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Stripping paradigmatic relations out of the syntax

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Stripping paradigmatic relations out of the syntax

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Abstract This contribution aims at showing how paradigms and associative relations can be integrated into word-formation, with special attention paid to compounding. In this regard, we will take into account a phenomenon at the border between derivation and compounding, namely formations like *süßherzig* ‘sweet-hearted’, in which *-ig* is an adjective-forming suffix and AN a possible compound. To do so, we will explore data available from a large web corpus, on whose basis we will show how syntagmatic and paradigmatic relations developed in syntax find their way into word formation. We will show that the most productive compounding schemas as they are currently assumed in Construction Morphology give rise to processes of semi-affixation which are a first step toward derivation proper.

1 Introduction

Construction Morphology crucially centers on the idea that word-formation patterns emerge syntagmatically by means of a number of formal operations such as conflation, word-group derivation, etc. (cf. Booij 2010; Gaeta 2006). This is particularly the case in a language like German, in which compounds are extremely productive (see Gaeta and Schlücker 2012). On the other hand, at least since Ferdinand de Saussure associative relations, which basically underlie paradigmatic modeling, have been

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48 claimed to play a relevant role in word-formation. Clearly, one has to distinguish carefully
49 fully between a concept of paradigm “narrow sense” from a paradigmatic dimension
50 “broad sense”: while the former plays a major role in inflectional morphology, which
51 has been defined by its nature prototypically paradigmatic, the latter often shows up
52 in word-formation research whereby it is not clear whether and to what extent the
53 two senses correspond to each other and even overlap.

54 In this paper, we will try to defend the view that far from being different the concepts
55 of paradigm “narrow sense” and of paradigm “broad sense” highlight different facets
56 of the same procedural mechanism activated by the speakers when they elaborate
57 on vertical and horizontal associations established among words on the basis of
58 pattern similarity. In particular, we will devote our attention to complex formations in
59 German resulting from the combination of recurrent patterns of AN compounds and
60 of AN phrases on the one hand, and on the other on derivatives formed by means of
61 a highly productive suffix like *-ig*: this gives rise to bracketing paradoxes requiring
62 (para-)synthetic derivation because for instance a formation like *hochfiebrig* ‘having
63 high fever’ cannot be formed on *°fiebrig* nor on *°Hochfieber* while its syntactic
64 correspondent *hohes Fieber* ‘high fever’ is widely attested.

65 The paper is structured as follows: in Sect. 2 some theoretical background is given
66 discussing in particular the role of paradigms and associative relations within the
67 Constructicon; in Sect. 3 we will briefly discuss with the help of a concrete example
68 the conceptual and empirical differences between the usage of paradigm in inflection
69 and in word-formation, carefully distinguishing between the latter’s subparts, namely
70 derivation and compounding; in Sect. 4 we will devote our attention to the role of
71 paradigms in compounding as a specific case of word-formation, while in Sect. 5
72 the particular case of AN-*ig* formations (called *Zusammenbildungen* in the German
73 literature, which in a way correspond to English deverbal synthetic compounds like
74 *sweet-hearted*) will be introduced which give rise to different paradigmatic processes
75 and in Sect. 6 the systematic subtypes of AN-*ig* formations will be discussed in the
76 light of their corresponding AN phrases; in Sect. 7 single instantiations of paradigm
77 families relating to the general AN-*ig* pattern will be discussed in detail; the final
78 Sect. 8 draws the conclusion.

81 2 Paradigms, associative relations and the constructicon

82
83 Traditionally, the paradigmatic dimension is deemed to characterize inflectional morpho-
84 logic in neat contrast with derivational morphology. Conversely, the latter is held
85 to be more connected with the syntagmatic dimension as it provides words to be in-
86 serted into syntactic structures. In older models (see for instance Scalise 1984:6–8
87 for a discussion), this operation used to be called lexical insertion and is clearly dis-
88 tinct from inflection insofar as it takes into consideration lexemes while inflectional
89 morphology usually provides word forms appropriately selected for a given syntac-
90 tic node among a closed set of possibilities. While lexical insertion as such does not
91 apparently require any reference to a paradigm because any lexeme can in principle
92 be inserted into a syntactic structure, inflectional morphology comes into play after
93 lexical insertion, once the lexeme has been selected because the appropriate word
94

95 form needs to match the fixed number of morphosyntactic properties required by the
96 syntactic environment. In other words, it is the property of closure which keeps inflectional
97 morphology distinct from derivational morphology (cf. Aronoff 1976:2).
98 Accordingly, a word (or inflectional) paradigm is a finite set of possible word forms
99 generated by the (implementation of the) inflectional categories occurring in a given
100 language (cf. Gaeta 2007 for a discussion of the issue of productivity in inflection).
101 This corresponds to the notion of paradigm “narrow sense” hinted at above.

102 Very much in tune with this view, a realizational interpretation of the paradigm
103 has been recently made current, as in Carstairs’ (1987:48–49) following definition
104 (cf. also Stump 2005 for a discussion):

105 “A paradigm for a part of speech N in a language L is a pattern P of inflexional
106 realizations for all combinations of non-lexically-determined morphosyntactic
107 properties associated with N such that some member of N exemplifies P (i.e.
108 displays all and only the realizations in P)”.

109
110 This definition strictly connects the concept of paradigm with the number of mor-
111 phosyntactic properties associated with a certain lexeme, independently of any formal
112 relation of morphological nature. In this way, suppletive realizations are easily cap-
113 tured by the definition, while only combinations of lexically-determined morphosyn-
114 tactic properties are excluded from the count.

115 One problem with this view is that it is only feasible if a clear distinction can be
116 drawn between lexically- and non-lexically-determined morphosyntactic properties.
117 As is well known, this is not always easy to do. In fact, it is not clear how far mor-
118 phological categories like verbal adjectives (participles) or verbal nouns (infinitives)
119 are expressed in terms of non-lexically-determined morphosyntactic properties while
120 others (e.g. adverbs) are not. To make one concrete example, everybody agrees with
121 the assumption of a specific slot for *drinking* within the paradigm of the verb *to drink*,
122 but it is not clear why the slot for the verbal adjective *drinkable* is normally rejected.
123 In a similar way, in the paradigm of an adjective, e.g. *fast*, one normally counts the
124 comparative and superlative forms *faster* and *fastest*, but only few also include the
125 adverb *fastly*.

126 On the other hand, alleged non-lexically-determined morphosyntactic properties
127 normally modeling inflectional paradigms are often subject to limits intrinsic to single
128 lexemes which makes them strictly lexically-determined: for instance, defective
129 paradigms (e.g., Italian *prudere* ‘to itch’/past participle: ??*pruso*, ??*prudito*) are much
130 more frequent than one normally reads in language descriptions (cf. Baerman and
131 Corbett 2010 for a discussion). Moreover, other limits on the size of the paradigms
132 come from general constraints on their extension: e.g., English intransitive verbs nor-
133 mally do not form the passive, stative verbs do not form the imperative or the pro-
134 gressive form, etc. Clearly, such differences are related to the specific properties of
135 the single lexeme, i.e. they are lexically-determined. This renders the boundaries of
136 a paradigm difficult to draw. As a matter of fact, one cannot tell whether such re-
137 strictions refer to the actualization of a pattern giving rise to possible, but unattested
138 word forms like °*was slept*, °*am knowing*, °*know!*, etc., or whether these word forms
139 are to be considered ungrammatical. In a way, this reminds us of the problem raised
140 by derivatives like *decaffeinate* which implies the intermediate step °*caffeinate* (cf.
141 Gaeta 2015 for a discussion).

