

Headedness and/or grammatical anarchy?

Edited by

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Preface

This book has had a rather long gestation period. The papers in this collective volume originate in a selection of the papers that were presented at a workshop at Freie Universität Berlin in May 2017, which was jointly organised by Ulrike Freywald, then University of Potsdam, and Horst Simon, FU Berlin. In an elaborate and anonymous peer review process, the papers were selected and revised under the guidance of UF and HS, and finally refined and brought into their present shape by Stefan Müller, who had also presented at the workshop, and his team at HU Berlin.

We thank various institutions and individuals, above all the Deutsche Forschungsgemeinschaft and the Ernst-Reuter-Gesellschaft der Freunde, Förderer und Ehemaligen der Freien Universität Berlin e.V. for their financial support of the workshop, then a host of colleagues, who need to remain anonymous, who have offered their expertise when peer reviewing, and finally a group of student assistants in the final process of polishing the papers into publishable form, namely Elisabeth Eberle, Luisa Kalvelage, and Julie Täge.

It is to be hoped that the present volume will testify more to the potential headlessness of the structures discussed than to the headlessness of the pondering linguist.

Berlin & Dortmund, 10th October 2022

Ulrike Freywald
Horst J. Simon
Stefan Müller

Part I

Headaches

Chapter 1

Anarchy in Grammar? On headedness and some of its problems, illustrated by examples from German

Ulrike Freywald 

TU Dortmund

Horst J. Simon 

Freie Universität Berlin

One of the fundamental characteristics of grammars of human languages seems to be the fact that (most of) their structures are inherently asymmetric, with exactly one element, the *head*, being more important than its co-elements. By way of introduction to this volume, we discuss some phenomena that pose potential problems for such a view and that have not yet been fully described empirically and understood theoretically. Here we focus on three structures from German, namely “left-headed” (?) verbs, then morphological reduplications and copulative/coordinative compounds, and finally (auxiliary) verb ellipses, all of which are not easily captured by a straightforward analysis in terms of head structures.

1 Grammar is all about hierarchies, or maybe not? – Structure-building in grammar

Once you start thinking about it, it appears that Grammar is a rather unlikely thing: it is full of asymmetries, full of dependencies, full of hierarchies.¹ Why is that so?² – Now, if you imagine a completely blank slate with regard to gram-

¹Fortunately we also have agreement and harmony and the like.

²The following reasoning is of course a gross simplification, but the general idea should hopefully become clear.



mathematical modelling (on the part of the linguist; or with regard to grammatical knowledge if you consider a new-born baby) the situation might be described like this: In the beginning there is just noise; the speech signal you receive consists of seemingly unstructured sounds.³ However, you will soon realise that certain elements stick out: syllables with their vocalic nuclei, certain syllables that are more accentuated than others (in most languages) etc. In other words, a major factor to be taken into account when describing a language is ‘prominence’, the fact that some elements are more conspicuous and thus also somehow more important than others.

You will also realise that certain sound combinations co-occur together time and again, that’s what linguists call *words*, or sometimes larger units, collocations. In many languages, these words sometimes occur with minor differences, i.e. modifications or further elements added to them: inflection. After a while you will realise that not only sounds regularly co-occur in order to form words, but also that some of those words tend to come together with specific other words, or at least with one or another word of a small group of other words. In other words, words can be grouped into classes. The members of these classes share certain commonalities; for instance, members of one class tend to be preceded – immediately or with something in-between – by elements from another word class. Thus we get a distinction between, say, nouns and articles in English or German or French. If you carry out such classificatory operations long enough, by determining (types of) elements that somehow hang together, you will gradually build up a system of the building blocks of a language: sounds, words, and what in many grammatical models is called phrases. In their entirety, all these elements constitute a complex network of interrelations.

Interestingly now, not all of these elements are of equal standing with regard to their interaction with other elements, that is with regard to their behaviour in larger linguistic structures, the way they fit into those units. Some elements seem to be more important for structure-building at a particular location in the system than others. Factors that are relevant for the relative importance of elements include: the degree of obligatoriness of their occurrence within a particular structure, their ability to determine the occurrence and even the particular shape of other elements nearby, their ability to determine certain properties of the whole group of elements in which they occur.

So, for example, and like before we simplify slightly, in certain structures a verb is (more or less) certainly there – otherwise the whole thing would be a different structure altogether; such a verb, by virtue of its valency, requires through

³This is similar to the situation one experiences when one hears an entirely unknown language.

a dependency relation the presence of certain other elements (called arguments, i.e. a subject, potentially also objects) and can assign them a particular case; all structures combining such an element *verb* with its companion(s) are verb phrases and share certain properties. For example, in most grammatical structures in languages such as English or German verbs have endings that indicate different *tenses*, and this entails that at some higher level the whole group containing the verb will have tense.⁴ To put it in a nutshell: a verb phrase is a verb phrase only by virtue of its containing an obligatory element called verb, which is thus its most important element and which exhibits certain (combinatorial) properties, which in turn influence some of the properties of the structure at large, for instance how many verbal arguments this structure contains.

Such reasonings can be generalised: similar structure-building processes seem to occur at all levels of grammar, from phonology through morphology to syntax. We will always find structures where some element is more central, more dominant, more important than the other. This very observation is, of course, the rationale behind the wide-spread application of a notion *head* in grammatical theorising, in theorising across widely different grammatical models. Thus, the classical literature on the subject (since Bloomfield 1933) has collected a variety of characteristics of grammatical heads (in contrast to non-heads) that they exhibit typically in their respective structures:⁵ Usually, heads are obligatory, determine the category and other properties of the structure they are part of, select for elements they co-occur with, and determine features of their respective non-heads via agreement, case and theta-role assignment, etc. – However, not all grammatical structures can be easily captured with such a notion of head: Time and again we find exceptional structures where there either seems to be no head at all because there is no structural asymmetry involved or where there seems to be a head that exerts some influence, but stays invisible otherwise, or where there is a head that just behaves in an unexpected way, for example by occurring in the “wrong” position with regard to the language-specific serialisation rules.⁶

⁴Needless to say for linguists, depending on the particular grammatical framework you happen to work in, you might believe that things are much more complicated, such that, strictly speaking, it is not the verb phrase in the narrow sense that is tensed, but a somewhat more subtle grammatical element called the Inflectional Phrase or Tense Phrase or some other superordinated structural element or feature, respectively.

⁵We need to list only the most important publications here: Lieber (1980), Williams (1981), Selkirk (1982), Zwicky (1985), Hudson (1987), Corbett et al. (1993), Croft (1996), among many others.

⁶For a general discussion of how grammatical exceptions can be dealt with theoretically cf., e.g., Simon & Wiese (2011).

Now, by focussing on problematic cases, mostly but not exclusively from German, this volume aims to contribute some fresh ideas to the extensive discussion of headedness, the discussion around the central properties of grammatical heads, whether they are an essential ingredient of grammatical theory or whether they might actually be a hindrance to understanding the characteristics of some (or all?) grammatical structures, and whether the idea of *head* can even be done away with altogether and be replaced by more abstract notions. In the rest of this introductory chapter we will present some hard nuts from the grammar of German, without attempting to provide definitive answers regarding their analysis; they involve directionality, strict symmetry, thus non-headedness and invisibility, i.e. headlessness.

2 Potential problems for the notion *head*

2.1 Contrarianism: Against the usual directionality

First, problems for the notion *head* may arise if structures appear to be asymmetric and endocentric but if it is nevertheless hard to determine which constituent fulfils the function of the head. To illustrate this, we discuss two examples from word-formation of verbs in German(ic).

In German – as in Germanic languages in general –, morphologically complex words usually adhere to the “Righthand Head Rule” (RHR), as first formulated in Williams (1981: 248) with regard to English: “In morphology, we define the head of a morphologically complex word to be the righthand member of that word”.

Surprisingly then, the Low German verbs *nickköppen*, *schüddköppen*/*schürrköppen*, *luukoren*, *reckhalsen*, and *knipögen* in (1) have the structure “verb + noun”; here it is not the righthand nominal constituent that determines the properties of the complex word, such as word class, inflection class and semantic category, but the element on the left, the verb:

- (1) a. *nick-köpp-en* (Low German, Åsdahl Holmberg 1973: 50–52)
 nod-head-INF
 ‘to nod (one’s head)’
 b. *schüdd(e)-köpp-en*
 shake-head-INF
 ‘to shake one’s head’
 c. *luuk-or-en*
 listen-ear-INF
 ‘to listen’

- d. reck-hals-en
crane-neck-INF
'to crane one's neck'
- e. knip-ög-en
cut-eye-INF
'to blink'

It is important to note that the respective simplex verbs **köppen*, **halsen*, **oren* etc. do not exist in Low German, at least not with the meanings involved in the examples above.

The pattern is not exclusive for Low German, it is also vividly present – and productive up to this day – in Dutch (cf., e.g., Åsdahl Holmberg 1973 for a vast collection of examples). There are not many analyses of these verbs on the market, and these few vary considerably. In brief, they offer the following morphological interpretations:

- Inverted compound (Henzen 1965):

This analysis is discussed by Åsdahl Holmberg (1973: 55–56) referring to a remark in Henzen (1965: Section 145c). It comes closest to the idea of left-headed compounds. The analysis is supported by the fact that some verbs have right-headed equivalents, such as *slagbuk(en)* / *bukslag(en)* 'to breathe heavily, lit. hit+belly' (Åsdahl Holmberg 1973: 53, 56).

- Noun incorporation (van Ginneken 1939: Section 2; Weggelaar 1986 for Dutch):⁷

Drawing parallels to noun incorporation in indigenous languages of the Americas, particularly to Nahuatl and the Algonquian and Iroquoian languages, van Ginneken and Weggelaar both assume that a noun with the function of instrumental adverbial, direct object or – less frequently – subject has been incorporated into the verb.

- Conversion (e.g. Weise 1920: 32–37; Åsdahl Holmberg 1973):

According to this view, verbs of the type illustrated in (1) originate from exocentric compounds, more precisely from possessive compounds, with the structure 'V+N', for example nouns such as *Knippoog* 'a wink', *Schüddekopp* 'someone who has a shaky head', or *Nickkopp* 'someone who keeps nodding approvingly, i.e. a hypocrite'. If these nouns, which remarkably involve without exception inalienable possessivity, are converted into verb

⁷We are very grateful to Anne Breitbarth for bringing the paper by Weggelaar to our attention.

stems we get the verbs in (1). Here, any flavour of left-headedness is dispensable. Plausible as this account is, it faces the problem that often no corresponding possessive compounds are attested (cf. Weggelaar 1986: 304). The only way to maintain the conversion analysis is to assume that verbs without a corresponding noun have been formed by analogy (which can well be argued for considering the fact that many of these verb patterns are analogically productive; cf. Åsdahl Holmberg 1973).

However, this picture gets even more complicated when we look at nouns. N+N compounds such as *Stuutenbotter* (lit. bread-butter) ‘slice of bread and butter’ and *Katteik* (lit. cat-oak) ‘squirrel’ cannot be the result of incorporation or conversion but look indeed very much like inverted compounds (“Inversionskomposita”, Ortner & Ortner 1984: 61–62; Olsen 2015b). The respective right-headed equivalents exist alongside the “inverted” compounds, cf. examples (2) and (3):

- (2) *Stuuten-botter* vs. *Botter-stuuten* (Low German)
 white.bread-butter butter-white.bread
 ‘slice of bread and butter (sandwich)’
- (3) *Katt-eik* vs. *Eik-katt* (Low German)
 cat-oak oak-cat
 ‘squirrel’

Clearly, analyses that rely on morphological processes other than compounding, such as noun incorporation, or conversion from other word classes, are not feasible here.

What we illustrate by these few examples is that such patterns of (alleged or true) inversion still pose a number of empirical and theoretical problems. In this introduction we cannot discuss these questions further but must leave them open for now.

A more clear-cut case of potential left-headedness are verbs which are derived from nouns and adjectives through prefixation. Examples for this type of verb formation are abundant in German (and in other Germanic languages, e.g. in Swedish and English):^{8,9}

⁸An example from Swedish is the prefixed verb *bekransa* ‘to garland’ (Schmidt 1996: 90).

⁹For present purposes we do not need to commit ourselves to any of the numerous accounts for the difference in morphosyntactic status of the first morpheme of the verbs in (4a-d) vs (4e,f), respectively; hence the unconventional gloss MORPH.

- (4) a. ver-gitter-n (German, Elsen 2014: 215, 216)
 PREFIX-lattice-INF
 ‘to lattice sth.’
 b. ver-blass-en
 PREFIX-pale-INF
 ‘to fade’
 c. be-frei-en
 PREFIX-free-INF
 ‘to free sth.’
 d. ent-thron-en
 PREFIX-throne-INF
 ‘to dethrone sb.’
 e. auf-heiter-n
 MORPH-bright-INF
 ‘to cheer up sb.’
 f. ein-nebel-n
 MORPH-fog-INF
 ‘to fog sb./sth.’

In the examples in (4), the syntactic category of the complex word is inherited from the verbal prefixes and verbal particles *ver-*, *be-*, *ent-*, *auf-* and *ein-*. This phenomenon cannot be waved aside as exceptional, for such types of denominal prefixed verbs are very frequent, and what is more, they comprise almost the whole inventory of German verbal prefixes and verbal particles (see Fleischer & Barz 2012: Sections 5.2–5.3 and Elsen 2014: 215–222 for comprehensive lists).

Williams (1981: 250) considers these derivations as “systematic exceptions to the RHR”, referring to English denominal verbs with the prefix *en-*, for example *to enrage*, *to encase*, *to ennoble*, etc.

This view is not generally taken in subsequent studies on German. Verbal prefixes are often considered as not being able to change the word-class of nouns and adjectives. Instead, it is assumed that verbal prefixes are strictly selective with respect to their base, i.e. they only combine with verbs. From this it follows that one needs to assume that the base nouns and adjectives are first turned into verbs by conversion (Olsen 1990a; Lohde 2006: 49–50, 275–277; Fortmann 2007: 27–28; Michel 2014: 145–149) or by derivation (Müller 2003: 284 for particle verbs) and then, in a second step, combined with the verbal prefix or verbal particle. While such analyses preserve the consistent right-headedness of complex verbs

it comes with a considerable disadvantage: again, we have to assume something special, namely virtual intermediate forms because simplex verbs corresponding to the base nouns and adjectives most often do not exist:

- (5) a. Gitter_N > *gitter-_V > ver-gitter-(en)_V (German)
 ‘lattice’ ‘to.lattice’
 b. blass_A > *blass-_V > ver-blass-(en)_V
 ‘pale’ ‘to.fade’

Assuming such virtual intermediate verbs is particularly unsatisfactory because conversion from noun to verb or adjective to verb is otherwise very productive in German, cf. *Salz* > *salzen* 'salt – to salt', *kühl* > *kühlen* 'cool – to cool'. Products of N>V and A>V conversion can easily be prefixed, cf. *versalzen* 'to oversalt' and *verkühlen* 'to get a chill', *abkühlen* 'to cool down'. Accordingly, exactly this observation is brought forward not against but in favour of the conversion analysis. The argument here is that verbs like **gittern* and **blassen* are potential, grammatically well-formed verb forms which are merely – and more or less accidentally – not in regular use in contemporary German.

The nature of conceivable ways of coming to grips with these prefix-verb patterns depends strongly on the very notion of *morphological head*. Here, relevant questions concern the categorial features of heads, their semantic contribution, their fixed (or non-fixed) position, among others. – Another way to approach this problem is to ask oneself, e.g., whether heads are really indispensable or whether structure-building processes may appropriately be modelled without relying on the basic premise that each type of structural complexity implies a head-complement configuration (a proposal for an analysis of verbs like those in (4) within the framework of Construction Morphology is spelled out in Michel 2014; cf. also the Construction Grammar account of applicative verbs like *bedachen* ‘to roof something’ in particular in Michaelis & Ruppenhofer 2001).

2.2 Egalitarianism: No or more than one head

A second difficulty for the notion of “head” and for the concept of headedness manifests itself in symmetric structures. Here we deal with structural complexity that lacks dependency. To illustrate this notorious problem very briefly and only exemplarily, we turn again to word formation in German, specifically to morphological full reduplication – with a side glance to coordinative compounds.

In general, full reduplication refers to a structure-building operation that comprises the exact doubling of a linguistic unit. In German, this process is considered as a marginal and not fully productive process by reference grammars and

text books (cf., e.g., Ortner & Ortner 1984: 104; Lohde 2006: 43; Fleischer & Barz 2012: 94–96). Recent studies have shown, however, that full reduplication is in fact quite productive in contemporary German (Finkbeiner 2014; Freywald 2015), namely with regard to a type of reduplication that has first been described in greater detail for English, where it was labelled as “Contrastive Focus Reduplication” (Ghomeshi et al. 2004), “Identical Constituent Compounding” (Hohenhaus 1996, 2004), and “lexical clone construction” (Horn 2018). These terms cover reduplications of the type *salad-salad* (‘green salad, as opposed to, say, pasta salad’) or *late-late* (‘very much too late and not just late’). Examples for the German equivalent are given in (6)–(8). They are attested widely in colloquial spoken and written German (cf. Finkbeiner 2014; Freywald 2015):¹⁰

- (6) Dann bin ich doch mal hier die langweilige Wurst, die ein Buch nach dem anderen liest. :-) Es ist höchstens drin gleichzeitig eins auf meinem Reader und ein *Buchbuch* zu lesen und selbst das mach ich nicht so gerne.¹¹
 ‘So, I’m the bore who reads one book after the other. At the utmost, I read one on my reading pad and a *book-book* at the same time. And even that I don’t like very much.’

For English, the function of this kind of reduplication has been described as “singl[ing] out a member or subset of the extension of the noun that represents a true, real, default, or prototype instance” (Horn 1993: 48). The same can be said for the German cases. The noun *Buchbuch* ‘book-book’ refers to a real, physical book, one that is made of paper between covers, which in the example above is contrasted with an e-book that consists only of an electronic file and can hence only be read with the help of an e-book reader or a similar device.

The internal structure of nouns like *Buchbuch* could be seen as that of a compound where the word *Buch* is combined with the word *Buch*. Then, the right-hand constituent could be regarded as the head of the resulting noun. Even if head effects, such as word-class change, determination of gender and inflection class, are not discernable at all – given that both nouns have the same grammatical properties –, the interpretation of the complex noun as a compound implies a semantic relationship of modification between the constituent on the left and the one on the right: A *Buchbuch*, or: *book-book*, is a book-like book. Thus, on semantic grounds, it can be argued that reduplicative nouns like the one in (6) are right-headed.

¹⁰Consequently, the remark made in Stolz et al. (2011: 202) seems somewhat outdated by now and calls for correction: “Not surprisingly, the pattern has not caught on in colloquial German”.

¹¹Contribution in an internet forum, 2013-07-24; <https://wasliestdu.de/frage/lesegewohnheiten/buecher-parallel-lesen>.

This line of argumentation starts crumbling, however, as soon as other word classes are taken into account. Adverbs and verbs are as happily reduplicated as nouns and adjectives in German:

- (7) Und die Millisekunde nach dem Schuss reicht für den Geiselnehmer auch, selbst noch den Abzug zu drücken. Man stirbt ja nicht *sofortsofort*.¹²
'The millisecond after the gunshot is enough for the kidnapper to pull the trigger himself. One does not die *instantly-instantly* [= that instantly].'
- (8) Auch an so einem Vergleich merke ich, was ich an Gladbach mag: Hier sind alle so realistisch. Leverkusen muss europäisch spielen, Schalke muss, Wolfsburg *muss-muss*, vielleicht muss bald sogar Leipzig.¹³
'By such a comparison I realise, too, what I like about Gladbach: They are so realistic. Leverkusen must play European [i.e. in a European league], Schalke must do it, Wolfsburg *must-must* do it, perhaps even Leipzig must do it soon.'

It is much harder to establish a modifying relation between the two instances of *sofort* 'instantly' in (7) and of *muss* 's/he must' in (8) than with *Buch* 'book' in (6). How can *muss* be a modifier of *muss*? – Moreover, and more importantly, compounding is generally not productive with adverbs and verbs in contemporary German (Fleischer & Barz 2012: 361–366, 374).

Another argument against a compound-like determinative modifier-head structure comes from the fact that, as in example (8), both reduplicated elements can be inflected word-forms – something unheard of in regular compounds. The reduplicated verb *muss* is a finite form of the modal verb *müssen* 'must', which is marked for 3SG.PRS.IND.

Similarly, in reduplicated nouns both elements are marked for number. In (9) and (10) the plural markers *-er* in *Büch-er* 'books' and *-e* in *Freund-e* 'friends' are attached twice:

- (9) So betrachtet müsste der Unterricht sehr viel individueller und offener gestaltet werden: bringt eure Lieblingsbücher mit und diskutiert sie, und wenn ihr *Bücherbücher* sterbenslangweilig findet, hey, es gibt auch zu zahlreichen Filmen und Spielen bereits komplette Bücherserien und Graphic Novels.¹⁴

¹²Internet-forum entry, 2009-07-28.

¹³*Süddeutsche Zeitung* [German newspaper], 2016-07-23/24, p. 39. We are very grateful to Ursula Götz for spotting this example and sharing it with us.

¹⁴Internet-forum entry, 2010-08-12.

‘Seen from this perspective, lessons should be organised much more individually and openly: bring your favourite books along and discuss them, and if you find that *books-books* are deadly boring, hey, there are also whole book series on films and games as well as graphic novels.’

- (10) nächstes thema. ich brauche einen freund. also, *freunde**freunde* habe ich allemal genug, aber ich brauche einen festen freund.¹⁵
 ‘Next topic. I need a friend. Well, *friends-friends* [= pals] I’ve got enough, I need a boy-friend.’

In conclusion, it is not only not self-evident, which of the two constituents might serve as a head, but also whether we deal with a headed structure at all.

A second kind of currently productive full reduplication in German, the reduplication of bare verb stems, illustrated in (11) and (12), poses even more severe questions with regard to headedness:

- (11) ...drei vier dünne scheiben frischen ingwer ungeschält mit heißem wasser übergießen, paar minuten ziehen lassen löffel zucker umrühren köööstlich und **fühl-fühl** füsse sind warm¹⁶
 ‘Pour hot water on three or four thin slices of unpeeled ginger, let it draw for several minutes, add a teaspoon of sugar, stir – delicious, and *feel-feel* feet are warm.’
- (12) **freu-freu** Der erste Award hat meinen Blog erreicht :)))¹⁷
 rejoice-rejoice the first award has my blog reached
 ‘*being glad* The first award for my blog!’

The use of bare verb stems is widespread in computer-mediated communication, especially in chat rooms, guestbooks, forums, and newsgroups. Typically, they are enclosed by two asterisks. These bare verb stems are uninflected verbs which lack any inflection marker, even the otherwise obligatory infinitive suffix *-en* (the German term for these free-standing verb stems, coined by Teuber (1999), is “Inflektiv”, a somewhat confusing terminology when viewed from an English perspective; they are termed “Non-Inflectional Constructions” in Bücking & Rau (2013)). Here, roughly speaking, the function of bare verb stems is to depict sounds or to comment on an utterance or event by referring to a concomitant non-linguistic activity, such as grumbling, blinking, laughing or being

¹⁵Blog entry, 2009-07-19.

¹⁶Internet-forum entry, 2003-01-08.

¹⁷Newsgroup and forum corpus, Richling (2008).

glad (cf. Teuber 1999: 22–25; Schlobinski 2001: 193–206; Pankow 2003: 116–121; Bücking & Rau 2013: 76–82). For the most part, they are used in their simplex, non-reduplicated form, but reduplication is very common, too. The reduplicated forms express a prolonged way of the activity or state the single verb refers to; therefore they are analysed as expressing durative aspect in Freywald (2015: 935–938). Crucially, while reduplicated bare verb stems often have such iterative semantics, there is no restriction to iterativity. Verbs expressing states, such as *freuen* ‘to be glad’ in (12), are reduplicated, too. Thus, there is a structural meaning of the reduplication process as such, namely that of “extended duration of the denoted activity” (Freywald 2015: 936).

As to headedness, there is no modifying relation between the two reduplicated bare verb stems at all. The interpretation is tied to the reduplicative pattern itself and not to any semantic relation between the two parts. Thus, there is a clear indication that we deal with non-headed structures here.

The reduplication patterns discussed above, particularly the reduplication of nouns (cf. (6)), raise questions with respect to headedness that arise in a similar way with copulative, or more precisely: coordinative compounds, such as *Spieler-trainer* ‘player-coach’. These compounds are categorised as *Kopulativkomposita* ‘copulative compounds’ in the German tradition, but labelled “coordinative appositive compounds”, for instance, in Olsen (2015a: 368–369), in order to separate them from so-called “co-compounds” (Wälchli 2005; Arcodia 2018) (or: *dvandvas* in Sanskrit terminology). The latter refer to referents or concepts which represent “the sum of the meanings of the constituent lexemes”, which typically “form a ‘conceptual unit’”, for example Modern Greek *maxeropíruna* ‘cutlery’ (lit. knife-fork) (Arcodia 2018: 1198–1199). The former, in opposition, refer to referents which combine characteristics of both constituents; these two constituents usually do not form a natural conceptual unit (cf. Wälchli 2005: 5; Arcodia 2018: 1198) (as, for example, in the English compound *singer-songwriter* or in the German compound *Dichterkomponist* ‘poet-composer’).

In German, the *coordinative appositive compound*-type is prevalent (as it is in European languages in general; cf. Arcodia 2018 for an investigation of areality). The problem with headedness in German coordinative appositive compounds arises from the fact that they lack a determinative structure. Rather, the relation between the two constituents is symmetric: a *Dichterkomponist* is a person who is a poet and a composer at the same time. With regard to the English equivalents, such as *singer-songwriter*, *poet-translator* etc., Plag (2003) therefore concludes: “They could be said to have two semantic heads, neither of them being subordinate to the other. [...] both members equally contribute to the meaning of the compound” (Plag 2003: 146).

Contrary to this view, findings from an earlier empirical study on the interpretation, perception and production of coordinative appositive compounds in German show that a semantic symmetry between the two constituents is not justified by speaker judgements (Breindl & Thurmair 1992). There is a clear preference for an asymmetric interpretation, which suggests that, in fact, the two parts do not equally contribute to the meaning of the compound. Instead, in the majority of cases, the second constituent is interpreted as semantically dominant (which, among other reasons, brings Breindl & Thurmair to dispense with the category “Kopulativkompositum” altogether).

At the level of morphological structure the situation is even less unclear. Concerning their grammatical features coordinative appositive compounds behave like headed structures quite consistently (cf. Olsen 1990b: 143; Olsen 2015a: 369). Gender and inflection class of German coordinative appositive compounds is always determined by the right constituent, which has therefore to be considered the morphological head. See Breindl & Thurmair’s (1992: 34) examples in (13):

- (13) a. Fürst-bischof(M) < Fürst(M) + Bischof(M) (German)
 prince-bishop
 ‘prince-bishop’
 b. Mantel-jacke(F) < Mantel(M) + Jacke(F)
 coat-jacket
 ‘coat jacket’
 c. Radio-wecker(M) < Radio(N) + Wecker(M)
 radio-alarm.clock
 ‘clock radio’

Having said that, it is remarkable and perhaps no coincidence that the constituents of coordinative appositive compounds very often belong to the same gender class so that a gender conflict cannot arise in the first place (as in (13)a). There are numerous examples for same-gender coordinative appositive compounds, for example *Kaiserinkönigin* ‘empress-queen’, *Fürstabt* ‘prince-abbot’, *Dichtersänger* ‘poet-singer’, *Gottkönig* ‘god-king’, *Kinocafé* ‘cinema-café’, *Strichpunkt* ‘semicolon, lit. dash-dot’, and many more (all examples are attested and come from Breindl & Thurmair 1992: 34). Hence, a certain degree of ambivalence in terms of relational (a)symmetry remains.

2.3 Hidden rulers: Invisible heads

Finally, we encounter structures which lack a visible (or audible) head but undergo effects of a head, such as, for example, case marking and theta-role assign-

ment. This leads to the indirectly obtained inference that in these cases a head must be structurally present even if it is not phonetically expressed. Prototypical cases are different kinds of ellipses which – if not purely pragmatic in nature – require that the dropped element is reconstructable from the linguistic context through some kind of identity (semantic, grammatical, phonological) with an antecedent.

However, there are more puzzling cases of ellipsis; in this section we point briefly to two cases of verbal ellipsis which are not easily categorised as simple cases of antecedent ellipsis under identity. The first phenomenon is auxiliary ellipsis in subordinate clauses, a kind of ellipsis that is particularly frequent in Early New High German (Demske-Neumann 1990; Breitbarth 2005). The omission of the (supposedly finite) auxiliary in (14), which was taken from Demske 2022: 128, this volume, ex. (5a) – is apparently not immediately licensed by any antecedent:

- (14) vnd bekamen gleich am Morgen vor tags wiederumb den
and got right on.the morning before day again the
Maistral, welchen wir [...] mit frewden angenommen ____
mistral which we with pleasure accepted
‘Right in the morning before daylight, we got the mistral which we
welcomed with pleasure.’

We are here dealing with a perfect construction that would normally consist of an auxiliary HAVE or BE plus a participial form of a lexical verb. The challenge is now that there is no suitable antecedent of the omitted auxiliary available (a form of HAVE in this case), neither within the linguistic nor within the extra-linguistic context. At the same time, it is evident that the subordinate clause is finite, judging, for example, from the presence of the subject *wir* ‘we’.

As Demske (2022) argues, these cases of auxiliary omission represent a type of antecedent-correlated ellipsis in its own right. According to Demske, what is reconstructed during the resolution of the missing auxiliary information is grammatical information which is provided by the matrix clause via the linking subordinating element that introduces the subordinate clause. Thus, we can consider omitted auxiliaries in Early New High German as instances of “silent heads”.

A second candidate for a silent head is the unrealised infinitive of a lexical verb in modal verb constructions in Contemporary German. As a default, modal verbs take a non-finite verb phrase as their complement, as illustrated in (15):

- (15) Darf ich noch einen Keks essen? (German)
 may I still a biscuit eat
 'May I have another biscuit?'

Especially in informal, spoken language the head of the complement VP, the infinitive, is regularly missing, leading to utterances like those in (16):¹⁸

- (16) a. Darf ich noch einen Keks? (German)
 may I still a biscuit
 'May I have another biscuit?'
 b. Kann ich eine Cola?
 can I a cola
 'Could I have a cola?'
 c. Muss ich den ganzen Apfel?
 must I the whole apple
 'Do I have to eat the whole apple?'

Without doubt, the interpretation of the missing infinitive is dependent on the situational, i.e. the extralinguistic, context. The head of the verb phrase selected by the modal verb can not be reconstructed with respect to an antecedent in the preceding discourse. So, either we observe a process of transitivity of modal verbs or we deal with pragmatic ellipsis here, where the general meaning of the infinitive has to be inferred from the communicative situation.

The first option would fit in with the behaviour of the modal verbs *mögen* 'to like', *können*₁ 'to be able to', *möchten/wollen* 'to want'. The transitive use of these modal verbs is entirely acceptable in modern German:

- (17) a. Sie mag Kekse. (German)
 she likes biscuits
 'She likes biscuits.'
 b. Sie können Rumba.
 they can rumba
 'They are able to dance the rumba.'
 c. Willst du eine Cola?
 want you a cola
 'Would you like to have a cola?'

¹⁸For a comprehensive corpus study and analyses concerning patterns of use and communicative functions of 'bare' modal verbs cf. Kaiser (2017).

In contrast to the transitive modal verbs in (17), the modal verbs *dürfen/können*₂ ‘to be allowed to’, and *sollen* ‘to be supposed to’ from the examples in (16) undergo restrictions which are quite unexpected in transitive verbs. For example, as opposed to the verbs in (17), they cannot be combined with complement clauses (cf. (18)), they cannot be used in the passive (cf. (19)), and they cannot occur in embedded clauses (cf. (20)):

- (18) a. * Sie darf/kann, dass sie noch einen Keks isst. (German)
 she may/can that she still a biscuit eats
 intended meaning: ‘She is allowed/supposed to eat another biscuit.’
 b. Sie mag/möchte (es), dass du noch einen Keks isst.
 she likes/wants (it) that you still a biscuit eat
 ‘She likes it that you’ll have another biscuit.’
- (19) a. * Heute werden Kekse gedurft/gekonnt. (German)
 today are biscuits may.PTCP/can.PTCP
 intended meaning: ‘It is allowed/supposed to eat biscuits.’
 b. Kekse werden immer gern gemocht/gewollt.
 biscuits are always gladly like.PTCP/want.PTCP
 ‘Biscuits are always fancied by all.’
- (20) a. * Er wundert sich, dass er heute eine Cola kann/darf. (German)
 he wonders REFL that he today a coke can/may
 intended meaning: ‘He is surprised that he is allowed to have a coke today.’
 b. Er wundert sich, dass sie Rumba mögen/können.
 he wonders REFL that they rumba like/can
 ‘He is surprised that they like/are able to dance the rumba.’

In light of these observations, it is not plausible that the direct objects in (16) are complements of (transitivised) modal verbs. Rather, it seems more appropriate to assume that the object is the complement of a phonetically unrealised infinitive, namely the “silent” head of the VP that is selected by the modal verb.

As outlined above, this silent verbal head is not recoverable from the previous linguistic context; it has no antecedent. Thus, one option is to consider the ellipsis as being pragmatically licenced. Another option is to assume that the verbal head position is filled by a “zero verb”, which is a verb with semantic and syntactic properties but without phonological form. Van Riemsdijk (2002, 2012)

suggested zero verbs in modal verb constructions in Swiss German. Van Riemsdijk (2012: 22) argued that the utterances in (21) contain the “silent” non-finite verb *gaa* ‘to go’:

- (21) a. wil si het müese i d schuel [GAA] (Swiss German)
 because she had have.to in the school go
 ‘because she should have gone to school’
 b. das mer no-ni händ döörfe häi [GAA]
 that we yet-not have may home go
 ‘that we were not allowed to go home yet’

In parallel, the constructions in (16) might contain a zero verb with the quite un-specific semantics of ‘having / consuming / getting something’. This is supported by the fact that verbs with other meanings are not as easily omissible as verbs with a HAVE-semantics, cf. (22):

- (22) *Darf/Kann ich heute Nachmittag meine Oma? (German)
 may/can I today afternoon my grandma
 intended meaning: ‘May I visit my grandma this afternoon?’

A structure which is inspired by the zero-verb analysis in van Riemsdijk (2002, 2012) could look like this:

- (23) a. Darf ich noch einen Keks [HABEN]? (German)
 may I still a biscuit [have]
 ‘May I have another biscuit?’
 b. Kann ich eine Cola [HABEN]?
 can I a coke [have]
 ‘Could I have coke?’
 c. Muss ich den ganzen Apfel [HABEN]?
 must I the whole apple [have]
 ‘Must I eat the whole apple?’

Under such an analysis, structures that involve bare modal verbs divide into two categories in German: first, “true” transitive uses of modal verbs, as illustrated in (17), and second, modal verbs that select a VP that is headed by a “silent verb” with the general meaning HAVE (cf. (23)).

What “silent verbs” in modal verb constructions and auxiliary ellipsis in subordinate clauses have in common is that the absence of heads is only apparent.

There are clearly visible head effects, such as finiteness in the case of auxiliary ellipsis and case and theta-role assignment in the case of seemingly headless VPs which are selected by a modal verb. Thus, these kinds of heads can be seen as elements that take their effect in hiding.

3 This book

The above walk through some grammatical phenomena in German that might possibly pose problems for the notion of “head” may remind us of the fact that there are still a number of unanswered questions and loose ends with regard to head concepts – both at the empirical and the theoretical level. In this book, we intend to take up the thread of the previous discussions on heads, which started gathering speed in the 1980s with the seminal contributions of Zwicky (1985) and Hudson (1987). The problems that were formulated in this debate and in its aftermath (cf. Corbett et al. 1993 and subsequent work) are still with us. Furthermore, problems and problem-solving are generally quite framework-dependent.

With the collection of papers in this volume we aim at putting a new spin on the discussion of (notions of) heads in syntax, morphology, and phonology. This involves the intention to enlarge the empirical grounding and to further the theoretical understanding and show pathways for grammatical modelling.

To this end, the aim of this book is to approach the concept of *headedness* from its margins. Thus, central questions of the volume relate to the nature and grammatical status of heads and their implications for grammatical theory (Martin Salzmann, Manuela Korth, Hubert Haider, Renate Raffelsiefen) and the distinction between headed and non-headed structures (Stefan Müller, Patrizia Noel Aziz Hanna), to the origin of head effects (Yury Lander, Ulrike Demske), to the diachronic processes of gaining and losing head status (Jörg Bücker), and to the thought-provoking question as to whether grammar theory could do without heads at all (Andreas Nolda).

Most of the papers in this volume are characterised by a decidedly empirical approach, focussing on phenomena of one of the most-studied grammatical systems of the world, German. They bring new ideas for grammatical modelling and use an improved theoretical toolkit. It is thus to be hoped that the contributions to this volume stimulate and reinvigorate interest in one of the basic notions of grammatical theorising.

The collected papers view the topic from diverse theoretical perspectives (among others Mainstream Generative Syntax, HPSG, Optimality Theory) and different empirical angles, covering also typological and corpus-linguistic accounts, with a focus on data from German.

In sum, this volume contains contributions that discuss grammatical phenomena where heads might be involved or might not be involved, where their effects might be felt or not, or where it is in any case unclear what relevance the very notion of head should still possess. In that sense, they approach grammar and grammatical theory with the idea in mind that anarchy might in fact be a feasible (and attractive) state of being.

And now, to use a different metaphor at the very end: just as with the *akephaloi* and *blemmyes* of ancient Greek fame, i.e. those mythical beings who had their faces on their chests, there might be a certain ambivalence in grammar. Depending on how you look at it/them, heads or head-like structures might be there (albeit maybe in an unexpected way), or they might be completely absent, as non-essential elements of grammatical theorising as in Figure 1¹⁹.



Figure 1: Figure from Hartmut Schedel's *Liber Chronicarum*; Nuremberg, 1493

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¹⁹Figure taken from Wikimedia 2022-08-25. [https://commons.wikimedia.org/wiki/File:Nuremberg_chronicles_-_Strange_People_-_Headless_\(XIIr\).jpg](https://commons.wikimedia.org/wiki/File:Nuremberg_chronicles_-_Strange_People_-_Headless_(XIIr).jpg)

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Chapter 2

Three sources of head effects

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This paper elaborates on the idea that properties which are usually ascribed to heads have one of three sources: wide scope in semantic composition, information load (relevance), and origin from an appositive structure. Starting with constructions combining property words with words denoting objects, we proceed to possessive constructions, adpositional constructions and even clause-level phenomena, and argue that in all of them, the assignment of the relevant head properties to different elements may be motivated by the diversity of the sources. Given this picture, we tentatively conclude that in most cases we need not think of heads, but rather of head properties.

1 Introduction

This paper develops the claim that headedness, or more precisely, head effects owe their existence to several different factors. Taking constructions with adjectival words as an illustration, I will argue for three sources of head effects and then show that the same sources are relevant for other constructions as well. While the concept of “head” is basic in many linguistic theories, calling something “head” is often rooted in nothing more than linguistic tradition. The authors of grammatical descriptions and theoretical treatments make precise what they mean by “being the head” very rarely. Here I rely on the following properties which are frequently ascribed to the head of a construct¹, cf. discussion of

¹I use the term construct rather than, for example, constituent, since the properties listed here are in principle applicable to discontinuous dependencies.



head properties in Zwicky (1985); Corbett et al. (1993); Croft (1996); Croft (2001: 242–254) *inter alia*:²

- the head is required in the construct,³
- the head can determine the external syntax of the construct: the syntactic distribution of the construct (including the forms of the elements that combine with the construct) is often predictable from properties of the head,
- the head can determine the internal syntax of the construct: it makes it possible to predict what elements (simplex or complex) may appear within the construct and assigns syntactic functions to these elements; such function assignment may manifest itself in rules governing the word order and form of any participant of a construction,
- the head can be chosen as the locus of morphosyntactic marking,
- the head can appear as a distributional equivalent of the construct (i.e. it can appear alone in the same positions as the construct).

Though commonly accepted, these properties deserve a few comments.

First, I admit that head properties are applicable to both words and phrases⁴ (but in theories that allow only lexical heads, the points provided below should

²Many other tests proposed in the literature are not discussed here. First, I do not use semantic tests, since I think of headedness as a grammatical rather than a semantic phenomenon. Second, I avoid tests that require theory-specific analyses. An example of such a test requires that the head is the category determinant, i.e. “[i]t determines the syntactic category of the construct as a whole” (Zwicky 1993: 297). Presumably, this test is highly dependent on our view on syntactic categories, which, however, is not stable enough.

³Importantly, here I only mean overt elements and abstract away from the issue of null elements in syntax. Note, further, that in most syntactic theories not only heads are assumed to be obligatory but also their arguments/complements. This may lead to confusion: according to this criterion, the same elements may be depicted as heads and as their arguments. It is not obvious to me that this does not reflect the actual situation, though. For example, whenever one speaks of the grammatical category of definiteness, one assumes a parameter whose value must be specified, and this looks more like a specification of an argument. At the same time, definite articles are often assumed to head the nominal phrases on the basis of this and other criteria. Thus, indeed, the same elements sometimes can be treated as heads and as arguments depending on the perspective.

⁴Phrasal heads fit well into the definitions of ‘heads’ provided by some theories, e.g., by Categorical Grammar (Dowty 2003). Furthermore, it is normal to think about phrasal heads when discussing such patterns as relative clause constructions (Keenan & Comrie 1977). Though it is possible that in the relevant discussions of relative clauses, the term “head” is used differently from the discussions of many other grammatical patterns (since it is based primarily on semantics), the “heads” of these constructions often display the properties listed above.

be reformulated using the notions of “projection”, “percolation”, etc.). Furthermore, head properties can be discussed with respect to roots and affixes, but here I abstract away from this issue. Second, the original notion of headedness in non-coordinating constructions presupposes asymmetry but many of the head properties do not. For example, obligatoriness often holds for several parts of the construction (e.g., in *the dog* both the noun and the determiner are obligatory). Third, head properties do not unambiguously point to the head, since they are sometimes distributed among different elements. Fourth, sometimes a property which is typical for alleged heads allows an alternative explanation. For example, the locus of morphosyntactic marking is often determined with respect to the edge of a phrase, cf. Klavans (1985); Anderson (1992: 210), or such marking occurs on all words of a constituent that are available to such marking, see Lander & Nichols (2020) for a preliminary typology.

With all this in mind, I prefer to speak not of the heads but of the head effects and head properties. This is not to deny the very idea that something may be treated as the head of a constituent. Head properties probably tend to converge, but this is still worthy of cross-linguistic and cross-constructual investigation. At the same time, I admit that head effects are facts of grammar and as such result from grammaticalization of certain principles leading to asymmetry between elements.⁵ In Section 2, I discuss the problem posed by the fact that adjective-like words sometimes have properties of heads of nominal phrases. In Section 3, it is argued that this phenomenon receives different explanations in different constructions. Section 4 shows that similar explanations are applicable to possessive, adpositional and even clause-level patterns. The final section 5 summarizes the paper.

2 The Adjectival Problem

Below I assume that from the semantic perspective we can think of more “adjectival” words (ADJS) and more “nouny” words (NS), irrespective of part-of-speech distinctions. This is in accordance with current typological practices. For example, Dryer (2013) in his discussion of the order of “modifying adjective” and “noun” states that for his purposes

⁵The term grammaticalization is used here broadly, as “the shifting from relatively freely constructed utterances in discourse, whose idiosyncratic form is motivated only by the speaker’s goals for the immediate speech event (...) to relatively fixed constructions in grammar, seen as arbitrary (though ultimately not necessarily unmotivated) constraints on the speaker’s output” (Du Bois 1984: 346).

the term *adjective* should be interpreted in a semantic sense, as a word denoting a descriptive property, with meanings such as ‘big’, ‘good’, or ‘red’. [...] In some languages, like English, adjectives form a distinct word class. In other languages, however, adjectives do not form a distinct word class and are verbs or nouns [...]. (Dryer 2013)

A similar semantic understanding of “adjectives” is found in many other typological works; cf. Haspelmath (2010: 670), Rießler (2016: 6) among others. Essentially, it is intended for comparing languages with very different systems and providing generalizations which are not bound by specific grammatical characteristics, irrespectively of whether Ns and ADJs have the same grammatical distribution and are contrasted with other content words, ADJs and clearly verbal expressions constitute one part of speech grammatically contrasted with nouns, or any other situation. Notably, however, I do not discuss all “property words” here: while being interested in ADJs that apparently serve as heads of NPs, I remove from consideration all kinds of ADJs which behave in parallel to relative clauses.⁶

Traditional European linguistics seemingly assumes that in combinations like (1) ADJ is a modifier of N.

- (1) a. ‘small’ + ‘animal’
- b. ‘old’ + ‘person’
- c. ‘private’ + ‘person’
- d. ‘old-fashioned’ + ‘book’
- e. ‘principal’ + ‘investigator’

This assumption is reflected in the discussions of the concept of head. For example, among the criteria of headedness listed by Zwicky (1985) in his now classic paper, we find a test for *semantic headedness* which is described in the following way: “in a combination X + Y, X is the ‘semantic head’ if, speaking very crudely, X + Y describes a kind of the thing described by X” (Zwicky 1985: 4). According

⁶The fact that in many languages ADJs pattern together with verbs is well-known, cf. Beck (2002) and the literature cited there. However, there is evidence that sometimes ADJs can be described as reduced relative clauses even in languages where adjectives are contrasted with verbs. For example, in Tanti Dargwa (East Caucasian), adjectives are clearly distinct from verbs in many morphosyntactic properties. Yet when appearing as attributes, they manifest a subtype of relative clause and can have overt subjects which may but need not coincide with the modified noun (Sumbatova & Lander 2014: 198–199). Cinque (2010) argued that even in some Standard Average European languages, adjectival expressions can be divided into reduced relative clauses and base-generated expressions (which he considered to represent functional heads).

to this test, the N in the combinations such as (1) should be the head, at least if we follow Wierzbicka (1986: 359) in accepting that unlike an adjective, “a noun designates ‘a kind of (person, thing, or whatever)’ , rather than merely a single property” (as an adjective does).⁷

The “Adjectival Problem” I discuss below is related to the fact that in many languages the reality does match this picture, so that ADJs combined with Ns display head effects. For example, diminutive (‘small’) and augmentative (‘big’) expressions are sometimes based on the constructions with words with the meaning of ‘child’ and ‘mother’, cf. Matisoff (1992); Jurafsky (1996); Heine & Kuteva (2002: 65–67) among others. This kind of construction often develops from possessives: ‘child of X’ turns into ‘small X’, ‘mother of X’ turns into ‘big X’, etc. In adnominal possessives the possessee normally has head properties, so ADJs with the meaning ‘small’ and ‘big’ are expected to behave as syntactic heads then. For example, in (2a), where the noun for ‘daughter’ refers to the property of being small, it takes a “head-marking” suffix, which normally marks the feminine gender possessee in possessive constructions (2b) and assigns the following noun the possessor function. This pattern goes against the assumption that in a combination of an ADJ and a N, the former should be syntactically a modifier of the latter.

(2) Miya (Afro-Asiatic, Chadic; glosses are mine – YuL)

- a. wùn-a baday
 daughter-POSS.F basket
 ‘small basket’ (Schuh 1998: 54, 258)
- b. ngèn-a vórka
 name-POSS.F boy
 ‘the boy’s name’ (Schuh 1998: 249)

This phenomenon is not restricted to occasional combinations. Ross (1998) and Malchukov (2000) describe numerous languages which display the phenomenon dubbed “possessive-like attribute constructions” by the first author and “dependency reversal” by the second author. In such constructions, an assumed semantic modifier appears as an apparent syntactic head of the phrase. The relevant pattern is illustrated in (3a), whose comparison with the adnominal possessive construction (3b) suggests that the ADJ here appears as the possessee-like head (taking a marker which normally indexes the possessor on the possessee) and

⁷A reviewer pointed out that nouns like *thing* and *person*, which may be thought of as semantically almost vacuous, present a problem for this approach.

the *N* behaves as the possessor-like dependent (preceding its presumable head in accordance with the general “head-final” order in the language; cf. Green (1999: 69–70)).⁸

(3) Ulwa (Misumalpan; Koontz-Garboden & Francez 2010: 200)

- a. Alberto pan-ka
Alberto stick-PR.3SG
‘Alberto’s stick’
- b. al adah-ka as
man short-PR.3SG INDF
‘a short man’

Ross (1998), in his detailed study of the construction in Oceanic languages, showed that the range of apparent possessee-like elements in Oceanic possessive-like attribute constructions is closed and typically includes the concepts belonging to the semantic domains of DIMENSION, VALUE and AGE. This list is remarkable because, as was noted by Ross himself, it consists of almost all the categories which belong to the core of the semantical adjectival category as according to Dixon (1977), the exception being the domain of COLOR.

In other languages, however, the range of adjectival concepts participating in this kind of construction is open. An example is presented by West Caucasian languages, here illustrated with West Circassian. In this language, *NS* and *ADJS* constitute a complex stem, cf. Lander (2017), where the *N* precedes the *ADJ* and is incorporated into it (4a). There are several arguments for this direction of incorporation. First, such a description makes the nominal complex consistent in branching, since in other similar patterns the preposed *N* is incorporated into the following element (4b). This goes in line with the overall left-branching of the West Circassian stems and morphosyntax in general, cf. Korotkova & Lander (2010). Second, and more importantly, the distribution of a nominal complex sometimes depends on an *ADJ*. In particular, it is the *ADJ* that determines the (pragmatic) possibility of adding a comparative marker to the whole nominal complex, as in (4c).⁹

⁸The glosses are changed according to Koontz-Garboden & Francez’s (2010) treatment.

⁹The description according to which the *ADJ* heads the nominal complex in West Circassian was originally proposed by Svetlana Toldova together with the author.

(4) West Circassian (West Caucasian; corpus data: adyghe.web-corpora.net)

- a. adəgjejə-m jə-q^wəšhe-xe-r, jə-psəχ^we-čər-xe-r
 Adyghea-OBL POSS-mountain-PL-ABS POSS-river-tumultuous-PL-ABS
 daxe-x
 beautiful-PL
 ‘The mountains of Adyghea, its tumultuous rivers are beautiful.’
- b. ɤ^wəč’ə-maste-m r-e-laž¹e
 iron-needle-OBL INSTR-DYN-work
 ‘S/he is working with an iron needle.’
- c. mə λ’ə-m nah c’əf-halel mə dwənaje-nefəne-m
 this man-OBL more person-generous this world-bright-OBL
 tje-b-ɤ^wete-n-ep
 LOC-2SG.ERG-find-MOD-NEG
 ‘You will not find a person who is more generous than this man in
 this bright world.’

Thus, ADJs can behave as apparent heads – a phenomenon which is probably not that rare. But in some languages ADJs have head properties outside of the “dependency reversal” phenomenon patterns as well. As mentioned earlier, Dixon (1977) argued that the core of the semantic adjectival category includes the words denoting DIMENSION, VALUE, AGE and COLOR. This conclusion partly relied on languages with a grammatically distinct closed class of adjectives covering exactly the semantic domains listed above. Some of these languages (e.g. Hausa) distinguish the adjectival class on the basis of dependency reversal, but others do not. If we look at the morphosyntactic properties mentioned by Dixon for such classes, we will find that they include the expression of certain categories of NPs such as number or gender. Now, while the expression of such categories as number, case and gender on attributes is usually treated as agreement which marks their dependent status, the logic can be reversed as easily as dependency relations can be. Marking of a category of a whole phrase makes its host a morphosyntactic locus. Being a morphosyntactic locus can be a head property. Therefore, the members of small adjectival classes sometimes display head effects, even though this does not make them unambiguous heads of the nominal phrases.

This logic can be further extended to many systems with an open adjectival class whose members display the so-called NP-internal agreement (cf. Corbett 1993: 21–23 for Russian). Curiously, Moravcsik (1995) noticed that adjectives are

more likely to agree with their nominal heads than possessors (at least possessors displaying the *Suffixaufnahme*, i.e. double case marking). Lander (2010) argued that if a presumable modifier agrees in NP-categories, it normally can be used without the noun head, hence representing the whole NP and demonstrating a head property.¹⁰ Thus, ADJs may have head properties even where they are usually thought to be modifiers.¹¹

3 Ways of capturing head effects

In this section, I discuss explanations that can be offered for head effects. As we will see, there are several factors at play here.

3.1 Scope-based compositional effects

When adjectives are considered modifiers of nouns, trivially, they are assumed to be added to nouns. If so, they should be semantically added higher than nouns (“after nouns”) and should have scope over a noun. Some languages might rely on this in constructing their morphosyntactic structures. Here, a compositionally higher element (i.e. an element having semantic scope over other relevant elements) displays head effects.

Not all ADJs need to have scope over a noun, though. As known from formal semantic studies of adjectives (see Kamp (1975) and Siegel (1976) for original discussion and McNally (2016) for a recent overview), many ADJs can be interpreted as predicates restricting sets of individuals. Their combinations with Ns are interpreted as intersections of two sets: e.g., *black flags* refers to the intersection of a set of black individuals and a set of flags. Hence, combinations of such ADJs (called *intersective* ADJs) and Ns need not involve semantic asymmetry, although the asymmetric option of composition – when an adjectival predicate narrows down the set of possible referents provided by the N – is still retained.

On a par with intersective ADJs, we find *non-intersective* ADJs, whose interpretation requires the knowledge of the N being modified and as such has scope over

¹⁰Languages differ in whether there is a need to postulate a null modified noun in such structures. In Russian, for example, the adjective used without a noun nevertheless takes inflection based on the formal (not semantic) gender of the omitted noun, which evidences for a null noun controlling NP-internal agreement. However, this does not deprive the adjective of its formal head properties.

¹¹In the generative tradition, adjectives are often thought as heading some functional projections of the noun (and hence presumably being able to take some head properties) at least since Abney (1987). See Cinque (2010) for a discussion.

that *N*'s denotation. Some of them (e.g. *main*, *skillful*) still determine a subset of the set restricted by the *N* with which they combine. Interestingly, though, such *subsective non-intersective* meanings are often conveyed by nouns and hence pretend to have head properties within an NP: for example, the meaning 'main' is regularly expressed as 'the head of' and the meaning 'skillful' is often expressed as 'the master of'.

Finally, we find *non-subsective* (or *privative*) ADJs with the meaning 'former', whose combinations with *NS* do not even establish a subset of the denotation of the latter (see Kamp 1975, Kamp & Partee 1995, Partee 2010 for discussion).¹² Occasionally such concepts are expressed by basically subsective or even intersective ADJs with the meaning 'old' (e.g., in Turkish), and in some languages concepts like 'former' are conveyed by grammatical means such as a specific derivational morpheme (like English *ex-*) or nominal tense (Nordlinger & Sadler 2004). Still, whenever the privative concepts are expressed by dedicated words, non-subsective ADJs may show head properties. For example, the concept 'former' sometimes is expressed by the noun for 'trace of' appearing as the possessee in a possessive construction (see Lander 2009 for discussion):

- (5) Sundanese (Austronesian; Hardjadibrata 1985: 36)
 urut pamajikana-na
 trace wife-PR.3SG
 'his ex-wife'

Unfortunately, I am not aware of studies investigating the differences of expression of different types of ADJs in this perspective cross-linguistically.

3.2 Relevance

Malchukov (2000: 55) suggested that the dependency reversal may have a functional motivation, namely the "discourse-pragmatic salience of the attributive constituent" and provided facts from various languages that point in this direction. For example, in Latin the dependency reversal construction like that in (6) was typically used either when the semantic modifier was non-restrictive, or when it was contrastive or emphatic.

¹²A reviewer pointed out that similar but different problems arise with intensional expressions such as *alleged*. Interestingly, however, it is not even very clear that such expressions should be treated as ADJs – in fact, in many languages they are served by relative clause constructions (including participial ones).

- (6) Latin (Indo-European, Italic; Pinkster 2015: 949)
 arbor-um quae hum-i arid-o atque harenos-o
 tree-GEN.PL which soil-GEN.SG dry-SG and sandy-ABL.SG
 gign-untur
 grow-3PL.PASS.PRS
 ‘trees, which grow in a dry and sandy soil’

Following this line, I propose that an element of a constituent sometimes shows head effects due to its extraordinary information load, called *relevance* below.¹³ (It is true, however, that defining the relevance and measuring the information load precisely is a problem.)

There can be different reasons to assign relevance to elements. In combinations of ADJs and Ns, the latter are presumably relevant by default as bearers of the lexical content which is normally needed for the identification of the referent. That is why quite often, when a (non-predicative) NP consists of a sole ADJ, some “assumed noun” is recovered from the context. This is probably a *raison d’être* of the notion of semantic headedness in Zwicky’s approach.

Yet an element can receive sufficient relevance due to other factors as well. For example, the increased relevance accompanies non-restrictiveness because there should be a specific motivation for the appearance of an element which does not help to identify a referent. Restrictiveness, however, cannot be given in absolute terms either. Some expressions determine classes of objects more or less easily. For example, the word *crocodile* determines the class of crocodiles, *green* determines the class of green things, and *insane* determines the class of what is thought to be insane in a given society. Surely, insaneness may be questioned (even in a court), a word can be used indirectly, there are color shades which are classified as green by some people and blue by others, and speakers do not always distinguish between crocodiles and alligators. Nonetheless, when one uses words like these, it is normally assumed that the speaker and the addressee determine what is meant relatively identically. Now, for most basic ADJs in Dixon’s sense (except for COLOR), the situation is different because their use relies heavily on the speaker’s evaluation. Since the speaker’s evaluation need not be shared by the addressee, these ADJs are the worst candidates to function as restrictive modifiers. This is not to say that they cannot be: the addressee often has to take the speaker’s perspective. Yet, such ADJs should not be that conve-

¹³Croft (1996, 2001: 257–259) relates the status of head with the “primary information-bearing unit” (PIBU), which certainly reflects this factor. Note, however, that for ADJ+N combinations, it is not that easy to determine what the PIBU is.

nient when other means of restricting the reference are possible. This makes their use marked, increases their relevance and makes it more possible for them to display head effects as shown in (2).¹⁴

3.3 Appositive structures

So far we assumed that ADJs should syntactically interact with NS. But in some languages ADJs themselves constitute phrases which syntactically are not necessarily subordinate to NS, cf. Rießler (2016: 13–14). Probably the most well-known illustration of this is provided by “non-configurational” Australian (primarily, Pama-Nyungan) languages where apparent combinations of NS and ADJs actually consist of autonomous nominal expressions which describe the same individual, cf. Blake (1983); Heath (1984) among others. For example, Blake (1983: 145) argued for the oft-cited sentence (7) that “there are in fact no noun phrases but [...] where an argument is represented by more than one word we have nominals in parallel or in apposition”.¹⁵

- (7) Kalkatungu (Pama-Nyungan; Blake 1983: 145)

cipa-yi tuku-yu yaun-tu yapi icayi
 this-ERG dog-ERG big-ERG white.man bite
 ‘This big dog bit/bites the white man.’

The idea that some combinations of NS and ADJs either manifest apposition of two (or more) nominals or have developed from appositive structures was developed for languages of other areas too; cf., e.g. Testelec (1998: 651–654) on Georgian, as well as numerous recent studies on the rise of configurationality in Indo-European languages (Luraghi 2010, Ledgeway 2012, Spevak 2015, Reinöhl 2016), see also Rijkhoff (2002: 19–22) and Louagie & Reinöhl (2022) for typologically informed discussion of such patterns. Reinöhl (2016: 46) summarized the relevant diachronic scenario in the following way:

¹⁴Thompson (1989) studied the function of “Property Concept Words” in natural discourse. According to her, ADJs do not typically restrict the meaning of a N, which – if present – is often either anaphoric or “empty” (i.e. describing only a very general category). Rather they are usually used either predicatively (in the absolute majority of cases) or as a means of referent introducing. While the predication function goes in line with the speaker’s evaluation, the referent-introducing function is not, at least at first glance. It is not obvious, however, that the latter function is not fulfilled by NS, even where they are semantically empty.

¹⁵But see Louagie & Verstraete (2016) and Blake (2001) for arguments that nominal expressions in Australian languages are often more integrated than it is often assumed.

Several authors have described how syntactically independent and coranking elements with a shared reference, for example local particles and local case forms, or demonstratives and nominals (typically in core cases), frequently co-occurred in a sentence. They would often stand adjacent to each other in accordance with Behaghel's principle that what belongs together semantically also stands together [...]. At some point, elements would co-occur in such a symmetrical group so frequently that the string is reanalysed as a single syntactic unit, that is as a phrase. (Reinöhl 2016: 46)

This suggests that even in configurational structures originating from appositives, ADJS which formerly constituted independent nominals and naturally had head properties there¹⁶ retain these properties for historical reasons. This concerns the morphosyntactic locus criterion (i.e. ADJS may retain marking characterizing the whole NP) and the related capability of appearance without a companion N (Lander 2010).

4 Extending the perspective

While I only illustrated the sources of head effects by the examples of combinations of ADJS with NS, the same factors play a role in other constructions as well. Below I briefly consider the three sources of head effects in the context of adnominal possessive constructions, adpositional phrases and clause level constructions.

4.1 Possessive constructions

Scope-based effects in possessive constructions relate to the fact that possessive relations involving the most prototypical (primarily, definite) possessors are used to establish the reference of the possessee (Keenan 1974), so the latter tends to be definite (Haspelmath 1999). Since the possessive relation operates with the denotation of the whole NP, a combination of the possessor with the marker of this relation must be compositionally higher and may display head effects. The fact that in phrases like *John's enemy* the phrase *John's* is as obligatory as the possessee may have resulted from grammaticalization of this. Another possible manifestation of the same phenomenon is observed in indirect possessive constructions in mostly right-branching Oceanic languages. In these constructions the reference to the possessor is accompanied by a classifier specifying the kind

¹⁶Historically, such adjectives may originate from combinations of modifiers and nominalizing pronouns, but this does not affect the reasoning presented here.

of possessive relation, which arguably shows some head properties (Palmer & Brown 2007). The following examples demonstrate that the possessive classifier which characterizes the relation as that of consumption and contains the possessor indexing appears to be a distributional equivalent of the whole construction (in the examples in this section brackets enclose possessive NPs):¹⁷

- (8) Kokota (Austronesian; Palmer & Brown 2007: 205)
- a. n-e ĩɑ=di manei [ye-gu kaku=ro]
 RL-3.S eat=3PL.OBJ s/he CNSM-1SG.PR banana=DEM
 ‘He ate my bananas.’
- b. n-e ĩɑ=di manei [ye-gu=ro]
 RL-3.S eat=3PL.OBJ s/he CNSM-1SG.PR=DEM
 ‘He ate my food.’

Relevance comes into play in possessive constructions when highly relevant possessors determine the features of NPs. Prominent NP-internal possessors control agreement in some languages, for example, in Amazonia (cf. Dixon 2000, Ritchie 2017) and Northern Australia (Meakins & Nordlinger 2017, although the details of these constructions vary; see also the recent volume (Bárány et al. 2019), which includes a detailed discussion of such patterns (Nikolaeva et al. 2019)).¹⁸ A related phenomenon is found in patterns where arguments of quantifiers are formally represented as their possessors, but still affect the behavior of the whole NP. For example, in (9), the internal possessor (which agrees with the possessee) seemingly controls the object gender/number agreement on the verb, while in (10), the genitive possessor arguably controls the subject number agreement on the verb:

- (9) Chimane (unclassified; Bolivia; Ritchie 2017: 663)
- Juan tǎj-je-bi-te [un mu’ Sergio-s]
 Juan(M) touch-CLF-POSS.APPL-3SG.M.O hand(F) the.M Sergio(M)-F
 ‘Juan touched Sergio’s hand.’

¹⁷Palmer & Brown (2007) suggested that the possessive classifier is a kind of noun. Lichtenberk (2009) contended this view and argued that such classifiers should not be considered heads. Even then, however, we may still think of them as displaying head properties.

¹⁸Note that there are other ways to describe these constructions. Thus, for (10) one might suggest either that it represents semantic agreement or that the noun for ‘majority’ can control either singular agreement (not illustrated here) or plural agreement. Further, in many examples, the agreement with internal possessors is apparent only: either one can postulate a covert clause-level argument which controls agreement but is coreferent to the internal possessor (as suggested for (9) by Ritchie) or one can assume that some features of the possessor are transferred to the possessee (cf. Lander 2011 for Tanti Dargwa).

- (10) Russian (Indo-European, Slavic; corpus data: ruscorpora.ru)
 [bol'sinstv-o *passažir-ov*] vyxodj-at
 majority-NOM.SG passenger-GEN.PL exit-NPST.3PL
 'Most passengers exit.'

Finally, possessive constructions may develop from appositive structures, where the possessor expression evidently has properties of the head of a nominal itself. The Oceanic indirect possessive construction presumably developed from the apposition of a possessive classifier and a possessee, so the head properties of the possessive classifiers may be due to this and not only their semantic function.

In many languages, appositive structures arguably serve as a source of the phenomenon of Suffixaufnahme, where the possessor displays head properties by taking the “external” case (becoming the locus of case marking of the whole NP) in addition to genitive (Plank 1995); cf. (11), where genitive markers arguably originated from pronouns bound by possessa, i.e. the construction could be interpreted as “in the ones of the one of the woman, in the ones of the nice (one), in the ones of the house, in the doorways” (Aristar 1995). Moreover, there are languages like Bilin, where the possessor can remain the only host for the external case marking and does not share this head property with the possessee (12).

- (11) Awngi (Afro-Asiatic, Cushitic; Aristar 1995: 435, after Hetzron 1976: 37)
 yuna-w-s-k^w-da ceŋkut-ək^w-da ŋən-ək^w-da
 woman-GEN.M-DAT-GEN.PL-LOC nice-GEN.PL-LOC house-GEN.PL-LOC
 abjel-ka-da
 doorway-PL-LOC
 'in the doorways of the woman's nice house'
- (12) Bilin (Afro-Asiatic, Cushitic; Aristar 1995: 435, after Hetzron 1976: 37)
 ti'idad adäri-γ^w-əd
 order lord-GEN.M-DAT
 'by the order of the lord'

According to Aristar (1995), the pattern (12) continues an appositive structure like '(by) the order, by the lord's one'. For us, this construction is interesting because it shows that the appositive origin of head properties does not imply their symmetric distribution on several elements of a construction.

4.2 Adpositional constructions

In adpositional constructions, scope-based head effects are trivial and widely assumed. Adpositions typically provide the semantic and syntactic information

relating nominals to their context and as such they have scope over these nominals. This explains why adpositions can show such head effects as being obligatory, governing the form of nominals in dependent-marking constructions and marking their function in head-marking constructions.

Less discussed is the fact that the “adpositional object” displays head properties in adpositional structures, presumably because of its informational relevance. At least in non-head-marking patterns it is usually at least as obligatory as the adposition itself. Sometimes we even find that an adposition can be omitted, so that its “object” turns out to be a distributional equivalent of the whole phrase: a well-known example is the optionality of *to* in British English *I gave it (to) him*. Another non-canonical situation is presented when an adposition specifies the relation provided by the case, so the apparent object of a adposition serves as a locus of marking of some external relation.

(13) German (Indo-European, Germanic; Donaldson 2007: 208)

- a. Ich habe die Zeitung auf den Tisch gelegt.
I.NOM have.1SG the.ACC newspaper on the.ACC table put.PTCP
‘I put the newspaper on the table.’
- b. Die Zeitung lieg-t auf dem Tisch.
the.NOM newspaper lie-3SG on the.DAT table
‘The newspaper is lying on the table.’

(14) Russian (Indo-European, Slavic; personal knowledge)

- a. ja položi-l gazet-u na stol
I.NOM put-PST newspaper-ACC.SG on table(ACC.SG)
‘I put the newspaper on the table.’
- b. gazet-a lež-it na stol-e
newspaper-NOM.SG lie-NPST.3SG on table-LOC.SG
‘The newspaper is lying on the table.’

Curiously, it is usually assumed that the direction (‘to’, ‘from’) and essive (‘in’) meanings have scope over the search domain (‘on’, ‘front’, ‘under’, ‘behind’, etc.); cf. *from* [*under* [*the bridge*]], see e.g. Cinque & Rizzi (2010). If we follow this assumption, in (13)–(14) case marking should be higher than the prepositional marking in the semantic structure. This looks confusing under the traditional account which assigns the head status to adpositions and assumes that the case appears deeper in the syntactic structure than the adposition. The assumption that both an adposition and its associate NP are allowed to have head properties, presumably, opens the door to more sophisticated modes of the semantic composition of such constructions.

Head effects originating from appositive structures are observed when an adposition develops from an adverb while its associate NP bears a case with the same function as an adverb, as in (15). Presumably, in such examples both the adposition and the case-marked NP are distributional equivalents of the phrase, allowing omission of the other element.

- (15) Bagwalal (East Caucasian; Sosenskaja 2001: 169)
hinc'-ib-a-la *č'ihir*-isa-n partal r-uk'a qanč-ibi
 stone-PL-OBL.PL-SUPER on N.PL-find-PTCP.N.PL things N.PL-be cross-PL
 'crosses were found on stones' (lit.: on stones, things that were found are crosses)

4.3 Clause level

The issue of headedness in the clause is very complex, partly because clauses themselves may be very different in what candidates for having head properties they contain. Yet several observations can be made. For example, scope-based head effects can be found for auxiliaries and similar functional elements (cf. Zwicky 1985), which presumably have scope over the predicate.¹⁹ The predicate, which is usually described as the head in the absence of auxiliaries, is normally the most relevant element of the clause, which further seems to have wide semantic scope over much of the clause. Most informationally loaded elements different from the predicate occur as well and they can have head properties, as seen in languages where the focused element (which presumably has the highest relevance value) takes clause-level morphosyntactic marking. For example, in Udi, the focused element takes a marker of agreement with the subject even when it is the subject itself; cf. (16a) with the focused subject and (16b) with the predicate focus:²⁰

¹⁹In fact, there may be other candidates to the highest elements in the semantic structure. For example, some adverbials (e.g., modal adverbials) have scope over the whole clause, but the expressions involving such adverbs regularly allow complex paraphrases with the relevant meaning expressed in a matrix clause (e.g., *It is possible that...*) and the very event described in a subordinate clause. Another candidate is the topic (or the subject, when it has grammaticalized from the topic), and here the situation is probably similar to the special properties of the possessor described above. Here I refrain from the discussion of these issues.

²⁰The Udi agreement markers are often described as clitics (Harris 2002), but the main reason for this is the fact that they can be hosted by different constituents. This vision comes from a very strong association of heads with particular lexical categories, which is unnecessary if we think of head effects rather than of heads.

(16) Udi (East Caucasian; corpus data)

- a. sa läzgi-n k:oj-a q:onaʁ-χo-t:un eʁ-o.
 one Lezgi-GEN house-DAT guest-PL-3PL come-POT
 ‘Some GUESTS are coming to a Lezgi.’
- b. q:onaʁ-χo har-i-t:un
 guest-PL come-AOR-3PL
 ‘The guests came!’

Traces of appositive-like structures at the clause level can be observed in serial constructions lacking formal restrictions on their components, called symmetrical serial verb constructions (Aikhenvald 2003: 3).²¹ A construction of this type is illustrated in (17):

(17) Abui (Trans-New Guinea, West; Kratochvil 2007: 354)

- ko pi yaa mit nate-a tanga ananra naha
 soon we.INCL go sit stand.up-DUR speak.CNT tell.CNT NEG
 ‘we will not negotiate’

Here, the whole conventionalized sequence of verbs refers to negotiation, so the negation has scope over all of these verbs.

Aikhenvald (2006: 22) states that “[s]ymmetrical serial constructions are not ‘headed’ in the way asymmetrical ones are: all their components have equal status in that none of them determines the semantic or syntactic properties of the construction as a whole”, but this claim involves a presupposition that head properties deny equality. If we abandon this presupposition, we can instead suggest that in symmetrical serial constructions several predicates may have head properties and this is due to the fact that these constructions originate from appositive-like constructions.

