

# Modeling polyfunctional word formation patterns. A Construction Morphology account of adjectival derivation in the history of German

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*This article presents an account for modeling word formation patterns, more precisely: the functional spectrum of a given pattern. The model presented here is placed within the framework of Construction Morphology (Booij 2007a, 2007b, 2010, 2013) and elaborates inheritance hierarchies of the type designed by Riehemann (1998, 2001). While the paper focuses on adjectival suffixation in Early New High German and 20<sup>th</sup> century German, the account is expected to be, in principle, transferable to adjectival word formation patterns in other languages.*

**Keywords:** *derivation, affix polysemy, German, adjective, Construction Grammar, Construction Morphology*

## 1. Introduction

The research presented here derives from my dissertation on adjectival word formation in the history of German (Kempf 2016). The study aims to draw a coherent picture of word formation change from EARLY NEW HIGH GERMAN (ENHG) to NEW HIGH GERMAN (NHG)<sup>1</sup> with a special focus on the three most dominant suffixation patterns, *-lich*, *-ig*, and *-isch* (cognates to English *-ly*, *-y*, and *-ish*).<sup>2</sup> The monograph combines a new corpus study with the results of previous empirical works.<sup>3</sup> It contrasts the ENHG vs. NHG functional range of each pattern, mainly using the empirical findings of Thomas (2002) and Kühnhold et al. (1978). Based on comprehensive corpora of Nürnberg ENHG around the year 1500 and standard written German of the 20<sup>th</sup> century, respectively, both monographs offer in depth functional analyses of the relevant patterns for each period. As these works focus on data analysis, it does not lie within their scope to develop a theory for modeling word formation patterns. However, in order to fully understand the functionality of a derivational pattern, a suitable model is needed. For one thing, we need a clear idea of (or at least some thorough reflection on) how a “pattern” is to be conceived of, and how it is assumed to be linked with other aspects of grammatical knowledge. For another, we need tools to capture the synchronic functionality of a pattern adequately, so as to compare it to other patterns as well as to other periods.

In this paper, I will sketch an extended Construction Morphology account to achieve these ends. After a more detailed description of the data and the problem in §2, I will turn to reviewing the state of research (§3). Section 4 will introduce and flesh out the account and also discuss its advantages and its current limits, while §5 gives a conclusion as well as an outlook on future perspectives.

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<sup>1</sup> These periods range from 1350–1650 and 1650 to the present day, respectively.

<sup>2</sup> The term *pattern* here is used to refer to the entire derivation involving a particular affix. Below, this notion will be anchored theoretically.

<sup>3</sup> Goetze (1899), Flury (1964), Kühnhold et al. (1978), Bentzinger (1987, 1992), Ros (1992), Winkler (1995), Pounder (2000), Thomas (2002), Klein et al. (2009), Ganslmayer (2012).

## 2. The data and the problem

### 2.1. Adjective formation: a challenge to theory building

Adjective formation constitutes an often neglected, yet worthwhile challenge to theory building. Adjectives may be perceived as a “third string” among the three main parts of speech (i.e. nouns, verbs, and adjectives), as displaying little character of their own, or as living in the wake of nouns (Eichinger 2007: 113). In present day German, there are but a few hundred primary adjectives (Trost 2006: 215; Eichinger 2009: 150). This, however, makes for an excellent breeding ground for word formation: the realm of adjectives offers a high density of secondary words and of competing word formation patterns. Competition is traditionally recognized as one of the primal problems of word formation theory.

Another notorious problem for theory building is affix polysemy. This phenomenon, too, is found abundantly in adjectival word formation. Even though some suffixes are considered monofunctional (e.g. *-en* (*wooden*), *-able* (*downloadable*), *-less* (*frameless*)), a great many adjectival suffixes are highly polysemous or fuzzy in meaning, e.g. *-y* (*hairy* ‘with X’, *sleepy* ‘inclined to X-ing’, *booky* ‘addicted to X’, *bushy* ‘like X’, etc.) or *-al* (*intentional* ‘with X’, *architectural* ‘about X, concerning X’). This has to do with a core characteristic of the word class: as a dependent part of speech (Trost 2006: 5), an adjective generally occurs together with the word it modifies – henceforth called the COLLOCATOR (adapting Ganslmayer’s 2012: 116 term *Kollokator*).<sup>4</sup> Therefore, adjectives can afford to be, and very often are, semantically underspecified (Trost 2006: 402). The exact reading of the adjective then crystallizes in context. This holds as well, in fact even more, for adjectival suffixes. The next section gives an example of a highly polysemous ENHG suffix.

### 2.2. Case example ENHG *-lich*-derivation

The adjective forming suffix *-lich* has, since at least Old High German times, occurred in quite a number of different functions. Even tokens involving the same base can display different derivational functions. Consider the ENHG examples in (1) and (2), taken from Thomas (2002: 413, 367).

- (1) Darumb ist das Vatter vnser ein solches Gebet/ das niemandt/  
Therefore is the Father our a such prayer/that nobody/  
denn Gott selb/ auß seiner **Göttlichen** weyßheytt/ hat können/  
but God self/ out.of his divine wisdom/ has can/  
so mit wenig worten fassen  
so with few words grasp  
‘Therefore, Our Father is a prayer that no one but God himself, out of his divine wisdom, could have put so concisely.’

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<sup>4</sup> In the prototypical case, the collocator is a noun. However, in the language under survey, 14<sup>th</sup> century to present day German, the collocator can be a different part of speech, e.g. a verb, since the formal differentiation between adverbs and adjectives has (by and large) ceased during the ENHG period (cf. Paraschkehoff 1974: 290; Winkler 1995: 67, 388–394; Kempf 2016: §4.2.2.1).

- (2) Awff solchs will ich mit **gotlicher** hylff daz wenig, so jch  
 Onto such will I with godly help the little, so I  
 gelernt hab, antzeigen, wÿ woll solchs jr vill  
 learned have, indicate, how well such you.PL much  
 verachten werden  
 despise will  
 ‘Therefore, I will, with the help of God, indicate the few things I have learned, albeit you are going to despise such things a lot.’

In discussing these examples, I will apply roughly the functional terminology that is, with some variation, used throughout most of the relevant empirical studies.<sup>5</sup> The derivation in example (1) is analyzed by Thomas (2002: 413) as denoting an ‘affiliation’: the concept of the collocator (‘wisdom’) is affiliated with the concept of the base (‘God’). In example (2), a ‘source’ relation is expressed: the concept of the collocator (‘help’) comes from the base concept, ‘God’. The difference is subtle, but noticeable.

Besides ‘source’ and ‘affiliation’, there are many more functions to be found. Thomas (2002: 451) actually lists 26 different functions of *-lich* that are attested in her ENHG corpus. To give a full, yet comprehensible impression of the spectrum, a simplified version of her findings is displayed in Table 1.

Table 1: Functional spectrum of ENHG *-lich*-derivation

example	literal translation	meaning	word formation function
<i>gotlich hylff</i>	God-ly help	‘divine help’	‘source’
<i>Göttliche weyßheytt</i>	God-ly wisdom	‘divine wisdom’	‘affiliation’
<i>fridliche Zeiten</i>	peace-ly times	‘peaceful times’	‘possessive’
<i>geferlich fewer</i>	danger-ly fire	‘dangerous fire’	‘causative’
<i>christliche tugent</i>	Christian-ly virtue	‘Christian virtue’	‘corresponding’
<i>bruderliche liebe</i>	brother-ly love	‘brotherly love’	‘comparative’
<i>kristlich Man</i>	Christian-ly man	‘Christian man’	‘identificational’
<i>peulich arbeyt</i>	construction-ly work	‘construction work’	‘limitative’
<i>rufelicher stymmen</i>	shout-ly voice	‘shouting voice’	‘active’
<i>merckliche Mühe</i>	notice-ly effort	‘noticeable effort’	‘passive’
<i>vleissiglichen suchen</i>	diligent-ly searching	‘diligent searching’	[≈adverbial, back into attributive use, see §4]
<i>clerlichen worte</i>	clear-ly words	‘clear words’	‘pleonastic’

<sup>5</sup> Kühnhold et al. (1978), Bentzinger (1987, 1992), Winkler (1995), Thomas (2002), Klein et al. (2009), Ganslmayer (2012), see the latter (2012: 1123–1127) for a synopsis of the exact terminologies.

Perhaps, one could declare this compilation a portrait of the ENHG *-lich*-derivation. But, of course, simply listing “all functions” is rather unsatisfactory. The next sub-section discusses some problems with this approach and sketches what is needed in order to advance it.

### 2.3. Problems with listing functions and requirements for an adequate model

When working with a simple list, for one thing, the relations that hold between the various functions remain unclear. Obviously, some are more similar than others e.g. ‘source’ and ‘affiliation’ are closer to each other than to the ‘passive’ function. This proximity is reflected by the multiple membership of individual derivatives, e.g. *gött-lich* ‘divine’ → ‘source’ and ‘affiliation’; *christ-lich* ‘Christian’ → ‘corresponding’ and ‘identificational’ etc. Due to their similarity, one might feel tempted to simply merge the respective categories. However, multiple memberships of different derivatives do by no means fully conform. Instead, different derivatives suggest different mergers (e.g. ENHG *kunig-lich*, ‘royal’ can display the functions ‘affiliation’ and ‘identificational’). Thus, when merging categories, it is hard to tell where to begin and where to stop. Many functions may appear similar, but in the end, there’s the risk of obliterating differentiations that do matter. Which functions are worthwhile maintaining, and which are not? This also links to the problem of granularity (cf. Lieber 2004: 6–7, 10): how fine- or coarse-grained should the categories be?