142 Finally, language change often has the effect of blurring the boundaries insofar
143 as single forms are taken to enter or to leave the paradigm. For instance, the actual
144 participle *drinking* used to be a verbal noun normally not included into the paradigm
145 of an Old English verb while it's not clear what to do with old participles like *shaven*
146 which only behaves as an adjective nowadays: *John is shaven* (*by his mother). In
147 short, even if we were to agree with Carstairs' definition given above, drawing a clear
148 line between what has to be included into an inflectional paradigm and what has to
149 be left out remains a difficult and in certain cases meaningless task.

150 On the other hand, since the early days of modern linguistics there has always
151 been a wide consensus on the central role played by paradigmatic or associative re-
152 lations in the language as already envisaged by Ferdinand de Saussure. This intuition
153 can be placed at the core of how we figure out that a morphological relation should
154 be, namely a form/meaning relation of any kind, and corresponds to the concept of
155 paradigm "broad sense" hinted at in Sect. 1 above. The intuition of basic associa-
156 tive relations can be expanded into a more general procedure for cross-referencing, if
157 the relation proves to be minimally systematic. This idea lies behind Bauer's general
158 assumption of a paradigm not only for inflectional morphology but also in word-
159 formation proper:

160 "[C]ross-referencing within the paradigm is the only way to find a regular way
161 to generate the appropriate forms, and that means that the derivational paradigm
162 must be at the heart of a generative grammar, even if there are times when
163 derivational paradigms do not appear to be totally regular" (Bauer 1997:254).

164 Note that Bauer himself provides an example of how minimally systematic an as-
165 sociative relation can be: the English lexeme *bishop* (besides the plural form *bishops*,
166 of course) only cross-refers to the overt derivative *bishopric*—besides the conversion
167 to *bishop*—and viceversa: the only reason for assuming *-ric* is its occurrence in *bish-*
168 *opric* (cf. Bauer 2001:47). In fact, a certain degree of systematicity is usually required
169 to provide associative relations with a certain paradigmatic strength. The latter refers
170 to a double dimension: on the one hand, an associative relation is made more and
171 more robust by increasing the number of word pairs in which it occurs. Accordingly,
172 the relation between *bishop* and *bishopric* is unique throughout the English lexicon
173 and accordingly its paradigmatic strength is very weak within the realm of the pro-
174 cedures forming |PLACE| from an input basis. In a different way, one normally says
175 that the productivity of the suffix *-ric* is limited to the base *bishop*. On the other hand,
176 the paradigmatic strength is increased by the number of the derivatives formed with
177 a certain base, namely its family size. Also from this perspective the family size of
178 *bishop* is limited to the only derivative *bishopric*, again besides the conversion to
179 *bishop*.

180 To give an immediate perception of the relevance of concepts like paradigmatic
181 strength and family size we can adopt a constructional view of morphology as it
182 has been suggested in recent research (cf. Booij 2010; Jackendoff and Audring 2016;
183 Gaeta and Zeldes 2017). In this view, morphological schemas—on the one hand—and
184 simple as well as complex lexemes—on the other—occur side by side in a network
185 (the Constructicon, cf. Goldberg 2013) differing in generality and specification:

186 Two things are relevant in this figure: first, the similar status of fully specified
187 lexemes like *bishop*, *bishopric*, *king*, *kingdom*, etc. and of underspecified schemas
188

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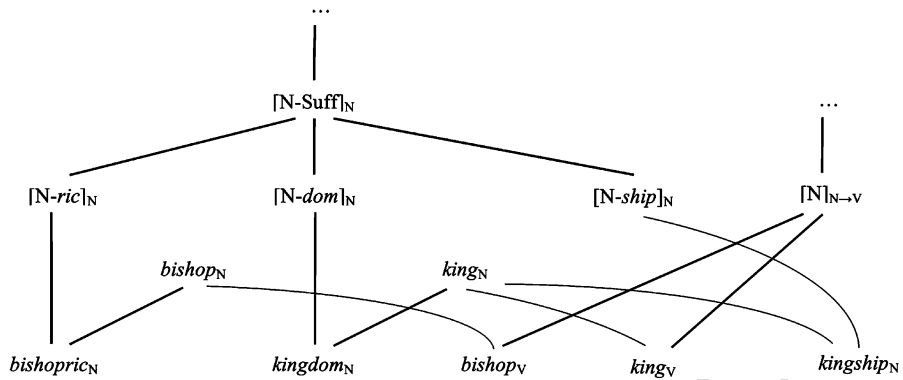


Fig. 1 Relational networking within the Constructicon

such as [N-ric], [N-dom], [N-ship] and the like. By doing so, the network is able to encode both the representational dimension typically associated with the lexicon and the generative capacity typically associated with the word-formation component: in this regard, both dimensions are simultaneously contained in the schemas.

The second thing is the concept of inheritance hierarchy and of schema unification which allows the speakers to go up and down the network insofar as the properties of the single schemas are inherited top-down while schemas are unified bottom-up and further generalized over more and more subschemas. In this way, inheritance hierarchy and schema unification give expression to the vertical as well as to the horizontal dimension implied both by paradigmatic modeling and by Saussurean associative relations. In fact, the network clusters around more general schemas, which are then implemented in more specific subschemas, which in their turn can be horizontally connected with other low-level schemas pushing the link further to other more general schemas, and so on.

On this background, family size can be intended along two different axes (cf. Štekauer 2014): a horizontal axis which collocates the involved pattern together with others sharing the same derivational meaning or more in general cognitive category, but differing for instance in productivity, as shown by [N-ric] and [N-dom] in Fig. 1 above for place names, and a vertical axis in which the involved pattern is listed close to others based on the same word, as in *king* → *kingdom*, *kingship*, etc. Accordingly, in (1a) the derivational paradigm of the cognitive category |AGENT| is reported including the example of a compounding strategy, *milk* → *milkman*, which shows how in principle the concept of paradigm can be applied in word-formation even beyond the limits of derivation proper:

- (1) a. *teach* → *teacher*, *journal* → *journalist*, *library* → *librarian*, *escape* → *escapee*, *milk* → *milkman*
- b. *písat* ‘to write’ → *za-písat* ‘to record by writing’ → *zapis-ovat* ‘to keep recording by writing’ → *zapisova-teř* ‘registrar/recorder’ → *zapisovateř-ka* ‘female registrar/recorder’ → *zapisovateřk-in* ‘belonging to female registrar, recorder’

- 236 c. *škola* ‘school’ → *škol-ák* ‘schoolboy’
237 → *škol-ník* ‘school janitor’
238 → *škôl-ka* ‘kindergarten’
239 → *škol-stvo* ‘education system’
240 → *škol-ička* ‘small school’
241

242 Such a derivational paradigm profiles a family of derivatives sharing the same ba-
243 sic meaning. On the other hand, the family of a word can be quite rich as in Slovak
244 (cf. Furdík 2004:73–74) insofar as it may comprehend the successive applications of
245 different processes to an initial base-word (1b), or of the different processes applica-
246 ble to a single base-word (1c). Keeping in mind on the one hand the Constructicon
247 and its architectural properties and on the other the double dimension connected with
248 paradigmatic strength and family size as they are underpinned by associative rela-
249 tions, we will explore in this paper how useful the concept of derivational paradigm
250 can be in order to account for a number of associative relations which pop out from
251 recurrent patterns resulting from the combination of compounding and suffixation in
252 German. This makes this paper one of the first attempts to apply the concepts and the
253 modeling of paradigmatic morphology beyond the realm of derivational processes.
254 To do this, we will rely on data available from the corpus DeWaC which is a huge
255 corpus of the German language featuring about 2 billion tokens constructed in the
256 realm of Web-as-a-Corpus projects (cf. Baroni et al. 2009).
257
258

259 3 Paradigms between inflection and word-formation

261 With the help of a concrete, and perhaps somewhat trivial, example let us start with
262 discussing the main differences between inflection and derivation and, within word-
263 formation, between derivation and compounding, as far as the concept of paradigm
264 is concerned.