5 Conclusion

To sum up, I propose that head properties arise (at least) due to one of the three factors: (i) the higher position of an element in a compositional structure, (ii) the informational prominence, and (iii) the development of a construction from an appositive(-like) structure. These factors are logically independent and may lead to the assignment of head properties to different elements of a construction.

²¹ Asymmetrical serial verb constructions, which put restrictions on one of the components, are associated with head effects of different origin.

As a result, it is more accurate to speak not of the heads but rather of head effects, which may – but need not – concentrate around a single component of a construction.

It is worth noting that the list of factors contributing to head effects should not be thought of as including both synchronic and diachronic properties. In fact, all these factors can be interpreted as diachronic. Grammaticalization of a construction may lead to the development of a hierarchical structure out from a flat non-configurational sequence of words and groups of words. Such development relies on the informational prominence and/or on the most typical compositional combinations, but this development may apply to syntactic units that are already grammaticalized and display morphosyntactic asymmetries. Hence, in diachrony, we suspect to find a kind of competition or interaction between various factors affecting the shape of a construction that we observe. Such processes, the ways that languages meet such conflicts and escape from them, seem to be a fruitful subject for further studies.

Finally, this paper did not attempt to answer the question of why the concrete head effects appear where they appear. Hawkins (1993, 1994: 343–358) tried to explain the head properties by the role that head-like elements play in efficient processing of utterances. If his work is on the right track, it makes sense to look at the limits of cross-linguistic and cross-constructural variation of structures with respect to this role.

Abbreviations

AOR	aorist
CNSM	‘consumed’ (possessive classifier)
CNT	continuative
DYN	dynamic
INSTR	instrumental preverb
MOD	modal (tense)
NPST	non-past
POT	potential
PR	possessor
RL	realis
SUPER	‘on the surface’

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Part II

Identifying heads

Chapter 3

The NP vs. DP-debate and notions of headedness

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Much of the NP- vs. DP-debate has relied on largely conceptual and theory-internal arguments. In this paper, I instead discuss well-established concepts of headedness and explore their relevance for the NP vs. DP-debate. I will rely on two simple and arguably theory-neutral concepts: (i) the fact that there is an asymmetric relationship between head and non-head regarding selection and form determination and (ii) the fact that the features of the head are present on the maximal projection and its consequences for distribution, selection and agreement. While not all arguments lead to a conclusive result, the facts overall favor the DP-hypothesis: W.r.t. the asymmetry between D and N, we will see some evidence that D selects N(P). Facts from categorial selection, selection of particular forms of the D-position and from agreement with hybrid nouns suggest that the features of D rather than those of N are present on the maximal projection. This clearly supports the DP-hypothesis.

1 Introduction

It is fair to say that the DP-hypothesis, first proposed in Abney (1987), and illustrated in the tree diagram in Figure 1, has been very successful. In most of the current formal syntactic literature, especially that carried out within the Minimalist Program since Chomsky (1995), the DP-hypothesis is usually taken for granted.¹

¹The idea that the determiner is the head of the noun phrase can also be found in literature predating Abney's dissertation, see Abney (1987: 77) for references. In the literature on German, the NP/DP-debate was most prominent in the late 80s/early 90s, see Vater (1984, 1986) for proponents of the NP-hypothesis and Haider (1988, 1992), Bhatt (1990), Gallmann (1990), Olsen (1991) and Vater (1991) for proponents of the DP-hypothesis; interestingly, the earliest mention of the idea that D is the head can already be found in Erben (1980: 280).



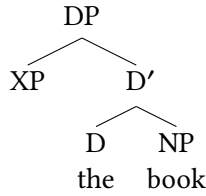


Figure 1: DP-hypothesis

Against this background it is somewhat surprising that most of the evidence in its favor is based on theory-internal considerations, either having to do with specific assumptions within GP-theory at the time or presumed parallels between the nominal and clausal structure. Arguments that refer to established concepts of headedness are actually rather rare and have not played a prominent role in the discussion. This paper therefore aims to address this issue by discussing a number of widely-accepted concepts of headedness and applying them to the NP vs. DP-debate. It will be shown that while some of the concepts do not lead to a conclusive result, some actually make clear predictions and help tease apart the two different theories. As we will see, facts from selection and agreement favor the DP-hypothesis, while none of the diagnostics favors the NP-hypothesis. Overall, then, the DP-hypothesis is at an advantage.

This paper is structured as follows: Section 2 briefly discusses examples of theory-internal arguments in favor of the DP-hypothesis. Section 3 introduces different concepts of headedness and applies them to the NP vs. DP-debate. Section 4 concludes.

2 Theory-internal arguments for the DP-hypothesis

As discussed in Salzmann (2020), previous arguments in favor of the DP-hypothesis can be categorized as follows:

- i. Conceptual arguments that are largely due to specific assumptions of the GB-framework at the time.
- ii. Parallelism arguments based on the presupposition that the clausal and nominal architecture must be very similar.
- iii. Constituency arguments showing that N forms a constituent to the exclusion of D.

- iv. Head-movement arguments suggesting that there is an X° -position above N.

As shown in Salzmann (2020), most if not all of these arguments are inconclusive. The constituency arguments are irrelevant since they do not diagnose headedness. The head-movement arguments are relevant, but strictly speaking, they do not show that the higher head has to be identified with D. For the conceptual and parallelism arguments, reasonable alternatives can be provided within the NP-hypothesis. Since I have discussed this extensively in my previous work (and see also Bruening 2009, 2020, Bruening et al. 2018), I will only discuss one concrete case and refer the reader to the references just mentioned for details.

This conceptual argument for the DP-hypothesis comes from examples like the following, where in addition to the possessor there is also a prenominal determiner present (such structures are limited in English but frequent in other languages, e.g., Hungarian, cf., e.g., Abney 1987: 270-276 and Salzmann 2020):

- (1) John's every secret wish

Such examples posed a problem under the X' -theoretic assumptions of the Government-and-Binding era because it was assumed that heads only project one specifier (Abney 1987: 288-297). Since both the quantifier and the possessor have to occupy specifier positions of N, analyzing the previous example as in Figure 2 was not an option:

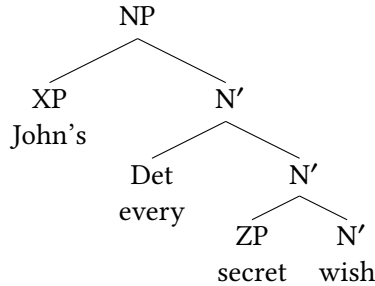


Figure 2: Co-occurrence of possessor and determiner under the NP-hypothesis

No such problems arise under the DP-hypothesis, where the possessor occupies the specifier, while the determiner is in the D-position. The respective structure is given in Figure 3.

While consistent with the assumptions at the time, the restriction to just one specifier has been given up in the meantime. One obvious reason for this are languages with multiple *wh*-fronting where at least under some analyses, all fronted

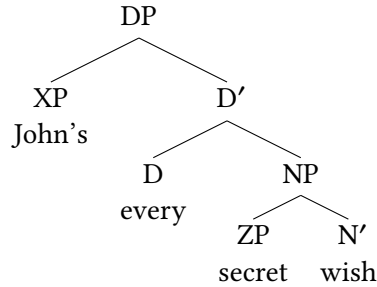


Figure 3: Co-occurrence of possessor and determiner under the DP-hypothesis

wh-phrases occupy specifiers of the same head. Multiple specifiers are also frequently postulated in scrambling languages. See, e.g., Heck & Himmelreich (2017) for cases where multiple scrambling targets different specifiers of *v*.

Even in languages like English where there is no overt evidence for several specifiers of the same head being occupied at the same time, multiple specifier configurations can arise during the derivation, e.g., when a *wh*-object undergoes successive-cyclic movement via Spec,vP.

3 Concepts of headedness and their implications for the NP/DP debate

I take the following concepts of headedness to be well-established and uncontroversial since they rely on simple phrase-structural properties:²

- the head and the complement are in an asymmetric relationship
- the features of the head are present on the maximal projection

As far as I can tell, these criteria are shared by most contemporary syntacticians, which makes them largely theory-neutral (as long as phrase-structure is adopted).

²I ignore semantic concepts of headedness as discussed in Zwicky (1985), since they generally do not lead to useful results w.r.t. the relevant properties: In a PP or an Aux-VP-combination, one will classify the noun or the verb as the semantic head. But with respect to their syntactic behavior, it is clear that the preposition and the auxiliary are the heads instead. Consequently, nothing much can be gained by classifying the noun as the semantic head of the noun phrase.

I will now explore the implications of these concepts for the NP/DP debate. The first property of heads has consequences for selection and form determination between D and N. The second affects the distribution of the constituent of which X is the head and its interactions with material outside its projection w.r.t. selection and agreement. Most of these arguments are discussed in more detail in Salzmann (2020).

3.1 Head/non-head asymmetry

This asymmetry is very clear when we look at verbs and their arguments: It is the verb that selects the argument, e.g., an NP, and it is the verb that determines its form, e.g., by assigning it a case.

3.1.1 Selection

When we look at the noun phrase, the result of applying this criterion is not fully clear. On the one hand, D-elements like the definite determiner do not occur without a noun. On the other hand, there are noun phrases without an overt determiner, e.g., with bare plurals:

(2) books

This might suggest that the determiner is the head. However, this is in fact far from clear since there is a large body of literature suggesting that in cases like the one just mentioned, there is in fact a silent determiner (I will come back to this below). Note also that the determiner must be present with singular nouns.

Another aspect to be considered when applying the selection criterion is to ascertain whether one is dealing with syntactic or semantic selection. The fact that the determiner requires a noun could simply be due to the fact that it is specified to combine with a predicate to return an individual (cf. Longobardi 1994). However, such interactions also exist between adverbs and verbal projections of different sizes, but nobody would treat the adverb as the syntactic selector. Furthermore, nothing in the semantic composition requires D to be the syntactic head (cf. Bruening 2009: 31 for more discussion).

In the case at hand, however, it can be shown that semantic selection is not sufficient. As pointed out in Larson (2019), determiners cannot combine with just any predicate. Rather, they require a nominal predicate:

(3) Every man/happiness/*happy

This suggests indeed that D selects N. Under the assumption that only heads can select (cf. also Zwicky 1985 for discussion), this would argue in favor of the DP-hypothesis. While arguably the standard assumption, there have been proposals suggesting that non-heads can select, too, see Bruening et al. (2018), who argue for selection by D under the NP-hypothesis. Thus, one probably shouldn't draw any strong conclusions from this.³

3.1.2 Form determination

Form determination refers to phenomena like case-government and morphological selection in verbal complexes (where the auxiliary/functional verb determines the form of the lexical verb). In the following example, each verbal element determines the form of the immediately subordinate verb (from Bruening 2009: 30):

- (4) I might have been being handed some cocaine (when the police caught me).

It is difficult to apply the criterion to the noun phrase, though. Bruening (2009) argues that the noun should be considered the head because its features determine those of NP-modifiers like adjectives and determiners, which show concord with the head noun in gender and number.⁴ However, concord is to be distinguished from government. In government by verbs, a verb governing accusative case on an object is not accusative itself; it does not share a feature with the object; rather, it assigns a feature to the object for which it is not specified itself (case is just a probe feature). Concord, on the other hand, involves the sharing of features.

There are, to my knowledge, no cases of form determination within the noun phrase that would clearly identify either D or N as the head. Strong and weak

³A popular concept of headedness is obligatoriness. It overlaps with the asymmetry argument in that the selector is also obligatory (unless it is elided, which is irrelevant, as this is phonetic deletion). The limits of the argument become clear once cases are considered where the dependent argument cannot be omitted. This not only holds for objects of verbs like *devour*, but also for complements of prepositions. W.r.t. the noun phrase, we can observe that both determiner and noun are present and neither can be omitted (assuming there to be a silent determiner with bare plurals). Consequently, the obligatoriness criterion leads to an inconclusive result when applied to the noun.

⁴Double definiteness in Germanic could potentially be considered a case where D determines features of the noun, but that largely depends on one's analysis of the phenomenon, and it is far from obvious that this phenomenon should be subsumed under concord, see, e.g., Schoorlemmer (2012) for recent discussion.

inflection on adjectives in Germanic (where the adjective covaries with the definiteness/shape of the D-element) shows that D can affect the form of other constituents within the noun phrase. This may suggest that D is indeed a head, from which one may conclude that it must be the head of the noun phrase. While plausible, it relies on the assumption that probes must be heads and cannot be phrasal. While the predominant view, alternative conceptions have been proposed. Probing by phrasal elements is arguably inevitable if concord within the noun phrase involves a phi-probe on A targeting N (and if A is adjoined to NP).⁵ Thus, no argument can be made for either the NP- or DP-hypothesis on the basis of form determination.

3.2 The features of the head are present on the maximal projection

This property of heads has the consequence that it is the features of the head that are visible to the syntactic context outside the noun phrase. Features of other noun phrase internal constituents, however, are less visible.

This has the following syntactic implications: First, the head determines the distribution of the phrase since its category label is visible on the projection. Second, the head is the preferred element for higher heads to interact with. This can be seen in that the head/the features of the head are the preferred target for selection and agreement.

3.2.1 Distribution

The question is whether the distribution of noun phrases is due to the categorial properties of D or those of N. Since the distribution of pronouns and noun phrases is very similar and since verbs can be combined with both nouns/noun phrases and pronouns, this would seem to favor the DP-hypothesis; one could simply state that verbs generally combine with D(Ps). However, given that pronouns are frequently reanalyzed as D-heads taking a silent NP-complement (Elbourne 2005), it is not inconceivable that they could also be reanalyzed as NPs with only the determiner overt as in the right-hand tree in Figure 4.

Thus, in either case, the similar distribution of nouns/noun phrases and pronouns would be due to whatever categorial feature is on the maximal projection

⁵Another possibility may be the genitive of quantification in Slavic, where the NP in the scope of the quantifier/numeral appears in the genitive. If quantifier/numeral occupy the head of the DP, this would indeed represent a case of form determination. In some of the analyses, however, cf., e.g., Bošković (2006), the quantifier actually occupies a specifier position, which renders the argument inconclusive.



Figure 4: Pronouns under the DP- and NP-hypothesis

in both cases, viz., either D or N. Thus, arguments from distribution do not help to decide the NP/DP-debate.⁶

3.2.2 Selection from outside

There are three different aspects of selection that are relevant here, viz., selection of particular phi- or definiteness features of noun phrases, categorial selection, and third, selection of particular lexical items within noun phrases in the context of idioms, addressing an argument from Bruening et al. (2018).

3.2.2.1 Selecting features of D vs. N Morphological selection is assumed to target features of the head in a selector’s complement. In the case of verbal complements, this can be features such as +/– wh, +/– V2, +/– subjunctive or specific non-finite forms (participle, bare infinitive, *to*-infinitive)

As pointed out in Bruening (2009), there do not seem to be any cases where the verb selects D-related properties such as a particular definiteness value or particular determiners (but see the next subsection). This does not support the DP-hypothesis. However, one also does not find any cases where a verb selects properties of N. One does find semantic selection, e.g., selection of an animate/inanimate noun, but I am not aware of any cases where the verb selects any particular morpho-syntactic features of N like [gender] or [number] (to the extent that the latter really is a feature of N and not of Num). Consequently, the facts from morphological selection are inconclusive w.r.t. the NP/DP-debate.

3.2.2.2 Categorial selection Bruening et al. (2018: 6) claim that there is an important asymmetry between the selection of verbal and nominal complements:

⁶Pronouns sometimes display different distribution than nouns, but that usually concerns weak pronouns. For instance, in German, weak pronouns are fronted to the Wackernagel position and weak object pronouns cannot occur in Spec,CP. However, this restriction is not primarily about their categorial status but about their information-structural possibilities and, associated with that, their prosodic weight (which in some works, however, is reanalyzed as a categorial difference): none of these restrictions apply to strong pronouns.

German personal pronouns are different from demonstrative pronouns in important respects that argue against a silent NP-complement, see Salzmann (2020: 6, fn. 4) for discussion.

While verbs can select verbal complements of different sizes like CP, TP, vP and VP, there do not seem to be any cases where verbs select nouns of different types, e.g., DP vs. NP.

While this is generally correct, there are cases that suggest that categorial selection of different types of noun phrases may be necessary after all. This holds quite generally for pseudo-incorporation, which often involves NP-objects, which are predicates and thus compose differently with the verb. Crucially, contrary to the claims in Bruening et al. (2018); Bruening (2020), it is not the case that each verb of a language can occur with both ‘regular’ and pseudo-incorporated nouns. The class of verbs that allows pseudo-incorporation is always restricted. For instance, as discussed in Kallulli (1999), in Albanian, a language that generally allows bare count singulars, pseudo-incorporation is blocked with individual-level predicates like ‘love’, ‘hate’, ‘admire’, ‘respect’. Furthermore, it is often observed that verb and noun together express an “institutionalized activity”, see Dayal (2011: 164-165). There is thus clearly a selectional component. Under the DP-hypothesis, one can state that some verbs allow the selection of NPs in addition to DPs. Under the NP-hypothesis, the difference can arguably only be captured by means of semantic selection, viz., some verbs can select predicates in addition to individuals.

However, not all cases can be handled by means of differences in semantic selection. Erschler (2019) discusses a comitative preposition in Ossetic that selects NumP but is crucially not compatible with DP (he shows that the selection must be morphosyntactic rather than semantic). The need for categorial selection is even more obvious w.r.t. the distribution of bare noun constructions and weak definites. Both are semantically very similar in that they covary under ellipsis and quantification and do not support anaphora (Carlson et al. 2006, Aguilar-Guevara 2014). The following two examples illustrate covariation under quantification. In both cases, a distributive reading is possible (in fact by far the most salient if not even only reading).

- (5) a. Jeder Schüler spielt Klavier. (German)
 every student plays piano
 ‘Every student plays the piano.’
 b. Jeder Schüler bleibt im Bett.
 every student stays in.the bed
 ‘Every student stays in bed.’

What is relevant in the case at hand is that the two construction types are in complementary distribution within a language; given that they have the same

semantics, the distribution of the presence/absence of the definite article cannot be captured in semantic terms. The fact that the distribution has to be captured in morphosyntactic terms becomes particularly obvious once English is compared with German. While there are cases where the languages pattern the same (e.g., uses of the weak definite construction as in ‘take the bus’ or the bare noun construction as in ‘take to court’), there are several cases where the distribution is the opposite. English uses the weak definite in the expressions *play *(the) piano*, *read *(the) newspaper*, *listen to *(the) radio*, while German uses the bare noun construction in these cases. However, it is not always the case that a weak definite in English corresponds to a bare noun in German. The reverse can also be found: We find bare nouns in the following English expressions *stay in (*the) bed*, *go to (*the) church*, *be in (*the) jail*, while German requires the weak definite.

How can this distribution be captured and what does it imply for the NP/DP debate? Under the DP-hypothesis, one can handle the distribution by means of categorial selection. Certain verbs or prepositions (in certain collocations) select either a full DP as in *take the bus*, other verbs or prepositions select a bare NP in certain cases as in *stay in bed*. Under the NP-hypothesis, the challenge arises to ensure that in some cases only a bare noun is possible. However, determiners are modifiers under the NP-hypothesis and therefore it should always be possible to add them (with count nouns). One cannot use selection here: One cannot assume that V/P selects an N which in turn selects nothing.

3.2.2.3 Selection of D-elements in idioms Bruening et al. (2018) and Bruening (2020) discuss selection relationships in conventionalized expressions/idioms. They show that these expressions always consist of (potentially a sequence of) local relations, which are mainly government relations between heads. There can be open slots, but they never affect heads in the government sequence but only left branches or the lowest complement. This is illustrated by the following German example:

- (6) Gefahr laufen, zu ... (German)
risk run to
‘run the risk to ...’

Here, the verb and the object are fixed, as is the specification of the non-finite complement clause attached to the noun, which has to be a *to*-infinitive. However, everything else in that non-finite clause is open. The open slot is the structurally lowest position. Open slots in the middle of the government sequence, however, do not seem to be found. For instance, while there are idioms involving V+P+N, there are no idioms involving just V+N with P being completely open.

While this may seem like a complicated and counter-intuitive approach to idioms (and it is not fully clear how such an idiom would be represented in the lexicon), it should be pointed out that this view avoids the pitfalls of constituency-based approaches since idioms crucially need not form a syntactic constituent. Thus, Bruening's approach seems like an interesting proposal to capture what a possible idiom can look like.

What is relevant in the current context is that, according to the authors, there is an important asymmetry between the verbal and the nominal domain. While conventionalized expressions can involve verbs selecting functional heads with particular properties, e.g. +wh-clauses (as in *know which way the wind blows*), the *to*-infinitive discussed above or particular prepositions, there do not seem to be conventionalized expressions involving nominals where the D-position is fixed. They argue that even if there is a default specification for the D (e.g., *the* or *a* or no determiner at all), they argue that the choice of D can always vary. The type of examples Bruening has in mind are as follows: the idiom *foot the bill* normally takes the definite determiner, but one can find variations as in the following example:

- (7) Taxpayers must foot another bill.

The same goes for idioms with indefinite determiners like *beat a dead horse*. The canonical form of the idiom includes an indefinite determiner, but one can find variants like the following:

- (8) politicians who continue to beat the dead horse that all the economy needs to be robust is for rich people ...⁷

Crucially, what cannot vary, however, is the content of N. This strongly suggests that N+V form a closer unit than N and D and thus favors the NP-hypothesis. Under the DP-hypothesis, one would expect the D-position to be fixed.

In what follows I will take issue with this argument (see also Larson 2019 for similar criticism). First, both in English and in German, there is usually a canonical form for the D-position, even if the D-position is to some extent variable. For instance, in the following two German idioms, it is clear that the canonical form is either definite or indefinite:

- (9) a. ins Gras beißen (German)
in.the grass bite
'die'

⁷<https://www.english-corpora.org/iweb/>

- b. jemandem einen Korb geben
to.someone a basket give
'reject someone'

Thus, if there is a default specification, this means that we have rather specific knowledge about the form of the D-position. This suggests that selection is needed after all. Second, there are many idioms where no flexibility of the D-position can be found, neither via google nor via the DeReKo-corpus, the largest corpus of written German (<https://www1.ids-mannheim.de/kl/projekte/korpora.html>). Here are a few German examples where the D-position is either empty (bare singular, bare plural), definite or indefinite:

- (10) a. Leine ziehen (German)
leash pull
'to get lost'
b. Bände sprechen
volumes speak
'to speak volumes'
c. die Flinte ins Korn werfen
the shotgun into.the grain throw
'to give up'
d. ein Licht aufgehen
a light appear
'to dawn upon'

Third, concerning variability, one has to distinguish different cases. There are indeed cases of free variation. Some German examples can be found in Fleischer (1982: 209), of which I represent one where the determiner can be 'all', 'both' or 'the':

- (11) alle / beide / die Hände voll zu tun haben (German)
all both the hands full to do have
'have one's hands full'

In many other cases, the variation largely involves creative language use that is generally possible with idioms but not indicative of an open slot. Often, the effect of choosing different Ds affects the quantification of the event (cf. *foot another bill* above). As competent speakers and cooperative hearers, we can also play with this. For instance, while the following opaque idiom normally does not

allow any variation regarding the D-position, once we force it, one can probably obtain a plausible interpretation nevertheless (recall that *ins Gras beissen* means ‘to die’):

- (12) in ein anderes Gras beissen als sein Vater (German)
in a different grass bite like his father
‘die in a different way than his father’

Thus, by deviating from the canonical form of the idiom, one can achieve a certain effect that is part of creative language use, but this does not imply that the D-position is generally free. Crucially, since the nature of the D-position cannot be predicted on the basis of semantics, it will have to be regulated by syntax, viz., by selection.

Consequently, the argument from idioms actually favors the DP-hypothesis because it allows direct selection of the D-position. The presence or absence of a D-element can, in addition, be handled by means of categorial selection (NP vs. DP). Under the NP-hypothesis, serious problems arise. To account for idioms without a D, one would have to prevent the presence of a D, but since determiners are modifiers, there is no obvious way to do that. Furthermore, to ensure that a specific D occurs, one would have to select an N which in turn selects a particular type of D. While doable, this solution would be more complicated than direct selection as under the DP-hypothesis.

3.2.3 Agreement

Given that the features of the head of the noun phrase are present on the maximal projection, we expect the (features of the) head to be the preferred goal for probes, e.g., those initiating agreement, outside the noun phrase. Access to the non-head will be blocked by Relativized Minimality/the A-over-A-principle (Chomsky 1973). The two different theories thus make crucially different predictions here. Under the DP-hypothesis, D will be the preferred target, while N and other constituents may be inaccessible. Under the NP-hypothesis, the reverse prediction is made: It is N that should be the preferred target, while D should be less accessible. The crucial differences are indicated in the tree diagrams given in Figure 5 (potentially inaccessible material is set in gray).

The predictions are thus rather clear here. However, since D and N normally agree in phi-features through concord, it is difficult to find cases that would help tease apart the two theories. In Salzmann (2020) I argue that agreement switches within the noun phrase with hybrid nouns in Bosnian-Croatian-Serbian favors



Figure 5: Minimality under the DP- and NP-hypothesis

the DP-hypothesis: In this language, certain nouns can trigger biological or grammatical agreement on various nominal and clausal agreement targets. Importantly, there can be switches from grammatical to biological agreement but not the other way around. I argue that this follows most naturally under the DP-hypothesis. Suppose that N bears both gender features, that all heads within DP enter Agree with each other and that each head will only target the next lower head. This can lead to a situation where we find biological agreement only on D. When the verb targets the noun phrase in this case, it can only copy the biological gender feature, the grammatical gender feature on N is inaccessible. While this follows under the DP-hypothesis, the reverse would be predicted under the NP-hypothesis: Since N is the head, both gender features would be present on the maximal projection. Thus, a switch back from biological to grammatical gender between D and v should be possible, contrary to fact.⁸

4 Conclusion

While much of the literature on the NP/DP-debate discusses conceptual and theory-internal arguments, this paper has focused on arguments that make direct reference to concepts of headedness. The two criteria I have relied on are (i) the asymmetric relationship between head and non-head regarding selection and form determination and (ii) the fact that the features of the head are present on the maximal projection.

As we have seen, while several arguments turn out to be inconclusive, the facts overall favor the DP-hypothesis. W.r.t. the asymmetry between D and N, there is some evidence that D selects NPs. The facts from categorial selection and the selection of the form of D-elements in idioms suggest that it must be possible to

⁸Another possible argument for the DP-hypothesis could come from agreement with quantified nouns where in some cases agreement can only target the features of the quantifier and not those of the noun, see Danon (2013), Driemel & Stojković (2019). This suggests that the quantifier is the head rather than the noun.

select (i) both DP or NP and (ii) different types of D. This can be straightforwardly handled by means of the DP-hypothesis, while under the NP-hypothesis, blocking the presence of a D-head in certain collocations/idioms turns out to create insurmountable problems. Furthermore, agreement facts from hybrid agreement suggest that D is closer to noun phrase external agreement probes than N, which supports the DP-hypothesis. I thus conclude that based on simple and arguably theory-neutral diagnostics for headedness, the DP-hypothesis is at an advantage.

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Chapter 4

Headless in Berlin: Headless (nominal) structures in Head-Driven Phrase Structure Grammar

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This paper deals with the status of heads in Head-Driven Phrase Structure Grammar (HPSG). Firstly, background assumptions are presented: the lexical representation of valence at the head and projection of head features. Secondly, I discuss criteria for determining the head of a phrase. I use nominal structures as an example, since the DP/NP debate is still undecided across frameworks, and exploring the arguments from an HPSG perspective may be interesting for readers. Zwicky's (1985) criteria are discussed, and I show that most of them do not decide the issue for German nominal structures, but assignment of semantic roles by relational nouns and selectional relations in idioms (Osborne & Groß 2012, Bruening 2020) support NP structures. I discuss nominal structures with non-overt nouns and copulaless sentences in African American Vernacular English (AAVE) and argue for an empty nominal head. I show that empty elements can be eliminated from grammars but argue that they are nevertheless useful in nominal structures and copula constructions in AAVE, since they capture generalizations. However, there are other structures like Jackendoff's (2008) N-P-N construction that should be analyzed as unheaded. The paper closes with general considerations about the use of empty elements in grammars, arguing that they should be detectable in the input by systematic variation with overt material. This excludes the assumption of empty elements like AgrO or Topic in grammars of languages like German, since there is no overt material associated with these heads.

1 Introduction

Ulrike Freywald and Horst Simon asked proponents of various linguistic theories to take part in their workshop *Headedness and/or grammatical anarchy?* and ex-



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plain the notion of head used in the respective theories. They asked the following questions:

- Are structural asymmetries a precondition for structure building?
- Or do “real” non-headed structures exist?
- If so, how are non-headed structures built?
- How does headedness/a headed structure work, if there is no head?
- Do we need the concept of “head” in grammatical theory?

The current paper addresses these questions. I start with an introduction of Head-Driven Phrase Structure Grammar (HPSG, Pollard & Sag 1987, 1994, Müller 2013) in Section 2; there, I explain how lexical heads determine the internal structure and external distribution of phrases. Following the introduction of the basic machinery in Section 2, I step back a bit and discuss more general, theory-neutral criteria for an element being a head in Section 3. Zwicky’s (1985) criteria for being a head are applied in the notorious DP/NP debate. German data shows that most of the criteria deliver inconclusive results, but some seem to argue for N as the head. After comparing the complexity of NP and DP structures and discussing the assignment of semantic roles in nominalizations, selection, and idioms, I argue for assuming N as the head in nominal structures.

Section 4 deals with the question of how to deal with structures in which there is no visible head. Again, I discuss nominal structures and show how nounless nominal structures can be described by assuming an empty nominal head. Furthermore, I explain the analysis of predicative structures in African American Vernacular English and why the assumption of an empty head was suggested in Sag et al. (2003: Section 15.3.5).

Frameworks like Construction Grammar reject empty elements dogmatically (Goldberg 2003: 219, 2006: 10, Hoffmann & Trousdale 2013: 3, Fillmore 2013: 112, Michaelis 2013: 134) since they are said to be unacquirable. I show in Section 5 that grammars with empty elements may be transformed into grammars without empty elements, and I argue that the NP grammar with empty nominal heads is in fact easier to learn than the grammar without empty elements, since it captures the facts about omissible elements directly.

Apart from nominal structures in which we have a head but it is invisible, there are other structures in which it is impossible to identify one central element that determines the structure of the whole unit and where the stipulation of an empty head cannot be motivated by anything theory-external. Section 6 shows how such phrases can be analyzed and why they are unproblematic for HPSG even

though the theory has “head-driven” in its name, which seems to suggest that all structures have to have a head.

Section 7 discusses language acquisition and provides criteria for when the assumption of empty elements is appropriate. Section 8 provides a summary of the paper.

2 Heads and HPSG

The notion of head is crucial for Head-Driven Phrase Structure Grammar: most phrases in grammars have a central element that is responsible for the internal structure of the phrase and for its distribution. For example, prepositions determine the case of the NP they combine with:

- (1) a. zu diesem Termin
to this.DAT appointment
- b. * zu diesen Termin
to this.ACC appointment

The form of the preposition in prepositional objects is important, since it is responsible for the external distribution of the whole phrase: while an *auf* PP can function as the object of *warten* ‘to wait’, an *an* PP cannot:

- (2) a. Ich warte auf den Mann.
I wait on the man
‘I am waiting for the man.’
- b. * Ich warte an den Mann.
I wait at the man

It is clear for prepositions, verbs, and adjectives that they have valence and that their form and/or inflectional properties are responsible for the distribution of the whole phrase. The problematic cases (determiner and noun) and respective criteria for head status are discussed in Section 3.

I turn now to the foundational assumptions of HPSG (treatment of valence and percolation of head information) in order to be able to explain headless structures with reference to these more common structures.

In HPSG, valence information is expressed by means of lists. For example, valence lists of two-place verbs contain two elements (in German).¹ One of these arguments gets the nominative and the other one the accusative case.

¹It is commonly assumed that finite verbs in OV languages select all their arguments in one valence list (Pollard 1996: 295–296, Kiss 1995: Section 3.1.1, Müller 2002), while there are two valence lists for SVO languages like English: one list for preverbal arguments (specifiers) and one for post-verbal arguments (complements; Sag, Wasow & Bender 2003: Section 4.3; Müller 2022: Section 4.3).

I assume binary branching structures for German, as most authors working on German in HPSG do (see for instance Hinrichs & Nakazawa 1994, Kiss 1995, Meurers 1999, Müller 1999b, Kathol 2000, Holler-Feldhaus 2001). Which argument is combined with the head is not constrained, so the head can combine with the nominative or with the accusative first. The argument that is not combined with the head is passed up in the tree. Figure 1 shows this for the example in (3):

- (3) [dass] niemand ihn kennt
 that nobody him knows
 ‘that nobody knows him’

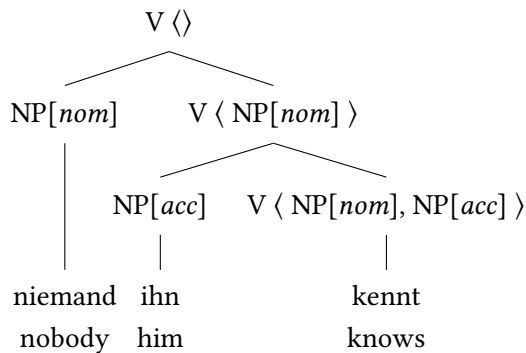


Figure 1: Analysis of *niemand ihn kennt* ‘nobody knows him’

The verb *kennt* ‘knows’ requires one NP in the nominative and one in the accusative. After combining *kennt* ‘knows’ with the accusative object *ihn* ‘him’, one gets a linguistic object that requires an NP in the nominative. If this linguistic object is combined with the nominative, an element with an empty valence list results. Since the head of this linguistic object is a verb, the whole linguistic object is a sentence.

Many theoretical papers discuss tree structures without providing the rules that actually license the trees. HPSG uses abstract dominance schemata to license linguistic objects. A representation of such a schema is shown in Figure 2.

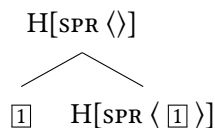


Figure 2: Visualization of the Specifier-Head Schema

This treelet shows how heads can be combined with an element of their specifier list (SPR stands for specifier). Usually the SPR list of a head contains exactly one element (the subject of SVO languages and the determiner in NP structures², 1 in Figure 2), which means that the SPR list of the mother node is the empty list.³

Heads are marked by H in the figures. This is supposed to indicate that all head information, that is, information that is relevant for the distribution of the phrase, is present at both the head daughter and the mother. For sentences, this would be the information that the part of speech of the head is *verb* and whether the verb is finite, a participle, or an infinitive with or without *to*. Of course other information about required arguments, extracted arguments and adjuncts, and

²Some authors assume an additional valence feature for subjects, namely SUBJ (Borsley 1987, Polard & Sag 1994: Chapter 9). I assume a head feature SUBJ for control and raising. Subjects in SVO languages like English and the Scandinavian languages are treated as specifiers (Müller 2022). There are analyses of the NP assuming that the determiner is a marker of the head rather than a dependent selected via valence features (Van Eynde 2006, Allegranza 2007, Sag 2012). See also Van Eynde (2021) for an overview of alternative approaches to nominal structures within HPSG. The marker-based approaches provide a simple analysis of determinerless nominal structures (Van Eynde 2006: 167, 174–175), but the syntactic simplicity of syntactic structures comes at a price: the resulting structures are missing the quantifier usually contributed by the determiner. The only solution to the problem I am aware of was suggested by Allegranza (1998). Allegranza (1998) suggests an analysis in which nouns that may appear without determiner (plurals and mass nouns) introduce a quantifier lexically. If these nouns are used without a determiner or a quantifier, the lexically introduced quantifier is used. In all other cases the lexically introduced quantifier is removed (p. 103). The solution involves disjunctions and subtraction operations over sets and is rather complex. Furthermore, Allegranza's account fails on examples like *alleged water*, since in his setup the quantifier scopes over *water* directly. While this probably can be fixed, any imaginable solution is probably not simpler than what was suggested so far and hence I prefer the approach described in this paper.

In addition, marker-based approaches do not capture the parallelism between verbs and nouns in nominalizations like (i):

- (i) a. Caesar destroyed the city.
- b. Caesar's destruction of the city

In the approach assumed here, both the subject *Caesar* and the determiner phrase *Caesar's* will be selected by the verb and by the noun derived from the verb, respectively. The heads will assign semantic roles to the selected element (Machicao y Priemer & Müller 2021). In the marker-based analysis *Caesar's* would select *destruction of the city* despite the fact that it fills a semantic role of *destruction* (Frank Van Eynde, p.c. 2019). I prefer the more uniform analysis of the examples in (i). Nominalizations will be discussed further in Section 3.2.3.

³See Müller & Ørnsnes (2013) for an analysis of object shift in Danish in which objects appearing to the left of the verb (like subjects) are treated as specifiers. In this analysis the SPR list may contain more than one element. See also Ng (1997: Sections 5.3, 6.3) for an analysis of nominal structures in English and Chinese with multiple specifiers and Wang & Liu (2007) for such an analysis of Chinese nominal structures.

relative pronouns within a phrase, among other things, are also relevant for the external distribution of a phrase. This information is part of the complex categories that are assumed in HPSG. The head information is the information that is directly shared between lexical heads and intermediate and maximal projections of the lexical head.

The trees we saw so far are convenient for visualization, but HPSG uses typed feature value structures to model all aspects of linguistic objects; even the internal configuration of complex syntactic objects is represented by feature value pairs. (4) shows how the Specifier-Head Schema can be described with feature value pairs.⁴

(4) Specifier-Head Schema:

$$\text{specifier-head-phrase} \Rightarrow \left[\begin{array}{ll} \text{SPR} & \langle \rangle \\ \text{HEAD-DTR} & \boxed{1} \left[\text{SPR} \langle \boxed{2} \rangle \right] \\ \text{DTRS} & \langle \boxed{1}, \boxed{2} \rangle \end{array} \right]$$

The symbol \Rightarrow stands for a logical implication: if a feature structure is of type *specifier-head-phrase*, the restrictions on the right side of the implication have to hold. Types and implicational constraints are discussed further below. The daughters in a tree are represented in a list, which is the value of the DAUGHTERS feature (Ginzburg & Sag 2000: 30). In the case at hand, we have two daughters: $\boxed{1}$ and $\boxed{2}$. The daughter $\boxed{1}$ is the head daughter. In addition to being in the DTRS list, it is identified with the value of the feature HEAD-DTR. The SPR list contains a description of the other daughter ($\boxed{2}$). Figure 3 shows the tree representation for structures licensed by the schema in (4). *Mannes* ‘man’ selects a determiner.

Verbs project information about part of speech and inflection. The part of speech and case information determines the distribution of nominal projections. HPSG groups information that belongs together into one attribute value matrix (AVM). Part of speech information and case information form the value of HEAD in (5).⁵ *noun* is the type of the feature description. Feature structures of type *noun*

⁴Even though the schema is more formal than the little treelets, it is still a simplification in that not all feature-value paths are fully specified as they would have to be according to the theory. (4) leaves out the paths leading to SPR and a path in the list of daughters. For details see Ginzburg & Sag (2000: 30) and Müller & Machicao y Priemer (2019).

⁵Of course other properties like number, gender, and declension class are relevant for the distribution as well. Some authors bundle case, person, number, gender, and declension class as agreement features inside of HEAD (Kathol 1999: 262), and others refer to the number and gender information contained in the semantic index contributed by nouns (Pollard & Sag 1994: Section 2.5.1, Müller 2007b: Section 13.2). I omit declension class here, since it is not relevant for the current discussion.

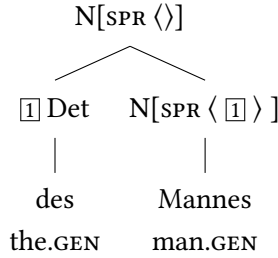


Figure 3: Specifier-Head structure

always have a CASE feature. This feature may have the values *nom*, *gen*, *dat*, or *acc* in German. For *Frau* ‘woman’, we may leave the value underspecified, since *Frau* is compatible with any of the four cases in German, but for *Mannes* ‘man’, which is in the genitive, it has to be *gen*.

$$(5) \left[\begin{array}{l} \text{PHON} \quad \langle \text{Mannes} \rangle \\ \text{HEAD} \quad \left[\begin{array}{l} \text{noun} \\ \text{CASE} \text{ gen} \end{array} \right] \\ \text{SPR} \quad \langle \text{Det} \rangle \\ \text{COMPS} \quad \langle \rangle \end{array} \right]$$

Since HPSG allows values of features to be internally complex, features that have to be projected from lexical items can be grouped together and the projection of head features can be set up in a general way: all information that is present under HEAD is shared between head daughter and mother, that is, the information in the description of the head daughter is identical to the respective information at the mother. Figure 4 shows the analysis of the nominal phrase *des Mannes* ‘the.GEN man.GEN’.

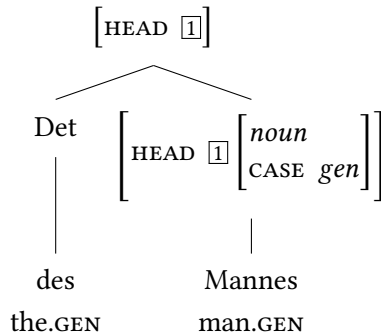


Figure 4: Specifier-Head structure

The information concerning part of speech and case of the noun is shared with the respective information for the whole phrase.

Apart from Specifier-Head structures, there are also Head-Complement structures. These play a role in the combination of relational nouns with their complements. Figure 5 gives an example.

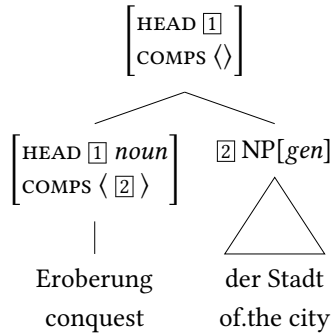


Figure 5: Head-Complement structure

Head-Complement phrases are parallel to Specifier-Head phrases. The only difference is that complements are selected via another valence feature (COMPS rather than SPR). The schema for head-complement combinations that is parallel to Figure 2 is shown in Figure 6. As with Specifier-Head phrases, the valence

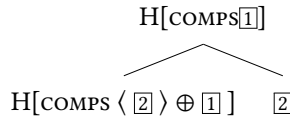


Figure 6: Visualization of the Head-Complement Schema

list is split into two parts: one list with exactly one element $\langle 2 \rangle$ and another list with the rest ($\langle 1 \rangle$). 2 is identified with the other daughter, and 1 , the list containing the rest, is identified with the COMPS value of the mother node. The combination of a head with its complements as it is given in Figure 6 combines the head with the first element in the valence list. This is exactly what we find in SOV languages. For SOV languages and languages with scrambling see (Müller 2020: Sections 9.1.1, 9.4, 2021a: Sections 3, 4). The order of combination differs from the one in Specifier-Head structures, in which the head is combined with the last element in the SPR list first. Again see Müller & Ørsnes (2013) for details.

(6) shows the schema that licenses Head-Complement phrases. Apart from the schemata introduced so far, HPSG has schemata for head-adjunct combinations

(6) Head-Complement Schema:

$$\begin{array}{l} \text{head-complement-phrase} \Rightarrow \\ \left[\begin{array}{ll} \text{COMPS} & \boxed{1} \\ \text{HEAD-DTR} & \boxed{2} \left[\text{COMPS } \boxed{1} \oplus \langle \boxed{3} \rangle \right] \\ \text{DTRS} & \langle \boxed{2}, \boxed{3} \rangle \end{array} \right] \end{array}$$

and for nonlocal dependencies (for less general schemata see Section 6). The two schemata above are sufficient to be able to explain the assumptions about heads and headedness made in HPSG.⁶

All feature structures in HPSG have to be of a certain type. These types are organized in hierarchies. All feature structures modeling linguistic signs are of type *sign*. Linguistic signs are divided into phrases and words. For these objects, we have the types *phrase* and *word*. Phrases can be categorized into phrases that have a head (*headed-phrase*) and phrases without a head (*non-headed-phrase*). *specifier-head-phrase* and *head-complement-phrase* are subtypes of the type *headed-phrase*.

We want to say the following about structures: if there is a head in the structure, then the head features of the head daughter have to be identical to the head features of the mother. HPSG allows for an elegant expression of this fact using an implicational constraint:⁷

⁶A reviewer asked how agreement between determiners, adjectives, and nouns can be accounted for in HPSG. These items agree in case, number, gender, and match in declension class. Agreement is usually analyzed using structure sharing of features of items that select others/are selected by others. Since nouns select their determiners, agreement between nouns and determiners can be assured. Similarly, adjectives select nouns, and hence adjective-noun agreement can be taken care of. Since nouns agree with their determiners, the agreement between all three elements is accounted for. See Pollard & Sag (1994: Section 2.5.1) and Müller (2007b: Section 13.2) for worked-out proposals for agreement in German noun phrases and Wechsler & Zlatić (2003) on agreement in HPSG in general.

⁷An alternative formulation of the Head Feature Principle, the so-called Generalized Head Feature Principle, is suggested by Ginzburg & Sag (2000: 33). They suggest that all syntactic and semantic information of the head daughter is shared with the information of the mother by default. As (4) and (6) show, the valence information at mother nodes differs from the valence information at the head daughter in Specifier-Head phrases and in Head-Complement phrases. The same is true for semantic information: usually the semantic information at the mother node differs from the information at the head daughter, since the mother node has a collection of the semantic contributions of all daughters. This is captured by Ginzburg & Sag because sharing all information is a default that is overwritten in subtypes of *headed-phrase*. Defaults are often used in linguistics to describe unmarked cases, but what the Generalized Head Feature Principle sets as a default never actually holds. In fact, there is not a single structure in any HPSG theory I am aware of in which all syntactic and semantic features of head daughter and mother are identical. So the Generalized Head Feature Principle is not a generalization. It is never true, and hence I do not use it.

$$(7) \text{ headed-phrase} \Rightarrow \left[\begin{array}{c} \text{HEAD} \quad \boxed{1} \\ \text{HEAD-DTR} \quad \left[\text{HEAD} \quad \boxed{1} \right] \end{array} \right]$$

(7) specifies a constraint that holds for all feature structures of type *headed-phrase*, including those that are subtypes of *headed-phrase*. The constraint identifies the head features of the head daughter with the head features of the mother.

The fact that we have an implication in (7) cannot be emphasized enough. This means that the conclusion has to hold only if the antecedent is true. If the antecedent is false, nothing is said about the presence of head daughters or the values of head features. This means that one can assume headless structures in HPSG, and there are plenty of examples of headless constructions in the literature (Müller 1999a, 1999b: Chapter 10). Hence it would be wrong to claim that HPSG assumes that all structures must be headed. I will return to headless constructions in Section 6.

Before turning to such truly headless constructions, in the following section I want to discuss nominal structures, which are interesting for two reasons. For one, researchers still disagree as to which element in a nominal structure is the head. And for another, both determiner and noun may be omitted in German, which means that nominal structures could be problematic for linguistic theories in general.

3 Nominal structures

Since the 1970s there have been proposals to treat the determiner as the head of nominal structures. Such proposals became popular within the framework of GB (Chomsky 1981) but are entertained in other frameworks as well: there are proposals in Categorical Grammar, LFG, HPSG, and Dependency Grammar that assume the determiner to be the head. See Ajdukiewicz (1935: 6), Vennemann & Harlow (1977), Brame (1982), Hudson (1984: 90–92), Hellan (1986), Abney (1987), Netter (1994, 1998), Van Langendonck (1994), Salzmann (2020, 2022) for DP proposals and Pollard & Sag (1994), Demske (2001: 49), Müller (2007b: Section 6.6.1), Bruening (2009, 2020) for NP proposals in various frameworks. Hudson (2004) working in Word Grammar, a version of Dependency Grammar, suggests mutual dependency between determiner and noun.⁸

⁸Due to space limitations, it is not possible to go into the details of a comparison, but such mutual dependencies are also assumed in HPSG: the noun selects the determiner via the valence feature *SPR* and the determiner selects the noun via the feature *SPECIFIED* (Pollard & Sag 1994: 50).

3.1 Tests for head status

I talked about prepositions, verbs, and adjectives at the beginning of the previous section. It is clear that these categories are heads of their respective phrasal units. This begs the question whether there are criteria for headedness that could help deciding the question for nominal structures. Zwicky (1985) looked at tests for headhood in the 80s more carefully. The tests will be repeated below and it will be examined whether they are useful in the DP/NP debate.

3.1.1 The subcategorizand

Zwicky (1985: Section 2.1.2) states that the subcategorizand is likely to be the head. The subcategorizand is the lexical element, in contrast to the phrasal one(s), and it may appear in certain configurations. For instance, the verb *give* can appear with two NP arguments (e.g. in *give her a book*) or with an NP and a PP as arguments (e.g. in *give a book to her*). On the other hand, *donate* is restricted to NP and PP. In both cases, the lexical element (the verb) is the head of the respective phrase. For nominal structures, Zwicky argues that Det must be the subcategorizand, since the Det is the sole lexical element in Det- \bar{N} combinations, and hence the determiner is the only plausible candidate for a lexical head. Unfortunately, he missed the fact that the determiner may be complex both in English and other languages as well:⁹

- (8) a. the Queen of England's son
- b. unter des Körpersportlers Haut¹⁰
 below the body.sportsman's skin
 'below the body builder's skin'

Since both the determiner and the \bar{N} can be phrasal, this test does not really help here.

3.1.2 The morphosyntactic locus

A further test discussed by Zwicky (1985: Section 2.1.3) is the test for the morphosyntactic locus. The inflectional features are located at the noun in English:

- (9) a. the child
- b. the children

⁹See Pollard & Sag (1994: 51–54) and Ginzburg & Sag (2000: 193) for analyses of 's as determiner and of complex prenominal phrases as determiner phrases.

¹⁰taz [German newspaper], 1995-01-04, p. 15, quoted from Müller (1999b: 59)

However, this test does not help for German, since determiners are inflected as well:

- (10) a. das / dieses Kind
the.SG.N this.SG.N child(N)
b. die / diese Kinder
the.PL these.PL children.PL

3.1.3 Determinant of concord

Zwicky (1985: Section 2.2.2) looks at the element that determines concord within a phrase. Sometimes it is claimed that the determiner is responsible for the inflection class of the adjective. The determiners in (11) have a fixed inflection class and the other elements in the nominal structure have to be appropriate for the respective class with it:

- (11) a. ein kluger Mann
a smart man
b. der kluge Mann
the smart man

However, it is equally possible to argue the other way round, and Zwicky (1985: 9) does exactly this: gender is an inherent property of most nouns and the determiner has to match the gender of the noun:

- (12) a. der Mann
the.M man(M)
b. die Frau
the.F woman(F)

This suggests that the noun is the head in nominal structures. Therefore we can conclude that this test fails as well for German: sometimes the determiner, sometimes the noun determines concord.

3.1.4 Semantic functor

A further criterion suggested by Zwicky (1985: Section 2.1.1) is the one of the semantic selector. Unfortunately, this criterion does not really decide the issue either. It is true – as Zwicky notes on page 4 – that for instance the universal quantifier selects the semantic contribution of the nominal part and incorporates it into the complete formula. The nominal part *Frauen* ‘women’ corresponds to the Q in (13b):

- (13) a. alle Frauen
all women
b. $\lambda Q(\lambda P(\forall x(Q(x) \rightarrow P(x))))$

But on the other hand, we have relational nouns like *conquest* whose arguments may be realized in the position of the determiner. The meaning representation of (14a) has to contain (14b) somewhere:

- (14) a. Peters Eroberung der Stadt
Peter's conquest of the town
b. $\text{conquest}(\text{Peter}, \text{town})$

This means that this criterion is not reliable either. The determiner embeds the semantic contribution of the remaining nominal group, and the remaining nominal group may embed parts contributed by the determiner.

3.1.5 The distributional equivalent

Zwicky (1985: 12) states that the noun is the distributional equivalent of the whole phrase, including the determiner. Proper names like *Kim* and plural nouns like *penguins* can be used instead of *the penguins*.

As a reviewer pointed out, the criterion is a rather odd one since it could not be applied to all heads that obligatorily require arguments. Examples are prepositions in German and verbs like *devour* in English. Since a single preposition cannot be used anywhere without its NP argument, the preposition is not distributionally equivalent to the PP and hence would not qualify as the head. Clearly an unwanted result.

3.1.6 Obligatoriness

Both the determiner (15a) and the noun (15b) may be omitted in German. It is even possible to omit both of them, as (15c) shows:¹¹

- (15) a. Er hilft Frauen.
he helps women
'He helps women.'
b. Er hilft den klugen.
he helps the smart
'He helps the smart ones.'

¹¹The adjectives in (15) could be nominalizations, but I am talking about elliptical constructions here. Nominalizations would be written with capital letters.

- c. Er hilft klugen.
he helps smart
'He helps smart ones.'

As the translation of the examples shows, the pronoun *one* is used in the parallel English structures. However, English also permits nominal structures without a visible noun (Zwicky 1985, Arnold & Spencer 2015: 13). Zwicky notes that structures with omitted noun are always elliptical. This means that nouns are obligatorily present, and if they are missing, their omission is due to ellipsis. So, if this criterion is accepted, it decides in favor of N as the head.

A reviewer pointed out that there are certain cases in which the nominal part is optional, but when it does not occur, this is not due to ellipsis. Examples are *this*, *that*, *we*, and *you*:

- (16) a. this man
b. we sailors

I think that a double categorization of these elements as determiners and full NPs is justified. So *we* would be a full DP/NP if it is used without other material and something different in constructions like *we sailors*. See Section 3.1.8.1 for more on pronoun-noun combinations. In any case, examples like the ones just mentioned show that the criterion cannot be applied without further qualifications.

3.1.7 Language acquisition, uniformity, and Poverty of the Stimulus

Abney's dissertation (Abney 1987) made the DP analysis very popular within the generative world. Abney argued for a treatment of English nominal structures that is parallel to the structures assumed for the sentential domain. Many authors assume an IP/VP analysis for English, not just those working in Mainstream Generative Grammar (MGG), but also in LFG (Bresnan, Asudeh, Toivonen & Wechsler 2016: 102). In such analyses, there is a functional I projection in addition to verbal projections. An advantage of the DP analysis is that one has parts of the theory that are similar, and hence one can claim to have found deeper laws. Apart from this, language acquisition is used as an argument in the DP/NP discussion: Chomsky still believes that language cannot be learned from input alone (Berwick, Pietroski, Yankama & Chomsky 2011).¹² Since – according to Chomsky – language is acquired despite this Poverty of the Stimulus, there must be innate language-specific knowledge which helps us to acquire language from the input

¹²The authors discuss auxiliary inversion. See Müller (2020: Section 13.8.2.4) and Sag et al. (2020: Section 1) for a critical discussion of these claims.

that is available. The claim was that children can acquire language because all phrases have the same internal structure and knowledge about this structure is innate and therefore helps to acquire language (Haegeman 1994: 106).¹³ In particular, nominal structures have a DP structure which is parallel to the IP/VP structures.

Fodor (2001: 739) points out that the situation is not as simple if movement to places in otherwise invisible structure is possible. For example, it is not obvious in some cases whether verbs are in V, I, or C, whether a language is V2 or not, or whether we have an SVO or an SOV language, as the following three examples from English, Danish, and German illustrate (Müller 2022: Section 6.2.2, Figure 6.11):

- | | | | |
|------|----|-----------------------|----------|
| (17) | a. | Conny reads a book. | –V2, SVO |
| | b. | Conny læser en bog. | +V2, SVO |
| | c. | Conny liest ein Buch. | +V2, SOV |

So, having simple transitive sentences in the input is not enough to decide. Sentences with auxiliaries would help the linguist to decide between SOV and SVO languages, but this wouldn't help to distinguish between –V2 and +V2; for this the linguist would need examples with fronted objects, rather than subjects as in (17). As Fodor points out, there are many questions concerning how language acquisition is supposed to work in a Principles & Parameters setting. It is unclear how a child can determine which way to set the parameters. Fodor suggests a model assuming innate treelets that can be used in analyses of utterances and shows that this avoids problems of alternative approaches. While this seems to be the most plausible approach with the Principles & Parameters framework, there are still serious issues (discussed by Fodor herself), and of course the overall question is how information about treelets distinguishing between V2 and non-V2 languages are supposed to make it into our genome (Hauser, Chomsky & Fitch 2002). Assuming data-driven approaches without a rich UG (Freudenthal et al. 2007) seems to be preferable.

But let us assume for the sake of the argument that uniformity of basic \bar{X} structure would help in language acquisition. Even with this assumption, there remains a problem with this argument, namely that many researchers (from different frameworks) believe that the assumption of an IP structure is not plausible

¹³Haegeman (1994: 106) states that “the principles of X' theory will be part of UG, they are innate. The ordering constraints found in natural languages vary cross-linguistically and thus have to be learned by the child through exposure. Very little data will suffice to allow the child to fix the ordering constraints of the language he is learning. A child learning English will only need to be exposed to a couple of transitive sentences to realize that in English verbs precede their complements.”

for German (Bayer & Kornfilt 1990, Haider 1993, Berman 2003). If German does not have an IP, it is not reasonable to assume that the DP is parallel to the sentential domain and that constraints on both domains are part of our innate linguistic knowledge.¹⁴ Hence, uniformity of nominal and sentential domain is not an argument for the DP analysis.

I want to close this section with a somewhat ironic remark. Although I do not believe in the “parallelism in structure helps language acquisition” argument, I want to point out that the NP analysis suggested here is parallel to the analysis of the sentential domain assumed in HPSG: auxiliaries are treated as verbs, not as *Is* or *Ts* (Sag et al. 2020). The subject of verbs in SVO languages are treated as specifiers, and so are determiners in nominal structures (Müller 2022: Sections 4.3–4.4), so we have arrived at parallelism all the same.

3.1.8 Pronoun-noun combinations, selection, agreement, and idioms

Zwicky’s (1985) criteria for head status discussed so far are theory-neutral, as far as this is possible. The DP analysis is considered the standard in Mainstream Generative Grammar and authors usually refer to Abney (1987) for a thorough argumentation for the DP analysis. However, Salzmann (2022), this volume, points out that all previous arguments for the DP analysis depend on theory-internal assumptions. If these assumptions are not made, the arguments collapse. Since MGG changed considerably since the 80s, none of the original arguments holds any longer. Salzmann suggests a new argument based on agreement data from Bosnian/Croatian/Serbian (BCS). In what follows, I want to discuss three phenomena that seem to argue for DP analyses (pronoun-noun combinations, selection, and agreement) and one controversial phenomenon that is very interesting in the DP/NP debate: idioms.

3.1.8.1 Pronoun-noun combinations

Let us start with pronoun-noun combinations:

- (18) a. Ich Idiot habe mich gefreut.
I idiot have myself been.glad
‘I idiot was glad.’

¹⁴Haider (1992) assumes a functional head in the German clause that is not IP. In his DP approach he assumes a parallel between his FP (Functional Projection) and the DP. While there is a parallel in the functional/lexical structure of FP and DP, the makeup of the respective phrases in German is quite different. The head of the FP is the place for the finite verb or a complementizer and SpecCP is the target for fronted constituents in V2 clauses.

- b. Du Idiot hast dich gefreut.
 you idiot have yourself been.glad
 ‘You idiot were glad.’
- c. Wir Idioten haben uns gefreut.
 we idiots have ourselves been.glad
 ‘We idiots were glad.’
- d. * Er Idiot hat sich gefreut.
 he idiot has himself been.glad
 Intended: ‘He was glad and he is an idiot.’

The examples in (18) show that the pronoun agrees with the verb in person and number, while the noun together with a determiner is always third person. (18d) shows that third person pronouns are not possible in this construction, so there is something idiosyncratic about it. Simon (2003: 139–140) and references cited there see data like this as evidence for the DP analysis, but I think this construction should not be treated as an instance of the normal NP or DP construction. Note also that some languages have this construction and combine the pronoun with a full nominal projection (Höhn 2016: Section 5.3). In these languages, one would not say that a D head selects an NP, but the pronoun would have to select a full DP. This is actually the solution suggested by Höhn (2016: 568): he assumes a PersP with the pronoun as head selecting a DP.¹⁵ So, it seems reasonable to treat the pronoun as a head, but the whole construction should not be decisive in the DP/NP discussion.

3.1.8.2 Selection

Salzmann (2022: Section 3.2.2.2), this volume, mentions the fact that incorporation seems to require selection of nominal structures without determiners (NPs), while otherwise, verbs select nominal structures with determiners (DPs). For this to have any force as an argument for DP, one needs the assumption that only maximal projections can be selected. However, this assumption is not made in HPSG. For example, partial verb phrase fronting is explained by assuming that non-maximal verbal projections may be combined with governing heads (Müller 1996b; 2002: Section 2.2.2; Meurers 1999). And once non-maximal projections can be combined with heads, we can have heads combining with bare nouns, \bar{N} s, and NPs, and hence there is no argument for DP. See for example Müller (2010: 632) for the suggestion that light verbs in Persian may combine with lexical nouns.

¹⁵Note that this begs the question why governing heads selecting for DPs can take PersPs as well.

Salzmann also states that it is impossible to “select the absence of structure” (Salzmann 2020: 28, 32, 2022: Section 3.2.3), but this does not apply to HPSG. Since \bar{N} is defined as a nominal projection without a specifier, one can select for something with absent structure. Furthermore, material that is combined contributes to the properties of a complex category. The respective contributions can be selected for. This is independent of the question at which projection level the respective combination takes place. See for example the use of the marking feature in Pollard & Sag (1994: 45–46) or Van Eynde (2006).

3.1.8.3 Agreement

Salzmann (2020: Section 4.3) discusses agreement patterns from Bosnian/Croatian/Serbian (BCS) and argues that they show that there has to be a DP layer over an NP layer to get the facts right. While he is very careful to show that Abney’s (1987) arguments for the DP analysis are theory-internal, the same holds for Salzmann’s new argument: agreement is established via the Probe/Goal mechanism of Minimalism (Chomsky 2001). This crucially relies on c-command and the proximity of agreement source and agreement target. In comparison to this, agreement is dealt with differently in frameworks like HPSG: the main expressive tool is structure sharing. It is not assumed that there is an agreement source and an agreement target (Pollard & Sag 1994: Section 2.2), but instead, both exponents of morpho-syntactic features are treated alike and the information on both sides is simply identified (Pollard & Sag 1994: Chapter 2, Kathol 1999, Wechsler & Zlatić 2003, Van Eynde 2021). Salzmann points out that there are two types of agreement in BCS: adjectives and determiners may agree in grammatical and semantic gender. If a certain head agrees in semantic gender, the next higher head cannot go back to grammatical gender. Salzmann concludes from this that there must be a DP layer, since in terms of c-command the determiner would be the highest head and its features would be decisive for agreement with elements outside of the nominal structure (p. 38). But this conclusion is dependent on many theory-internal assumptions. Bruening (2020: Section 4), working in the same framework and assuming an NP approach, developed an alternative theory of the agreement facts.

So again, the argument that Salzmann suggests instead of Abney’s arguments is also a theory-internal one.¹⁶

¹⁶Salzmann’s puzzle is not solved for HPSG yet. Van Eynde (2020) discusses agreement in BCS but does not solve the problem of inaccessibility of one of the two agreement options. In his account both agreement options are always available. So further research and modification of the general theory of agreement is needed but it is not necessary to assume an agreement theory based on c-command.

3.1.8.4 Idioms

A very interesting argument comes from Bruening (2020: Section 5). Bruening argues that idioms make reference to dependency chains. This was also suggested within Dependency Grammar (O’Grady 1998, Osborne & Groß 2012: Section 4.2). Osborne & Groß (2012: Section 4.2) argue for the importance of dependency relations in linguistic descriptions and explicitly claim that all idioms are based on dependency chains. They assume that determiners are dependents of nouns and explicitly state that idioms with fixed verbs, free nouns, and fixed determiners do not exist (p. 180).

If the Catena claim is correct, this is 100% compatible with the NP analysis suggested here. Sag (2007) and Kay, Sag & Flickinger (2015) developed a local theory of idioms that is based on selection. This is compatible with the claims made by Bruening (2020) and Osborne & Groß (2012: Section 4.2).

Salzmann (2020: 31) argues that examples like the ones in (19) are counter-examples to the dependency chain claim:

(19) She plays the piano/trombone/flute.

In the specific collocation at hand one has to use the definite determiner and the actual instrument is open. Salzmann sees this as a data point that could be used to argue against the dependency chain claim. I would argue, however, that the fact that an instrument has to be inserted shows that *piano/trombone/flute* are part of the idiom. The material that is fixed in idioms varies to a great degree. Sometimes case is fixed, sometimes it is not. Sometimes idioms can be passivized or used in relative clauses, sometimes they cannot (Nunberg et al. 1994). In the case at hand, the semantic properties of the noun slot are specified: *She plays the volleyball* is not possible. Hence the nouns are part of the collocation and the determiner depends on a collocation element as predicted by the theory.

3.1.9 Summary

Summing up the discussion of Zwicky’s (1985) tests for headedness and their application to the DP/NP issue, it can be said that these tests deliver inconclusive results. Further arguments for either NP or DP are either theory-internal or pro-NP (the idiom data).

3.2 The DP analysis

Having discussed criteria for head status in the previous subsection, I now turn to the DP analysis and show why an NP analysis should be preferred.

3.2.1 Personal pronouns

Figure 7 shows the analysis of personal pronouns in the DP analysis. Personal pronouns are complete and stand for a full nominal structure. Hence they are D^0 rather than N^0 . D^0 is projected to the maximal level, that is, to DP. This begs the question how languages without determiners are analyzed (e.g., Slavic languages; Zlatić 2014). Since there are no determiners, maximal projections within nominal structures have to be NPs. Since personal pronouns are placeholders for the whole structure, they should be NPs as well. Hence we had languages in which pronouns are DP and others in which pronouns are NPs, which would be somewhat unsatisfying.

3.2.2 Possessive pronouns

The next question concerns possessive pronouns. Possessive pronouns and possessor phrases in general will play a major role in my argument for an NP analysis in HPSG, which is the reason why the proposals to treat them in a DP approach are discussed here. There are proposals to analyze possessives like determiners, that is, as D^0 (left figure in Figure 8). Since possessives may be complex and since possessive pronouns alternate with such possessive phrases, both should occupy the same position. This is the reason for G. Müller (2007a: 18) to analyze possessive pronouns as specifiers. The middle figure in Figure 8 shows a GB rendering of this analysis. Finally, Olsen (1991: 52) observes that a DP like *seine Stadt* ‘his town’ is third person but *seine* ‘his’ is first person, and that this is evidence against the possessive pronoun being the head. Therefore, she assumes that *-e* is the D head and *mein-* is a DP functioning as the specifier. While this seems to be convincing at first, one could assume that *seine* has a first person referen-



Figure 7: Personal pronouns in the DP analysis

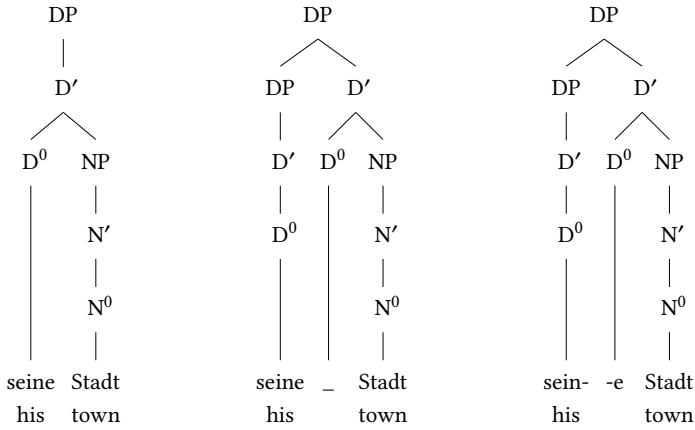


Figure 8: Possible analyses for possessive pronouns: left as D⁰, middle as specifier of an empty D⁰, right as specifier with inflection in D⁰ following Olsen (1991: 53)

tial index but syntactic features for third person for DP-internal agreement. The rightmost analysis in Figure 8, therefore, is not the only possibility. One could assume the one in the middle as well. The analysis to the right would not be an option within HPSG anyway, since usually, fully inflected words are inserted into syntax rather than bound morphemes like *-e*.

The assignment of thematic roles by relational nouns also plays a role in the analysis of possessives. These are discussed in the following section.

3.2.3 Relational nouns and assignment of semantic roles

If possessives were analyzed as D heads as in Figure 8 (left) and in Figure 9, relational nouns would have to assign a semantic role to a head position that is higher up in the tree (Olsen 1991: 51). This is prohibited since, according to Chomsky (1981: 47), semantic roles may be assigned to argument positions (A positions) only. Chomsky explicitly does not count head positions among these. One could claim that the possessive pronoun is a D⁰ and that the agent gets its semantic role within the NP and is then moved out of the NP into the head position, as shown in the left figure in Figure 10. In such a setting, the movement out of the NP would have to target a head position, which is also prohibited (see e.g., Radford (2004: Sections 5.1, 6.1, 7.1) on various types of movement). This means that possessive pronouns have to be placed into SpecDP. It follows that the semantic role assigned by the relational noun is either assigned nonlocally, that

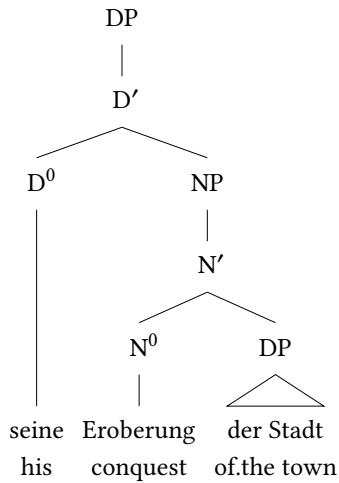


Figure 9: Possessive pronouns as D⁰ and assignment of a semantic role by a relational noun

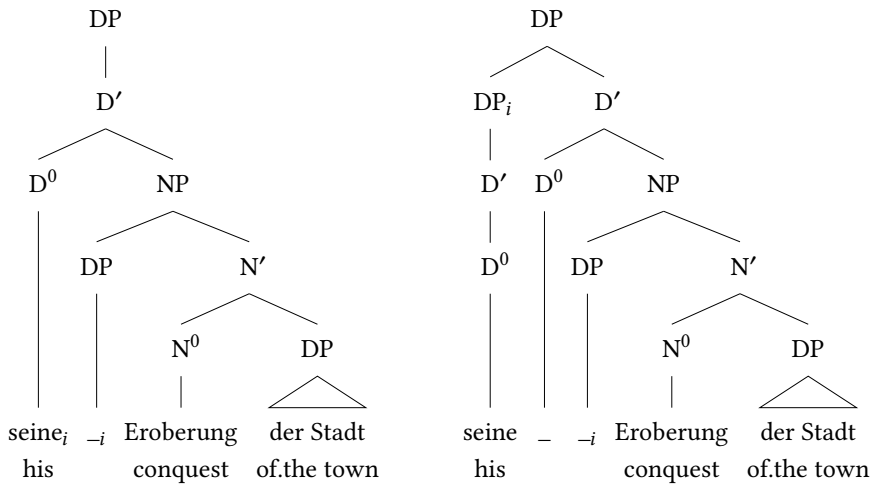


Figure 10: Assignment of semantic role to SpecNP and successive movement from a phrase position into a head position or a specifier position, respectively

is, from within the NP to a specifier position of the DP, or that the assignment is local within the NP and the receiving element is moved into the specifier position of the DP (see Figure 10 (right)).¹⁷

Given what was said in this and the previous section, it follows that possessive pronouns have to be in SpecDP in the DP system. Figure 11 shows the structures of the DP and NP analysis in a fully fledged \bar{X} system.

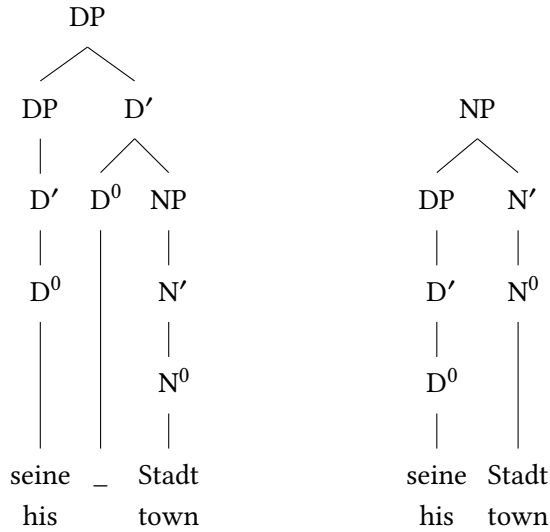


Figure 11: Comparison of the construction with possessive pronouns in a fully fledged \bar{X} system in the DP and in the NP analysis

It is obvious that the NP analysis is much simpler.