One other problem with listing “affix functions” (if viewed as such) is the risk of attributing too much meaning to the affix. For instance, in some analyses, categories like ‘local’ or ‘temporal’ are found in the functional taxonomy. Yet both functions turn out to only operate with time or place designations, respectively (e.g. ENHG *anfeng-lich* ‘initial’, lit. ‘beginning-ly’, analyzed by Thomas 2002: 401 as *-lich*<sub>ij</sub>: ‘modal<sub>temporal</sub>’). Since the ‘local’ and ‘temporal’ meanings clearly stem from the bases, it is debatable whether or not the functions should be included in the description of the pattern.

What is called for is a model that can handle the wide functional spectra of derivational patterns like ENHG *-lich* and plot them in a way that allows for inter-affix as well as diachronic comparison. Also, the model should help us gain a better understanding of how the affix itself, the base, and the context contribute to the emergence of the relevant functions.

## 3. State of research

A number of relevant publications approach the issue of modeling the functionality of (adjectival) derivational patterns. Naturally, not all are equally suited to the present purposes. In this section, I will briefly discuss three theoretical approaches, starting out with Lieber’s (2004) seminal work on *Morphology and Lexical Semantics*. As the title suggests, word formation is seen as embedded in the lexicon. Derivational affixes are modeled as items of the lexicon, having their own, albeit often very abstract meaning. This meaning is rendered by semantic “atoms”, in fact the same ones that occur in the lexical entries of unbound morphemes as well. The theory is fleshed out using examples from present day English. Sadly, it touches upon adjective formation only very marginally. For the entries of the highly polysemous suffixes *-ic* (*dramatic*), *-ary* (*visionary*), *-ive* (*attractive*), *-al* (*architectural*), *-ous* (*poisonous*), and *-y* (*sleepy*), only one semantic feature is assigned: [–dynamic], indicating a ‘state’ (Lieber 2004: 39–40). The wide functional spectra of these patterns are thus handled by using a parsimonious, underspecified lexical entry. The rest of the meaning is assumed to

stem from the base and the context. This account is fully compatible with empirical findings; however, it fails to capture functional differences between the patterns. While polysemous affixes typically do show some functional overlap, they still each have their core areas. These specific functional profiles are not represented in Lieber's parsimonious, identical entries.

A quite different approach is taken in Pounder's (2000) *Processes and paradigms in word-formation morphology*. The extensive monograph examines denominal adjective derivation in 16<sup>th</sup> to 18<sup>th</sup> century German, based mainly on historical dictionaries. The work also comprises a discussion of theoretical issues. One basic assumption is that morphology constitutes a separate component in grammar (albeit "the existence of a morphological component [...] can only be stipulated", Pounder 2000: 35). Also, Pounder (2000: 50–52) puts forward the view that form and meaning in morphology must be separated. Accordingly, she uses a triple perspective approach: the data of each sub-period are presented onomasiologically, semasiologically, as well as from the perspective of base categories (such as 'substances' or 'animal designations'). Thus, for each function (e.g. WITH('X') as in *salty*), each affix (e.g. *-ig*, the cognate of English *-y*) and each base category, paradigms are provided, listing whatever operations they occur in. We learn, for instance, that 16<sup>th</sup> century *-ig* occurs in the functions LIKE('X'), WITH('X'), and OF('X'), in each case involving certain base categories, such as 'substances' in the function WITH('X'), cf. *schleim-ig* 'slimy' (Pounder 2000: 193–194, 220).

This way, the monograph is highly informative in all three perspectives. For the present account, which is primarily concerned with the affix perspective, the relevant data have been extracted from Pounder's (2000) comprehensive work. What we end up with, is still a sort of a list, but with a few advantages over a list like in Table 1. One of the merits is the functional taxonomy (WITH('X') etc., see also §4), which has been developed on the basis of cross-linguistic data (Pounder 2000: 109–122). It is designed more coarsely than the inventory usually used in analyses of German adjectival derivation (cf. footnote 5). Conveniently, Pounder's functional terms match the traditional terms fairly well: they can be utilized as macro-classes each of which incorporates one, two or more of the traditional terms. For example, 'corresponding' and 'comparative' can be subsumed under the functional macro-class LIKE('X'). This does not necessarily entail doing away with the traditional terms. Instead, both levels of functional category can be retained. Thus, we express the similarities between the functions in question, without fusing them altogether. In deciding "where to begin and where to stop" combining functions, Pounder's (2000) cross-linguistically tested categories have proven helpful.

Another merit of Pounder's (2000) approach is that it reveals what base categories any given function occurs with. We are thus one step closer to understanding the semantic contributions of the bases to the word formation functions in question. However, there is still no systematic way of accounting for the semantic contribution of the collocator (cf. the difference between (1) vs. (2)). To grasp the emergence of derivational meaning we need a model that connects affixes, bases, and collocators. This can at the same time be a first step towards understanding the place of word formation in grammar.

For this purpose, a CONSTRUCTION GRAMMAR (CxG) account is particularly well suited. CxG does not view language as subdivided into separate modules such as lexicon or syntax. Instead, linguistic knowledge is conceived of as a network of conventionalized form–meaning pairs (Ziem & Lasch 2012: VI, Goldberg 2003: 219). This network, the CONSTRUCTICON, forms a continuum of lexicon and grammar. It contains CONSTRUCTIONS that range in size from words to phrases, sentences, or even larger units. Irrespective of their size,

they also vary in abstractness: they can be completely or partially lexically filled or completely abstract (cf. Goldberg 2013: 17). Unfilled as well as partially filled constructions are referred to as SCHEMATA. As for word-sized constructions, examples are given in (3).

- |     |    |              |   |
|-----|----|--------------|---|
| (3) | a. | <i>dirty</i> | completely filled word-sized construction                       |
|     | b. | N-y          | partially filled word-sized construction (schema)               |
|     | c. | N+N          | unfilled (completely abstract) word-sized construction (schema) |

The branch of CxG that concerns itself with word formation, as advanced by Booij (2007a, 2007b, 2010, 2013) is called CONSTRUCTION MORPHOLOGY. The core ideas have been laid out already in the late nineties in a publication by Riehemann (1998). In Construction Morphology, word-sized constructions such as in (3) are the central unit of investigation. Affixes are conceived of as parts of complex words or of derivational schemata.

Complex words, in this account, are of vital importance. Word formation schemata do not exist separately from complex words. Rather, they are the result of how language users “generalize over sets of existing complex words with a systematic correlation between form and meaning.” (Booij 2010: 34). Schemata primarily serve the function of structuring the lexicon (the constructicon). They are cognitive shortcuts that “express predictable properties of existing complex words” (Booij 2010: 4) or phrases, and they help parsing the constructions we perceive. It is only a secondary effect, that schemata are used for creating new words. As Riehemann (1998: 67) puts it, “[s]peakers use their knowledge of learned patterns to form new exemplars. It is not necessary to have a separate lexical rule mechanism for this purpose”. Due to the vital role of existing complex words, Riehemann (1998) originally named her account, quite descriptively TYPE BASED DERIVATIONAL MORPHOLOGY.

Derivational schemata specify phonological, morphological, and semantic aspects of the set of complex words they generalize over (Booij 2010: 1–11). Consider as an example the adjective forming *-bar*-derivation in German: Quite similar to the English *V-able* schema, it forms words like *falt-bar* ‘foldable’, *erkenn-bar* ‘recognizable’, etc. Riehemann (2001: 261) describes the schema of the default *-bar*-derivation as follows,

*In the proposed approach, there is a schema expressing the fact that there is a class of words, ending in the suffix -bar, that have transitive verbs as their morphological basis. It also states how the syntax and semantics of the verb relate to that of the adjective. For example, the accusative object of the verb [e.g. (to fold) a container] is linked with the subject of the adjective [foldable container], and the semantics of the verb reappears within the scope of the possibility operator in the semantics of the adjective.*

Having established how schemata come about and what they contain, there is one more important concept to touch upon: how schemata are organized in the constructicon. Just like in other spheres of CxG, e.g. syntactic constructions, word formation schemata are assumed to be organized in large networks. These networks can be conceived of as multiple inheritance hierarchies that stretch from specific and concrete constructions at the bottom up to a general and abstract top level. To briefly illustrate the idea, Figure 1 shows a simplified version of how Riehemann (1998: 64) designs the inheritance hierarchy involving NHG *-bar* derivation.