265 If we consider a German adjective like *hoch* ‘high’, this is characterized by a rich
266 word paradigm, corresponding to all slots generated by the different values of gender
267 (3: masculine, feminine and neuter), number (2: singular and plural; in the plural,
268 the gender distinctions are neutralized), case (4: nominative, accusative, dative and
269 genitive) and definiteness (2: the so-called strong and weak forms).¹ German also
270 has synthetic forms for comparative and superlative, and these additional dimensions
271 triplicate the number of the resulting slots.

272 As far as base allomorphy is concerned, German *hoch* has four different allo-
273 morphs: *hoch*, used only in the predicative use (*Der Turm ist hoch* ‘The tower is
274 high’), *hoh-* used in the positive forms, *höh(er)-* which builds the comparative and
275 *höch(st)-* used for building the superlative.
276

277 ¹As is well known, German adjectives display different forms if they are preceded by the determinative
278 article (weak forms) or not (strong forms). However, the whole paradigm—and especially among the weak
279 forms—is filled with homonymous forms, i.e. widespread syncretism: the forms *hohe* and *hohen* alone fill
280 all the slots in the weak paradigm, e.g. no case distinction is conveyed by the adjective in plural weak
281 forms and no gender distinction is conveyed by the adjective in nominative, dative and genitive singular
282 weak forms.

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The same word paradigm that we have described for *hoch* is applicable to basically all German adjectives (2a), possibly with different patterns of allomorphy involved (2b):

- (2) a. *klein* ‘small’: *klein-ler-lest-*
b. *kalt* ‘cold’: *kalt- ~ kälter-lest-*

Further, each new German adjective is immediately provided with a regular paradigm of this type. In fact, the presence of a paradigm of forms is often regarded as a defining feature of inflectional phenomena as opposed to derivational ones (cf. Štekauer 2015 for a discussion).

However, on the one hand inflection is not exception-free as a number of adjectives do not inflect for a number of reasons, e.g. *prima* ‘fine, cute’ *sand* ‘sand’, etc. (cf. Gaeta 2010, 2014). On the other hand, derivation is not chaotic and, to some extent, the same relationship between whatever adjective and its inflectional forms can hold between an adjective and its derivatives.

Taking once again German *hoch* into account, it can access several derivational processes as any other German adjective. One can derive for example nouns, adverbs and verbs:

- (3) a. *hoch* → *hoh-* + *-heit* → *Hoheit* ‘Highness’
b. *hoch* → *höh-* + *-e* → *Höhe* ‘height’
c. *hoch* → *höch(st)-* + *-ens* → *höchstens* ‘at most’
d. *hoch* → *höh-* + $-\emptyset_V$ → *hohen* ‘(in painting) to highlight with opaque white’²

Each of these processes is applicable to many other German adjectives.

- (4) a. *niedrig* → *niedrig-* + *-heit* → *Niedrigkeit* ‘the fact of being low’
b. *kalt* → *kält-* + *-e* → *Kälte* ‘cold (weather, environment)’
c. *erst* → *erst-* + *-ens* → *erstens* ‘firstly’
d. *falsch* → *fälsch-* + $-\emptyset_V$ → *fälschen* ‘to falsify, to fake’

However, differently from inflection, we cannot take it for granted a priori that for each German adjective every possible derivational process is concretely actualized, and this is also connected to the fact that derivational processes usually display different grades of productivity (or rentability, as defined in Bauer 2001, cf. Gaeta and Ricca 2015 for an overview).

Table 1 shows the five adjectives and the four processes exemplified above (in particular, the suffixes *-heit* and *-e* give rise to abstract nouns, the suffix *-ens* forms adverbs based on the superlative or relative form, and the conversion forms verbs) and gives an impressionistic idea of how many gaps actually exist in a hypothetical derivational paradigm. This state of affairs is a good representation of Bauer’s description of how a derivational paradigm can be conceived of:

²Here, the traditional zero-suffix $-\emptyset_V$ for forming verbs is assumed. See Gaeta (2013) for a discussion of the alternative conversion hypothesis. The pattern PREFIX-ADJ- $-\emptyset_V$ —which is called *Präfixkonversion* ‘prefix conversion’ in German (cf. Fleischer and Barz 1992:308)—is more productive in the formation of de-adjectival verbs. See for example *hoch* → *er-* + *höh-* + $-\emptyset_V$ → *erhöhen* ‘to raise, increase’, *hoch* → *auf-* + *höh-* + $-\emptyset_V$ → *aufhohen* ‘to heighten’.

Table 1 The derivational paradigm of *hoch* ‘high’³

| | -heit _N | -en | -ens _{Adv} | -Ø _V |
|----------------|--------------------|-------------------|-----------------------|--------------------|
| <i>erst</i> | ° <i>Erstheit</i> | ° <i>Erste</i> | <i>erstens</i> | ° <i>ersten</i> |
| <i>falsch</i> | <i>Falschheit</i> | ° <i>Fälsche</i> | ° <i>fälschestens</i> | <i>fälschen</i> |
| <i>hoch</i> | <i>Hoheit</i> | <i>Höhe</i> | <i>Höchstens</i> | <i>höhen</i> |
| <i>kalt</i> | ° <i>Kalthheit</i> | <i>Kälte</i> | ° <i>kältestens</i> | <i>kälten</i> |
| <i>niedrig</i> | <i>Niedrigkeit</i> | ° <i>Niedrige</i> | ° <i>niedrigstens</i> | ° <i>niedrigen</i> |

“[T]here are constellations of positions in matrices which, while they may be filled in ways which are so irregular as to put them outside what is traditionally viewed as inflection, can nonetheless be considered slots which must be available for any word of the appropriate word-class. These available slots are the paradigm.” Bauer (1997:253)

Further elaborating on this, Štekauer (2014) concludes that:

“[p]otentiality is a crucial term for the concept of derivational paradigm. It guarantees a high level of predictability and regularity [...] in the sense that the existing gaps in the system can be filled anytime with actual words.”

He further points out that “one of the essential features of the derivational paradigm is the availability of slots (filled with potential words) that are more important for the paradigm than the forms which fill them”. Accordingly, in spite of their absence in the Duden dictionary, which actually witnesses of the lack of institutionalization (cf. Hohenhaus 2005), it is crucial in Table 1 that some of those potential words are attested as nonce-formations in large corpora and more in general on the Web. This makes them a concrete example of what availability actually means in this realm. For example, a word like *kältestens* ‘most coldly’, is attested in the following example taken from corpus DeWaC to which we refer henceforth for the actual web references:

- (5) *Unser Versuch, in ein vollkommen untouristisches Bad zu gehen, war nicht wirklich erfolgreich: vom Besuch des Hamam direkt nördlich der Galata-Brücke [...] sei wärmstens (bzw. kältestens) abgeraten.*
‘Our attempt to go in a completely un-touristic bathing facility wasn’t really successful: be most warmly (or coldly) advised against visiting the hammam north from the Galata bridge.’

The nonce-formation *kältestens* appears to be licensed by the presence of the form, by contrast institutionalized and semantically specialized, *wärmstens* ‘most warmly’. Further examples of *kältestens* found through a Google search occur in constructions which once again would usually contain *wärmstens*:⁴

³The symbol ° marks the output of the processes which are not attested in the Duden online dictionary available at www.duden.de.

⁴It is worth noting that Motsch (2004:282) in his treatment of the *-ens* de-adjectival adverbs of German explicitly excludes the existence of *kältestens*, as opposed to *heißestens*, and in general the possibility to produce the relevant antonym of an *-ens* adverb formed from an adjective constituting the higher pole of an antonymic scale.