3.2.4 The DP analysis in Minimalism and the NP analysis in HPSG

The HPSG analysis with an NP structure is really minimal: the lexical noun is combined directly with the determiner/possessive pronoun. Since the noun does not require anything but the determiner, it has the category \bar{N} .¹⁸ The possessive pronoun is complete as well and need not be combined with other elements.

¹⁷HPSG does not refer to movement within NPs, but, as a reviewer pointed out, similar effects can be obtained by assuming that D embeds an \bar{N} and that the specifier of the embedded \bar{N} is shared with the specifier of the determiner (see Hinrichs & Nakazawa (1994) for argument attraction in general).

¹⁸Categories are feature bundles. \bar{N} is an abbreviation for a nominal object selecting a determiner. (5) is an example.

Hence it may be combined with the noun, directly resulting in a fully saturated nominal projection: an NP. The left figure in Figure 12 shows the HPSG analysis. The figure on the right-hand side of Figure 12 shows the respective analysis in

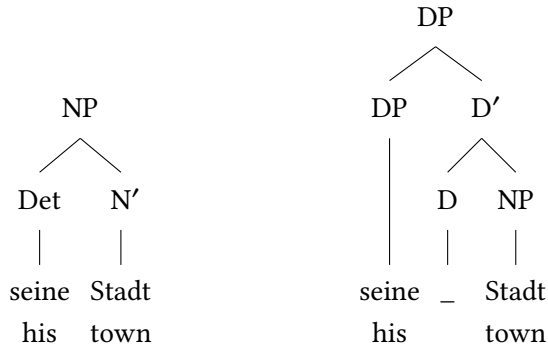


Figure 12: NP and DP analysis in HPSG and Minimalism

Minimalism. Although the problem with unnecessary unary branching nodes does not exist in the framework of Bare Phrase Structure (Chomsky 1995a),¹⁹ the problem with role assignment remains. In contrast, in the NP analysis, possessives are in the specifier position of the noun and can receive their semantic role there. If one assumes a DP analysis, one would have to assign the semantic role to the governing head (in HPSG) or to an even higher element – the specifier of the governing head. Within Minimalism, one could – or rather, had to – assume non-local role assignment across phrase boundaries or movement of the possessive pronoun out of the NP into the dominating DP (Salzmann 2020: 18).

In conclusion, one can say that there is almost no theory-external evidence for a DP or NP analysis. The criteria for headedness are inconclusive in the DP/NP area. Only few tests clearly decide the issue, and these are in favour of an NP analysis. Theory-internal considerations show, however, that the NP analysis must be preferred in non-transformational approaches.

¹⁹In Bare Phrase Structure Grammar, unary projections of determiners or nouns do not exist. Linguistic objects are combined with Merge and the category of the result is determined by Labeling. The Label is basically part of speech information, bar levels are not used. A noun and its dependent form a phrase and if the noun does not require any further arguments, the result of the combination will be a complete nominal object, which corresponds to the classical NP. Assuming a DP analysis of *the house*, the noun like *house* is categorized as NP right away. So in Bare Phrase Structure, lexical items can be both minimal and maximal at the same time (Chomsky 1995b: 64). This is parallel to what Categorical Grammar assumed since Ajdukiewicz (1935) and what is assumed in the analysis of nominal structures in HPSG as well. See also Muysken (1982) for an early suggestions to collapse bar-levels in the GB framework. See Müller (2020: Section 4.6.2) for further discussion of Bare Phrase Structure Grammar.

The next section deals with invisible heads, and nominal structures will play an important role in this section as well.

4 Invisible heads

Wunderlich (1987: 37) writes the following on empty elements in syntax:

Eine sinnfällige Sprachtheorie sollte die Prinzipien der Sprache so nahe wie möglich nachzeichnen und nicht Repräsentationen für Positionen vorsehen, die aus funktionalen Gründen gar nicht erscheinen. Dem erwähnten sprachinhärenten Prinzip möchte ich daher das methodologische Prinzip „Vermeide leere Kategorien“ zur Seite stellen. (Wunderlich 1987: 37)²⁰

While early HPSG used empty elements in nonlocal dependencies (traces, Pollard & Sag 1994: 164) and empty heads for the analysis of relative clauses (Pollard & Sag 1994: 216), later publications tried to avoid empty elements (Sag & Fodor 1995, Sag 1997, Bouma, Malouf & Sag 2001). This section discusses two examples of empty heads: Subsection 4.1 deals with nominal structures again and suggests an empty nominal head, and Subsection 4.2 deals with copula constructions in African American Vernacular English (AAVE), for which an empty verbal head was suggested.

Another empty verbal head is assumed in the analysis of German by almost all HPSG theoreticians working on German. I followed an approach without such an empty verbal head from 1993 until 2003 (see Müller 2002: Section 1.9), but I am now convinced that the assumption of the empty verbal head is necessary to account for apparent multiple frontings in German (Müller 2003, 2005). The discussion of the arguments for an analysis with an empty verbal head cannot be included here due to space limitations, but the reader is referred to a book-length discussion of the data, the analysis, and its alternatives in Müller (2021b).

See also Borsley (1999, 2009, 2013) for further explicit suggestions of analyses with empty heads.

4.1 Nominal heads

In the previous section, I argued for an NP analysis, that is, for an analysis in which the noun is the head. This begs the question how to analyze phrases that distributionally behave like NPs but do not contain a noun. The phrases in (20f–k) may appear in places in which the NPs in (20a–e) may appear:

²⁰Language theory should model the principles of language as closely as possible. It should not assume representations for positions that do not appear for functional reasons. In addition to the principle inherent to language mentioned already [Avoid Pronoun], I would like to add the methodological principle Avoid Empty Categories. [my translation, St.M.]

- (20)
- a. die kluge Frau
the smart woman
 - b. die Frau aus Hamburg
the woman from Hamburg
 - c. die kluge Frau aus Hamburg
the smart woman from Hamburg
 - d. die kluge Frau, die wir kennen
the smart woman who we know
 - e. die kluge Frau aus Hamburg, die wir kennen
the smart woman from Hamburg who we know
 - f. die kluge
the smart
'the smart one'
 - g. die aus Hamburg
the from Hamburg
'the one from Hamburg'
 - h. die kluge aus Hamburg
the smart from Hamburg
'the smart one from Hamburg'
 - i. die, die wir kennen
the who we know
'the one who we know'
 - j. die kluge, die wir kennen
the smart who we know
'the smart one who we know'
 - k. die kluge aus Hamburg, die wir kennen
the smart from Hamburg who we know
'the smart one from Hamburg who we know'

For instance, all phrases in (20) may function as the subject of the verb *lacht* 'laughs'. Therefore it is appropriate to categorize all these phrases with the same label, rather than to assume that those in (20a–e) are NPs and those in (20f–k) DPs, say. If we want to analyze (20f–k) as NPs, we either have to assume an empty nominal head or we have to formulate rules for NPs that say that an NP may consist of a determiner and one or several adjectives, or of a determiner and PPs, or relative clauses, or some variation of these elements. The set of rules would grow and the generalizations would not be captured (see Section 5.1). Instead of

this, one can simply assume an empty nominal head. The advantage of this is that all phrases in (20) can be analyzed with the same set of rules and that they have the same structure. Figure 13 shows the analysis of (20h). A simple trick to get rid of the empty element in Figure 13 is to assume a unary branching rule that projects the adjective to \bar{N} (Wunderlich 1987). Note though that this unary branching rule does not account for (20g). We will come back to this in Section 5.

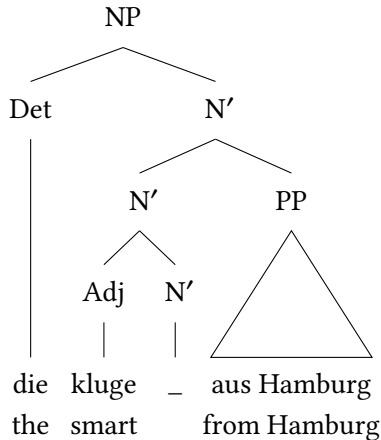


Figure 13: Analysis of *die kluge aus Hamburg* ‘the smart one from Hamburg’ with empty nominal head

As was noted in Section 3.1.6, determiners can be omitted as well. This is possible for all nouns in the plural:

- (21) a. Frauen
women
b. Frauen, die wir kennen
women who we know
c. kluge Frauen
smart women
d. kluge Frauen, die wir kennen
smart women who we know

Mass nouns may be used without a determiner in the singular as well:

- (22) a. Getreide
grain
b. Getreide, das gerade gemahlen wurde
grain that just ground was
‘grain that was just ground’

- c. frisches Getreide
fresh grain
- d. frisches Getreide, das gerade gemahlen wurde
fresh grain that just ground was
'fresh grain that was just ground'

As I did for structures without a noun, one may assume an empty determiner (Pollard & Sag 1994: 90). The analysis of (21a) is shown in Figure 14.

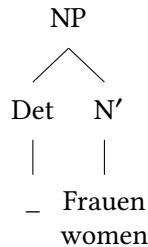


Figure 14: Analysis of nominal structures without a determiner

Interestingly, both determiner and noun may be omitted in a phrase, resulting in phrases consisting of one or several adjectives and possibly PPs and relative clauses:

- (23) a. Ich helfe klugen.
I help smart
'I help smart ones.'
- b. Dort drüben steht frisches, das gerade gemahlen wurde.
there over stands fresh that just ground was
'Over there is fresh [grain] that was just ground.'

The structures for (23a) and a similar NP including a modifying PP are shown in Figure 15.

Instead of an empty determiner, one can assume a unary branching rule projecting an \bar{N} to NP (Müller 2007b: 88).²¹ This and other alternatives to empty elements will be discussed in Section 5. But before turning to alternatives to empty heads, I want to discuss empty verbal heads in the next subsection.

²¹The computational implementation (Müller 1996a) of the grammar described in Müller (1999b) did not contain empty elements. I used a unary branching rule for structures without a determiner. A lexical rule, as suggested by Michaelis (2006: 80), is not an option. See Müller (2007b: Section 6.6.2) on this point.

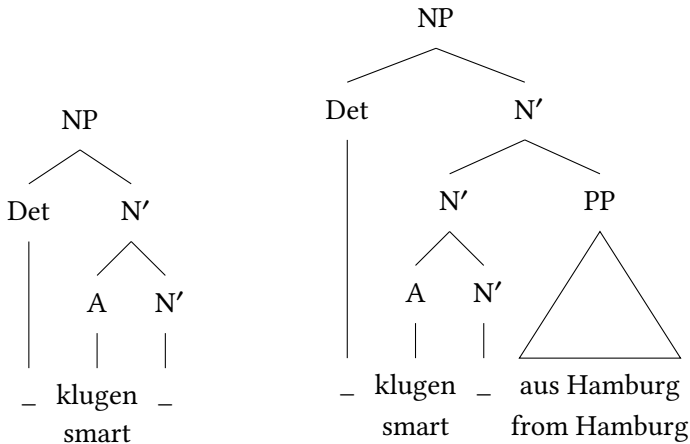


Figure 15: Analysis of nominal structures lacking both determiner and noun: *klugen* ‘smart ones’ and *klugen aus Hamburg* ‘smart ones from Hamburg’

4.2 Verbal heads

Bender (2001) discusses data from African American Vernacular English (AAVE), in which the copula can be omitted, resulting in sentences like (24), taken from Sag, Wasow & Bender (2003: 457):

- (24) a. Chris at home.
 b. We angry with you.
 c. You a genius.
 d. They askin for help.

Sag, Wasow & Bender (2003: Section 15.3.4) discuss a phrasal schema that combines a predicate selecting for an NP in a certain form with this NP directly.

- (25) $S \rightarrow \text{NP Pred}$

While this provides an account for examples like (24), it fails on examples like (26), also taken from Sag et al. (2003: 463):

- (26) a. How old they say his baby ϕ ?
 b. Tha’s the man they say ϕ in love.

The interesting fact about these examples is that the predicate is extracted in (26a) and the subject is extracted in (26b). The rule in (25) cannot apply in the analysis of (26), since Sag et al. do not assume traces for extraction, and hence one would

need a special rule for the case in (26a) for combining a subject with an extracted predicate and a special rule for the case in (26b) for combining a predicate with an extracted subject.²² Rather than assuming three unrelated rules, Sag et al. follow Bender (2001) in assuming an empty head for the copula. This is an interesting twist in the discussion of empty elements, since the need to assume this empty copula was caused by eliminating empty elements in the analysis of extraction phenomena by Bouma, Malouf & Sag (2001).

5 Grammar conversion

In the previous section, I suggested using empty elements in the analysis of nominal structures. Current grammatical theories have different views regarding empty elements. There are hundreds of empty elements of various categories in Minimalism (Webelhuth 1995: 76; Newmeyer 2004: 194; 2005: 82; Müller 2020: Section 4.6.1.1), in most Construction Grammar variants there is not a single one, and in other frameworks it depends on the author whether empty elements are assumed and, if so, which ones.²³ Apart from the two empty elements mentioned already, I am using only two further empty elements in my grammars: one for nonlocal movement and one for head movement (Müller 2013, 2021b).

I show in this section which formal means used in various frameworks correspond to each other and how grammars using empty elements can be transformed into grammars without them. This may help to objectify the discussion, which is a bit emotional sometimes.

5.1 Phrase structure grammars

It was shown as early as the 1960s that grammars with empty elements can be transformed into grammars without them by inserting the empty elements into the grammar rules. This results in new grammar rules in which the respective symbols do not appear any longer (Bar-Hillel et al. 1961, Müller 2004).

Let's take the grammar in (27a) as an example. We can eliminate the empty element for \bar{N} by adding new rules for all rules where \bar{N} appears on the right-hand side of the rule. The result of such a transformation is shown in (27b):

²²Note that this is basically the same problem as the one I pointed out in the discussion of phrasal approaches in Construction Grammar (Müller 2006: 854).

²³Müller (2020: Section 19.1) gives an overview of approaches with and without empty elements in Categorical Grammar, GPSG, LFG, TAG, Dependency Grammar, and HPSG.

- | | |
|---|--|
| <p>(27) a. $NP \rightarrow \text{Det } \bar{N}$</p> <p>$\bar{N} \rightarrow \text{Adj } \bar{N}$</p> <p>$\bar{N} \rightarrow \bar{N} PP$</p> <p>$\bar{N} \rightarrow _$</p> <p>$\text{Det} \rightarrow \text{die}$</p> <p>$\text{Adj} \rightarrow \text{klugen}$</p> <p>$\bar{N} \rightarrow \text{Frauen}$</p> | <p>b. $NP \rightarrow \text{Det } \bar{N}$</p> <p>$\text{NP} \rightarrow \text{Det}$</p> <p>$\bar{N} \rightarrow \text{Adj } \bar{N}$</p> <p>$\bar{N} \rightarrow \text{Adj}$</p> <p>$\bar{N} \rightarrow \bar{N} PP$</p> <p>$\bar{N} \rightarrow PP$</p> <p>$\text{Det} \rightarrow \text{die}$</p> <p>$\text{Adj} \rightarrow \text{klugen}$</p> <p>$\bar{N} \rightarrow \text{Frauen}$</p> |
|---|--|

When we insert empty elements into rules, it may happen that all elements on the right-hand side are deleted, which has the effect of creating new empty elements. Hence the step of inserting empty elements into rules has to be applied until it converges, no new empty elements are produced, and all empty elements are eliminated from the grammar.

As is demonstrated by the simple example in (27), the elimination of empty elements may result in an increase of the number of rules.²⁴ One rule from grammar (27a) (the one for the lexical item of the empty element) was removed and we got three new rules in (27b) instead. The generalization that nouns may be omitted in German is not captured directly in the new grammar any longer. Instead we have a largish number of descriptions of constituents that can form an NP or an \bar{N} , respectively.

It is often argued that there cannot be empty elements since these would be invisible and hence not learnable. The acquisition problem seems to argue for empty elements in the nominal structures at hand, though, since what has to be acquired is the fact that the noun can be omitted in elliptical constructions.

The empty determiner is not part of the example in (27), but it is clear that its elimination by the techniques described above results in a unary branching rule that projects an \bar{N} to an NP. See Zlatić (2014: 31) for the assumption of such a unary projection.

5.2 Lexical rules

As was mentioned above, the number of empty heads that are assumed in Minimalist work is significant. Some contribute semantic information and are important for valence alternations like the one in (28):

²⁴Wunderlich (1987: 38), discussing a proposal with an empty head by Olsen (1987), suggests a rule projecting nouns from adjectives, but does not mention cases like (20g), in which no adjective is present.

- (28) a. Er bäckt einen Kuchen.
 he.NOM bakes a.ACC cake
 b. Er bäckt ihr einen Kuchen.
 he.NOM bakes her.DAT a.ACC cake

(28a) shows the transitive verb *bäcken* ‘to bake’ with a nominative and an accusative argument. (28b) has a dative argument in addition.

Almost all linguistic theories handle such alternations without empty elements. LFG, HPSG, and SBCG analyze such valence alternations via lexical rules instead (Toivonen 2013, Müller 2018, Sag, Boas & Kay 2012). Figure 16 is a comparison of the two analyses. The left-hand side shows a lexical rule-based analysis relat-

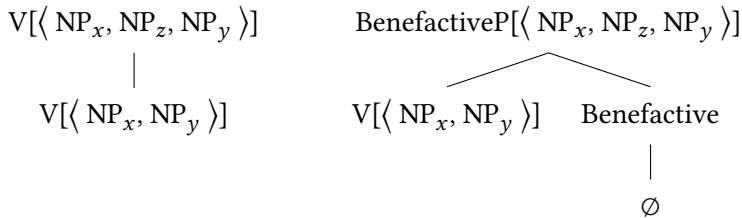


Figure 16: Comparison of the analysis of valence alternations by lexical rule and empty head

ing a word with two elements in the valence list to a word with three elements in the valence list. The right-hand side shows an analysis with an empty head: The benefactive head selects a verb with two arguments, and the result of the combination is a projection that takes three arguments.²⁵

Lexical rules in HPSG are basically unary branching rules (Briscoe & Copestake 1999, Meurers 2001) and hence it does not come as a big surprise that they correspond to constructions with an empty head.

5.3 Recategorization of phrases

The previous section dealt with lexical rules. Lexical rules relate words or stems to other words or stems. One way to model lexical rules is parallel to unary branching rules. But nothing prevents one from relating phrases to one another.

²⁵ Analyses suggested in the literature usually combine a VP with one further head, that is, the verbal head is combined with its arguments first and the result of this combination is then combined with the benefactive head (Bosse & Bruening 2011: 75).

For instance, Partee (1986) and, following her, Müller (2009) suggest recategorizing NPs like *ein guter Lehrer* ‘a good teacher’ as in (29a) via a unary projection into an NP that can be used predicatively as in (29b). (The lexical rule-based analysis by Ginzburg & Sag (2000: 409) has scope problems, since lexical rules can be applied to single lexical elements only, and other elements that can appear in NPs (adjectives for example) cannot be part of the input of the lexical rule (Kasper 1997, Müller 2012).)

- (29) a. Ein guter Lehrer lobt.
 a good teacher praises
 ‘A good teacher praises.’
 b. Er ist ein guter Lehrer.
 he is a good teacher
 ‘He is a good teacher.’

Figure 17 shows the analysis with a unary branching syntactic rule. The rule projects a NP[PRD−] to NP[PRD+], and of course the semantic type of the NP is adapted as well. This is not shown in the figure, since I do not have the space to introduce semantic representations in this paper. What is missing from the figure is that both valence and semantics of the dominating NP are different from the one of the dominated NP. The predicative NP selects for a subject and introduces a respective relation that relates the subject to the predicative noun.

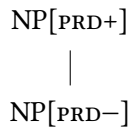


Figure 17: Semantic type raising via unary rule

The same effect can be reached by assuming an empty nominal head selecting for a PRD− phrase and projecting a PRD+ one.²⁶

Another interesting case are free relative clauses. Free relative clauses have the form of relative clauses but function like NP or PP arguments or adjuncts

²⁶Proposals in MGG sometimes use an empty Pred head projecting a PredP (Bowers 1993). This is not entirely equivalent to what is suggested here, since all categories are projected as PredP, and this makes it impossible for governing heads to select the syntactic category of the predicative element they combine with. As Pollard & Sag (1994: 105–106) pointed out, verbs like *grow*, *get*, *turn out*, *become*, and *end up* select different kinds of predicative elements. In the analysis in Figure 17, an NP is projected into an NP. The syntactic category remains selectable.

(Bausewein 1991, Müller 1999a). For example, in (30) the relative clause *wem er vertraut* ‘who he trusts’ fills the slot of the dative object of *helfen* ‘to help’:

- (30) *Wem er vertraut, hilft er auch.*²⁷
 who he trusts helps he too
 ‘He helps those he trusts.’

Groos & van Riemsdijk (1981: Section 2) suggest an analysis with an empty head (XP) that is modified by a relative clause and the properties of the relative phrase are related to the ones of the empty head. This analysis as sketched in (31a) is interesting since it is parallel to normal relative clause structures containing an overt pronoun as in (31b):

- (31) a. [_{NP[dat]} _{NP[dat]} [*Wem er vertraut*]], *hilft er auch.*
 b. [_{NP[dat]} *Denen*_{NP[dat]}, [*denen er vertraut*]], *hilft er auch.*
 those who he trusts helps he too
 ‘He helps those he trusts.’

However, the problem is that relative clauses are adjuncts and modification by adjuncts is optional. To maintain an analysis like the one by Groos & van Riemsdijk, one would have to assume that modification of the empty head by a relative clause is obligatory, since otherwise one would have complete XPs in the grammar that could function as arguments in other areas of the grammar (Müller 1999a: 97). For example, one could derive sentences with ditransitive verbs and all of the arguments could be saturated by the empty element:

- (32) * *dass* _{NP[nom]} _{NP[dat]} _{NP[acc]} *gibt*
 that gives
 As in: ‘that she gives it to her’

Usually adjunction is not obligatory however. While empty elements and unary projections are equivalent in most cases, we have a clear difference here. If one analyzes free relatives using a unary branching rule mapping a free relative clause to an XP, it is clear that this rule can only apply if there is a free relative clause, while nothing ensures the presence of an adjunct in the analysis using an empty head.

5.4 Summary

I have used nominal structures without overt nouns to further support the point that empty elements may help capturing generalizations in some cases. They

²⁷Engel (1977: 234)

can be avoided in other parts of grammars, and unary branching projections in the lexicon or in the syntax may be assumed instead. Sometimes unary projections have an advantage over empty heads since they can ensure the obligatory presence of constituents that would be treated as adjuncts to empty elements.

6 Headless structures

Section 4 dealt with structures in which we usually find certain elements, and it was argued that it is reasonable to use empty elements in the places in which the heads would appear when realized overtly. That is, it was assumed that there is a head even though it is invisible. The argumentation for empty elements is based on the fact that the respective positions are usually filled. In Section 5.3, I argued that the assumption of an empty head in the analysis of free relative clauses would permit ill-formed structures and argued for an analysis without head. However, Jackendoff (2008) pointed out that there are sequences like those in (33), called N-P-N expressions, where it is not reasonable to assume that one of the involved elements is the head or that there is some kind of bigger structure from which an element is missing:²⁸

(33) student after student

Such sequences can be used in NP positions within larger structures, but they do not have the structure of NPs internally. For instance, there is no determiner and there is the restriction that the second N has to be identical with the first one. The meaning of N-P-N expressions cannot be determined compositionally from the meaning of the parts: N *after* N roughly means *many Ns in succession* (Jackendoff 2008: 26).

²⁸See also Jacobs (2008) for further examples from German and Müller (2020: Section 21.10.1) for discussion. Another example of a construction that is usually treated as headless in HPSG is coordination. Borsley (2005) shows that the Minimalist analysis of coordination as ConjP suggested by Kayne (1994: Chapter 6), Johannessen (1998: Chapter 3), and others fails in several respects. Categorical Grammar also assumes a functor-based approach with the conjunction as the head. However, the result of the combination of two X with a conjunction categorized as $(X/X)\backslash X$ is an X, which gets the external distribution right as far as the main category is concerned, while this remains a puzzle in the Minimalist proposals (governing heads select a DP, not a ConjP). Nevertheless, there are cases in which the last conjunct determines the properties of the complete phrase, as Borsley has shown. So additional mechanisms seem to be needed to get the headed analysis right. I will not take a stand on this issue here but point the reader to Abeillé & Chaves (2021) for a general discussion and an overview of approaches to coordination in HPSG.

All theories assuming that all structures have a head/functor (Minimalism, Dependency Grammar, Categorical Grammar) have a problem. The previous section showed that one can charm away empty heads if one does not like them. Similarly, one can conjure up empty heads if one needs them. Figure 18 shows a hypothetical Dependency Grammar analysis. This analysis assumes an empty

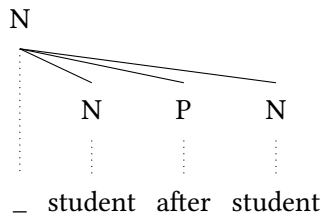


Figure 18: Analysis of the N-P-N Construction with empty head

head that selects the two Ns and a P.

Since Minimalism allows for binary branching only, one would need two empty heads to model the N-P-N construction with empty heads.²⁹

Like for Constructional Grammar, Jackendoff's examples are entirely without any problem for HPSG: a special schema combines N, P, and N (and possibly further Ps and Ns). Figure 19 shows the respective analysis.

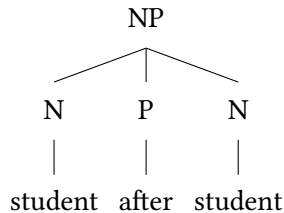


Figure 19: Construction-based analysis of N-P-N structures

I can hear the reproaches: “But the assumption of a special schema is a stipula-

²⁹G. Müller (2011) suggests an analysis in which the preposition selects a noun and bears a feature REDUP, which triggers a reduplication of the noun. It remains unclear why a structure with a preposition as the main element should project an NP and how sequences of the type N-P-N-P-N (*student after student after student*) should be analyzed. See Jackendoff (2008: Section 4.4) and Bargmann (2015) on sequences of the latter type. Note also that G. Müller stated that his analysis predicts that adjectival modifiers of the N in N-P-N constructions are not permitted in German, a claim that is empirically false (Müller 2021c: Section 4.1).

tion!” This is true, but an empty head would be a stipulation as well. The N-P-N schema captures everything that can be and must be said about the construction: three or more elements (see Bargmann 2015) are combined idiosyncratically, resulting in an idiosyncratic meaning.

Having shown that empty elements can be removed from grammars (Section 5) and can be added if theories require heads (Figure 18), I now turn to the question of whether there are limits/style guides for the assumption of empty heads.

7 Good and bad empty elements

As mentioned on page 97, HPSG follows Wunderlich in assuming that syntactic theories should avoid the stipulation of empty elements because of methodological considerations. I have demonstrated that sometimes the assumption of empty elements is warranted (empty nominal and verbal heads) and sometimes it is not and should therefore be avoided (N-P-N construction). This section tries to give a more general answer to the question when it is legitimate to assume an empty element and when it is not. In general, it has to be explained how syntactic structures that are suggested can be acquired by language learners. If one assumes a lean Universal Grammar as Hauser, Chomsky & Fitch (2002) or none at all (Tomasello 2003, Goldberg 2006), then there must be language-particular evidence for empty elements. Analyses that are solely theory-internally motivated like, for instance, the analysis of PPs by Radford (1997: 452) are not legitimate. Radford assumes that case can be checked in specifier positions only. In addition, he assumes five empty elements and complicated movement processes. His analysis is shown in Figure 20. The necessity for these empty elements follows from the theoretical apparatus that is assumed. Since there is no independent evidence for the apparatus, it is not acquirable and hence has to be innate. This contradicts Minimalist assumptions (Hauser, Chomsky & Fitch 2002). A precondition to detect absence of elements is that the positions of the prospective elements can be filled in principle (Müller 2015: 40). It is not legitimate to argue cross-linguistically for empty elements, since the cross-linguistic evidence is available to us as linguists but not to those who acquire the language.

Summing up, one can say that empty determiners, nouns, and verbs can be acquired from linguistic evidence from within the language that is acquired, but categories like AgrO, Topic, Pred, etc. that are motivated with reference to other languages cannot. The respective categories should be assumed for the languages in which they have visible forms (e.g., AgrO for Basque and Topic for Japanese) but not for languages without any morphological reflexes.

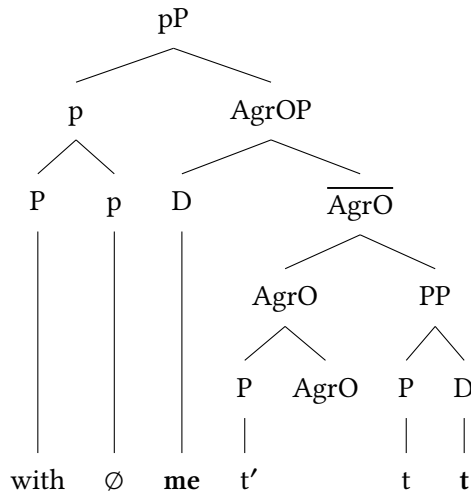


Figure 20: Theory-internally motivated analysis of a PP following Radford

8 Summary

This paper discussed the role of heads in syntactic structures (within the framework of HPSG). Heads project morpho-syntactic features (part of speech, case, verb form, and so on), and they have valence specifications determining the structure of phrases. While it is clear for most types of phrases which element is the head, theory-neutral criteria for determining heads often fail to decide the question of whether N or D is the head in German nominal structures. I used thematic role assignment and selection in idioms to argue for an NP analysis. Apart from discussing the notorious DP/NP issue, I discussed two cases in which empty heads were assumed (again nominal structures in German and copula constructions in AAVE). These empty heads filled slots in which overt material can be realized. For the N-P-N construction, an empty head could be stipulated as well, in order to save claims made in other frameworks that all structures have to have a head. Since HPSG does not make this claim, I argued for a headless construction instead. I have shown that grammars assuming empty elements can be converted into ones without empty elements in a straightforward way. Nevertheless there are conditions on the use of empty elements in grammatical theories: the elements should be recoverable from input in the language under consideration. There has to be language-internal evidence for assuming an empty element, that is the position that is assumed should be filled in some situations.

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Chapter 5

Silent heads in Early New High German

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The rising standard language in Early New High German (1350–1650) provides particularly interesting cases for the question of missing heads on all levels of language structure. A well-known example are subordinate clauses lacking a finite auxiliary verb, traditionally called Afinite Constructions. Based on new data, drawn from two treebanks of Early New High German, the present paper will briefly sketch the distribution of ACs, before establishing that they are in fact a type of ellipsis and do not cluster with other non-finite clauses in German. The remainder of the paper addresses the question what kind of information is missing in ACs and how this information is retrieved. Obviously, auxiliary drop in ENHG represents a type of ellipsis rarely attested in present-day German.

1 Introduction

The language of the Early New High German period (= ENHG) is set apart from the language in other periods of German by its overwhelming array of contexts where graphemes, bound morphemes and words may be left out. Two well-known examples are provided below: in (1a), the inflectional suffix *-e*, indicating first person singular, is dropped. And the unbound morpheme *landt* is omitted in the first conjunct of the N N-coordination in (1b).

- (1) a. Jch *clopffet* an man ließ mich ein
 I knocked.1SG.PST at one let me in
 ‘I knocked at the door and was let in.’ (1490: KalF s1052)¹

¹For each source, the publication date and a siglum of the respective text in the treebank is provided along with the number of the clause.



- b. Weilen der Anstandt beschlossen/ kömpt teglich viel Volcks aus
 since the armistice declared comes daily much people from
Holl: vnd Seelandt allhero (1609: Aviso 151)
Holl: and Zeeland here
 ‘Since the armistice is declared, a lot of people from Holland and
 Zeeland arrive here each day.’

A prominent example for dropping a segment of syntactic structure is provided by so-called Afinite Constructions (= ACs) widely attested in the German language of the 16th and 17th century. The finite auxiliary is absent in the relative clause in (2a) and the adjunct clause in (2b). The probable position of the omitted auxiliary is indicated by an underscore in clause-final position. This assumption of the gap in clause-final position proves reasonable in view of the fact that ACs are restricted to syntactically dependent clauses exhibiting either a subordinator or a relative pronoun at the left periphery. The type of ellipsis illustrated below is hence different from coordinate ellipsis which will be addressed in the present paper only in passing.

- (2) a. Diesen Monat seynd auß Holland vnd Seeland/ vber 80. Schiff/
 this month are from Holland and Zeeland over 80 ships
 so nach Spania gewählt ___/ abgeseglet/ (1597: AC s118)
 which to Spain wanted sailed
 ‘This month 80 ships have left Holland and Zeeland heading for
 Spain.’
- b. Ob schon der Friede mit Engeland vor richtig gehalten ___/ so
 even if the peace with England for right considered so
 wird dennoch dieses Reiches Krieges-Floote wenig vermindert
 is however this country’s war-fleet hardly diminished
 ‘Even if the peace with England is considered to be good, the war
 fleet of this country is hardly diminished.’ (1667: M s4619)

This type of auxiliary drop is still attested in present-day German, as witnessed by an example found in *Buddenbrooks* from the beginning of the 20th century, an example taken from Schröder (1985). Its use in present-day German, however, is very restricted.

- (3) Begreift man das stille Entzücken, mit dem die Kunde, als
 comprehends one the quiet delight, with which the news, when
 das erste, leise, ahnende Wort gefallen __, von der Breiten in die
 the first, soft, guessing word dropped, from the Breite to the

Mengstraße getragen worden ____ (1901: Buddenbrooks 408)

Mengstraße carried been

‘If one comprehends the quiet delight characterizing the news that has been carried from Breite to Mengstraße when the first, soft, guessing word has been dropped ...’

Regarding the data in (2) and (3), the question arises whether the respective subordinate clauses in fact include a gap, i.e. are headless clauses, or rather pattern with infinitival and participial clauses. Assuming that we are dealing with ellipsis here, how do we retrieve the missing information? With respect to present-day German, two ways are distinguished to fill an obvious gap: either by referring to a suitable antecedent or to the current situation and world knowledge (Reich 2011).

The outline of the paper is as follows: before tackling the aforementioned questions in Section 3, the basic facts about ACs in ENHG are presented in Section 2. The remainder of the paper addresses the question why this particular type of auxiliary ellipsis is productive for only 200 years in the history of German. The data used in the present paper mainly come from two constituent-based treebanks for ENHG comprising a total of 770.000 tokens with 2.789 attestations of ACs from the whole language period.

2 Afinite Constructions in Early New High German

2.1 Background

ACs are a phenomenon characteristic of ENHG syntax. While they are only rarely attested for the 14th century, and their occurrences remain sparse even throughout the 15th century, the 16th and the 17th centuries represent the heyday of the construction. In the 18th century, attestations of ACs are scattered again (Admoni 1980, Härd 1981, Breitbarth 2005, Ebert et al. 1993).² As regards register as a parameter driving the distribution of ACs, Admoni (1967), Biener (1925) and Stammler (1954) observe the first instances in formal registers, namely chancery texts of the 14th century, indicating that ACs are characteristic of rather formalized varieties of language. Recent corpus studies however suggest that there are in fact considerable differences not only with respect to register but also with respect to individual authors (Breitbarth 2005, Thomas 2018). Future corpus studies covering even more variation across registers will contribute to this still open issue.

²Härd (1981: 171, 172) provides the time course of ACs in three-place verb complexes of the type “*sein* ‘be’ + *worden* ‘been’ + past participle” or “*haben* ‘have’ + past participle + modal verb”.

The frequent use of ACs in ENHG gave rise to a significant number of accounts for this type of auxiliary ellipsis, starting with the assumption that ACs are due to language contact with Latin, in particular with its participial constructions (Biener 1925). Their early attestations in chancery language were taken to support such a view. But Behaghel (1928: 491) and Breitbarth (2005) point out that the patterns in German and Latin are too different in crucial respects to suggest the influence of language contact as a plausible explanation. As regards language contact, Blum (2018) also considers the possible impact of Low German and Swedish on ENHG, because both languages likewise include some version of afinite constructions. He argues that in the first case, we are probably dealing with an independent development, while the impact is the other way round in the latter: the omission of the auxiliary verb *hava* ‘have’ in Swedish is due to language contact with (Low) German because of its chronology. A more promising account for the rise of ACs is based on the syncretism of finite and non-finite past tense forms, emerging for instance in cases where *ge-* is prefixed to both forms, a proposal put forward by Biener (1925). As illustrated by example (4a), the prefix *ge-* may be attached to a finite verb in past tense in order to focus the result state of a complex event. Note that the strongly inflected verb *sprechen* ‘speak’ has distinct stem forms for past tense and present perfect in German. Weakly inflected verbs such as *machen* ‘make’ on the other hand give rise to an ambiguity between the non-finite participle and the finite preterite form, when the person and number marker *-e* is absent (4b), cf. Ebert et al. (1993: 242) for more information on *e*-apocope in ENHG. The dental suffix as well as the prefix are interpreted as past tense marker.

- (4) a. So bald sy die wort ge-sprach, für sy durch die lüft
 as soon she the words PFV-spoke, went she through the air
 ‘As soon as she had spoken these words, she flew away’
 (1509: Fortunatus 150.6)
- b. wann sie got auz dem selben ertreich ge-machet als uns
 because them God from the same soil PFV-made like us
 ‘Because God has created them from the same soil like us.’
 (Ebert et al. 1993: 386)

As stated by Ebert et al. (1993: 386), the use of *ge-* with finite verbs is most frequent in the 14th century when only a few examples of ACs are attested. Therefore there are some doubts in the literature that the chronology does fit the syncretism scenario (Ebert et al. 1993, Breitbarth 2005). We will come back to the syncretism of finite and non-finite verbs in Section 4.

The particular historical development of ACs is certainly at odds with another proposal interpreting the rise of ACs in subordinate clauses as an analogy to main clauses with the right sentence bracket in both clause types restricted to non-finite verbs. According to Bock (1975), the V-second pattern might have affected V-final clauses in such a way that finite verbs were omitted from the right sentence bracket. Breitbarth (2005), however, can show in her study that the right sentence bracket is attested earlier in dependent clauses than its counterpart in V-second clauses.

Further accounts include possible influences from auxiliary ellipsis in other contexts (Behaghel 1928, Bock 1975, Schröder 1985) as well as the use of ACs as a marker for syntactic dependency (Admoni 1967, Breitbarth 2005, Demske-Neumann 1990). We will come back to a possible trigger for the rise of ACs in Section 4, when the particular history is embedded in the ENHG context.

2.2 Distribution of Afinite Constructions

This section will present the properties of ACs in more detail, based on data from two treebanks of ENHG. Table (1) shows absolute frequencies for the period from 1400 until 1700 as well as relative frequencies referring to the number of all dependent clauses in texts of the respective century.³ Regarding the size of the underlying corpus for each subperiod, the treebank data confirm earlier observations that the frequency of ACs increases rapidly from the 15th to the 16th century.⁴

Table 1: Afinite constructions from the 15th to the 17th century

ENHG	Tokens	Afinite Constructions	
		absolute	relative
1401–1500	201,870	65/5,917	1,1%
1501–1600	241,238	1,648/10,824	15,2%
1601–1700	229,184	1,076/15,953	6,7%
Total	672,292	2,789/32,694	8,5%

The gap in ACs concerns the finite auxiliary in syntactically dependent clauses. All auxiliary verbs can be omitted, *haben* ‘have’ and *sein* ‘be’ outnumber the aux-

³The number of dependent clauses in each century comprises clauses with a subordinator or relative pronoun. Infinitival clauses are not considered. cf. discussion in Section 3.1.

⁴Many thanks go to Iskra Fodor who drew the numbers from both treebanks.

iliary verb *werden* ‘get’ and the modal verbs by far, as already noted by Breitbarth (2005) and Blum (2018). The following examples provide different contexts, each of them suitable for one of the auxiliary verbs, disregarding possible changes affecting the alternation between *haben* and *sein* in combination with the past participle (Ebert et al. 1993, Sapp 2011: 387).⁵ The missing auxiliaries are given in the gloss of each example.

- (5) a. vnd bekamen gleich am Morgen vor tags widerumb den
and got right in the morning before day again the
Maistral, welchen wir ... mit frewden angenommen ___/
Mistral which we with pleasure accepted (have)
‘Right in the morning before daylight, we got the Mistral which we
welcomed with pleasure.’ (1582: RW s64)
- b. Zu dem ist ein Gallion so auß Spania / nach Genoua
furthermore is a galleon which from Spain to Genoa
abgefahren ___/ durch vngewitter/ in den Hauen Diff. in Prouinz
gone (is) due to thunderstorm in the harbor Diff. in Provence
eingelauffen / (1597: AC s190)
landed
‘Furthermore a galleon which left Spain heading towards Genoa has
landed in the harbor of Diff. in Provence.’
- c. Ob schon der Friede mit Engeland vor richtig gehalten ___/ so
even if the peace with England for right considered (gets) so
wird dennoch dieses Reiches Krieges-Floote wenig vermindert
is however this country’s war-fleet hardly diminished
‘Even if the peace with England is considered to be good, the war
fleet of this country has not been diminished.’ (1667: M s4619)

Auxiliary ellipsis means that the dependent clause contains at least one non-finite

⁵Consider for instance the use of *haben* ‘have’ with *gelingen* ‘succeed’ by Friedrich Schiller, a verb that is restricted to the perfect auxiliary *sein* ‘be’ in present-day German:

- (i) Man unterrichte sich demnach im Verfolg dieser Geschichte, wie weit ihr’s gelungen
hat – Ich denke, ich habe die Natur getroffen.
‘One may inform oneself by following the story how far it has succeeded – I think I
pictured the nature quite well.’ (Die Räuber; Behaghel (1924: 275))

Further discussion and data for the changes concerning the alternation of perfect auxiliaries are provided by Behaghel (1924: 273–282).

form of a main verb.⁶ Besides the past participle, the infinitive is attested either with or without the infinitival marker *zu* ‘to’, though there is a clear preference for the past participle in ACs, cf. Table (2).⁷ The table records all instances of auxiliary ellipsis attested in two-place verbal complexes. Auxiliary ellipsis in three-place verbal complexes is not taken into account, since we only find a few instances in our data.⁸

Table 2: Non-finite forms in Afinite Constructions

ENHG	PAST PARTICIPLE	<i>zu</i> INFINITIVE	BARE INFINITIVE
1401–1500	45 (90%)	1 (2%)	4 (8%)
1501–1600	1,606 (89%)	108 (6%)	81 (5%)
1601–1700	964 (92%)	47 (4%)	41 (4%)
	2,615	156	126

The examples in (6) provide instances for auxiliary ellipsis in two-place and three-place verbal complexes with the first example comprising *zu* ‘to’ + infinitive and the second example two participles in a passive construction. Our findings from the ENHG treebanks hence match findings such as Breitbarth (2005) and Thomas (2018) regarding the form of the non-finite verb in ACs in qualitative and quantitative respects.

⁶There is disagreement in the literature regarding the inclusion of copula constructions. In contrast to the present paper, Ebert et al. (1993) for instance do not consider examples as (i) as instantiations of ACs. Since this question has no impact for the present discussion, I will not delve any further into the matter.

- (i) Alexander, Khuenig zu Polln vnd Großfuerstn in Littn der mer rhue vnd
 Alexander, king of Poland and Grand.Duke of Lithuania who more quietness and
 fridens begierig ___/ hat das alles lassen hin / geen (1557: H s249)
 peace longing (was) has that everything let by go
 ‘Alexander, king of Poland and Grand Duke of Lithuania, who was longing for more
 quietness and peace, has everything let go by.’

⁷As Breitbarth (2005) points out, the auxiliary verbs *haben* ‘have’ and *sein* ‘be’ are dropped by far more frequently than the auxiliary *werden* ‘get’. Auxiliary ellipsis is therefore a quite common phenomenon with the present and past perfect and much less so with passive constructions, cf. Breitbarth (2005: 78) for the numbers in her corpus.

⁸Regarding the small number of instances, the role of ordering in the verbal complex, in particular the supposed position of the gap, cannot be addressed in this context, as suggested by one of the reviewers.

- (6) a. Vnd ist sich zu verwunderen/ daß sie in solchen Gewehren also
and is REFL to astonish that they in such weapons also
geübet/ daß sie ohne fahlen dieselbigen in jhre
practiced that they without missing the.very. same towards their
feind werffen/ vnd sonderlich mit den Messeren welche den
enemies throw and in.particular with the knives which the
breiten Schûmacher-messern zu *vergleichen* __, dem feind seinen
wide shoemaker-knives to compare (are) the enemy his
kopff mit werffen voneinander spalten. (1624: Brun s94)
head with throwing apart split
'It is astonishing that they are so skillful in using such weapons that
they can throw those towards their enemies without missing them, in
particular the knives – comparable to a shoemaker's knife – in order
to split the heads of their enemies apart.'
- b. hingegen sollen die Gelder so unsern Schiffen zu Ostende
however shall the means which our ships at Ostende
abgefordert worden __/ wieder erleget/ und die Abforderer zur
demanded been (have) again reimbursed and the demanders to
Straffe gezogen werden. (1667: M s186)
account called are
'The means, however, which have been demanded from our ships at
Ostende, are supposed to be reimbursed and the wrongdoers are
called to account for this.'

The particular distribution of ACs regarding the form of the non-finite verb will be taken up again in Section 4.

Dependent clauses without a finite auxiliary occur in all positions where dependent clauses can appear in ENHG: apart from the right periphery which is their most frequent position (7a), they occur at the left edge of the clause (8) and sometimes even in the middlefield (7b). At the left edge, the auxiliary is omitted especially when it is identical to the fronted auxiliary of the main clause, cf. (8b). As the example in (7a) illustrates, auxiliaries may be omitted more than once in a complex sentence. Both ACs are not related by a coordination relation.

- (7) a. Vmb den 20. diß/ ist bey Mödling in Oesterreich ein
around the 20. of.this is at Mödling in Austria a
erschrocklich Wetter abgangen/ welches so viel stein
terrible thunderstorm broken which so many rocks

geworffen ___/ daß sie in den Gräben eines Knie tieff gelegen
 thrown (has) that they in the trenches a knee's deep lain
 ___/ (1597: AC s423)
 (have)

'Around the 20th of May, a terrible storm has broken over Mödling in Austria such that many rocks fell down filling the trenches about knee-deep.'

- b. du hast mich Oliuiers/ den ich vnder allen menschen am
 you have me Olivier's whom I among all people the
 liebsten gehabt ___/ beraubt (1532: FB s488)
 best liked (have) bereaved

'You have bereaved me of Olivier whom I have liked the best among all people.'

- (8) a. Alß wir vns nun vñ Mittagszeiten zůruck nach dem Portu
 when we us now around noon back to the harbor
 wider gewendet ___/ ersahen wir zur lincken von ferne ain
 again turned (have) discovered we at the left from afar a
 Schiff (1582: RW s99)
 ship

'When we turned back to the harbor at noon, we discovered afar a ship to our left.'

- b. Hernach da die Kirchen die Gefahr gesehen ___/ hat sie diß
 thereafter when the church the danger recognized (has) has it this
 abstellen koennen. (1650: FP s318)
 stop can

'When the church recognized the danger eventually, it could have stopped it.'

ACs are particularly frequent in relative and adjunct clauses as witnessed by the preceding data, whilst ACs in object and subject clauses occur much less frequently. Two examples for the latter types of subordinate clauses are given below. Table 3 provides an overview of the instances occurring in the treebanks of ENHG depending on clause type, merging subject and object clauses into one type of subordinate clause (= complement).

- (9) a. was sie verricht ___ möchte in folgenden Monaten erzehlet
 what they fulfilled (have) wants in following months told

werden. (1597: AC s120)
 been

‘In a few months time, it might be told what they have fulfilled.’

- b. Jn disem Land haben die Holaender vor der zeit gewonnen,
 in this country have the Dutch before the time obtained
 was sie begert _____. (1624: Brun s555)
 what they wanted (have)

‘In this country, the Dutch have obtained some time ago whatever
 they wanted.’

Table 3: Afinite constructions depending on function of subclause

ENHG	RELATIVE	ADJUNCT	COMPLEMENT
1401–1500	20/1,856 (1%)	33/2,784 (2%)	12/1,277 (1%)
1501–1600	827/3,250 (25%)	701/3,184 (22%)	113/4,390 (3%)
1601–1700	488/2,919 (17%)	466/2,874 (16%)	110/10,160 (1%)
TOTAL	1,335/8,025 (17%)	1,200/8,842 (14%)	235/15,827 (1%)

Accounting for a similar distribution across functions of subclauses, Breitbarth (2005: 139–141) suggests to consider ACs as markers for pragmatic dependency. According to her, relative and adjunct clauses are pragmatically more dependent from their matrix clause than subject and object clauses and therefore tend to trigger auxiliary ellipsis. Demske-Neumann (1990) on the other hand argues in line with previous work by Admoni (1967) that ACs are markers of syntactic dependency. In her view, their preference for relative and adjunct clauses results from the ambiguity of adverbial and relative connectors: lexical items such as *so* ‘so’ may introduce verb-final relative clauses (10a) as well as verb-second clauses (10b), indicating that they do not signal syntactic dependency of a clause. Even the placement of the finite verb is not a reliable marker for syntactic dependency in ENHG, as argued by Demske (2018). Instead, the omission of the finite auxiliary may be taken as an unambiguous marker (10c).

- (10) a. vnd keret ich im Fundique der Frantzosen ein/ wie alle
 and stopped I in.the shelter of.the French off as all
 Teutschen so dahin kommen zuthon pflegen/ (1582: RW 68.3)
 Germans who there come to.do use
 ‘And I stopped off in the French’s shelter as all Germans do who come
 here.’

- b. So seind sie auch mit Rettich/ Knoblauch/ Zwybel zimlich wol
 so are they also with radish garlic onion very well
 versehen. (1582: RW 73.13)
 supplied
 ‘They are well supplied with radish, garlic and onions.’
- c. Dise seind aber in wenig Jaren von vngestüminen deß Möhrs
 those are however in few years by storms of.the ocean
 so gar verwüstet/ vnd mit dem sand/ so das Wasser darüber
 so very devastated and with the sand which the water over.it
 außgeworffen ___/ dermassen bedeckt worden/ das heütigs tags an
 casted (has) so covered been that today at
 denen orten sonderlichs nichts/ dann ain sandechter boden (wie
 these places else nothing but a sandy soil (as
 im wüsten Arabien) zûfinden ___. (1582: RW s167)
 in.the arid Arabia) to.find (is)
 ‘They have been devastated by stormy weather and so covered by
 sand which has been cast over by the water such that today one will
 find nothing but sand (as in the arid Arabia).’

Whatever the ultimate motivation of using ACs in ENHG, be it a pragmatic or a syntactic one, the question arises how to analyze this type of headless construction. This will be the topic of the following section. The probable motivation for using ACs in ENHG will be addressed in the final section of the paper.

3 Afinite Constructions as auxiliary ellipsis

3.1 Afinite Constructions are a type of ellipsis

According to Schröder (1985), ACs are not instantiations of ellipsis. He claims that any type of ellipsis requires the identity of a gap with a suitable antecedent, cf. also Biener (1925) for a similar argument. The following example shows that this condition need not hold for ACs in ENHG, going on the assumption that the auxiliary *sein* ‘be’ is omitted in the relative clause comprising a non-finite form of the motion verb *kommen* ‘come’, while the only other auxiliary in the present context is the auxiliary *haben* ‘have’ in the root clause.

- (11) Sein Schiff hat vom Feuer/ so in die Brandwein Fässer gekommen
 his boat has from fire which in the spirits barrels come
 ___/ grossen Schaden erlitten/ (1667: M s831)
 (is) major damage suffered
 'His boat has suffered major damage from the barrels filled with spirits
 which have been on the boat.'

Schröder (1985) therefore suggests treating ACs as a member of the class of non-finite clauses along with participial and infinitival clauses as illustrated in (12). The first clause involves a present participle heading a relative clause, the second one a ^{zu}-infinitive heading an adjunct clause.

- (12) a. Die Dünkircher Capers haben Königl. Ordre/ alle Ostender Schiffe
 the Dunkirk privateers have royal order all Ostende ships
 [mit Wahren von Contrebande nach England fahrend]/
 with goods of contraband to England going
 wegzunehmen. (1667: M s841)
 to.capture
 'The Dunkirk privateers have royal order to capture all ships heading
 for England with contraband.'
- b. Jch were zwar gern außgestigen/ [dise Jnsulen besser zu
 I were indeed with.pleasure got.off these islands better to
 besichtigen] (1624: Brun s22)
 visit
 'I would have loved to get off in order to better visit these islands.'

Even if the AC in (11) and the non-finite clauses in (12) have in common that they do not include a finite verb, they differ in three crucial respects: ACs are restricted to dependent clauses introduced by either a relative pronoun or a subordinating conjunction, and ACs include subjects in contrast to non-finite clauses as in (12).⁹ In addition, ACs differ from participial and infinitival clauses, because the omitted auxiliary obviously governs the status of the non-finite verb: the so-called 'infinitivus-pro-participio' effect (IPP-effect) provides strong support for the presence of an auxiliary at least at one point in the derivation. Pertinent examples include a modal verb that does not appear as a past participle as expected but as an infinitive as shown with the modal verb *müssen* 'must' governed by *haben* 'have' in (13a). The AC in (13b) involves two non-finite verbs, one being the

⁹English in contrast allows for subjects in non-finite clauses, as one reviewer adds, cf. *for ... to* infinitival clauses.

modal verb *müssen* ‘must’. An interpretation of the modal verb as finite is excluded because of the singular subject, i.e. *man* ‘one’. Obviously, the IPP-effect in (13b) is triggered by the omitted auxiliary verb. A further example for an AC exhibiting an IPP-effect is given in (13c) and involves the modal verb *sollen* ‘be supposed to’.

- (13) a. Vñ seind von 20. gewaltigen Türckischen Meer-^eräubern
and are by 20 powerful Turkish pirates
besprungen wordē/ haben aber weichen ^emüssen/ die Türcken
overrun been have however retreat must.INF the Turkish
weren sonst meister worden. (1624: Brun s671)
were otherwise victor been
‘They have been overrun by Turkish pirates and had to retreat.
Otherwise the Turkish would have beaten them.’
- b. Sie aber hat beschuetzt der enge Weg/ darauff man
them however has protected the small path where one
nacheinander gehen ^emüssen ___/ daß der Feind jhnen nicht
after.another go must.INF (have) that the enemy them not
zu komen kondte. (1624: Brun s645)
towards come could
‘The small path where one had to go one after another however
protected them, so that the enemy could not get to them.’
- c. die haben erstlich auf den Malkutsch Aga, der die Janitscharn
they have at.first upon the Malkutch Aga who the janissaries
herauff gen Raab führen *sollen* ___/ getroffen
up towards Rab lead should.INF (have) come
‘At first, they have come upon the Malkutch Aga, who was supposed
to lead the janissaries up towards Rab.’ (1597: AC s743)

ACs therefore do not pattern with non-finite clauses, but are rather a type of ellipsis. The following section will look into the analysis of ACs as elliptical variants of full clauses.

3.2 Dropping the finite auxiliary

ACs are subordinate clauses where a finite auxiliary is dropped. The missing information includes agreement features such as person and number as well as finiteness features, including tense, mood and assertion features according

to Klein (2006) and Repp (2009). On Repp (2009)'s approach, the latter bundle of features is needed to anchor a finite clause in the possible world where the proposition is evaluated. In contrast to syntactically independent clauses, the anchoring of a subordinate clause is supposed to happen indirectly by way of its subordinator which anchors the dependent clause in its matrix clause.¹⁰

In present-day German, the finite verb can be omitted in Gapping and Sluicing constructions. In Gapping constructions, the elliptical clause is part of a coordination structure – including embedded clauses – and the finite verb is absent in the second conjunct. The following examples illustrate the observation that parallelism and identity promote the elision of language material. They all display alternatives with the focus being set on the local PP. Gapping also allows for the omission of more than the finite verb, namely the verbal complex (14b), and is hence a type of non-constituent ellipsis.¹¹

- (14) a. dass Fred in München wohnt und Selma in Berlin ____.
 that Fred in Munich lives and Selma in Berlin (lives)
 ‘that Fred lives in Munich and Selma in Berlin.’
 b. dass Fred in München gewohnt hat und Selma in Berlin ____.
 that Fred in Munich lived has and Selma in Berlin (lived has)
 ‘that Fred has lived in Munich and Selma in Berlin.’

Both examples exhibit instances of ellipsis in conjoined subordinate clauses. Note that Gapping in subordinate clauses requires that the complementizer in the second conjunct is dropped as well. Following Repp (2009), I assume that anchoring of the proposition is due to the complementizer in the first conjunct, respectively.

Sluicing is another type of ellipsis in present-day German involving a finite verb. In contrast to Gapping, Sluicing is restricted to subordinate clauses with the anchoring implemented by the *wh*-phrase in a functional projection such as CP (Repp 2009). The omitted material always includes the whole subordinate clause

¹⁰Non-finite independent clauses are anchored through their modal interpretation as pointed out by Reis (2003) with respect to examples like the following:

- (i) a. Ich – (und) die Fenster putzen? Niemals!
 ‘I – (and) cleaning the windows? Never!’
 b. Wohin fahren?
 ‘Where to go?’
 c. Den Eierkuchen wenden.
 ‘Flip over the pancake.’

¹¹cf. Reich (2011) for a comprehensive typology of ellipsis (in German).

except the *wh*-element at the left periphery as shown by the following examples from Repp (2009). It does not matter whether the matrix clause is syntactically independent or dependent, cf. (15a) vs. (15b).

- (15) a. Max hat etwas gegessen, aber ich weiß nicht, was ____.
 Max has something eaten, but I know not what
 ‘Max ate something, but I don’t know what.’
 b. Max liebt diese Gruppe, obwohl ich nicht weiß, warum ____.
 Max adores this band, although I not know why
 ‘Max loves this band, although I don’t know why.’

Obviously none of these types of ellipsis patterns with ACs: Gapping does allow the omission of a finite auxiliary but is restricted to coordination structures, while Sluicing is restricted to subordinate clauses but does not allow the omission of just the finite (auxiliary) verb. Going on the assumption that ACs are a type of ellipsis, they instantiate a type no longer productive in German.

3.3 Resolving the missing information

Depending on the way missing information is resolved, two types of ellipsis are distinguished: antecedent-based ellipsis and situation-based ellipsis (Reich 2011). The latter type relies on the current situation as well as world knowledge to retrieve the omitted information, cf. (16a) for an example from present-day German. Antecedent-based ellipsis reconstructs the missing information from a suitable antecedent as illustrated by the Gapping construction in (16b) where the finite verb is omitted in the second conjunct.

- (16) a. Mit Senf, bitte.
 with mustard please
 ‘With mustard, please.’
 b. Selma arbeitet an ihrem neuen Roman und Wilma an ihrem Blog.
 Selma works at her new novel and Wilma at her blog
 ‘Selma works at her new novel and Wilma at her blog.’

How do ACs fit into this typology? The omitted finite auxiliary is certainly not resolved by the non-linguistic context and ACs cannot be considered instantiations of the situation-based type of ellipsis. But do they belong to the antecedent-based type of ellipsis? This type requires identity between the omitted information and a linguistic antecedent as in (16b): the finite verb of the first conjunct *arbeitet* ‘works’ is taken to fill the gap in the second conjunct. Even if ACs do not occur

in coordination but subordination structures, identity between gap and a possible antecedent might play a role as suggested by examples like (17). The finite auxiliary is dropped in a temporal clause preceding its matrix clause. Assuming that it is the auxiliary *haben* ‘have’ which is missing here, identity holds not only for the choice of the auxiliary verb but also for the grammatical features person and number.¹²

- (17) Als der 33 Jar geregiert ___/ hat er mit seinem fueß an seines
 when he 33 years governed (had) has he with his foot at his
 gestorbnen Roß khopf gestossen/ ist durch ain vergiffts thier
 dead horse’s head hit is by a poisonous animal
 gepissen worden/ vnd dauon gestorben. (1557: H s93)
 bitten been and thereof died
 ‘When he has ruled 33 years, he hit the head of his dead horse with his
 foot and was bitten by a poisonous animal whereof he died.’

There are, however, many attested examples for ACs where either identity between a possible antecedent and the dropped auxiliary is not given or where a suitable antecedent is entirely absent. The first case concerns examples like (18a) where the linguistic context displays another auxiliary verb or (18b) where auxiliaries do not agree with respect to the grammatical feature person (second-person vs. first-person).

- (18) a. Sein Schiff hat vom Feuer/ so in die Brandwein Fässer
 his boat has from fire which in the spirits barrels
 gekommen ___/ grossen Schaden erlitten/ (1667: M s831)
 come (is) major damage suffered
 ‘His boat has suffered major damage from the barrels filled with
 spirits which have been on the boat.’
 b. du hast mich Oliuiers/ den ich vnder allen menschen am
 you have me Olivier’s whom I among all people the
 liebsten gehabt ___/ beraubt (1532: FB s488)
 best liked (have) bereaved
 ‘You have bereaved me of Olivier whom I have liked the best among
 all people.’

¹²In contrast to present-day German, the verb *stoßen* ‘hit’ appears with the auxiliary *haben* ‘have’ instead of *sein* ‘be’, testifying to the change as regards the use of auxiliary verbs in the history of German Ebert et al. (1993: 387) and Sapp (2011).

Identity is not given in a trivial sense in examples without a possible antecedent altogether as in (19): the auxiliary *haben* ‘have’ is dropped in a relative clause, embedded in a clause with a finite form of the main verb *begleiten* ‘accompany’ but no finite auxiliary. Examples like the one below therefore suggest that ACs are not a type of antecedent-based ellipsis either, giving rise to the question how we reconstruct information in this type of ellipsis.

- (19) sie belaiten auch die jhenige/ vber welche der Cadi oder
 they accompany also those about whom the Cadi or
 Obrichter den sententz gesprochen ___/ zur Hauptstatt hinauß/
 judge the sentence pronounced (has) of.the capital out
 damit sie sehen/ das der execution gnügsame volziehung
 so.that they see that of.the execution sufficient performing
 geschehe: (1582: RW s284)
 happened
 ‘They also accompanied those out of the capital whose sentence has been
 pronounced by the Cadi or judge, in order to see whether the execution
 would be enforced in a sufficient manner.’

Let us turn back to the question what kind of information we drop when we drop the finite auxiliary. We have seen that finiteness comprises tense and mood features besides the agreement features person and number. As stated by Repp (2009), tense and mood features expressed by the finite verb in syntactically independent clauses are used to anchor the proposition in a possible world where the proposition is evaluated. As a consequence, Gapping in independent clauses is restricted to coordination structures exhibiting identity between gap and antecedent. As regards subordinate clauses, anchoring happens through the same functional projection in the C-domain as in independent clauses, hosting here either a subordinator or a pronominal element instead of the finite verb as in syntactically independent clauses. Repp (2009) observes that Gapping in subordinate clauses is only available when the complementizer is dropped in the second conjunct under identity, cf. the example below taken from Repp (2009). Gapping thus aims at elements anchoring the proposition in a possible world.

- (20) Ich denke, dass Max draußen spielt und (*dass) Pia drinnen.
 I think that Max outside plays and (that) Pia inside
 ‘I think that Max plays outside and Pia inside.’

In contrast to Gapping, ACs do not occur in coordination but subordination structures with the complementizer or relative particle present in all instances. This

is expected in view of the fact that the subordinator is required to anchor the proposition by way of connecting it to the tense and mood features of its matrix clause. Anchoring is done by the subordinating conjunction *dass* ‘that’ in (21a) and by the relative pronoun *davon* ‘thereof’ in (21b), while a finite verb is not necessary to anchor subordinate clauses. This is cross-linguistically reflected by the fact that many subordinate clauses do not include a finite verb (Repp 2009). Note that anchoring by a subordinator does not hinge on the fact that the subordinator itself carries temporal meaning, tense is rather contributed by the matrix predicate.¹³

- (21) a. Dem seye nun wie jm wöll/ so muß ich gleichwol bekennen/
 this.one be now as it may so must I nonetheless confess
das sie noch heütigs tages in dem Acker zûfinden ____.
 that they still nowadays in the field to.find (are)
 ‘Be it as it may, I have to confess nevertheless that they are to be
 found in the field still nowadays.’ (1582: RW s385)
- b. Die Holländer haben von unsrer Virginischen Floote nur 17.
 The Dutchmen have of our Virginia fleet only 17
 Kauff-Schiffe und die Fregat Elisabeth bekommen/ *davon* sie
 trading.vessels and the frigate Elisabeth got whereof they
 13. mitgenommen und 4. mit der Fregat verbrennt ____.
 13 captured and 4. with the frigate burnt (have)
 ‘The Dutchmen have got only 17 trading vessels and the frigate
 Elisabeth from our Virgina fleet whereof they captured 13 and burnt 4
 together with the frigate Elisabeth.’ (1667: M s4959)

Likewise, the subordinator anchors the embedded propositions in coordinated dependent clauses, appearing in the first conjunct. The finite auxiliary may be dropped in only one (22a) or both conjuncts (22b).

- (22) a. *Alß* sich nun das wetter für vns widerumb geschicket ____/ wir
 when REFL now the weather for us again befitted (has) we
 auch unser Schiff mit holtz vnnd frischem wasser gnuogsam
 also our boat with wood and fresh water sufficiently
 hetten versehen/ liessen wir die Segel fliegen/ vnnd fuohren daruon:
 had equipped let we the sails fly and went away
 ‘When the weather became suitable for us and we had our boat

¹³It is therefore not necessary, as claimed by Breitbarth (2005: 105), to establish a relationship between the rise of ACs and the unfolding of a system of temporal subordinators.

sufficiently equipped with wood and fresh water, we let the sails fly
and went away.’ (1582: RW s500)

- b. *Dieweil* wir aber bey 7. Monat allda gelegen — mit
while we however about 7 months there anchored (have) with
vnserem Schiff sampt einem Jacht-schiff/ vnd sie vnser
our boat along.with a hunting-boat and they our
gemueth genugsam erfahren vnd erkandt __/ haben sie vns
mind sufficiently understood and known (have) have they us
alles guts erzeugt/ (1624: Brun s211)
all good shown
‘While we anchored there with our boat along with a hunting boat
for about seven months and they had understood our mind well
enough, they showed us all interesting things.’

Unlike infinitival and participial clauses, the finite auxiliary is present in the syntactic structure of ACs, cf. arguments provided in Section 3.1. The agreement features carried by the auxiliary in T assign nominative case to the subject in question and the auxiliary *haben* ‘have’ governs the third status of the non-finite verb, cf. example (23). The strikethrough in Figure 1 indicates that the auxiliary is given a silent spellout in the phonological component of the grammar and testifies to the deletion approach adopted here.¹⁴

- (23) Da fieng es den Portugalesern am wasser zu manglen/ jnmassen sie
then started it the Portugese in water to lack such.that they
grossen durst gelitten __. (1624: Brun s416)
big thirst suffered (have)
‘Then there was a shortage of water, such that the Portugese severely
suffered from thirst.’

In line with Klein (2006) and Repp (2009), Figure 1 subscribes to the assumption that finiteness is rather a property of clauses than of VPs. Irish data – (24) is taken from Repp (2009) – show that finiteness markers can attach to complementizers, providing cross-linguistic evidence for this assumption.¹⁵ An analysis of ACs along the lines of Figure 1 further suggests that ACs are only superficially headless clauses, whereas they actually contain a silent head.

¹⁴Three approaches to ellipsis are distinguished: (i) the movement approach, (ii) the anaphora approach, and (iii) the deletion approach. cf. Reich (2011) for a detailed discussion.

¹⁵Weiß (1998) discusses a German dialect exhibiting a similar behavior as regards inflected complementizers.

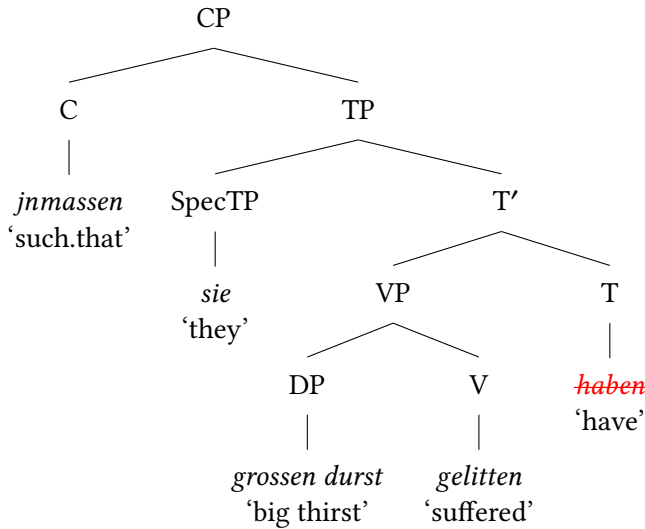


Figure 1: Afinite Construction *jnassen sie grossen durst gelitten*

- (24) D'éag sé sula-*r* thánig an sagart (Repp 2009)
 die.PST he before-PST come.PST the priest
 'He died, before the priest arrived.'

Like other types of ellipsis, ACs drop redundant information for economy reasons. In contrast to other types of ellipsis, however, redundancy in ACs does not arise because of identical material in the linguistic context. The finite auxiliary may rather be omitted because it carries grammatical features which are already contributed by the subordinator and the tense features of the matrix predicate. The example (25) with ACs in a sentence-initial temporal clause and a relative clause following the matrix clause illustrates how tense information is provided by the context: the event denoted by the temporal clause precedes the event expressed in the matrix clause. Since the latter uses narrative past tense, it is the past tense of the auxiliary *haben* 'have' which can be reconstructed. The missing finite verb in the relative clause has to be the past tense of *sein* 'be', because the proposition denotes an unalterable property of the small town (Rothstein 2008: 27).¹⁶

- (25) Als wir die gantze weite herumb gnuogsam besichtigt ___/
 when we the whole plateau around sufficiently visited (had)

¹⁶Regarding individual state predicates, Rothstein (2008: 27) presents a clear grammaticality contrast between past tense and present perfect.

giengen wir hinab zur stett des fleckens Bethphagae, welcher
 went we down to.the place of.the small.town B. which
 jhenseyt an der hoehe des oelberges gelegen ___/ vnd den
 beyond at the incline of.the mount.of.olives situated (was) and the
 Priestern zu Jerusalem hat zu gehoret: (1582: RW s348)
 priests of Jerusalem has to belonged

‘When we had sufficiently visited the whole plateau, we went down
 towards the small town of B. which was beyond, at the incline of the
 mount of olives and belonged to the priests of Jerusalem.’

The finite verb in a subordinate clause is rather not omitted when it carries information in addition to the finiteness features: according to Ebert et al. (1993: 442), the finite auxiliary tends to be present when it is marked for subjunctive, i.e. when there is grammatical information that cannot be provided otherwise. In (26), the perfect auxiliary *haben* ‘have’ is marked for subjunctive in a context favorable for auxiliary drop, i.e. an IPP-effect context (Härd 1981). Another case is provided by subordinate clauses with the finite verb being either a modal verb or a main verb accounting for the observation that modal verbs are rarely omitted from subordinate clauses (Behaghel 1928: 486–492). Here again, the finite verb conveys information that goes beyond finiteness information.¹⁷ This also holds for *sein* ‘be’ and *haben* ‘have’ when they trigger a modal meaning, building complex verbs with a ^{zu}infinitive.

- (26) vnd darmit jnen nit leichtlich hilff zukommen möchte/ ist der
 and so.that them not easily assistance provide may is the
 Rheinstromb/ mit den Außlägern dermassen verlegt worden/ das
 Rhine with the ships so dammed.up been that
 kein Schiff leichtlich hette vberkommen mögen. (1597: AC s804)
 no ship easily had pass may
 ‘And in order to prevent any assistance for them, the Rhine has been
 dammed up with ships such that no ship may easily have passed.’

