<i>gloss</i>
	lieden	lijden	to suffer
	mien	mijn	my
	piene	pijn	pain
	wies	wijs	wise

This correspondence is used by some primary school teachers in the North-Eastern part of the Netherlands to teach the intricacies of Dutch orthography. In Dutch orthography, the diphthong /ei/ is spelled in two ways, either as *ei* or as *ij* (compare the homophonous verbs *lijden* ‘to suffer’ with *leiden* ‘to lead’). This reflects a historical difference: the spelling *ij* is used when this vowel derives

historically from /i/, the vowel that has not changed in the Low-Saxon dialects. Therefore, bilingual speakers can use this systematic correspondence to determine the proper spelling of Dutch words with the diphthong /ei/: when the corresponding vowel in Low-Saxon is /i/, the spelling is *ij*.

The psychological reality of this correspondence rule can be observed in cases of hypercorrection. For instance, Low-Saxon speaker may incorrectly pronounce the word for onion, *siepel* /sipəl/ as [sɛipəl], a word that does not exist in Dutch (instead, the word for ‘onion’ is *ui*).

Although I agree that such systematic correspondences may be part of the knowledge of bilinguals, we do not need an abstract higher order schema that generalizes over the common properties of words in the two languages pace Höder (this issue). A sister schema that expresses the systematic correspondence on the phonological level between such words will suffice.

Second order schemas are of utmost importance for an adequate account of non-concatenative morphology. Consider, for instance, partial reduplication in Javanese (Booij 2012: 36) in which the initial consonant of a word is copied, and followed by the vowel /ə/:

- | | | |
|------|--------------|--------------------------------------|
| (12) | tamu ‘guest’ | tətamu ‘to visit’ |
| | jawah ‘rain’ | jəjawah ‘to play in the rain’ |
| | gəni ‘fire’ | gəgəni ‘to warm oneself by the fire’ |

This morphological pattern can be expressed by assuming a paradigmatic relationship between two schemas, as given in (13):

- | | | | |
|------|---------------------------------------------------------------------|---|-----------------------------------------------|
| (13) | PHON: (C ₁ əC ₁ y _a) _i | ≈ | (C ₁ y _a) _j |
| | SYN: V _i | | N _j |
| | SEM: [Action related to SEM _j] _i | | SEM _j |

In these schemas C is a consonant, and y is the variable for a sequence of sounds. The type of word formation discussed by Norde & Sippach (this issue) also requires second order schemas, but of a less abstract nature. Most of their so-called libfixes are stumps of words such as *-gasm* in *brain-gasm* (*brain* + *orgasm*) that are preceded by another word, or by a word stump, such as *-tainment* in *infotainment* (*information* + *entertainment*). The meanings of the original words are preserved in the corresponding libfixes, and this implies a paradigmatic relationship between the libfix and the corresponding word, as illustrated here for *-gasm*:

- | | | | |
|------|----------------------------------------------------------------|---|--------------------------------------|
| (14) | PHON: (x _k gazm _a) _i | ≈ | (ɔr gazm _a) _j |
| | SYN: [X _k Y _a] _{N_i} | | N _j |
| | SEM: SEM _j related to SEM _k | | SEM _j |

This second order schema establishes a relation between a constructional idiom (a constructional schema that is partially fixed) and a word. It states, for instance, that the word *braingasm* means ‘orgasm related to the brain’. The presence of the variable *x* in the first schema indicates that other words or stumps may appear before *-gasm*, thus leading to new words of this type.

3. The role of phonology in constructions

The role of phonology in constructions is implied by the tripartite parallel architecture of grammar, and there are many phenomena that show the role of phonology in characterizing morphological constructions (Booij & Audring 2017, Höder 2016). For instance, a word formation process may impose phonological constraints on the kind of base words it accepts, and word formation processes may have to be defined in terms of phonological output forms.

Word formation by means of phonological templates is another case of this role of phonology. An example given in §1 is the use of a phonological template for words denoting occupations in Damascus Arabic. Davis & Tsujimura (2018: 324 ff) also discuss the use of templatic morphology in the formation of comparative forms of adjectives in Egyptian Arabic, as illustrated in (15); these adjectives have the shape $aC_1C_2aC_3$, with the consonants copied from the corresponding adjective:

(15)	<i>Adjective</i>	<i>Comparative</i>
	kibiir	akbar ‘big’
	tixiin	atxan ‘fat’

This morphological pattern can be accounted for by a second order schema:

(16)	PHON	$(C_1VC_2VC_3)_j$	\approx	$(aC_1C_2aC_3)_i$
	SYN	A_j		A_i
	SEM	SEM_j		[Comparative of SEM_j] _i

In short, second order schemas insightfully account for the phonological patterns in non-concatenative morphology.