- 377 (6) *Diese drei Rezepte von klassischen Minze-Eistee bis zum fruchtigen Erdbeer-*
378 *Eistee können wir kältestens empfehlen.*
379 ‘We can most coldly recommend these three recipes from the classic Mint Ice
380 Tea to the fruity Strawberry Ice Tea.’
381

382 In these two examples, it appears clearly how, for the sake of expressivity, consti-
383 tutive elements of a lexicalized construction are replaced by alternative, previously
384 unattested (or at least not institutionalized) elements whose existence is licensed by
385 the specific context and by the meaning that the replaced element acquires in that spe-
386 cific context. We can define the adverb *kältestens* as a paradigmatic alternative to the
387 institutionalized *wärmstens*, where ‘paradigmatic’ has the different sense, rooted in
388 Saussure’s associative relations, of ‘being able to occur in the same syntagmatic slot’.
389 Furthermore, potentiality makes reference to the paradigmatic strength of the asso-
390 ciative relations insofar as the capacity of occurring in certain patterns is strengthened
391 by the number of times this possibility is concretely exploited (counted both in types
392 and tokens). In this light, the difference between the concept of paradigm “narrow
393 sense” and “broad sense” hinted at above turns out to be rather of a quantitative na-
394 ture (see Bauer’s quote above on the “irregular” ways in which a slot in the paradigm
395 can be filled) and refers to the degree of probability of actualization to the extent that
396 “narrow sense” means more probably actualized and “broad sense” less probably ac-
397 tualized.
398

400 4 The role of paradigms in compounding

401
402 Turning our attention to compounding and taking again German *hoch* as example, it
403 becomes clear that despite the intuitive appeal of Saussurean associative relations the
404 concept of paradigm in this realm is more difficult to apply, at least in its entire im-
405 plications. One has first to consider that the rich inventory of compounding patterns
406 of German makes it possible for adjectives to be either heads or modifiers in com-
407 pounds. An adjective like *hoch* can be connected to nouns to form new adjectives
408 with the meaning of ‘high as a N’.
409

- 410 (7) a. *Turm* ‘tower’ + *hoch* ‘high’ > *turmhoch* ‘high as a tower’
411 b. *Finger* ‘finger’ + *hoch* ‘high’ > *fingerhoch* ‘high as a finger’
412 c. *Mann* ‘man’ + *hoch* ‘high’ > *mannshoch* ‘high as a man’
413 d. *Wolkenkratzer* ‘sky-scraper’ + *hoch* ‘high’ > *wolkenkratzerhoch* ‘high
414 as a sky-scraper’

415 The range of nouns modifying *hoch* in a compound is wide and encompasses nouns
416 designating high objects (7a): *Turm* ‘tower’, as well as small ones (7b): *Finger* ‘fin-
417 ger’, possibly displaying linking elements as in *mann-s-hoch* (7c), and even nominal
418 compounds (7d): [[[*Wolken*]_N [[*kratz*]_V -*er*]_N *hoch*]_A.

419 How can we apply in this case the concept of paradigm in the sense of a deriva-
420 tional family as suggested by Štekauer above? If we directly apply to *hoch* the logic
421 of derivational processes as exemplified in (1c) above, the various nominal modi-
422 fiers might be considered as processes which are applied to the adjective forming its
423

424 derivational family; however, this does not make much sense, since it would imply
425 that tens of nouns represent some kind of process as well. Conversely, if we con-
426 sider *hoch* as a process—for example because all output formations are adjectives—
427 following the vertical axis of the paradigmatic relations suggested in (1b) above, we
428 overlook the fact that these nouns can occur also in compounds with other adjectives
429 as head, e.g. *Turm* can occur also in *turmähnlich* ‘similar to a tower’, *turmbewehrt*
430 ‘fortified with towers’, *turmbestückt* ‘provided with towers’, *turmgeschmückt* ‘deco-
431 rated with towers’ etc. Apparently, the paradigm in its narrow sense of a closed set
432 of more or less structured and realized forms seems to be in most cases not useful
433 in compounding, given the scarce advantage of conceiving words, even the head of
434 a compound, as processes or constructions. On the other hand, the paradigm in its
435 broad sense of a network of relations moving up and down within the Constructicon
436 might be relevant in compounding but it does not seem to constrain the inventory of
437 possible combinations to a closed set or at least to a limited set of alternatives.

438 However, this does not force us to conclude that the concept of derivational
439 paradigm is of no help to model compounding. In fact, the concept of paradigm taken
440 in its cross-referencing sense and modeled in a lexical network like the one seen in
441 Fig. 1 above can be applied also to compounding, but only to a limited range of phe-
442 nomena. If we turn our attention to the behavior of *hoch* as a modifier, it is possible
443 to observe the relevance of the paradigm in a narrower sense. In the examples in (8a–
444 b) *hoch* modifies the adjectival heads, but it displays—rather than its usual meaning
445 ‘high’ available for example in the compounds cited in (8c)—a specialized meaning
446 ‘very, highly’:

- 447
448 (8) a. *hochinteressant* ‘highly interesting’, *hochkomplex* ‘highly complex’,
449 *hochaktuell* ‘very actual’
450 b. *hochqualifiziert* ‘highly qualified’, *hochentwickelt* ‘highly developed’,
451 *hochgeschätzt* ‘highly esteemed’, *hochgiftig* ‘highly poisonous’
452 c. *hochgelegen* ‘lying in relatively big height’, *hochdosiert* ‘showing a high
453 dosage’, *hochwertig* ‘having a high value’, *hochrangig* ‘high-ranked’

454 Accordingly, it has been suggested to consider this use of *hoch* as ‘grammaticalized’
455 insofar as it has undergone a process of semantic bleaching and expansion. There-
456 fore, it constitutes one of the possibilities to express the elative in German, the other
457 being the superlative (*interessantest*, but *am interessantesten* in most uses) and the
458 use of grade adverbs (*extrem interessant*). As one of the strategies to express the el-
459 ative, *hoch-* constitutes a paradigm on the horizontal axis seen in (1a) above insofar
460 as it belongs together with the other strategies cited above to the same cognitive cate-
461 gory of |RELATIVE|. Interestingly, among the other strategies for expressing the elative,
462 *hoch-* is the only one belonging to word-formation—though not to derivation *stricto*
463 *sensu*—while the superlative, which can also be used as elative, is normally held to
464 belong to inflection (but cf. Fuhrhop and Vogel 2010 for a discussion), while grade
465 adverbs are modifiers at the syntactic level. This shows how paradigmatic relations
466 involving a single cognitive category can in principle be established across several do-
467 mains: inflection, word-formation, syntax. On the vertical axis (s. e.g. (1b–c) above),
468 *hoch-* expressing |RELATIVE| constitutes one of the forms available to an adjective (e.g.
469 *interessant*) in the paradigm “narrow sense”: *hochinteressant* is namely one of the
470

possible formations that can be formed starting from the adjective beside the abstract noun *Interessantheit* ‘interestingness’, the adverb *interessanterweise* ‘interestingly’ etc.

We will again take into consideration the horizontal and the vertical axis of the paradigm relations in the realm of compounding in the next section where we will deal with a class of German synthetic compounds.

5 Paradigmatic processes in compounding

In this section, we move a step further towards morphological complexity discussing formations like the already cited *hochwertig* ‘having a high value’ and *hochrangig* ‘high-ranked’, in which *-ig* is an adjective-forming suffix and AN a possible compound (henceforth AN-*ig* formations). This rather complex pattern involves two lexical elements—an adjective and a noun—and the derivational suffix *-ig* which is the most used suffix to form adjectives in German and is highly polysemous (DWB 3 1978:108–109). Up to 24 different uses for it can be listed, but, in the light of the high range of lexical categories that can access the process, we can consider *-ig* more generally as a category-shifting suffix, whose meaning contribution to the output changes in accordance with the input category. Among its uses a possessive meaning (*dornige Hecke* ‘thorny hedges’ = *Hecke, die voller Dornen sind* ‘hedges which are full of thorns’) is particularly frequent as far as nouns are concerned.