¹⁷This does not hold for a contrast observed by Warner (1995) between full verbs and auxiliary verbs in English: while only full verbs may be dropped in the following context in present-day English, the auxiliary *be* lost this option at the beginning of the 19th century; cf. the examples taken from Warner (1995: 537):

- (i) a. If Paul comes in, then Mary will too. (sc. come in)
 b. ‘I wish our options were the same. But in time they will.’ (sc. be the same)
 (1816 Jane Austen, Emma)

According to Warner (1995), the auxiliary *be* loses this option due to a change affecting the possible decomposability of finite verbs into lexical information and tense information.

4 The larger picture: Early New High German

ACs are a type of ellipsis with a striking historical development as noted above: while they are frequently attested in the language of ENHG, they scarcely occur in present-day German. Taking into account the preceding discussion, I will come back to the question why ACs are a characteristic feature of ENHG grammar.

Dropping the finite auxiliary verb in a syntactically dependent clause is licensed by the subordinator linking the subordinate clause to its matrix clause and thus supplying its anchor to a possible world. But what kind of changes in the grammar of German trigger the rise and subsequent spreading of ACs just in the 15th century? The asymmetry of main and subclauses regarding verb position is reasonably well established by the end of Old High German, cf. Axel (2007) among others. The same holds for various types of coordinate ellipsis. The prerequisites are hence in place for some time already, before the first instances of ACs are attested. What is indeed new in ENHG, is the coincidence of two changes affecting the coding of past tense. On the one hand, we observe the increasing use of the present perfect at the expense of past tense forms which gained momentum throughout the 16th century according to Dentler (1997).¹⁸ An example from Amft (2018) is given in (27) where a perfect tense form is used in an otherwise all simple past context.

- (27) Jnn dißem allem weyß gott woll/ hab ich auß seynen gnaden mit
in this all knows God well have I from his mercy with
lachendem hertzen vnd muthun gethan als merckt ichs gar nicht
laughing heart and courage done as.if noticed I=it at.all not
(Korn; Amft (2018: 262))
'God knows very well that I acted by his mercy and courage with a
laughing heart as if I noticed nothing at all.'

On the other hand, we note the decline of finite forms of the simple past including the prefix *ge-*, which are available until the 16th century (Ebert et al. 1993: 386). As a consequence, verb forms including the prefix *ge-* are rather interpreted as non-finite rather than finite forms in syntactic contexts admitting both forms, i.e. the right sentence bracket in subordinate clauses.¹⁹ An interpretation as a non-

¹⁸Cf. Fischer (2018) for a comprehensive discussion of the increasing use of the present perfect at the expense of the simple past in the history of German. Amft (2018) informs on the development in a particular register.

¹⁹So far there are not enough data across dialects available to validate the suggested correlation between the loss of simple past forms and the increase of ACs in the history of German.

finite form is further supported by a prominent feature of ENHG syntax, the omnipresence of coordinate ellipsis in this variety of German, including instances of parallel and non-parallel coordination patterns in subordinate clauses (Behaghel 1928, Schröder 1985).²⁰ Note that auxiliary drop in parallel coordination patterns of subordinate clauses may be licensed either by a suitable antecedent or by a subordinator. Coordinate ellipsis is therefore promoting the spread of ACs, but not causing it, as claimed by Behaghel (1928) and Schröder (1985).

Other features of ENHG grammar support the spreading of ACs as well: as argued by Demske (2018), verb position may be pragmatically motivated as in (28) where the final position of the finite verb indicates background information rather than syntactic dependency. The clause introduced by *der selbig brack* ‘this tracker dog’ elaborates on a referent introduced earlier into the discourse, and the clause introduced by the pronominal connector *dardurch* ‘in this way’ in the second example provides a scribe’s comment on the reporting itself.

- (28) a. Do man geessen het, ward geschickt nach Wilhalems wappen unnd corperthur, desgeleichen nach seinem bracken, der im von der abentheüre hauptman gegeben was. *Der selbig brack* auff das mal nitt gefunden *ward*, dann er sich inn dem wald verlaufen het.
 ‘After dinner, they sent for Wilhelm’s coat of arms and armor, likewise for his tracker dog, that was given to him by the captain. This tracker dog was not found in time, because he got lost in the forest.’
 (1481: WvÖ 265.21)
- b. Do sprach auch maniger in der stat: „Wer mag der mit dem feür sein, er furt die bosten corperthur, die ye kein man gesach, unnd anders vil, das er an im het.“ *Dardurch* er gelopt *ward*, das nit alles zû schreiben ist.
 (1481: WvÖ 243.13)
 ‘Some men in town also said: “Who might be the one with the fire, he has the best armor ever seen by man, and other things more.” Thus he was praised in a way that refrains from any description.’

²⁰Both types of ellipsis are not restricted to subordinate clauses, but are also attested in syntactically independent clauses (Biener 1925). To account for non-parallel coordinate ellipsis, we therefore need an analysis allowing for non-identity of gap and antecedent. This problem does not arise for ACs, because licensing the gap works differently in coordination and subordination patterns. Non-parallel patterns of coordinate ellipsis in subordinate clauses may be instances of ACs with the gap licensed by a subordinator instead of an antecedent, cf. also Breitbarth (2005: 63) on this issue. But then we still have to account for non-parallel coordinate ellipsis in main clauses. And I have nothing to say in the present paper about coordinate ellipsis in ENHG.

At the same time verb position is a syntactic device in ENHG, used to discriminate between main clauses with verb-second and syntactically dependent clauses with the finite verb in final position just as in present-day German. As shown by Demske (2018), ambiguities arise with pronominal elements like *darauf* ‘afterwards’ which are attested with the finite verb either in second or in final position, cf. (29a) vs. (29b). In view of examples like (28), there is no way to indicate whether verb-final clauses like (29b) are syntactically dependent or independent.²¹ Since only subordinators license the omission of the finite auxiliary in dependent clauses, ACs provide a means to clearly mark syntactic dependency in ENHG (29c). Recall that ACs are particularly frequent in adverbial and relative clauses (cf. Table 3), often introduced by an ambiguous element such as *wann* ‘when’ or *so* ‘so’. The following examples display all three variants attested with the pronominal *darauf* ‘afterwards’, i.e., verb-second, verb-final and AC.

- (29) a. Den folgenden Morgen haben die Türcken im Schloß angefangen zu parlamentieren vnd mit jhren Gütern abzuziehen begert/ weil man dann verstanden/ das in 400. gefangner Christen in der Vöstung sein sollen/ ist jhnen der Abzug mit jhren Wöhren/ vmb die gefangne Christen desto ehe bey dem Leben zuerhalten/ bewilliget worden. *Darauff* hat man drey fürnemmer Türcken herauß/ vnd drey von den vnsern zu Geisel hinein gegeben. (1597: AC s658)
 ‘The next morning the Turkish people started to negotiate in the castle and desired to withdraw with their belongings, because there was an understanding that about 400 arrested Christian people are supposed to be in the fortress. The withdrawal with their stockpile of weapons has been granted to them in order to keep the arrested Christians alive. Afterwards there was an exchange of three noble Turkish men and three of our people.’
- b. König Agrant vonn Zisia reit von einem künig czû dem anderen unnd bate sy all unnd jecklichen in sunderheit, iren fleiß zû thûnde wider den künig vonn Maroch, ob sach wäre, das sy im abgesigen möchtent. *Darauff* sy im all czû sagtent, das sy all das böste thûn wöltent. (1481: WvÖ 249.31)
 ‘King Agrant of Zisia was riding from one king to the next and asked them all and each in person to fight with all power against the king of Morocco. Since they had to defeat him. They all promised him then to do their best.’

²¹ As Löttscher (2000) points out, clauses introduced by pronominal connectives like *darauf* ‘afterwards’ in ENHG are always pragmatically dependent – irrespective of their syntactic status.

- c. Zu Parma hat es ein erschrecklich Wetter gehabt/ so ein Tag vnd Nacht gewehrt/ welches viel Bäum vnd Schornstein nidergerissen/ *darauff* es auch 6. Tag vnd Nacht stets geregnet __ / (1609: R09 69.31)
 ‘There was an awful storm in Parma, which lasted day and night. Many trees and chimneys were destroyed, then it did rain for 6 days and nights incessantly.’

Probably, the ambiguity of examples like (29b) is another feature of ENHG grammar strongly promoting the rapid expansion of ACs in the 16th century. The marking of syntactic dependency does not, however, trigger the rise of ACs as claimed by Admoni (1967), Breitbarth (2005), Demske-Neumann (1990) and Senyuk (2014).²² Even if this assumption can explain the fact that this type of ellipsis is restricted to syntactically dependent clauses, it fails to account for its restriction to finite auxiliaries. The same goes for Breitbarth’s claim that ACs are markers for pragmatic dependency, cf. Section 2.2.

Obviously, there are good reasons for ACs to become a prominent feature of ENHG syntax. But why are ACs lost again throughout the 18th century? The general understanding is that the decrease is due to the growing conventionalization of syntactic means as part of the emergence of a written standard language in German. Verb position for instance is no longer a pragmatic device to distinguish between foreground and background information, but marks exclusively syntactic (in-)dependency, and coordinate ellipsis is much more constrained in present-day German than in ENHG. Even if the omission of a finite auxiliary in a dependent clause could be licensed by its subordinator, this option is less and less used in German. Late witnesses are examples from the 20th century, cf. (3) above and further examples in Blum (2018: 18).

5 Summary

ACs are a special type of ellipsis, rarely attested in present-day German. They resemble the antecedent-based type of ellipsis, because they drop grammatical information provided by their matrix clauses. The ellipsis is licensed by the respective subordinator which links the proposition of the dependent clause to

²² Apart from the ambiguity of verb position and pronominal connectors, Admoni (1967) adduces the increasing complexity of sentences throughout the period of ENHG to justify the necessity of an additional marker for syntactic dependency which is according to him most needed in chancery texts. The high frequency of ACs in this register may therefore be due to its complexity instead of Latin influence. Breitbarth (2005) refers to the decreasing use of the subjunctive as a marker. None of these proposals can however explain why this type of ellipsis is confined to finite auxiliaries.

the proposition of the matrix clause. ACs are, however, only superficially headless clauses. The finite auxiliary is present in the syntactic structure of ACs as indicated by the assignment of nominative case and verb status, but is given a silent spellout in the phonological component of the grammar. ACs result from ambiguous verb forms in past tense, their overwhelming numbers in sources of the 16th and 17th century is due to remarkably favorable conditions in the ENHG grammar, among others a strong bias towards ellipsis on all levels of language structure. ACs are lost again throughout the 18th century.

What do we learn from the history of ACs regarding the question of headedness? Obviously, syntactic changes concerning auxiliary ellipsis do not affect the hierarchical structure of the clause. The verbal head is at all times present in the finite subordinate clause, even if it may remain silent in the phonological component of the grammar during the period of ENHG. In my view, the rise of ACs is best understood against the background of a rising standard language with a great deal of variation not only in the lexicon but also in the grammar, fed by a large number of dialects. The increasing conventionalization of grammatical means in the history of German from the 17th century onwards constrains the occurrence of ellipsis considerably: the grammatical system requires the spellout of silent heads except for instances comprising complete identity.

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Chapter 6

Categoryless heads in morphology?

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This article presents a symmetrical approach to headedness in German morphology. All affixes are assumed to be heads irrespective of their position and independent of their function. Categorical projection is no longer seen as the central criterion for morphological headedness. The head in an affixed word is rather defined by morphological minimality and selectional restrictions. A consequence is the existence of categoryless heads. It is shown how structure building processes operate and how projection and feature-percolation mechanisms work in such an approach. Several challenging examples for theories of morphological headedness are discussed – especially inflected forms, prefixed words, and diminutives. The findings are evaluated by inspecting the result of stress assignment processes in affixed words.

1 Introduction to headedness

Heads are a common concept in the analysis of linguistic structures. The discussion about headedness in modern linguistics started several decades ago in syntax and was based on work by Bloomfield (1933), who distinguishes endocentric from exocentric syntactic constructions. An endocentric construction contains a head, by which the headed construction can be replaced. An exocentric construction instead is unheaded. Neither of its subparts can stand for the superordinate construction.¹ Exocentric constructions are the anarchists in grammar but have become rare over the years. Nowadays, most syntacticians manage without exocentricity. Syntactic structures can be analyzed as completely endocentric due to

¹An overview of endocentricity and exocentricity is given by Hinch (1961) and Barri (1975).



the introduction of functional projections and the abandonment of substitution as a central criterion for headedness.

The debate about heads in morphology started later. Harris (1946) already mentioned the role of morpheme classes for endocentric constructions in syntax and thereby gave an idea of headedness in morphology, but the main discussion did not begin until the 1980s. Influential approaches to morphological heads are the ones by Williams (1981), Lieber (1980, 1992), Selkirk (1982), and Di Sciullo & Williams (1987). The notion of head in German morphology is subject to the approaches by Höhle (1982), Reis (1983), Olsen (1986, 1990) and many others. Headedness in compounding is still under discussion,² but the debate about heads in derived words and inflected forms faded out in the 1990s. It is time to renew the discussion and to bring back the topic into the morphological discourse. There has been progression in all areas of linguistic research. New developments bring along further insights and different solutions to challenging data.

We will pick up the symmetrical approach of Lieber (1980) and take a closer look at derivational and inflectional affixes in German. Our assumption is that all affixes are heads – irrespective of their position and function. Prefixes as well as suffixes and inflectional as well as derivational affixes serve as heads. Categorical determination is often seen as a central criterion for the identification of morphological heads because heads typically bear a category, which they share with the immediately dominating node. We will change the perspective on headedness by setting up a headedness condition which is based on requirement and selection and refers to the projection level of constituents. The consequence is that some morphological heads are categoryless. Percolation problems like in Lieber's approach are avoided by taking selectional restrictions into account. Such a proposal parallels morphological and syntactic analyses, in that it uses a uniform headedness condition for phrasal and word-internal structures. It thereby allows for graduality between syntax and morphology on the one hand and between derivation and inflection on the other hand, so that e.g. diachronic processes can easier be handled.

The next two sections constitute the base for our analyses. Section 2 gives an overview over the notion of head in morphology and looks at different conceptions to word-internal headedness. Section 3 afterwards shows parallels to heads in syntax. The following four sections discuss central phenomena, which are challenging for theories of morphological headedness. The head status of in-

²Exocentric compounds are examined by e.g. Bauer (2008) and Scalise et al. (2009). Further challenges to headedness in compounding – next to exocentricity – are studied by Scalise & Fábregas (2010).

flectional affixes is subject to Section 4. Section 5 examines diminutive suffixes and considers examples from colloquial German, in which diminutive forms of categories other than nouns exist. Derivational prefixes are the topic of Section 6. Most of them are transparent with respect to categorial specification but the verbal ones seem to determine the category of the complex verb. Section 7 picks them up and inspects the difficulties in combination with inflection. Section 8 checks the findings of the previous sections at the interface to phonology and shows that morphological heads behave not differently to syntactic heads with respect to prosodic interface conditions. A short conclusion finishes this study.

2 Heads in morphology

Concatenative morphological processes combine morphological constituents to more complex morphological constituents, which can be new words or inflected forms. One immediate subpart of every morphologically complex constituent should head the respective structural level to minimize grammatical anarchy. But there is no consensus about the point which part of a complex word the important leadership status should be given to. Some criteria can help to determine heads in morphology. The head of an endocentric compound is often identified by the semantic relation of hyponymy. Most compounds are a hyponym of its head and can be replaced by it in syntax. The right-hand subpart *juice* of the English compound *apple juice* in (1a) can thereby be diagnosed as head. The drinking of apple juice implicates the drinking of juice, so that the sentence with the compound is subaltern to the sentence which contains the compound's head instead.³

- (1) a. Hugo drinks apple juice.
- b. Hugo drinks juice.

The morphological head determines the properties of the complex word. Its features percolate one level up to be shared with the immediately dominating node. The compound in (2a) gets the category from its head *hoch* 'high', moreover, the compound in (2b) and its head *Haus* 'house' do not only correspond in category but also in gender.

³See e.g. Löbner (2003: Section 4.3) or Schwarz & Chur (2001: Section 5.2) for implications and other semantic relations between sentences.

- (2) a. haus-hoch [N, neut] + A → A
 house-high
 ‘extremely high’
 b. Hoch-haus A + [N, neut] → [N, neut]
 high-house
 ‘skyscraper’

Affixal heads typically have selectional restrictions, (cf. Höhle 1982: 77). The German suffix *-bar* productively combines with verbal bases to form adjectives.⁴ Nominal and adjectival bases are excluded from derivation with *-bar*. There are only some marginal and marked exceptions. Affixal heads in word formation can also take influence on the valency of their base. The German suffix *-bar* and its English counterpart *-able* in (3) induce a passive-like transformation.

- (3) a. Linguists drink beer.
 b. Beer is drinkable.

Different theories have been developed to predict which constituent qualifies as the morphological head of a complex word. Williams (1981) proposes the Right-hand Head Rule (= RHR), which gives the head status to the rightmost subpart of a complex morphological constituent. The morphological head can thereby be the right-hand member of a compound, a derivational or inflectional suffix, or the base which a prefix combines with. But the RHR does not come without exceptions. Some Germanic prefixes seem to determine the category of the derived word and should be considered to serve as heads, whereas inflectional suffixes do not take influence to the category of the inflected form, so that their classification as head is rather doubtful. Furthermore, several compounds in Romance languages are left-headed (cf. e.g. Scalise 1988: Section 5).

The RHR is nevertheless the most common conception regarding headedness in morphology. Some modified versions have been proposed to capture more phenomena. One of them has been suggested by Selkirk (1982). Her version gives the head status to the right-hand constituent which shares the category with the dominating node. A consequence of such a modification is that inflectional affixes can never be heads in morphology, whereas derivational prefixes can occasionally get head status. Selkirk’s approach describes the situation in complex words but does not prognosticate the head of a new combination without further assumptions. A combination of a verbal and a following nominal morphological constituent can potentially lead to a verbal or nominal word-formation product.⁵

⁴See Riehemann (1998) for a detailed analysis of *bar*-adjectives in German.

⁵Olsen (1990) modifies Selkirk’s version of the RHR, so that it can predict the head of a new word, but it neither allows for prefixal heads nor for left-headed compounds.

Furthermore, Selkirk's approach inconsistently analyses the verbal prefix *en-* as head in (4a) but as non-head in (4b).⁶

- (4) a. ennoble $V^{af} + N \rightarrow V$
 b. enclose $V^{af} + V \rightarrow V / X^{af} + V \rightarrow V$

Lieber (1980) comes up with a different conception regarding the determination of morphological heads. She offers a symmetrical approach, in which affixes qualify as heads – prefixes as well as suffixes, inflectional as well as derivational affixes. Her approach contains a feature percolation mechanism with four conventions, which controls the feature transfer to the dominating node. It allows the non-head to percolate features if the head is not specified for them. Such a mechanism is necessary for the process of inflection because features of several affixes and the stem together constitute the feature complex of the inflected word (cf. (5)). The feature percolation mechanism is indifferent to the question whether the categorical specification comes from the head or a non-head. A side effect is that heads can be categoryless.

- (5) ging [V, past] + -e [conj]^{af} + -st [sg, 2ps]^{af} → gingest [V, past, conj, sg, 2ps]
 ‘(you) would go’

One decade later, Lieber (1992) revised her symmetrical theory to use a modified version of the RHR instead and assigned the head status in derivational and inflectional morphology to the rightmost constituent which matches in category with the dominating node. We will base our examinations in the following sections on Lieber's symmetrical approach and assume that all affixes are heads.

3 Parallelism to syntax

Givón (1971: 413) wrote the frequently cited sentence “today's morphology is yesterday's syntax”, which highlights the connection between syntax and morphology; however, it did not remain uncriticized. Syntactic structures can change to morphological structures during grammaticalization processes, (cf. Hopper & Traugott 1993 or Lehmann 2015 among many others). Syntax and morphology should therefore have a lot in common. Furthermore, it is still under discussion whether morphology constitutes a separate component of grammar as it is assumed by Sadock (1991, 2012) as well as by Borer (1988) and Spencer (1991)⁷ or

⁶This oddity has already been mentioned by Trommelen & Zonneveld (1986: 167).

⁷Borer (1988) and Spencer (1991) set up a separate morphological component but assume an influence of morphological processes at different stages of the structure building process in syntax and phonology.

whether it represents at least partially a subcomponent of syntax as in the conceptions of Jackendoff (1997) and Ackema & Neeleman (2004), in which morphology is split up into three portions – one morphological fragment is part of the syntactic component of grammar, the other two fragments belong to the phonological and to the semantic (resp. conceptual) component.⁸

Syntactic structures in German can be left-headed as in (6a) or right-headed as in (6b). So, it is to be expected that morphological structures allow for both options, too.

- (6) a. für die Reise P + DP → PP
 for the.ACC journey
 ‘for the journey’
- b. der Reise wegen DP + P → PP
 the.GEN journey because.of
 ‘because of the journey’

Syntax combines constituents with either the same level of projection as in Figure 1a or different levels of projection as in Figure 1b. We use a rather simple syntactic structure here without intermediate projections and specifiers so that we need to deal with only two kinds of structural relationships – adjunction structures and head-complement structures.

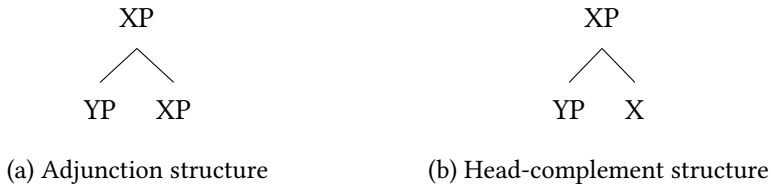


Figure 1: Syntactic structures

This is paralleled in morphology. Members of compounds show the same level of projection, cf. Figure 2a, whereas the subconstituents of derivations, cf. Figure 2b – and those of inflected words – have different projection levels.

We will concentrate our examinations mainly on structures with different projection levels in order to investigate the head status of affixes. Syntax designates the subconstituent with the lower projection level as head. Transmitting this

⁸ An early approach with a split-up morphology is the one by Shibatani & Kageyama (1988), in which some morphological processes belong to the lexicon, others to syntax and phonology.

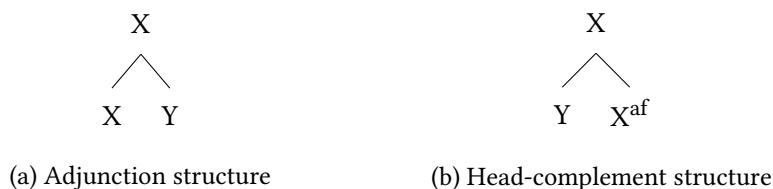


Figure 2: Morphological structures

method to morphology, affixes should be heads because their projection level is lower than that of the base. We can set up the headedness condition in (7) for structures whose subconstituents differ in the level of projection.

(7) Headedness condition:

The head of a complex constituent is the subconstituent with the lower projection level.

The projection level is related to the requirements of a constituent. Heads typically demand for a complement; non-heads are satisfied without a partner. The determiner in (8a) needs a partner in syntax; the suffix in (8b) looks for a complement in morphology. Both are heads under this perspective. So, we can say for short: The head is the subconstituent which requires a complement.

- (8) a. This is a *(mess).
 b. This is *(mess)-y.

The headedness condition does not distinguish between derivational and inflectional affixes. It is symmetrical and provides equal rights for prefixes and suffixes. A consequence is the presence of heads without a categorial feature. At a first glance, such categorylessness occurs with inflectional affixes as in (9a), possibly with diminutive suffixes as in (9b) and with derivational prefixes as in (9c). The abbreviation MSEL in (9) stands for morphological selection. N^4 in (9a) indicates a noun which belongs to the plural inflection class 4 (cf. Zifonun et al. 1997: 29).

- (9) a. Tag-e -e [pl | MSEL: N^4]^{af}
 ‘days’
 b. Tisch-chen -chen [neut | MSEL: N]^{af}
 ‘small table’
 c. un-wahr un- [MSEL: A]^{af}
 ‘untrue’

Affixal heads without a categorical specification like the ones in (9) allow for feature percolation from the non-head. The selectional restrictions of the respective affix indirectly guarantee that the correct category is transferred from the non-head to the dominating node. Most affixes are specialized for bases of one specific category. Some derivational affixes are less strict and combine with bases of different categories. The adjectival suffix *-lich* is compatible with adjectival, nominal, and verbal bases (cf. Fleischer & Barz 1995: 260–263 and Altmann & Kemmerling 2000: 141–142). A certain variability with respect to the category of the base also holds for the prefix *un-* (cf. Schnerrer 1982). Several derivations with nominal bases can be observed in addition to the pattern in (9c), although the adjectival *un-* is more productive than the nominal one. The suffix *-lich*, which carries a categorical specification, leads to an adjective independently of the category of the base, whereas the categorically underspecified prefix *un-* is transparent for the category of its partner. A combination with an adjective produces an adjective. A combination with a noun results in a noun. An adjusted notation for the selectional restrictions of the prefix *un-* is given in (10). The representation A/N can be unified to +N if a binary system is used to distinguish categories.

- (10) a. *un-wahr* *un-* [MSEL: A/N]^{af}
 ‘untrue’
 b. *Un-sinn* *un-* [MSEL: A/N]^{af}
 ‘nonsense’

We started this section with the diachronic connection of syntactic and morphological structures, and we will close it now with a remark on historical processes. A model which analyzes affixes as heads allows for an easier description of grammaticalization processes. There is no radical change by which function words lose their category, their unboundedness, and their status as head at once. They rather undergo a gradual shift from a word to an affix. Their autonomy decreases more and more, but the headedness remains constant. Beyond this, the same grammatical features can either be expressed by analytic or by synthetic constructions in different languages as well as during different periods of time.⁹ Analytic and synthetic realizations even exist in parallel as can be seen in (11).

- (11) a. *Er käm-e.*
 he come.PAST-CONJ
 ‘He would come.’

⁹ An overview of historical changes in analytic and synthetic realizations in German is given by Nübling et al. (2010: Section 11).

- b. Er würd-e komm-en.
 he AUX.PAST-CONJ come-INF
 ‘He would come.’

Such a graduality also holds for compound parts which become derivational affixes.¹⁰ The connection of compounding and derivation is further highlighted in the model of Höhle (1982), who treats derivations in parallel to compounds.¹¹ Graduality has further been observed on the passage between syntax and compounding¹² as well as between derivation and inflection. Bybee (1985) sets up a relevance hierarchy, which demonstrates regularities in the succession of inflectional feature classes. Feature classes with more semantic relevance are closer to the stem than feature classes with less semantic relevance.¹³ Eisenberg & Sayatz (2002) take the way from the other side and look at the order of derivational affixes. Some derivational affixes are close to the root, others – like e.g. diminutive suffixes (cf. Dressler 1994) – are next to the fuzzy border to inflectional suffixes. Still others – like suffixes for comparative adjectives – have a rather doubtful status with respect to the classification as derivational or inflectional.

The different continua are symbolized in Figure 3. Only a model which does not strictly divide syntax, compounding, derivation, and inflection can handle the graduality among them. Consequently, we treat morphological heads as similar to syntactic heads and inflectional affixes similarly to derivational affixes.

We now take a closer look at the three groups of potentially categoryless affixes in (9) during the next sections. We start with inflectional suffixes in Section 4.

4 Inflection

Morphological theories are confronted with the peculiarities of feature percolation in inflected words. Some morphologists avoid the challenge by using inflectional paradigms (cf. Stump 2001). Our discussion focuses on a morpheme-based analysis, so that we are faced with questions of feature percolation and headedness in inflected words.

¹⁰ An intermediate state on the way to a derivational affix is often called *affixoid* (cf. e.g. Elsen 2009 and Szatmári 2011 for affixoids in German as well as Schmidt 1987 for a critical view.).

¹¹ But see Reis (1983) for a critical discussion of Höhle’s theory.

¹² See e.g. Nübling & Szczepaniak (2009: Section 2) for the origin of linking elements in German compounds, which derive from inflectional affixes in former genitive constructions.

¹³ This has a strong connection to the set of linguistic universals, (cf. Greenberg 1963). Less relevant feature classes occur in fewer languages and presuppose the existence of more relevant feature classes.

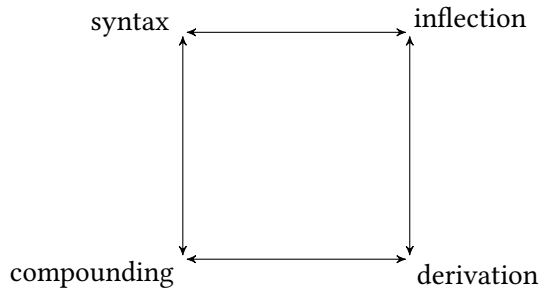


Figure 3: (Morpho-)syntactic subcomponents with gradual relationship

The feature complex of finite verbs in German includes the category feature as well as features for tense, mood, number, and person, which percolate from different morphemes. The structure in Figure 4 represents the analysis for an inflected form of the weak verb *sag* ‘say’. The category feature originates from the stem. Tense and mood percolate from the suffix closest to the stem. The outer suffix is responsible for number and person.

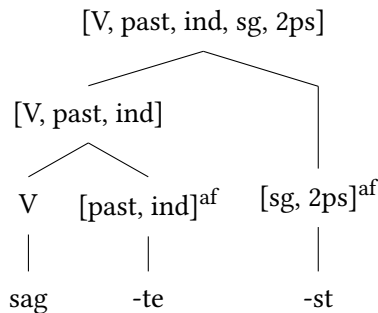


Figure 4: Structure for *sagtest* ‘(you_{sg}) said’

All three morphemes provide important components for the entire word. That is traditionally the mission of the head, but only one morphological constituent can qualify as head at any binary branching point. Following the reflections in the last two sections, the outer suffix *-st* functions as head of the whole inflected form, whereas the inner suffix *-te* can be seen as the head of the left immediate subconstituent. All features percolate to the highest node in Figure 4. None of them is blocked, because the heads are not prespecified for features which are of the same kind as the features of the non-heads. The inner suffix *-te* does not have a category feature and allows for the percolation of the category from the

stem. The outer suffix *-st* is not only underspecified for a category but also lacks features for tense and mood. It takes over the respective information from its partner.

Lieber (1992) mentions a problem for her original model from 1981, in which she works with categoryless affixal heads. The feature percolation mechanism therein seems not to be restricted enough to exclude some non-existing feature combinations. It would potentially be possible to percolate the gender feature of the nominal base *Bild* ‘image’ in Figure 5 to the higher adjectival node.

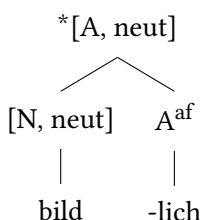


Figure 5: Structure for *bildlich* ‘figurative’ (inadmissible percolation)

Lieber therefore changes her original theory radically. She now analyzes only category-determining affixes as heads and introduces a categorical signature to capture inflection. Nouns, verbs, and adjectives have underspecified features which can be valued through the process of inflection. This is shown for the noun *Tag* ‘day’ in Figure 6. Percolation from the non-head only serves to fill the unvalued features in the categorical signature of the head. No independent feature values of the non-head are permitted to percolate.¹⁴

But the categorical signature comes with new problems. Inflectional features are irrelevant in word formation processes like derivation and composition, so that the underspecified features in the categorical signature remain unvalued. Such unvalued features should crash the structure-building process. An alternative could be to value them by default, but such a mechanism seems to be quite odd inside compounds and derived words. It would furthermore be necessary to have two different categorical signatures for verbs in German. German verbs can either occur as finite forms with the feature complex in Figure 7a or as non-finite forms with a status feature in Figure 7b (cf. Bech 1983).

Categorical signatures have been invented to solve problems of percolation, but they provide no better results for examples like the one in Figure 5 than models which do without a categorical signature. The value for the gender fea-

¹⁴The notation in Figure 6 differs from the notation of Lieber (1992) in that she uses a binary system to represent features.

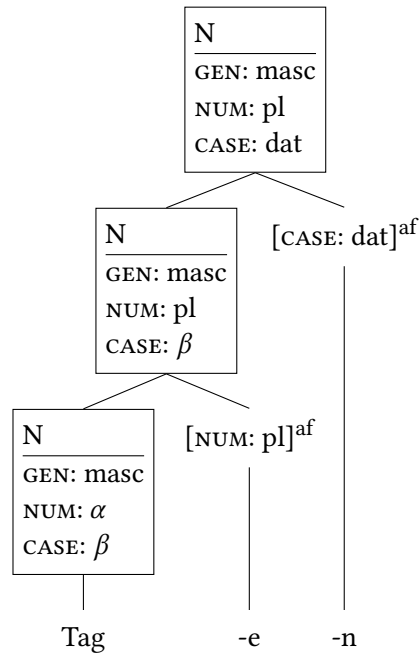
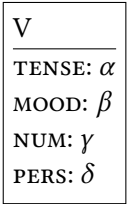
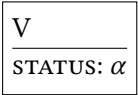


Figure 6: Structure with categorical signature for *Tagen* 'days'



(a) Feature complex for finite forms



(b) Feature for non-finite forms

Figure 7: Two categorical signatures for verbs

ture cannot be prevented from percolating in Figure 5 resp. Figure 8, because adjectives have an underspecified gender feature in their categorical signature.

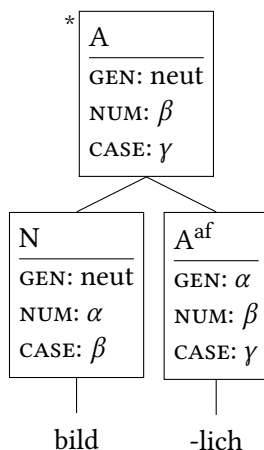


Figure 8: Structure with categorical signatures for *bildlich* ‘figurative’ (inadmissible percolation)

The underspecified features of adjectives are normally valued by agreement within DP. Only adjectives in attributive function as in (12a) show inflection in German. Adjectives in predicative use as in (12b) occur uninflected, although agreement was historically possible (cf. Szczepaniak 2009: 107).

- (12) a. die bildlich-e Darstellung
 the.FEM.SG.NOM figurative-FEM.SG.NOM representation.FEM.SG.NOM
 überzeugte ihn
 convinced him
 ‘The figurative representation convinced him.’
- b. Die Darstellung war bildlich.
 the.FEM.SG.NOM representation.FEM.SG.NOM was figurative
 ‘The representation was figurative.’

The lack of inflection comes unexpected, if adjectives and other lexical categories are stored with a categorical signature in the mental lexicon. Underspecified features should be valued in context. It seems to be necessary therefore to add the categorical signature later and assign it only in contexts which force inflectional marking. Such a method would require phonologically and semantically

empty morphological elements which carry the respective categorical signature and open a lexical category for a specific context. But morphological elements without a phonological or semantic counterpart are not desirable. So, we will do without the doubtful categorical signature here and try to explain the percolation independently.

Spurious connections with an arbitrary percolation like the one in Figure 9 are excluded by the selectional restrictions of inflectional affixes. The suffix *-st*, which is responsible for number and person, looks for a verb. It can therefore not be bound to an adjectival or nominal stem.

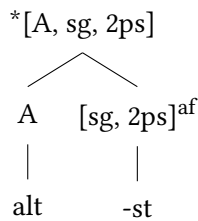


Figure 9: Inadmissible connection of *-st* to *alt* ‘old’

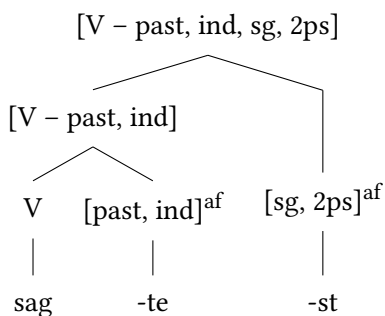
But the suffix *-st* is not satisfied with any verbal base. It is specialized for bases with features for tense and mood, whereas the suffix *-te*, which introduces these features, looks for a pure verb without inflectional marking. The selectional restrictions of both suffixes are given in (13). They ensure that the suffixes occur in the correct order.¹⁵

- (13) a. *-st* [sg, 2ps | MSEL: V – α TENSE, β MOOD]^{af}
 b. *-te* [past, ind | MSEL: V]^{af}

The percolation is restricted to categories and free features. Features which are already connected to a category only percolate with the category together. The features for tense and mood in Figure 10 are free, i.e. they are not bound to a category. They percolate from the suffixal head to the immediately dominating node. Their categorical underspecification allows for a percolation of the verbal category from the non-head. The formerly free features for tense and mood connect to the category. This connection is symbolized by the dash.

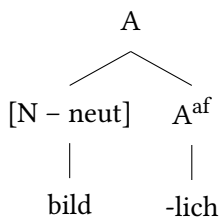
The suffix *-st* is added at the next higher level in Figure 10. The features for number and person are free and percolate up. The category is taken from the non-

¹⁵The order of affixes is displayed in the relevance hierarchy of Bybee (1985). See also Eisenberg (2006: 205) for a hierarchy of verbal feature classes in German.

Figure 10: Modified structure for *sagtest* '(you_{sg}) said'

head again. But the category does not come alone this time. Features for tense and mood are already bound to it and must percolate with the category together. The formerly free features for person and number connect to the category. The verb is fully specified now.

The problematic percolation in Figure 5 can be excluded with such a mechanism. The gender feature is connected to the noun and cannot percolate independently. The dominating adjectival node in Figure 11 remains correctly without a gender feature.

Figure 11: Structure for *bildlich* 'figurative'

But do inflectional affixes really occur without a categorical specification? There is another option to handle the data. We know from modern generative models that inflectional features are assigned (or at least checked) by special functional heads like T or Agr. Transferring this to morphology would mean that inflectional suffixes have a category. Suffixes with a tense feature are of category T, whereas suffixes which mark a verb for person and number can be given the category Agr. This simplifies the selectional restrictions (cf. (14)). The suffix *-st* looks now for a partner with the category T and not for a verb with a prespecifi-

cation for tense and mood. The result at this single step of the structure-building process is nearly the same but we do not need to deal with categorylessness.

- (14) a. -st [Agr – sg, 2ps | MSEL: T]^{af}
 b. -te [T – past, ind | MSEL: V]^{af}

A problem seems to be that the features which are bound to T must disconnect from T to percolate to higher nodes. This is excluded by the percolation mechanism. But any further percolation of tense and mood is not necessary. The syntax only needs number and person for agreement in German. Tense does not matter, as can be seen with many examples from novels, in which past tense verbs are often combined with non-past adverbials. The modified structure for Figure 10 is given in Figure 12.

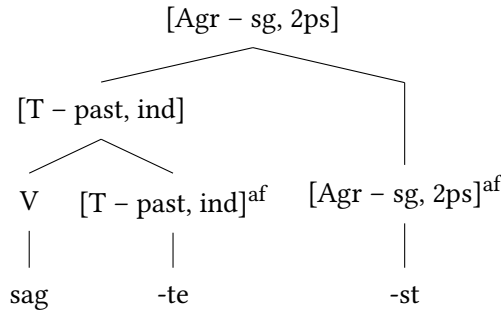


Figure 12: Alternative structure for *sagtest* ‘(you_{sg}) said’

Thus, whether inflectional suffixes have or lack a category depends on the complexity of syntactic structures in the respective conception of grammar. A model which allows for the functional projections T and Agr in syntax can handle the German data by using the same categories in morphology. A simpler syntax which manages without them can deal with categorylessness. We will stick to the categoryless variant in the analyses below and will briefly come back to a challenge with the alternative variant in Section 7.

5 Diminutive suffixes

Diminutive suffixes show a special behavior with respect to headedness in several languages. German has the diminutive suffixes *-chen* and *-lein* next to some

regional variants, which are related to the two standard forms.¹⁶ We will concentrate our discussion on the suffix *-chen* here, but *-lein* and regional variants behave similarly. German diminutive suffixes standardly build nouns out of nouns. They do not affect the categorical specification but determine the gender of the resulting noun. All diminutive nouns have neuter gender irrespective of the gender of their base (cf. (15)).

- (15) a. Tisch [N – masc]
 ‘table’
 b. Tischchen [N – neut]
 ‘small table’

Diminutive suffixes seem to be categoryless heads, but examples like (16) and (17) point in another direction. It looks as if the suffix is category-changing here and transfers an adjective to a noun with neuter gender (cf. also Höhle 1982: 85).

- (16) a. dumm [A]
 ‘stupid’
 b. Dummchen [N – neut]
 ‘stupid person’
 (17) a. früh [A]
 ‘early’
 b. Frühchen [N – neut]
 ‘preemie’

We should be cautious with such diminutives because we cannot exclude that there is an intermediate step in the derivation. It is equally possible, that the adjective first becomes a noun (cf. (18)), before it combines with the suffix. However, Wiese (2006) points out that diminution with *-chen* gets along without such an intermediate step synchronically.

- (18) der/die Dumme [N – masc/fem]
 ‘(the) stupid person’

Other examples support the hypothesis of categorylessness. Diminutive suffixes can be bound to adjectives as in (19) and interjections as in (20) without affecting the category or other features. Examples like those in (20) are used quite often in

¹⁶Diminution can furthermore be expressed by *i*-formation, which often occurs with truncation of the base. The ending <i> has not yet reached the full status of a suffix (cf. Köpcke 2003).

colloquial German, whereas a combination with adjectives is only rarely found. Adjectives with diminutive suffixes almost ever occur in predicative use, where no inflection is required. But a few attributive cases, in which the inflection follows a truncated diminutive suffix, are also attested, cf. (21).

- (19) a. müde [A] müdchen [A]
 'tired' '(a little) tired'
 b. gut [A] gutchen [A]
 'good' '(a little) good'
 c. spät [A] spätchen [A]
 'late' '(a little) late'
- (20) a. tschüss tschüsschen
 'bye' 'bye'
 b. hallo hallöchen
 'hello' 'hello'
 c. okay okaychen
 'okay' 'okay'
- (21) a. ein müd-ch-es Lächeln¹⁷
 a tired-DIM-NEUT.SG.NOM smile
 'a tired smile'
 b. ein klein-ch-es fein-ch-es
 a small-DIM-NEUT.SG.ACC fine-DIM-NEUT.SG.ACC
 Jung-chen¹⁸
 boy-DIM.NEUT.SG.ACC
 'a nicens little boy' (James Joyce)

The structural analysis of diminutives faces some problems. A completely transparent suffix can handle the data in (19) and (20) but is not fully compatible with prototypical examples. The neuter gender of nominal diminutives would come out of nowhere. The suffix must therefore be responsible for the gender. A first approximation to a structural analysis is given in Figure 13. The gender feature of the suffix is free and percolates to the dominating node. The category is taken from the base. Such a percolation conflicts with our assumptions in the previous

¹⁷<https://www.gamestar.de/xenforo/threads/offizieller-mechwarrior-mechcommander-thread.58151/page-20> (2020-08-23).

¹⁸http://www.meine-liebingsbuecher.de/AnfangeEinleitung/AnfangeJ/body_anfangej.html (2020-08-23).

section because the gender feature of the base is bound to the category and cannot be left behind. It has to percolate with the category together, but this would lead to double gender marking, which is not possible in German.

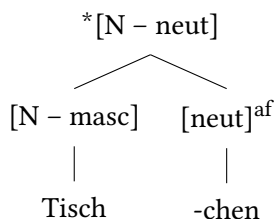


Figure 13: Structure for *Tischchen* ‘small table’ (inadmissible percolation)

Furthermore, a categoryless diminutive suffix with a gender feature is incompatible with adjectival and interjectional examples. The free gender feature should percolate to the top, but *mädchen* in (19) and *tchüsschen* in (20) as well as similar examples do not bear a gender feature. So, there are in fact two diminutive suffixes, (cf. (22)).¹⁹

- (22) a. $-\text{chen}_1$ $[\text{N} - \text{neut} \mid \text{MSEL: N/X}]^{\text{af}}$
 b. $-\text{chen}_2$ $[\text{MSEL: X}]^{\text{af}}$

The suffix in (22a) is the original diminutive suffix which creates neuter nouns. It has a category to which the gender feature is bound, so that no illegitimate percolation must be assumed. It is not obvious that the suffix has a category, because it normally demands for nouns, so that no categorical change can be observed. But examples like (16), (17), and (23) point in the direction of a potentially category changing nature of the nominal diminutive suffix.

- (23) a. *nein*
 ‘no’
 b. *Neinchen* $[\text{N} - \text{neut}]$
 ‘child who habitually says *no*’

This is further motivated by the inflectional behavior of diminutive nouns. All diminutive nouns standardly belong to one and the same inflection class C1 independently of the inflection class of the base noun.²⁰ Diminutives are marked by

¹⁹Wiese (2006) assumes a family resemblance in the sense of Wittgenstein (1953) for the two variants.

²⁰See again Zifonun et al. (1997: 29) for inflection classes.

-s in their genitive singular form and occur unmarked in their plural form. The contrast is shown for the noun *Bär* ‘bear’ in (24) and its diminutive *Bärchen* ‘little bear’ in (25).²¹ The inflection class should be bound to a category. A change of the inflection class is thus not expectable with a categoryless diminutive suffix.

- (24) a. (des) Bär-en [N – masc, sg, gen]
 ‘(of the) bear’
 b. (die) Bär-en [N – neut, pl]
 ‘(the) bears’
- (25) a. (des) Bär-chen-s [N – neut, sg, gen]
 ‘(of the) little bear’
 b. (die) Bär-chen-ø [N – neut, pl]
 ‘(the) little bears’

The suffix in (22b) is derived from the original variant. It has lost its morphological features and has become non-selective with respect to the category of the base.²² Furthermore, it is semantically bleached.²³ It does not add any meaning related to smallness to the base meaning. It has a more social function and makes an utterance friendlier. The salutation *hallöchen* ‘hello’ is not a small *hallo*, which could be interpreted as impolite, but a friendly *hallo* in the communication with family and friends.

It would potentially be possible to combine the categoryless variant of the diminutive suffix to nouns. That would lead to a preservation of the gender of the base, so that words like *Bärchen* ‘little bear’ would have masculine instead of neuter gender. Such an expansion of the categoryless variant has not yet been attested in German, but see Edelhoff (2017) for Luxembourgish. The original variant of the diminutive suffix is more specific. It outranks the more general categoryless variant in contexts where both variants could apply.²⁴

²¹Colloquial German also allows for s-plurals. There are furthermore some marginal exceptions with internal inflection. Bases with *er*-plural like *Kind/Kinder* ‘child/children’ can keep their plural form in the combination with a diminutive suffix. The plural of *Kindchen* is either realized as *Kindchen* or as *Kinderchen* in Standard German.

²²Such a neutral diminutive suffix with respect to category also exists in Romance languages like Italian (cf. e.g. Scalise 1988).

²³Semantic bleaching is typical for diachronic processes. It accompanies grammaticalization processes (cf. Szczepaniak 2009: Section 3.2) as well as the transition of free lexical morphemes to derivational affixes (cf. Nübling et al. 2010: Section 2).

²⁴This parallels the assumption that specific rules have priority over general ones, which is known from the Elsewhere Condition by Kiparsky (1973).

6 Verbal prefixes

Prefixes normally do not influence the morphosyntactic properties of the derived word. Some of them do not even care about the category of the base. The prefix *miss-* is compatible with adjectives, nouns, and verbs. The category of the base corresponds to the category of the prefixed word. Prefixes like *miss-* in (26) and *un-* in (10) before can be analyzed as categoryless.

- (26) a. *miss-launig* [A]
dis-joyful
'bad-tempered'
b. *Miss-ernte* [N]
dis-harvest
'crop failure'
c. *miss-acht* [V]
dis-respect
'to disregard'

Verbal prefixes are special. They combine with bases of different categories, but the prefixation always results in a verb. This is shown with the prefix *ent-* in (27), (28), and (29).

- (27) a. *fern* [A]
'distant'
b. *entfern* [V]
'to remove'
(28) a. *Stein* [N]
'stone'
b. *entstein* [V]
'to remove stones (out of fruits)'
(29) a. *sag* [V]
'to say'
b. *entsag* [V]
'to renounce'

Verbal prefixes also determine the thematic structure of the derived word (cf. e.g. Wunderlich 1987). They are able to add new arguments. The direct object in (30b)

is introduced by the prefix and cannot occur with the base verb in (30a), which only demands for a subject.

- (30) a. Der Student schläft.
the.NOM student sleeps
'The student sleeps.'
- b. Der Student ver-schläft die Vorlesung.
the.NOM student PREF-sleeps the.ACC lecture
'The student misses the lecture by oversleeping.'

Prefixes also have the power to suppress arguments of the base. The verb in (31a) occurs with a subject and a direct object. The prefix verb in (31b) replaces the direct object with a new one. The original object is reintroduced as PP. This property of prefixes is parallel to the behavior of verbal particles (cf. (31c)).²⁵

- (31) a. Er baut die Häuser.
he.NOM builds the.ACC houses
'He builds the houses.'
- b. Er ver-baut die schöne Aussicht (mit den
he.NOM PREF-builds the.ACC beautiful view with the.DAT
Häusern).
houses
'He obstructs the beautiful view (by building houses).'
- c. Er baut die schöne Aussicht (mit den Häusern)
he.NOM builds the.ACC beautiful view with the.DAT houses
zu.
PTCL
'He obstructs the beautiful view (by building houses).'

Some prefix verbs show a phonological peculiarity. Their adjectival and nominal bases occur with umlauts as in (32) and (33). The umlaut cannot be caused by the prefix. Umlauting is more typically an effect of suffixes (cf. Eschenlohr 1999: 101 and references therein).

- (32) a. jung [A]
'young'

²⁵See Hoekstra (1988) for similar examples with Dutch particle verbs.

- b. verjüng [V]
‘to rejuvenate’
- (33) a. Kraft [N – fem]
‘power’
- b. entkräft [V]
‘to weaken’

We can also observe doublets, where the same prefix and the same base result either in a derived word with umlaut as in (34) or in a derived word without umlaut as in (35). Umlauts furthermore appear in verbalizations without prefixes, cf. (36) and (37).

- (34) a. kalt [A]
‘cold’
- b. erkält [V]
‘to catch a cold’
- (35) a. kalt [A]
‘cold’
- b. erkalt [V]
‘to cool down’
- (36) a. schwarz [A]
‘black’
- b. schwärz [V]
‘to blacken’
- (37) a. Luft [N – fem]
‘air’
- b. lüft [V]
‘to ventilate’

The umlaut in these examples is introduced by an independent verbalizing suffix which corresponds to the feature [+front] in phonology. The suffix cares for the category, determines the umlaut, and influences the valency of the base. The umlauting suffix goes back to the Germanic stem-building suffix *-ian* and is typically accompanied by transitivization, in which a causer is added to the argument structure of the base, cf. (38a) vs. (38b). Transitivization through umlauting also

appears in verbal doublets like (39).²⁶ Not all examples are as clear as the ones in (38) and (39) because of semantic changes of lexicalized verbs on the one hand and analogical processes on the other hand.

- (38) a. Das Papier ist schwarz.
the.NOM paper is black
'The paper is black.'
- b. Der Junge schwärzt das Papier.
the.NOM boy blackens the.ACC paper
'The boy blackens the paper.'
- (39) a. Die Bäume fallen.
the.NOM trees fall
'The trees fall.'
- b. Die Männer fällen die Bäume.
the.NOM men fell the.ACC trees
'The men fell the trees.'

The structure of prefixed verbs with umlaut can now be represented as in Figure 14.

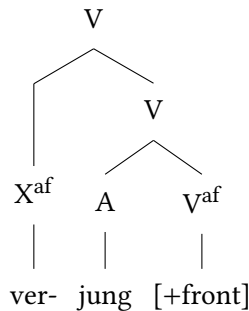


Figure 14: Structure for *verjüng* 'to rejuvenate'

There are still a lot of prefix verbs without umlaut. We have two options for their formation. We can represent their structure either as in Figure 15a or as in Figure 15b. The verbal prefix in Figure 15a directly combines with the noun

²⁶See Sonderegger (1979: 90–93, 2003: Section 5.3.7) and Schmidt & Langner (2004: 217–220) for *-ian* and further Germanic stem-building suffixes.

and determines the category of the derived word. The alternative structure in Figure 15b parallels the representation in Figure 14 in that it contains an additional suffix which is responsible for the category. In contrast to Figure 14, the verbal suffix in Figure 15b has no phonological effect. The prefix does not need a category feature anymore. It is a categoryless head. Its head status can be based on the property that it causes semantic changes and influences the argument structure of the base verb.²⁷

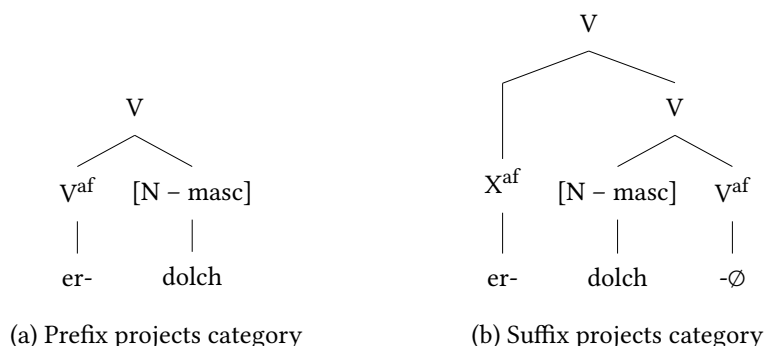


Figure 15: Two alternative structures for *erdolch* ‘to stab’

The structure in Figure 15a has the advantage that we do not need a phonologically empty suffix, but the structure in Figure 15b gives more uniformity to the analysis of prefix verbs. A phonologically empty verbalizing suffix – as it is assumed in Figure 15b – is independently needed for examples like (40) and (41), in which nouns and adjectives become verbs by conversion or zero-derivation.²⁸

- (40) a. Strand [N – masc]
 ‘beach’
 b. strand [V]
 ‘to strand’
- (41) a. gesund [A]
 ‘healthy’

²⁷Semantic changes are shown by Stiebels (1996). Changes in argument structure are represented by Wunderlich (1987), who, for example, assumes a passive-like transformation for verbs with the prefix *be-*.

²⁸Different views on conversion and zero-derivation in general are collected in Bauer & Hernández (2005). A further alternative would be the categorial underspecification of the base, cf. Motsch (1965) and Bergenholtz & Mugdan (1979) for early approaches as well as Harley & Noyer (1999), among others, for assumptions in the framework of Distributed Morphology.

- b. gesund [V]
'to recover'

The phonologically empty suffix for Figure 15b and the examples (40) and (41) also derives from Germanic stem-building suffixes. The suffixes *-ēn* and *-ōn*, which existed besides *-ian*, did not trigger umlauting.²⁹ They are conflated synchronically to a suffix which stands for those semantic representations that are not covered by the umlauting verbal suffix. So, we decide for the structure in Figure 15b here. An argument against this analysis could be that several bases of prefixed verbs do seemingly not occur independently as verbs, so that the intermediate step in the derivation is missing.

- (42) a. Glas [N – neut] → √
'glass'
b. glas [V] → ?
c. verglas [V] → √
'to glaze'
- (43) a. Dolch [N – masc] → √
'dagger'
b. dolch [V] → ?
c. erdolch [V] → √
'to stab'

The verbs which represent this intermediate step are generally possible, but speakers merely do not need all of them (at least nowadays). A careful look at the data brings us to examples like (44), in which the missing verbs can be found. The verbs at the intermediate step occur, but some of them not as frequent as the prefixed verb.

- (44) a. Also, wie man glast habe ich ja schon lesen können,
well how one.NOM glasses have I.NOM PTCL already read can
aber [...] ³⁰
but
'Well, I could already read how to glass, but...'

²⁹See again Sonderegger (1979: 90–93, 2003: Section 5.3.7) and Schmidt & Langner (2004: 217–220) for Germanic stem-building suffixes.

³⁰<http://forum.longboardz.de/showthread.php?5570-Glasing> (2017-10-30).

- b. Obsessiv [...] dolcht er mit einem Kuli für sein Recht,
 obsessive daggers he.NOM with a.DAT biro for his.ACC right
 dabei Blut statt Tinte spritzend.³¹
 thereby blood.ACC instead ink.ACC sprinkling
 ‘He obsessively daggers for his right with a biro, thereby sprinkling
 blood instead of ink.’

The verbal prefixes in Figure 14 and Figure 15b seem to be functionless, because the verbalizing suffixes determine the category and influence the argument structure. But examples like (45) and (46) show that prefixes provide for additional changes in valency.

- (45) a. Staub [N – masc]
 ‘dust’
 b. staub [V]
 ‘to raise dust’
 c. ent-staub [V]
 ‘to free from dust’
- (46) a. Der Teppich staubt.
 the.NOM carpet dusts
 ‘The carpet raises dust.’
 b. Der Mann ent-staubt den Teppich.
 the.NOM man PREF-dust the.ACC carpet
 ‘The man frees the carpet from dust.’

Thus, verbal prefixes are still heads, but rather unobtrusive ones, which leave the attention to their partner. They are categoryless and demand for a verbal base (cf. (47)).

- (47) ver- [MSEL: V]

7 Inflected prefix verbs

We take a closer look at the possibilities of inflection for prefixed verbs now. Verbal prefixes are not responsible for the inflectional behavior of the derived verb. Whether a prefix verb belongs to the strong or to the weak inflection class

³¹<https://kid37.blogger.de/topics/Super+8/?start=20> (2017-10-30).

depends on the base. Strong verbs like *schreib* ‘to write’ mark their past tense form by ablaut, whereas weak verbs like *sag* ‘to say/tell’ use the suffix *-te*. The inflectional behavior is transferred to prefix verbs with the respective bases. This is shown for the strong verb *beschreib* ‘to describe’ in (48) and for the weak verb *besag* ‘say/mean’ in (49). We will concentrate on the tense feature here (as well as in the following examples) and set aside the mood feature and other features for ease of presentation.

- (48) a. *schreib* [V – pres] / *schrieb* [V – past]
 ‘to write’
 b. *beschreib* [V – pres] / *beschrieb* [V – past]
 ‘to describe’
- (49) a. *sag* [V – pres] / *sagte* [V – past]
 ‘to say/tell’
 b. *besag* [V – pres] / *besagte* [V – past]
 ‘to say/mean’

Deadjectival and denominal verbs (with and without a prefix) as the ones in (50) and (51) belong to the weak inflection class. The weak inflection is regular and represents the default variant.

- (50) a. *rot* [A]
 ‘red’
 b. *röt* [V – pres] / *rötete* [V – past]
 ‘to redden’
 c. *erröt* [V – pres] / *errötete* [V – past]
 ‘to blush’
- (51) a. *Staub* [N – masc]
 ‘dust’
 b. *staub* [V – pres] / *staubte* [V – past]
 ‘to raise dust’
 c. *entstaub* [V – pres] / *entstaubte* [V – past]
 ‘to free from dust’

We have to explain now how the strong inflection in (48) comes to the base verb. One possibility would be to percolate an ablaut feature from the base to the next higher node. Lieber (1992) denies such a percolation, because ablaut is marked by a diacritic feature and must therefore be excluded from percolation. Another

possibility would be to allow certain variability in structure, so that inflectional processes can operate before derivational processes set in. The effects of such a structural variability are shown for the weak denominal prefix verb *verjährr* ‘to become time-barred’ in Figure 16. The tense suffix *-te* looks for a verb. It can either bind to the lower verb as in Figure 16a or to the higher verb as in Figure 16b.

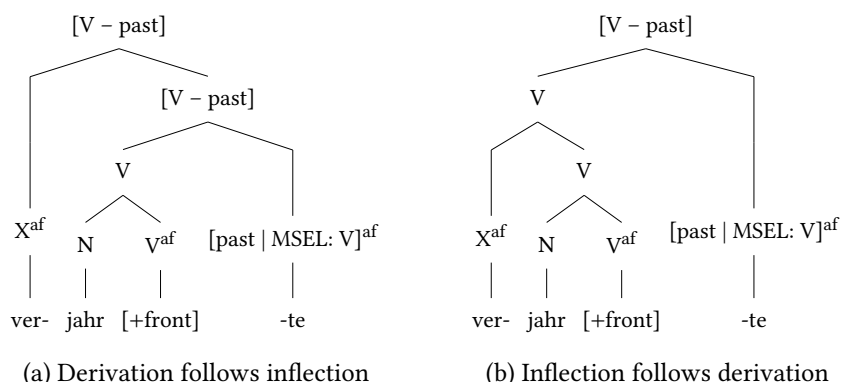


Figure 16: Two alternative structures for *verjährrte* ‘became time-barred’

The tense suffix of strong verbs corresponds to an ablaut feature in phonology, which changes the vowel of the stem. The structures in Figure 17 represent two possible analyses for the past tense form of the strong prefix verb *verschling* ‘to devour’ under the assumption of structural variability. The structure in Figure 17a seems to be more adequate for prefix verbs which belong to the strong inflection class, because the base and the tense feature form a constituent and can easily amalgamate to *schlang*, which is part of the paradigm of *schling* ‘to gulp’.

The structures in Figure 16a and 17a do not come without problems. Combinations of a verbal prefix and its base are used independently in derivational processes like (52) and should therefore correspond to a constituent in the structural analysis.

- (52) a. *verjährr* [V] + *-ung* [N – fem]^{af} → *Verjährrung* [N – fem]
 become time-barred NMLZ limitation of time
- b. *beschreib* [V] + *-bar* [A]^{af} → *beschreibbar* [A]
 describe -able describable

Information from inflectional marking is furthermore needed in syntax. That does not hold for inherent inflection like tense and mood, but for contextual features like number and person, which are relevant for agreement in syntax (cf. Booij 1996). Inflectional markings should therefore be highest in morphological

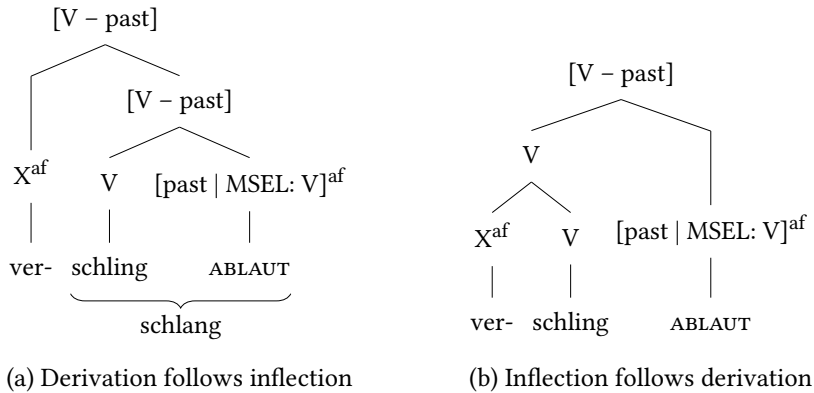


Figure 17: Two alternative structures for *verschlang* ‘devoured’

structure, so that the syntactic component can easily get access to it. Even if the tense feature is not needed in syntax, it should be higher in structure than the prefix, because it classifies the whole event as past and not only a subpart of the verbal action. Not *schling* ‘to gulp’ alone is interpreted as past in Figure 17 but (*etwas*) *verschling* ‘to devour (something)’.

Additional problems appear if we use T and Agr as inflectional categories instead of assuming free features. In this case, the prefix would need selectional restrictions for a pure V in Figure 16b as well as Figure 17b, for T in Figure 16a as well as Figure 17a, and possibly for Agr in other examples. It is therefore less complicated to use analyses without structural variability and to connect derivational affixes to the structure before inflectional affixes are added. So, we need another solution for the task how to ablaut the root.

Structures which are generated by different modules of grammar are not necessarily isomorphic. This is well known from bracketing paradoxes (cf. e.g. Spencer 1988), and from the interface of syntax and phonology (cf. Shattuck-Hufnagel & Turk 1996, among many others). Structural mismatches also occur at the morphology-phonology interface. Ackema & Neeleman (2007) assume the rule in (53) to translate (morpho-)syntactic into phonological representations.

- (53) *Input correspondence* by Ackema & Neeleman (2007: 344)
- If an AFFIX selects (a category headed by) X,
 the AFFIX is phonologically realized as /affix/, and
 X is phonologically realized as /x/,
 then /affix/ takes /x/ as its host.

The rule in (53) is able to create mismatches. We can see this with one of Spencer's bracketing paradoxes in example (54). The suffix *-ian* semantically combines with the complex constituent *transformational grammar* because the whole phrase describes a person who makes their studies in this specific framework. Ackema & Neeleman (2007) assume an isomorphism between the semantic and the morphosyntactic organization in examples of this kind. The bracketing in (54a) represents (a simplification of) the morphosyntactic structuring, whereas the bracketing in (54b) shows the division into phonological units.

- (54) a. [[transformational grammar] -ian]
 b. (transformational) (grammarian)

The morphosyntactic constituent *transformational grammar* is too complex to constitute a partner for the suffix in phonology. The suffix looks for a simpler phonological base and decides to combine with the category-determining head of its morphosyntactic sister. It syllabifies together with *grammar*, so that we get the phonological constituents *transformational* and *grammarian* in (54b).³²

The rule in (53) is based on the common concept of head, in which the head corresponds to the category-determining constituent. Our present analysis differentiates between heads and category-determining constituents. A head typically determines the category, but it can also be categoryless. We can apply the rule in (53) to our examples in Figure 16 and 17, if we interpret X as the category-determining element, which does not necessarily coincide with the head. The tense feature of our examples is morphologically bound to the whole prefix verb but combines with the category-determining root in phonology. So, we get the morphological bracketing in (55a) and the phonological structuring in (55b) and (55c).³³

- (55) a. [[X^{af} V] T^{af}]
 b. (ver) (jährte)
 c. (ver) (schlang)

³²German bracketing paradoxes of this kind cannot result from a mismatch between morphosyntax and phonology because the prenominal adjective agrees with the suffix in gender. The mismatch must rather be shifted to the interface between morphosyntax and semantics. Such a difference does not influence our analysis for Figure 16 and 17, in which we are faced with a real mismatch to phonology.

³³This analysis gives us a further argument for sorting out the structure under Figure 15a in the last section. The prefix in Figure 15a is represented with a category feature and should therefore attract the inflectional suffix phonologically. Such structures are ungrammatical.

The prefix in (55) is phonologically less integrated than the inflectional suffix. That comes unexpected with regard to (53). But prefixes behave in a peculiar way. Several phonologists assume that prefixes are mapped onto a separate phonological word in German (cf. Wiese 1996: Section 3.4).³⁴ The inflectional affix *-te* instead must be integrated into an adjacent phonological word because it consists of a reduced syllable, which cannot receive stress.

But how does morphology know that the past form of verbs like *verschling* ‘to devour’ or *beschreib* ‘to describe’ is realized by ablauting the root? Morphology does not know anything about the phonological realization. Morphology is only interested in the category of the individual constituents and the inflectional features, especially in the past value for the tense feature in our examples in Figure 16 and 17. Lexicon and phonology do the rest. Following the rule in (53), suffixes phonologically integrate into the category-determining element. So, phonology but not morphology has access to a constituent of root and tense. Phonology now asks the lexicon whether it has stored a suitable entry for such a constituent. The lexicon offers the form *schlang* ‘gulped’, which is accepted by phonology. If the lexicon has no entry on the whole word route for a specific request, the past form is realized by combining the root with the suffix *-te*.³⁵

We have seen now that different kinds of affixes can be analyzed as heads in German. Typical affixal heads bear a category, which is projected to the dominating node; the less typical ones lack a category and allow for categorical projection from their base. Morphological heads can no longer be identified by categorical projection alone. The crucial criteria for headedness are requirement and selection instead. Affixes are heads because they require a partner and select it by its properties.

8 Prosodic behavior of heads

An argument for the head status of affixes comes from the interface to prosody. Heads in syntax are prosodically subordinated to their complement due to the stress condition in (56). This is shown in Figure 18, where the noun *Buch* ‘book’ receives the strongest stress in the bottom line. The strongest stress is marked for each constituent by the value 1.³⁶ The stress value of the determiner *ein* ‘a’, which

³⁴Booij (1985) assumes that verbal prefixes with a reduced syllable like *be-* and *ge-* in German and Dutch do not correspond to a phonological word. They rather constitute an appendix to the phonological word of the base.

³⁵See Caramazza et al. (1988) and Plag (2006) for an interaction of whole word route and decomposition route.

³⁶The stress notation (but not the stress assignment process used here) goes back to Chomsky & Halle (1968).

constitutes the head of the DP, is lowered by 1, whereas the nominal complement keeps its stress level. The same holds for the verb *lesen* ‘to read’, which heads the VP. Its stress level is reduced, while the stress pattern of the DP does not change.

- (56) Stress condition I (neutral stress)³⁷
 Heads have a lower stress level than their complement.

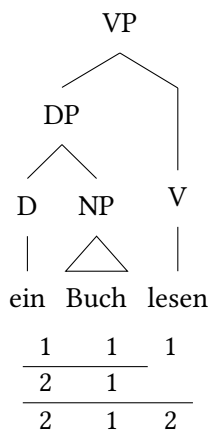


Figure 18: Structure and stress pattern for *ein Buch lesen* ‘to read a book’

Affixal heads do not differ from syntactic heads in this point. The prefix in Figure 19 is subordinate to the verbal root, and the nominal suffix is subordinate to the prefix verb.

Some affixal heads seem to resist the stress condition. Among them are negation prefixes and several non-native affixes. The peculiarities in the phonological behavior of non-native affixes go back to the source languages and must be stored in the mental lexicon. In contrast to that, the stress pattern in words with negation prefixes is not accidental. Some examples are given in (57) and (58). The prefixes in (58) are nonnative ones, but – regarding stress – they behave similarly to the native prefixes in (57). The stressed syllable in (57) and (58) and in most of the following examples is marked by italicization.

- (57) a. *un*-weit [A]
 NEG-far
 ‘not far’

³⁷This is a simplified part of the stress assignment condition by Korth (2014: 253). Similar conceptions of stress assignment in syntax are given by Jacobs (1993) and Truckenbrodt (2007).

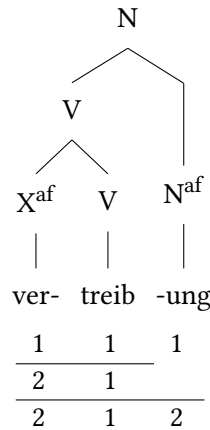


Figure 19: Structure and stress pattern for *Vertreibung* ‘expulsion’

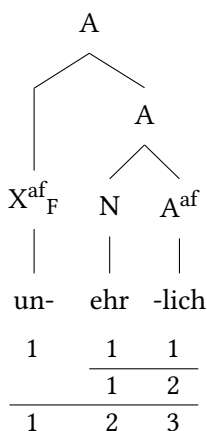
- b. *Un*-kraut [N]
 NEG-herb
 ‘weed’
- (58) a. *in*-stabil [A]
 NEG-stable
 ‘unstable’
- b. *a*-tonal [A]
 NEG-tonal
 ‘atonal’

Words with negation prefixes usually realize a contrast to their unprefixated positive counterpart, which has already been mentioned by Altmann & Kemmerling (2000: 108). Contrast is accompanied by a focus feature on the contrasting element in the structural analysis. The focused constituent attracts stress due to the condition in (59), which outranks the condition in (56). This is shown for *unehrlich* ‘dishonest’ in Figure 20.

- (59) Stress condition II (focus)³⁸

Focused constituents have a higher stress level than non-focused constituents in the same domain independently of the structural relationship.

³⁸This is again a part of the stress assignment condition by Korth (2014: 253). Gussenhoven (1992) makes similar assumptions with respect to focused constituents in syntax.

Figure 20: Structure and stress pattern for *unehrlich* ‘dishonest’

Focus features are restricted to focus domains (cf. Rooth 1992).³⁹ The focus features on the adjectives in (60) highlight the adjectives inside the DPs but do not project any higher. The adjectives would otherwise receive stronger stresses than the noun *Schach* ‘chess’.

- (60) Er sah [einen *alten*_F Mann]_{FD} und [einen *jungen*_F Mann]_{FD}
 he.NOM saw a.ACC old man and a.ACC young man
Schach spielen.
 chess.ACC play
 ‘He saw an old man and a young man playing chess.’

Similar effects can be observed for word-internal foci (cf. Korth 2014: Section 4.5). Focus projection does not cross the word level. The stress assignment outside the focus domain in (61) is not influenced by the word-internal focus on the negation prefix. The prefix and the designated syllables of the two nouns get equally high metrical prominences.