Phonological patterns may also have an expressive value, as is the case for sound symbolism, like that in the famous mimetic words of Japanese. Klamer (2002) presents examples of the expressive value of phonotactic patterns in Kambara and in Dutch. This underscores the point that phonology is an essential part of constructions.

In Höder’s (this issue) example of a higher order schema that expresses a diasystematic correspondence, there is no meaning component involved; it accounts for a systematic phonological

correspondence between vowels of German and Danish words: diphthong [ai] versus monophthong [i(:)]. The correlating non-phonological property is that of the language system to which each subschema belongs. This correspondence can be expressed by a second order schema applying to the phonological level and to the level of the language to which each of the corresponding schema belongs. This means that we do not need the superordinate schema for the Danish and German words that Höder proposes.

Second order schemas can also be used in order to express generalizations concerning allomorphy. For instance, for Dutch words with a vowel followed by a non-velar fricative (f/v, s/z), the following generalization holds: short vowels are followed by a voiceless fricative, and long vowels by a voiced fricative. Exceptions to this generalization are loanwords such as *Pasen* [pa:sən] ‘Easter’ and *grafen* [ɣra:fən] ‘graphs’, the plural of *graaf* ‘graph’. This constraint is also visible in morpheme alternations, as illustrated in (17a,d) (Booij 2010: 245; Booij 2011: 2065) where the alternation in vowel length correlates with a difference in voicing of the following fricative:

- | | | |
|---------|----------------------|----------------------------|
| (17) a. | graf [ɣraf] ‘grave’ | graven [ɣra:vən] ‘to dig’ |
| b. | stof [stɔf] ‘dust’ | stoffen [stɔfən] ‘to dust’ |
| c. | raaf [ra:f] ‘raven’ | raven [ra:vən] ‘ravens’ |
| d. | glas [ɣlas] ‘glass’ | glazen [ɣla:zən] ‘glasses’ |
| e. | pas [pas] ‘pass’ | passen [pasən] ‘passes’ |
| f. | kaas [ka:s] ‘cheese’ | kazen [ka:zən] ‘cheeses’ |

The alternation between long and short vowels is lexically governed, and has to be specified for each individual word. The correlation between vowel length and voice property of the following non-velar fricative can be expressed by a second order schema in which the singular and plural noun constructions differ in the phonological make-up of the stem (V = short vowel, VV = long vowel, y = variable for sequence of sounds):

- | | | | | |
|------|------|------------------------|---|-----------------------------------------|
| (18) | PHON | (y V f/s) _i | ≈ | (y VV v/z ən) _j |
| | SYN | N _i [sg] | | N _i [pl] |
| | SEM | SEM _i | | PLURAL [SEM _i] _j |

This second order schema is a subschema of the general schema for the pluralization of Dutch nouns. It illustrates once more how phonology may play a role in morphological constructions, and that the concept of second order schema provides the right formalism for expressing phonological generalizations concerning morphological constructions.

4. Affixoids

The phenomenon of affixoids provides a strong argument for the necessity of subschemas, for subclasses of compounds in which one of the constituents has a bound meaning, that is, a productive meaning that is not available for that constituent when used as a word by itself. An example from Dutch is the use of the noun *bloed* ‘blood’ as an emphatic intensifier, as in *bloedmooi* ‘very beautiful’. For me, the term ‘affixoid’ is a convenient label for word constituents with bound meanings. These bound meanings are specified in constructional idioms, compound schemas with the relevant word specified.