In the German-speaking literature, AN-*ig* formations are referred to as *Zusammenbildungen* ‘combined formations’, cf. Sugarewa 1972), a term indicating complex constructions in which a compound is connected to a suffix, but without the possibility to recognize a clear priority of the two processes as neither of the possible intermediate steps is actually attested:

- (9) a. $[[[breit]_A [krempe]_N -ig]_A]$ ‘wide-brimmed, having a wide brim’
b. $^{\circ}[[Breit]_A [krempe]_N]_N$
c. $^{\circ}[[krempe]_N -ig]_A$

The example in (9a) shows an AN-*ig* formation, *breitkrempig* ‘wide-brimmed’: neither of the possible formations which could constitute previous steps in generating it—the compound $^{\circ}Breitkrempe$ ‘wide-brim’ or the derivative $^{\circ}krempig$ ‘brimmed’—occurs, although both of them might be considered as possible but unattested words (see the discussion in Sect. 2 above). This state of affair is shared by many instances of synthetic compounds like English *broad-shouldered* or Dutch *blauwogig* ‘blue-eyed’. In the case of Dutch formations of this type Booij (?Boo2004:129, 2010:46) suggests that the two constructions available in Dutch word-formation, namely the not very productive construction producing AN compounds and the highly productive denominal derivation formed with the *-ig* suffix, are conflated giving rise to the unified constructional schema in (10a):

- (10) a. $[[X_i]_A [[Y_j]_N -ig]_A]_A \leftrightarrow$ lhaving SEM_j with a SEM_il
b. $[[[X_i]_A [Y_j]_N]_N -ig]_A \leftrightarrow$ lprovided with a SEM_i SEM_jl
c. $[[X_i]_A [Y_j]_N -ig]_A \leftrightarrow$ lprovided with a SEM_i SEM_jl

Table 2 Vertical and horizontal AN-*ig* formations clustering around *hochherzig*

| | | | | | | | | | | | | |
|-----|---------------|-----------------|--------------------|----------------|----------------|--------------------------|-----------------|-----------------|-----------------|-----------------|-----|--|
| | | | | | | | ... | | | | | |
| | | | | | | | <i>bös-</i> | | | | | |
| | | | | | | | <i>edel-</i> | | | | | |
| | | | | | | | <i>eng-</i> | | | | | |
| | | | | | | | <i>groß-</i> | | | | | |
| | | | | | | | <i>gut-</i> | | | | | |
| | | | | | | | <i>halb-</i> | | | | | |
| | | | | | | | <i>hart-</i> | | | | | |
| ... | <i>-adlig</i> | <i>-fiebrig</i> | <i>-geschossig</i> | <i>-gradig</i> | <i>-hackig</i> | <i>hochherzig</i> | <i>-karätig</i> | <i>-klassig</i> | <i>-levelig</i> | <i>-oktanig</i> | ... | |
| | | | | | | <i>kalt-</i> | | | | | | |
| | | | | | | <i>klein-</i> | | | | | | |
| | | | | | | <i>leicht-</i> | | | | | | |
| | | | | | | ... | | | | | | |

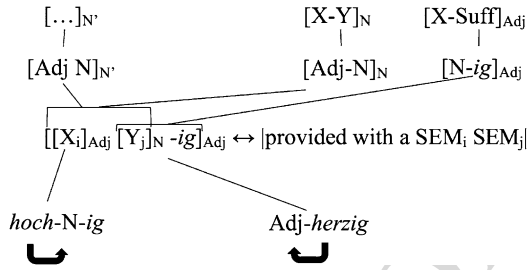
However, besides the conflated schema assumed by Booij, the representation in (10b) is also of relevance because it accounts for the case in which an AN compound does normally occur as in *Graukopf* ‘gray-haired person’ → *grauköpfig* ‘gray-haired’. Since—as we hope to show below—both (sub-)schemas are available, we prefer in what follows to adopt the flat representation in (10c) which strictly corresponds to the synthetic nature of these formations as they result from the simultaneous combination of the three morphemes involved. In fact, this constructional schema, which can straightforwardly be extended to German, is characterized by two open slots, one for adjectives and one for nouns, which can be simultaneously filled producing rich series of formations.

Elaborating further on this schema, the two slots can be conceived of as they can be filled freely by any adjective or noun. In the horizontal axis of Table 2 we list some formations featuring *hoch* as first constituent. The examples are taken from the 2-billion-token corpus DeWaC:

The nouns involved in the formations occurring along the horizontal axis of Table 2 have very different semantic features and *hoch* displays correspondingly different meaning nuances. We have abstract, uncountable nouns (*Adel* ‘nobility’, *Fieber* ‘fever’), abstract, countable nouns (*Grad* ‘degree’, *Karat* ‘carat’, *Klasse* ‘class’, *Level* ‘level’, *Oktan* ‘octane’) and concrete, countable nouns (*Geschoss* ‘floor’, *Hacke* ‘heel’, *Herz* ‘heart’). If we select one of these nouns, for example *Herz* ‘heart’, and look at the AN-*ig* formations in which it occurs along the vertical axis, we can observe a similar, long list of formations, one of which (*hochherzig* ‘generous-hearted’) is shared across this list and the former. In these formations, *Herz* ‘heart’ is never used in its proper, anatomic sense, but displays a metaphoric meaning as is revealed by the selection of adjectives indicating either properties referring to concrete objects (*eng* ‘narrow’, *groß* ‘big’, *halb* ‘half’, *hart* ‘hard’, *hoch* ‘high’, *kalt* ‘cold’, *klein* ‘small’, *leicht* ‘light’) or moral properties (*böse* ‘evil’, *edel* ‘noble’, *gut* ‘good’) both of which can be easily combined with the figurative meaning of *Herz*.-The examples in Table 2 show that the A and N slots in (10c) can be filled with many lexical

Stripping paradigmatic relations out of the syntax

Fig. 2 A constructional schema for the AN-*ig* formations



items, but they also exemplify the mutual selection preferences which characterizes the constituents of AN-*ig* formations. If an adjective like *hoch* is selected first, it narrows the possible filling of the N slot down to a range of nouns limited to those which are countable or, if not, to those which can be used with scalar sets of adjectives, as seen above. Conversely, if a noun like *Herz* is picked out first, it selects within the domain of adjectives like *böse* ‘evil’, *edel* ‘noble’, or *gut* ‘good’, etc. The mutual selection preferences observed uncover the presence of some kind of relation between the pairs of adjectives occurring in AN-*ig* formations. The schema in Fig. 2 is meant to express concretely the selection preferences emerging from the crisscrossing of paradigmatic and syntagmatic factors adopting the constructional approach seen in Sect. 2 above.

Note that in dependence of the access point selected, the two partially specified subschemas can be activated providing open variables respectively for nouns or adjectives. In Fig. 2 a peculiar role is played by the syntactic schema on the left side—in our examples this is implemented by the occurring noun phrases [[[*hoh-*]_{Adj°} -*es*]_{Adj'} [*Herz*]_{N°}]_{N'} and [[[*breit-*]_{Adj°} -*e*]_{Adj'} [*Krempe*]_{N°}]_{N'}—which is directly wired with the partially specified morphological schema accounting for the AN-*ig* formations and actually motivates *hochherzig* and *breitkrepig*. This relation is clearly syntagmatic as it refers to the co-occurrence of these nouns and adjectives in syntax. We will return to these syntagmatic relations in Sect. 7 below.