- (61) Der Minister machte eine [*un*_F wahre]_{FD} Aussage.
 the.NOM minister made a.ACC un- true statement
 ‘The minister made an untrue statement.’

There are words in which the negation prefix is not stressed. But instead of contradicting our previous explanation, words like the ones in (62) and (63) rather support it.

³⁹Such domains are sometimes called foreground domains (by e.g. Heusinger 1999).

- (62) a. *unverbesserlich*
 ‘incorrigible’
 b. *unausweichlich*
 ‘inevitable’
 c. *unglaublich*
 ‘unbelievable’
 d. *unverwüstlich*
 ‘indestructible’
- (63) a. *unverantwortlich*
 ‘irresponsible’
 b. *unvergesslich*
 ‘unforgettable’

Most words with this prosodic behavior do not express a genuine contrast. Their adjectival bases do not occur independently, so that there is no need for a word-internal focus marking on the prefix. The positive counterparts of the respective adjectives can be expressed by alternative words with similar meaning.

- (64) a. Er ist verbesserlich. → ?
 he.NOM is corrigible
 ‘He is corrigible.’
- b. Er ist korrigierbar. → √
 he.NOM is corrigible
 ‘He is corrigible.’
- (65) a. Das ist ausweichlich. → ?
 that.NOM is avoidable
 ‘That is avoidable.’
- b. Das ist vermeidbar. → √
 that.NOM is avoidable
 ‘That is avoidable.’

The positive counterparts of the adjectives in (63) are used independently, but in other contexts than the negated versions. A genuine contrast is absent once more.

- (66) a. Der Minister ist dafür verantwortlich.
 the.NOM minister is there.for responsible
 ‘The minister is responsible for this.’

- b. Diese Entscheidung ist unverantwortlich.
 this.NOM decision is irresponsible
 'This decision is irresponsible.'
- (67) a. Der Minister ist vergesslich.
 the.NOM minister is forgetful
 'The minister is forgetful.'
- b. Seine letzte Rede ist unvergesslich.
 his.NOM last speech is unforgettable
 'His last speech is unforgettable.'

Stress on the negation prefix is not completely blocked. It is only less preferred in isolation as well as in predicative use, because of the missing genuine contrast. But speakers can interpret the words in (62) and (63) as contrasting with potential positive counterparts. Furthermore, the prefix tends to be stressed in attributive use. Such a stress results from a prominence shift in contexts where another strong stress follows. The phenomenon of prominence shift has been mentioned in earlier studies, e.g. by Chomsky & Halle (1968) and Selkirk (1995) for English, and Wiese (1996) for German.

- (68) a. Dieses Werkzeug ist *unentbehrlich*.
 this.NOM tool is essential
 'This tool is essential.'
- b. ein *unentbehrliches* Werkzeug
 a essential tool
 'an essential tool'

Some of the adjectives with a positive counterpart optionally show a stress pattern like the words in (62) and (63). Speakers vary in marking the contrast explicitly where it is useful and doing without it where it is not necessary.

- (69) a. Er ist *belehrbar*.
 he.NOM is teachable
 'He is teachable.'
- b. Er ist *unbelehrbar*.
 he.NOM is unteachable
 'He is unteachable.'
- c. Er ist *unbelehrbar*.
 he.NOM is unteachable
 'He is unteachable.'

Native affixes satisfy the phonological requirements for heads. They are prosodically subordinated to their base unless they carry focus features.

9 Conclusion

The previous sections discussed the head status of affixes in Standard German and examined the hypothesis that all affixes are heads. We argued for a general head status of affixes based on different criteria which set affixes in parallel with syntactic heads. Affixes require a complement, have a lower projection level than their partner, and show effects of prosodic subordination unless they express a contrast. These characteristics equally hold for derivational and inflectional affixes. Prefixes are treated similarly to suffixes.

Several affixes are atypical heads. They lack a central property by which heads are normally identified. They do not bear a category feature, so that they do not directly influence the category of the superordinate morphological constituent. It is therefore necessary to disconnect the category determination from the identification criteria for morphological heads. Typical affixal heads have a categorical specification, which they share with the immediately dominating node, but direct category determination is not necessarily a criterion for the head status of morphemes.

Adjectival and nominal prefixes as well as the semantically bleached variants of diminutive suffixes appeared to be categoryless. Even verbal prefixes turned out to be categoryless heads. Whether inflectional suffixes come up without a category too, depends on the conception of grammar. We can label them with categories like T and Agr or analyze them as categoryless. Categorically underspecified affixal heads allow the non-head to project its category. Models in which inflectional suffixes are classified as categoryless must assume that features can percolate from head and non-head at once. The percolation is thereby restricted to categories and free features, whereby head features have priority over non-head features. Bound features cannot be untied from the category to which they are connected. Affixes are heads, but some of them are quite unusual ones. Thus, affixation in German does not show anarchistic tendencies. Affixes have a rather temperate and diplomatic nature, leaving nearly all glory and attention to their partner.

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Part III

Watching heads

Chapter 7

The Left-Left Constraint: A structural constraint on adjuncts

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Left-hand adjuncts of left-headed (= *head-initial*) phrases are constrained in a particular way. The constraint, which is absent for adjuncts of head-final phrases, is this. The head of the adjunct must be in the absolute phrase-final position. Anything that follows the head disqualifies the phrase as an adjunct. The effect of this *head-final-constraint* is adjacency between the head of the adjunct and the phrase the adjunct is adjoined to. This holds for adverbials, viz. adjuncts to VPs and APs, as well as for adnominal attributes.

This constraint does not follow from any established conditions on phrase structuring. It will be shown to arise from a licensing requirement that holds for phrases merged with a given phrase. Left adjuncts of head-*initial* phrases are outside of the structural licensing domain of the head of the phrase and therefore they are in need of an alternative way of getting structurally licensed. This alternative way – proper attachment – results in the hitherto unaccounted adjacency effect.

1 The issue

Left-adjunction to *left*-headed major lexical phrases¹ is subject to a constraint that is absent for (left-)adjunctions to right-headed phrases (Haider 2004: 782–785; Haider 2010: 194; Haider 2013: 13–16, 34–37). For ease of reference in this paper, this constraint shall be referred to as the *Left-Left-Constraint* (LLC). In

¹“Major lexical phrases” are phrases headed by word-level categories, such as A⁰, N⁰, V⁰, and to a limited extent P⁰. These heads, unlike functional-category heads, license the phrases they combine with directionally. The LLC is a constraint on left-adjoining to left-head phrases of argument-taking heads.



strictly head-initial languages such as English, the LLC applies to left adjuncts of any major lexical phrase, and in particular to adjuncts of NPs as well as VPs. For all these adjuncts, their heads must be strictly adjacent to the phrase they are adjoined to. The adjunct phrase may be extended on its own left side, for instance by degree modifiers, but its head must be phrase-final in order to be adjacent to the host phrase. Note that the adjacency requirement holds for the *head* of the adjunct relative to the *phrase* to which it is adjoined. In other words, it is not a *head-to-head*-adjacency but a *head-to-phrase* adjacency. This is particularly clear when several adjuncts are involved. Each adjunct must be adjacent to the phrase it adjoins, even if this phrase already contains a left-adjoined adjunct.

In German and Dutch² and all other Germanic OV languages, the LLC applies only to adjuncts of NPs but not to adjuncts of VPs or APs. This is a predictable fact since NPs are head-initial while VPs and APs are head-final phrases in these languages.³ Since the LLC is a constraint on left-adjunction to *head-initial* phrases, VPs and APs are not in the scope of this constraint. Consequently, in uniformly head-final languages – Japanese, for example – there is no context at all for the LLC to apply.

The following English examples illustrate the LLC first for adjuncts of VPs (cf. (1)) and then for adjuncts of NP (cf. (2)). Preverbal adverbials may contain modifiers, but the head of the adverbial must be in the final position (1a), (1b), in order to meet the LLC. Example (1c) illustrates the head-to-phrase adjacency. Each of the two adjuncts must be head-adjacent to the phrase they are adjoined to.

- (1) a. A finch is [[much more *often* (*than an owl)] [heard in Blackwood Forest]].
- b. He has [[more *carefully* (*than anyone else)] [analysed this problem]].
- c. She has [_{VP} very often [_{VP} publicly [_{VP} criticised Trump]]].
- d. [Much more *often* than an owl], a finch is heard in Blackwood Forest.
- e. One should *more carefully* analyse such data.
- f. * One should *with (more/great) care* analyse such data.

²Broekhuis (2013: 292) formulates a “Head-final Filter on attributive adjectives”: “The structure [NP ... [AP ADJ XP] N#] is unacceptable, when XP is phonetically non-null and N# is a bare head noun or a noun preceded by an adjective phrase: [(AP) N].”

³For Dutch, see Broekhuis (2013: 291–293).

Example (1e) is instructive in two respects. First it shows that the adjective plus the comparative phrase form a single phrase, and second, it shows that a clause-initial position is not subject to the LLC. The structure of (1e) can be analysed in alternative ways. If the adverbial is in a functional spec position, the absence of LLC is predicted, since it constrains adjoined positions but not spec positions. Alternatively, if the position of the clause-initial adverbial is regarded as an adjoined position, it is adjoined to a functional projection. In this case, the LLC is not operative since it constrains lexical projections as projections of heads with a grammatically defined directionality property, but it does not apply to functional projections.⁴

Eventually, the contrast between (1e) and (1f) reconfirms that a *structural* condition is at work. The adverbials are in the very same pre-VP position, semantically they are exchangeable, and phonologically, the unacceptable (1f) consists of even less syllables than the acceptable version (1e). Nevertheless, their acceptability is completely opposite, as a search in three big corpora⁵ confirms. The sequence “should more *ly”, with “*” as a joker for a single word, is attested in each corpus (BNC: 17, COCA 53, NOW 254). However, as expected for a PP in the pre-VP position, the sequences “should with care”, “should with great care”, or “should with more care” are completely absent in these three corpora, that is, in an aggregated corpus of 5.8 billion words.

The situation illustrated above is parallel in Romance. A Google search (Dec. 15, 2017) for “doit soigneusement” ‘must carefully’ on news and book sites produced 59 and 14,100 hits, respectively. A search for “doit avec soin”, ‘must with care’, however, produced zero hits on news sites and only eight in the unfiltered search, some of which are enclosed by commas, although “avec soin” is attested

⁴Examples such as *Rarely in this league do you get two long touchdowns* are clear cases of a Spec-head-configuration, with *do* in the functional head-position. Corpus searches confirm that an adverbial like *at this point* or *in this respect* is not attested in between a finite auxiliary and a verb, but it occurs between the subject and a finite auxiliary, that is, within a functional projection, as in (i) and (ii):

- (i) Nobody *at this point* has stepped out.
- (ii) [...] and *in this respect* has replaced the Muslim Brotherhood.

Neither the BNC nor CoCA contains a single written token of “*has at this point*” or “*has in this respect*”, but “*at this point has*” or “*in this respect has*” is attested. In these cases, the adverbial is adjoined to the *functional* projection of the finite auxiliary.

⁵BNC = British National Corpus (100 million: British, 1980s–1993); CoCA = Corpus of contemporary American English (520 million: US, 1990–2015); NOW = News on the web (5.2 billion: Web news, since 2010).

31,000 times for ‘news’ and more than 7 million times in general. In languages with head-final VPs, as for instance Dutch or German, such a difference does not exist (cf. (4)).

As for attributes, Huddleston & Pullum (2002: 551) emphasise the “virtual exclusion of post-head dependents. Attributive AdjPs, like other attributive modifiers, hardly permit post-head complements or modifiers.” The hedging by *hardly* is motivated by apparent exceptions of the kind that will be dealt with in Subsection 2.4 of this paper.

- (2) a. an [[obviously much less fascinating (*than the LLC)] [constraint]]
- b. an [[extremely fascinating (*to his audience)] [actor]]
- c. a [very good (*at math)] linguist
- d. a [generous (*to a fault)] examiner

In German, the LLC constrains left-adjunction to an NP as a head-initial phrase (cf. (3)) in the same manner as in English. APs and VPs, however, are head-final and therefore “immune” against the LLC (4a–c). German is representative of the Germanic OV-languages in this respect, and Dutch is, too (4g,h).

- (3) a. eine [[hervorragend *geeignete* (*dafür)] [Kandidatin]]
 an outstandingly eligible for.it candidate
 ‘an outstandingly eligible candidate for this’
- b. eine [[um Vieles *bessere* (*als gedacht)] [Lösung]]
 a by much better than thought solution
 ‘a by much better solution than thought’
- (4) a. Diese Beschränkung könnte [_{VP} [viel *faszinierender* als das
 this constraint could much more.fascinating than the
 EPP] sein].
 EPP be
 ‘This constraint could be much more fascinating than the EPP.’
- b. Er hat [_{VP} dieses Problem [so *präzise* wie alle anderen]
 he has this problem as precisely as all others.AGR
 analysiert].
 analysed
 ‘He has analysed this problem as precisely as all others.’
- c. ein [_{AP} [viel *häufiger* als jedes andere] verfügbares] Gut
 a much more.frequent than any other available.AGR asset
 ‘a much more frequent available asset than any other’

- d. eine [_{NP} [_{AP} viel faszinierendere (*als das EPP)] Beschränkung]
a much more.fascinating than the EPP constraint
‘a much more fascinating constraint than the EPP’
- e. eine [_{NP} [so präzise (*wie alle anderen)] Analyse des Problems]
an as precise as all others analysis of.the problem
‘an analysis of the problem that is as precise as all others’
- f. ein [_{NP} [_{AP} viel häufigeres (*als jedes andere)] Gut]
a much more.frequent than any other asset
‘an asset much more frequent than any other’
- g. dat beslissingen [veel meer dan werd gedacht] (Dutch)
that decisions much more than was thought
gedreven worden door emoties⁶
driven were by emotions
‘that decisions were driven by emotions much more than thought’
- h. een veel sneller (*dan een paard) dier
a much faster than a horse animal
‘a much faster animal than a horse’

As a consequence of the LLC, prenominal attributes in uniformly head-*initial* languages such as Romance, North-Germanic and English are complementless since any complement of the head of the attribute would intervene between the head and the target of adjunction and thereby violate the LLC. Complex attributes are obligatorily post-nominal (cf. (5)). In Romance this is a regular option, in Germanic this is an instance of an apposition (cf. (6)).⁷ Unlike in Romance languages, adnominal attributes are prenominal. The difference is reflected in the lack of agreement (cf. (6a) vs. (6b)). Another option is extraposing the intervening phrase, if the grammar admits this (cf. (6c)). French is representative for all other Romance languages in this respect.

⁶<http://nha.courant.nu/issue/HD/1935-07-11/edition/0/page/2>, 2022-03-17.

⁷Prosodically, appositions are marked with a separate intonation contour (“comma intonation”; see Dehé 2014: Section 2.3.3) for English. The analogous situation holds for German. In (i), the AP is an adjunct while in (ii) it is appositive and parenthetical. Here, adjectives do not agree and the AP is a separate intonation phrase.

- (i) Die [mageren und blau geäderten] Arme ragten aus einem schwarzen T-Shirt.
the meagre.AGR and blue veined.AGR arms protruded from a black T-shirt
- (ii) Die Arme, [mager und blau geädert], ragten aus einem schwarzen T-Shirt.
the arms meagre and blue veined protruded from a black T-shirt

- (5) a. a curious (*about his past) mother-in-law
 b. a mother-in-law, curious about his past
 c. un [AP plus grand (*que le précédent)] nombre de personnes
 a much bigger than the preceding number of persons
 d. un nombre de personnes [AP plus grand que le précédent]
 a number of persons much bigger than the preceding
 e. une femme [AP fière de soi]
 a woman proud of herself
 f. une [AP fière (*de soi)] femme
 a proud of herself woman
 ‘a woman proud of herself’
- (6) a. Ein Schmetterling, *so selten* wie der Apollofalter,
 a butterfly as rare.(NO AGREEMENT) as the Apollo.butterfly
 ist der Segelfalter.
 is the Iphiclides.podalirius
 ‘A butterfly as rare as the Apollo butterfly is the Iphiclides podalirius.’
 b. Ein so seltener (*wie der Apollofalter) Schmetterling ist der
 a as rare.AGR as the Apollo.butterfly butterfly is the
 Segelfalter.
 Iphiclides.podalirius
 c. Ein [[so seltener] Schmetterling *wie der Apollofalter*] ist der
 a as rare.AGR butterfly as the Apollo.butterfly is the
 Segelfalter.
 Iphiclides.podalirius

The LLC predictably holds for any language with unequivocally head-initial phrases. However, there are alleged SVO languages that apparently violate the LLC, as for instance the Slavic languages. Upon closer scrutiny, these languages do not qualify as “unequivocally head-initial”. In Slavic languages, the head position in the phrase is in fact not fixed. It is *flexible*. For details, the reader is referred to Haider & Szucsich (2022a) and Szucsich & Haider (2015). Slavic languages are representative of a “third type” of head-positioning, namely *unspecified* head-positioning, in addition to the other two widely acknowledged types, namely head-*initial* and head-*final*. In such a “Type-3” setting, adjuncts of an apparently head-initial phrase are not constrained by the LLC. A grammar with unspecified head positioning, that is, a Type-3 language, allows for alternative serialisations within a

phrase. A head may alternatively be in an initial (cf. (7a)), final (cf. (7b)), or intermediate position (cf. (7c)), that is, sandwiched between its arguments. Polish is representative of the majority of Slavic languages in this respect.

- (7) a. *de Basia pokazuje Jarkowi swój dom.* (Polish)
that Basia.NOM shows Jarek.DAT her house.ACC
‘that Basia shows Jarek her house’
b. *że Basia Jarkowi swój dom pokazuje.*
that Basia.NOM Jarek.DAT her house.ACC shows
‘that Basia shows Jarek her house’
c. *że Basia Jarkowi pokazuje swój dom.*
that Basia.NOM Jarek.DAT shows her house.ACC
‘that Basia shows Jarek her house’

In Slavic languages (see Siewierska & Uhliřová 1998: 116, Haider & Szucsich 2022a: 16, Haider & Szucsich 2022b: Section 6), the LLC effect is absent for preverbal adjuncts (8a,b) as well as for prenominal adjuncts (8c,d).⁸ The contrast between English and Slavic languages in this respect confirms the claim that LCC is a property of adjuncts of genuinely head-initial phrases, as in English, and absent for adjuncts within the directionality domain of the head of the adjunction site. If in Slavic, a head licenses in either direction, it will license adjuncts in either position.

- (8) a. *V prošlom godu [gorazdo bol’she čem Igor] vyigrala* (Russian)
in previous year much more than Igor won
tol’ko Maša
only Mary
‘Last year, only Mary has much more won than Igor.’
b. *Prošle godine je [mnogo više od Želimira] radila* (B/C/S)
last year has much more than Želimir worked
samo Branka
only Branka
‘Last year, only Branka has much more worked than Želimir.’
c. *[verni-jat (na žena si)] muž* (Bulgarian)
faithful-DEF to wife his.REFL husband
‘a husband faithful to his wife’

⁸Bosnian/Croatian/Serbian and Czech do not admit this pattern (Siewierska & Uhliřová 1998: 116).

- d. [wierny (swojej żonie)] mąż (Polish)
 faithful his wife.DAT husband
 ‘a husband faithful to his wife’

The absence of the LLC in Slavic languages is merely one feature out of a systematic set of contrasts between uncontroversial SVO languages and the Slavic languages. They are Type-3 languages that have been misclassified as SVO languages (Haider & Szucsich 2022a, Szucsich & Haider 2015).

2 Previous attempts of accounting for LLC-constrained data

The adjacency property of adnominal attributes and of preverbal adverbials in English has each been seen as a theoretical challenge in the literature, but not as a common property of head-initial phrases. As for attributive APs in English, Emonds (1976) has raised the issue and Williams (1982) has deferred it to a filter-condition (i.e. *Generalised Head Final Filter*).

The following accounts⁹ have been tried out, namely a *head-to-head adjunction* proposal for adverbs (Section 2.1), a *head-to-functional-head raising* account for adjectives (Section 2.2), a *head-complement* relation for adjectives (Section 2.3), and a *processing* account (Section 2.4) for adnominal attributes. In each particular case, adjacency is captured, but each account turns out to be empirically inadequate. None of these accounts is able to satisfactorily cover both instances – a *adnominal* attributes and *adverbial* phrases – and the absence of adjacency of adjuncts when the host phrase is head-final. Eventually, even the theoretical null-hypothesis – the apparent correlations are accidental – has found its advocate (Section 2.5).

2.1 Adverbs as head-to-head adjoined items?

The fact that preverbal adverbials very frequently are simple adverbs has duped Bouchard (1995: 409), who claims that preverbal adverbials in English or French

⁹One anonymous reviewer tells me that – according to a forthcoming publication – a “final-over-final constraint” (= a constraint that disallows structures where a head-initial phrase is contained in a head-final phrase in the same extended projection/domain) could account for the facts. Evidently, this cannot be the case: in languages like English, heads are uniformly *initial*, in any phrase, so the constraint cannot be operative at all since there are no head-final phrases involved. The LLC applies to head-*initial* phrases, and the adjunct phrases are head-initial in English as well, and so are the NPs and VPs they are adjoined to.

are head-adjoined to the verbal head and therefore “simple”. Even if this were a correct option, which it is not, it would not rule out adjoining phrasal adverbials. The hypothesis merely postulates that word-level adverbials may be adjoined to a verbal head. By the same token, however, one would have to assume that phrase-level adverbials would have to be adjoined to the phrase-level category, that is, the VP. Eventually, it would be entirely unclear what to do with adverbs that precede other ad-verbs as in *She’d have surely more deeply regretted it*.

It should be obvious that a head-head adjunction idea misses an essential generalisation. Pre-verbal adverbials may be phrasal but only to the extent that the head remains phrase-final. For strictly head-initial languages like English or French this entails that a preverbal adverbial phrase can be extended only on its left side and not on the side where the complements would appear. Hence adverbial phrases in English may contain modifiers but no complements (cf. (9a)), as attested in English, and other VO-languages, such as Romance languages (cf. (9b,c)).¹⁰

- (9) a. She has *even much* earlier (**than him/he*) published in this field.
 b. Saint-Etienne a *plus souvent* (**que Lille*) gagné. (French)
 Saint-Etienne has more often than Lille won
 ‘Saint-Etienne has won more often than Lille.’
 c. La sinistra *ha più volte* (**di Fratelli d’Italia*) vinto (Italian)
 the left has more times than Fratelli d’Italia won
 le elezioni.
 the elections
 ‘The left party has won the elections more often than Fratelli d’Italia.’


2.2 Adjectival attributes with heads raised to functional heads selecting an NP?

A more sophisticated approach is the hypothesis that attributive APs are complements of a functional head, viz. an agreement head, in combination with the obligatory raising of the adjective to this functional head position. This is exactly what Corver (1997: 291) has proposed, namely “the existence of a head-final func-

¹⁰The only licit option for *plus souvent que* [...] in the position in (9b) is parenthetical. And, indeed, a Google search (2020-01-26), has produced no hit for “news” sites, but a single hit (i), with comma signs for parenthesis, on a “books” site, although in all other contexts taken together, the phrase *plus souvent que* is attested in a range of well above 5 millions:

(i) et doit, *plus souvent que* moi, souffrir de la faim
 and must more often than me suffer from the hunger

tional node Agr (heading AgrP) which can function as a landing site for adjectival heads that are moved rightward”.

- (10) a. [NP [AgrP PRO [Agr' [AP ... A⁰ ...] [Agr⁰ e]]] [NP ... N⁰ ...]] base structure
 b. [NP [AgrP PRO [Agr' [AP ... e_i ...] [Agr⁰ A⁰]]] [NP ... N⁰ ...]] raising of A⁰ to Agr⁰
- 

This hypothesis correctly predicts that the adjectival head of an AP attribute in the NP will always be adjacent to NP because the functional head is NP-adjacent. However, the hypothesis demonstrably fails in other respects. There are equally immediate predictions of this hypothesis which are evidently wrong. Head-movement to the right over-generates heavily. It predicts out-comes that do not exist. Here are two areas of counterevidence, one from English and one from German which are representative of the respective language type, that is, VO and OV, respectively.

If an adjective were raised out of the AP into a pre-nominal functional head position, then APs with complements (cf. (11a), (11b)) would be turned into attributes in which the argument of the AP apparently precedes the adjective, but only in attributes. The predicted results (cf. (11c), (11d)) are unquestionably discouraging. English is a case for the LLC but English obviously does not raise the adjectival head out of an AP attribute (cf. (11c), (11d)), and English is representative of all other head-initial Germanic and Romance languages, all of which are constrained by the LLC. By the same token, participial constructions with particle verbs are predicted to strand the particle in German or Dutch, but in fact they do not (cf. (11e)).¹¹

¹¹The structure in (11e) is exactly the structure Corver (1997: 350) argues for, with examples such as (i):

- (i) [DP een [NP [AgrP PRO [Agr' [nauw t_i daaraan] [Agr verwante_i]]] [NP idee]]]
 a closely there.to related idea
 ‘an idea closely related to this’

The problematic side shows when the moved item is a verbal element, that is, a participle, with an obligatorily stranded particle. The predicted outcome is clearly deviant. (11e), the participial construction corresponding to (ii) – stranded particle & extraposed PP – is ruled out by the LLC. The well-formed version is (iii).

- (ii) Der Experte riet_i [allen ab-e_i davon]. (ab-raten = dis-suade)
 the expert suaded everyone dis of.it
 (iii) der [AP allen davon abratende] Experte
 the everyone from.it dissuading expert

- (11) a. He has always been [_{AP} eager to improve].
b. He has always been [_{AP} faithful to her].
c. * He has always been a [_{AgrP} [_{AP} e_i to improve] eager_i] scientist.
d. * He has always been a [_{AgrP} [_{AP} e_i to her] faithful_i] husband.
e. * der [[allen ab-e_i davon] ratende_i] Experte
the everyone.ACC dis of.it advising expert
(ab-raten = 'dis-advise')

Raising an adjective to an agreement position would strongly resemble raising the finite verb to the verb second position in V2-languages. In Scandinavian languages, for instance, the finite verb crosses the subject and precedes it in its derived position, and it strands the particle. In the Germanic OV-languages, the fronting of the finite verb crosses all of its complements. In the case of adjective movement, the adjective in its derived position would be predicted to cross particles and objects, with such items ending up in a position in which they would precede the raised item. The facts do not support this hypothesis, however.

German provides another area of evidence, along the same line. Elements that obligatorily follow the adjective in the AP are banned from the attributive construction in German (and in Dutch as well) because of the LLC. A comparative PP obligatorily follows the adjectival head (cf. (12a,b)). But, if the adjective raises, it would cross the comparative PP, resulting in (12c). This prediction turns out wrong (cf. (12c)). The adjective in (12c) is treated just like the adjective in (12b), namely as an adjective with a wrong serialisation.

- (12) a. Der Preis ist [_{AP} höher als der Wert].
the price is higher than the value
b. * Der Preis ist [_{AP} als der Wert höher].
the price is than the value higher
'The price is higher than the value.'
c. * der [_{AgrP} [_{AP} e_i als der Wert] höhere_i] Preis
the than the value higher price
'the price which is higher than the value'

Eventually, a movement account for adjectives would merely cover NP-adjuncts. So, the account would have to be generalised in order to cover VP-adjuncts as well since the LLC applies in both contexts.

For VP adjuncts, Cinque (1999) has worked out a proposal that is based on functional projections. According to this proposal, which has become a standard

assumption in Generative approaches, adverbials are expressions in spec positions of empty adverbial functional heads indicated by $[_{F^0-Adv} e]$ in (13). The idea that preverbal adjuncts are contained in functional projections has been widely adopted since.

- (13) a. ... $[_{AdvP} XP [_{Adv'} [_{F^0-Adv} e] [_{VP} V^0 \dots]]]$
 b. Hillary has $[_{AdvP} [\text{very cleverly}] [_{Adv'} [_{F^0-Adv} e] [_{VP} \text{figured out that}]]]$

In spite of its wide reception, it is unlikely to be empirically adequate since it is challenged by unequivocal, robust and manifold counterevidence for its core part; see Haider (2013: Section 6.4, 6.5) and Haider (2004).¹²

Within Cinque's framework, an LLC-effect is completely unexpected and unpredicted. If an adverbial phrase is a phrase in a spec position, the LLC has no chance at all to apply. Typical and uncontroversial functional spec positions such as the clause-initial position in V2-languages or the subject position in SVO languages are open to phrases of any structural make-up. In particular, there is no evidence for a restriction such as the LLC to apply to phrases in such positions. Such evidence, if it existed, would be surprising since the LLC is a constraint on adjunctions and not on functional specifier position.

Note that in Cinque's account, a raising approach would not be admissible since the VP is regarded as the functional complement of the functional head. A VP with a preverbal adverbial is an adverbial phrase with a VP complement.¹³

¹²Here is a central and straightforward prediction that is wrong in any of the applicable OV languages: any argumental phrase preceding an adverbial phrase in an OV language is predicted to be opaque for extraction. Such a phrase would be in a pre-VP-functional projection. That such positions are opaque for extraction is an established fact in the literature on extraction domains. This prediction is inevitable but empirically wrong. For example, if *vergeblich* 'futile' in (i) had to be assigned to a functional spec position, the infinitival clause preceding it is adjoined to or contained in a functional projection. In each case, extraction is predicted to be ungrammatical. However, there is no OV language that would unequivocally confirm Cinque's prediction (see Haider 2004).

(i) Mich_i / Wen_i hat er [_e_i damit zu überzeugen] *vergeblich* versucht?
 me who(m) has he with.it to convince vainly attempted

¹³As an inevitable but unwelcome consequence, each auxiliary in (i) subcategorizes and selects an adverbial phrase while the very same auxiliaries in (ii) subcategorize and select a VP (see also Müller 2016: Section 4.6.1.3):

(i) The new theory certainly may $[_{AdvP}$ possibly have $[_{AdvP}$ indeed been $[_{AdvP}$ badly formulated]]].
 (ii) The new theory may $[_{VP}$ have $[_{VP}$ been $[_{VP}$ formulated badly]]].

The adverbial phrase is a phrase in the spec position of the functional projection. An adverbial head could not leave the spec position and target the functional head position. In Corver's version, the AP is the complement of the functional head and the functional projection containing the adjective is adjoined to the NP.

In sum, a functional projection accommodating an attributive AP or an adverbial phrase of a VP is not the key for the solution but a road to predictions that fail. Its consequences are counterfactual.

2.3 Attributive adjectives as heads that select an NP complement?

A third avenue of attacking the problem has been contemplated by Abney (1987: 339). He suggested that the NP following the attributive AP is a complement of the adjective (cf. (14a)).

- (14) a. [_{DP} the_D⁰ [_{AP} very [_{A'} outspoken [_{NP} critic of this proposal]]]]
 b. [_{DP} ein_D⁰ [_{AP} sich [_{A'} seiner Sache [_{A'} sehr [_{A'} *sicherer*_A⁰
 a REFL.DAT his cause.GEN very sure
 [_{NP} Kritiker des Vorschlages]]]]]]
 critic the proposal.GEN
 'a critic of the proposal who is very sure of his cause'
 c. * [_{DP} ein_D⁰ [_{AP} sich [_{S'} seiner Sache [_{A'} sehr [_{A'} [_{NP} Kritiker
 a REFL.DAT his cause.GEN very critic
 des Vorschlages] *sicherer*_A⁰]]]]]
 the proposal.GEN sure.AGR
 'a critic of the proposal who is very sure of his cause'

That (14a) cannot be a correct analysis becomes clear in a language in which the AP is head-final. Here, the complements of the adjective precede the head, but the phrase is nevertheless subject to the LLC if it is an adjunct of a head-initial phrase. German is a language with this kind of setting. Abney's focus is merely on English. German clearly tells that an analysis that – due to the

Moreover, intervening heads, such as a negation particle, trigger *do*-support (iii). The alleged adverbial heads are predicted to have the same effect but they do not (iv). The difference follows if adverbials are adjuncts of the VP.

(iii) It does *not* work that way.

(iv) It *never* works that way.

restriction imposed by LLC – might be contemplated for English would not work for German, as (14b,c) illustrate.

In German, just like in English, adjectives do not permit accusative objects,¹⁴ but there are dative, genitive and prepositional objects. The adjective *sicher* 'sure' takes a reflexive dative and a genitive NP as objects in a head-*final* AP. If we disregard the implausible semantic compositionality of (14b) for the moment, the NP as a complement in (14b) would be a structurally illicit complement nevertheless since an AP is head-final in German. So, NP complements have to precede. Consequently, if the NP were a structural complement of the adjective, it would have to precede (cf. (14c)). The resulting expression is gibberish, however. No language is known with structures like (14c).

Moreover, the complementation idea would run into difficulties whenever a NP is modified by more than one attribute (cf. (15)). In this case, in Abney's analysis, the lower adjective *sympathisch* 'likeable' would select an NP as complement while the adjectival head *befremdlich* 'strange' of the higher attribute would have to select an AP. Clearly, the result would be grammatical only if the lower AP is an attribute of an NP. Since the higher attribute cannot select the lower NP directly, the account will inevitably lead into over-generation.

- (15) der [_{NP} [_{AP} für mich befremdliche] [_{NP} [_{AP} ihm sympathische]
the to me strange him.DAT likeable
Vorschlag]]
proposal
'the proposal that is strange to me but likeable to him'

Abney's idea is in fact similar to Cinque's proposal for adverbials, except that Cinque postulates an empty functional head while Abney takes the adjective to be the selecting head. If Abney updated his analysis, he could join Cinque

¹⁴There is an exceptional historical relic (s. also Müller 1999: 272): *Gewohnt* ‘used to’ used to govern a genitive, which is identical in form with the accusative (i) for the pronoun *es* ‘it’. This has facilitated a reanalysis. However, as (ii) shows, *ungewohnt* ‘not used to’ is not acceptable with an accusative. The negative prefix *un-* ‘un-’ selects only adjectives, but no verb or participle.

(i) Ich bin es gewohnt – Ich bin das gewohnt. – Ich bin diesen Lärm nicht
I am it.GEN/ACC used.to I am this used.to I am this noise.ACC not
gewohnt. – der ungewohnte Lärm
used.to the unused.to noise

(ii) *Ich bin den Lärm ungewohnt. – Der Lärm ist ungewohnt. (= unusual)
 I am the noise.ACC unused.to the noise.NOM is unused.to

and postulate a functional head for attribution (or agreement, like Corver), that selects the NP. This analysis would fail, too. If he assumed, following Cinque, that adjuncts are phrases in spec positions, the LLC could not apply and rule out the ungrammatical cases. If, on the other hand, Cinque adopted Abney's analysis and applied it to adverbials, assuming that the head of an adjunct in reality selects the phrase it appears to be adjoined to, then the analysis fails for languages with head-final phrases, since they are not constrained by the LLC.

2.4 The LLC as a processing effect?

In a theoretically uncommitted approach, Fischer (2016) presents a tentative proposal in terms of processing effects. In particular, adjectival agreement is suspected to work as a boundary signal. As a boundary signal for the boundary of the AP it is phrase-final. That's why it is bound to occur at the right *edge* of the AP.

Attractive though it might seem, such a parsing-based account does not satisfactorily work for various reasons. First, there are languages such as English without any adjectival agreement, but attributes are constrained by the LLC nevertheless. Second, Norwegian shows that the inflected adjective is not strictly adjacent to the following NP since *nok* 'enough' may intervene; see examples in (28) below. Third, the LLC effect for attributes is but a subset of the LLC phenomena. The LLC applies to adverbials as well, but in this case, it could not be treated as a violation of a morphologically signalled boundary condition since adverbials do not agree. Fourth, the boundary-signal hypothesis would lead to exactly opposite expectations with respect to the head-position of the host-phrase of the adjoined phrase. The LLC effect should be absent for head-initial phrases because here, the phrase-*initial* head of the NP or VP clearly signals the boundary of the NP relative to the preceding attribute.

On the other hand, head-final phrases, such as German VPs, are notoriously ambiguous with respect to the boundary of an adjunct. If a boundary-signal-triggered condition were favoured by parsing, it ought to disambiguate (16a), which is structurally ambiguous between (16b) and (16c). An adjacency condition would be sufficient for ruling out (16b) and thereby disambiguating (16a). But, patently, adjunct boundaries are not signalled where signalling would be needed for parsing.

- (16) a. Sie ist zufrieden damit abgereist.
 she is content there.with left

- b. Sie ist [zufrieden damit] abgereist.
 she is satisfied there.with left
 ‘Satisfied with it, she has left’
- c. Sie ist zufrieden [damit abgereist].
 she is satisfied there.with left
 ‘Satisfied, she has left with it.’

In sum, the theoretical tool-kit of grammar theory does not offer the promising tool for deriving the LLC in such a way that it simultaneously covers the modifiers of NPs (viz. ‘attributes’) and the modifiers of VPs and APs (viz. ‘adverbials’). The potential way out by postulating functional projections above an attribute or an adverbial turns out to be empirically as well as theoretically unattractive.

2.5 Sampling error?

It rarely happens in research literature that a cross-linguistically uniform and robust pattern is suspected to be a mere coincidence of unrelated grammatical circumstances. This is what Hinterhölzl (2016) proposes, however. In his view, the adjacency effect in German has nothing in common with the corresponding effect in English. In other words, it is a sampling error, that is, two unequal things are falsely treated as equal by anyone who seeks a uniform account.

Accordingly, “the $H_{\text{ead}}F_{\text{inal}}$ -effects in the verbal and nominal domain in English can be reduced to a metrical condition” (Hinterhölzl 2016: 180). For German, however, the pertinent constraint for the NP is claimed to be morphological: “If we assume that inflected words are formed in the syntax and that the adjectival inflection constitutes a phrasal affix, [...] we may assume that affix and head may be joined at $M_{\text{orphological}}F_{\text{orm}}$ under the condition of strict adjacency.” (Hinterhölzl 2016: 188). Surely, an “if we assume” is easily available. The costly part is the demonstration that it is correct. Unfortunately, this part is missing in the paper. Neither the “phrasal-affix” claim nor the allegedly causal metrical conditions are independently justified or at least demonstrated to work for one of the crucial examples.

Had the author dutifully shown how the proposed metrical constraints are supposed to work, it could not have escaped him that they do not. Replacing metrically equivalent subtrees does not change the metrical property of the whole tree. In (17a), the adjectival phrase is branching, but obviously well-formed with the weak subtree *much smaller*. Adding a metrically weak extension such as *than it*, with a weak pronoun, would not change weights. On the other hand, *than it appears* may be strong and this could change the s/w-distribution. Consequently, if (17a) is metrically ok, (17b) is metrically ok as well, and the only variant that

possibly might be filtered out is (17c). But this is not what the facts tell. The COCA corpus – 520 million words of present day American English – contains exactly 741 items of *a much smaller [...]*, but only a single item of the form *a much smaller than*, namely *a much smaller than expected loss*, which is irrelevant (see the discussion in the following section). In terms of corpus frequency, the difference between (17a) and (17b,c) is as clear-cut as anyone could ask for.¹⁵

- (17) a. a [much smaller] new building
 b. * a [much smaller than it] new building
 c. * a [much smaller than it appears] new building

Analogously, German and English would have to be separated by rigid metrical constraints that make a structure like (18a) virtually unstressable in English, Italian (cf. (18d)) or Swedish (cf. (18e)), but not in German (cf. (18b)) or Dutch (cf. (18c)). Independent evidence for the empirical and operational details of the required metrical phonology is wanting, especially since it is implausible that a highly flexible property such as prosody, that adapts to all kinds of structures, could exert a rigid bonding on structuring in exactly this case.¹⁶

- (18) a. [He [has [[more often (**than anyone else*)] scored.
 b. [Er [hat [[viel öfter (als jeder andere)] gepunktet.]
 he has much more.often than anyone else scored
 ‘He has scored much more often than anyone else.’
 c. Hij heeft vaker (dan iemand anders) gescoord. (Dutch)
 he has more.often than anyone else scored
 ‘He has scored more often than anyone else.’
 d. Ha più spesso (*di chiunque altro) segnato. (Italian)
 has much more.often than anyone else scored
 ‘He has scored more often than anyone else.’
 e. Hon var lika djupt (*som oss) [VP sårad över hans (Swedish)
 she was equally deeply as us hurt by his
 tystnad].
 silence
 ‘She was hurt by his silence equally deeply as us.’

¹⁵If meter were at issue, (i) ought to be as unacceptable as (17c), which is not the case. An explanation is presented in the following subsection of this paper.

(i) a much smaller *than expected* turnout (The Telegraph online, 2020-01-24)

¹⁶A line of a poem in a particular meter may be metrically deviant, but there is no meter for prose.

A metrical constraint fails also with respect to an adequate differentiation between adjuncts of major lexical projections and adjuncts of lexicalized functional projections (see fn. 4).

As for the suspected morphological constraint¹⁷ that allegedly separates German from English and Italian, independent evidence is missing. First, adjective inflection in German is definitely not a “phrasal affix”. It is inflection, that is, a paradigm with strong and weak forms and agreement for case and number. Second, if it were an affix, it ought to parallel the relation between a T^0 head and the finite lexical verb of the English VP. But, in an English finite clause, a pre-VP adverbial (unlike a negation particle) does not prevent joining the T^0 present tense affix, viz. the present tense -s, and the verb. Moreover, Russian and other Slavic languages would be wrongly subsumed under the adjacency requirement. In sum, the attempted dismissal of a single source for the cross-linguistically operative LLC effect lacks force. The theoretically stronger and empirically adequate solution is one that does not have to invoke several independent grammatical restrictions, especially when it can be shown *why* a single condition holds across categories as well as across languages (see Section 5).

3 Apparent counterevidence for the LLC-cases of “acceptable ungrammaticality”

English is a representative instance for a discussion of apparent exceptions. The LLC constrains two independent patterns. First, adverbials in the slot between the subject position and the left boundary of the VP in English have to be head-adjacent to a head-initial VP. Second, pronominal attributes of head-initial NPs have to be head-adjacent to the NP. This section presents data that at first glance

¹⁷ As predicted by the LLC, but in violation of the alleged morphological constraint, the left-hand AP of two *conjoined* attributes may violate the LLC, provided the second and NP-adjacent AP is head-adjacent indeed:

- (i) Jetzt steht dort ein [[genauso breites (*wie zuvor*)] aber [doppelt so hohes]]
now stands there a just.as wide as before but twice as high
Gebäude.
building
- (ii) * Jetzt steht dort ein [[doppelt so hohes] aber [genauso breites (*wie zuvor*)]]
now stands there a double as high but just.as wide as before
Gebäude.
building

appear to contradict these predictions and forwards reasons and evidence as to why this is apparent counterevidence only. In (19) are examples of the data areas to be discussed:

- (19) a. Research has [*at the same time*] come under increased scrutiny.
 b. a [*higher* than average/expected] proportion¹⁸
 c. ?? an [*easy* to enter] competition

In (19a), the head of the adverbial PP is the preposition *at*. The head of the attributive AP in (19b) is the adjective *higher*, and in (19c), the head arguably is the adjective *easy*. These heads are not adjacent to the target phrase of adjunction. Huddleston & Pullum (2002: 780) are deliberate when characterising what they call the “central position” of adjuncts: “Central position disfavors long and heavy adjuncts. Thus [...] PPs, NPs are for the most part less likely in this position than AdvPs.”

As for (19a), the following table presents instructive search results from the three big corpora (see fn. 5) of English for *has at the same time* in comparison to similar expressions with virtually the same structure. The scores show that (19a) is not representative of PP-adverbials in this position. The number before the slash is the number of occurrences of the given expression. The number following the slash is the number of occurrences of the PP in the respective corpus, that is, *at the same time* in (20a), and so on, in *any* position.

(20)		BNC	CocA	NOW
a.	has at the same time	6 / 6835	11 / 34097	105 / 279.400
b.	has at the right time	0 / 244	0 / 1208	0 / 21421
c.	has at a different time	0 / 18	0 / 86	0 / 541
d.	has at that time	0 / 2493	0 / 9772	2 / 83.806
e.	has at no time	1 / 126	0 / 367	19 / 20.410

A side glance on German, with its head-final VP shows that it imposes no restraints on adverbial positions preceding the base position of the verb in the VP. This is directly reflected in corpora. A Google search for *hat zu dieser Zeit* (‘has at that time’) – filtered for “news” and “book” sites – produced 1,380 hits on “news” pages and 19,200 hits on “book” sites.

The search results for English confirm that *at the same time* and, to a very small extent, *at no time* are the odd balls, but in a frequency range well below

¹⁸I am especially grateful to Kerstin Hoge and Amir Zeldes for making me aware of this particular type of data in the discussion period at the workshop from which this volume resulted.

one tenth of a percent. Both expressions are used like parenthetical¹⁹ idiomatic expressions. Whenever the very same NP headed by *time* has to be interpreted compositionally and therefore structured compositionally, the corpora confirm the LLC-gearred prediction at a 100% level (20b–d). This indicates that such expressions, viz. (20a) and (20e), are treated like an *adverbial idiom*, in place of *simultaneously* or *never*.

The pattern (21b) stands for an intriguing class of apparent counterexamples. Again, the exceptions are limited to a small set of candidates. The outstanding items are *expected* and *average* and the profile is uneven again. In each case, the comparative expression intervenes between the head of the attribute and the target phrase of adjunction. This is a structure clearly ruled out by the LLC.

(21)		CocA	BNC	NOW
a.	a better than <i>expected</i> ...	8	3	351
b.	a better than <i>average</i> ...	14	8	141
c.	a better than <i>necessary</i> ...	0	0	0
d.	a better than <i>usual</i> ...	2	0	6
e.	a higher than <i>expected</i> ...	5	3	220
f.	a higher than <i>average</i> ...	29	13	361
g.	a higher than <i>necessary</i> ...	1	0	3
h.	a higher than <i>usual</i>	5	2	131
i.	a faster than <i>expected</i> ...	1	0	65
j.	a faster than <i>average</i> ...	0	0	1
k.	a faster than <i>necessary</i> ...	0	0	0
l.	a faster than <i>usual</i> ...	0	0	6

The key for understanding these findings comes from languages in which the head of the attribute is inflected. German is such a language. Here are the German counterparts:

- (22) a. * ein besseres als erwartet Ergebnis
 a better.NOM/ACC.SG.N. than expected result
 ‘a result better than expected’

¹⁹Some writers typographically mark the parenthesis, as in the following example:

- (i) And it’s ridiculous to have someone who has – at various points in his life – paid little or no taxes, ...

<http://www.post-gazette.com/opinion/Op-Ed/2018/11/26/Ruben-Navarrette-Jr-Donald-Trump-flip-flops-on-immigration-make-for-one-wild-ride/stories/201811260022>, 2022-03-17.

- b. * ein teureres als nötig Eingreifen
a more.expensive.NOM.SG.F. than necessary intervention
‘an intervention more expensive than necessary’
- c. * den besseren als üblich Ausblick
the better.ACC.SG.M. than usual outlook
‘the outlook better than usual’

They confirm the LLC *and* they show how language users try to outfox it cf. (23), in German and in English. As expected and predicted, the LLC correctly blocks structures with interveners. In (22), the head is identified by agreement inflection, it is not adjacent to the NP, and the result is ungrammatical and robustly unacceptable.

Corpus search, however, produces a non-negligible number of specimen of the kind illustrated by (23). Here, an *adjacent* and *inflectable* item is inflected although it is not the head of the attribute. It is embedded in the comparative phrase introduced by *als* ‘than’. In fact, the pattern in (23) is a ‘fake’ fulfilment of the LLC. The adjacent item is treated as if it were the head although it is definitely not the head of the attribute. Why this? The reason is a rule conflict.

- (23) a. [ein besser als erwartetes] Ergebnis²⁰
a better than expected.N.NOM.SG. result
‘a result better than expected’
- b. mit einer [besser als durchschnittlichen] Note²¹
with a better than average.F.NOM.SG grade
‘with a grade better than average’
- c. ein [teurer als nötiges] Eingreifen²²
a more.expensive than necessary.NOM.N.SG intervention
‘an intervention that is more expensive than necessary’
- d. den [besser als üblichen] Ausblick²³
the better than usual.M.ACC.SG outlook
‘the outlook better than usual’

²⁰<https://invezz.com/de/news/2021/04/29/nokia-meldete-besser-als-erwartetes-ergebnis-fur-q1-hier-nachsten-ziele-fur-kaufer/>, 2022-03-19.

²¹<https://www.handelsblatt.com/finanzen/steuern-recht/recht/arbeitszeugnis-vor-gericht-note-3-ist-eine-durchschnittliche-leistung/10976846.html>, 2022-03-19.

²²<https://www.gruene-bundestag.de/parlament/bundestagsreden/2011/oktober/gerhard-schick-errichtung-des-europaeischen-finanzaufsichtssystems.html>, 2017-03-19.

²³<http://www.finanzen.net/nachricht/aktien/gute-aussichten-gute-branchennews-treiben-chipwerte-infineon-auf-langzeithoch-5293416>, 2022-03-19.

The rule conflict is this. The LLC enforces an adjacent head position but the comparative construction requires the comparative *than*-phrase to follow the comparative adjective and thereby to intervene. This is a “catch-22 dilemma”, that is, if one rule is obeyed, the other is violated, and vice versa. In such a situation, speakers tend to waive what they deem to be the minor rule. The results are phenomena of “acceptable ungrammaticality”, also known as “grammatical illusions”; see Bever (1976: 159),²⁴ Haider (2011), Phillips et al. (2011), Frazier (2015). Examples such as (23) sound acceptable and are only recognised as ungrammatical upon closer scrutiny.²⁵ This phenomenon – “acceptable ungrammaticality” – is the key for understanding (21).

In German, but not in English, the ‘fake head’-strategy is betrayed by inflection. The German data nevertheless show what happens in English. Speakers treat an adjacent item as a fake head for the purposes of the LLC. Let us check this explanation. An immediate prediction is this. Uninflectable items or items of a different category than that of the real head are fully unacceptable. This turns out to be correct. In (24a), *expected* is a finite verb, while *bullet* in (24b) and *median* in (24c) are nouns.

- (24) a. * a better than I expected result
 b. * a faster than a bullet interceptor plane²⁶
 c. * a higher than the median temperature

The category mismatch makes the very same strategy unviable in the case of adverbials. A corpus search for the counterparts of attributes in adverbial usage, such as (25), produced zero results. If *better than expected* were a licit adnominal attribute it ought to be a licit adverbial, too. But it is not.

- (25) a. * She has better than expected solved the problem.
 b. * She has higher than average scored on this task.

A special case of the pattern illustrated by (21) is triggered by the distribution of *enough* and its cognates in all Germanic languages (cf. Haider 2011). This is the

²⁴“Sequences that are ungrammatical but acceptable, that is, cases the grammar marks as ill-formed, but which are acceptable by virtue of their behavioural simplicity.”

²⁵A less frequent but also attested alternative attempt of dodging the conflicting rule situation is inflecting both, the adjectival head plus the NP-adjacent inflectable item. Google (2020-01-16) produces 158 hits for *besseres als erwartes*, as in: “ein besseres als erwartetes Ergebnis” ‘a betterAGR than expectedAGR result’.

²⁶Amir Zeldes (p.c.) made me aware of structures of the type a *faster-than-light travel*, which could be mistaken for attribute + N structures but are in fact compounds whose initial part is a graft.

only degree modifier that does not precede its target. Example (26) illustrates *big enough* in contrast with *sufficiently big* in three other Germanic languages. In all Germanic languages, the cognates of *enough* have survived and preserved their exceptional status over a period of more than a millennium, apparently due to its high frequency. Being a degree modifier, it is an uninflected word.

- (26) a. sufficiently big – big *enough*
b. genügend groß – groß *genug* (German)
c. voldoende groot – groot *genoeg* (Dutch)
d. tilstrækkeligt stor – stor *nok* (Danish)

The fact that this modifier *follows* the head of the AP should disqualify such an AP for attributive usage. It would violate the LLC, and indeed, such constructions are robustly deviant, as the examples (27a,b) exemplify. Even the spell-checker of my text software marks them as incorrect. However, the corpora reveal attempts of outwitting the LLC such as the following sample (26c), (26d), which is also confirmed by Fischer (2016).

- (27) a. * keine großen genug Triebwerke (German)
no big.NOM.FEM.PL enough engines
‘no engines that are big enough’
b. * auf festen genug Beinen
on strong.DAT.N.PL enough legs
‘on legs that are strong enough’
c. ? keine groß *genugen* Triebwerke²⁷
no big enough.NOM.FEM.PL engines
‘no engines that are big enough’
d. ? auf fest *genugen* Beinen²⁸
on strong enough.DAT.N.PL legs
‘on legs that are strong enough’

In (27c,d), the intervener is inflected, although it is an uninflectable item. In German, even in combination with a noun, *genug* ‘enough’ remains uninflected, in either position, prenominal or post-nominal.²⁹ The inflection in (27c,d) is a

²⁷http://www.kleinezeitung.at/international/5295011/A380-notgelandet_RiesenAirbus-zerrisses-ein-Triebwerk, 2022-03-17.

²⁸<https://www.pickupforum.de/topic/152024-toter-bester-freund-der-freundin-würde-euch-das-stören/?page=2&tab=comments#comment-2193863>

²⁹Cf.: *Geld genug* ‘money enough’ – *genug Geld* ‘enough money’ – *genug Münzen* ‘enough coins’ – *genug Abstand* ‘enough interspace’ – **genuges Geld* – **genuge Münzen* – **genuger Abstand*.

way of compromising the LLC by violating the minor rule (i.e. inflecting the uninflectable) for saving the major rule, namely LLC, by pretending that *genug* (enough) is the head, by virtue of being inflected.

Dutch, German, English, and Norwegian provide a nice minimal-pairwise setting for relevant contrasts in this respect. English does not inflect attributes, but Dutch does (Broekhuis 2013: 454), German and Norwegian (Fabricius-Hansen 2010: 180) do, too. Among the inflected group of these languages, Norwegian tolerates an inflected adjective followed by *enough*, but Dutch and German do not. So, these data show that the difference between English and Norwegian on the one hand, and German and Dutch on the other hand should not be sought in conditions of attribute inflection. What accounts for the acceptability of (28a,d) in contrast to (28b,c) cannot be a principle of inflection.

- (28) a. a big enough room
 b. *een groote genoeg inzet – ?? een groot genoeg
 a big.AGR enough dedication a big enough.AGR
 inzet
 dedication
 c. *ein großer genug Raum – ?? ein groß genuger
 a big.NOM.SG.M enough room a big enough.NOM.SG.M
 Raum
 room
 d. et stort nok rom – det store nok leveranser³⁰
 a big.SG enough room the big.PL enough supplies

Why are English (28a) and Norwegian (28d) tolerant against *enough* as intervener, but Dutch (28b) and German (28c) are not? English and Norwegian are VO languages and in VO languages, particles of particle verbs follow the verb. Consequently, participial attributive constructions with particle verbs always have particles intervening between the participial attribute and the noun phrase:

- (29) a. a washed *out* road – a switched *off* phone – a rolled *up* ribbon
 b. eine *ausgewaschene* Straße – ein *abgeschaltetes* Telefon – ein
 aufgerolltes Band

Particles of particle verbs do not count as interveners for LLC since particles are part of a complex verb and this complex verb is the head. This opens an escape

³⁰<https://www.an.no/bodoby/vi-har-fatt-landets-storste-fiskebutikk/s/1-33-7147807>, 2022-01-01

hatch for (28b,c). The degree particle is interpreted as part of a complex adjectival head.³¹ This escape is not available in Dutch or German since in these languages, the particle of complex verbs obligatorily precedes. Hence there is no licit pattern for post-head degree particle to be associated with.

Let us turn now to the third pattern, namely (19c). The German counterparts (cf. (30)) are unproblematic since inflection shows that the head of the attribute is in final position. The construction is a participial construction in which the adjective serves as an optional adverbial.

- (30) a. ein nicht (leicht) zu lösendes Problem
 a not easy to solve.NOM.SG.N problem
 ‘a problem that is not (easy) to solve’
 b. eine nicht (einfach) zu beantwortende Frage
 a not easy to answer question.NOM.SG.F
 ‘a question that is not (easy) to answer’

For the pattern (19c), illustrated once more by (31a), there is a variant in English, namely (31b), in which the adjective clearly is the adjacent head. Corpus search³² shows that the type (31b) outnumbers the type (31a) by far. This result is stable across other predicates such as *difficult*, *hard* or *simple*.³³ Huddleston & Pullum (2002: 551) rule out and star *an easy to find place* but admit a *ready to eat TV meal* as having *something of the character of a fixed phrase*.

In fact, (31b) is an independent construction, and not merely the extraposition variant of (31a), as the examples in (31c,d) illustrate. For predicates such as *convenient* or *comfortable*, a construction type such as (31a) is unquestionably deviant but an infinitival clause as a complement of N is grammatical and acceptable.

³¹Consequently, *enough* should be a tolerated intervener also for preverbal adverbials, which is the case indeed:

(i) “Security” has often enough become a stand-in for whatever intelligence operatives decide to do. (NOW)

³²Here are the results for the following searches:

(i) “is an easy to” : BNC 0; COCA 1; NOW: 147.

(ii) “is an easy * to” (“*” = joker for a word slot): BNC: 30; CocA: 177; NOW: 1,601.

³³NOW corpus: “is a *difficult* to”: 26, “is a *difficult* * to”: 1690; “is a *hard* to” 22, “is a *difficult* * to” 1416; “is a *simple* to” 13, “is a *simple* * to” 770.

- (31) a. ?? an *easy to answer* question
b. an *easy* question *to answer*
c. a *necessary* price to pay – *a necessary to pay price
d. a *comfortable* car to drive – *a comfortable to drive car

Once more, and in analogy to (22) and (31a) is an instance of a ‘fake-headed’ attribute. Grammars of English qualify such a structure as deviant (Huddleston & Pullum 2002: 551). This judgement matches the corpus search results. The construction *an easy to N* is totally absent in the BNC. COCA produced a single hit. Even the biggest corpus consulted, namely the NOW corpus, contains merely a single token of the string *an easy to answer*, in the context of *an easy to answer question*. There are other instantiations of this construction type that are somewhat more frequent. For example, there are 146 tokens of *an easy to understand ...* in the NOW corpus, but not a single token is attested in the BNC corpus. The COCA corpus contains four tokens of this expression. Therefore, it seems to be safe to conclude that these are instances of acceptable ungrammaticality.

The attributes in (31) are treated as if the infinitival verb were the head. After all, it is the NP that provides the referent for the object slot of *answer* in (32a). But even in this situation of acceptable ungrammaticality, LLC is clearly respected since anything to the right of the verb makes the construction strictly deviant in the pattern (32a). Here, the LLC is violated, as above, but the fake head strategy would not work, either, since in VO languages, adverbials must not intervene between the verb and a direct object.

- (32) a. * an [easy to answer *correctly*] question
b. an easy question [to answer *correctly*]

In sum, it is warranted to conclude that the allegedly “apparent” counterevidence is apparent indeed. The LLC is not challenged by these data. Taken together with the existing positive evidence, they confirm the existence of such a constraint on adjunction to head-initial phrases.

4 The grammatical source of the LLC constraint

The LLC is real, but a satisfactory account of this constraint is still missing. Let us recapitulate what the desired account has to cover. *First*, it has to capture a directionality property. The LLC constrains left adjuncts of *left-headed* phrases, that is, head-*initial* phrases. It is absent for left adjuncts of right-headed, that

is, head-*final* phrases, and it is absent for adjuncts of phrases with unspecified directionality of the head, as for instance in the VPs or NPs³⁴ of Slavic languages.

Second, the desired condition has to be category-neutral since the LLC applies to NP adjuncts (i.e. attributes) as well as to adjuncts of VPs and APs (i.e. adverbials). This disqualifies accounts in terms of an agreement relation between the head of the adjunct and the head of the hosting phrase. In other words, the fact that there are languages in which adnominal attributes agree with the NP they are adjoined to is irrelevant since in the very same languages the adverbials do not agree but both contexts are equally constrained by the LLC.

Third, the LLC only constrains *adjuncts* of lexical projections but it crucially does not apply to phrases in spec positions. This disqualifies accounts that place attributes or adverbials in spec position of functional heads. Taken these facts together, they call for a fresh approach. The approach suggested here is one in terms of a directionality-based licensing theory (Haider 2013, 2015). Directionality of licensing is a property of lexical categories. Functional categories do not have arguments. Their structure is invariant across categories³⁵ and languages. The specifier precedes and the complement follows; see Haider (2013, 2015).

Why should the directionality of a lexical head matter at all for adjuncts?³⁶ After all, adjuncts unlike arguments do not depend on the head. But – and this matters – an adjunct position³⁷ is a structural position within the phrasal projection of a head and needs to be licensed just as any position within a phrase. Hornstein & Nunes (2008: 57) characterise the situation as follows. “It is fair to say that what adjuncts are and how they function grammatically is not well understood. The current wisdom comes in two parts: (i) a description of some of the salient properties of adjuncts (they are optional, not generally selected, often display island effects, etc.) and (ii) a technology to code their presence (Chomsky-adjunction, different labels, etc.).”

The LLC is part of the “technology to code their presence”. The LLC is the reflex of a strict structural management of admissible *positions* in a phrasal pro-

³⁴The South Slavic BCS languages, that is Bosnian, Croatian, Serbian and Slovenian (see Szucsich & Haider (2015), differ from other Slavic languages with respect to the LLC. In the BCS languages and Slovenian, the directionality of N⁰ is specified as “progressive”, producing *head-initial* NP-structures, which are subject to the LLC.

³⁵Contrary to widely assumed but empirically unfounded assumptions, functional positions as targets of lexical head movement are universally preceding their complement. Hence, their serialisation is not directionality dependent.

³⁶I am grateful to one of the reviewers for legitimately raising this question.

³⁷This approach dodges the traditional structural analysis of *adjuncts* (i.e. *Chomsky-adjoined phrases*), as phrases that are *adjoined* to their host phrase. Attributes are adjuncts adjoined to NPs; adverbials are adjuncts of verbal, adjectival and in certain cases of nominal constituents

jection of a lexical head. This paper focuses on the very property imposed on *structure* (and not on the syntactic or semantic content). Adjuncts that *precede* their host phrase are *structurally* constrained if and only if their host phrase is a head-initial phrase. This constraint is absent for adjuncts of head-final phrases or adjunct phrases with flexible head positioning, such as in the Slavic languages.

Adjuncts preceding a head-initial NP, VP, or AP are phrases whose position is obviously not in the directionality domain of the progressively licensing head of the phrase. That is the crucial distinction between head-initial and head-final phrases. Adjuncts preceding the head of a head-final phrase, such as ZP in (33a), are within the directionality domain of the regressively licensing head of the phrase. In (33b), ZP is not within the directionality domain of X^0 .

- (33) a. head-final: $[_{XP} ZP \leftarrow [_{XP} \dots \leftarrow X^0]]$
 b. head-initial: $[_{XP} ZP [_{XP} X^0 \rightarrow \dots]]$

In (33a), an adjunct ZP is within the licensing domain of X^0 because X^0 is a *regressively* licensing head and therefore it is directionally licensed by X^0 . In (33b), ZP is outside the directionality domain of X^0 and therefore not licensed by X^0 . For the details of the licensing system and the derivation of the systematic contrasts between head-final and head-initial phrases, the reader is referred to Haider (2015) and Haider (2020).

For the present purpose it is sufficient to realise the directionality difference between (33a) and (33b) and to accept the condition that a *structural position* of a phrase to be integrated in another phrase needs to be *directionally licensed* in the containing phrase. This leaves exactly one context of a phrase that is not licensed by the head of the phrase it is a part of. This context is the context of left adjuncts to left-headed phrases. This is the case singled out by the LLC. Here, the ‘glue’ for integrating a phrase is not the directional license by a head. The phrase must produce its own glue for attaching to another phrase. Let us call this relation “proper attachment” and define a principle to that effect:

- (34) a. *Principle of Proper Attachment* (PPA):
 A phrase XP adjoined to a constituent YP that is *not within the directional licensing domain* of the head of YP must be properly attached to YP.
 b. A phrase XP is *properly attached* to a constituent YP if it is *minimally distant* from YP.
 c. The head X^0 of XP is *minimally distant* from YP if there is no ZP (\notin projection nodes of X^0) dominated by XP that is closer to YP in linearization than X^0 .

This principle is sufficient for covering all the phenomena discussed above. The LLC is the joint result of properties of the adjoining phrase and the host phrase. Head-initial host phrases are unable to license their *left* adjuncts directionally. So the adjoined phrase must license its position by itself. It must properly attach to the host phrase. This is the source of the LLC effects. For adjuncts that are properly attached and precede a head-initial phrase, *each node* on the projection line of the adjunct is “minimally distant” to the host phrase.

In head-final phrases, adjuncts are directionally licensable in any adjunction position preceding the head. So there is no need for a last resort option for obtaining a positional license via the PPA, whence the complete absence of LLC effects. In Type-3 phrases, the head is free to license in either direction since the directionality is not fixed to a particular value, that is, either progressive or regressive.

As a closing remark, I do not hesitate to admit that the definition in (34) involves a potentially unwelcome ingredient for an entirely structural condition, namely “linearization”, that is, a string-based notion. Two items α and β are adjacent if there is no *intervening* (= string-based) item γ . For the time being, I do not see how to dispense with the string-based part of PPA in order to arrive at a purely structure-based definition.

5 Conclusion

The LLC is the effect of a principle that governs the attachment of phrases to other phrases out-side of the directionality domain of the head of the host phrase. It is a principle necessitated by the conditions of licensing phrases in a projection, based on the directionality of a head and its projections (see Haider 2015 for the details of the licensing system and the systematic syntactic consequences that correlate with the head-initial and head-final property). Phrases *adjoined* to a phrase outside of the directionality domain of the head are nevertheless licensed but under a different condition. They are “glued” to the respective phrase, which requires “tight” attachment. This is defined as proper attachment by the PPA (cf. (34)). *Each node* on the projection line of the head of a PPA-adjoined phrase is *adjacent* to the host phrase since there are no interveners between the head of the adjunct and the boundary of the phrase the adjunct is pre-adjoined to.

For strictly head-initial languages with prenominal attributes, the PPA strips these attributes of all their complements. Apparent counterexamples are cases of acceptable ungrammaticality and reflect the users’ attempts to circumvent the PPA. In head-final phrases, all these effects are absent. In sum, the PPA completes the licensing system for joining phrases by defining the licensing condition for

adjunct position outside of the directionality domain of the extended projection of the head of the host phrase.

6 Afterthought in connection with the topic of this volume – headedness or anarchy

“Adjunct” is a well-studied concept in terms of its semantical properties. Its appropriate syntactical coverage is still a matter of dispute. As Dowty (2003: 33) points out, “The distinction between ‘complements’ and ‘adjuncts’ has a long tradition in grammatical theory, and it is also included in some way or other in most current formal linguistic theories.” But he emphasises that “it is a highly vexed distinction for several reasons, one of which is that no diagnostic criteria have emerged that will reliably distinguish adjuncts from complements in all cases.”

The only reliable distinctive property of adjuncts and complements, which Dowty (2003) notes, seems to be the following. Adjuncts can be instantiated in an arbitrary number within the same phrase, complements cannot. Grammar does not set a principal upper bound for attributes in combination with a single noun phrase or adverbials in combination with a single verb phrase. “Multiple adjuncts (an unlimited number), can accompany the same head while only a fixed number of complement(s) can accompany a head (viz. just the one (or two, etc.) subcategorized by the particular head.” (Dowty 2003: 39)

From a theoretical point of view, this tells us that what we usually call an adjunct is not under strict control of the head of the phrase it is adjoined to. It is neither semantically nor categorially selected. As a consequence, even the number of admissible occurrences is not fixed. Adverbs may “come or go” without permission by the head of the phrase they are associated with. Does this certify adjuncts as structural anarchists in the tightly ruled realm of phrasal heads, defying the grammatical authority of their heads? Hornstein & Nunes (2008: 58) make out “a deeply held, though seldom formulated, intuition: the tacit view that adjuncts are the abnormal case, while arguments describe the grammatical norm. We suspect that this has it exactly backwards. In actuality, adjuncts are so well behaved that they require virtually no grammatical support to function properly.”

They are well-behaved indeed, respecting all the constraints which the phrasal and the clausal architecture imposes. Phrase structure determines possible slots for adjuncts. What is a possible slot differs across phrase structure types. Example (35) illustrates the differences between English, as a head-initial [S[VO]] language, and German, with a V2-clause structure based on a head-final verb phrase.

- (35) a. The second show will be held *tomorrow evening at the same time at the same venue*.
- b. [*Morgen Abend, zur selben Zeit, am selben Ort*] wird die tomorrow evening at.the same time at.the same venue will the zweite Show stattfinden.
second show happen
'Tomorrow evening, the second show will happen at the same time, at the same venue.'
- c. [*Morgen Abend*] wird *am selben Ort* die zweite Show *zur* tomorrow evening will at.the same venue the second show at.the *selben Zeit* stattfinden.
same time happen
'Tomorrow evening, the second show will happen at the same time, at the same venue.'
- d. [*Morgen Abend*] wird die zweite Show stattfinden, *zur selben* tomorrow evening will the second show happen at.the same *Zeit, am selben Ort*.
time at.the same venue
'Tomorrow evening, the second show will happen at the same time, at the same venue.'

Typically, in clauses based on head-final VPs, unlike head-initial ones (see Haider 2015, 2010: 12, 43), adverbials may intervene between the arguments of the verb. In addition, there is – like in English – room in the clause-initial area. Here, multiple adjuncts, unlike arguments, may be stacked in German (cf. (35a)). Eventually, there is the clause-final areas, the extraposition range at the end of VPs, which provides structural space for extraposed adverbial PPs and clauses. Altogether, this amounts to more than fourteen additional word order variants for (35b), two of which are listed as (35c) and (35d). In English, the head-initial phrase-structure and the SVO clause structure restrict the kind of adverbial phrases in (35a) to the peripheral positions of the clause.

That adjuncts “require virtually no grammatical support” is a correct observation, but “virtually” is an essential part of this characterisation. The support they need is the availability of a syntactic position. Adjuncts lack this minimal grammatical support whenever the adjunction site is outside the directionality domain of the head of the phrase they are adjoined to. Exactly in this case, LLC comes into play and guarantees that the adjunct is tightly “glued” to its host phrase.

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Chapter 8

Head alignment in German compounds: Implications for prosodic constituency and morphological parsing

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The notion of head alignment was introduced to account for the observation that in a word with multiple feet, one is more prominent than the others. In particular, this notion is meant to capture the characteristic edge-orientation of main stress by requiring the (left or right) word boundary and the respective (left or right) boundary of the head foot to coincide (McCarthy & Prince 1993). In the present paper the notion of head alignment will be applied to compounds, which are also characterized by the property that one of their members, located in a margin position, is most prominent.

The adequacy of an analysis in terms of head alignment hinges on the question of whether observable prominence peaks associate with the boundaries of independently motivated constituents. It will be argued that such links exist for German compounds, indicating reference to at least three distinct compound categories established on morphological grounds: copulative, phrasal, and a default class of “regular” compounds. The evidence for the relevant distinctions sheds light on morphological parsing, indicating that compound categories can be – and often are – determined by properties pertaining to their complete form, rather than by conditions affecting their (original) construction.

1 Introduction

The motivation for the notion *head* in linguistics rests on consistent criteria for singling out units within given constructions where those units associate with



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some sort of dominant role. Originally intended to account for semantic relations among words in sentences in a dependency framework,¹ the head concept was subsequently extended to other areas of linguistics (derivational morphology, phonology) as well as to constituency-based grammar models. These applications have met with great skepticism (Hudson 1987, Croft 1996) and the need to recognize the notion *head* as an independent concept has been questioned (Nichols 1993, Hawkins 1993). Bauer (2017: 41) summarizes as follows: “If some notion of head is to be retained [...] it needs to be made clear that the derivational head is not the same as the head in a compound is not the same as a syntactic head.”

Bauer’s assessment raises the issue of general properties defining the concept *head* in natural language. Relevant statements assert two consistent properties: “uniqueness” (reference to the numeral *one*) and “dominance”:

The intuition to be captured with the notion HEAD is that in certain syntactic constructs one constituent in some sense ‘characterizes’ or ‘dominates’ the whole (Zwicky 1985: 2).