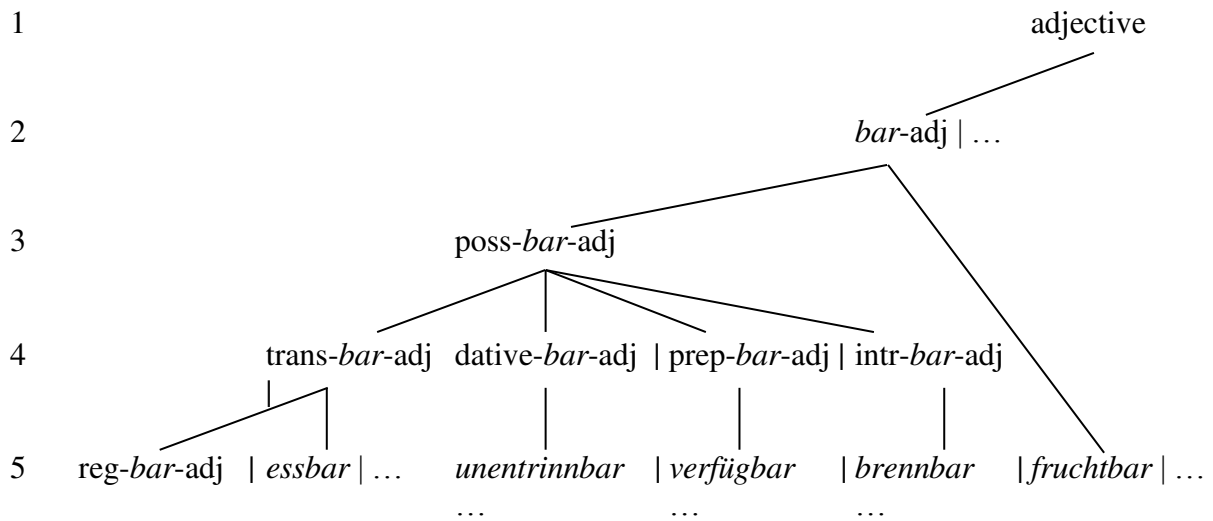


Figure 1: Simplified version of Riehemann’s (1998: 64) inheritance hierarchy of NHG *-bar-*derivation

While the topmost level only bears the abstract information ‘adjective’, the lower levels become increasingly more specific: the general schema for *-bar-*adjectives is split between those denoting a possibility (level 3) and lexicalized ones such as *frucht-bar* ‘fruitful’, that don’t. Level 4 distinguishes between various base verbs, including the typical case of a plain transitive verb. Level 5 includes “reg[ular]-*bar-adj*”, the prototypical schema that has been described above, and a number of other cases, that each comprise only a few similarly structured derivatives (e.g. *brenn-bar* ‘flammable’ and a few other *-bar-*adjectives are derived from an intransitive verb: *brennen* ‘to burn<sub>INTR</sub>’).

In hierarchies of this kind, the properties of a higher schema (e.g. ‘adjective of possibility’ in level 3) are inherited down to all lower subschemas. As to whether this inheritance is strictly monotonic, there are differing views in the branches of CxG. Riehemann (1998: 72), with an HPSG background, pleads for monotonic inheritance in which “no information specified at a higher level can be overridden by more specific information lower in the hierarchy”. Goldberg (2013: 21–22) and Booij (2010: 27), on the other hand, advocate default inheritance, which can be overridden in specific cases.

As can be concluded from Figure 1, the NHG *-bar-*derivation constitutes a case with little to no polysemy. The base verbs vary morphosyntactically, but the derivational function is, apart from the lexicalized derivatives, always that of ‘possibility’. The following section will explore the utility of the model with respect to more complex patterns and also to diachronic comparison. The term *pattern* can now be theory-internally defined as the entirety of constructions in a word formation hierarchy.

#### 4. An extended Construction Morphology account

##### 4.1. Elaborating a CxG hierarchy for the complex case of ENHG *-lich-*derivation

The ENHG *-lich-*derivation, as outlined above, shows a wide functional spectrum. Instead of listing functions we can arrange fine- and coarse-grained functions in a structured manner. As described above, schemata arise in bottom-up processes as generalizations over complex words. Over groups of similar schemata, further generalizations can be made – resulting in a

multi-level hierarchy. By using multiple levels of a CxG inheritance hierarchy, we can account for very subtle differences and yet gain a general picture. This serves, at first, as a descriptive tool. At the same time, CxG inheritance hierarchies can serve as models of representations in the speaker's mind.

It must be emphasized though, that the hierarchies suggested below cannot be expected to be cognitively real exactly the way they are shown. First of all, they are based on linguistic data and thus are limited to circumstances that can be concluded from the data. Second, they are simplifications in that they are two-dimensional, whereas mental connections can be conceived of as multidimensional networks. The hierarchies would be tiny clipings of the complex network of linguistic knowledge, the constructicon. A third reason for caution is inter-personal variety: since derivational hierarchies form in a bottom-up manner, they are dependent on the input and the store of complex words. It can be expected that among speakers, they show some variation; thus language users may come up with different generalizations.

With these cautions in mind, the hierarchies developed here can be understood as approximations to how information could actually be stored. If nothing else, the hierarchical network is expected to be cognitively real, as is its bottom-up nature. More specific attributes of the hierarchies are based on empirical evidence (such as diachronic development and affix distribution), but could be adapted, if further evidence (e.g. from other languages) outweighed the previous. Yet, certain schemata can be expected to be reoccurring due to universal functional implications. The hierarchy for ENHG *-lich*-derivation, shown below in Figure 2, is based on the types that have been analyzed by Thomas (2002: 324–452).<sup>6</sup> Details for all levels will be specified below.

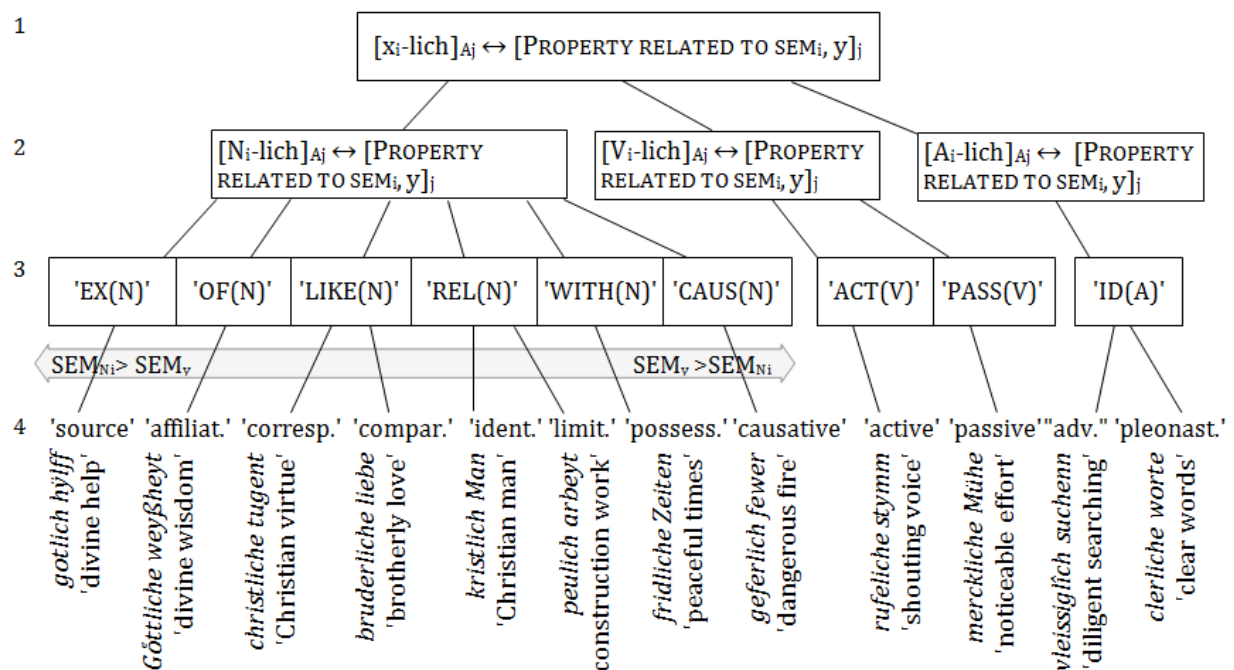


Figure 2: Inheritance hierarchy of ENHG *-lich*-derivation

<sup>6</sup> For details on how the data were extracted see Kempf (2016: §3.1.2 and §4.2.2). In a few cases, very similar subtypes have been merged; marginal subtypes are omitted.



The inheritance hierarchy ranges from concrete, entirely filled constructions at the bottom to the most abstract schema at the top, the head schema of the pattern. For reasons of space and ease of reading, all schemata in Figure 2 are presented in a simplified way. As mentioned in §3, Construction Morphology schemata contain phonological, morphological, and semantic properties of the words they generalize over. Accordingly, the head schema in a fully explicit notation would spell as:

$$(4) \quad [ [\dots]_i [\text{liç}] ]_j \leftrightarrow [x_i\text{-lich}]_{A_j} \leftrightarrow [\text{PROPERTY RELATED TO SEM}_i, y]_j$$

On the formal side, it is stated that some element *x* combines with the suffix *-lich* to form an adjective. The semantic side states a very general adjectival meaning, here termed as PROPERTY, in accordance with Booij (e.g. 2010: 38, 2013: 256) and in principle comparable with Lieber's (2004: 39–40) [–dynamic], indicating a 'state'. The property denoted by the complex adjective is related to the semantics of the base (cf. Booij 2010: 54 for a similar notation). This relation is not specified any further in the head schema of the *-lich* pattern, but it might be more specific in head schemata of semantically more clear-cut patterns, such as NHG *-los*-derivation, denoting a privative relation ('X-less'). What deviates from Booij's notations is the inclusion of an argument slot *y*. This move is based on the fact that adjectives are a dependent part of speech. They don't occur on their own, but generally modify some entity, here termed the "collocator". The argument slot can be co-indexed with the collocator that appears in the concrete construction which contains the complex adjective.