6 From syntagmatic relations to paradigmatic alternations

The possibility for adjectives and nouns to restrict their selection possibilities of, respectively, nouns and adjectives entering the AN-*ig* formations is a process that transfers syntagmatic preferences on the level of paradigmatic alternations. As seen above, both the nouns occurring in compounds featuring adjective *hoch* and the adjectives occurring in compounds featuring noun *Herz* can be grouped in sets of elements sharing some semantic property. Widening the scope beyond the examples of Table 2, with the help of data extracted from the sub-corpus DeWac-1 (about 90 million tokens) we can observe numerous series of AN-*ig* formations with common adjectives or common nouns which constitute partially instantiated constructional schemas. As far as adjectives are concerned, many of them can be further grouped together in antonymic pairs (11a) or in scalar sets (11b–c).

- 612 (11) a. *hoch-* ‘high’ ~ *niedrig-/nieder-* ‘low’; *breit-* ‘wide’ ~ *eng-* ‘narrow’;
613 *warm-* ‘warm’ ~ *kalt-* ‘cold’
614 b. *lang-, mittel-, kurz-, längerfristig* ‘of long, middle, short or longer term’
615 c. *groß-, mittel-, kleinkronig* ‘(of trees) with a huge, middle or small crown
616 of foliage’

617
618 We will discuss later in Sect. 7 the relations among groups of constructional schemas
619 with a filled A slot. Turning the attention to nouns, concrete nouns—sometimes used
620 in a metaphoric sense, see the example of *Herz* in Table 2 above—are common. The
621 adjectives used in these formations describe properties displayed by the actual refer-
622 ent rather than indicating a specific class of these objects, as in the following exam-
623 ples based on different concrete nouns:

- 624 (12) a. *Knochen* ‘bone’: *dürr-, stark-, schwerknochig* ‘of thin, strong, heavy
625 bones’
626 b. *Korn* ‘grain’: *fein-, grobkörnig* ‘fine-, rough-grained’
627

628 Measure nouns, which are characterized by being abstract and countable, are compat-
629 ible with a wider range of adjectives. It is worth noting that the use of the comparative
630 and of the superlative form of the adjective is possible and allows finer nuances as in
631 (13a):

- 632 (13) *Grad* ‘grade, degree’:
633 a. *hoch-, höher-, höchst-, mittel-, niedriggradig* ‘of high/higher/highest,
634 middle, low degree’
635 b. *erst-, drittgradig* ‘of first, third degree’
636 c. *verschiedengradig* ‘of different degrees’
637

638 Countable properties of some nouns occurring in the AN-*ig* formations are evident
639 in the examples in (13b–c) and are further exploited in the constructional schema in
640 (14), which is very productive in German and can be conceived as a subschema of
641 (10) above: e.g., *zehngradiges Bier* ‘beer having 10% alcohol content’:
642

- 643 (14) $[[X_i]_{\text{Num}} [Y_j]_{\text{N}} -ig]_A \leftrightarrow \text{provided with an amount of SEM}_i \text{ SEM}_j$

644 Countable nouns can occur in both schemas, which are thus intersected, as far as noun
645 constituents are concerned. Abstract nouns that fill the N slot of AN-*ig* formations can
646 build long series of formations. For example, inserting the noun *Farbe* ‘color’ in the
647 schema in (10) one can build mostly color adjectives like those in (15a):
648

- 649 (15) a. *beige-, grau-, orange-, sepiafarbig* ‘beige-/grey-/orange-/sepia-colored’
650 b. *hell-, dunkelfarbig* ‘light-/dark-colored’
651 c. *gleich-, anders-, vielfarbig* ‘of the same/another/many colors’
652

653 While in most cases $[X_i]_A$ is a color adjective as in (15a), the slot can be filled also by
654 adjectives indicating degrees of brightness (15b) or even similarity and variety (15c).

655 The high productivity of the partially instantiated subschema $[[X_i]_A [farb-]_{\text{N}} -ig]_A$
656 \leftrightarrow ‘having SEM_i color’, accompanied by the occurrence of the adjective *farbig*,
657 which facilitates the segmentation of the AN-*ig* formations but at the same time con-
658 veys the partially different meaning ‘colorful, full of colors’ (see fn. 4 for the similar

Stripping paradigmatic relations out of the syntax

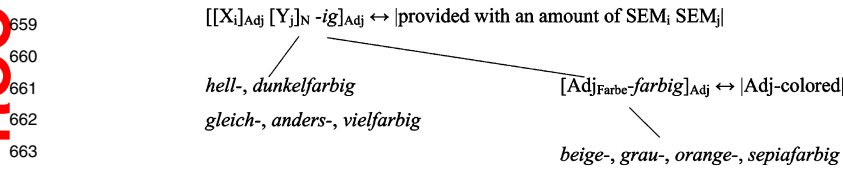


Fig. 3 A constructional schema for the semi-suffix *-farbig*

665
666
667 case of *stämmig*), favors its reanalysis in terms of a suffix-like unit resulting from
668 a process of grammaticalization. In fact, in the German-speaking literature, *-farbig*
669 has been treated as a suffixoid (cf. DWB 3:427, 499), or as a semi-affix (cf. Marchand
670 1969:356, Vögeding 1981, cf. the discussion in Fleischer and Barz 1992:27, 236, De-
671 croos and Leuschner 2008; Van Goethem 2008), stressing in particular the pattern-
672 restricted meaning displayed in the instantiated subschema as a whole. As will be
673 argued in Sect. 7 below, the main semantic effect connected with the semi-affix con-
674 sists in reducing the modifying nature of these determinative compounds, because
675 the first elements do not serve to sub-classify their respective heads as in normal
676 compounding; rather, the semi-affixes elaborate communicatively relevant categories
677 in paradigmatic terms enhancing the role of the first adjective with respect to the
678 head (cf. Eichinger 2000:98). In other terms, the relevant information provided by
679 the formation *orangefarbig* in the NP *ein orangefarbiges Hemd* ‘an orange-colored
680 shirt’ is the strict relation expressed between *orange* and *Hemd* rather than the sub-
681 classification of *farbig* by means of *orange*, which makes it similar to a true adjectival
682 suffix such as *-ern* in the NP *ein hölzerner Nachttisch* ‘a wooden nightstand’.

683 The constructional schema in Fig. 3 results from the partial elaboration of the
684 general schema in Fig. 2 accommodating on its right side the semi-suffix *-farbig* as it
685 systematically selects color adjectives.

686 It has to be added that this is not the only candidate for such a treatment that can
687 be found in the data, and we can speak in fact of a general process of semi-suffixation
688 involving a number of possible candidates. It is important to stress the developmental
689 perspective adopted in the discussion of these phenomena of semi-suffixation because
690 the latter can only be properly accommodated in the general frame of an emergent
691 grammar, as it is commonly understood in the construction-grammatical approach as
692 well as in grammaticalization studies, cf. respectively Bybee (2013) and Hopper and
693 Traugott (2003:35).

694 If we look at the N slot of AN-*ig* formations, nouns like *Sprache* ‘language’ and
695 *Stamm* ‘root’ also contribute to build complex adjectives indicating language and
696 national or ethnic groups, as shown by the examples respectively in (16a–b):

- 697
698 (16) a. *albanisch-sprachigl-stämmig*, *deutsch-sprachigl-stämmig* ‘of Alba-
699 nian, German language/roots’
700 b. *jiddischsprachig* ‘of Yiddisch language’ ~ *jüdischstämmig* ‘of Jewish
701 roots’
702 c. *gleich-/verschiedenssprachig* ‘of the same/a different language’

703 Compounds displaying the nouns *Sprache* or *Stamm* are numerous: we count more
704 than 80 adjectives indicating ethnonyms connected with one or both of them. It is
705