Headedness is a pervasive phenomenon throughout different components of the grammar, which fundamentally encodes an asymmetry between two or more items, such that one is in some sense more important than the other(s) (Moskal & Smith 2019).

¹The origin of the notion *head* in grammar is often credited to Sweet (1898), who identified asymmetric relations among “head-words” vis-à-vis “adjunct-words” within given constructions on semantic grounds (adjunct-words modify the meaning of the head-word). Referring to the sentence *He is not very strong* he proposes the role assignments in (i.a), illustrating the possibility of different roles played by the same words in the same sentence. The relevant roles for the compounds *stonewall* and *bookseller* are shown in (i.b) (Sweet 1898: I:16, Sections 40 and 41).

- | | | |
|-----|-----------|--------------|
| (i) | head-word | adjunct-word |
| | a. he | strong |
| | strong | very |
| | very | not |
| | b. wall | stone |
| | seller | book |

The concept *head* is motivated by various independent correlates. For instance, head-words are claimed to determine agreement (e.g., the dependence of the verb forms on the respective head word in *she walks* versus *they walk*) as well as govern case (e.g., specific case forms of objects determined by verbs or prepositions (Sweet 1898: I:32).

With reference to constituent structure, I then propose the following criteria for recognizing heads:

The empirical motivation for the notion *head* rests on independently defined constituents for which a unique daughter constituent can be identified in a consistent manner. That daughter's role is characterized by dominance vis-à-vis given sister constituents.

As for phonology, in particular prosodic phonology, there are two well-known references to the notion *head*, the constraint HEADEDNESS (Selkirk 1995) and the notion of head alignment (McCarthy & Prince 1993).² Both notions will be discussed in Section 2, where I will argue that only head alignment conforms to the concept of headedness stated above.

Head alignment was first proposed to capture main stress in a phonological word, by picking out one of the respective feet based on its position within the word (McCarthy & Prince 1993: 98). This notion comprises both "uniqueness" and "dominance", assuming that dominance could be expressed in form of prosodic prominence, manifest in increased pitch, loudness, along with various properties concerning (language-specific) phonetic implementation, including the lengthening and strengthening of articulatory gestures associated with segments in stressed syllables (cf. Lehiste 1970: 125,³ Ladefoged 2003: 90). Indeed, McCarthy and Prince explicitly mention the generality of their use of the notion *head* in this context:

The head-alignment constraint has obvious cognates in both morphology and syntax, presumably to be expressed in the same way (McCarthy & Prince 1993: 99).

Still, reference to the notion *head* in connection with prosodic prominence differs from the notion *head* typically used in syntax or morphology in one major regard. In syntax or morphology, the daughter functioning as the head is determined based on her inherent properties, which percolate to the mother node.

²The notion *head* has also been invoked to account for segmental phenomena in the frameworks of Government Phonology, Dependency Phonology and various offshoots of these theories (see the contributions in Carr et al. 2005).

³Lehiste (1970: 125) observes that whereas increased loudness and vocal fold vibrations are both caused by an increase in respiratory effort, greater duration of stressed syllables is an independent factor characteristic of Western European languages.

Even when percolation is linked to a margin position (cf. Williams' "Righthand-Head rule" Williams 1981: 248) the occupant of the margin position appears to be determined by inherent properties.⁴ In prosody, the daughter functioning as the head is picked based on her (independently determined) position relative to her sisters, where prominence is a consequence, rather than a condition, for the head status. This also concerns the patterns of head alignment in German compounds to be explored below. For instance, in the German compound *Augapfel* 'eyeball' the righthand member *-apfel* clearly constitutes the morphosyntactic head, passing on its features (singular, masculine) to the compound as a whole. Yet, it is the lefthand member *aug-*, which is most prominent, forming the prosodic head due its representation as a separate phonological word at the left periphery of the (prosodic) compound constituent.

The generalization that prosodic head status is determined by the position of a constituent relative to the respective mother constituent raises the question of what determines hierarchical prosodic structure. As for compounds, such structure appears to result from an isomorphic mapping of morphological to prosodic structure,⁵ which shifts the burden of the analysis to the question of what determines compound morphology. The present article argues that the prominence patterns seen in compounds correlate systematically with various morphological compound types, themselves determined by conditions pertaining to morphological parsing. As for German compounds, relevant parsing patterns motivate at least three distinct compound types (copulative, phrasal, and "default"), each mapping to separate prosodic compound constituents, where main stress is determined by compound-specific head alignment constraints.

The article is organized as follows. Section 2 discusses general issues pertaining to the notion *head* in word prosody, focusing on the constraint HEADEDNESS

⁴When forming a compound, the speaker will consider the intended referent, ensuring that the stem forming the semantic head will emerge in rightmost position, where its features percolate upward. For instance, if a speaker wishes to refer to a tree (which bears fruit) she will chose the order *fruit tree*, German *Obstbaum*, where the features of the rightmost member percolate upward (for instance, masculine in German). If she wishes to refer to fruit (which grows on trees) she will chose the order *tree fruit*, German *Baumobst*, where again the features of the rightmost member percolate upward (in this case, neuter in German).

⁵Isomorphy does not always persist, due to the effects of higher-ranking constraints. A well-known case concerns cohering affixes, which due to their shape and position integrate into the phonological word of the adjacent stem (see Raffelsiefen (2022a) for a review of relevant asymmetries). In compounds, non-isomorphy may result from prominence reversals, resulting in stress patterns no longer matching the morphological compound type (e.g., *North Séa*, a sort of compound associated with final main stress in English, but *Nòrth Sea óil*, where the constituent *North* is more prominent than *Sea*, to avoid a stress clash (Fudge 1984: 137). See also Gussenhoven (2011) for an overview of relevant phenomena in English.

and head alignment constraints. The latter are also compared to an alternative approach to capturing prominence relations in terms of a binary branching formalism. Section 3 explores possible conditions on parsing words as “regular” compounds, as opposed to simple phonological words, in German. Sections 4 and 5 investigate the notion of head alignment in regard to copulative and phrasal compounds, respectively. Section 6 gives a summary.

2 Heads in word prosody

A much-cited reference to heads in phonology concerns a constraint on dominance relations referring to the so-called *Prosodic Hierarchy*. A version of part of this hierarchy is shown in Figure 1, where the term *composite group* encompasses clitic groups, (certain) affixed words, and compounds (Nespor & Vogel 2007: xvii). The dotted lines represent additional structure not specified here.

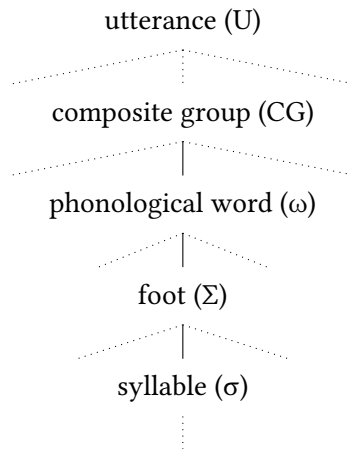


Figure 1: Prosodic Hierarchy (excerpt)

The constraint **HEADEDNESS** proposed by Selkirk (1995: 443), which is claimed to be universally obeyed, is meant to ensure that every (non-terminal) unit dominates at least one unit belonging to the immediately lower layer of the Prosodic Hierarchy:⁶

⁶The constraint expresses “Principle 1” as stated by Nespor & Vogel (2007: 7): “A given nonterminal unit of the Prosodic Hierarchy, X^p , is composed of one or more units of the immediately lower category, X^{p-1} .” The novelty in (1) concerns the conceptualization of this principle as an (inviolable) constraint involving reference to the notion *head*.

(1) HEADEDNESS: Any C_i must dominate a C_{i-1}

There is no reference here to a unique daughter, nor to a daughter's dominant role vis-à-vis her sister constituents.⁷ In fact, constituents in the Prosodic Hierarchy are often associated with daughters belonging to the **same** rank, a condition known as *Strict Layer Hypothesis*. The constraint HEADEDNESS as stated in (1) simply requires the presence of some constituent of the relevant type (without expressing any asymmetry vis-à-vis potential sister constituents). This requirement, as it refers to a single-line hierarchy, is in fact problematic as it implies that for individual (non-top) units in the hierarchy there is a certain type of mother constituent which requires their existence. For compounds, clitic groups or affixed words there is no such mother, as there is no prosodic constituent which necessarily dominates such daughter constituents. I conclude that the constraint HEADEDNESS, apart from the fact that it does not cover typical head properties, hinders a coherent integration of complex words such as compounds into the Prosodic Hierarchy.

Before turning to the notion of head alignment, consider briefly the question of why HEADEDNESS performs so unevenly, expressing exceptionless generalizations for some parts of the hierarchy (e.g., a foot must dominate a syllable) while wreaking havoc for other parts. This outcome is hardly unexpected, given the lack of homogeneity of the Prosodic Hierarchy, where some constituents (i.e. the phonological word and all higher-level prosodic domains) necessarily involve alignment with morphological or syntactic boundaries, whereas others (the lower constituents) are shaped by parsing the given phonemic material.

As for the phonological word and higher-level prosodic constituents, restrictions concerning their presence naturally pertain to the respective morphosyntactic structures from which they originate. For instance, German morphology allows for some recursiveness in compounding, resulting in various compound categories nested within each other. In fact, even phrases occur regularly as part of German compounds for as long as they do not occupy the morphological head position (e.g., *Mit-dem-Kopf-durch-die-Wand-Mentalität* 'head through the wall mentality'). Pertinent restrictions on compound formation or on morphological parsing will be reflected in the respective prosodic form, due to the isomorphic mapping of relevant structures. The constraint HEADEDNESS is then neither needed nor suited to express restrictions on relations among relevant prosodic constituents. There is also no need to invoke HEADEDNESS to control

⁷Selkirk has meanwhile distanced herself from the notion of headedness as stated in the constraint in (1), characterizing that formulation as "unfortunate" (cf. Elordieta & Selkirk 2018: 1, footnote 1).

dominance relations among lower prosodic constituents (foot, syllable) as these are inherently defined by the relation to the constituents they dominate.⁸

Consider next the notion of *head alignment* introduced by McCarthy & Prince (1993) in connection with a sub-theory of Optimality Theory known as *Generalized Alignment*. The sub-theory restricts the positions of various constituents relative to one another, expressed in the schema in (2), where a designated edge of every prosodic (PCat) or morphological (GCat) constituent of a certain category Cat1 is required to coincide with a designated edge of some other constituent Cat2.

(2) Generalized Alignment (McCarthy & Prince 1993: 80)

Align (Cat1, Edge1, Cat2, Edge2) =_{def}

$\forall \text{ Cat1 } \exists \text{ Cat2}$ such that Edge1 of Cat1 and Edge2 of Cat2 coincide.

Where

Cat1, Cat2 \in PCat \cup GCat

Edge1, Edge2 \in {Right, Left}

Alignment constraints as defined in (2) capture both characteristic properties associated with heads, obligatoriness and asymmetry. Obligatoriness is captured through the use of the universal and existential quantifiers, asymmetry is captured through the reference to one edge, left or right. Edge-orientedness has indeed been recognized as a salient property of heads in syntax (cf. Williams' *Righthand-Head rule* Williams 1981, see also Trommelen & Zonneveld 1986) and the idea to use alignment to associate heads with prominence is already present in the earliest work in Optimality Theory. Specifically, the constraint ALIGN-HEAD stated in (3) has been posited to express prominence at the word level (McCarthy & Prince 1993: 98).⁹

⁸A reviewer asks "If HEADEDNESS [cf. (1) R.R.] is dispensed with [...] then what excludes ill-formed structures such as a σ dominating a Σ , a Σ dominating a ω , and so on, from occurring in a language?" An answer lies in lexical semantics. For instance, the definition of a foot as a unit "consisting of a group of two or more syllables in which one syllable bears the main stress" (Trask 1996: 147) establishes the concept "syllable" as a meronym of the concept "foot". This status is manifest in acceptable sentences like $\sqrt{A \text{ foot has syllables}}$, as opposed to illicit $*A \text{ syllable has feet}$ (See Cruse 1986: 157–180 for tests relevant to establishing a meronymic relation among words). In the cases of prosodic constituents not due to morphology-prosody mapping it is then the lexical concepts associated with the relevant symbols (e.g., Σ , σ), which determine their hierarchical organization and exclude ill-formed dominance relations.

⁹That constraint replaces earlier EDGEMOST proposed by Prince & Smolensky (2004), which was intended to express the same generalization (e.g., EDGEMOST(Hd-F;left;Wd) Prince & Smolensky 2004: 34–38, which requires the head foot of the phonological word to occur in initial position.)

(3) ALIGN(ω , Edge_i, Head(ω), Edge_i)

The constraint in (3) requires a specific edge (left or right) of every phonological word to coincide with the same edge of its head, thereby giving prosodic head status to the respective daughter constituent. It thereby accounts for the characteristic edge orientation of *main* stress (e.g., reference to the first syllable or the antepenult syllable). Deviations from regular patterns are captured in terms of constraint interaction in Optimality Theory, where head alignment constraints, too, can be violated under domination (see Section 3).

How does the analysis in terms of head alignment compare to other approaches to capturing relative prominence? An alternative formalism invokes the labels “strong” versus “weak” referring to sister constituents. The principle is stated as follows:

The relative prominence relation defined for sister nodes is such that one node is assigned the value strong (s) and all the other nodes are assigned the value weak (w) (Nespor & Vogel 2007: 7).

Strong/weak markings of relative prominence raise a question in cases where a given domain contains only a single or more than two daughter constituents. Although it has been proposed that “the sole syllable of a monosyllabic foot is by convention strong” (Selkirk 1984: 15), others have insisted that strong/weak-marking necessarily presupposes binarity:

It [the annotation of tree nodes with the symbols w (for “weak”) and s (for “strong”); RR] represents a local property of the tree structure, a relation defined on sister nodes, and the apparent ‘node labels’ s and w cannot have any existence independent of the definition of such a relation. Therefore an isolated [s], an isolated [w], and the configurations [ss] and [ww] are meaningless. (Lieberman & Prince 1977: 256)

The motivation for a uniform representation for both the (sole) syllable in a monosyllabic word and a stressed syllable in a polysyllabic word as *strong* concerns structural similarities. Consider the pattern that German words may contain several schwas but must include at least one full vowel. Assuming the validity of universal constraints requiring phonological words to contain a foot, and syllables to contain a nucleus, this pattern follows from the independently motivated constraints in (4). The head alignment constraint in (4a) assigns head status to the first syllable within the foot, regardless of how many syllables there are in total. The constraint in (4b) bans the presence of schwa in head syllables.

- (4) a. $\text{ALIGN}(\Sigma, L, \text{Head}(\Sigma), L)$
 b. $^*\text{SCHWA}/_{\sigma_{\text{Hd}}}$

Satisfaction of both constraints in (4) is demonstrated by the German words in Figure 2. Words with only schwa as in Figures 3a, 3b violate either head alignment or the ban on schwa in head syllables. Words containing no vowel other than schwa are thereby ruled out.

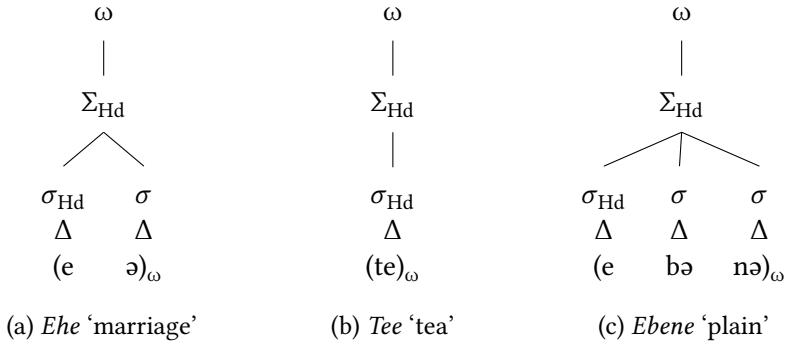


Figure 2: Wellformedness due to satisfaction of both constraints (4a) and (4b) in German

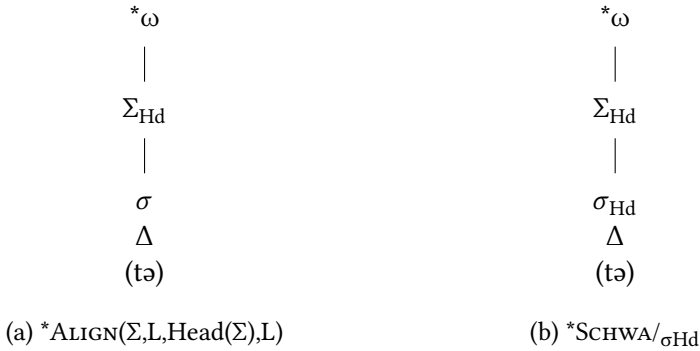


Figure 3: Illformedness due to violation of either constraint (4a) or (4b)

Consider now the account of the relevant restrictions on schwa in an alternative formalism in terms of strong/weak relations among sister constituents. Both monosyllabic feet as in Figure 2b and ternary feet as in Figure 2c can be accommodated in a binary branching framework also: the former by admitting empty

syllables (see Figure 4b), the latter by allowing foot-internal nested branching (see Figure 4c), (cf. Giegerich 1985: 57). Here the relevant restriction concerning the distribution of schwa in German could be expressed in terms of requirements on branching structures along with a ban on schwa in positions dominated by a strong node. Potential empirical differences among the descriptions lie in (possibly missing) independent motivation, in particular regarding the empty syllable in Figure 4b and the additional /s/ node resulting in an asymmetric representation of the two unstressed syllables in Figure 4c.¹⁰

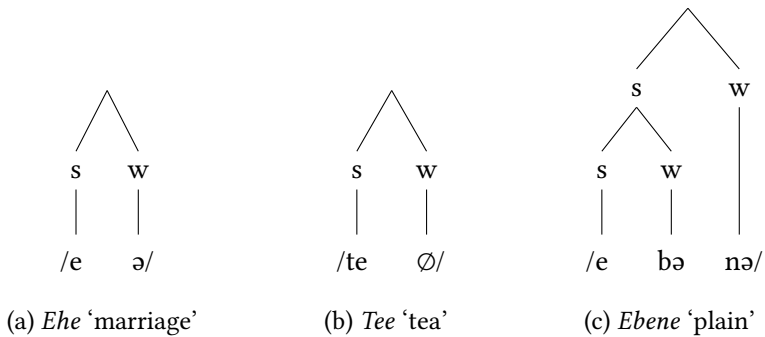


Figure 4: Alternative representations for the words in Figure 2 in terms of binary branching.

The perhaps most important argument made in support of s/w branching structures concerns the generalization that for any given constituent, regardless of its complexity, there is always a single most prominent syllable. This property, referred to as the *designated terminal element* (Lieberman & Prince 1977: 259), is captured nicely in binary s/w branching formalisms in that any given constituent contains exactly one syllable dominated exclusively by strong nodes. However, the property in question is captured by the notion of head alignment as well as every prosodic constituent likewise contains exactly one terminal element which itself forms a head while also being dominated exclusively by head constituents (see Sections 4 and 5).

¹⁰The assumption of empty nuclei in connection with word-final onsets differs in that it is motivated by correlating properties concerning syllable structure and stress (cf. Harris & Gussman 2002, Raffelsiefen (2022b: 88–90). This sort of evidence is missing for the assumption of the empty syllable in Figure 4b.

3 “Regular” compounds

To illustrate the relevance of internal morphological structure for word prosody consider the relative prominence patterns in the four-syllable words in (5a) versus (5b), where main and secondary accents are marked.

- (5) a. /obɛɾʒinə/ <Aubergine> ‘eggplant’
b. /'obɛɾʃinə/ <Oberschiene> ‘top rail’

The words differ regarding their morphological structure in that one is a simplex whereas the other is a compound consisting of two stems. Assuming the morphological structures in (6a,c) and a mapping of morphological to prosodic structures, where every stem (STM) boundary aligns with a corresponding phonological word boundary (ω),¹¹ and where every morphological compound category (COMP-M) aligns with a prosodic compound category (COMP-P), the prosodic structures in (6b,d) arise. Square brackets represent the boundaries of morphological constituents, round brackets those of prosodic constituents.

- (6) a. $[[\text{obɛrʒinə}]_{\text{STM}}]_{\text{W}}$
 \Downarrow
 b. $(\text{obɛrʒinə})_{\omega}$
- c. $[[[\text{obɛr}]_{\text{STM}}[\text{finə}]_{\text{STM}}]_{\text{COMP-M}}$
 \Downarrow
 d. $((\text{obɛr})_{\omega}(\text{finə})_{\omega})_{\text{COMP-P}}$

Prosodic words by definition constitute domains for the prosodic organization of phonemic material, including syllabification and foot formation. Assuming that all syllables are parsed into feet this would result in the single phonological word *Aubergine* dominating two (trochaic) feet as in Figure 5 left, compared to two phonological words in *Oberschiene* each dominating a single foot in Figure 5 right. Significantly, there are clear judgments regarding the prominence among the respective sister constituents: within the single phonological word the final (branching) daughter constituent is strongest whereas within the compound, the initial daughter constituent is strongest (for reasons of space, the symbol Δ is used to represent the complete prosodic organization within the respective constituent).¹²

¹¹Cf. Nespor & Vogel (2007) and the arguments for English in Raffelsiefen (1999), for German in Wiese (2000: cf. footnote 12), Raffelsiefen (2000).

¹² It is true that speakers may declare their inability to assess the location of the main prominence in a given constituent. A diagnostic test to be applied here is to expose them to two exaggerated stress patterns, stressing the actual main stressed syllable to the extreme vis-à-vis some other syllable (e.g., (o**b**er'zi^hnə)_ω versus (o**b**erzi^hnə)_ω), to elicit a preference. The robust results obtained for such tests (in this case main stress on the syllable /zi/) reflect on grammatical knowledge, supporting the sort of head markings shown in the trees as in the figures in Figure 5.

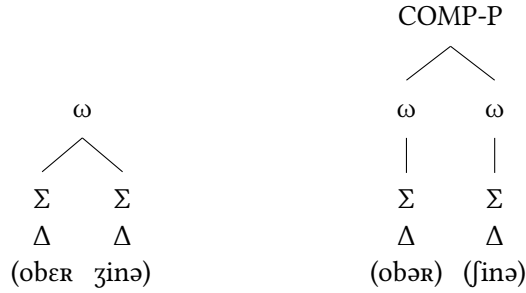


Figure 5: Distinct prosodic constituent structures resulting from alignment with distinct morphological structures

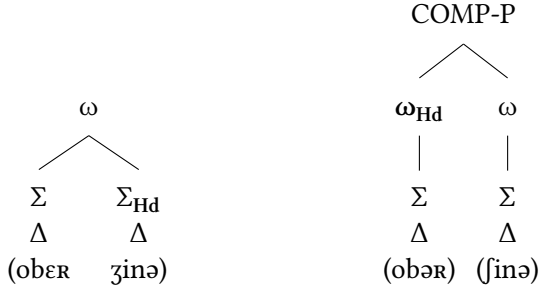


Figure 6: Right-oriented head alignment in phonological words versus left-oriented head alignment in compounds

Given the prosodic structures in Figure 5 the head alignment constraints in (7) pick out the rightmost foot in *Aubergine* (cf. Figure 6 left) and the leftmost phonological word in *Oberschiene* (cf. Figure 6 right), accounting for the accent patterns (primary versus secondary stress) stated in (5).

- (7) a. $\text{ALIGN}(\omega, R, \text{Head}(\omega), R)$
- b. $\text{ALIGN}(\text{COMP-P}, L, \text{Head}(\text{COMP-P}), L)$

The importance of morphological structure for an adequate mapping to prosodic constituents draws attention to the question of what exactly motivates the concept of a morphological compound. The presence of meaningful morphemes determining the meaning of the whole in a compositional fashion is neither sufficient nor necessary. The insufficiency is demonstrated by so-called root compounds, which may entirely consist of meaningful morphemes, yet form single phonological words. Consider the morphologically complex words in (8), which

are among the 173 words ending in *-(o)loge* characterized by consistent form-meaning recurrences (e.g., *X+loge* ‘expert in X’) listed in Muthmann (1989). Some of those words even include initial morphemes corresponding to free-standing words (*Ozean* ‘ocean’). All the same, their stress patterns reveal the application of the head alignment referring to the category ω , rather than COMP-P.

- (8) a. [zino'logə] Sin+o+log+e ‘sinologist’
- b. [ot^seano'logə] Ozean+o+log+e ‘oceanographer’

The assumption that internal stem boundaries necessarily align with phonological word boundaries along with the observation that the words in (8) form single domains of prosodic organization suggest that the complex words in question do not include separate stems. This in turn suggests that stem-boundaries are not inherent features of morphemes but rather are assigned to complex words due to conditions on morphological parsing. The string /ʃinə/ in the word *Oberschiene* qualifies as stem because it occurs in the rightmost position (see (6c)), and corresponds to an independent word /ʃinə/ *Schiene* ‘rail’, which is a hypernym of *Oberschiene*. The string /logə/ is not a stem because it does not correspond to an independent word, the string /ot^sean/ in (8b) is not a stem because it does not occur in the rightmost position of the complex word. There may be independent reasons to assume internal morphological constituents, perhaps *roots* (e.g., [[ot^sean]_Ro[log]_Rə]), to capture shared properties among the words in question. What matters is that the constraints aligning phonological word boundaries with morphological boundaries do not refer to them and the entire words are mapped into single phonological words (e.g., (ot^seano'logə)_ω). Root compounds do not yield prosodic compounds.¹³

Focusing now on the conditions under which a word is morphologically parsed into multiple stems there is evidence for various factors, including those listed in (9):¹⁴

- (9) a. Position of relevant string: rightmost (morphological head position)
- b. Status of relevant string: free (corresponding to a free-standing word)

¹³Wiese’s claim that each root forms a separate phonological word (Wiese 2000: 298) is refuted not only by evidence from stress but also syllable structure (e.g., the possible syllabification of a root-initial consonant in the coda when an obstruent follows as in /t̪ɛr.mɔs.tat/, *Thermostat* ‘thermostat’, /ho.rɔs.kop/ *Horoskop* ‘horoscope’, involving the possible roots [stat] and [skop], respectively.)

¹⁴The criteria in (9) are in part based on a study of four syllable words in Baayen et al. (1995). A more comprehensive study based on a much larger corpus will likely result in a considerable expansion of the list in (9), along with more information regarding the relative weight of those factors in connection with morphological parsing.

- c. Semantic relation between relevant string and compound: hyponymy
- d. Phonological form of potential stem forms: Ending in /ə+(R,L,n)/
- e. Phonological form of compound: violation of phonotactics (juncture-related)
- f. Phonological form of compound: form symmetry (reduplication)

The factors in (9a,b,c) have been mentioned in the preceding paragraph in connection with the stem status of *-schiene* in *Oberschiene*. Such cases where all three of those conditions are jointly satisfied, known as “endocentric” compounds, indicate regular internal stem structure manifest in robust left-oriented stress placement of main stress in German. The sufficiency of those conditions is illustrated by comparing the words in (10a) with (10b), none of which start with a string corresponding to a free-standing word. Moreover the words in each line exhibit somewhat similar syllable and foot structures. The systematic difference in the stress patterns, namely initial main stress in (10a) compared to main stress on the final trochee in (10b), appears then to be entirely due to the status as endocentric compounds of the words in (10a).¹⁵

- (10) a. Kárwòche ‘Holy Week’ (Woche ‘week’)
 Brómbèere ‘blackberry’ (Beere ‘berry’)
 Ménopàuse ‘menopause’ (Pause ‘pause’)
 Tsétsefliege ‘tsetse fly’ (Fliege ‘fly’)
- b. Kartóffel ‘potato’ (ʒ toffel)
 Trompéte ‘trumpet’ (ʒ pete)
 Menostáse ‘menostasis’ (ʒ stase, ʒ tase)
 Gelatíne ‘gelatin’ (ʒ tine)

Assuming that the parsing of words into morphological constituents must be exhaustive and provided that the respective preceding material does not correspond to a recognizable prefix,¹⁶ that material is classified as a stem as well.

¹⁵The claim that the relation between *Ménopàuse* and *Pause* is a case of hyponymy can be questioned as the meaning of *Pause* does not just involve the concept of cessation but typically also a return to some prior activity. The stress pattern of the compound can perhaps be seen as evidence that temporary cessation suffices here to establish hyponymy. By the same token, the string *-phrase* in *Periphráse* ‘periphrasis’ fails to qualify as a hyponym as a *Periphrase* ‘periphrasis’ is simply not conceptualized as some kind of *Phrase* ‘phrase’. Consequently, the word is parsed as a single stem, which forms a single phonological word, where main stress falls on the final trochee.

¹⁶The recognition of prefixes takes priority by the Elsewhere Condition.

Words decomposed into multiple stems are then classified as (morphological) compounds. The resulting morphological structures are illustrated in (11):

- (11) a. $[[k\alpha R]_{STM}[v\alpha\zeta\alpha]_{STM}]_{COMP-M}$ Karwoche ‘Holy Week’
 b. $[[k\alpha R't\alpha f\alpha l]_{STM}]_W$ Kartoffel ‘potato’
 c. $[[meno]_{STM}[pauz\alpha]_{STM}]_{COMP-M}$ Menopause ‘menopause’
 d. $[[men\alpha st\alpha z\alpha]_{STM}]_W$ Menostase ‘menostasis’

The isomorphic mapping of the morphological structures in (11) to prosodic structures yields the outputs in (12). The position of main stress then follows from the relevant head alignment constraints: right-oriented for single phonological words but left-oriented for regular compounds (see (7)).

- (12) a. $((k\alpha R)_{\omega Hd}(v\alpha\zeta\alpha)_{\omega})_{COMP-P}$ Karwoche ‘Holy Week’
 b. $(k\alpha R't\alpha f\alpha l)_{\omega}$ Kartoffel ‘potato’
 c. $((meno)_{\omega Hd}(pauz\alpha)_{\omega})_{COMP-P}$ Menopause ‘menopause’
 d. $(men\alpha s't\alpha z\alpha)_{\omega}$ Menostase ‘menostasis’

The relevance of hyponymy, rather than just the presence of a string corresponding to a free-standing word, is demonstrated by the cases in (13). Those in (13a) satisfy conditions (9a) and (9b), but clearly are not cases of hyponymy. The relevant assessment is more uncertain in (13b): the statement that a *Kilometer* is kind of a *Meter* is hardly acceptable, yet the relevant strings are semantically closely related and also have the same gender (masculine nouns).

- (13) a. $/\beta\epsilon rg\alpha'm\alpha t\alpha/$ Bergamotte ‘bergamot’ (\exists Motte ‘moth’)
 $/t^s\epsilon ntri'fug\alpha/$ Zentrifuge ‘centrifuge’ (\exists Fuge ‘joint’)
 b. $/kilo'met\alpha R/ \sim /'kilo,met\alpha R/$ Kilometer ‘kilometer’ (\exists Meter ‘meter’)
 $/t^s\epsilon nti'met\alpha R/ \sim /t^s\epsilon nti,met\alpha R/$ Zentimeter ‘centimeter’ (\exists Meter ‘meter’)

It is presumably the uncertainty concerning the question of what exactly qualifies as hyponymy which manifests in stress variation. Final main stress indicates a single phonological word, itself indicative of a single stem originating from the non-acceptance of *Kilometer* as a hyponym of *Meter*. Initial main stress originates in the acceptance of that hyponymy, which yields a morphological and prosodic compound structure.

- (14) a. $(\beta\epsilon rg\alpha'm\alpha t\alpha)_{\omega}$ Bergamotte ‘bergamot’
 b. $(kilo'met\alpha R)_{\omega} \sim ((kilo)_{\omega Hd}(met\alpha R)_{\omega})_{COMP-P}$ Kilometer ‘kilometer’

While (some sort of) hyponymy appears to be mostly sufficient for inducing left-oriented head alignment¹⁷ it is not a necessary condition. Consider the words ending in the string *-peter* in (15), where hyponymy clearly fails as that string corresponds only to a derogatory term for males or to the male name *Peter*. Yet the words in (15b) exhibit apparently stable initial main stress.¹⁸

- (15) a. /zal'petər/ Salpeter 'saltpeter'
 b. /'vakəlpetər/ Wackelpeter wobble.Peter 'jello'
 /'tʰigənpetər/ Ziegenpeter goat.Peter 'mumps'
 /'hakəpetər/ Hackepeter chop.Peter 'ground meat'

The relevant prosodic structures are shown in (16), one associated with right-oriented head alignment determining main stress in the phonological word *Salpeter*, the other with left-oriented head alignment determining the main stress in the compound *Wackelpeter* (see (7)).

- (16) a. (zal'petər)_ω Salpeter 'saltpeter'
 b. ((vakəl)_{ωHd}(petər)_ω)_{COMP-P} Wackelpeter 'jello'

The different prosodic structures in (16) draw attention to properties relevant for morphological parsing which pertain to the initial compound member. They indicate the possible significance of final schwa syllables, presumably connected to their typical restriction to stem-final position in German. This holds in particular for closed schwa syllables, which, along with other closed syllables containing tense vowels, diphthongs or coda clusters, are mostly confined to phonological word-final position in German. The words in (17), which clearly are not endocentric compounds and consist of more or less meaningless trochees only, support the significance of the presence of closed schwa syllables. The words in (17a), where feet end in closed schwa syllables, appear to be marked by a stable compound prosody, manifest in robust initial main stress, whereas the former compound in (17b) has been reanalyzed as a simple stem with main stress on the final trochee.

¹⁷There are rare cases like *Pfefferminze* 'peppermint', which is often pronounced with main stress on the final trochee despite being a hyponym of *Minze* 'mint'. Here initial main stress also occurs and is certainly acceptable. Cases like *Karfreitag* 'Good Friday', *Rosenmontag* 'Rose Monday', where initial main stress is unacceptable, differ in that the compounds are proper nouns, which inherently resist participation in hyponymy relations.

¹⁸These words have been attested for over a century where the original role of the constituent *Peter* is unclear according to German etymological dictionaries.

- (17) a. /'pʊmpəʁ,nɪkəl/ Pumpernickel 'pumpernickel'
 /'knɪkəʁ,bɔkəʁ/ Knickerbocker 'knickerbockers'
 b. /hɛlə'bɑrdə/ Hellebarde 'halberd'

The possible significance of phonotactic violations indicative of the presence of internal stem boundaries is supported by various additional cases exhibiting word-initial main stress. None of the words in (18) ends in a string which matches an independent word and some do not contain any independently recurring strings. Yet, all of these words exhibit seemingly stable prosodic compound structure, with main stress on the initial member:

- (18) a. Féldwèbel 'sergeant' (∃ Feld 'field', ∃ webel)
 Täusendsàssa 'jack-of-all-trades' (∃ tausend 'thousand', ∃ sassa)
 b. Quácksälber 'charlatan' (∃ quack, ∃ salber)
 Káulquàppe 'tadpole' (∃ kaul, ∃ quappe)

The parsing of the words in (18) as compounds is likely motivated by certain deviations from regular phonotactics. Specifically, the intervocalic clusters shown in the lefthand column in (19) are such that they violate word-internal phonotactic constraints (e.g., constraints against complex codas, against onsets with an insufficient sonority increase, against certain mismatches in voicing) but are consistent with the assumption of the internal phonological word boundaries shown in the middle column.

- (19) a. ∅ (...ldv...)_ω b. ((fɛld)_{ωHd}(vɛbəl)_ω) 'sergeant'
 ∅ (...ulkv...)_ω ((kaul)_{ωHd}(kvapə)_ω) 'tadpole'
 ∅ (...ndz...)_ω ((tauzənd)_{ωHd}(zasə)_ω) 'jack-of-all-trades'
 ∅ (...kz...)_ω ((kvak)_{ωHd}(zalbəʁ)_ω) 'charlatan'

The idea that certain violations of word-internal phonotactics might motivate a parsing of the word as a compound also accounts for the prosody of the root compounds in (20). All of those words are neuter nouns ending in the string *-meter* associated with a measuring device, preceded by a string which corresponds to a unit of measurement (e.g., *Var* 'var', *Ohm* 'ohm'). The stress on the final trochee in (20a) is expected, as *-meter* does not correspond to an independent word and the compounds are therefore not endocentric. The unexpected placement of main stress on the initial syllable in (20b) again correlates with phonotactic violations. Unlike the wellformed intervocalic cluster /ʁm/ the clusters /ltm/ or the geminate /mm/ violate German phonotactics. The assumption

that such violations motivate the decomposition of a word into a compound accounts then for the stress differences in (20), in particular, the placement of main stress on the initial syllable in (20b):

- (20) a. /ˌvɑrˌmɛtər/ Varmeter ‘varmeter’ (Var ‘var’)
 /ˌɑmˌpɛrˌmɛtər/ Amperemeter ‘amperemeter’ (Ampere ‘ampere’)
 b. /ˌvɒltˌmɛtər/ Voltmeter ‘voltmeter’ (Volt ‘volt’)
 /ˌoʊmˌmɛtər/ Ohmmeter ‘ohmmeter’ (Ohm ‘ohm’)

The relevant prosodic structures can be illustrated with $(\text{var}'\text{met}\text{ər})_{\omega}$ versus $((\text{vɔlt})_{\omega}\text{Hd}(\text{met}\text{ər})_{\omega})_{\text{COMP-P}}$, marked by left-oriented head alignment.

Yet another, more marginal, factor likely influencing morphological parsing concerns the presence of certain repetitions in the structure of words (cf. (9f)). This influence explains the presence of initial main stress in the words consisting of two similar trochees in (21a). The observation that main stress falls on the final trochee in (21b) indicates the relevance of the presence of final schwa syllables for morphological parsing (cf. (9d)).

- (21) a. /tɪŋəlˌtʌŋəl/ Tingeltangel ‘honky-tonk’
 /ˈpɪləˌpələ/ Pillepalle ‘trivia’
 b. /vɪʃɪˈvʌʃi/ Wischiwaschi ‘wishy-washy’

The relevant prosodic structures are then $((\text{tɔŋəl})_{\omega}\text{Hd}(\text{təŋəl})_{\omega})_{\text{COMP-P}}$, marked by left-oriented head alignment referring to regular compounds, versus the single phonological word $(\text{vɪ}^{\text{f}}\text{i}^{\text{v}}\text{a}^{\text{f}}\text{i})_{\omega}$, which is subject to right-oriented head alignment (see (7)).

A possible testing ground for exploring the relative weight of the various types of factors listed in (9) are data from loan word adaptation illustrated in (22). All of these words entered the language in the form of segment strings associated with a prominent foot at the word end. The adaptation of that prominence pattern in German indicates that some of these words were parsed as compounds, others as simplexes.

- (22) a. Old French attentát ⇒ [ˈatən, tət]_{N.NEUT}
 (ʒ atten, ʒ [tət]_{N.FEM} Tat ‘deed’)
 Attentat ‘assassination attempt’
 b. Old French aventure ⇒ [ˈabən, tɔiər]_{N.NEUT}
 (ʒ aben, ʒ [tɔiər]_A teuer ‘expensive’)
 Abenteuer ‘adventure’
 c. French pamplemousse ⇒ [ˈpampəl, muzə]_{N.FEM}
 (ʒ Pampel, ʒ muse)
 Pampelmuse ‘grapefruit’

- d. Dutch *appelsína* ⇒ [ap^fəl'zinə]_{N.FEM}
 (∃ Apfel 'apple', ∄ sine)
 Apfelsine 'orange'
- e. Latin *petrosílium* ⇒ [petər'ziliə]_{N.FEM}
 (∃ Peter, ∄ silie)
 Petersilie 'parsley'
- f. Italian *cavoli rápe* ⇒ [kol'rabi]_{N.MASC}
 (∃ Kohl 'cabbage', ∄ rabi)
 Kohlrabi 'cabbage turnip'
- g. Italian *intermézzo* ⇒ [intər'met^so]_{N.NEUT}
 (∃ inter 'inter', ∄ mezzo)
 Intermezzo 'interlude'

Consider the stress shift to the initial syllable in *Attentat*, which correlates with the accidental correspondence of the final string with the common German word *Tat* 'deed', which may have been accepted as a hypernym.¹⁹ The presence of the preceding foot ending in a closed schwa syllable, presumably a spelling pronunciation, may have further motivated the parsing of the word as a compound. The presence of internal closed schwa syllables is also a likely important factor for parsing the words *Ábenteuer* and *Pámpelmuse* as compounds. This parsing, indicated by the shift of the main stress to the initial syllable, correlates with the correspondence of the respective word-final strings to independent words (i.e. *teuer* 'expensive' and *Muse* 'muse'), which, however, are clearly not hypernyms. The relevance of the status of the final string is demonstrated by the remaining cases, none of which ends in a string corresponding to a free-standing word. Consider the cases of *Apfelsíne* and *Petersílie*, where stress remained on the penult, indicative of the parsing of the words as single stems. This is despite the presence of a word-initial string which ends in a closed schwa syllable and also corresponds to an independent word.²⁰ The likely importance of correspondence of the word-final string to some free-standing word is further supported by the persistence of penult main stress in *Kohlrábi* and *Intermézzo*. Here stress indicates the parsing of these words as a single stem, despite the presence of various cues indicative of morphological complexity (e.g., the presence of schwa or a tense vowel in

¹⁹This is not a clear case of endocentricity as the gender in the words *Attentat* and *Tat* does not match. Still, morphological parsing of *Attentat* with reference to the noun *Tat* 'deed' is supported by the formation of the agentive *Attentäter* 'assassin', which matches the regular agentive based on *Tat* (i.e. *Täter* 'culprit'). Further support comes from the historical plural form *Attentaten*, which matches the plural of *Tat* (*Taten* 'deeds'). (Eventually the plural was changed to *Attentate*, conforming to the regular plural ending for polysyllabic neuter nouns.)

²⁰The existence of other words for citrus fruit ending in the stressed string *-íne* (*Mandaríne* 'tangerine', *Klementíne* 'clementine') may also have stabilized the stress in *Apfelsíne*.

a closed syllable). The observation that similar violations appear to have been sufficient to motivate the parsing as a morphological compound elsewhere, as in *Káulquàppe*, may indicate the relevance of the final schwa syllable. The absence of a final string matching an independent word, along with the presence of the final full vowel, may exclude the parsing of *Kohlrábi* and *Intermézzo* as a compound in German.²¹

Summarizing the review of potential factors motivating the morphological analysis of a word as a compound, rather than as a single stem, all of the factors listed in (9) are likely to play some role. It appears that endocentricity is not a necessary prerequisite for the parsing of a word as a compound, as other factors, or perhaps certain combinations of factors, may also suffice to motivate internal stem structure. A finding of particular interest here is that the data support a top-down approach to morphological parsing. This is because the identification of relevant factors, including phonotactic violations, presupposes access to the complete word, not individual morphemes.

Focusing now on the topic of head alignment constraints it appears that the simple correlation established so far, left-oriented head alignment for compounds and right-oriented head alignment for simplexes (see (7)), is riddled with exceptions. Consider first the stress patterns in the apparent simplexes in (23), which indicate that the pattern of the final foot carrying main stress holds only for words consisting of (at least) two trochees (see (23a)). If the final foot contains only one syllable as in the trisyllabic words in (23b,c), the position of the head foot is determined lexically and is hence potentially contrastive.

(23) a. (fɾɪkə'dɛlə) _ω	b. (kəɾʊ'sɛl) _ω	c. (dɛt ^s i,bɛl) _ω
Frikadelle	Karussell	Dezibel
'meatball'	'merry-go-round'	'decibel'
(obɛɾ'zɪnə) _ω	(maga't ^s ɪn) _ω	(tɾampo,lin) _ω
Aubergine	Magazin	Trampolin
'eggplant'	'magazine'	'trampoline'
(ɪntəɾ'mɛt ^s o) _ω	(ɪntəɾ'val) _ω	(ɪntəɾ,viu) _ω
Intermezzo	Intervall	Interview
'interlude'	'interval'	'interview'

Trisyllabic words ending in /ə/, /ɛɾ/, or /ən/ also exhibit potential contrast regarding stress, where either the final trochee or the initial monosyllabic foot can

²¹The cases *Apfelsíne* and *Kohlrábi* also suggest that the restructuring of the initial string in analogy with semantically related existing words (e.g., *Apfel* 'apple' and *Kohl* 'cabbage') does not necessarily indicate recognition of stem structure. As was noted earlier in connection with the word *Ozeanologe* in (8b), the morphological parsing of a word is not determined by the inherent status of word-internal material.

form the head foot (see (24b,c)). Again, phonological words consisting of two trochees have stable main stress on the final syllable, regardless of their ending (see (24a)).

- | | | |
|------------------------------------|----------------------------|-----------------------------|
| (24) a. (ˌpantoˈmimə) _ω | b. (ʀeˈklamə) _ω | c. (ˈbroˌzamə) _ω |
| Pantomime | Reklame | Brosame |
| ‘pantomime’ | ‘advertising’ | ‘crumb’ |
| (ˌkandeˈlɒbər) _ω | (ʀɑˈbərbər) _ω | (ˈbɛʀˌzɛrkər) _ω |
| Kandelaber | Rhabarber | Berserker |
| ‘candelabra’ | ‘rhubarb’ | ‘berserk’ |

Dependencies of phonological regularities on particular contexts as in (23) or (24) actually support the assumption of head alignment constraints as in (7). This is because such dependencies lend themselves to modeling in terms of ranked constraints in a framework such as Optimality Theory, where grammar consists of constraint interaction.²²

The relevant stress patterns support not only the notion of head alignment, conceived of as a violable constraint, but also the assumption of the two distinct head alignment constraints in (7). The two constraints differ not only with respect to the constituent targeted for alignment and in their orientation (right-versus left-oriented) but also in the way they interact with other constraints. For “regular” compounds consisting of two members it holds that main stress always falls on the initial member, regardless of its size or phonological structure. The relevant head alignment constraint is hence undominated by phonological markedness, unlike the head alignment constraint operating within phonological words.

To capture the regularities pertaining to the position of main stress in words it is not only necessary to distinguish compounds from simplexes (and consider the internal foot structure in simplexes, see (23), (24)), but also to distinguish among various types of compounds. In particular there are two special compound types, “copulative” and “phrasal”, which both associate with head alignment referring to their rightmost margin. The classification of all three compound types originates from differences in morphological structure, which are mapped to the respective prosodic constituents as shown in (25) (COPCOMP = copulative compound, PHRASCMP = phrasal compound):

²²The relevant analysis would invoke faithfulness constraints requiring preservation of head feet in input forms, which make their force felt in the respective three-syllable words in (23/24b,c), but not in phonological words consisting of two trochees as in (23/24a), where markedness constraints prevail.

- (25) COPCOMP-M \Rightarrow COPCOMP-P
 PHRASCOMP-M \Rightarrow PHRASCOMP-P
 COMP-M \Rightarrow COMP-P
 W \Rightarrow ω

The segmental material of a given string may allow for various morphological parsings, which raises the question of how to resolve potential conflicts. Here the Elsewhere Principle comes into play, meaning that more specific conditions take precedence over less specific ones. *Copulative compounds* are characterized by the most specific condition in that the relation between all members is restricted to the effect that all must be equal in certain ways (see Section 4). *Phrasal compounds* are defined by a range of relations between its members, where all of those relations are “phrasal” in some sense to be made explicit (see Section 5). *Regular compounds* are mostly endocentric but can lack semantic restrictions altogether (cf. cases like *Abenteuer*, *Kaulquappe* discussed above). The more specific conditions motivating the parsing of a word into stems, as opposed to parsing it as a single stem, have been demonstrated in some detail in this section. The order among the four morphological categories in (25) then mirrors the level of restrictedness pertaining to the conditions on morphological parsing, with the most specific type listed first (i.e. copulative compounds) and the default listed last (simplexes).²³

In ending this section, I will briefly draw attention to the occurrence of idiosyncratic stress properties in compounds, such as final main stress in compounds ending in *pie* in English (e.g., *apple-pie*, *meat-pie* versus *apple cake*, *méatball*). These could be captured by marking relevant stems as head constituents in the lexicon, where this marking requires alignment with a margin position in the relevant compound. Hence, *pie* associates with main stress only when occurring in the rightmost position of a compound, not as an inherent property of that stem. Interestingly, such cases motivating the diacritic marking of lexical items as compound heads, while somewhat common in English (Fudge 1984: 144–149), appear not to exist in German.

²³Evidence in support of the distinctions among the categories in (25) argues against the alternative representations of the relevant complex words in terms of so-called *recursive phonological words*. Such structures have been advocated by McCarthy & Prince (1993: 6) and Ito & Mester (2009), where the prosodic difference between for instance *Aubergine* versus *Oberschiene* would be represented as (obɛɹʒinə) ω versus ((obɛɹ) ω (ʃinə) ω) ω instead. Adequate reference to the sort of distinct prosodic domains motivated by the properties mentioned above could be achieved only by employing various diacritics, which would then amount to a notational variant of the prosodic categories in (25). For relevant discussion see (Nespor & Vogel 2007: xvii), (Vogel 2010: 150–152).

4 Copulative compounds

Copulative compounds are characterized by a structure which can be exhaustively parsed into two or more stems which are “on equal footing” (Bauer 2017: 83).²⁴ The expression “on equal footing” captures the essence of copulative compounds, which are restricted to the effect that each member must exhibit the same relation to the respective mother constituent. This entails that members may not differ regarding their category (e.g., no combinations of adjective and noun stems) and must belong to the same lexical field (e.g., only color terms, only certain kinds of names (for instance, only river names)). The possibility that all members are meaningless also exist, where shared properties concern phonology (e.g., only syllables starting with the same onset consonant as in English *tic-tac-toe*). Copulative compounds may include any number of members arranged in a strictly flat structure. Main stress associates systematically with the final member, perhaps a cross-linguistic property of such compounds. This restriction is captured by the right-oriented head alignment constraint in (26), distinct from the left-oriented constraint associated with regular compounds (cf. (7)).

(26) ALIGN(COPCOMP-P, R, Head(COPCOMP-P), R)

The head alignment constraint as stated in (26) draws attention to the fact that the terms “copulative” or “coordinative” compound are frequently used to refer to words with initial main stress such as *Mäntelkleid* ‘coat dress’ or *Dichtermal* ‘poet painter’ in German (cf. Ortner & Ortner 1984). Assuming the validity of the head alignment constraint in (26) this raises the question of whether relevant forestressed compounds differ independently from those with stress on their final member. I will argue that such differences exist, pertaining to semantics but also to (segmental) phonology. This section aims then to identify necessary and sufficient conditions for motivating the classification of words as “copulative” in German. The study focuses first on conditions pertaining to free-standing compounds, followed by cases where a (copulative) compound appears embedded as the first member in a complex compound.

Correlations between stress and meaning differences relevant to the question of how to delineate copulative compounds in German can be illustrated with words consisting of combinations of color adjectives. Compare the compound with final stress in (27a) with that in (27b), which exhibits initial stress:

²⁴Bauer writes: “...contains two elements which are on equal footing, not one which is subordinate to the other...The wording “contains two” is inaccurate here in that it allows for additional (non-equal) material to be included in such a compound and also wrongly excludes the possibility of copulative compounds consisting of three or more members.

- (27) a. Die griechische Fahne ist *blauwéi*.
'The Greek flag is blue and white.'
b. Ihre Augen sind *gráu*grün.
'Her eyes are gray-green.'

The color term compounds in (27) have been noted to differ in that in (27a) the individual members associate with distinct entities (e.g., distinct stripes in the flag) while those in (27b) refer to a single entity²⁵, yielding some sort of modifying reading: 'grayish green eyes' (Pümpel-Mader et al. 1992: 44).²⁶ These data suggest then that only the compound with final main stress, *blauwéi*, qualifies as copulative. This is because the modifier versus head roles attributed to the two compound members in the fore-stressed compound *gráu*grün indicate an asymmetry which does not fit the notion of a copulative compound.

The question is then which property ultimately distinguishes the two compound types in (27) and determines the difference in stress. Taking the descriptions of the semantic differences stated above as a point of departure, the relevant difference could pertain to properties of referents, that is, their lending themselves to some sort of dissection into mutually exclusive parts, each to be associated with one of the compound members.²⁷ Such an approach would be odd in that it implies a dependence of morphological classification on properties pertaining to the physical characteristics of entities in the extralinguistic world.

The other difference mentioned, namely the asymmetry associated with the modifier-head roles, is a more plausible route to finding factors relevant to determining morphological categorization. The asymmetry in question appears to be connected to the relation between the compound and its rightmost member, which is hyponymic in the case of *grau*grün 'gray-green', but not in the case of *blau*wei 'blue and white'. That is, *grau*grün can be considered a kind of green but *blau*wei cannot be considered a kind of white. Assuming that there is a natural preference for interpreting a compound as a hyponym of its semantic head constituent (i.e. in German the member in rightmost position), and assuming further that the recognition of such a relation tends to relegate the preceding

²⁵I.e. a pair of eyes, or rather the respective irises.

²⁶The authors do not mention the correlation between the relevant semantic differences and differences in stress. Those are attested for instance in the transcriptions in the online *Duden* dictionary, where *grau*grün is transcribed with only the initial syllable marked for stress, while the representation of *blau*wei includes stress marks for both syllables (<https://www.duden.de>). The marking of both members for stress is the general convention adopted there for representing final stress in two-member compounds.

²⁷See the notion of "heteroreferential" versus "homoreferential" compounds discussed by Renner (2008: 608).

member to a subordinate status, it follows that hyponymy hinders the classification of a compound as copulative. The classification as a regular compound ensues by default, resulting in initial main stress in *gráugrün*, analogous to other endocentric compounds where the initial constituent functions as modifier such as *hállgrün* ‘light green’ or *ápfelgrün* ‘apple green’.

The classification of a compound as copulative is then possible only if hyponymy fails and, moreover, the relevant daughter constituents are assessed to be “on equal-footing” (for instance, all are color adjectives). These conditions are met in the compound *blauweiß* ‘blue-white’, which consequently is subject to right-oriented head alignment manifest in final main stress (*blauwéiβ*).

The two relevant claims are then that there is a preference for interpreting a compound as endocentric (as long as it can be construed as a hyponym of its semantic head constituent) and that German grammar does not allow “double-endocentric” compounds. As for the analysis of given words, this approach results in compounds with stress on the initial member functioning as a modifier, whenever the hyponymy in question can be established. For instance, the compound *Königinmutter* ‘queen mother’ denotes a kind of *Mutter* ‘mother’ meeting the requirement that the compound is a hyponym of its semantic head constituent, which results in the classification as a regular compound manifest in stress on the initial member.²⁸ When creating novel words “double-endocentricity” is avoided in German by resorting to syntax. To express the concept of a *hunter-gatherer*, meant to convey the notion of someone being both a *hunter* and a *gatherer* in equal measure, the conjunction *und* is employed *Jäger und Sammler* or *Sammler und Jäger*, consisting of the nouns (*Jäger* ‘hunter’ and *Sammler* ‘gatherer’). German differs then from English, where *queenmóther* has final stress and the compound *hunter-gátherer* does apparently convey an equal semantic status between the compound members.²⁹

The assumption of a categorical difference between the two compound types illustrated in (27) is also manifest in the sequencing of the members. Endocentric compounds in German (or English) are characterized by the presence of the semantic head in the rightmost position whereas the order among the members of copulative compounds is determined by the respective inherent properties of

²⁸The compound *Königinmutter* is clearly not double-endocentric, in fact, the referent cannot be a monarch herself. The particular modification which has lexicalized here according to dictionaries is that *Königinmutter* designates the mother of a reigning monarch, who can be female or male.

²⁹English appears to resist the formation of adjective compounds characterized by “equal-footing”, regardless of possible hyponymy (e.g., *gray-green*, where *gray* modifies, but *black and white*, *sweet and sour*).

each member and relevant asymmetries. That is, the order between the members *grau* and *grün* in word-formation hinges on the intended meaning, *graugrün* is chosen to express a shade of green while *grüngrau* is chosen to express a shade of gray. By contrast, the order between *blau* und *weiß* is determined by relevant inherent properties of the individual members, including perhaps a principle that the darker color precedes the lighter one (*schwarzweiß* ‘black and white’, but ?*weißschwarz*). A potential phonological asymmetry pertains to syllable count such that the member with fewer syllables comes first (e.g., *weiß-rosa* ‘white-pink’ may be preferred to *rosa-weiß*, see below).

The claim that endocentricity blocks the classification of a compound as copulative in German will be further examined with respect to the words in (28). They all are composed of some sort of cohyponyms, therefore meeting a prerequisite for the classification as a copulative compound. Those in (28a) can be considered hyponyms of the concept *garment*, those in (28b) could belong to a hypernym defined by a high ranking position, those in (28c) are hyponyms of professions associated with art. The compounds in (28d) consist of adjective combinations, each associating with a common hypernym, those in (28e) consist of antonyms, again associated with a common hypernym.³⁰

- (28) a. Strümpfhose ‘pantyhose’ (Strumpf ‘stocking’ + Hose ‘pants’)
Mantelkleid ‘coatdress’ (Mantel ‘coat’, Kleid ‘dress’)
- b. Fürstbischof ‘Prince Bishop’ (Fürst ‘prince’, Bischof ‘bishop’)
Prinzgemahl ‘husband of a governing monarch’ (Prinz ‘prince’ + Gemahl ‘husband’)
- c. Mälerdichter ‘painter-poet’ (Maler ‘painter’ + Dichter ‘poet’)
Dichterkomponist ‘poet-composer’ (Dichter ‘poet’ + Komponist ‘composer’)
- d. táubstumm ‘deafmute’ (taub ‘deaf’ + stumm ‘mute’)
dúmmdreist ‘impudent’ (dumm ‘dumb’ + dreist ‘brash’)
láuwarm ‘lukewarm’ (lau ‘mild’ + warm ‘warm’)
násskalt ‘dank’ (nass ‘wet’ + kalt ‘cold’)
- e. Hássliebe ‘love-hate relationship’ (Hass ‘hate’ + Liebe ‘love’)
Fréundfeind ‘frenemy’ (Freund ‘friend’ + Feind ‘enemy’)

³⁰In English, too, the corresponding compounds are cited as examples for copulative compounds, and indeed several of them are end-stressed (e.g., *deafmúte*, *painter-póet*) (Olsen 2000: 61). This is in accordance with the above-mentioned possibility that English does allow for double-endocentric compounds, classified as copulative and therefore receiving final stress.

A consultation of a standard dictionary (<https://www.duden.de/>) confirms both the presence of a hyponymy relation and main stress on the initial member. In most cases, an asymmetry to the effect that the initial member functions as a modifier is supported as well, such as *Mantelkleid* '(Kleid) 'dress' tailored like a coat' (not a coat tailored like a dress), *Fürstbischof* '(Bischof) 'bishop' with the rank of a prince' (not a prince who also works as a bishop), *Prinzgemahl* 'Gemahl 'husband' of a reigning monarch' (not some sort of prince), *taubstumm* '(stumm) 'mute' as a result of being born deaf'.³¹

It is true that several of the definitions given in (28c) and (28e) do indicate an interpretation characterized by 'equal-footing' among the members. For instance, *Málerdichter* is defined as someone who is both a painter and a poet (<https://www.duden.de/rechtschreibung/Malerdichter>). One may wonder if this definition is influenced by those of corresponding compounds in English, which have final stress and possibly are truly copulative. A somewhat random search of relevant data in the internet does indicate an asymmetry, where *Malerdichter* 'painter-poet' differs from *Dichtermaler* 'poet-painter', depending on which role is considered more central with regard to the referent in question.³²

My skepticism concerning the adequacy of the truly 'equal-footing' readings provided by (<https://www.duden.de/>) also pertains to the cases of antonymy in (28e), including the definition of *Hassliebe* as 'a strong emotional bond that alternates between hate and love'. In my view the proposition that *Hassliebe* is a kind of *Liebe* 'love' seems far more adequate than the proposition that *Hassliebe* is a kind of *Hass* 'hatred'. Here, too, the dictionary definition in German may have been influenced by the corresponding expression in English, *love-hate relationship*, where the compound *love-hate* is embedded and therefore automatically interpreted on equal footing (see the discussion below (46)).

Turning now to the conditions for classifying a compound as copulative in German it was argued that the case of *blau-weiß* indicates the relevance of two prerequisites: failed hyponymy in the relation between the compound and its rightmost daughter (i.e. exocentricity) and shared properties among the members (in this case their status as cohyponyms of the concept *color term*). Consider the additional data in (29), all of which exhibit stress on their final member and meet the requirement of shared structure between the respective members.

³¹For discussion of these compounds and arguments against their classification as copulative, see also Becker (1992).

³²Compare the use of the compound *Dichtermaler* ending in *Maler* in reference to *Oskar Kokoschka*, a well-known painter who also produced some literary work (<https://oe1.orf.at/artikel/216337/Wenn-Dichtermaler-malerdichten>) to that of the compound *Malerdichter* ending in *Dichter* referring to *Max Jacob*, who in the French Wikipedia article is described as a 'modernist poet and novelist but also a painter' (https://fr.wikipedia.org/wiki/Max_Jacob).

- (29) a. *südwést* ‘southwest’ (*süd* ‘south’ + *west* ‘west’)
b. *rot-gélb* ‘red-yellow’ (coalition of the party represented by the color *rot* (social-democrats) and that represented by the color *gelb* (liberals))
c. *feuchtkált* ‘cold and humid’ (*feucht* ‘humid’ + *kalt* ‘cold’)
feuchtwárm ‘warm and humid’ (*feucht* ‘humid’ + *warm* ‘warm’)
d. *manisch-depressív* ‘manic-depressive’
passiv-aggressív ‘passive-aggressive’
e. *Marxismus-Leninísmus* ‘Marxism-Leninism’

The failure of hyponymy in *südwést* is evident as *southwest* can hardly be considered a kind of *west*. This assessment relates to the fact that *west* is not a kind of direction, rather, *west* is a member of a set of items constituting the inventory of direction terms. Such expressions, being defined by their place in some sort of nomenclature, appear to have a name-like status which insulates them from participation in hyponymic relations.

It is then the exocentric status of the compound *südwést*, along with the fact that all sisters are on a par (i.e. both *süd* and *west* belong to the inventory of direction terms in question), which motivates the classification of the compound as copulative. Right-oriented head alignment results, manifest in final main stress (*südwést*).³³

The relevant effect is also seen in (29b), where the two color terms each refer to a German political party and the compound refers to a coalition among the two parties. Here the color terms serve as names, which resist functioning as hypernyms.³⁴

The observation that final stress is somewhat less robust in (29c) correlates with the less clear status of the relevant compound members (e.g., *feucht*, *kalt*), which only tenuously qualify as part of a nomenclature of adjectives referring to climate.³⁵ Final main stress appears to be more natural in the phrase *feuchtkáltes*

³³Note also that the order among the members in the respective compounds has nothing to do with potential modifier-head roles but is determined by inherent properties and relevant asymmetries (in this particular case the (arbitrary) convention that expressions pertaining to latitude (*north*, *south*) precede those pertaining to longitude (*east*, *west*)).

³⁴This effect may also be at play in the analysis of the compound *blauweiß* in (27). That is, the classification as a copulative compound might be due to the conception of *blau* and *weiß* as basic color terms belonging to a (more or less) fixed inventory, rather than being conceived as parts of a spectrum where they are subject to modification. On that view, the different morphological analyses of the compounds in (27) reflect differences in the conceptions of the color terms, presumably influenced by the nature of the color combinations in question.

³⁵The compound is transcribed with final stress in <https://www.duden.de/rechtschreibung/feuchtkalt>, but with initial stress only in <https://de.wiktionary.org/wiki/feuchtkalt>.

Klima ‘humid-cold climate’ than in the phrases *feuchtkalte Hand* ‘moist-cold hand’ or *nasskaltes Wetter* ‘wet-cold weather’, which do not evoke the sense of the compound members belonging to a fixed nomenclature. The observation that final stress in phrases like *feuchtkältes Klima* is still far less robust than final stress in for instance *südwést* can then again be linked to the semantic relations in question: *feuchtkalt* is more easily conceptualized as a hyponym of *kalt* than *südwést* being viewed as a hyponym of *wést*.

Stress variation also characterizes the compounds in (29d),³⁶ whose members belong to an inventory of psychological terms used to describe pathological states of mind but could also be viewed as regular adjectives. Here an additional factor motivating the classification of a compound as copulative may come into play, pertaining to formal similarities between the respective members. The occurrence of (Latinate) suffixes may be relevant there, especially that of identical suffixes as in (29e). Another type of similarity linked to final stress is seen in (30), namely, alliteration, as the respective members start with the same phoneme.

- (30) süßsáuer ‘sweet and sour’ (süß ‘sweet’ + sauer ‘sour’)
 hübsch-hässlich (hübsch ‘pretty’ + hässlich ‘ugly’)
 feuchtfröhlich (feucht ‘moist (referring to the consumption of alcohol)’ +
 fröhlich ‘cheerful’)

The potential relevance of alliteration or other shared structural properties (e.g., identical affixes) as a factor motivating the classification of compounds as copulative makes sense as “sameness” (“equal footing”) among members is the central characteristic of such compounds. Yet another phonological factor which appears to correlate with final stress concerns the ordering among compound members in accordance with syllable count (fewer before more syllables). This pattern is also natural in that the placement of longer compound members in the final position results in a congruence between (main) stress and (maximal) size.³⁷

³⁶Cf. the transcription with final stress in <https://www.duden.de/suchen/dudenonline/manisch-depressiv> versus that with initial stress only in (<https://de.wiktionary.org/wiki/passiv-aggressiv>).

³⁷The impact of the phonological factors on the classification of compounds is likely strongest when various factors align, such as alliteration and sequencing in accordance with syllable count in the case of *süßsáuer* ‘sweet and sour’. Here final stress is rather robust, despite the fact that the compound might be considered some sort of hyponym of its rightmost member. When none of these factors apply, comparable compounds are prone to be pronounced with initial stress as in *bittersüß* ‘bittersweet’, cf. <https://en.wiktionary.org/wiki/bitters%C3%BC%C3%9F>, which indicates the parsing of that word as a regular compound. Possible pronunciations with initial stress are also expected in cases such as *feucht-fröhlich*, where relevant phonological factors align, but the compound members fail to share semantic properties <https://de.wiktionary.org/wiki/feuchtfr%C3%B6hlich>.

The conditions pertaining to structural similarities between compound members discussed here likely play a role in motivating the classification of a compound as copulative but differ substantially from the condition named earlier, namely the unequivocal status of compound members as proper nouns. This is because proper nouns do not participate in hyponymies, thereby firmly establishing the status of a compound as exocentric. Coupled with shared properties among the compound members (e.g., all forenames in (31a), all names of territories in (31b), and all last names referring to individuals in (31c)) such compounds are characterized by robust stress on their final member, regardless of their respective phonological forms:³⁸

- (31) a. Marie-Luise (two female first names, used as double-name)
 Ann-Kathrin (two female first names, used as double-name)
 Klaus-Dieter (two male first names, used as double-name)
- b. Schleswig-Hólstéin (two names of territories associated with a single German state)
 Baden-Wúrttemberg (two names of territories associated with a single German state)
 Nordrhein-Westfálen (two names of territories associated with a single German state)
- c. Daimler-Bénz (two last names of company founders referring to a single corporation)
 Magirus-Déutz (two last names of company founders referring to a single corporation)
 Klöckner-Humboldt-Déutz (three last names of company founders referring to a single corporation)

The two compounds in (32), one copulative, the other regular, illustrate the isomorphic mapping of the relevant distinct morphological structures to the corresponding prosodic compounds, which form the basis for applying the respective left- versus right-oriented head alignment constraints.

- (32) a. [[daimlƏR]_{STM}[bɛnt^s]_{STM}]_{COPCOMP-M}
 b. [[mɔlƏR]_{STM}[dɪçtƏR]_{STM}]_{COMP-M}

³⁸Here, too, the sequence among the members is typically determined by syllable count, such that the shorter member comes first. The few counter-examples to this generalization found in a website listing fifty double-names (<https://www.familie.de/schwangerschaft/vornamen/die-50-schoensten-doppelnamen-fuer-jungen-und-maedchen/>) appear to be borrowed already as double-names from other languages (e.g., *Mary Lou*). The only exception to this rule I know of concerns the names of German companies as in (31c), where the sequence among the members, all referring to male company founders, possibly favors a masculine cadence.

- (33) a. ((daimlæR)_ω(bɛnt^s)_{ωHd})_{COPCOMP-P}
 b. ((mälæR)_{ωHd}(dɪçtæR)_ω)_{COMP-P}

The most common type of copulative compound in German involves expressions known as letter names, each of which associate with individual letters of the alphabet (e.g., [ve] ‘W’, [ge] ‘G’). Consider the words in the left-hand column in (34), which can be decomposed exhaustively into stems corresponding to a letter name each (see the right-hand column in (34)). The regular classification of such words as copulative compounds in German is manifest in systematic main stress on the word-final syllable.

- (34) a. [ve'ge] <WG> [[ve]_{STM}[ge]_{STM}]_{COPCOMP-M}
 b. [ɛsɛm'fau] <SMV> [[ɛs]_{STM}[ɛm]_{STM}[fau]_{STM}]_{COPCOMP-M}
 c. [øpeɛn'fau] <ÖPNV> [[ø]_{STM}[pe]_{STM}[ɛn]_{STM}[fau]_{STM}]_{COPCOMP-M}
 d. [kapedeɛs'u] [[ka]_{STM}[pe]_{STM}[de]_{STM}[ɛs]_{STM}[u]_{STM}]_{COPCOMP-M}
 <KPdSU>
 e. [abe't^se] <ABC> [[a]_{STM}[be]_{STM}[t^se]_{STM}]_{COPCOMP-M}

The cases in (34a–d) differ from that in (34e) regarding the morphosyntactic properties of the compound. The letters in the acronyms in (34a–d) are determined by correspondence with the initials given in the respective source expressions, whose morphosyntactic head determines the gender of both the complete expression (cf. the lefthand column in (35)) and of the corresponding letter compound (cf. the righthand column in (35)). By contrast, the compound in (34e) is due to independent conventions pertaining to the listing of letter names, whose inherent gender (always neuter) determines the category of the letter compound (see (35e)).

- (35) a. **Wohngemein[schaft]**_{N.FEM} **WG]**_{N.FEM}
 ‘shared apartment’
 b. **Schüler#mitverwalt[ung]**_{N.FEM} **SMV]**_{N.FEM}
 ‘student representation’
 c. **Öffentlicher Personen#nah[verkehr]**_{N.MASC} **ÖPNV]**_{N.MASC}
 ‘public transportation’
 d. **Kommunistische Part[ei]**_{N.FEM} **KPdSU]**_{N.FEM}
 der Sowjetunion
 ‘Communist party of the Soviet Union’
 e. [a]_{N.NEUT} [be]_{N.NEUT} [t^se]_{N.NEUT} **ABC]**_{N.NEUT}

Differences pertaining to the creation of letter compounds illustrated in (35) will not affect the classification of morphological compounds proposed here, which is determined by particular parsing strategies based on complete words.³⁹ Those strategies focus on decomposing the word into stems, establishing the status of the compound as endo- versus exocentric based on hyponymy, and on assessing similarities between the respective members. All of the words in the left-hand column in (34) will be parsed in a parallel fashion, resulting in identical types of morphological structures, namely the copulative compounds shown in the righthand column in (34), which are mapped to the corresponding prosodic domains in (36). Alignment of internal stem boundaries with phonological word boundaries results in separate syllabification domains, manifest in the association of stem final consonants with the syllable coda, even when a vowel follows, as in /ɛs.ɛm.fau/⁴⁰. Right-oriented head alignment associated with copulative compounds captures the fact that main prominence always falls on the very last member, regardless of the respective total number of members.⁴¹

(36)	a.	((ve) _ω (ge) _{ωHd}) _{COPCOMP-P}	WG
	b.	((ɛs) _ω (ɛm) _ω (fau) _{ωHd}) _{COPCOMP-P}	SMV
	c.	((∅) _ω (pe) _ω (ɛn) _ω (fau) _{ωHd}) _{COPCOMP-P}	ÖPNV
	d.	((ka) _ω (pe) _ω (de) _ω (ɛs) _ω (u) _{ωHd}) _{COPCOMP-P}	KPdSU
	e.	((a) _ω (be) _ω (t ^s e) _{ωHd}) _{COPCOMP-P}	ABC

The claim that the exhaustive parsability of a given word into ‘equivalent’ strings along with failed hyponymy sufficiently motivate the classification of a compound as copulative is demonstrated further in (37). Here one condition for the classification of compounds as copulative, namely that all members must be on equal footing, is evidently satisfied by the exhaustive decomposability of the word into homophonous meaningless strings.⁴² The exocentricity condition is satisfied as well, as meaningless strings necessarily fail to engage in hyponymy. Main stress on the final member is rather robust in such cases, deviating strik-

³⁹Letter name compounds illustrate the quintessential failure of hyponymy (a *WG* is not some kind of *G*) along with the clear equivalence among all compound members (all correspond to letter names).