Since the head schema offers only minimal semantics, its status as a linguistic sign and thus as a separate schema in the mind can be questioned. However, there are arguments at least for the subschemas to be interconnected: for one thing, speakers would usually be able to name a number of derivatives belonging to the pattern, irrespective of their individual word formation functions. Another piece of evidence is provided by "shared quirks" among various subschemas of a hierarchy: for instance, various subschemas of NHG *-isch* (to be presented below) share an affinity for foreign bases (*melanchol-isch* 'melancholic') as well as an affinity for pejorative bases (*mörder-isch* 'murderous'). An alternative way to account for this evidence without postulating a separate head schema would be to assume for the information of the head schema to be immanent in the subschemas and the subschemas to be interconnected with each other directly.<sup>7</sup>

The schemata at the next level (level 2 in Fig. 2), in their full versions, would spell as:

$$(5) \quad [ [\dots]_i [\text{liç}] ]_j \leftrightarrow [N_i\text{-lich}]_{A_j} \leftrightarrow [\text{PROPERTY RELATED TO SEM}_i, y]_j$$

$$(6) \quad [ [\dots]_i [\text{liç}] ]_j \leftrightarrow [V_i\text{-lich}]_{A_j} \leftrightarrow [\text{PROPERTY RELATED TO SEM}_i, y]_j$$

$$(7) \quad [ [\dots]_i [\text{liç}] ]_j \leftrightarrow [A_i\text{-lich}]_{A_j} \leftrightarrow [\text{PROPERTY RELATED TO SEM}_i, y]_j$$

In the morphological part of the schema, the part of speech of the base is now specified: ENHG *-lich* derives adjectives from nouns, verbs, and adjectives. The phonological part of the schema is not elaborated here. Indeed, phonological restrictions do not seem to play a vital role in ENHG adjectival derivation (cf. Pounder 2000: 635, 712), but in principal, specifications could be added here. As for the semantic part, the notation of the head schema is

<sup>7</sup> I would like to thank an anonymous reviewer for pointing out the problem of the cognitive realness of the head schema and for suggesting the view of higher schemas as being immanent to more specific constructions. As for this notion, s/he refers to Langacker (2008: 56).

repeated here. Alternatively, the implications of the specified word class of the base could be made more explicit in the semantic notation, e.g. by adding [PROPERTY, y] to SEM<sub>i</sub> in the notation of the de-adjectival schema.

Evidence for subschemata at this level stems from distributional observations: as opposed to ENHG *-lich*-derivation, the NHG *-lich*-pattern operates only on nouns and adjectives, while the deverbal subschema has become inactive (see below); quite complementarily, NHG *-bar*-derivation (≈‘X-able’) focuses on deverbal derivation almost exclusively (cf. Flury 1964: 94, 113). NHG *-ig*-derivation operates on nouns, verbs, and adverbs, but not on adjectives (cf. Fleischer & Barz 2012: 339); from the perspective of the base classes, it is striking that adverbs are exclusively derived by *-ig* (Kühnhold et al. 1978: 417–419).

The schemata of the next level will by default inherit the specifications of the higher level(s). Booij (2013: 257) points out that there are two ways of interpreting default inheritance: one that omits inherited information and one that chooses full entries, repeating inherited information. He argues in favor of the latter, because it appears unlikely that in lower, more concrete constructions information gets canceled when a higher, more abstract construction (schema) has been formed. While I fully concur with this view, I will, for ease of reading, not repeat all inherited information, but focus on the most relevant parts.

The schemata on level 3 (Figure 2) add information on word formation functions. The functional terminology is a modified version of Pounder’s (2000: 110–122) taxonomy, which she has developed on the basis of a cross-linguistic sample. As mentioned in section 3 above, Pounder’s terms can be applied as macro classes for the more fine-grained traditional terms. For lack of space, Figure 2 uses condensed notations in which the word class of the base (e.g. N) is inserted in the designation of the function (e.g. ‘WITH(X)’), cf. (8a.). In (8b.), the morphological part and the semantic part of the schema are spelled out. This schema generalizes over denominal *-lich*-derivatives that assign the property of ‘being with N/having N’ to a collocator y (e.g. *kunst-lich-er arbeiter* ‘skillful worker’, Thomas 2002: 411).

- (8) a. ‘WITH(N)’  
 b. [N<sub>i</sub>-lich]<sub>Aj</sub> ↔ [[WITH SEM<sub>i</sub>]<sub>PROPERTY, y</sub>]<sub>j</sub>  
 c. [N<sub>i</sub>-lich]<sub>Aj</sub> ↔ [[WITH SEM<sub>i</sub>]<sub>PROPERTY, y</sub>]<sub>j</sub> \N<sub>i</sub>{abstract designation\mental state}

It is one of the core claims of this theory that a word formation function such as ‘WITH(N)’ does not arise without a suitable base contributing to it (this is why the base N is represented in the functional notation). Therefore, additional specifications about the semantics of the base are made on this level. For the function ‘WITH(N)’ to emerge, for instance, the base needs to designate an entity that can be possessed/owned/contained, e.g. objects (*bearded*), substances (*dusty, salty*), or mental states (*joyful*). The semantic class of the base determines the meaning of the derivative to a high degree, but not entirely, e.g. objects, substances, and mental states could occur in privative relations (*beardless, dust-free, joyless*). Conversely, a schema with the function ‘WITH(N)’ need not involve all potentially suitable base classes. As for ENHG *-lich*-derivation, only abstract designations (especially mental states) play a significant role, while objects and substances are virtually irrelevant. The exact combination of base class, word formation function, and affix is a conventionalized property of the schema, supported by the derivatives it generalizes over. This is expressed by including all three aspects in the full-fledged notation in (8c.). The backslash is used to introduce sub-

specifications.<sup>8</sup> The semantic base specification reads prototypically; other base types may occur, but rarely do. The level 3 schemata will now be discussed proceeding from left to right, including some preview of level 4 notions (i.e. the fine-grained traditional functions).

The schema glossed here as ‘EX(N)’ indicates a property where the base N denotes the origin of the referent of the collocator (e.g. in *got-lich hylff* ‘divine help’, the help originates from God). ‘OF(N)’ subsumes constructions that express an alienable (*der Straßburgisch-e Secretarius* ‘the secretary of Strasbourg’) or inalienable possession or affiliation (*Göttlich-e weyßheytt* ‘divine wisdom’). The macro functions ‘EX(N)’ and ‘OF(N)’ do not comprise more than one basic function in this particular hierarchy, but they may in others. For instance, ‘EX(N)’ may include the traditional function ‘material’, present in English/German *-en* as in *golden*. As for ENHG *-lich*-derivation, ‘EX(N)’ and ‘OF(N)’ both emerge with person designations or spheres/domains/spaces as proto-typical base classes.

(9)  $[N_i\text{-lich}]_{A_j} \leftrightarrow [[\text{EX SEM}_i]_{\text{PROPERTY}}, y]_j \setminus N_i \{ \text{person designation|sphere/domain/space} \}$ <sup>9</sup>

(10)  $[N_i\text{-lich}]_{A_j} \leftrightarrow [[\text{OF SEM}_i]_{\text{PROPERTY}}, y]_j \setminus N_i \{ \text{person designation|sphere/domain/space} \}$

‘LIKE(N)’ comprises the ‘comparative’ as well as the ‘corresponding’ subschema, entailing that the referent of the collocator is evaluated with respect to the concept of the base (e.g. *bruder-lich-e liebe* ‘brotherly love’, *christ-lich-e tugent* ‘Christian virtue’). The concept of the base is typically a person or an animal designation or, again, a designation of a sphere, domain, or space. ‘REL(N)’ is the most general macro function, comprising cases where the collocator is seen relative to some concept ‘N’ – be it the relation of identity (*krist-lich Man* ‘Christian man’), or that of limitation (e.g. *peu-lich arbeyt* ‘construction work’, limiting the notion of ‘work’ to ‘construction work’). Accordingly, the semantic specification of the base remains rather general (cf. (12)); identifying or limiting one concept (collocator) by means of another (base) is open to many different sorts of concepts (as has often been observed with respect to the semantic relations holding between the constituents of compounds).

(11)  $[N_i\text{-lich}]_{A_j} \leftrightarrow [[\text{LIKE SEM}_i]_{\text{PROPERTY}}, y]_j \setminus N_i \{ \text{person or animal designation|sphere/domain/space} \}$

(12)  $[N_i\text{-lich}]_{A_j} \leftrightarrow [[\text{REL SEM}_i]_{\text{PROPERTY}}, y]_i \setminus N_i \{ \text{person designation|general abstract or concrete designation} \}$

The function ‘WITH(N)’ (already mentioned above) potentially incorporates all sorts of containedness (inner or outer, concrete or abstract: *salty soup*, *dusty floor*, *mournful song*), but here is restricted to the abstract type. ‘CAUS(N)’ involves various kinds of causation; the function emerges typically with bases states, events, or actions: *gefer-lich fewer* ‘dangerous fire’; *thott-lich kranck* lit. ‘death-ly ill’, ‘fatally ill’; *mörd-lich-er haß* ‘murderous hatred’ (Thomas 2002: 370, 349, 421).

(13)  $[N_i\text{-lich}]_{A_j} \leftrightarrow [[\text{WITH SEM}_i]_{\text{PROPERTY}}, y]_j \setminus N_i \{ \text{abstract designation|mental state} \}$

(14)  $[N_i\text{-lich}]_{A_j} \leftrightarrow [[\text{CAUS SEM}_i]_{\text{PROPERTY}}, y]_j \setminus N_i \{ \text{abstract designation|(state|event|action)} \}$

<sup>8</sup> Booij (2013: 268) uses a more explicit phrasing for a comparable purpose: In the schema for Dutch genitival *-s*, he specifies “Condition: NP<sub>i</sub> is a proper name”.

<sup>9</sup> The signs are used as follows: “|” = ‘or’, “/” marks alternative phrasing, “\” indicates a sub-specification.