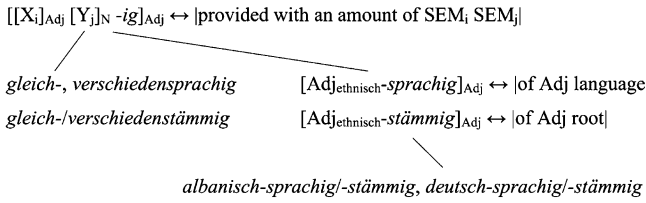


Fig. 4 A constructional schema for the semi-suffixes *-sprachig* and *-stämmig*

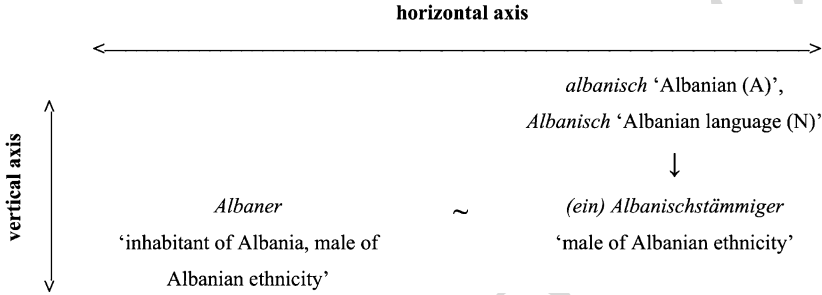


Fig. 5 Horizontal and vertical axes in compounding

worth noting that *-sprachig* and *-stämmig* occur with the same ethnonyms, while cases like (16b), in which an adjective specifically indicates a language and another one indicates the ethnic group membership, are rather an exception. As in the case of *-farbig* also more general adjectives are compatible with the subschema, as shown by the examples in (16c). Figure 4 expresses in the usual constructional terms the status of semi-suffixes of *-sprachig* and *-stämmig* resulting as a partial elaboration of the general schemas shown in Fig. 2 above.

The rise of partially instantiated schemas like *-farbig*, *-sprachig* and *-stämmig* makes both the vertical and the horizontal axis of paradigmatic relations accessible to these subschemas which, as said, are often conceived as almost derivational processes: they can in principle alternate or compete with other derivational strategies.

For example, *-sprachig* and *-stämmig*, which are applied to adjectives indicating ethnic/national membership, can belong to both the vertical and horizontal axis of a paradigm in which other processes related to ethnic or national membership occur, for example forming nouns of inhabitants, as visualized in Fig. 5.

This example shows once again that also products of compounding can be included in a derivational paradigm. Obviously, compounding processes tend to display a richer intensionality, which correspondingly allows one to carve out a narrower and precise meaning, as we can see in the examples in Fig. 5: *(ein) Albanischstämmiger* refers to a ‘male of Albanian ethnicity’ while its competitor *Albaner*, which is derived from *Albanien* ‘Albania’ through derivation via the *-er* suffix, has a broader meaning, which includes a more general sense ‘inhabitant of Albania’.

While—in the perspective opened by grammaticalization—compounding is generally a source of new suffixes resulting from grammaticalization processes (as shown for example by cases like *-heit*, *-lich* and *-los*, which occur respectively in *Schönheit*

Stripping paradigmatic relations out of the syntax

753 'beauty', *freundlich* 'friendly' and *bedeutungslos* 'meaningless' and go back to the
754 older lexemes *heit* 'figure', *lich* 'body' and *lös* 'loose'), it can also participate to some
755 extent to existing derivational paradigms. In the next section, we will evaluate how
756 paradigms specific to compounding can rise and how they are enriched and struc-
757 tured.

760 7 Paradigm families in compounding

761 Even if *-farbig*, *-sprachig* and *-stämmig* can be conceived as semi-suffixes, in the
762 relevant compounds the semantic scope of the adjective in the A slot is always on
763 the noun and does not expand over the full *-N-ig* part of the schema. Thus, *orange-*
764 *farbig* 'having an orange color', *albanisch-stämmig* 'of Albanian roots' do not mean,
765 respectively, 'orange-colorful' and 'Albanian-vigorous'.⁵

766 The meaning of the adjectives occurring in AN-*ig* formations corresponds to the
767 meaning of the corresponding adjective noun sequences:

769 (17) *feinkörnig* 'fine-grained' \approx *feines Korn* 'fine grain'

770
771 In this example, *fein* qualifies grains (*Korn*) as 'fine' as in the corresponding AN
772 phrase. More in general, the adjectives in AN-*ig* formations display a non-classifying,
773 qualifying function (cf. Schlücker 2013), which essentially differs from the more
774 usual classifying function generally displayed by modifiers in compounds, including
775 AN compounds:

776 (18) a. *Süßkartoffel* 'sweet potato (type of vegetable, *Ipomoea batatas*)'
777 b. *süße Kartoffel* 'sweet potato (a potato which tastes sweet)'

778
779 In (18a) *süß* has a classifying function insofar as it serves as a label for identifying a
780 specific kind of vegetable (properly not a kind of potato). Even if the adjective 'sweet'
781 is used because this kind of vegetables is in general sweet, it does not mean that a
782 specific item of this species is necessarily sweet: *Süßkartoffel* may have a bitter taste,
783 which does not imply renaming that item as **Bitterkartoffel*. The qualifying function
784 of adjectives in AN-*ig* formations complies with the usual function of adjectives in
785 syntax and suggests the need of checking to what extent the syntagmatic relation
786 already evoked above between specific adjectives and nouns plays a role in motivating
787 the formations attested in the corpus.

788 In some cases, the frequency of AN-*ig* formations mirrors that of the correspond-
789 ing AN phrases. In Table 3 the parallel decrease in frequency of A-*sprachig* com-
790 pounds and their [A *Sprache*]_{NP} correspondents taken from a 90-million-token sub-
791 corpus of DeWaC is reported:

792 More importantly, of 62 pairs of ethnic adjective and *-sprachig* attested in AN-*ig*
793 formations in the subcorpus, 60 are attested as AN phrases in the whole DeWaC.

794 It must be added that not always the AN-*ig* formations directly mirror the syntac-
795 tic use of their corresponding AN phrases. We have already encountered the com-
796 pounds *hoch-* and *niedriggradig* 'of high/low degree'. They correspond to phrases
797

798 ⁵The derivative *stämmig*, from *Stamm* 'root', exists, but means in fact 'strong, vigorous, athletic'.

Table 3 AN-ig formations and their corresponding AN phrases

| AN-ig formation | Frequency | Corresponding AN phrase | Frequency |
|----------------------------|-----------|-----------------------------|-----------|
| <i>deutschsprachig</i> | 1697 | <i>deutsche Sprache</i> | 1214 |
| <i>französischsprachig</i> | 62 | <i>französische Sprache</i> | 137 |
| <i>türkischsprachig</i> | 29 | <i>türkische Sprache</i> | 48 |
| <i>jiddischsprachig</i> | 1 | <i>jiddische Sprache</i> | 8 |

like *hoher Grad*, *niedriger Grad*. It is worth noting that the NP built on the lemmas *hoch* and *Grad* in the whole DeWaC corpus is almost a hundred times more frequent than the NP built on *niedrig* and *Grad* (2124 vs. 26 occurrences) and this is reflected by the even higher difference of the token frequency of the corresponding compounds (*hochgradig*:5515; *niedriggradig*:19). In other words, the frequently attested NP formed with *hoch* and *Grad* licenses the compound *hochgradig*, and it is the associative relation of the antonyms *hoch* and *niedrig* that makes the formation of *niedriggradig* available rather than the NP formed with *niedrig* and *Grad* which displays a low token frequency. An associative relation in syntax is thus transferred to a compound creating an associative relation—a small paradigm—in compounding. This small paradigm is based on the alternation of the two adjectives *hoch* and *niedrig* which fill the A slot of the general AN-ig constructional schema and can be further expanded, as we will see below.