⁴⁰This syllable structure is supported by the potential glottalization affecting both instances of the vowel /ɛ/, due to their respective positions in the initial position of a phonological word (i.e. ((ɛs)_ω(ɛm)_ω(fau)_ω)_{COPCOMP-P}))

⁴¹Initial stress as in *LKW* (< *Lastkraftwagen* ‘truck’) is due to (historical) prosodic fusion of the former compound ((ɛl)_ω(ka)_ω(ve)_{ωHd})_{COPCOMP-P} into a single phonological word (‘ɛlka,ve)_ω. Here initial main stress reflects the previous rhythmic secondary stress (see Raffelsiefen (2022b: 102))

⁴²Meaninglessness follows from the fact that the relevant strings do not recur in other contexts.

ingly from the unmarked organization of disyllabic words as trochees in German.⁴³

- (37) a. Tamtám
 ‘ballyhoo’
 b. Töfftöff
 ‘motorized vehicle (children’s speech)’
 c. plemplém
 ‘cuckoo’
 d. ballabálla
 ‘cuckoo’

The claim that the analysis as a copulative compound is determined not only by stem homophony but also by failed hyponymy rests on the cases of so called REAL-X reduplication in (38), a construction characterized by a simple repetition of content words.⁴⁴

- (38) a. Freund-freund
 ‘friend-friend’ (a real friend, not a Facebook friend)
 b. jetzt-jetzt
 ‘now-now’ (really now, not earlier or later)
 c. hier-hier
 ‘here-here’ (really here, not just close to here)
 d. Buch-buch
 ‘book-book’ (a real paper book, not an e-book)

Referring to similar data in English and Spanish, Horn (1993: 48) notes that reduplication as in (38) induces a modifying reading, narrowing the set of potential referents to those representing the “real” cases. The relation is thus clearly hyponymic (e.g., a *Freundfreund* is in fact a prototypical kind of *Freund*), which rules out the categorization of the compound as copulative. The classification as

⁴³Words associated with children’s speech are special in that stress tends to vary, particularly when the word consists of two open syllables. Initial stressed syllables can appear ambisyllabically closed here, resulting in a lax stressed vowel no longer homophonous with the final vowel (e.g., /pi’pi/, /’pipi/, or /’pipi/ *Pipi* ‘pee’, /po’po/, /’popo/ or /’pɔpo/ *Popo* ‘popo’). Other exceptions are loanwords, where the stress is adopted from that given in the donor language (e.g., /’gaga/ *gaga* from English /’gaga/ *gaga*). The persistence of stress in borrowings also follows from the Elsewhere Condition, as already specified foot structure takes precedence over respective structures created from scratch.

⁴⁴The construction appears to have been borrowed into German, where it has become somewhat productive (cf. Freywald 2015).

a regular compound by default results. The analysis of the relevant two cases is illustrated in (39), where the isomorphic mapping along with the distinct head alignment constraints yield the distinct stress patterns:

- (39) a. $[[\text{tam}]_{\text{STM}}[\text{tam}]_{\text{STM}}]_{\text{COPCOMP-M}} \rightarrow ((\text{tam})_{\omega}(\text{tam})_{\omega\text{Hd}})_{\text{COPCOMP-P}}$
 b. $[[\text{fr}\text{ɔ} \text{ind}]_{\text{STM}}[\text{fr}\text{ɔ} \text{ind}]_{\text{STM}}]_{\text{COMP-M}} \rightarrow ((\text{fr}\text{ɔ} \text{ind})_{\omega\text{Hd}}(\text{fr}\text{ɔ} \text{ind})_{\omega})_{\text{COMP-P}}$

The assumption that the exhaustive decomposability of a given word into identical meaningless strings is sufficient to motivate a status as a copulative compound in German is supported by the stress patterns of certain shortened forms. The examples in (40) illustrate a productive rule of abbreviating morphologically complex expressions by retaining only the initial string of given stems, up to and including the first syllable nucleus (so-called *Silbenkurzwörter*). In abbreviations consisting of three open syllables main stress falls regularly on the penult as in (40a), under certain phonological conditions also on the initial syllable as in (40b). The single case where this type of shortening exhibits final main stress is shown in (40c):

- (40) a. **Hasel#nuss#tafel** \rightarrow $[\text{ha}'\text{nuta}]$ ⟨Hanuta⟩
 ‘hazelnut bar’ (TM candy)
 b. **Hans Riegel, Bonn** \rightarrow $[\text{'ha} \text{ri} \text{bo}]$ ⟨Haribo⟩
 ‘(name of individual), (city name)’ (TM candy)
 c. **Rowohlt Rotations#romane** \rightarrow $[\text{ro} \text{ro}' \text{ro}]$ ⟨rororo⟩
 ‘(name of individual) rotation novels’ (TM publishing company)

The stress patterns shown in (40a,b) indicate that the entire (trisyllabic) shortening forms a single domain for syllabification and foot formation. The final two syllables are organized as a trochaic foot, unless the string in question violates certain markedness constraints, in which case the first two syllables form a foot (see Raffelsiefen (2022b: 91–92)). Head alignment then picks out the rightmost binary foot. The only potential source for main stress on a final syllable is the analysis of the word as a copulative compound where all syllables, including the last, form separate phonological words as is shown in (41c).⁴⁵

- (41) a. $[[\text{hanuta}]_{\text{STM}}]_{\text{W}}$ $(\text{ha}(\text{nuta})_{\Sigma\text{Hd}})_{\omega}$
 b. $[[\text{haribo}]_{\text{STM}}]_{\text{W}}$ $((\text{ha} \text{ri})_{\Sigma\text{Hd}}(\text{bo})_{\Sigma})_{\omega}$
 c. $[[\text{ro}]_{\text{STM}}[\text{ro}]_{\text{STM}}[\text{ro}]_{\text{STM}}]_{\text{COPCOMP-M}}$ $((\text{ro})_{\omega}(\text{ro})_{\omega}(\text{ro})_{\omega\text{Hd}})_{\text{COPCOMP}}$

⁴⁵In the regular vocabulary there are other sources for main stress on the last syllable, including borrowings (e.g., French $[\text{roko}'\text{ko}]$ *Rokoko* ‘rococo’) or stress-attracting suffixes. The absence of any such influences in the shortening data makes them so valuable for studying stress patterns (cf. Raffelsiefen 2022b for detailed discussion).

The patterns in (41) strongly motivate a top-down parsing mechanism, where given words are decomposed into stems, based on their complete form. They moreover support the Elsewhere Principle, as the applicability of the special conditions motivating the classification as a copulative compound takes precedence over a simple parsing of the word as single stem. At the same time the principle accounts for an asymmetry concerning possible variation. A pronunciation of *rororo* with non-final main stress is conceivable but final stress in words like *Hanuta*, *Haribo* is not. This is because the presence of non-final stress in *rororo* would simply indicate that the (human) parser has failed to notice the sameness of the relevant substrings, resulting in an analysis of the word as a single stem and consequently a single phonological word. Final stress on the words in (40a,b) is ruled out as these words do not lend themselves to a morphological parsing as anything other than a single stem.

The observation that the exhaustive parsability of a given word into a sequence of identical (meaningless) strings motivates the morphological classification as a copulative compound raises the question of what exact conditions qualify as “sameness”. The answer can be found in correlations between stress regularities and patterns of partial phonological sameness. The data in (42)–(44), consisting mostly of obscure parts lacking correspondents among independent words, indicate systematic stress differences depending on which aspects of phonological vary. Words that can be exhaustively decomposed into rhyming constituents, characterized by variance of the respective initial onsets only, have main stress on the final constituent (cf. the words consisting of disyllabic rhyming constituents in (42) and those with monosyllabic rhyming constituents in (43)⁴⁶).

- | | | |
|------|--|---|
| (42) | a. [ˌʀɛmɪˈdɛmɪ]
⟨Remmidemmi⟩ ‘racket’
b. [ˌkʊdəlˈmʊdəl]
⟨Kuddelmuddel⟩ ‘jumble’
c. [ˌʃɪkɪˈmɪkɪ]
⟨Schickimicki⟩ ‘in-crowd’ | d. [ˌlɑrɪˈfɑrɪ]
⟨Larifari⟩ ‘airy-fairy’
e. [ˌtɛçtəlˈmɛçtəl]
⟨Techtelmechtel⟩ ‘affair’
f. [ˌʀambɑˈtˢambɑ]
⟨Rambazamba⟩ ‘uproar’ |
| (43) | a. [ˌklɪmˈbɪm]
⟨Klimbim⟩ ‘junk’
b. [ˌʀʊmsˈbʊms]
⟨rumsbums⟩ ‘abruptly’
c. [ˌʀatˢˈfatˢ]
⟨ratzfatz⟩ ‘fast’ | d. [ˌʀʊkˢtˢʊk]
⟨ruckzuck⟩ ‘fast’
e. [ˌtrɑˈʀɑ]
⟨Trara⟩ ‘ballyhoo’
f. [ˌhʊʃˢpˢʊʃ]
⟨huschpfusch⟩ ‘disorderly’ |

⁴⁶The word *Héckmeck* is an exception.

By contrast, words which can be decomposed into constituents that are identical except for the stressed vowel have main stress on the initial constituent (cf. (44)).

- (44) a. [ˈtɪŋəl̩ˌtaŋəl̩] d. [ˈvɪr̩ˌvʌr̩]
 ⟨Tingeltangel⟩ ‘honky-tonk’ ⟨Wirrwarr⟩ ‘clutter’
 b. [ˈkrɪkəl̩ˌkrɔkəl̩] e. [ˈʃnɪk̩ˌʃnak̩]
 ⟨Krickelkrakel⟩ ‘illegible writing’ ⟨Schnickschnack⟩ ‘nicknack’
 c. [ˈkrɪms̩ˌkrɑms̩] f. [ˈt̪sɪk̩ˌt̪sʌk̩]
 ⟨Krimskrams⟩ ‘hodgepodge’ ⟨zickzack⟩ ‘zigzag’

These generalizations indicate that the exhaustive decomposability of a word into rhyming constituents (i.e. constituents which are the same, except for the word-initial onset) satisfies the condition for the classification as a copulative compound (cf. (45a,b)). The stress on the final constituent then follows from the relevant head alignment constraint. By contrast, the exhaustive decomposability into constituents which are the same except for the nucleus fails to satisfy the requirements for copulative compounds. Separate stems are still recognized, which form a regular compound by default (cf. (44)). Such compounds are consequently leftheaded, manifest in main stress on the initial member:⁴⁷

- (45) a. [[rɛmi]_{STM}[dɛmi]_{STM}]_{COPCOMP-M} → ((rɛmi)_ω(dɛmi)_{ωHd})_{COPCOMP-P}
 ⟨Remmidemi⟩
 b. [[klɪm]_{STM}[bɪm]_{STM}]_{COPCOMP-M} → ((klɪm)_ω(bɪm)_{ωHd})_{COPCOMP-P}
 ⟨Klimbim⟩
 c. [[tɪŋəl̩]_{STM}[taŋəl̩]_{STM}]_{COMP-M} → ((tɪŋəl̩)_{ωHd}(taŋəl̩)_ω)_{COMP-P}
 ⟨Tingeltangel⟩

To summarize, stress patterns indicate rather narrow conditions defining the class of copulative compounds in German. The requirement that meaning relations between the compound and each of its respective members must be the same, along with the disallowance of double-endocentric compounds, results in the large ratio of cases characterized by the necessary failure of hyponymy, including those where members are meaningless (*Tamtám*, *Klimbím*) or consist

⁴⁷ While some of the positions of main stress in (42)–(44) also conform to the stress patterns seen in single phonological words, the assumption of single prosodic domains would be inconsistent with most of the data in (42)–(44). In (44) a single domain would cause main stress to fall on the penult in the four-syllable words, not the initial syllable. Final main stress in (43) would be unexpected as single phonological words consisting of two syllables regularly form trochees. Moreover, several words exhibit intervocalic clusters which are not found in single phonological words but rather indicate a compound structure (e.g., *Krimskrams*, *Schnickschnack*).

of names (*Schleswig-Hólstéin*) or name-like words (nomenclatures, e.g., *südwést*). All of these compounds are exocentric. Words which consist of combinations of similar stems but also lend themselves to an analysis as endocentric compound exhibit stress variance or indeed initial stress only in German (e.g., *Mántelkleid*, *Málerdichter*, *táubstumm*). The correlations between semantics and stress motivate the recognition of separate compound classes here, where copulative compounds in German are necessarily exocentric.

In contrast to the rather confined conditions restricting copulative compounds considered so far, there is one context where robust main stress on the final member correlates with a wider range of cases, namely when a compound is embedded as an initial member in another compound. Here compound members typically share semantic similarities (e.g., kinship terms, body parts, antonyms) but often correspond to regular content words. Examples are given in (46).

- (46) a. [[*mütər*]_{STM}[*zon*]_{STM}]_{COPCOMP-M}[*kɔnflɪkt*]_{STM}]_{COMP-M}
 Mutter-Sohn-Konflikt
 ‘mother-son-conflict’
- b. [[*frɔɪnd*]_{STM}[*faind*]_{STM}]_{COPCOMP-M}[*fema*]_{STM}]_{COMP-M}
 Freund-Feind-Schema
 ‘friend-foe scheme’
- c. [[*hɛrtˢ*]_{STM}[*lʊŋən*]_{STM}]_{COPCOMP-M}[*maʃinə*]_{STM}]_{COMP-M}
 Herz-Lungen-Maschine
 ‘heart-lung-machine’
- d. [[*kɔstən*]_{STM}[*nʊtˢən*]_{STM}]_{COPCOMP-M}[*analyzə*]_{STM}]_{COMP-M}
 Kosten-Nutzen-Analyse
 ‘cost-benefit-analysis’

Why is it possible to have a copulative compound *Mutter-Sohn* ‘mother-son’ with both members on equal footing and robust final stress embedded in *Mutter-Sohn-Konflikt* in (46), while the similar free-standing combination *Múttersöhnchen* ‘mother#son+diminutive’ ‘Mamma’s boy’ can only be analyzed as a regular compound with initial main stress? The latter case is easily explained by the endocentricity of the compound: *Múttersöhnchen* is a hyponym of *Söhnchen*, where the preceding constituent functions as a modifier (i.e. ‘a son who is spoiled by his mother’). This analysis is not available for the embedded compound because the relevant mother constituent (i.e. *Mutter-Sohn*) does not associate with a separate concept and therefore does not allow for a hyponymy relation to be established. The lack of a separate concept relates to the fact that the embedded compound does not refer independently, only free-standing words do. Here, too, it is the

exocentric status of the (embedded) compound which is crucial to its classification as copulative, manifest in main stress on the final member (i.e. *Mutter-Sohn* 'mother-son').

The effect in question is also seen in the comparison between the free-standing compound *Freundfeind* and cases where *Freund-Feind* is embedded as in *Freund-Féind-Schema*. The free-standing word associates with a concept describing particular individuals (say, a foe who sometimes acts like a friend), arguably a regular endocentric compound with main stress on the initial member. By contrast, the embedded constituent does not associate with a particular concept but only the entire compound does (it denotes a view of all people to fall into two classes, friend or foe). Again, the absence of a concept associated with the embedded compound motivates an exocentric analysis, manifest in main stress on the final member *Freund-Féind*.⁴⁸

The claim that the robustness of stress on the second member in the compounds in (46) is due to the absence of a separate concept associated with the respective immediate mother constituent makes sense of the overall differences in productivity among embedded and free-standing copulative compounds. Generally speaking, endocentricity appears to be a prerequisite for the productive formation of new compounds based on content words in German or English. This is presumably due to the role of endocentricity in the creation and learnability of concepts. Given access to the vast inventory of content words there is no difficulty in finding combinations associated with sensible concepts such as *Staublung* 'dust+lung', meaning 'lung disease caused by the inhalation of dust'. The picture changes drastically when the relevant inventory is confined to words associating with a particular hypernym, say *organs*. What concept, applicable to an entity in the world, is expressed by combining terms for organs such as *Herzlunge* 'heart lung', *Leberniere* 'liver kidney'? This problem does not arise for embedded compounds as they do not need associate with a separate concept. Complex words with embedded compounds such as *heart-lung-machine* are then easily formed and understood (i.e. 'a machine which involves the heart and the lung').

The few contexts where free-standing copulative compounds are reasonably productive are likewise explained by conditions relating to the creation and understanding of concepts. The most productive type in German, namely letter compounds, are characterized by their ability to simply inherit the concept as-

⁴⁸It is of course also possible to embed an existing endocentric compound such as *Freund-Feind*, in which case main stress will fall on the initial syllable in the complex compound (e.g., *Freund-Feind-Konflikt*, meaning a conflict which one has with a frenemy).

sociated with the full form (e.g., the compound *WG* associates with the same concept as the full form *Wohngemeinschaft* ‘shared apartment’). Other types are marked by conventions, such as names of adjacent territories to designate the respective combined area (*Schleswig-Holstein*). The latter convention does not apply to names of rivers, which, even when flowing close to each other, are not conceived of as single entities. Copulative compounds consisting of river names therefore occur only as embedded compounds (e.g., *Kocher-Jägst-Radweg* ‘Kocher-Jagst-bike path’, *Oder-Neiße-Grenze* ‘Oder-Neiße-border’).

Turning now to the question of parsing and consequent morphological classification we find that the stress patterns support an initial scan of the complete word for conformity with restrictions on copulative compounds, in accordance with the Elsewhere Principle. Words not amenable to being decomposed exhaustively into stems which are “on equal footing” are subject to a subsequent scan. Here parsing aims at recognizing contiguous substrings conforming with restrictions on copulative compounds. Examples for the resulting morphological structures are given in (47).⁴⁹

- (47) a. [[[RO]_{STM}[RO]_{STM}]_{COPCOMP-M}[[f]_{STM}]_{COMP-M}
 Ro-ro-Schiff (**R**oll-on-**r**oll-off-Schiff)
 ‘roll-on-roll-off-ship’
- b. [[[vin]_{STM}[vin]_{STM}]_{COPCOMP-M}[zituat^sion]_{STM}]_{COMP-M}
 Win-win-Situation
 ‘win-win-situation’
- c. [[[petər]_{STM}[paul]_{STM}]_{COPCOMP-M}[kirçə]_{STM}]_{COMP-M}
 Peter-Paul-Kirche
 ‘Peter-Paul-church’
- d. [[[a]_{STM}[be]_{STM}[t^se]_{STM}]_{COPCOMP-M}[[ʏt^sə]_{STM}]_{COMP-M}
 ABC-Schütze
 ‘abecedarian’
- e. [[[ha]_{STM}[ɛn]_{STM}[o]_{STM}]_{COPCOMP-M}[art^st]_{STM}]_{COMP-M}
 HNO-Arzt (**H**als-**N**asen-**O**hren-Arzt)
 ‘ear, nose and throat doctor’

Mapping the morphological structures in (46) and (47) to prosodic structures will result in embedded copulative compounds as shown in Figure 7. The mapping of

⁴⁹The constituent *Ro-ro* of the compound *Ro-ró-Schiff* is also a “Silbenkurzwort” accidentally consisting of homophonous syllables (cf. the case of *Rororo* discussed in (41c)). Initial main stress in the compound *Gó-go-Girl* is due to the fact that this word has been borrowed with initial stress, cf. footnote 43.

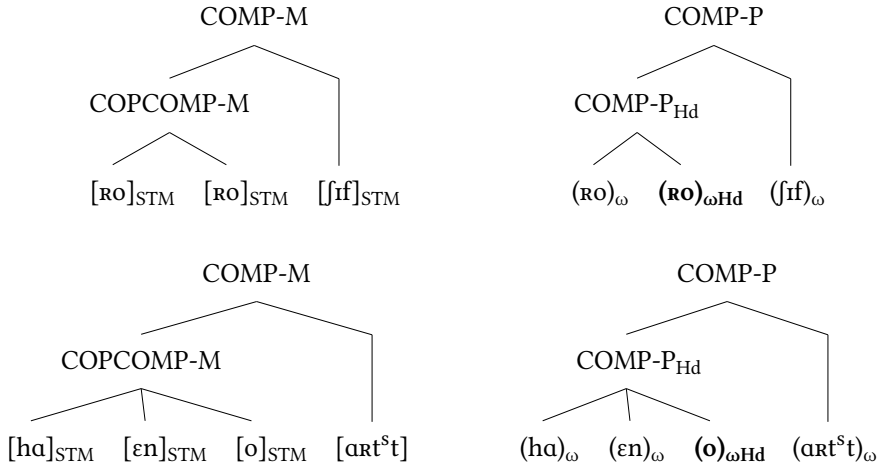


Figure 7: Isomorphic mapping and prosodic trees for (47a) and (47e)

morphological compounds to prosodic constituents is strictly isomorphic. Prominence patterns are determined by left- or right-oriented head alignment. The terminal unit forming a head constituent itself and also dominated exclusively by head constituents, boldfaced in Figure 7, will emerge as most prominent in the entire construction (cf. the notion of *designated terminal element* discussed in Section 2 above).⁵⁰

All cases of complex compounds considered so far are regular compounds containing a copulative compound as the initial member. Since that initial member forms the prosodic head of the higher compound, main stress always falls on its last member (see the prosodic trees in Figure 7). The examples in (48)–(50) illustrate additional complex compound types, where the morphological structure is determined by the conditions on the recognition of copulative compounds out-

⁵⁰While these structures are not affected by regular rhythmic reversal (cf. footnote 5), the main stress can appear “shifted” under certain complex conditions, including the avoidance of a stress clash (two adjacent head syllables) in combination with discourse-related properties (introduction of new information). For instance, the main stress on the constituent *Rad* in *Kocher-Jagst-Radweg* in the pronunciation observed in <https://www.youtube.com/watch?v=ZgnPua2aKu8>, at 2:42 in the video, is conditioned by both the presence of two head syllables next to each other (i.e. *Jagst-Rad*) and by the fact that prior to the first mention of the compound, the two rivers were referred to repeatedly. In more neutral contexts, the main stress is on the final member of the copulative compound appearing as the initial constituent of the complex compound (cf. also *Oder-Sprée-Radweg* referring to the two rivers *Oder* and *Spree*).

lined above. Each of these cases contrasts the satisfaction of relevant conditions motivating the recognition of a copulative compound in (a) with non-satisfaction in (b), where the initial compound is classified as a regular compound instead.

- (48) a. [[[kɔçəʀ]_{STM}[iakst]_{STM}]_{COPCOMP-M}[[rad]_{STM}[veg]_{STM}]_{COMP-M}
 Kocher-Jagst-Radweg
 ‘(river name + river name)-bicycle path’
 b. [[[obəʀ]_{STM}[rain]_{STM}]_{COMP-M}[[rad]_{STM}[veg]_{STM}]_{COMP-M}_{COMP-M}
 Oberrhein-Radweg
 ‘(upper + river name)-bicycle path’
- (49) a. [[[arm]_{STM}[raiç]_{STM}]_{COPCOMP-M}[[gə]_{PRFX}[fɛlə]_{STM}]_{STM}]_{COMP-M}
 Arm-reich-Gefälle
 ‘gap between rich and poor’
 b. [[[noi]_{STM}[raiç]_{STM}]_{COMP-M}[[gə]_{PRFX}[tuə]_{STM}]_{STM}]_{COMP-M}
 Neureich-Getue
 ‘nouveau riche posturing’
- (50) a. [[[alt]_{STM}[iʊŋ]_{STM}]_{COPCOMP-M}[[ve]_{STM}[ge]_{STM}]_{COPCOMP-M}]_{COMP-M}
 Alt-jung-WG
 ‘old-young shared apartment’⁵¹
 b. [[[ur]_{STM}[alt]_{STM}]_{COMP-M}[[ve]_{STM}[ge]_{STM}]_{COPCOMP-M}]_{COMP-M}
 Uralt-WG
 ‘very old shared apartment’

The relevant morphological and prosodic structures associated with the examples in (50) are shown in Figure 8.

The prosodic trees in Figure 7 and Figure 8 indicate insensitivity of head alignment in compounds to inherent properties of the respective daughters. The head daughter is picked solely on the basis of her presence in a specific margin position (left or right), which itself is determined by the isomorphic mapping of structures originating in morphological parsing mechanisms. As a result, the head of a compound may consist of a simple phonological word or various types of compounds.

⁵¹The expression *Alt-jung-WG* refers to a shared apartment with old and young inhabitants. The word *Uralt-WG* means a shared apartment where the inhabitants have lived together for a very long time.

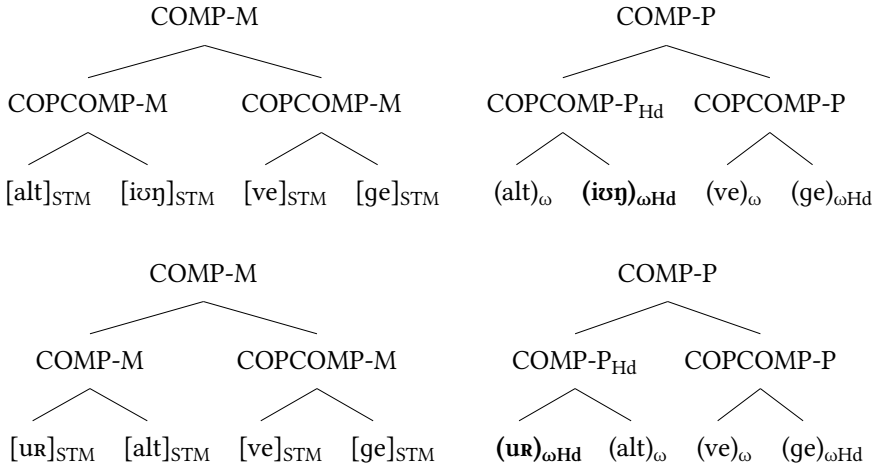


Figure 8: Isomorphic mapping and prosodic trees for (50)

5 Phrasal compounds

This section discusses evidence for a third compound category, here referred to as *phrasal compound*, distinct from both regular and copulative compounds. Like copulative compounds, phrasal compounds associate with right-oriented head alignment but differ in that the relation between compound members is characterized by asymmetry. The reason for assuming a single compound category concerns the nature of that asymmetry, which indicates a functor-argument structure.

This section presents three types of compounds, chosen to illustrate the striking disparities seen in German compounds characterized by a functor-argument structure along with final stress. The focus is on a case marked by correspondence patterns involving syntactic phrases, which is also of interest to the parsing issue (bottom-up vs. top-down). The other two cases are a class of compounds exhibiting the same distribution as prepositional phrases (e.g., *bergáb* ‘mountain-down’ meaning ‘downhill’) and elative compounds (e.g., *steinréich* ‘stone rich’, meaning ‘very rich’).

The particular conditions characterizing the first type of phrasal compounds considered here can be illustrated with the words in (51), which end in the same stem /metər/, corresponding to the free-standing masculine noun *Meter* ‘meter’, but differ in stress.

- (51) a. [*ˈfɛst,metəʀ*]_{N.MASC}
 ⟨Festmeter⟩
 ‘solid meter’ (i.e. ‘cubic meter’)
- b. [*ˌɛlf,metəʀ*]_{N.MASC}
 ⟨Elfmeter⟩
 ‘eleven meters’ (penalty kick in soccer)

The contrast seen in (51) brings to mind well-known differences in compound versus phrasal stress which can be illustrated with the near-minimal pairs in (52). Similar examples from German are listed in (53).

- | | | | |
|------|----|---|----------------------------|
| (52) | a. | a (*very) <i>wét suit</i> | a (very) <i>wet súit</i> |
| | | ‘diving equipment which may be dry’ | ‘suit which is wet’ |
| | b. | a (*very) <i>blúeberry</i> | a (very) <i>blue bérry</i> |
| | | ‘type of berry which may be unripe and green’ | ‘berry which is blue’ |
-
- | | | | |
|------|----|--|----------------------------------|
| (53) | a. | ein (*sehr) <i>Gróßvater</i> | ein (sehr) <i>großer Váter</i> |
| | | ‘a (*very) grandfather’ | ‘a (very) tall father’ |
| | b. | ein (*sehr) <i>Kléingarten</i> | ein (sehr) <i>kleiner Gärten</i> |
| | | ‘a (*very) garden plot, part of an allotment garden’ | ‘a (very) small garden’ |

The stress differences have been captured in terms of cyclic rules, where rules assigning stress to words (“Compound Rule” in Chomsky & Halle 1968: 17) are ordered before those assigning stress in syntactic phrases (“Nuclear Stress Rule” in Chomsky & Halle 1968: 17). The stress difference seen in (52), (53) is not captured by this type of classification as *Elfmeter* ‘penalty kick’ clearly patterns with words, not with phrases:

- (54) a. Sie hat einen (tollen) *Elfmeter* geschossen.
 ‘She took a (great) penalty kick.’
- b. Sie hat zwei (tolle) *Elfmeter* geschossen.
 ‘She took two (great) penalty kicks.’
- c. Sie hat ein (tolles) *Tor* geschossen.
 ‘She scored a (great) goal.’
- d. Sie hat zwei (tolle) *Tore* geschossen.
 ‘She scored two (great) goals.’

The property which distinguishes *Elfmeter* from *Festmeter* is the correspondence to the wellformed phrase *elfMeter* ‘eleven meters’, as in *Es fehlen noch* [ɛlfmɛtər]. ‘We still need eleven meters’. This correspondence is due to the fact that *elf* ‘eleven’ is a numeral, which is not inflected in German, leading to homophonous forms in compounds and phrases. By contrast, adjectives such as *fest* are inflected in attributive position in phrases, manifest in an ending containing schwa (e.g., *fest^{er} Meter*), distinguishing them from compounds (cf. also the relevant differences illustrated in (53)).

The perfect correspondence between the noun *Elfmeter* and the phrase *elf Meter* hinges on a second peculiarity, namely the absence of morphological plural marking in the noun *Meter*. Note that phrases consisting of a numeral referring to the number 2 or higher require the following argument to be a plural form as shown in (55). Such phrases differ then from compounds, where numerals combine with bare stems as in (56):

- | | |
|---|--|
| <p>(55) a. [fɪr'ɛkən]
vier Ecken
‘four angles’</p> <p>b. [drai'rædər]
drei Räder
‘three wheels’</p> <p>c. [fʏnf'kɛmp^fə]
fünf Kämpfe
‘five fights’</p> <p>d. [drai'zæt^sə]
drei Sätze
‘three sentences’</p> | <p>(56) a. [fɪr'ɛk]
Viereck
‘quadrangle’</p> <p>b. [drai'rɔd]
Dreirad
‘tricycle’</p> <p>c. [fʏnf'kamp^f]
Fünfkampf
‘pentathlon’ (sports)</p> <p>d. [drai'zat^s]
Dreisatz
‘rule of three’ (mathematics)</p> |
|---|--|

The formal discrepancies seen in (55) versus (56) do not affect the compound *Elfmeter* as nouns denoting measuring units are typically not inflected for plural in German.⁵² It is then the (accidental) alignment of both properties, the exemption of numerals and of nouns denoting measuring units from inflection, which yield the outcome of perfect correspondence in the relation between the compound and the phrase.

Assuming that perfect correspondence to a phrase motivates the classification of the noun *Elfmeter* as a phrasal compound (PHRASCMP-M), which maps into

⁵²Measuring terms ending in schwa are a systematic exception here (e.g., {*Tonne, Tonnen*} ‘ton, tons’, {*Meile, Meilen*} ‘mile, miles’).

a prosodic phrasal compound (PHRASCOMP-P), the following representations result.

- (57) a. $[[f\acute{e}st]_{STM}[met\acute{a}R]_{STM}]_{COMP-M}$
 \Downarrow
 $((f\acute{e}st)_{\omega Hd}(met\acute{a}R)_{\omega})_{COMP-P}$
 $\langle F\acute{e}stmeter \rangle$
- b. $[[f\acute{I}R]_{STM}[\acute{e}k]_{STM}]_{COMP-M}$
 \Downarrow
 $((f\acute{I}R)_{\omega Hd}(\acute{e}k)_{\omega})_{COMP-P}$
 $\langle Viereck \rangle$
- c. $[[\acute{e}lf]_{STM}[met\acute{a}R]_{STM}]_{PHRASCOMP-M}$
 \Downarrow
 $((\acute{e}lf)_{\omega}(met\acute{a}R)_{\omega Hd})_{PHRASCOMP-P}$
 $\langle \acute{E}lfmeter \rangle$

Left-oriented head alignment in the regular compounds accounts then for the prominence on the initial member in (57a,b). Stress on the final constituent in *Elfmeter* as in (57c) is captured by the right-oriented head alignment constraint in (58):

- (58) ALIGN(PHRASCOMP-P, R, Head(PHRASCOMP-P), R)

As for the conditions motivating the classification of a compound as phrasal it is important that relevant strings are not just adjacent in syntax but form phrases. For instance, words such as *Möchtegern* literally ‘would gladly’, meaning ‘wannabe’ or *Gérnegroß* literally ‘gladly big’, meaning ‘braggart’ do not match syntactic phrases and are consequently classified as regular compounds with initial stress. Compounds such as *Siebenschläfer*, literally ‘seven sleeper(/s)’, meaning ‘dormouse’ (rumored to hibernate for seven months) or *Zwölftonner* ‘twelve-tonner’ (vehicle carrying a load of twelve tons), also cannot be classified as phrasal as the relevant constructions lack a functor-argument structure. These, too, are then classified as regular compounds and receive initial stress.

Additional data indicate the possible relevance of yet another condition, namely exocentricity. Consider the compounds in (59), whose initial member ends in schwa preceded by a voiced obstruent, a context where schwa has tended to persist in German. The presence of stem-final schwa in the compounds leads to homophony with the respective phrases, where schwa is (also) an inflectional marker.

- | | |
|--|---|
| (59) a. Mürb[ə]teig
brittle.dough
‘shortcrust’ | cf. (der) mürb[ə] Teig
‘(the) brittle dough’ |
| b. Mies[ə]peter
wretched.guy
‘sourpuss’ | cf. (der) mies[ə] Peter
‘(the) wretched Peter’ |
| c. Leb[ə]wóhl
Live.well
‘farewell’ | cf. Leb[ə] wohl!
‘Live well!’ |

Like the compound *Elfmeter*, those in (59) are characterized by perfect correspondence to a syntactic phrase with functor argument structure. The fact that *Mürbeteig* and *Miesepeter*, two compounds likely originating from phrases historically, are (re)analyzed as regular compounds with initial stress might be due to their endocentric status, in contrast to *Elfmeter* or *Lebewohl*, which are clearly exocentric.

A conclusive answer is not easily obtained, as the relevant conditions are so narrow that they are rarely met and indeed none of the relevant cases considered so far is productive in German. Numerals cannot combine with nouns to form compounds even when corresponding perfectly to syntactic phrases: **Viereimer* ‘four buckets’, **Dreiesel* ‘three donkeys’ are simply ungrammatical.

Compounds like *Elfmeter* merit attention only because of the striking robustness of final stress: the typical shift to initial stress likely having affected *Mürbeteig* or *Miesepeter* seems entirely unacceptable in *Elfmeter* or *Siebenmeter*, a penalty kick in hockey defined by a distance of seven meters. Evidence that the sort of accidental correspondence relations to syntactic phrases claimed to play a role in their analysis are in fact highly significant comes from particular contexts where relevant conditions on phrasal compounds are more easily met. The main context is again the embedding of a compound in non-final position, in fact a likely source of *Elfmeter*, which may be an elliptic form stemming from the complex compound *Elfmeterschuss* ‘eleven meters kick’.

What seems special about the embedded context is again the fact that it need not associate with a separate concept linked to an entity in the world.⁵³ As noted above, one cannot form a compound **Zweizimmer* ‘two-rooms’ to denote two rooms in German, but there are countless combinations such as *Zweizimmerwohnung* ‘two room apartment’. Significantly, the conditions concerning the parsability of strings as phrasal compounds are confirmed by such cases. Consider the stress contrast in the complex compounds in (60), which is due to the

⁵³See the discussion below (46).

fact that a combination of numeral plus noun (e.g., *zwei Flügel*) corresponds to a well-formed phrase in German, whereas the combination *Doppelflügel* does not.

- (60) a. [[Zweiflügel]tür]
 'two wing door'
 b. [[Zweimütter]familie]
 'two mother family'
 c. [[Doppelflügel]tür]
 'double wing door'
 d. [[Doppelveodiener]familie]
 'two-income family'

The relevant morphological structures, along with the strictly isomorphic mapping yielding the prosodic structures, are shown in Figure 9. Parsing is again subject to the Elsewhere Condition, such that the conformity of a string with the conditions for phrasal compounds takes priority, ensuring the classification of the relevant constituent as PHRASCOMP-M versus COMP-M as shown in the lefthand side of Figure 9. The position of main stress is then due to isomorphic mapping along with the relevant head alignment constraints. The most prominent member in the entire compound is the terminal unit, boldfaced in the trees shown in the righthand side of Figure 9, as that member both forms a head itself and is dominated exclusively by head constituents.

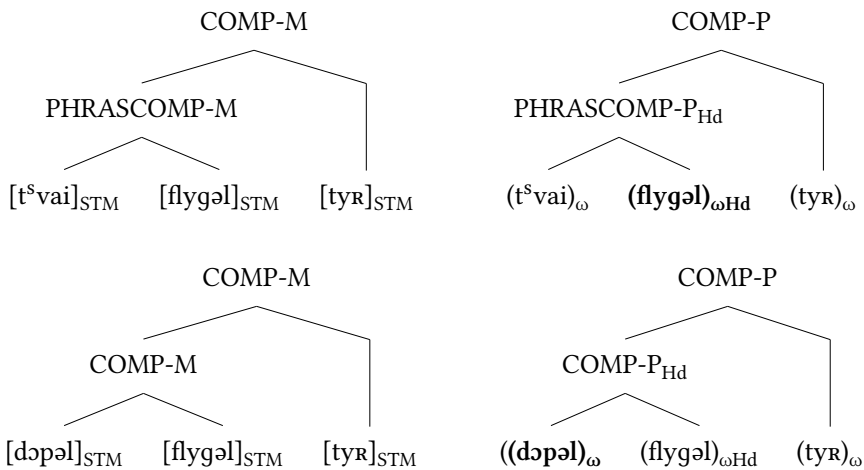


Figure 9: Morphological and prosodic structures for [[Zweiflügel]tür] ‘two wing door’ and [[Doppelflügel]tür] ‘double wing door’

The relevance of the homophony between the singular and plural form of *Flügel* for the morphological parsing of the constituent *Zweiflügel* as a phrasal compound can be demonstrated further with the stress contrast in (61). Stress consistently falls on the second member in (61a,b), where singular and plural

forms are identical (i.e. *Zimmer*), compared to initial stress in (61c,d), where the following noun does not match the plural form.

- | | | |
|------|---|--|
| (61) | a. [[Dreizímm̩er]wohnung]
‘three room apartment’ | c. [[Dréiraum]wohnung]
‘three room apartment’ |
| | b. [[Zwölffínger]darm]
‘twelve finger gut’
(duodenum) | d. [[Zwólft̩on]musik]
‘twelve-tone music’ |

The examples in (62) illustrate a stress difference conditioned by the use of distinct word forms: the numeral is followed by a plural form in (62a)–(62c), thereby meeting the requirement for phrasal compounds, vis-à-vis the occurrence of the respective singular form in (62d)–(62f), which results in the classification as a regular compound with initial stress.

- | | | |
|------|--|--|
| (62) | a. Dreigángemenü
‘three course menu’ | d. Dréiganggetriebe
‘three gear transmission’ |
| | b. Dreiwégehahn
‘three-way valve’ | e. Méhrwegflasche
‘returnable bottle’ |
| | c. Vierbéttenpension
‘four bed pension’ | f. Vierbettzimmer
‘four bed room’ |

There is an alternative analysis of the stress differences in (61) and (62), linked to the mono- versus disyllabicity of the second compound member (cf. Giegerich 1985: 154, Wiese 2000: 301). On Giegerich’s account main stress falls on the second member as in (61a,b), unless that form is monosyllabic. In that context, stress shifts to the initial member as in (61c,d), to improve the rhythm. This analysis incorrectly predicts stress on the second member in cases like *Zwólft̩onmusik*, *Dréiganggetriebe*, where the third member starts with an unstressed syllable.

The claim that the stress patterns of the embedded compounds in (62) are determined by the question of whether or not they correspond to a well-formed phrase is consistent with the facts but raises the question of what determines the choice of the relevant plural versus singular forms in the first place. As for the cases in (62d–f), the relevant choice may be influenced by the prevalence of corresponding compounds with the Numeral *Ein*-, which is always followed by a singular form (e.g., *Éinganggetriebe* ‘one gear transmission’, *Éinwegflasche* ‘one-way (disposable) bottle’, *Éinbettzimmer* ‘one-bed’ (single) room’).⁵⁴ A generalization likely affecting the choice of the singular forms in (61c,d) concerns

⁵⁴This raises the question of why the relevant compounds with *ein* have initial main stress, given

the marking of the relevant plural forms with umlaut. The relevant correlations are far from perfect, due in part to various analogical influences as noted in connection with (62), but there is a tendency to avoid the phonologically marked umlaut forms.⁵⁵ The data in (63) illustrate a general preference for plural forms in embedded compounds containing numerals. If the plural form is marked with umlaut, as in (64), the singular form is often chosen instead, with the result that the condition for the classification as a phrasal compound is no longer met. As a result, stress on the second member in the complex compounds in (63) contrasts with initial stress in (64), as the latter compounds are classified as regular by default.

(63) a. {Stern, Sterne }	Dreistérnehotel
‘star, stars’	‘three-star hotel’
b. {Tag, Tage }	Dreitágebart
‘day, days’	‘three-day beard’
c. {Staat, Staaten }	Zweistáatenlösung
‘state, states’	‘two-state solution’
d. {Burg, Burgen }	Fünfbúrgentour
‘castle, castles’	‘five castle tour’
e. {Auge, Augen }	Vieráugengespräch
‘eye, eyes’	‘four-eyes talk’
f. {Front, Fronten }	Zweifróntenkrieg
‘front, fronts’	‘war on two fronts’
g. {Person, Personen }	Dreipersónenhaushalt
‘person, people’	‘three-person household’
h. {Feld, Felder }	Dreifélderwirtschaft
‘field, fields’	‘three-field farming’
i. {Fuß (measuring unit)}	Zehnfúßcontainer
‘foot’	‘ten foot container’
j. {Karat}	Zehnkarátring
‘carat’	‘ten carat ring’

that *ein Gang*, *ein Weg*, *ein Bett* are perfectly well-formed phrases. The answer here may lie in the homophony between the numeral *ein* ‘one’ and the indefinite article *ein* ‘a/an’, causing stress on the numeral to mark the contrast to the article.

⁵⁵ A regular exception concerns cases where plural is marked only by umlaut (e.g., plural *Mütter* - singular *Mutter*). Here it is always the umlaut form which appears in the embedded compounds (e.g., *Zweimütterfamilie* ‘two mother family’).

(64)	a. { Raum , Räume}	Dréira um wohnung
	‘room, rooms’	‘three room apartment’
	b. { Ton , Töne}	Zwólf ton musik
	‘tone, tones’	‘twelve-tone music’
	c. { Frucht , Früchte}	Vier frucht gelee
	‘fruit, fruits’	‘four fruit jam’
	d. { Strom , Ströme}	Zwéi strom land
	‘river, rivers’	‘two river land’ (Mesopotamia)
	e. { Loch , Löcher}	Fünf loch felge
	‘hole, holes’	‘five lug rim’
	f. { Wort , Wörter}	Zwéi wort gefüge
	‘word, words’	‘two word construction’
	g. { Korn , Körner}	Fünf korn brot
	‘grain, grains’	‘five grain bread’
	h. { Zug , Züge}	Zwéi zug samstag
	‘train, trains’	‘two train Saturday’
	i. { Fuß , Füße}	Zéhn fuß krebs
	‘foot, feet’	‘ten foot crab’
	j. { Kanal , Kanäle}	Zwéi kanal ton
	‘channel, channels’	‘two channel sound’

The last examples are of particular interest as the nouns [ka'rat] *Karat* and [ka'nal] *Kanal* have very similar shapes and appear in the same metrical environment in the respective compounds. The claim that correspondence to a well-formed phrase is crucial to the morphological classification of the embedded compound explains the link between the lack of a distinct plural form for *Karat*, due to its status as a measuring unit, and the presence of stress on the second member (i.e. *Zehnkarátring*). Again, the homophony of the relevant noun forms allows for the classification of the string *Zehnkarat*- as a phrasal compound, which receives final stress. By contrast, the paradigm of the noun *Kanal* contains a distinct plural form *Kanäle*, which rules out the classification of *Zweikanal*- as a phrasal compound. The classification of a regular compound ensues by default, resulting in stress on the initial member (i.e. *Zwéikanalton*). The same explanation pertains to the formations with *Fuß* in the line above, used as a measuring term in one case (*Zehnfußmonitor*) and a regular noun associated with a distinct plural form in the other (*Zéhnfußkrebs*).

The expectation that all measuring terms attract main stress in the relevant three member compounds, regardless of their shape (disyllabic in (65), monosyllabic in (66)) and of the metrical environment is born out.

- | | | | |
|------|----|--------------------------------|-----------------------|
| (65) | a. | [[Fünféuro]job] | ‘five euro job’ |
| | b. | [[Fünfméter]turm] | ‘five meter tower’ |
| | c. | [[Fünfprozént]hürde] | ‘five percent hurdle’ |
| | d. | [[Zehnpfénnig]marke] | ‘ten penny stamp’ |
| | e. | [[Dreilíter]auto] | ‘three liter car’ |
| | f. | [[Dreigróschén]heft] | ‘three penny booklet’ |
| | g. | [[Zehndóllar]aktie] | ‘ten dollar stock’ |
| | h. | [[Fünfhéktar]hof] | ‘five hectare farm’ |
| | i. | [[Zehnfránken]schein] | ‘ten franc bill’ |
| | j. | [[Dreizéntner]sack] | ‘three centner bag’ |
| (66) | a. | [[Fünfúhr]zug] | ‘five o’clock train’ |
| | b. | [[Zweimárk]stück] | ‘two mark piece’ |
| | c. | [[Zweipfúnd]brot] | ‘two pound bread’ |
| | d. | [[Zweicént]stück] | ‘two cent piece’ |
| | e. | [[Fünfgrád]winkel] | ‘five degree angle’ |
| | f. | [[Zwölfzóll]display] | ‘twelve inch display’ |
| | g. | [[Fünfwátt]verstärker] | ‘five watt amplifier’ |
| | h. | [[ZehnHértz]Bereich] | ‘ten hertz range’ |
| | i. | [[Fünfgrámm]beutel] | ‘five gram bag’ |
| | j. | [[ZweiMánn]Band] ⁵⁶ | ‘two man band’ |

The patterns demonstrated in (60)–(66) are relevant to the issue of morphological parsing in that they indicate reference to the surface forms of complex words when determining the classification of compounds, rather than to the properties of individual morphemes. In particular, the relevance of syncretism in paradigms for the conditions identified here makes sense only from an analytic, not from a synthetic perspective.

⁵⁶While the regular plural form of *Mann* ‘man’ is *Männer* ‘men’, the unmarked plural form *Mann* is grammatical after numerals (e.g., *mit zwei Mann* ‘with two men’). The internal compound in *Zwei-Mánn-Band* ‘two-man-band’ is accordingly analyzable as a phrasal compound, the possible stress on the second member follows from right head alignment.

I will end the discussion of the particular phenomenon presented here, namely a condition on the classification of compounds requiring correspondence with well-formed phrases, with a presentation of cases straddling the boundary of compounding and derivational morphology. The cases in question concern adverbs ending in *-weise*, a morpheme categorized as a suffix or suffixoid in German grammars. The data in (67a–c) illustrate a particular pattern associated with *-weise*, namely the derivation of adverbs from adjectives requiring the interfix *-er* (e.g., *dumm* ‘stupid’ + *-er-weise* ‘ly’). Those in (67d–f) illustrate other adverbs, where the initial stem just happens to end in the phoneme sequence /əʀ/ *-er*:

- | | | |
|------|-------------------------------------|--|
| (67) | a. <i>dummerweise</i>
‘stupidly’ | d. <i>éimerweise</i>
‘by the buckets’ |
| | b. <i>netterweise</i>
‘kindly’ | e. <i>zéntnerweise</i>
‘by the hundredweight’ |
| | c. <i>klugerweise</i>
‘wisely’ | f. <i>kléckerweise</i>
‘in dribs and drabs’ |

The remarkable pattern is seen in the lefthand column in (67), as consonant-initial suffixes typically do not allow association with main stress in German.⁵⁷ This peculiarity is explained by the correspondence of the words in the lefthand column to a noun phrase headed by the free-standing noun *Weise* ‘manner’ illustrated in (68). In particular, it is the embedding of the relevant noun phrase in a prepositional phrase containing the preposition *in* which is relevant here, as this preposition requires the adjective in the noun phrase to end in inflectional *-er*:

- (68) *in dummer Weise*
in stupid manner
‘in a stupid manner’

The assumption that the correspondence of derived adverbs such as *dummerweise* to the syntactic phrase *dummer Weise* shown in (68) motivates the classification of the adverb as a phrasal compound accounts for the highly unusual pattern of final main stress. Stress then again results from right-oriented head alignment.

The stress patterns in the suffixations in (67) may seem odd in that main stress associates with the functor, rather than its argument.⁵⁸ However, this correlation

⁵⁷Muthmann (1989) lists 105 words ending in the string *-erweise* where that string is preceded by an adjective. All of them carry main stress on *-weise*. None of the remaining words ending in *-weise* have final main stress.

⁵⁸The morpheme *-weise* must be considered as functor in all of the cases in (67), where it functions as a suffix, but that is not the case for the noun *Weise* in (68).

also pertains to one of the other cases of phrasal compounds to be presented here, illustrated in (69):

- (69)
- | | | |
|----|---|--|
| a. | [[fluss][auf] _{Prep}] _{PP} | ((flʊs) _ω (auf) _{ωHd}) _{PHRASCOMP-P} |
| | river.up | |
| | ‘up the river’ | |
| b. | [[berg][ab] _{Prep}] _{PP} | ((bɛrg) _ω (ap) _{ωHd}) _{PHRASCOMP-P} |
| | mountain.down | |
| | ‘downhill’ | |
| c. | [[kopf][über] _{Prep}] _{PP} | ((kɔpf) _ω (ybər) _{ωHd}) _{PHRASCOMP-P} |
| | head.over | |
| | ‘head first’ | |
| d. | [trepp][auf] _{Prep}] _{PP} | ((trɛp) _ω (auf) _{ωHd}) _{PHRASCOMP-P} |
| | stairs.up | |
| | ‘up the stairs’ | |
| e. | [[fern][ab] _{Prep}] _{PP} | ((fɛrn) _ω (ap) _{ωHd}) _{PHRASCOMP-P} |
| | far.from | |
| | ‘far away (from some point x)’ | |
| f. | [[zweifels][ohne] _{Prep}] _{PP} | ((t ^s vaifəls) _ω (onə) _{ωHd}) _{PHRASCOMP-P} |
| | doubt.without | |
| | ‘without any doubt’ | |
| g. | [[kurz][um] _{Prep}] _{PP} | ((kʊrt ^s) _ω (ʊm) _{ωHd}) _{PHRASCOMP-P} |
| | short.about | |
| | ‘in short’ | |
| h. | [[rund][um] _{Prep}] _{PP} | ((rʊnd) _ω (ʊm) _{ωHd}) _{PHRASCOMP-P} |
| | round.about | |
| | ‘all around (some point x)’ | |
| i. | [[gerade][aus] _{Prep}] _{PP} | ((gəradə) _ω (aus) _{ωHd}) _{PHRASCOMP-P} |
| | straight.out | |
| | ‘straight ahead’ | |
| j. | [[mit][unter] _{Prep}] _{PP} | ((mit) _ω (ʊntər) _{ωHd}) _{PHRASCOMP-P} |
| | with.under | |
| | ‘from time to time’ | |
| k. | [[neben][bei] _{Prep}] _{PP} | ((nebən) _ω (bai) _{ωHd}) _{PHRASCOMP-P} |
| | next(to).by | |
| | ‘by the way’ | |

- | | | |
|----|---|--|
| l. | [[neben][an] _{Prep}] _{PP}
next(to).at
'next door' | ((nebən) _ω (an) _{ωHd}) _{PHRASCOMP-P} |
| m. | [[gegen][über] _{Prep}] _{PP}
against.over
'across from (vis-à-vis)' | ((gegən) _ω (ybər) _{ωHd}) _{PHRASCOMP-P} |
| n. | [[vor][ab] _{Prep}] _{PP}
before.from
'in advance' | ((fɔʀ) _ω (ap) _{ωHd}) _{PHRASCOMP-P} |

The compounds in (69) consist of a stressed preposition preceded by some sort of argument, in some cases exhibiting non-compositional meanings. The claim that each member of these compounds nonetheless forms a separate phonological word is supported by the fact that stem-final consonants never syllabify as onsets before a vowel-initial preposition, as is indicated by the potential glottalization of the relevant vowel (e.g., /flʊs[ʔa]uf/ *flussauf*, /fɔʀ[ʔa]p/ *vorab*).

A key property motivating the analysis of the compounds in (69) as phrasal concerns the fact that the distribution of the complex expression matches that of a prepositional phrase and cannot be used to modify other words. This distinguishes the compounds in (69) from similar-looking words which do function as modifiers and exhibit the characteristics of regular compounds, in particular initial stress. Compare the *phrasal compound* *rundum* 'all around' with the regular compound *rundum* 'completely' in (70):

- (70) a. In der Mitte brannte ein Feuer, rundum saßen die Kinder.
in the middle burned a fire round.about sat the children
'In the middle there was a fire, all around (it) the children sat.'
- b. Sie war rúndum glücklich.
she was round.about happy
'She was completely happy.'

The classification of the example in (70b), together with additional examples for regular compounds ending in prepositions, are given in (71).⁵⁹

- (71) a. [[rund][um]_{Prep}]_{Adv} (glücklich) ((Rʊnd)_{ωHd}(ʊm)_ω)_{COMP-P}
round.around
'completely (happy)'

⁵⁹In some of these cases the compound can fuse into a single phonological word, forming a single domain for syllabification (e.g., ((hɛl)_{ωHd}(auf)_ω)_{COMP-P} ~ ('hɛlauf)_ω).

- | | |
|---|---|
| b. [[hell][auf] _{Prep}] _{Adv} (begeistert) | ((hɛl) _{ωHd} (auf) _ω) _{COMP-P} |
| bright.up | |
| ‘completely (enthusiastic)’ | |
| c. [[voll][auf] _{Prep}] _{Adv} (zufrieden) | ((fɔl) _{ωHd} (auf) _ω) _{COMP-P} |
| full.up | |
| ‘completely (content)’ | |
| d. [[weit][aus] _{Prep}] _{Adv} (besser) | ((vait) _{ωHd} (aus) _ω) _{COMP-P} |
| far.out | |
| ‘much (better)’ | |
| e. [[über][aus] _{Prep}] _{Adv} (freundlich) | ((ybær) _{ωHd} (aus) _ω) _{COMP-P} |
| over.out ‘most (friendly)’ | |
| f. [[Schluck][auf] _{Prep}] _{N.MASC} | ((ʃlʊk) _{ωHd} (auf) _ω) _{COMP-P} |
| swallow.up | |
| ‘hiccup’ | |

There is nothing “phrasal” about these expressions and they are accordingly classified as regular compounds. As a result, they are subject to left-oriented head alignment manifest in main stress on the initial member.

It is clear that the criteria for classifying compounds as phrasal differ substantially in the cases defined by correspondence with syntactic phrases discussed earlier and those defined by a distribution similar to syntactic phrases presented here. Still in both cases some sort of phrasal properties associate with right-oriented head alignment. This also concerns the last case of compounds associated with final main stress briefly presented in (72). These are known as elative compounds, where the first member denotes a high degree of the property associated with the second member.

- | | |
|-------------------|---------------------|
| (72) a. hundemüde | d. strohdumm |
| dog/s.tired | straw.stupid |
| ‘very tired’ | ‘very stupid’ |
| b. schweinetéuer | e. kerngesund |
| pig/s.expensive | kernel/core.healthy |
| ‘very expensive’ | ‘very healthy’ |
| c. steinreich | f. arschkält |
| stone.rich | arse.cold |
| ‘very rich’ | ‘very cold’ |

Very similar compounds are seen in other languages, including Dutch, where they have been explicitly classified as phrasal (Trommelen & Zonneveld 1986:

157–158). Hoeksema (2012) also discusses several properties setting elative compounds apart from regular compounds in Dutch, including (optional) emphatic lengthening of the vowel to indicate extra high degree (Hoeksema 2012: 98). He further notes the possibility of emphatic reduplicative conjunction, which is also seen in regular free-standing adverbs of degree.

I will not pursue this matter further but simply note that main stress on the final compound members in (72) were captured by right-oriented head alignment, if elative compounds were recognized as phrasal in German as well.

6 Summary

The present article explores the notion of head alignment, based mostly on stress patterns in German compounds. Head alignment constraints, originally proposed by McCarthy & Prince (1993) to capture the most prominent foot in a phonological word, refer to either the left or the right boundary of a specific prosodic constituent, requiring that boundary to coincide with its head constituent. The basic generalization is that the position of main stress within any given prosodic domain always refers to one of the margins, the choice among which is determined by the category of the relevant domain. Reference to the term ‘head’ in this alignment constraint is fitting as it encapsulates both central properties of heads in grammar: uniqueness (only one daughter is picked to function as head) and dominance (assuming that prominence associated with heads can be viewed as a form of dominance).

A central aim of this article is to draw attention to the heuristic value of the notion of head alignment for identifying and defining morphological categories. For instance, the (tentative) assumption of a right-oriented head alignment constraint referring to copulative compounds has motivated the assumption of exocentricity as one of the defining properties of such compounds in German. Words with right-oriented main stress such as *blau-weiß*, *Schleswig-Hölstein*, *Klimbim* belong here whereas forestressed words often cited as examples for copulative compounds such as *Mäntelkleid*, *násskalt* or *Hássliebe* do not meet this criterion. The latter words are indeed characterized by an asymmetry to the effect that the initial member is readily understood as a modifier.

The possible confinement of copulative compounds in German to those which are exocentric raises a further issue pertaining to terminology. If English does in fact allow truly ‘double-endocentric’ compounds such as *hunter-gatherer*, meant to designate one who is equally a hunter and a gatherer, whereas German speakers must resort to syntax to express this sort of equality (*Sammler und Jäger*),

the use of a single label (say, *copulative compound*) in the grammar of the two languages is bound to sow confusion. Here the single label is perhaps best retained, in recognition of the fact that both languages have a class of compounds characterized by a flat structure where all members are on a par and the final member carries main stress. Two subclasses of copulative compounds must be distinguished then: those which allow “double-endocentric” compounds, characterized by equal hyponymy of the compound in relation to each of its members, versus those restricted to exocentric compounds.

Another issue addressed throughout this article concerns the question of how the morphological classification of individual words is established. The question centers on the concept of a ‘bottom-up’ approach, where the structure of complex expressions is determined by the inherent properties of the individual building blocks (morphemes) and the rules for combining them, versus a ‘top-down’ approach, where reference to the complete form is essential to determining categorization. Evidence for the latter model has been mentioned in connection with each compound category. For instance, phonotactic violations resulting from the independently given segmental structure of adjacent morphemes have been shown to motivate morphological decomposition in regular compounds vis-à-vis simplexes, manifest in the location of main stress (*Vóltmeter* versus *Varméter*). Similarly the independently conditioned presence or absence of inflectional markers in compounds consisting of an attribute followed by a noun has been shown to motivate the classification of one as a regular and the other as a phrasal compound, again manifest in the location of main stress (*Féstmeter* versus *Elfméter*).

Evidence for top-down parsing strategies is of interest in that it challenges the empirical adequacy of a pure bottom-up approach often taken for granted in formal linguistics. Here, too, the notion of head alignment constraints defined in terms of specific categories serves as a heuristic for guiding the search for relevant generalizations.

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Chapter 9

Heads and feet in prosody, poetry, and natural metrics

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This paper focuses on three issues concerning headedness vs. grammatical anarchy in German prosody. 1) Language contact: Poetic metres which are designed without metrical heads cannot be transferred to German without heads. 2) Language change and syntactic structure: German(ic) anacruses are ‘headless’ structures in terms of prosody – but the result of subsystem interactions. 3) Theory of metrics: Natural metrics privileges a flat prosodic hierarchy.

1 Poetic metres as long-term experiments of perception

Heads and feet in prosody, poetry, and theories of metrics will be investigated in this paper from the perspective of natural metrics. Natural metrics is part of naturalness theory (cf. Donegan & Stampe 1979, Hurch & Nathan 1996) and takes seriously the evolution of metrical systems as a result of long-term experiments of language perception and production. This implies that metrical systems do not evolve in arbitrary ways but, under default conditions,¹ offer language-based structural features. Within this framework, the question of headedness inevitably leads on to the next question of whether there is independent evidence for internal hierarchies of linguistic structures in traditions of poetic production and reception. The argumentation is not cyclic, because metrical systems change as a consequence of language change (cf. e.g., Noel Aziz Hanna 2008b).

¹Metres which are not forced from outside onto the speakers’ community but develop over long periods of time only stylise linguistic features which are part of everyday speech (Vennemann 1995; cf. also Miller 1902, Allen 1973).



The evolution of a metrical system is a collective decision of the speaker community about the stylisation of their mother tongue. When foreign poetic patterns are transferred into the native system, the integrated patterns are hypotheses about the foreign linguistic system; they are assumptions about structural properties of that language. A theory of metrics, in contrast to poetic practice, is the scholarly perspective on poetic production, i.e. the abstraction of the mentioned collective knowledge as an interpretation of linguistic output. As a consequence, both poetry and metrical treatises offer insights into linguistic structure.

It will be argued in this paper that the German poetic tradition provides evidence for a flat prosodic hierarchy. In this flat prosodic hierarchy, stressed syllables form the heads of feet. There are no layers which extend to morphology (e.g., 'prosodic word') nor to syntax (e.g., 'clitic group'); instead, interactions between phonology, syntax, and other linguistic subsystems are assumed. Three aspects serve to illustrate headedness vs. grammatical anarchy:

1. Language contact: Poetic metres which are designed without metrical heads cannot be transferred to German without heads.
2. Language change and syntactic structure: German(ic) anacruses are 'headless' structures in terms of prosody – but the result of subsystem interactions.
3. Theory of metrics: Natural metrics privileges a flat prosodic hierarchy.

The first aspect gives empirical evidence for an approach which takes the relation between feet and stress seriously. The second one provides evidence that anacrusis cannot be dealt with from the perspective of prosody alone. The third aspect explicates the relation between metrical and phonological theories with respect to headedness.

For a theory of metrics, its phonological foundation as well as the headedness of feet are not trivial issues. The question of whether feet belong exclusively to the domain of metrics or to the domain of prosody, or whether they are inherited from prosodic to metrical systems is a matter of debate. Furthermore, there is the question of whether metrics can be handled exclusively within phonology. Theories of metrics have always been dependent on linguistic theory, which is especially evident with respect to the subject of headedness.

2 Language contact: prosodic and metrical heads

In Standard German well-formed language rhythm, every syllable is assigned to a foot. This is not an arbitrary or mere theoretical regulation, as many examples

dealt with by prosodic morphology, such as morphological shortening, show (cf. e.g., Liberman & Prince 1977, Vennemann 1995; cf. also Drescher & Lahiri 2005 for metrical shortening). The foot implies headedness for German prosody and metrics, i.e. stress.

The relation between prosody and metrics can be demonstrated by the integration of metres without feet² into stress-based metrical systems. The French alexandrine (1a) was transferred to the German metrical system (1b).

- (1) a. French alexandrine: $\sigma\sigma\sigma\sigma\sigma\sigma \parallel \sigma\sigma\sigma\sigma\sigma(\sigma)$
 Je suis, mon cher ami, très heureux de te voir
 I am my dear friend very glad to you see
 (*Asterix et Cleopatra*)
- b. German alexandrine (transl. of (1a)): $|x\acute{x}|x\acute{x}|x\acute{x} \parallel x\acute{x}|x\acute{x}|x\acute{x}|(x)$
 Ich bin, mein lieber Freund, sehr glücklich, dich zu sehen.
 $|x \ \acute{x}| \ x \ \acute{x}|x \ \acute{x} \parallel x \ \acute{x} \ |x \ \acute{x}| \ x \ \acute{x}|x$
 I am my dear friend very glad you to see
 (*Asterix und Kleopatra*)
 'I am very glad to see you, my dear friend.'

There are two revealing innovations in the German alexandrine: anacrusis (cf. Section 3) and stress-based feet. The French syllable-counting alexandrine originally did not have feet.³ Therefore a product of linguistic imitation like the German alexandrine, which clearly is based on feet, provides evidence with respect to prosodic hierarchy in the framework of natural metrics. The German alexandrine is an artistic form which represents the German language community's implicit knowledge about prosodic headedness, more precisely, the structure of prosodic feet.

The French model is constructed without feet: In the 16th century, the French alexandrine consisted of 12 to 13 syllables with a caesura after the 6th syllable (Coenen 1998: 107). The form of the French alexandrine has undergone intense discussion (cf. e.g., Bunia 2014, Dufter 2010); for its integration into German, the relevant question is what was perceived and considered well-formed by its German imitators. Obviously, the number of syllables was understood to be an essential feature of the metre, cf. the definition in Wagenknecht 2007 (s.v. Alexandriner; transl. PN):

²For another aspect of prosodic integration, consider the incorporation of quantitative Classical metre into non-quantitative German metre, cf. e.g., Wackernagel (1831) and Noel Aziz Hanna (2008a).

³For experiments of syllabic alexandrines in the Netherlands and in Germany cf. Gasparov (1996: 192-197).

Metre of French origin: twelve or thirteen syllables (depending on the male or female ending) with a colon after the sixth syllable. [...] Since Opitz, the German alexandrine contains six iambs.⁴

Opitz in his poetic treatment *Buch von der Deutschen Poeterey* (1624) perceived the French alexandrine as an iambic metre and combined this with syllable counting and caesuras. His imitation became a consensus in the German literary tradition. The donor language's 'lack of' foot formation was either not understood or considered non-imitable by the users of the target language. The French alexandrine was not iambic and, what is more, it did not contain feet at all, cf. Meschonnic (1982: 229):

La nuisance du terme *pied* vient de ce qu'il n'y a pas de code métrique, pas de pieds, et, en ce sens, pas de métrique, en français. [...] Comme la seule règle métrique, pour l'alexandrin régulier, concerne l'accent à la 6e et à la 12e position, les autres accents sont rythmiques, non métriques.

This stands in line with French, which is not an iambic language but instead – and fitting well the caesuras – has phrase-final stress (cf. Meschonnic 1982: 229, Kuryłowicz 1945, Jun & Fougeron 2002). For a native speaker of German, however, French disyllabic words sound iambic; words in word lists are stressed like one-word sentences, which, because of the phrase-final stress, are interpreted as iambic feet. Trisyllabic French words would, of course, result in an anapaestic interpretation; the alexandrine, however, was not stylised as a metre with both binary and ternary feet. The reason may be that, in the 17th century, German metricists excluded ternary feet from German poetry.⁵ As a consequence, the iambic interpretation of the alexandrine was canonised.

The linguistic question which poses itself is whether the fact of reading iambs into a metre without feet is indeed language-based. In other words, how likely is the assumption that an integrated metre like the German alexandrine does not encode linguistic structures. If what we find is not the consequence of stress-timed German rhythm, why is there syllable counting plus feet and not just syllable-counting? Why are the feet of the German alexandrine stress-based and not, for instance, mora-based? Why do these feet consist of two syllables instead

⁴“Versmaß französischer Herkunft: Zwölf- oder Dreizehnsilbler (je nach männlichem oder weiblichem Schluß) mit Kolongrenze nach der sechsten Silbe. [...] Seit Opitz baut sich im Deutschen der Alexandriner aus sechs Jamben auf.”

⁵Ternary feet had unsuccessfully been proposed by August Buchner in his *Anleitung zur Deutschen Poeterey* (1665).

of, for example, five syllables? The German pattern shows the aforementioned non-arbitrary innovations. Thus the German iambic alexandrine is an example of fossilised foreign language interference: the French syllable-timed metre was interpreted as an iambic one.

Integrated metrical patterns reveal implicit linguistic knowledge. Foreign linguistic and also foreign metrical patterns can only be interpreted within the boundaries of actual speakers' linguistic horizons. Poets work within the rhythmic categories of their native tongue. Thus native prosody shines through in integrated metres – in the process of integration, metres borrowed by German poets show stress-timed rhythm. Those metres were assessed by sometimes generations of language producers and language recipients. In the German literary tradition, only metrical patterns which could both be successfully produced by poets and easily received by listeners in terms of their linguistic well-formedness were canonised. Both conditions were met with the German alexandrine. The German alexandrine provides independent evidence for the psycholinguistic reality of stress-based feet in German.

3 Language change: anacrusis

Metres stylise sentence rhythm, which results from an interaction between phonology and syntax. The stylisation of sentence rhythm in a metrical pattern means that implicit knowledge of not only prosody but also of syntax is encoded. So what does Germanic anacrusis reveal about headedness?

The Standard German language rhythm is trochaic-dactylic. Nevertheless, the alexandrine, as an 'iambic' metre, fits German so well that it was even used as the predominant verse in German baroque drama. The reason for this fit⁶ is that unstressed syllables typically occur at the beginning of German sentences. Since the Germanic long line is generally assumed to have been filled by a sentence, anacrusis represent beginnings of sentences. Therefore the monosyllabic unstressed syllables at the beginnings of alexandrine lines stand in a long tradition of Germanic anacrusis, with up to fourteen unstressed syllables⁷. Limiting the anacrusis to only one unstressed syllable is a specific trait of the alexandrine in

⁶According to (Hanson & Kiparsky 1996: 294) constraint FIT, "languages select metres in which their entire vocabularies are usable in the greatest variety of ways". The idea of lexical fit is extended in this paper to syntactic fit.

⁷Heusler (1925: §216) gives as an example of anacrusis (italics) in the Old Saxon *Heliand* (*Heliand*, VII, 605.2): *Saga ûs, undar huilicumu he sî thesaro cunneo afôdit* ['Tell us of which of these families he sprouted from'].

the sense of a strict regulation. The alternative to the scansion of the German alexandrine from the beginning of this article (1b) has trochees plus anacrusis instead of iambs (1b’):

- (1b’) German alexandrine: x|ǫx|ǫx|ǫ || x|ǫx|ǫx|ǫ(x)|
 Ich bin, mein lieber Freund, sehr glück lich, dich zu sehen.
 x| ǫ x |ǫ x |ǫ || x |ǫ x |ǫ x |ǫ x |ǫ x

Since the anacrusis forms an unstressed metrical position, prosodic heads are missing there. Yet anacrusis is no counter-evidence to prosodic headedness. The anacrusis does not belong to any measure.⁸ With heads of feet being defined as stressed syllables, this is a trivial statement. The question, however, of why there is anacrusis in Germanic poetry, and how it is to be accounted for in a theory of metrics, is not a trivial one. While the Germanic metrical system is a strictly constrained system, the variation with respect to anacrusis is peculiar. In addition, since there is consensus that Germanic metrics is rooted in music (cf. Hofmann 1963, Jammers 1964), which again presupposes isochrony – at least if the singer was musically accompanied by someone else – strong variation of syllable number in the anacrusis is unexpected. The complication can be subsumed under two aspects (cf. Noel Aziz Hanna 2010):

1. Anacrusis in Germanic metres is, as a rule, not obligatory.
2. The number of syllables in the anacrusis varies considerably.