‘ACT(V)’ and ‘PASS(V)’ denote active and passive deverbal derivation, respectively. Both could be differentiated at the subsequent level for degree of factuality, e.g. passive-factual (*begir-lich ding* lit. “desire<sub>v</sub>-ly things”, ‘things that are desired’), passive-potential (*mit [...] beweis-lich-er künst* ‘with provable skill’, Thomas 2002: 356–359), active-factual (*mit rufe-licher stymmen* ‘with a shouting voice’, Bonn ENHG corpus), or active-potential (*zergeng-lich ding* lit. “decay<sub>v</sub>-ly thing”, ‘perishable thing’, Thomas 2002: 417).

(15)  $[V_i\text{-lich}]_{Aj} \leftrightarrow [[\text{ACT SEM}_i]_{\text{PROPERTY}}, y]_j \setminus V_i \{ \text{intr. verb} | \text{transitive verb} \}, y = \text{AGENT}(V_i)$

(16)  $[V_i\text{-lich}]_{Aj} \leftrightarrow [[\text{PASS SEM}_i]_{\text{PROPERTY}}, y]_j \setminus V_i \{ \text{transitive verb} \}, y = \text{PATIENT}(V_i)$

‘CAUS(N)’ as well as ‘ACT(V)’ and ‘PASS(V)’ are new additions to Pounder’s (2000) original taxonomy. They fill gaps which may, at least in the latter cases, have persisted due to Pounder’s focus on denominal derivation. When dealing with deverbal derivation, ‘active’ vs. ‘passive’ proves to be a useful distinction so far. In a more elaborate version of the modeling sketched here replacing it entirely by co-indexation could be tested. In ‘active’ constructions the agent argument of the base verb corresponds to the collocator; in ‘passive’ constructions, conversely, the patient argument corresponds to the collocator.

Finally, ‘ID(A)’ replaces Pounder’s (2000: 119) notion “I(‘X’)” for reasons of clarity. It stands for ‘identity’: In the derivation process, the meaning of the base A remains unchanged. This is, by definition, the case in pleonastic derivation (*cler-liche worte* lit. “clear-ly words” = *clare worte* ‘clear words’). The term “adv[erbial]” is used as shorthand for derivatives that have originally been formed as adverbs, but have subsequently “migrated” back into attributive use;<sup>10</sup> typically, they modify action nouns (*sie sucht vleissig-lich* ‘she searches diligently’ > *In dißem vleissig-lich-en suchenn* ‘in this diligent searching’, Bonn ENHG corpus).

(17)  $[A_i\text{-lich}]_{Aj} \leftrightarrow [[\text{ID SEM}_i]_{\text{PROPERTY}}, y]_j \setminus A_i \{ \text{quality adjective} \}$

The double arrow in Figure 2 (replicated in Figure 3 below) refers to different semantic relations within the denominal schemata. In the discussion of the functional types, it became clear that the relation between the concept of the base and the concept of the collocator plays a crucial role with respect to the word formation function. Also, it turned out that some functions cluster in terms of similar affinities to semantic base classes. In her analysis of the relations between bases and collocators in denominal adjectives, Ganslmayer (2012: 129–140) observes essentially three types of relation: one where the concept of the collocator dominates the concept of the base, one where the reverse holds, and one where both range more or less on the same level. The last case applies e.g. in ‘identificational’ derivation; e.g. in *kristlich Man* ‘Christian man’ the base concept ‘a Christian’ and the collocator concept ‘a man’ are identified with one another and neither dominates. By contrast, in ‘OF(N)’ constructions like *Göttliche weyßheyt* ‘divine wisdom’, the base denotes the possessor while the collocator denotes the possessed; thus it can be stated that the base dominates the collocator. The opposite holds in ‘WITH(N)’ constructions like *fridliche Zeiten* ‘peaceful times’, where the collocator denotes the possessor and the base denotes the possessed. The same systematic connection can be observed with respect to the contrasting pair ‘CAUS(N)’ vs. ‘EX(N)’. The notion

<sup>10</sup> There is no clear-cut adverb–adjective distinction in ENHG, thus Thomas (2002), like many others, classifies a word as an adjective iff it can be used attributively.

of dominance in Ganslmayer’s consideration thus refers to semantic roles in the paraphrase, so that agents, possessors, and causers dominate patients, possessed, and caused (also instruments). The functions with a clear dominance of either the base or the collocator can be organized in a paradigmatic structure:

Table 2: Functional spectrum of ENHG *-lich*-derivation

situation of...	SEM <sub>Ni</sub> > SEM <sub>y</sub>	SEM <sub>y</sub> > SEM <sub>Ni</sub>
...possession:	‘OF(N)’ <i>Gött-lich-e weyßheyt</i> ‘divine wisdom’ <i>mensch-lich ferstand</i> ‘human mind’	‘WITH(N)’ <i>frid-lich-e Zeiten</i> ‘peaceful times’ <i>zorn-lich liüt</i> ‘angry people’
...emergence:	‘EX(N)’ <i>got-lich hylff</i> ‘divine help’ <i>pepst-lich-e gewalt</i> ‘papal force’	‘CAUS(N)’ <i>gefer-lich fewer</i> ‘dangerous fire’ <i>griuwe-lich tyer</i> ‘horrible animal’

To account for these systematic conditions within the denominal derivation, the schemata have been arranged accordingly in Figure 2/Figure 3. The double arrow is not part of the inheritance hierarchy proper, but rather makes explicit what is immanent in the schemata. It marks both poles, that of dominant bases (SEM<sub>Ni</sub> > SEM<sub>y</sub>) and that of dominant collocators (SEM<sub>y</sub> > SEM<sub>Ni</sub>). The intermediate schemata display no clear dominance of either participant, which is reflected in their position on the scale. However, some relatedness with respect to the function and the typical bases can be observed between the adjacent schemata. For instance, the ‘LIKE(X)’ example denoting ‘Christian virtue’ could alternatively be paraphrased as ‘virtue OF Christians’, and indeed, both schemata share person designations as typical bases. It is thus reasonable to assume some permeability between adjacent schemata. This permeability is expected to show in distributional clustering among different affixes and in diachronic developments, cf. §4.3.

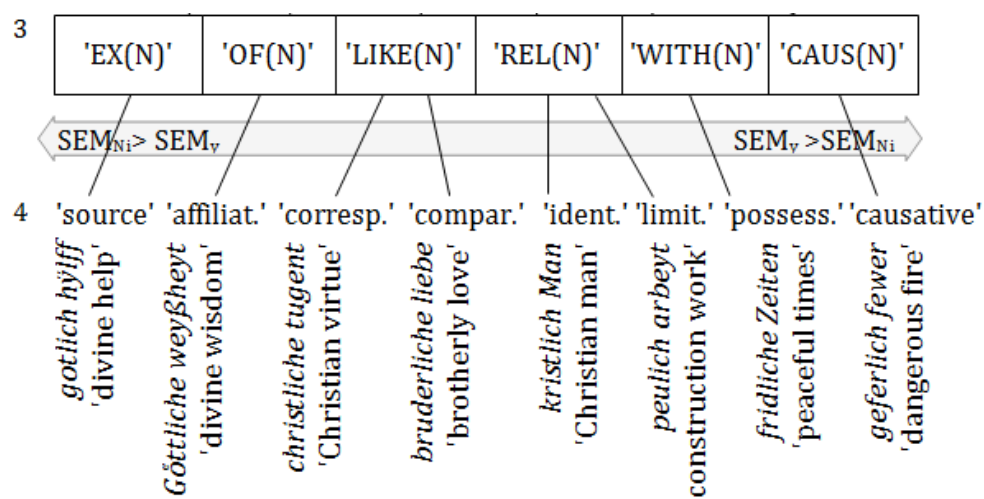


Figure 3: Denominal ENHG *-lich*-derivation (clipping of Figure 2)

Another interesting observation worth pointing out refers to adjectival prototypicality: Ganslmayer (2012: 138) observes that the functions with a semantically dominant base run counter

to the syntactic profiling of the collocator (which is the modified head noun). Thus, the schemata shown here on the left constitute less typical adjectives and may not be found in all languages that do display denominal adjectives.

At the bottom of Figure 2 (level 4), the fine-grained traditional terms (introduced above in Table 1) are arranged and connected to the suitable macro function. Below them, authentic examples of use are provided. The level 4 functions are included primarily for descriptive purposes. It is debatable whether they are plausible candidates for cognitive schemata. If we were to flesh them out as formalized schemata, more specific information on the bases might have to be added; most importantly, this level would include specifics about the collocator. In many cases, only the collocator determines the difference between closely related functions, cf. for instance the minimal pair ‘Christian virtue’ (→ ‘corresponding to  $N_i$ ’) vs. ‘Christian man’ (→ ‘identification with  $N_i$ ’). Another example is the differentiation between pleonastic and “adverbial” derivatives (in the de-adjectival part of the hierarchy). In the example *clerliche worte*, lit. “clear-ly words”, ‘clear words’ = *klare worte* ‘clear words’ a zero-function (i.e. pleonastic) can be observed; with an action noun as a collocator, e.g. in the hypothetical example *clerliches sprechen*, lit. “clear-ly speaking”, ‘clear speech’, the construction would receive the reading of an originally adverbial derivation.

Since the collocators account for a great deal of the differentiation at level 4, listing actual schemata may appear dispensable. However, a given suffixation pattern at a given point of time does not occur with all sorts of collocators and thus cannot assume all of the fine-grained functions; instead, it bears an affinity towards certain contexts – and this is what can be expressed by the level 4 functions. Thus, e.g. the function ‘causative’ can be taken to mean that the pattern does occur in contexts that evoke a ‘causative’ word formation meaning.