Furthermore, relations established on the syntagmatic level do not only affect the A slot, but also the N slot. Let's take for instance the pair of formations *hoch-* and *niedrigohmig* 'of high/low Ohm-value'. In contrast with the case of *hoch-* and *niedriggradig*, the phrases *hohes Ohm* and *niedriges Ohm* are not attested at all. However, in its syntactic use we can find the noun *Ohm*—which is the measure unit of electrical resistance (Ω)—preceded by a numeral:

- (19) *die aktiven [Terminatoren] werden mit einer Spannung von 2,85 V versorgt und besitzen einen Widerstand von 110 Ohm*
'the active terminators are supplied with a voltage of 2.85 V and display a resistance of 110 Ω '

Since they express a measure unit and strongly depend on the context, different numerical quantities correspond to what is a high or low Ohm-value. Therefore, similar to a *zehngradiges Bier* which is also a *hochgradiges Bier*, a value of electrical resistance can be *hoch* or *nieder-/niedrigohmig*⁶:

- (20) *Die Entgegenhaltung nutzt damit für ihre Füllstandsüberwachung nicht nur den niederohmigen Widerstandsbereich einerseits und den hochohmigen Widerstandsbereich andererseits*

'Thus, the anticipation not only exploits for the monitoring of the filling level the low ohm resistance range on the one hand and the high ohm resistance range on the other'

⁶The adjective *niedrig* is properly a derivative of the adverb *nieder* 'low' and the latter often occurs in alternation with the former in AN-ig formations.

Stripping paradigmatic relations out of the syntax

It is thus possible to identify a paradigm of partially instantiated constructional schemas, like that in (21), in which the free slot can be filled by nouns characterized by the property of being countable measure units:

- (21) $[hoch-[X_i]_{N-ig}]_A \leftrightarrow |provided\ with\ a\ high\ SEM_i| \sim [niedrig-[X_i]_{N-ig}]_A \leftrightarrow |provided\ with\ a\ low\ SEM_i|$

Consequently, beyond the relation between AN-*ig* formations and the corresponding AN phrases, a partially instantiated constructional schema can be enriched with paradigmatic alternatives independently of the occurrence of AN phrases motivating them in syntax.

Turning again our attention to the A slot, we can see that also in this case paradigmatic alternatives can be expanded without recurring to relations established at the syntactic level.

The paradigm in (21) is not unique and a number of other pairs of antonyms can occur in the A slot. In (22a) and (22b) two further paradigm families are listed and some examples are provided respectively in (22c) and (22d):

- (22) a. $[gro\beta-[X_i]_{N-ig}]_A \leftrightarrow |provided\ with\ a\ big\ SEM_i| \sim [klein-[X_i]_{N-ig}]_A \leftrightarrow |provided\ with\ a\ small\ SEM_i|$
b. $[lang-[X_i]_{N-ig}]_A \leftrightarrow |provided\ with\ a\ big\ SEM_i| \sim [kurz-[X_i]_{N-ig}]_A \leftrightarrow |provided\ with\ a\ small\ SEM_i|$
c. *gro\betakronig* ‘having a large crown of foliage’ \sim *kleinkronig* ‘having a small crown of foliage’
d. *langwellige Strahlung* ‘long-wave radiation’ \sim *kurzwellige Strahlung* ‘short-wave radiation’

In the specific case of the examples in (22d), they can actually be derived by two existing AN compounds, *Langwelle* and *Kurzwele* which indicate radiations belonging to two different ranges of frequencies—respectively 30 to 300 KHz and 3 to 30 MHz. A third range of frequencies—from 300 KHz to 3000 KHz (i.e. 3 MHz)—corresponds to the term *Mittelwelle*, a compound⁷ which in fact shows the highly productive use of *Mittel-* as first constituent in nominal compounds, as shown by the schema in (23a) and the relevant examples in (23b) below:

- (23) a. $[Mittel-[X_i]_{N}]_N \leftrightarrow |middle\ SEM_i|$
b. *Mittelalter* ‘the Middle Ages’, *Mittelpunkt* ‘central point’, *Mittelmeer* ‘Mediterranean’, *Mittelfeld* ‘middle field’, *Mittelklasse* ‘mid-range, middle class’, *Mittelstufe* ‘middle school’, *Mittelwelle* ‘medium frequency’

⁷At first sight, *Mittel-* in *Mittelwelle* might be connected either with the adjective *mittel* ‘neither good or bad, average’ or with the noun *Mittel* which can refer to ‘means, resources, remedy’ or to ‘middle value’, and in this latter meaning is related to the adjective (and historically derived from it). However, for the compounds in (23) the association with the adjective is preferable in the light of other compounds which clearly select the noun *Mittel* ‘mean’ such as *Mittelbestand* ‘funds, lit. stock of resources’, *Mittelbedarf* ‘resource needs’, etc.

Table 4 Paradigm families on the basis of the AN-ig pattern

| | | |
|---|---|--|
| [hoch-[X _i] _{N-ig}] _A ↔ provided with a high SEM _i | [groß-[X _i] _{N-ig}] _A ↔ provided with a big SEM _i | [lang-[X _i] _{N-ig}] _A ↔ provided with a long SEM _i |
| [mittel-[X _i] _{N-ig}] _A ↔ provided with an average amount of SEM _i | | |
| [niedrig-[X _i] _{N-ig}] _A ↔ provided with a low SEM _i | [klein-[X _i] _{N-ig}] _A ↔ provided with a small SEM _i | [kurz-[X _i] _{N-ig}] _A ↔ provided with a short SEM _i |

Some of the examples in (23b) has a counterpart in an AN-ig formation as shown by the examples in (24a) below, but many other instantiations without a NN compound as counterpart are also attested as shown by (24b):

- (24) a. *mittelaltrig* ‘related to the Middle Ages’,⁸ *mittelklassig* ‘of mid-range; related to middle class’, *mittelwellig* ‘related to medium frequencies’
b. *mittelformatig* ‘of middle format’, *mittelgradig* ‘of middle degree/grade’, *mittelkettig* ‘of middle chain’, *mittelohmig* ‘of middle Ohm-value’, *mittelrangig* ‘of middle rank’, *mitteltonig* ‘of mean tone’

The latter constitute instantiations of another schema in which *mittel-* fills the first slot:

- (25) [mittel-[X_i]_{N-ig}]_A ↔ |provided with an average amount of SEM_i|

This schema, which lacks any relation with the syntactic level, has rather arisen in the realm of compounding (see also the conflation schema in (10a) above). It perfectly fits in the paradigms in (21) and (22a–b) above and constitutes a third process available for building AN-ig formations as summarized by Table 4.

8 Conclusion

To sum up, in this contribution we hope to have shown how paradigmatic word formation looks like with special attention paid to compounding. Štekauer’s idea of a horizontal and a vertical axis proved very useful for identifying concrete paradigmatic or associative relations with the help of large text corpora. In this regard, exploiting schemas connected by means of inheritance relations which give rise to partially filled subschemas as is commonly assumed in Booij’s Construction Morphology has helped us to represent paradigm families reflecting direct connections between what results from word formation proper and what is the instantiation of syntactic constructions. Accordingly, we have shown how syntagmatic and paradigmatic relations developed in syntax find their way into word formation which inherits and further expands such relations in an autonomous way. Furthermore, the most productive schemas may end up in constituting semi-affixations which are in turn a first step toward derivation proper. In particular, we have been able to identify on the one hand different processes of semi-suffixation involving subdomains of the lexicon curtailing well-defined input bases (color and ethnic adjectives), and on the other a whole

⁸More commonly the adjective derived for *Mittelalter* ‘the Middle Ages’ is *mittelalterlich*.

941 paradigmatic set of relations giving rise to contrasts like *mittelwellig* vs. *mittelgradig*
942 where the latter displays purely paradigmatic meaning. In this sense, paradigmatic re-
943 lations in word formation are the initial stage of a grammaticalization cline in which
944 such relations are looser in compounding and become tighter in derivation. This pro-
945 cessual conception fits in very well with an emergentist view of grammar couched
946 within a usage-based approach as is commonly assumed in Construction Grammar.

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