Hartmann (this issue) discusses two types of nominal compounds in German, with *Welt* ‘world’ or *Landschaft* ‘landscape’ as heads. These two nouns receive a metaphorical interpretation in many compounds as denoting collectives. However, as Hartmann shows, these metaphorical interpretations are also available when these words are used in phrases. Does this mean that they do not require a specific compound subschema because these meanings are not bound to their occurrence in compounds? In the case of *bloedmooi* we cannot do without a subschema with *bloed-* for Dutch N+A compounds because this compound cannot be paraphrased as *mooi als bloed* ‘beautiful as blood’. That is, the noun *bloed* does not have the meaning of intensification when used by itself. In the compound types that Hartmann discusses, such subschemas are not absolutely necessary because the metaphorical interpretations are available anyway. However, from a usage-based perspective we might still assume subschemas for *Welt* and *Landschaft* since the metaphorical interpretation of these words is pervasive in the relevant compounds, and this usage pattern therefore deserves being represented. Entrenchment is a justification for assuming schemas even if there is no construction-specific idiosyncrasy involved.

The use of such subschemas for compounds with *Welt* and *Landschaft* does not imply that the meaning of these words within compounds has grammaticalized. In earlier work on affixoids they have indeed been considered cases of grammaticalization, because affixes qualify as a subtype of grammatical morphemes. However, as argued in Hüning & Booij (2014), it is more appropriate to characterize these patterns as cases of constructionalization (Traugott & Trousdale 2013), since the lexical meaning of these words is still available, although sometimes with a more abstract interpretation. This appears to be also the case for German compounds with *Welt* and *Landschaft*: metaphorical interpretations are triggered by these words being parts of compound constructions, but they are not really affix-like as far as their meaning is concerned.

The qualification ‘affixoid’ is also less appropriate for cases where a phrasal constituent receives a metaphorical interpretation when embedded in compounds, as is the case for the phrase *huis, tuin, and keuken* ‘house, garden and kitchen’ which is interpreted as ‘common, ordinary’ in Dutch compounds such as those in (19) (Booij & Hüning 2014: 102):

- (19) huis-tuin-en-keuken-adverteerders ‘ordinary advertisers’
 huis-tuin-en-keuken-tandarts ‘ordinary, non-specialized dentist’

We expect an affixoid to consist of one morpheme, whereas in this case a phrasal multi-word construction is involved.

When there is a correspondence between the metaphorical interpretation of a word in compounds and in phrases, as observed by Hartmann for *Welt* and *Landschaft*, this correspondence can be expressed by marking a morphological and a phrasal schema as sisters. This is not a one-off solution. For example, we also need sister schemas that relate morphological and phrasal constructions for particle verbs (which are phrasal constructions, Booij 2010: Ch. 5), and their corresponding nominalizations which are compounds (Booij 2015). Another example of such correspondences between the semantic interpretation of phrases and compounds is the following case from Dutch. Here, the idiosyncratic meaning of phrases recurs in compounds headed by the nominalization of the verb of the verbal collocation:

(20)	<i>verbal collocation</i>	<i>nominalization</i>
	[in beslag] _{PP} nemen ‘in possession take, to seize’	in-beslag-name
	[in bezit nemen] _{PP} ‘in possession take, to take possession of’	in-bezit-nem-ing
	[in dienst] _{PP} treden ‘in service step, to begin a job’	in-dienst-treding
	[in werking] _{PP} treden ‘in working step, to come into force’	in-werking-treding
	[ter aarde] _{PP} bestellen ‘into earth deliver, to bury’	ter-aarde-bestelling

A compound like *inbeslagname* has the structure of a nominal compound with a PP as its first constituent [[*in-beslag*]_{PP} [*name*]_N]_N (Booij 2015). That is, the idiosyncratic phrase *in beslag nemen* is not a formal constituent of the corresponding compound, but its meaning is part of the meaning of the compound. Therefore, the semantic correspondence can only be expressed by a paradigmatic relationship between the two constructions involved, a syntactic and a morphological one.

As in previous cases discussed in this article, I do not see why we need a higher order schema, once we accept the idea of paradigmatically related constructional schemas.

5. Conclusions

There is a wide variety of constructions for which we observe a systematic correspondences in form and/or meaning. These correspondences can be expressed by constructional schemas of various generality as well as by sister schemas. Phonological regularities form part and parcel of a CxM analysis of morphological regularities. The assumption of paradigmatic correspondences between

constructional schemas is a well-motivated and necessary enrichment of the possibilities of morphological analysis.

The articles in this issue of *Word Structure* all support the idea of CxG that grammar and lexicon are not separated, and that the architecture of the grammar should be conceived as a multidimensional network of relations between syntactic and morphological constructions.

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