#### 4.2. Interim recap

Having fleshed out a Construction Morphology hierarchy for ENHG *-lich* helps us represent the rich functional spectrum of the pattern. The granularity problem mentioned in §2 is encountered by the multi-level approach: We do not have to either content ourselves with only stating that the affix bears little meaning, or resort to listing *-lich*<sub>1</sub>, *-lich*<sub>2</sub>, and so on. Instead, we gain a differentiated picture which allows for variably detailed statements, e.g. “ENHG *-lich* derives adjectives from nouns, verbs, and adjectives”, or “Denominal ENHG *-lich*-derivation occurs in “dominant base”, “dominant collocator”, and in intermediate relations”. However, the exact details of the hierarchy – e.g. the number of levels or the ways of grouping subschemas – are still dependent on linguistic decisions. It is therefore important to broaden the empirical foundation.

As for the question of how meaning emerges in word formation, we can now give an assessment – with a focus, at first, on functionally diffuse affixes. Functionally, the topmost schema can be nearly empty, as in the case of ENHG *-lich*. It is, however, conventionally fixed as to what relations it occurs in – in this case almost any basic relation of adjectival word formation (except for de-adverbial derivation). Among these, specifications of the semantic base classes account for the macro-functions (e.g. objects, substances, mental states evoke the “dominant collocator” type functions ‘WITH(N)’ and ‘EX(N)’). Finally, the collocator renders the meaning more precise, as has been shown with the examples *kristlich Man* ‘Christian man’ vs. *christliche tugent* ‘Christian virtue’.

The influence of each of these components (conventionalized properties of the head schema, base classes, and collocators) will vary across different patterns and different parts of speech. As for different patterns, ENHG *-lich* can be contrasted with NHG *-bar*, which has been shown in Figure 1. Here, the conventionalized properties of the schema are much stronger, in that a verbal base and the function of ‘possibility’ (in Riehemann’s 1998 terms) are specified. A transitive or intransitive base supports a passive or active reading, respectively, while the collocator generally contributes rather little. The two case studies, ENHG *-lich* and NHG *-bar*, represent the spectrum of adjectival derivation, which ranges from clearer to more diffuse patterns (cf. the examples *-en* (*wooden*), *-able* (*downloadable*), *-less* (*frameless*) vs. *-al* (*intentional, architectural*), *-y* (*sleepy, hairy, booky*)). Among the parts of speech, adjectives are particularly susceptible to the contribution of the collocator, while with other parts of speech, the context may have considerably less influence on the word formation meaning.

Word formation meaning thus emerges in an interplay of the schema, the base classes, and the context – with some variance in the influence of the three components. In this approach, affixes are conceived of as parts of schemata, but no separate entry for an affix is needed. The affix itself need not bear any meaning, even though the head schema of some patterns may be quite specific in function. For functionally rather clear affixes like *-less* (or, arguably, NHG *-bar*), one could even assume they have their own entry – which would then be connected via instantiation link to the pattern. Crucially, the derivational hierarchies are functionally independent of such an entry.

Having gained a suitable descriptive tool, a closer general assessment on how meaning emerges, and thus a rough concept of what affixes are, the next question is whether there is any predictive power to the theory. For the most part, further empirical inquiry will have to determine restrictions on the hierarchies that would allow for prediction. At present, a few observations and hypotheses towards general tendencies can be made. First, the hierarchies may help uncover reoccurring correlations, e.g. typical pairings between base classes and macro functions. The ones displayed in (9)–(17) are candidates that would, when verified by more case studies, allow for prediction. Once the most common correlations are established, this allows for yet further prediction: when dealing with polyfunctional patterns, there is the question which functions tend to cluster, i.e. are spanned by one pattern. A tentative answer then could be that those functions tend to cluster that are evoked by the same class of bases. Thus we would expect to find, for instance, the functions ‘EX(N)’, ‘OF(N)’, and ‘LIKE(N)’ to cluster since they share certain base classes, e.g. person designations; or: the functions ‘WITH(N)’ and ‘ACT(V)’, since they both occur with mental states (ENHG *wüt-ig* lit. “rage-y” ‘with rage/raging’, *neid-ig* lit. “envy-y” ‘with envy/envying’). In order to broaden our empirical basis, the following section will test the model for diachronic as well as inter-affix comparison.

#### 4.3. Testing the model for diachronic and inter-affix comparison

For a brief probe into diachronic comparison, Figure 4 displays an inheritance hierarchy for NHG *-lich*-derivation. It is for the most part based on Kühnhold’s et al. (1978: 259–419) analysis of a comprehensive 20<sup>th</sup> century corpus. Structuring the empirical results in a hierarchical network enables us to grasp the changes at first glance. While the functions in the left part of the spectrum remain unchanged, the “dominant collocator” relations as well as the deverbal and de-adjectival subschemas have decreased. In the de-adjectival domain, both the

“adverbial” and the pleonastic function have ceased. Instead, a new function is present: the diminutive function as in *grün-lich* ‘greenish’, which has been taken over from the dying pattern of (E)NHG *-icht*.<sup>11</sup>

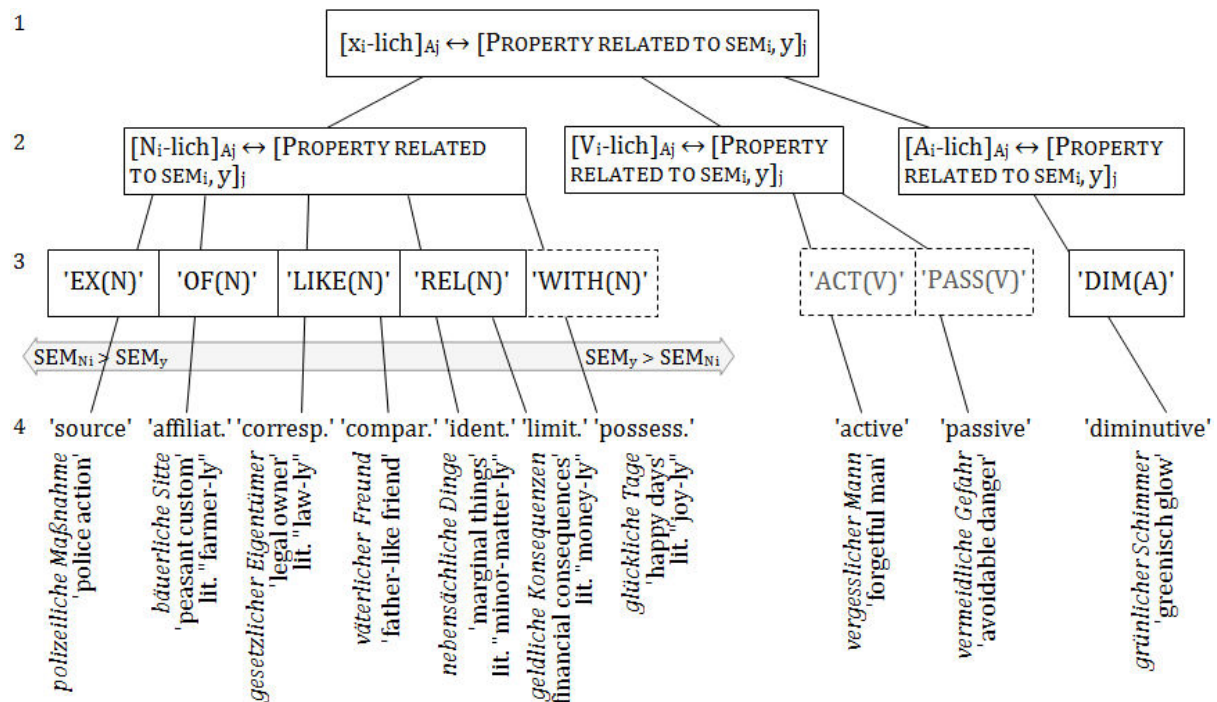


Figure 4: Inheritance hierarchy of NHG *-lich*-derivation

The function ‘CAUS(N)’ is excluded from the representation because it has dropped from 7.2% in ENHG to a mere 1.5% of types in the 20<sup>th</sup> century data. Interestingly, the closely related function ‘WITH(N)’ has undergone a strong decline as well (from 10.31% to 3.01% of *-lich* types). As for the deverbal functions, their decline would not have been obvious from comparing Thomas’ (2002) and Kühnhold’s et al. (1978) analyses of ENHG and NHG data. However, when backtracking all derivatives listed for the NHG corpus, it turned out, that none were more recent than from the 19<sup>th</sup> century. Deverbal *-lich*-derivation has thus decreased considerably, if not become entirely unproductive. To complete the representation in Figure (4), the relevant base classes are sketched in (18):

- (18) ‘EX(N)’ and ‘OF(N)’: person/place designations, abstract domains  
 ‘LIKE(N)’ and ‘REL(N)’: person/place designations, general abstract designations  
 ‘WITH(N)’: general abstract designations  
 ‘ACT(V)’: intransitive verbs, transitive verbs  
 ‘PASS(V)’: transitive verbs  
 ‘DIM(A)’: quality adjectives

Roughly, we can state that no new base classes have been unlocked. Overall, the changes in German *-lich*-derivation can be recognized as systematic ones, with mainly the “dominant base” relations and the newly acquired diminutive function staying active. As to why these

<sup>11</sup> For more detail, see Schwarz (1905), Winkler (1995: 340–342), Kempf (2016 §4.2.2.2).



changes have occurred, an important factor lies in affix rivalry. We will now turn to look at the second most frequent pattern in the relevant corpora, (E)NHG *-ig*-derivation.

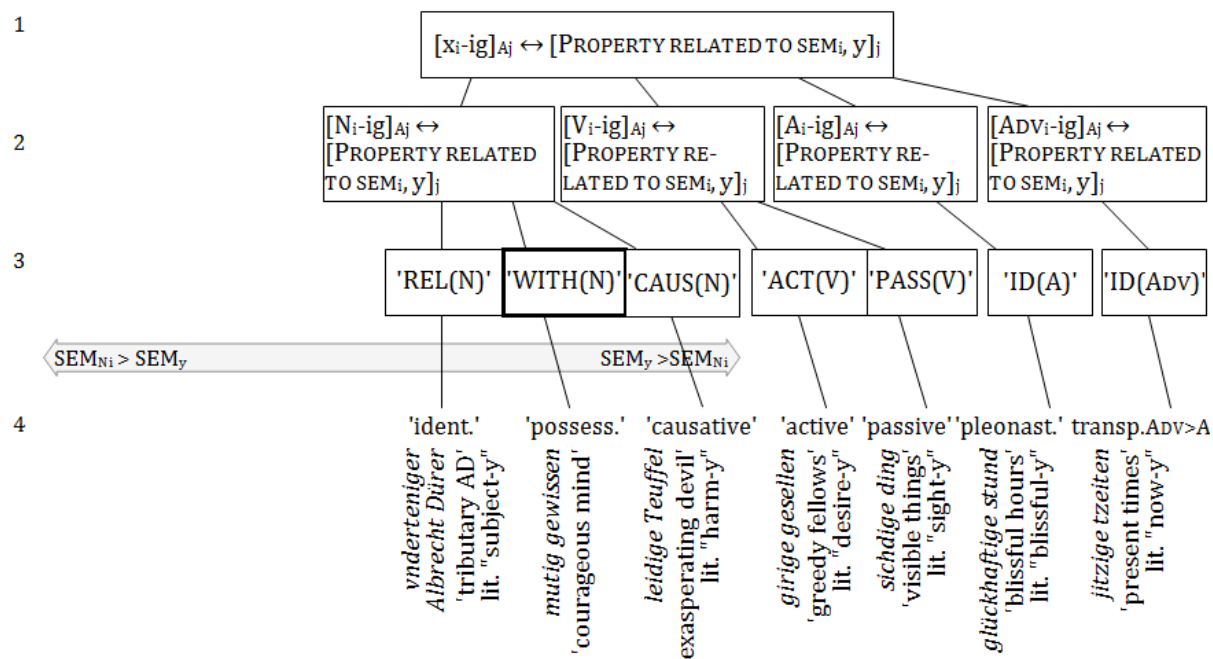


Figure 5: Inheritance hierarchy of ENHG *-ig*-derivation

When looking at the state of affairs in ENHG, it becomes clear that this pattern, despite being multifunctional, displays a clearer profile than ENHG *-lich*-derivation. The “dominant base” relations are missing entirely, as are the immediately adjacent ‘LIKE(N)’ functions. In the “dominant collocator” relation, the function ‘WITH(N)’ is particularly well entrenched, in that it is represented by a particularly large number of types (e.g. *mutig* ‘courageous’, *bartig* ‘bearded’, *giftig* ‘poisonous’; see Kempf 2016, §4.3.2 for more quantitative details). To complete the representation, the relevant base classes are sketched below:

- (19) ‘REL(N)’: person designations, general abstract designations  
 ‘WITH(N)’, ‘CAUS(N)’: general abstract designations, concrete designations (fewer)  
 ‘ACT(V)’: intransitive verbs, transitive verbs  
 ‘PASS(V)’: transitive verbs  
 ‘ID(A)’: quality adjectives  
 ‘ID(ADV)’: adverbs of space and time

When comparing *-lich*- and *-ig*-derivation in terms of involved base classes, similarities as well as differences between can be found. This means that, given enough data, we can define the common correlations between base classes and functions (e.g. general abstract designation in ‘WITH(N)’). It is then worth noticing which ones of the common combinations are missing with a given pattern. Here, what stands out by comparison, is that *-lich*-derivation lacks concrete designations in ‘WITH(N)’, whereas *-ig* derives substances (*gift* ‘poison’) and concrete objects (*bart* ‘beard’). In fact, the emergence of concrete designations in the schema

$[N_i\text{-ig}]_{A_j} \leftrightarrow [[\text{WITH SEM}_i]_{\text{PROPERTY}}, y]_j$  represents its ongoing expansion. Towards NHG times, the schema has become even stronger. This growth evidences Riehemann's (1998) account of type-based derivational morphology: if a schema is instantiated by a large number of types, they strengthen its entrenchment, which in turn can boost its productivity. The increase of this schema goes hand in hand with the decrease of possessive *-lich*-derivation and is most likely its main cause. In Figure 6, the spectrum of NHG *-ig*-derivation is displayed.

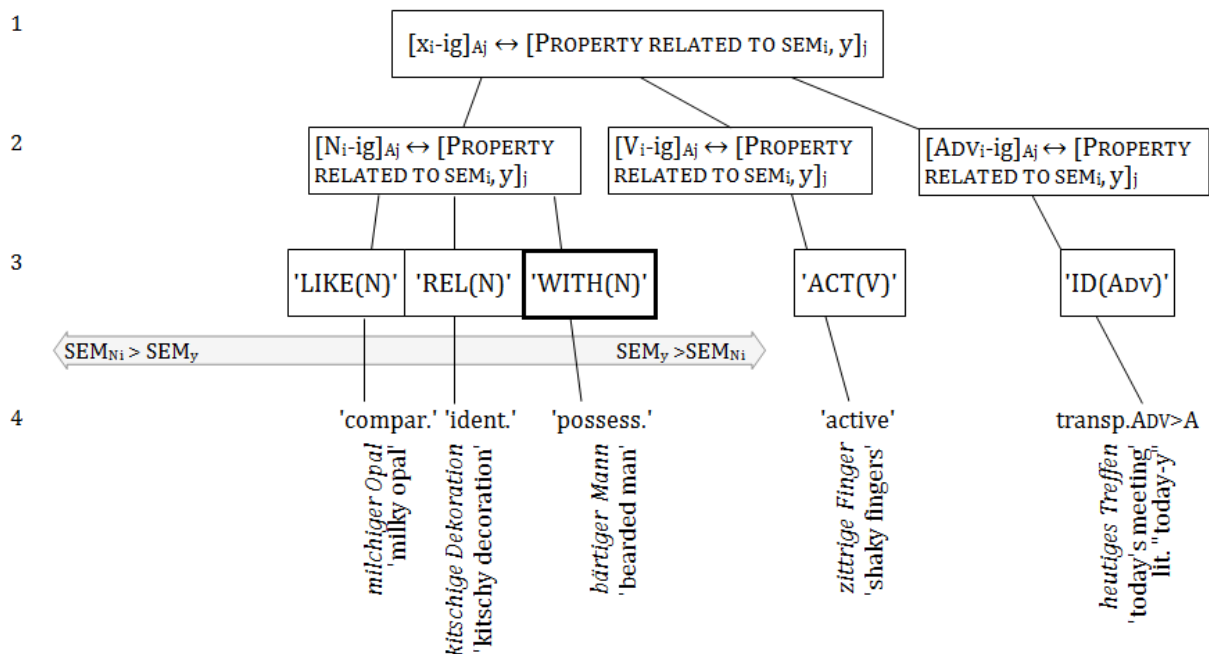


Figure 6: Inheritance hierarchy of NHG *-ig*-derivation

The function 'LIKE(N)' has largely been taken over from the dying *-icht*-pattern; the passive function in turn has been taken by the growing *-bar*-pattern (cf. Figure 1). The disappearance of the causative and the pleonastic schemata constitute systemic changes, since the first has sustained an overall decrease, and the latter has ceased altogether. Again, the relevant bases are sketched below:

- (20) 'LIKE(N)', 'REL(N)': person designations, concrete and general abstract designations
- 'WITH(N)': general abstract designations, concrete designations
- 'ACT(V)': intransitive verbs, transitive verbs (fewer)
- 'ID(ADV)': adverbs of space and time

As a last comparison, we will briefly look at the third most frequent pattern, NHG *-isch*-derivation. This pattern has seen a tremendous growth between ENHG and NHG. In Thomas' (2002) corpus of Nürnberg ENHG of around the year 1500, the data of this pattern are too scarce to base an inheritance hierarchy on them. Therefore, only the NHG state is portrayed here (Figure 7).

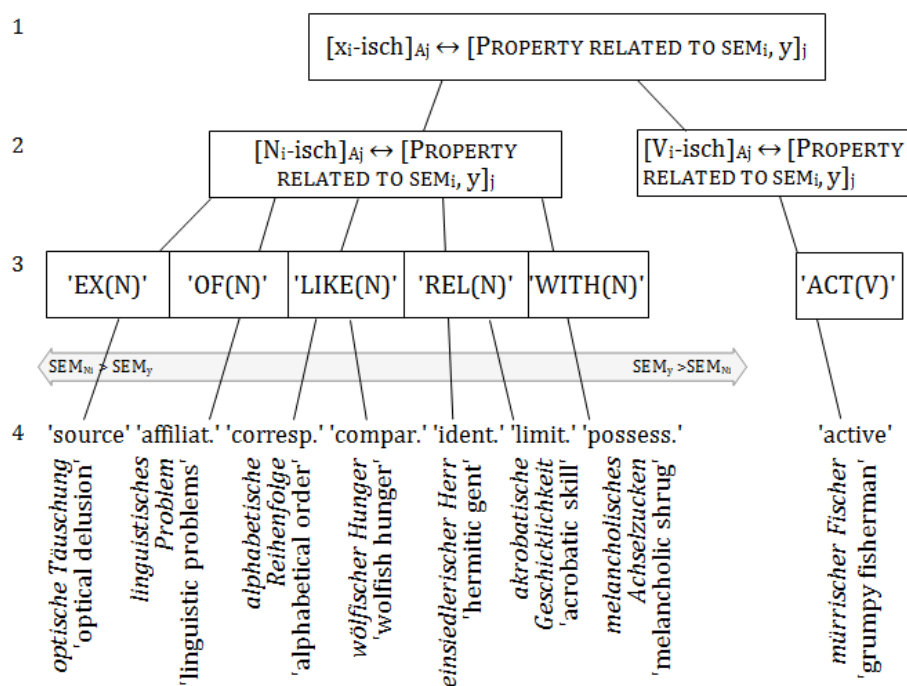


Figure 7: Inheritance hierarchy of NHG *-isch*-derivation

To a large extent, NHG *-isch*-derivation is complementary to NHG *-ig*-derivation: the “dominant base” relations together hold 36.5% of the types in Kühnhold’s et al. (1978) corpus, whereas only 6.2% are allotted to ‘WITH(N)’. Comparing to the NHG *-lich*-hierarchy, both patterns strongly realize the left part of the scale. To some degree, they do compete, which manifests in pairs like *gutachterliche Tätigkeit* lit. “reviewer-ly practice” ‘practice of a reviewer’ and *bergsteigerische Tätigkeit* lit. “mountaineer-ish practice” ‘practice of a mountaineer’. For the most part, however, there is a division of labor: NHG *-isch*-derivation strongly specializes in deriving loanwords (e.g. *optische Täuschung* ‘optical delusion’). The tendency towards loanwords is present in all functions of NHG *-isch*, so that it should be included in the specification of the base classes. Since derivation of native words occurs as well, the specification does not hold coercively.

- (21) ‘EX(N)’, ‘OF(N)’: person/place designations, abstract domains; loan words  
 ‘LIKE(N)’ and ‘REL(N)’: person/animal designations, general abstract designations; loan words  
 ‘WITH(N)’: general abstract designations; loan words, pejoratives  
 ‘ACT(V)’: bases: intransitive verbs; loan words, pejoratives

Another specialty of NHD *-isch*-derivation is the tendency towards pejorative meaning. In some cases, the pejorative aspect is simply conventionalized, cf. *kindisch* ‘childish’, which up until the late 18<sup>th</sup> century still had a neutral reading ‘childlike’. With the ‘ACT(V)’ and ‘WITH(N)’, however, there is a strong tendency for selecting pejorative bases, e.g. *misstrauisch* ‘distrustful’, *zänkisch* ‘quarrelsome’. Apart from these specifics, the specifications in (21) further confirm some correlations that have been present in the cases above, e.g. that the “dominant base” relations typically involve person and place designations as well as abstract domains; ‘WITH(N)’ here involves general abstract designations, like in all of the above

cases, but lacks concrete designations as was the case with *-lich*. With the aid of inheritance hierarchies, differences as well as similarities between the patterns have been revealed. In the final section, the account will be summed up and desiderata will be sketched.

## 5. Conclusion and outlook

This paper has delved into the issue of functionally complex derivational patterns using examples from German adjective derivation. The main concern was finding a model capable of adequate description which would also help understand how derivational meanings emerge. After brief surveys of Lieber's (2004) and Pounder's (2000) contributions to the matter, the Construction Morphology account (Booij 2007a, 2007b, 2010, 2013, Riehemann 1998, 2001) has been introduced. Crucial to this account is the idea of type-based multi-level hierarchies. In §4, the theory has been fleshed out using first the example of ENHG *-lich*-derivation, which offers a particularly wide functional range. The multi-level hierarchy proved a useful tool for grasping the complex pattern on variable levels of abstractness or concreteness. As a second step, the model has been tested for diachronic as well as inter-affix comparison by looking at NHG *-lich*, two stages of *-ig*-derivation, and at NHG *-isch*.

In both types of comparison, the model helped determine similarities as well as differences and detect rivalry as well as complementarity. While *-ig*-derivation is strongest in the center and right-hand part of the hierarchy used here, *-isch*-derivation is more concentrated in the left-hand part of the spectrum. For *-lich*-derivation, it has become clear that the original wide spectrum has narrowed down by decreasing in the central and rightmost (i.e. deverbal and de-adjectival) relations. These findings confirm the arrangement chosen for the hierarchy, because adjacent schemata behave similarly in language change (i.e. they decrease or increase together) and occur together within one hierarchy (e.g. 'EX(N)' and 'OF(N)' were either both present or both missing, due to their shared base classes).

Modeling NHG *-isch*-derivation showed that while the overall model is retained, some additions may be called for, in this case adding "loanword" and "pejorative" to the base specification. It is a core principle of the model that it is flexible – in a number of senses: for one thing, categorizations are prototypical and schemata are stretchable (this is also one of the ways in which word formation change can occur). In a second sense, the model is meant to image generalizations as they could be formed in the minds of speakers. Naturally, these categorizations need not be homogenous, either across speakers or within one speaker's construction. In a third sense, the model is intended to be open to empirically induced adjustments. Adhering to the core idea of multi-level hierarchies that are based on existent concrete constructions, various options can be tested for empirical sustainability. It is crucial that more data be consulted: while some alterations may prove useful, particular patterns will reoccur due to conversational needs and properties of the extra linguistic world (e.g. the link between place designations and 'OF(N)'/ 'EX(N)'). These general tendencies, once identified, can be used for prediction.

There are a great many more tendencies and restrictions that could be refined by future inquiries. Looking at a wide spectrum like that of ENHG *-lich*, questions arise as to how derivational spectra are possibly limited. The hierarchies here are based on samples of derivatives attested at the relevant period – the idea being that all analyzable derivatives lend support to schemata, which could in principle be productive. If hierarchies were designed not according to existent types, but rather to evidentially active subschemas, their range would in

many cases diminish considerably. Telling apart fossilized vs. active subschemas of complex derivational patterns would certainly be one of the most fruitful pursuits for future research. Also, it would be interesting to determine whether wide spectra are typically connected with older affixes, while younger ones tend to occur in simpler hierarchies (cf. the ancient pattern of *-lich* vs. the much younger *-bar*-derivation). Another question concerning productivity would be whether only the bottom most schemata or also more abstract ones can generate new words. Evidence suggests that concrete schemata are preferred because they make for a greater similarity between the model types and the new coinage.

Pertaining to the central issue of how word formation meaning emerges, §4.2 has stated that three components contribute, to variable degrees: conventionalized properties of the schema, semantics of the base, and context. Affixes in the present model are viewed as parts of word-sized constructions. On this premise, the base naturally contributes to the meaning. Optionally, an argument slot for the collocator can be included into the schema as well, as has been done here when modeling functionally diffuse adjectival patterns. This step may not be necessary for patterns that bear a more clear-cut function and are thus less dependent on the context. For those patterns, an entry can be considered, if a mental representation of the affix as a sign is likely. The theory advocated here is flexible enough to accommodate the empirical range from independent to context-sensitive affixes.

The notions of affix, schema, and pattern are embedded in the core concept of the constructicon as a multi-dimensional network of concrete and abstract constructions of variable sizes. While the constructicon does encompass morphological, syntactical etc. knowledge, there is no sharp division between these components. When including an argument slot for the collocator into a derivational schema, we are incorporating syntactic aspects; when specifying loanwords as bases for *-isch*-derivation, arguably, phonological information is being utilized. These steps, in CxG, are legitimate, because no boundaries are expected in the first place. However, the interaction with constructions of other components will need a much more detailed study than it has been given in this paper.

Another desideratum lies in differently perspectivized inheritance hierarchies. In this paper, the formally defined patterns *-lich*, *-ig*, and *-isch* have been pursued, thus taking a semasiological perspective. Additionally, onomasiological hierarchies should be elaborated: Generalizing over, for example, constructions like *dusty*, *bearded*, *joyful*, an abstract schema for ‘WITH(N)’-relations could be formed. Yet another perspective would be taken by base-oriented networks such as Pounder’s (2000) paradigms in which she assembles all derivations involving the same base (e.g. *männisch*, *mannbar* ‘of a man’, *männisch*, *mannlich*, *mannhaft* ‘man-like’ in 16<sup>th</sup> century German, Pounder 2000: 255), and these networks can easily be extended to including various inflectional forms (*Mannes* ‘man.GEN’, *Männer* ‘men’, etc.). It is crucial to understand that these hierarchies are not mutually exclusive, but instead clippings of the vast network which is the constructicon. Hierarchies as sketched here are very simple, and two-dimensional. Numerous other links that each construction would actually engage in are left out for reasons of overview. Accepting the multi-dimensional nature of the network and also accepting that linguistic information in the mind is organized redundantly (Hay & Baayen 2005), it becomes conceivable that each concrete construction such as *joyful* is an instantiation of multiple schemata and hierarchies simultaneously.

## Sources

Bonn ENHG corpus <http://www.korpora.org/Fnhd/>

GerManC corpus <http://www.ota.ox.ac.uk/desc/2544>

### Abbreviations

CxG	Construction Grammar
ENHG	Early New High German (1350–1650)
NHG	New High German (1650–present)

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