How does anacrusis ranging from one to fourteen syllables fit an aesthetic pattern which also gets by without anacrusis?⁹ Since there is no foot formation in anacrusis, the answer to why there is no stressed syllable in this position is not a phonological one. The approach presented here assumes a flat prosodic hierarchy, i.e. a prosodic hierarchy which neither extends to morphology nor

⁸The endings of lines are often marked and in many cases can be related to the beginnings of the following lines. However, this is not always successful and thus cannot serve as an explanation for the occurrence of anacrusis. The first anacrusis of a poem, for instance, could not be subsumed under such a principle. Also, offsetting endings of lines against anacrusis would require that the number of syllables in anacrusis is kept within a limit defined by the extended foot. Apart from that, offsetting endings of lines against anacrusis would disregard the function of marked line endings, which signals the end of the line to the recipient of oral poetry.

⁹One has to assume with Heusler (1925: §216) that poems with long series of syllables in anacrusis were not sung. Nevertheless, the question remains why anacrusis came into existence at all, i.e. what caused the structure at the beginning of lines.

to syntax. Instead it is proposed that anacrusis is best dealt with by considering interactions between phonology, syntax, and information structure.¹⁰

The Germanic anacrusis represents a syntactic structure already outlined by Kuhn in the 1930s. Kuhn discusses a systematic difference between Proto-Indo-European and Germanic syntax. Proto-Indo-European beginnings of sentences had been described before by Wackernagel (1892). The Germanic structure corresponding to the Proto-Indo-European version of Wackernagel's Law means a series of unstressed syllables at the beginnings of sentences. Kuhn's Law transfers Wackernagel's Law to Germanic (Kuhn 1933: 8; transl. PN):

Sentence particles are found in the first drop of the sentence, i.e. in proclitic position either to the first or to the second stressed word.¹¹

I suggest that Germanic anacrusis resulted from a compromise between conservative versification and an adaptation to the new state of Germanic syntax. Germanic anacrusis is a remnant of the transition from Proto-Indo-European to Germanic syntax; neither the prestigious Classical Latin nor French poetry, which strongly influenced German literature, share this peculiarity. In Proto-Indo-European syntax, specific words occur in second position after the first word, e.g., coordinating sentence conjunctions, a set of adverbs, and object pronouns. (2) visualises the transition from Wackernagel's Law in Proto-Indo-European to Wackernagel's Law in Germanic, using, by way of example, two translations from Latin (cf. bold elements).

- (2) a. Latin coordinating sentence conjunction
Vivamus mea Lesbia, atque amemus,
*rumores**que** senum severiorum*
omnes unius aestimemus assis!
 (Catull, *Carmen* 5)
- b. German coordinating sentence conjunction (transl. by Eduard Mörike)
Lass uns leben, mein Mädchen, und uns lieben,
***Und** der mürrischen Alten üble Reden*
Auch nicht höher als einen Pfennig achten.

¹⁰Syntactic or information-structural influence on metrical structures are rarely investigated. Hayes (1989: 224), for instance, states: "I would like to suggest that metrical rules NEVER refer to syntactic bracketing. In other words, syntax has effects in metrics insofar as it determines the phrasings of the Prosodic Hierarchy. [...] Intuitively, the hypothesis states that meter is essentially a phonological phenomenon."

¹¹"Die satzpartikeln stehen in der ersten senkung des satzes, in der proklise entweder zu seinem ersten oder zweiten betonten worte."

- c. English coordinating sentence conjunction (transl. by Thomas
Campion)

*My sweetest Lesbia, let us live and love;
And though the sager sort our deeds reprove,
Let us not weigh them.*

In (2a), the enclitic Latin sentence conjunction occurs in second position. The German (2b) and English (2c) translations, in contrast, show the corresponding conjunction in first position. Most Wackernagel elements occur regularly in first position in Germanic, with the exception of Gothic. They can also occur before the second stressed word, because the Wackernagel chain can be interrupted, e.g., by the finite verb.

Initial position of Wackernagel elements corresponds to anacrusis in Germanic metrics. By contrast, in languages with second-position placement of these elements – i.e. the position originally described by Wackernagel – the chance of sequences of unstressed words at the beginnings sentences is low. Gothic, as the oldest attested Germanic language, shows characteristics which are similar to Proto-Indo-European syntax; for example, its enclitic coordinating sentence conjunction *-uh* ‘and’ occurred in second position.¹²

If the Germanic alliterative verse had its roots in a language with a syntax similar to Gothic, the complication of Germanic anacrusis would not have occurred at first. The change of Proto-Indo-European Wackernagel syntax to the Germanic variant of Wackernagel syntax meant a considerable increase of elements in the left sentence periphery before the first stressed content word (cf. Figure 1; for details cf. Noel Aziz Hanna 2015). The high number of syllables in Germanic anacrusis is the result of language change.

In alliterative verse, the first rhematic word, i.e. usually the first content word, alliterates. Wackernagel’s Law does not encompass elements prone to rhematicity, which is why Wackernagel elements usually do not alliterate. Although the syntax had changed, the metrical system at first remained conservative: The ‘new’ unstressed syllables at the beginnings of sentences were not integrated

¹²cf. Wackernagel’s Law in Krisch’s presentation (Krisch 1997: 283–284):

1. #X(E).....#
X = one word (default)
E = Wackernagel enclitic
2. #X(E₁)C(E₂).....#
E₁ and E₂ = Wackernagel enclitics
E₁ = enclitic coordinating conjunctions
E₂ = sentence particles and enclitic pronouns
C = subordinating conjunctions, relative pronouns, question pronouns, verbs

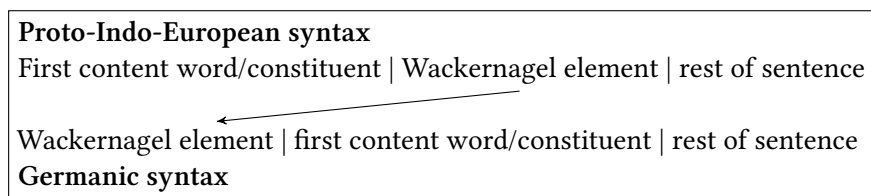


Figure 1: The change from Proto-Indo-European to Germanic beginnings of sentences

rhythmically into the line, because the principle of assigning the stave to the first rhematic word still prevailed.¹³

Is the Germanic anacrusis a headless position? The above argumentation demands a syntactic perspective on the structure. In order to investigate the serialisation principles within the German Wackernagel chain, a corpus analysis (1.900.000 words, 190.000 sentences from different genres and regions, starting from Old High German)¹⁴ was carried out (for details see Noel Aziz Hanna 2015). (3a) with the Wackernagel chain *endi – auur* gives an example of two adjacent Old High German Wackernagel elements. Elements which interrupt the Wackernagel chain (e.g., finite verbs or prefields) were skipped, cf. (3b) with the Wackernagel chain: *endi – auur – ni*.

(3) Scopal serialisation (Wackernagel elements underlined)

- a. Endi auur ist auh chiscriban:

and but is also written.PII

‘And then it is also written:’ (Althochdeutscher Isidor, IV, 11)

Interrupted chain

- b. Endi so ir auur dhuo ni uuas huuerfandi zi dhies ęrrin

and so he but there not was come.back.PI to the former.GEN.SG

meghines uueghe.

virtue.GEN.SG way.DAT.SG

‘And so he did not get back there to the way of virtue.’

(Althochdeutscher Isidor XXIX, 11–13)

¹³As literary history shows, this principle of versification was given up with time. There are no long sequences of syllables in anacrusis any more. In early Middle High German, however, trisyllabic anacrusis is still frequent, and anacrusis with five to six syllables can occur (Paul & Glier (1961: §53). In the *Nibelungenlied*, disyllabic anacrusis is still possible (Reichert 2005: 37). Despite the prestigious Romance ideal of syllable-counting poetry, variation in the anacrusis was upheld as a principle. In the late Minnesang, anacrusis became more and more regulated.

¹⁴I am grateful to the IT-Group of the LMU Munich, especially to Christian Riepl, for their indispensable help in programming the SQL database.

The corpus, in combination with the Gothic evidence, revealed the exceptionless order of elements presented in Figure 2.¹⁵

Coordinating sentence conjunctions	Sentence mood markers	adverbial connectors	sentence negation	object pronouns
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Figure 2: Preferred serialisation in the Wackernagel chain

The serialisation within the Wackernagel chain follows the scope of elements. Coordinating sentence conjunctions precede sentence mood markers which precede adverbial connectors followed by sentence negation and then object pronouns. Scope decreases from left to right in the chain; it causes the default serialisation within the chain.¹⁶

Scopal serialisation regulates the organisation of sentence beginnings; clearly neither this principle which regulates the relative position of elements in anacrusis nor the information-structural selection of elements in anacrusis are subject to phonology. Unstressedness in anacrusis is derivable because the involved elements are non-rhematic, contributing to discourse organisation, coherence, and cohesion. Thus, although the effect is stresslessness, its motivation lies in information structure.

4 Natural metrics: privileging a flat prosodic hierarchy

Both phonological theories and theories of metrics differ substantially with respect to the concept of headedness. There are, for instance, theories of metrics based on multi-layered prosodic hierarchies¹⁷ which rely on phonology only and theories of metrics which regard feet without relation to speech rhythm. The re-

¹⁵ As has been noted above, the chain does not contain rhematic elements. Topicalised negation particles as well as topicalised object pronouns are excluded.

¹⁶ Coordinating sentence conjunctions refer to two sentences and thus have the widest possible scope. Following sentence mood markers, such as the Gothic question particle *-u* (cf. Noel Aziz Hanna 2013 for its placement), signal the status of the sequence of words as a sentence by fixing its mood; consequently, these markers are the highest heads of the sentence after coordinating sentence conjunctions. Then follow adverbial connectors and the sentence negation in Wackernagel position; adverbial connectors like German *nämlich* ‘namely’ cannot be negated. When seen in the light of scopal serialisation, enclitic pronouns have the narrowest scope in the Wackernagel chain. As an ordering principle, scope has already been proposed for Hittite (Luraghi 1990).

¹⁷ I.e. in contrast to a flat prosodic hierarchy, which does not extend to morphology or syntax.

lation between head and foot is another controversial issue, both in metrics and phonology; the phonological foot plays a major role in theories of metrics, even if a relation between head and foot is rejected. Metrical terminology transports all sorts of theoretical preconditions; differences in concepts of metrical headedness transport conflicting ideas of prosodic hierarchies.

For illustration, iambicity has been interpreted non-perceptually. Fabb & Halle (2009: 167;170) describe the French alexandrine – as well as all other French syllable counting metres – as iambic:

All French meters are in fact organized into iambic feet. [...] The grid is not a record of the line that we produce or hear.

Fabb & Halle (2009: 171) aim at the representation of their knowledge about the metrical form of a line and note that their approach hightens “the aesthetic pleasure that competent readers derive from reading verse”. This approach shows an iambic interpretation which differs strikingly from the iambic interpretation of both poets and metricists presented in the sections above. Though it is based on headedness, the concept is not linked to the perception or production of linguistic rhythm.

The metrical approach of Hayes (1989: 221) points to another direction, representing a synchronic categorisation of metrical production: “Metrics can be defined as the study of how conventionalized rhythmic patterns are manifested in linguistic material”. Being grounded on multi-layered phonology and stressing parallelisms between metrical and prosodic hierarchies, metrics remains within the field of phonology. With respect to anacrusis, Hayes (1989: 256-257) describes the beginnings of lines as “extra freedom”:

It may be that the principle [“beginnings free, endings strict”] must be accepted as a basic postulate of metrics, unless it follows from deeper psychological principles unknown to me.

While natural metrics shares with Hayes’ theory the close orientation to the linguistic material, it differs from it with respect to the role of linguistic subsystems other than prosody.

Among the phonological theories which criticise multi-layered phonological hierarchies is the approach of Halle & Idsardi (1995: 439;440–441):

We deny the hypothesis that units of prosody are strictly layered in a hierarchy. [...] In our framework, the foot is not a theoretical primitive. Rather,

metrical boundaries are placed among the stress-bearing elements. In this way, the sequence of stress-bearing elements is subdivided into constituents of various kinds, including iambs and trochees, although iambs and trochees have no privileged status.

Subsequently, the relation between head and foot has at times been called into question. For instance, Hyde (2002: 313), in an OT analysis of binary stress systems, proposes that feet can overlap, making the foot-stress relationship violable and “allowing feet to remain stressless under appropriate rankings”. Similarly, the common structure of poetic and phonological feet has been questioned: “Poetic feet are constituents, and they can be aligned to stress positions, but they have no heads” (Van Oostendorp 2017: 1); accordingly, poetic feet exist just in the interface with phonology since they have no ontology of their own (Van Oostendorp 2017: 11).

The different conceptions of theories of metrics demonstrate that phonological theory is directly transferred to theories of metrics. As a matter of course, this is also the case with natural metrics. Natural phonology neither fits the idea of non-perceptual metrics¹⁸ nor the idea of hierarchical levels in the sense of phrasal phonology which extends to morphology or syntax. In the preceding sections, I have argued instead that prosody, syntax, and information structure are stylised in metrical systems. The phonological share in the metrical system of Standard German has been described with reference to stressed and unstressed syllables building left-headed feet. It has been argued that specific phenomena like anacrusis are derivable from linguistic subsystems other than phonology. Natural metrics privileges a flat prosodic hierarchy.

In contrast, in phonological approaches with multi-layered prosodic hierarchies, the prosodic word, which rests on stress and foot formation, is considered the domain of basic foot formation (e.g., Nespor & Vogel 1986). Féry (2000: 147) notes that the prosodic word ideally conforms to a language’s unmarked foot which at the same time is the unmarked prosodic word. From the point of view of the framework presented in this paper, Occam’s razor applies, since the prosodic word is an extra assumption. Rhythmic well-formedness conditions are not restricted to the domain of the word but, on the contrary, apply to well-

¹⁸ An anonymous referee notes: “I take it that metrics is by definition abstract knowledge of poetic forms, and therefore, by its very nature, non-perceptual.” Literary history documents how this knowledge was arrived at; the genre of poetics provides evidence for a perceptual basis of metrics. To give an example, Voß, with his poetics *Zeitmessung* [The measuring of time] (1802), introduced a list of criteria which aimed at enabling poets to distinguish between long, short, and middle-timed syllables.

formedness on the sentence level (e.g., Vennemann 1986: 58, Noel Aziz Hanna 2003). The prosodic word, from a sentence-rhythmic perspective, is a result of rhythmic descriptions of isolated words;¹⁹ word lists in turn are one-word sentences and thus marked occurrences. As another part of the multi-layered prosodic hierarchy, the clitic group was developed, because the prosodic word was considered to be not larger than a complete morphological word. Thus clitics cannot form a phonological word with their hosts – a notion which sometimes has been doubted (cf. e.g., Stechow 1993: 54).

There is no evidence for a stylisation of prosodic words or clitic groups in the German metrical patterns known to the author of this paper. If the assumed iambic feet of the German alexandrine coincided with prosodic words, the choice of words would be very limited. In addition, the choice of elements in anacrusis is not derivable from phonology. A flat prosodic hierarchy matches not only the output of generations of singers and authors but also traditional philological analyses. Paul (1905: §16); transl. PN) describes the German versification system as follows:

It is the nature of German verse that the *measures* in which it is organised follow the rhythm of natural speech, i.e. *measures of speech*, and start with the most stressed syllable. The first measure may be preceded by an anacrusis of one or more unstressed syllables. This organisation has been characteristic of the earliest rhyming poetry and has been obscured temporarily in learned poetry but never in folk verse (syllable counting).²⁰

Both aspects, anacrusis and the German prerequisites for successful syllable counting, have been treated in this article from the perspective of speech rhythm typology while at the same time considering the interactions of phonology, syntax and information structure. The approach takes both the metrical patterns' origin from spoken language into account as well as the original function of metrics as a mnemonic device. The fact that German metrics has from its beginnings

¹⁹An anonymous referee asks: "Does the author wish to claim that rhythmic well-formedness conditions *only* apply at the sentence level or that they apply within *both* word *and* sentence phonology?" Rhythmic well-formedness conditions also apply to one-word sentences. Since, however, one-word sentences are not the rule, but the exception, phenomena like rhythmic asymmetries find their motivation on the level of the sentence (Noel Aziz Hanna 2008a).

²⁰"Es gehört zum Wesen des deutschen Verses, dass die *Takte*, in die es zerfällt, sich an die Takte der natürlichen Rede, die *Sprechtakte* anschließen und mit der stärkstbetonten Silbe beginnen. Dem ersten Takte kann ein aus einer oder mehreren unbetonten Silben bestehender Auftakt vorangehen. Diese Gliederung kennzeichnet schon die älteste Reimdichtung und sie ist nur vorübergehend in der Kunstdichtung, nie in der Volksdichtung verdunkelt (Silbenzählung)."

been based on feet provides independent evidence for the psycholinguistic reality of prosodic heads. What constitutes a head in a metrical pattern changes when the phonological system changes (cf. e.g., Vennemann 1995, Noel Aziz Hanna 2008b).

Coming back to the integration of the French alexandrine, the metrical question at issue is why the German alexandrine has traditionally been described as metre with right-headed feet instead of a left-headed one with anacrusis. According to Rudolf Westphal (1892: 154), one of the founders of comparative metrics, it is irrelevant whether one talks of an iambic pattern or a trochaic one with anacrusis because they are one and the same thing.²¹ In contrast, in the proposed framework of natural metrics, the evolution of an iambic or a trochaic metre makes a significant difference. Right-headed metres are to be expected for right-headed prosodic systems, left-headed metres for left-headed prosodic systems. The trochee as a left-headed foot fits in well with the German poetic tradition as well as with Germanic prosody. Right-headed feet, however, neither fit the German poetic tradition nor German prosody.²²

Yet metrical terminology is not arbitrary but of cultural interest. The evolution of the German alexandrine as an iambic metre with six feet from a French source without feet has been argued to result from the language-specific imitation of a prestigious non-native pattern. Building feet (in addition to syllable counting) is a foreign language interference. The traditional metricists' terminology of the 'iambic' alexandrine rests on the same linguistic interference. The reason, however, why the alexandrine could be successful in German literature is that it was produced by German authors and perceived by German listeners as a trochaic metre with anacrusis.

Natural metrics allows an analysis of the language-specific emergence of metrical systems. Deviations from the expected, such as the existence of anacrusis or a right-headed metrical pattern despite a left-headed phonological system, are not interpreted as arbitrary occurrences but as indices in the Piercean sense. The German alexandrine and the Germanic anacrusis point to collective phonological and syntactic knowledge. In this sense, deviations from the expected metrical patterns lead to new research questions.

²¹ "Es ist genau dasselbe, ob wir Iambus oder anakrusischer Trochäus sagen."

²² An anonymous referee notes: "Given that English boasts an impressive tradition of poetry written in iambic pentameters, I am reluctant to accept these claims." The name of the English metre does not lead to a decision here. While the genealogy of the English iambic pentameter is controversial (Classical, native, Romance, mixed), the English iambic pentameter "had been written in great numbers for two centuries (Chaucer) before it was given any Cl[assical] name" (Preminger & Brogan 1993, s.v. pentameter).

5 Conclusion

At the beginning of this paper, three aspects were emphasised:

1. Language contact: Poetic metres which are designed without metrical heads cannot be transferred to German without heads.
2. Language change and syntactic structure: German(ic) anacrusis are 'head-less' structures in terms of prosody – but the result of subsystem interactions.
3. Theory of metrics: Natural metrics privileges a flat prosodic hierarchy.

The three aspects were exemplified by the integration of the French alexandrine into German and by the evolution of Germanic anacrusis. The fact that the German alexandrine uses feet, even though it was integrated into the German metrical system from a source without feet, provides independent evidence for the psycholinguistic reality of phonological feet. The head of the foot is the stressed syllable. It is salient for both producers and recipients of language and poetry.

Anacrusis, trivially, means a succession of unstressed syllables at the beginnings of lines; these syllables are not grouped into feet. This peculiar asymmetry in poetic form cannot be motivated on phonological grounds alone. Instead, Germanic anacrusis has been motivated by an interaction of phonology, syntax, and information structure; more exactly, it stems from a transition of Wackernagel's Law from Proto-Indo-European to Germanic.

Prosodic words, clitic groups, and other aspects of a multi-layered prosodic hierarchy have not been stylised in German versification. In a framework of natural metrics, both the German alexandrine and the Germanic anacrusis provide evidence for a flat prosodic hierarchy.

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Chapter 10

Burning down the phrase and heating up the head: The interjectionalization of German *von wegen*

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While bare prepositional heads usually do not develop into interjections in German, the interjection *von wegen* is an exception, it traces back to the complex preposition *von wegen*. In this paper it will be shown that *von wegen* arose substantially from dialogic language use as a verbal means to reestablish prior speech acts in order to react to them. While its semantic and pragmatic development followed the common diachronic path from a descriptive meaning to a text-/discourse-structuring and affect-/stance-related meaning, its structural development was less usual since it involved the structural reduction of an exocentric phrase to its head. This paper suggests that some aspects of this change might be addressed as head-status change, head-category change and head-feature change.

1 Introduction

In German, lexicalization of complete PPs is a common outcome of linguistic change, cf. entrenched PPs such as *zum Beispiel* ‘for example’, *auf gut Glück* ‘haphazardly’, *vor Freude* ‘for joy’ and *zwar* ‘indeed, admittedly’¹ as some random examples. The lexicalization of PPs can also lead to de- and recategorization as an interjection, cf. deprepositional interjections such as *um Himmels willen* ‘good heavens’, *in Dreiteufels Namen* ‘in three devils’ name’, *bei Gott* ‘by Jove!’, *am*

¹*Zwar* is a fused and decategorized descendant of *ze wäre* ‘for real’ (cf. Kluge 2002: 1020).



Arsch ‘my ass’, *zum Kuckuck* ‘dash it!’ and *fürwahr* ‘forsooth!’². Following Fries’ (1992, 2002) approach of interjections as heads of interjection phrases (INT⁰, INTP), this pathway of “interjectionalization” (“Interjektionalisierung”, Nübling 2001) can be reconstructed in terms of PP > INT⁰ (see also Ehlich 1986, Reisigl 1999, Nübling 2004 on interjections).

At first sight, only full-fledged PPs with nominal complements (preferably from specific lexical domains, e.g., sacral and profane nouns) seem to be qualified to be reanalyzed as interjections in German. The reanalysis of prepositional heads alone in terms of P⁰ > INT⁰ seems to be blocked instead. However, even though the path PP > INT⁰ is certainly much more common in German, there is at least one remarkable exception that reflects a development along the path P⁰ > INT⁰: The present-day German interjection *von wegen* ‘my foot’ did not arise from a full PP but traces back to the Early Modern High German prepositional head *von wegen*. In this paper, I will look at the forms and functions of present-day German *von wegen* in spoken data in Section 2 before reconstructing the diachronic steps of its development in Section 3 and arriving at some observations and considerations on why a development along the path P⁰ > INT⁰ is less frequent in German in comparison to the alternative path PP > INT⁰ in Section 4.

In particular, it will be argued that the reanalytic steps leading to the emergence of *von wegen* arose essentially from peculiarities of dialogic language use such as the necessity to reestablish accessible speech acts in order to react to them. Accordingly, this study is substantially based on examples from dialogic contexts.³ The present-day *von wegen* examples are taken from the “Datenbank für Gesprochenes Deutsch (DGD)” (‘Database for spoken German’) and are transcribed according to GAT 2 conventions (cf. Selting et al. 2009).

The historical examples come from the “Corpus der altdeutschen Originalurkunden bis zum Jahr 1300” (‘Corpus of Old German Original Charters up to the year 1300’, 13th century, mainly Central and Upper German)⁴ and from Early Modern High German letters. The examples from letters in this study are primarily taken from “Actenstücke und Briefe zur Geschichte des Hauses Habsburg im Zeitalter Maximilian’s I” (‘Records and Letters Pertaining to the History of the House of Habsburg in the Age of Maximilian I’, 15th century, Upper German) and from “Aktensammlung zur Geschichte der Basler Reformation in den Jahren 1519 bis Anfang 1534” (‘Collection of Records Pertaining to the History of the Basel

²*Fürwahr* traces back to the Middle High German PP *vür wār/vür wāre* ‘for real’ (cf. Grimm & Grimm 1878: 927).

³Methodologically, the study is qualitative.

⁴It contains the oldest instances of the circumposition *von – wegen*.

Reformation in the Years 1519 until Early 1534', 16th century, Upper German), but the study is also based on an analysis of examples from the corpus "Frühneuzeitliche Fürstinnenkorrespondenzen im mitteldeutschen Raum" ('Early Modern Correspondences of Princesses in Central Germany', 16th – 18th centuries, Middle German) and from letters by Hildebrand Veckinchusen (15th century, Low German). All examples mentioned in this paper will contain references to the corpus or edition they are taken from.

2 The present-day German interjection *von wegen*

The present-day spoken German interjection *von wegen* is a common emphatic expression of disagreement.⁵ The following example shows this use:⁶

(1) *Von wegen* as an interjection in spoken German (DGD, FOLK_E_00132)

- | | | |
|-------|---------|---|
| 1 | JA: | [einfach keine schönen Möglichkeiten,
'simply no nice possibilities' |
| 2 | | was zu MACHen.]
'to do something' |
| 3 | AM, KA: | [((giggle))] |
| 4 | PA: | verHÖkere sie [an andere spieler (weiter).]
'sell them to other players' |
| 5 | AM: | [ja weil WIR die ganzen (kart hent)?]
'yeah because we have all the cards' |
| 6 | AM: | [((giggles))] |
| 7 → | JA: | [ja weil ihr HORTet.]
'yeah because you're hoarding' |
| 8 | AM: | <<smile voice> ja,>
'yes' |
| [...] | | |
| 88 | AM: | [wo::w.] |
| 89 | ?: | [((claps her/his hands one time))] |
| 90 | KA: | [((laughs))] |

⁵Note that present-day German *von wegen* can also be used to initiate direct speech in terms of a conversational "reporting frame" (cf. Bucker 2009, 2013, see also Androutsopoulos 1998: 307–310). Since the reporting frame *von wegen* is the outcome of a diachronic path of development in its own right (cf. Bucker 2022), this paper will restrict itself to the diachronic emergence of the disagreeing *von wegen*.

⁶For the sake of simplicity, the line numbering of the transcripts in this section starts with 1.

- 91 JA: nicht SCHLECHT.
 ‘not bad’
92 → KA: **von !WE!gen.**=
 ‘so much for’/‘my foot’
93 → [=wir HORTen?]
 ‘we’re hoarding’
94 AM: [triUMPH.]
 ‘victory’
95 AM: triUMPH. ((laughs))
 ‘victory’

This extract is taken from a conversation between four friends who are playing the board game “Thurn und Taxis”. In the game, JA and PA on the one hand and KA and AM on the other are both trying to build up the most comprehensive network of post offices in a 17th century Germany setting. In the first segment of the extract (lines 1–8), JA complains that his possibilities to improve his situation in the game are restricted because AM and KA are “hoarding” (cf. line 7) a large number of city cards which are necessary to establish postal routes. About 50 seconds later, AM and KA make use of their city cards in order to finish a lengthy postal route (cf. the second segment of the extract, lines 88–95), and JA has to concede that this achievement was not bad at all (cf. line 91). In reaction to JA’s concession, KA reestablishes JA’s “hoarding” claim in line 7 in order to reject it by means of the emphatically stressed *von wegen* (cf. lines 92–93), whereas AM expresses her enthusiasm for the victory points they just gained (cf. 94–95).

In example (1), *von wegen* can be translated either as ‘so much for’ or as ‘my foot (eye, ass, ...)’, ‘my foot’ probably being the better translation as *von wegen* clearly expresses disagreement. In example (2), *von wegen* is again used as an expression of disagreement, but this time it can only be translated as ‘my foot (eye, ass, ...)’:

(2) *Von wegen* as an interjection in spoken German (DGD, FOLK_E_00255)

- 1 → AG: jetzt geht der schöne winter (0.2) dem [ENde zu.]
 ‘now the beautiful winter is coming to an end’
 2 BS: [hm::]
 3 (0.4)
 4 AG: HEUT ist [er pampig-]
 ‘today he’s snotty’
 5 → PD: [von !WE!gen.]
 ‘my foot’

- 6 → PD: es wird noch [KÄLter wieder.]
 ‘it will get even colder again’
- 7 BS: [also es ist] GLATT im (.) bei uns in der;
 ‘well it is icy in the – at our place in the’

Example (2) is an extract from a “coffee klatch” conversation between four women. The extract starts with AG claiming that the winter weather is about to come to an end (line 1). Since her conversational partners do not take over the turn after that (cf. the pause in line 3), AG tries to carry on with another topic (cf. line 4). PD, however, interrupts AG by means of an emphatically stressed *von wegen* and a counterclaim to her assumption of the winter weather ending (cf. lines 5–6). This keeps the focus on the weather topic for the subsequent turn (cf. line 7).

At first sight, the *von wegen* instances in example (1) and example (2) look very similar: Prosodically, *von wegen* has a strong emphatic accent on the trochee *wé-ge-n*; semantically, *von wegen* expresses disagreement with a prior claim by one of the addressees; syntactically, *von wegen* occupies an independent position right in front of a subsequent syntactic unit; functionally, *von wegen* has substantial weight as an action in its own right, it expresses a full-fledged challenge of a prior claim.

However, the sequential context and the relationship between *von wegen* and the subsequent utterance are actually quite different in the two examples:

- In example (1), *von wegen* expresses disagreement concerning a prior claim that is accessible but not contextually active anymore. Against this background, the subsequent *wir horten* ‘we’re hoarding’ serves as a quotative index that reestablishes a preceding speech act *von wegen* is reacting to.
- In example (2), *von wegen* expresses disagreement concerning a prior claim that is both accessible and contextually active. Against this background, the subsequent *es wird noch kälter wieder* ‘it will get even colder again’ is not a quotative index but a counterclaim reinforcing *von wegen* and making the propositional content of the disagreement explicit. This is the reason why *von wegen* cannot be translated as ‘so much for’ in (2).

The difference between the utterances immediately following *von wegen* in examples (1) and (2) is not only a matter of pragmatics but also a matter of syntactic positioning. Note that quotative indexes and counterclaims can easily combine after *von wegen*, but in such cases, the quotative index (e.g., *der Winter endet* ‘the winter weather ends’) has to precede the counterclaim (e.g. *es wird noch kälter wieder* ‘it will get even colder again’), cf. *von wegen der Winter endet, es wird noch*

kälter wieder ‘my foot the winter weather ends, it will get even colder again’. This is also reflected on the prosodic level: Just like in example (1), quotative complex anaphors tend to follow *von wegen* fast (“latching”) or are even a part of its intonation phrase. Counterclaims, in contrast, are usually separated from adjacent *von wegen* intonation phrases more clearly (cf. example (2) without “latching”).

In the next section, it will be shown from a diachronic point of view that the pragmatic relationship between *von wegen* and subsequent quotative indexes is a reanalyzed remnant of a former syntactic relationship between *von wegen* as a prepositional head P^0 and its complement, while the pragmatic relationship between *von wegen* and subsequent counterclaims is a reanalyzed remnant of a former syntactic relationship between hanging topic instances of *von wegen* PPs and their subsequent host clauses.

3 The diachronic interjectionalization of *von wegen*

3.1 The rise of prepositional *von wegen* in Early Modern High German

The complex preposition *von wegen* is syntactically derived from the circumposition *von – wegen* in terms of a linearization change beginning in the 14th century.⁷ The change from *von – wegen* to *von wegen* did not affect the semantic and pragmatic characteristics of *von – wegen* but maintained them for the most part.⁸ In the 13th century, *von – wegen* PPs were predominantly used as one of the following three adjunct types:

- (3) Causal adjunct (1284, Corpus der altdeutschen Originalurkunden II, Doc. No. 673, lines 19–20; cf. Wilhelm & Newald 1943: 86):

fo ift von beiden fiten gýtlich / vnd einmýtlich verzigen auf allen den
fchaden der *von def Chrieges wegen* / biz auf difen tac hivte ift gifchehen
‘so both sides amicably and consensually waive the compensation for the
damage that has been done till this day *due to the war*’

⁷The earliest instances of *von wegen* can be explained both by an influence of the well-known positional shift of attributive nouns from pre- to postposition (cf. Demske 2001: 215–231 and Nübling et al. 2013: 100–101, among others) and by syntactic adaption to the prototypical head-initial pattern of German prepositions. See Paul (1995: 106–120), Bloomfield (1933: 404–124) and Becker (1990: 14ff) on analogy formation in language change.

⁸Structural and semantic changes that set the preposition *von wegen* apart from the circumposition *von – wegen* happened later.

- (4) Modal adjunct establishing a person or institution from whose side or under whose authority the action being expressed in the host clause proposition is carried out (1286, Corpus der altdeutschen Originalurkunden II, Doc. No. 841, lines 21–23; cf. Wilhelm & Newald 1943: 192):

dat men en geenrehande scade fal doen noch mit roue - noch mit brande -
noch in geenre maniren - *uan des hertogen Wegen* - noch *uan unfer wegen*
'that one shall not do any damage, neither with robbery nor with pillage
nor in any other way, *on behalf/the part of the Duke or on our behalf/part*'

- (5) Domain adjunct establishing a domain of conceptual content with regard to which the validity of the host clause proposition is restricted (1297, Corpus der altdeutschen Originalurkunden IV, Doc. No. 2687, lines 34–36; cf. de Boor & Haacke 1963: 78):

vnde [wir, J.B.] verziehen vnf / vúr vnf / vnde vúr alle vnfere nahkomen
/ allef def rehtes / daz wir hatten an demme vorgeantent hove / *von der
felben vorgeantent fúnzehen fchefol koren geltes wegen*
'and [we, J.B.] abandon every of our and our descendants' rights that we
had on the estate mentioned above *regarding those above-mentioned fifteen
bushels' corn rent*'

The domain adjunct use (example (5)) is of particular importance for this study because it can be assumed to be the semantic, syntactic and pragmatic starting point of the diachronic development towards *von wegen* as an interjection of disagreement (see Subsections 3.2 and 3.3).

3.2 The increasing scope of *von wegen* in Early Modern High German

While the circumposition *von – wegen* dates back to the first half of the 13th century, the complex preposition *von wegen* emerges in the mid-14th century and becomes productive in the 15th century. This study assumes the restrictive *von wegen* to be the starting point of its diachronic development towards the disagreeing interjection *von wegen*. Let's start with an Early Modern High German instance of *von wegen* as a head of a restrictive domain adjunct that looks quite similar to 13th century examples such as (5) – it provides a conceptual point of reference with regard to which the action or state being expressed in the proposition is restricted (example (6) is taken from a letter by Heinrich of Puchheim to the court chancellery of the Holy Roman Emperor Maximilian I):

- (6) Restrictive prepositional domain adjunct with propositional scope (1477, Geschichte des Hauses Habsburg II, Doc. No. 116; cf. Chmel 1968a: 304):
Als dann sein k. gnad *von wegen des umgeltz zu Liechtmwerd* ausrichtung und raittung begert, nun hab ich meinen brief und urkunnd damit ich sein k. gnad desselben hanndels unterrichtung mocht yetz nicht bey hanndn
'As then his Imperial Highness is asking for a notification and accounting *regarding the dues of Lichtenwerd*, as a matter of fact, I don't have my record and document at hand by which I intended to inform his royal grace about this business'

In example (6), the proposition of the host clause is restricted to all contextually relevant matters that relate to "the dues of Lichtenwerd", and the subsequent clause is oriented towards this restriction (cf. *desselben hanndels* 'this business'). Just like in example (5), the grammatical shape of the complement of *von wegen* indicates accessibility (cf. the definite article *des* in *des umgeltz zu Liechtmwerd*). This is because (6) is part of a reply to a preceding letter by the court chancellery of Maximilian I that included the following passage:

- (7) Context of example (6) (1477, Geschichte des Hauses Habsburg II, Doc. No. 15; cf. Chmel 1968a: 302):
Item so sol er [= Heinrich of Puchheim, J.B.] seinen kaiserlichen gnaden ierleich von ungelt zu Liechttenwerde 8 pfunt pfenning geben die er lanngze nit geraicht hat, begert sein kaiserlich gnad daz er dauon raittung tu und was er mit raittung dauon schuldig wirdet daz er das seinen kaiserlichen gnaden ausrichtte und gebe.
'Item he [= Heinrich of Puchheim, J.B.] is obliged to give his Imperial Highness 8 pound of pfennigs of the dues of Lichtenwerd each year which he has not been doing for a long time now, his Imperial Highness asks that he gives an account hereof, and about what he is owing according to the account, he shall inform his Imperial Highness and give it to him.'

Example (6) and its context (7) show us the following:

- The restrictive *von wegen* can recycle linguistic material from the preceding verbal context in its complement position (cf. *ungelt zu Liechttenwerde* in example (7) and the repetition *umgeltz zu Liechtmwerd* in example (6)).
- The recycling can be done to identify an accessible speech act in the context (cf. the request by the court chancellery of Maximilian I in example (7)) in order to prepare a reaction to it (cf. the answer to the request by Heinrich of Puchheim in example (6)).

With regard to the addressee of example (6) (i.e., the court chancellery of Maximilian I), the prior speech act in (7) can be assumed to be accessible, but not active for three reasons. First, an exchange of letters is a temporally “stretched” way to communicate, i.e. the letter with the request and the letter with the answer follow each other with significant delay. Second, a reply to a big court chancellery has to take into consideration that the chancellery is concerned with a multitude of different issues and thus needs hints to the specific background of the reply. Third, the two letters do not only consist of the request and the answer that are cited in (6) and (7). They also deal with other topics and issues.

For these reasons, the request for the account has to be reactivated before it can be answered. This is achieved by the host clause of the *von wegen* PP, but not by the *von wegen* PP itself – note that the *was*-clause does not yet express a reaction but only prepares it, while the subsequent claim starting with *nun hab ich meinen brief und urkunnd [...]* is the reaction. Obviously, the *von wegen* PP does not establish its syntactic host as a speech act reacting to a preceding speech act but just modifies it with propositional scope in terms of a domain adjunct.

While the *von wegen* PP in (6) clearly has a propositional scope, the following example shows that specific contexts can allow for an interpretation of *von wegen* either with propositional scope or with speech act scope (cf. example (8) from a synopsis of a letter from the Styrian administrative district to the court chancellery of Maximilian I):

- (8) Restrictive prepositional domain adjunct with ambiguous scope (1479, Geschichte des Hauses Habsburg III, Doc. No. 144; cf. Chmel 1968b: 331):

Item *von wegen der lehen* ist der lanndschaft antwurtt, daz sy getrawn seinen k. g. trew und gewerttig allzeit gewesen, und sich gehalten als die trewn unndertanen und auch lehenslewt.

‘Item *regarding the fiefdom* is the answer of the district, that they have always been loyal and subservient to his Imperial Highness and acted like loyal subjects and vassals as well.’

The answer that is referred to in this synopsis was a reaction to a prior inquiry by Maximilian I (cf. (9)):

- (9) Context of example (8) (1479, Geschichte des Hauses Habsburg III, Doc. No. 144; cf. Chmel 1968b: 330):

Und wolt sein k. gnad gern ain wissen von in [= the residents of the Styrian administrative district, J.B.] haben, was die dienst wern, die sy seinen k. gnaden von der lehen wegen zu tun schuldig sein.

‘And his Imperial Highness would like to know from them [= the residents of the Styrian administrative district, J.B.] what the services were that they owe his Imperial Highness regarding the fiefdom.’

Just like in (6) and (7), the *von wegen* PP in (8) recycles linguistic material from a relevant part of the context (cf. example (9)) in its complement position as a part of a relationship between an accessible prior speech act (a request) and a corresponding reaction (an answer). However, there are at least two important differences. First, the restrictive *von wegen* PP in (8) occupies the front field of its host clause and is preceded by the topic-changing Latin particle *item*. Second, the host clause of the *von wegen* PP in (8) is a reaction to the reactivated speech act. This is regularly the case with combinations of *von wegen* PPs with host clause matrix predicates denoting a verbal or mental activity that is or at least could be a reaction to a prior speech act (e.g., verbs of speaking or thinking and related constructions).

Taken together, this leads to ambiguity because *von wegen* can now be interpreted as providing a restrictive point of reference either for the host clause proposition (= [F [*von wegen* NP [p]]]) or for the host clause as a full-fledged speech act (= [*von wegen* NP [F [p]]]).⁹ The latter interpretation is supported by the front field position of the *von wegen* PP after *item* that establishes it as a wide-ranging part of the background.

Example (8) shows that the use of *von wegen* as a head of a restrictive domain adjunct results in scope ambiguities when (a) its complement contains linguistic material that appears to be recycled from a prior speech act and (b) its host clause shows features of a full-fledged reaction to this speech act. In this respect, examples such as (8) represent an important “critical context” (cf. Diewald 2002) in which a new interpretation of *von wegen* – an interpretation as a head of a restrictive domain adjunct with an increased speech act scope – becomes available and plausible, albeit not obligatory yet.

A crucial “isolating context” (Diewald 2002) in which *von wegen* can only be interpreted as a head of a domain adjunct with speech act scope is its use as a “hanging topic” in the sense of Altmann (1981). Example (10) from a letter to the mayor of Basel shows such a case:

- (10) Restrictive prepositional domain adjunct with speech act scope (1529, Geschichte der Basler Reformation IV, Doc. No. 36, lines 9–15; Roth 1941: 34):
Aber von wegen des Mertzen und anderer prediger munch, die sich zu Gebwyler und an andern orten inn unser verwaltigung enthalten sollen, des haben wir bitz auff das obgemelt ewer schreyben dheyn wissen gehept; [wir, J.B.] wissen auch noch nit, wa oder an welchen enden sich die

⁹“F” symbolizes the illocutionary force, “p” the propositional content of a given speech act (cf. Searle 1969: 31).

gemelten prediger inn unser verwaltung enthalten sollen. Das¹⁰ aber der Mertz zû Gebwyler sein solle, das ist nit inn unser Verwaltung, deshalben wir uns auch desselben nit beladen.

‘But *regarding this Mertz and other preacher monks who are supposed to stay in Guebwiller and elsewhere in our district*, we had no knowledge of this up to your letter; [we, J.B.] also didn’t know where or in which parts the above-mentioned preachers are supposed to stay in our district. If this Mertz should be in Guebwiller, though, that is not within our district, therefore we will not deal with this issue.’

In example (10), the *aber*-prefaced *von wegen* PP reestablishes a request for administrative cooperation concerning the recovery of stolen goods in a prior letter (see *Geschichte der Basler Reformation IV*, Doc. No. 25, lines 40–27; cf. Roth 1941: 26–27)¹¹ in order to prepare its matrix clause as a reaction (= [*von wegen* NP [F [p]]]). An interpretation of *von wegen* with a narrow propositional scope over the subsequent clause (= [F [*von wegen* NP [p]]]) is not possible, in contrast. Example (10) also shows that the use of restrictive *von wegen* PPs as a hanging topic affects the referential characteristics of the complement: The NP *des Mertzzen und anderer prediger munch* [...] ‘this Mertz and other preacher monks [...]’ clearly contributes to the function of *von wegen* by means of its pragmatically established reference to a prior speech act in the context, not by means of its semantically established reference to a group of certain individuals. We should bear this in mind as it is important for the decategorization of the complement position of *von wegen* (see Subsection 3.3).

3.3 The isolation, decategorization and renewal of *von wegen* in Modern High German

The previous section has shown that in the 15th and 16th centuries, the restrictive *von wegen* underwent a scope extension and came to be used as a hanging topic in order to reestablish an accessible but inactive speech act for its host as

¹⁰The complementizer *dass* seems to be used conditionally here, which was possible in Early Modern High German (cf. Grimm & Grimm 1860: 821). If so, this would be an early instance of a so-called “relevance (speech act/utterance/pragmatic/biscuit) conditional” restricting not the propositional validity conditions of the matrix clause consequent but its relevance as a speech act in the given line of actions (e.g. Austin 1956, Sweetser 1990, Günthner 1999).

¹¹Since the pragmatic operation of reactivating a speech act from a prior letter should have become obvious enough from the preceding examples, I will do without quoting the full context in the remainder of this paper.

a reaction to it. This already bears obvious resemblances to present-day German examples with *von wegen* reestablishing a non-adjacent prior speech act in order to challenge it (cf. example (1) on p. 317). However, there are still crucial differences between the Early Modern High German hanging topic *von wegen* on the one hand and present-day German *von wegen* as an emphatic interjection of disagreement on the other:

- The Early Modern High German preposition *von wegen* is restricted to case-governed NPs (e.g., *von wegen der lehen* ‘regarding the fiefdom’ in example (8)), while the present-day German interjection *von wegen* can be accompanied by linguistic material of any category (e.g., *von wegen wir horten* ‘my foot we’re hoarding’ in example (1)) and cannot assign a case to associated NPs anymore (NPs receive the nominative instead as a default case, cf. *von wegen tolles Wetter* versus **von wegen tollem Wetter* or **von wegen tollen Wetters*).
- The Early Modern High German preposition *von wegen* must come with a complement and a host clause, while the present-day German interjection *von wegen* is inherently independent of both (cf. the examples in Section 2).
- The Early Modern High German preposition *von wegen* establishes its host clause as a reaction to a preceding speech act, whereas the disagreeing interjection *von wegen* is a full-fledged reaction itself.

Obviously, we are still only halfway between the 14th century domain adjunct *von wegen* with propositional scope on the one hand and the present-day German interjection *von wegen* on the other. There are still some steps of change missing, in particular the structural loss of constraints on the prepositional complement position (up to the point where a complement position in a strict sense no longer exists) and the functional renewal as an emphatic expression of disagreement.

The loss of categorial constraints on the complement position was probably a result of its functional reduction to a quotative link to a preceding speech act when the *von wegen* PP occupied the pre-front field as a hanging topic. Since this function did not require the referential semantics of a noun, other linguistic items than nouns became possible as heads of the complement (cf. the following 18th century example):

- (11) Restrictive semi-prepositional domain adjunct with an AdvP as complement (Goethe 1887: 120–121):

Du hättest immer schweigen können, daß du drüben zu früh angekommen bist, es hilft uns nichts und ärgert uns nur; besonders den Horn, dem es

unaufhörlich im Kopfe liegt daß du nicht noch hinunter gegangen bist. Apropos *von wegen unten*. Der Hr. Langer ist der Mutter und Tochter ums Tohr begegnet [...]

‘You should have withheld that you arrived too early over there, it does not help us but just annoys us; especially Horn, who constantly wonders why you did not come downstairs. Apropos *regarding downstairs*. Mr. Langer met the mother and the daughter at the gate [...]

In example (11), *von wegen* takes the AdvP *unten* ‘downstairs’ as its complement. *Unten* refers back to the verb in the preceding clause as its antecedent (cf. the past participle of *hinuntergehen* ‘to go downstairs’), and *apropos von wegen unten* can be analyzed as a “modificative complex” (“modifikativer Komplex”, Zifonun et al. 1997: 1167–1172) with *apropos* as the head and *von wegen unten* as a restrictive modifier (= [*apropos* [*von wegen unten*]]).

Example (11) shows that in the 18th century at the latest, the complement position of *von wegen* had lost its categorial restriction to NPs. This implies a substantial decategorization of *von wegen*: Since it can take phrases of all categories as its complement, it is not a core member of the class of prepositions anymore. However, the loss of the categorial restriction to NPs does not lead to the interjection *von wegen* directly. It instead took some time until the non-prepositional use of *von wegen* became common enough to result in a complete categorial split between a case-assigning prepositional *von wegen* on the one hand and a non-prepositional *von wegen* on the other that could not assign a case anymore. In fact, it was not until the second half of the 19th century that *von wegen* was mentioned in grammars and dictionaries as an independent non-prepositional expression of disagreement. For example, the “hennebergisches Idiotikon” describes *von wegen* as a stand-alone reply accompanied by emphatic dissent, cf. *ja, von wegen! dabei walten noch ganz andere Gründe ob, sind noch ganz andere Dinge zu bedenken, wenn’s wahr ist! das geht so nicht! das ist so nicht gemeint (mein Lieber!)* ‘well, my foot! there are also completely different reasons and issues involved, if that is true! that is not ok! that is not what I meant (my dear fellow!)’ (cf. Spiesz 1881: 271–272). Similarly, Meyer (1880) and Brendicke (1897) mention a spirantized stand-alone *von wejen!* as a common part of the urban vernacular of Berlin (“Berlinish”).¹² The fact that *von wegen* not only leaves the class of prepositions but simultaneously enters the class of interjections has at least two reasons: Interjections tend to occupy a syntactic position in the left periphery of utterances (e.g. Nübling 2004: 31), and they can combine with ca-

¹²Cf. *Na von wejen – !* ‘well my foot’ (Meyer 1880: 89) and *von wejen! ach so! das ist nichts.* ‘my foot! I see! that is nothing.’ (Brendicke 1897: 190). See also Schlobinski (1988), Schönfeld & Schlobinski (1998), Freywald (2017) on “Berlinish”.

sus rectus-NPs (e.g., *Oh diese Philologen!* ‘Oh those philologists!’, see Fries 1992: 321–322).

The reanalysis of *von wegen* as an interjection cleared the formal way for the functional renewal of *von wegen* as a full-fledged marker of disagreement. The relevant context of this renewal was the recurring use of *von wegen* as a means to reestablish a prior speech act in order to challenge it by means of a disagreeing reaction. Such constellations already occurred in the Early Modern High German period (cf. example (12)):

- (12) Restrictive prepositional domain adjunct with speech act scope (1532, Geschichte der Basler Reformation VI, Doc. No. 202, lines 22–25; cf. Roth 1950: 161):

Aber von wegen der XXXII [Kronen, J.B.] solden, so dem hauptman sollen noch uszstan, daran tragend wir dhein schuld, dann wir haben alle monat unnserer XI. [Kronen, J.B.] sold völlig abgericht, daran nut uffgeschlagen.
 ‘But regarding the XXXII [Kronen, J.B.] pay that are to be due to the bailiff, we are not responsible for this as we delivered our XI. [Kronen, J.B.] pay completely every month, did not delay in that.’

Example (12) shows a prepositional hanging topic with *von wegen* reestablishing a prior claim that had been raised in order to challenge its validity in the subsequent host clause. It arose in reaction to an attempt of the bailiff (*Hauptmann*) of Zurich to gain remaining payments from Basel.

In contexts such as (12), it became possible to reanalyze the contextually emerging expression of disagreement as an inherent function of *von wegen*. However, the inability of *von wegen* as a preposition to express a full-fledged stance blocked this reanalysis, until the interjection *von wegen* emerged that was independent enough to be resemanticized towards a full-fledged expression of disagreement.

After *von wegen* was fully established as a disagreeing interjection without a complement position that had to be filled for grammatical reasons, it could be used without accompanying quotative material in direct reaction to a speech act that was still contextually active (cf. (2) on p. 318). This was important for the final step of the development – the lexicalization of the strong accent on the disagreeing interjection *von wegen*. As we have seen in Section 2, the present-day disagreeing *von wegen* only forms a prosodic unit with quotative material occupying its former complement position. If such material is missing, there is a more or less clear prosodic “caesura” (Auer 2010, Barth-Weingarten 2016) between *von wegen* and the subsequent part of the utterance – a caesura that is inherited from the prosodically independent hanging topic use of its (semi-)prepositional pre-

decessor *von wegen* in the left periphery of their syntactic hosts.¹³ Against this background, the extra-strong accent on *von wegen* probably emerged as follows:

- When used as a direct reaction to a prior action, *von wegen* forms an intonation phrase with a clear caesura after *wegen* and the initial syllable of the trochee *wegen* as the lexically and syntactically fixed position for a prominent emphatic accent of the phrase.
- As direct challenges of a prior action tend to be emphatic by nature, the accent on *wegen* was consistently intensified and finally reanalyzed as an inherent prosodic feature of *von wegen* (in terms of *von wégen*).

Accordingly, the prosodically prominent *von wégen* can be assumed to be the most recent innovation within the development of *von wegen*. Given that the earliest instances of the semi-prepositional *von wegen* occurred in the second half of the 18th century and that the stand-alone disagreeing *von wégen* is mentioned for the first time in dictionaries of the second half of the 19th century, the reanalysis of *von wégen* probably took place at some point in the first half of the 19th century.

4 Complexity of change as the reason why $P^0 > INT^0$ is less common than $PP > INT^0$ in German

We have seen in Section 3 that the emphatic disagreeing interjection *von wégen* is the result of four major reanalytic steps. The first step affected the Early Modern High German restrictive preposition *von wegen*, extended its scope, and made it possible to use its maximal projection as a hanging topic in the pre-front field. The second step removed the restriction to case-governed NPs as complements (= semi-prepositional *von wegen*), while the third step removed the complement position entirely (= non-prepositional *von wegen*), yielding an interjection that adopted the function to express disagreement from a recurrent context of use. The final step brought out the stressed *von wégen*.

This development clearly does not represent a case of grammaticalization in the traditional sense (“grammaticalization I”, Wischer 2000) as none of the reanalytic steps increase the “grammaticity” of the item they affect (e.g., by means of

¹³Cf. Selting (1993) on the prosody of hanging topics in everyday spoken German. Even though we do not have direct access to prosodic features of written historical data, the assumption that hanging topics had a substantial degree of prosodic independence not only in present-day Modern High German but in Early Modern High German and in earlier stages of Modern High German as well does not seem to be too daring.

attrition, paradigmaticization, obligatorification, condensation, coalescence and fixation; cf. Lehmann 2015: 174).¹⁴ Instead, the development can be related to two tendencies of semantic-pragmatic change discussed in Traugott & König (1991) that are brought about by metonymy (contextual contiguity) rather than metaphor:¹⁵

- The first two reanalytic steps yielded an item that no longer contributes to the host clause proposition but to coherence in terms of the dialogical well-placedness of the host clause as a speech act. This corresponds to Traugott & König's (1991: 208) "semantic-pragmatic tendency II": "Meanings based in the described external or internal situation > meanings based in the textual situation".
- The last two steps yielded an item that expresses affect and stance concerning a contextually accessible and relevant speech act. This corresponds to Traugott & König's (1991: 209) "semantic-pragmatic tendency III": "Meanings tend to become increasingly situated in the speaker's subjective belief-state/attitude toward the situation".

Accordingly, we can consider the semantic-pragmatic development of *von wegen* a case of change along the frequently discussed diachronic path "propositional/descriptive meaning > text-/discourse-structuring meaning > affect-/stance-related meaning". Of course, this does not mean that the diachronic emergence of *von wegen* is a purely semantic and pragmatic change. As we have seen above, it involves substantial changes of the status, category and features of *von wegen* as a head over time (cf. Subsections 3.2 and 3.3). In general, heads and headedness can change in three different ways:¹⁶

1. The grammatical status of a linguistic item changes either from head to non-head (e.g. phrase) or vice versa (= head-status change). Recently,

¹⁴See also Norde (2012) on Lehmann's parameters. Hopper (1991, 1996) proposes five alternative parameters (or "principles") of grammaticalization (layering, divergence, specialization, persistence, de-categorialization), while Himmelmann (2004) criticizes the "box metaphor" lying behind many traditional structural approaches to grammaticalization and lexicalization.

¹⁵In former studies, Traugott distinguishes between "propositional", "textual" and "expressive" aspects of meaning (cf. Traugott 1982), while in more recent studies, Traugott prefers the cline "non-/less subjective > subjective > intersubjective" and holds that subjectification and intersubjectification as processes of linguistic change are inherently independent of grammaticalization (e.g., Traugott 2010; see also Brinton 1996: 57–59).

¹⁶See Zwicky (1985, 1993), Hudson (1987), Croft (1996) on the concept of headedness in linguistics. It is understood that the details of the three types of change that are distinguished here will differ substantially depending on the grammatical theory that is assumed.

van Gelderen has argued in the theoretical framework of Minimalism that speakers tend to construct constituents as heads rather than as phrases due to processing economy (“Head Preference Principle (HPP)”, cf. van Gelderen 2011: 13–14). According to van Gelderen, this tendency can also be observed in grammaticalization.¹⁷ In the case of *von wegen*, only head-status change from head to non-head played a marginal role because the reanalysis of *Wegen* (= dative plural form of *wec* ‘side’) as a part of the discontinuous complex head of the circumposition *von – wegen* – the predecessor of *von wegen* as a continuous complex preposition (cf. Subsection 3.1) – implies a loss of the head-status: As a noun in the complement position of *von*, *Wegen* was the lexical head of an NP, but as a part of the circumpositional head of *von – wegen*, it became a head segment that was not a head in its own right anymore. Of course, this holds for *von* as well when it was merged into the circumpositional head in terms of a head segment. However, since the emergence of the circumposition *von – wegen* is not directly linked to the diachronic emergence of *von wegen*, we can ignore this in the following.

2. The head-status of a linguistic item remains but its category changes (= head-category change). Head-category change has two aspects: In terms of its source (or linguistic input), it is decategorization as a certain head X^0 , and in terms of its target (or linguistic output), it is recategorization as a certain head Y^0 .¹⁸ In this study, the de- and recategorization of the preposition *von wegen* as the interjection *von wegen* involves head-category change in terms of $[_{PP} P^0 NP] > [_{INTP} INT^0 XP]$, if we follow Fries’ (1992, 2002) concept of an interjection phrase (INTP). However, we have to bear in mind that $[_{PP} P^0 NP]$ did not lead to $[_{INTP} INT^0 XP]$ directly but via two intermediate steps – the semi-prepositional *von wegen* and the interjection *von wegen* without lexicalized stress (cf. Subsection 3.3). This shows that headedness can be a matter of degree (e.g., in terms of prototypical and peripheral types of P^0 and INT^0 ; see point 3 below) and that additional reanalytic steps can precede and follow head-category change (e.g., $P^0_{\text{prototypical}} > P^0_{\text{peripheral}} > INT^0_{\text{peripheral}} > INT^0_{\text{prototypical}}$; only the head-category change is marked bold). This leads us to the third principal type of change that can affect heads and headedness.

¹⁷Van Gelderen discusses the grammaticalization of the pronominal specifier *that* as the head of a complementizer phrase, for instance.

¹⁸This sets head-category change apart from head-status change, which can potentially lead to categoryless “junk” (Lass 1990, see also Simon 2010). Head-category change, in contrast, cannot lead into a linguistic wasteland of categorylessness just by definition.

3. The features of a linguistic item as a head change while its head-status and its category remain (= head-feature change). One case of head-feature change is the reduction of grammatical restrictions on the complement position that affected the preposition *von wegen* (loss of a restriction to NPs, cf. $P^0_{\text{prototypical}} > P^0_{\text{peripheral}}$). When this reached the point where an identifiable complement position did not exist anymore, the category of the head changed from P^0 to INT^0 (see point 2 above). Another important head-feature change affected the scope of *von wegen* as a domain adjunct: As we have seen, the early instances had scope over the host clause proposition only and it took a reanalytic step to develop the capability to take scope over the host clause as a full-fledged speech act (in terms of $[F [\textit{von wegen NP [p]]] > [\textit{von wegen NP [F [p]]}]$, cf. Subsection 3.2). Furthermore, the lexicalization of the emphatic accent on the interjection *von wegen* can be regarded a case of head-feature change (cf. Subsection 3.3). At first sight, this feature does not seem to play a significant role for the headedness of *von wegen*. However, if we follow Nübling (2004: 18) and consider strong stress to be a feature of prototypical interjections, the lexicalization of the emphatic accent reflects development towards the core of the category “interjection” (in terms of $INT^0_{\text{peripheral}} > INT^0_{\text{prototypical}}$), just like the reduction of grammatical restrictions on the complement position reflects development towards the periphery of the category “preposition”.

The head-feature changes mentioned here arose substantially from ambiguous contexts of use in which conventional and nonconventional meaning aspects of a linguistic item could not be separated from each other, and they resulted in semantic enrichment of this item (in terms of occasion becoming convention): The quotative reactivation of a prior speech act, the increased scope, the expression of disagreement and the presence of an emphatic accent all started as occasional side effects in certain contexts of use and became conventional parts of the *von wegen* items they are related to over time. This can be classified as hypoanalysis in the sense of Croft (2000: 126–130).

Considering now what we found out about the structural and semantic-pragmatic changes that led to *von wegen* and returning to our initial question of why the interjectionalization path $PP > INT^0$ with head-status change is much more common in German in comparison to the path $P^0 > INT^0$ with head-category change, the main reason seems to be the striking complexity of change it requires:

- Structurally, a prepositional head has to get rid of its complement position before it can become an interjection in terms of $P^0 > INT^0$. The case of *von*

wégen has shown, however, that it takes a massive reanalytic effort in very specific contexts (e.g., formal isolation as a hanging topic with a quotative complement) to remove the complement position of a fully grammaticalized prepositional head entirely (note that the semi-prepositional *von wegen* could not be reanalyzed as an interjection yet; cf. Subsection 3.3). If such contexts are not given (and they are by no means taken for granted), the complement position will not drop and the prepositional head alone cannot be de- and recategorized as an interjection. A PP such as *zum Teufel* ‘to the devil’, in contrast, is not inherently tied to fixed accompanying syntactic material that needs to be removed before it can be reanalyzed in terms of $PP > INT^0$.

- Semantically and pragmatically, German prepositional heads do not have an inherent affective and stance-related meaning that is directly qualified for use as an interjection, while PPs – especially ones with nominal complements from sacral and profane domains of the lexicon – can be emphatic expressions of affect and stance in their own right. Since prepositional heads have to acquire a completely new meaning in order to become an interjection, they are maximally dependent on dialogical contexts providing the possibility to adopt such a meaning. The case of *von wegen* shows that this implies a long and complex way through the above-mentioned path “propositional/descriptive meaning > text-/discourse-structuring meaning > affect-/stance-related meaning”. A PP such as *zum Teufel* ‘to the devil’, in contrast, is less dependent on such a context-driven import of meaning, and its semantic and pragmatic path towards a use as an interjection can be assumed to be shorter and less complex.

Taken together, it is obviously the high complexity and context-dependency of changes that prevents a frequent development of new interjections from prepositional heads in German. Full PPs, in comparison, can be reanalyzed much more easily as interjections as they require fewer changes and fewer contexts giving rise to these changes. However, if both the linguistic system and the contextual circumstances of language use provide an opportunity, the path $P^0 > INT^0$ is possible and can yield interjections such as *von wegen* that are able to become a lasting part of the language.

5 Summary

The starting point of this paper was the observation that German deprepositional interjections usually arise from full PPs ($PP > INT^0$) and not from prepositional

heads alone ($P^0 > INT^0$), the present-day German interjection *von wegen* ‘my foot’ being an exception that traces back to the Early Modern High German prepositional head *von wegen*. In order to find out how an isolated prepositional head can be reanalyzed as an interjection, we took a look at the forms and functions of *von wegen* in present-day German spoken data in Section 2 and then reconstructed the diachronic steps of its development, beginning with the rise of the prepositional *von wegen* in Section 3. After that, we arrived at some observations and considerations on why a development along the path $P^0 > INT^0$ is far less frequent in German in comparison to the alternative path $PP > INT^0$ in Section 4: Even though each step of the diachronic emergence of *von wegen* for itself reflects common mechanisms and directions of semantic-pragmatic and structural change, the development as a whole was strikingly complex. Most of the reanalytic complexity has to do with the presence of a complement position and the absence of an affective and stance-related meaning that characterizes P^0 : The removal of this position and the adoption of a new meaning required, so to say, hard reanalytic work in highly specific contexts. Full PPs, in contrast, can be reanalyzed as interjections much more easily as they are not inherently connected to fixed accompanying linguistic material that has to be removed and can come with complements from lexical domains that promote the use as an interjection (e.g., sacral and profane nouns).

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Part IV

Doing without heads

Chapter 11

Headedness as an epiphenomenon: Case studies on compounding and blending in German

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This paper demonstrates how statements like “compounds are right-headed in German” can be interpreted in a paradigmatic approach to morphology in terms of word-formation relations between lexical units, without presupposing word structures with “head constituents”. Using the theoretical framework of the Pattern-and-Restriction Theory (Nolda 2013, 2018), it is shown in four case studies that right-headedness applies in German not only to compounds, but in principle also to blends – a domain where “head constituents” are notoriously difficult to ascertain. Headedness properties such as being a word-formation product which is categorially and/or semantically determined by its last basis are identified solely on the basis of word-formation relations and the involved formation patterns. In a paradigmatic approach of this kind, headedness emerges as an epiphenomenon of the word-formation relations between lexical units in a linguistic system.

1 Overview

In a paper discussing the question “Do words have heads?”, Becker (1990: 5–8) distinguishes two kinds of morphological description: *syntagmatic morphology* and *paradigmatic morphology*. Syntagmatic morphology in the sense of Becker (1990) describes morphological regularities in terms of relations between constituents in word structures. Paradigmatic morphology, in turn, describes morphological regularities in terms of relations between words (or stems, one might add). Key notions of syntagmatic approaches include “head” and “non-head”,



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whereas descriptions in paradigmatic approaches make explicit or implicit reference to “products”, “bases”, “morphological processes”, “word-formation rules”, and “morphological restrictions” (as pioneered in the work of Aronoff 1976). The contrast between syntagmatic and paradigmatic morphology thus roughly coincides with Hockett’s (1954) distinction between “Item and Arrangement” and “Item and Process”.

According to Becker (1990: 6), paradigmatic approaches can cope for any kind of morphological phenomena, whereas syntagmatic approaches are designed for concatenative morphology:

Clearly for every syntagmatic analysis there is a corresponding paradigmatic analysis, however the reverse is not valid: There are structures that can be analysed paradigmatically but not syntagmatically, since a syntagmatic analysis is only possible for additive rules but not for subtractive or substitutional processes.

Compounds, for example, are readily analysed in both approaches, since they are basically formed by means of concatenation. For blends, however, there is no straightforward syntagmatic analysis, because their formation can involve various kinds of shortening operations.

Although paradigmatic approaches do not encode head relations in word structures, relations such as the “categorical dependency” of a compound on one of its bases can still be accounted for by appropriate formation rules. To put it in the words of Zwicky (1985: 2): “category determination resides not in constituents but in rules performing morphological operations”. A similar point can be made for the “semantic dependency” which is typical for endocentric subordinative compounds. Thus head properties like “categorical dependency” or “semantic dependency” can in principle be determined in a paradigmatic approach without presupposing any structural heads.¹

In the present paper, it will be demonstrated how a statement of the sort “compounds are right-headed in German” can be interpreted in a paradigmatic approach like the *Pattern-and-Restriction Theory* (PR). PR is a general theory of word formation which was developed and axiomatically formalised by Nolda (2013, 2018). PR’s major theoretical tools are *formation patterns* and associated

¹As an anonymous reviewer points out, a related approach is taken by Construction Morphology which describes the headedness of words in terms of constructional schemas (Booij 2010: Section 1.4 and 3.1, Arcodia 2012, and others). Still, Construction Morphology is, in my view, more akin to syntagmatic approaches to word formation: schemas directly specify properties of products, whereas properties of bases are only indirectly specified via properties of constituents of the product.

formation restrictions, which are used to describe word-formation relations between lexical units in a spoken or written linguistic system.² Instead of syntagmatically encoding them in word structures, PR states word-formation relations paradigmatically between *lexical units*, the latter being understood in the sense of *Integrational Linguistics* (IL) as pairings of a paradigm and a lexical meaning (Lieb 1983, 1992, 2005).³

Using this theoretical framework, it will be shown that right-headedness not only applies to compounding products in German, but also to certain blending products. This claim will be based on case studies on selected compounds and blends in spoken Modern German. Given a word-formation relation between a word-formation product and at least two word-formation bases, the following subkinds of headedness will be distinguished:

- the property of the product of being *categorially determined* by one of the bases and
- the property of the product of being *semantically determined* by one of the bases.

These properties are based on properties of the formation patterns by means of which word-formation products are formed from word-formation bases. “Right-headedness” can then be reconstructed as a descriptive term for the property of being a product that is categorially and/or semantically determined by the last basis. In this paradigmatic approach, thus, headedness emerges as an epiphenomenon of the relations between word-formation products and word-formation bases.

This paper is structured as follows. Section 2 introduces the notions of *lexical word* and *lexical stem* presupposed from IL. Sections 3 and 4 discuss selected formation patterns and their associated formation restrictions in four case studies on compounds and blends in a system of spoken Modern German. On the basis of these case studies, right-headedness will be reconstructed as a purely descriptive term in PR in Section 5. Theoretical notions of PR are introduced in a mostly informal way as we go along.

²There is a sample computer implementation of PR called “PPR” (“System for Processing Formation Patterns and Restrictions”, available at <http://andreas.nolda.org/software.html#ppr>), which can be used for testing the soundness of theoretical and empirical hypotheses in the PR framework. It currently provides a very limited lexicon and selected formation patterns for spoken and written Modern German systems, including some of the patterns discussed in this paper.

³For a closely related word-formation theory in the IL framework cf. the *Process Model of Word Formation* by Lieb (2013).

2 Lexical units

According to the IL conception, a *lexical word* consists of a word paradigm and a lexical meaning. For lexical words in spoken linguistic systems, the following informal notation will be used in this paper:⁴

/norD[ə]n/^W_{north}: lexical word consisting of a word paradigm with the citation form /norD[ə]n/ and a lexical meaning paraphrased here as ‘north’.

/norD[ə]n/^W_{northern region}: lexical word consisting of a word paradigm with the citation form /norD[ə]n/ and a lexical meaning paraphrased here as ‘north region’.

Lexical words are grammatically characterised by means of *lexical categorisations* such as:

- (1) noun in the masculine

Categorisations like (1) are modelled as sets of *word categories*:

- (2) {Noun, Masc-N}

(“Masc-N” stands for ‘nominal word in the masculine’, i.e. masculine noun or pronoun.⁵ For a complete list of the symbols cf. the appendix.)

A *word paradigm* is a relation between *word forms* and the *paradigmatic categorisations* they realise. For instance, the word form /norD[ə]n/ in the word paradigm of the lexical words /norD[ə]n/^W_{north} and /norD[ə]n/^W_{northern region} realises the following paradigmatic categorisations:

- (3) a. nominal word form in the nominative singular

⁴In the phonological notation used here, the IPA symbol “^W” represents a *primary lexical accent*, understood as the potential of a syllable for bearing a non-contrastive syntactic accent (Lieb 1999b); *deaccented lexical accents* (“secondary lexical accents”) are represented by the IPA symbol “.”. In syllables with primary or deaccented lexical accents, the IPA symbol “:” marks vowels which are phonetically realised as long, smoothly cut, tense vowels, while unmarked vowels in such syllables are phonetically realised as short, abruptly cut, lax ones. Contrasts in vowel quality between tense and lax vowels are ignored. “[ə]” represents phonologically unspecified schwa, which may, or may not, be inserted epenthetically in phonetic units; “[ə]r” is the phonological representation for syllabic vocalic [ɐ]. Capital “D” stands for an archiphonemic sound which is unspecified for voice (or tenseness) and is realised as [d] unless it undergoes final devoicing (tensing) (cf. Lieb 1999a: 374–375).

⁵In this paper, a distinction is made between *nouns* and *nominal words*, the latter comprising nouns, adjectives, pronouns, and articles.

- b. nominal word form in the accusative singular
- c. nominal word form in the dative singular

Categorisations like those in (3) are modelled in IL as sets of *word-form categories*:

- (4) a. {Nom-Nf, Sing-Nf}
- b. {Acc-Nf, Sing-Nf}
- c. {Dat-Nf, Sing-Nf}

These sets can be thought of as specifications of corresponding “paradigm cells”.⁶

Lexical meanings like ‘north’ or ‘northern region’ are understood in IL as *concepts* of a certain kind (for details cf. Lieb 1985). As a rule, concepts are uniquely determined by their intension. The intension of ‘north’, for example, may be identified with the property of being a direction oriented towards the North Pole.⁷ As problems of lexical semantics are beyond the scope of the present paper, I won’t explicitly define lexical meanings here; instead, an intuitive understanding of the paraphrases in single quotation marks will be taken for granted.

In analogy to lexical words, IL conceives *lexical stems* as consisting of a stem paradigm and a lexical meaning, the latter being identical to the lexical meaning of the corresponding lexical word (if any).⁸ Lexical stems will be notated as follows in this paper:

/’norD/’St_{‘north’}: lexical stem consisting of a stem paradigm with the citation form /’norD/ and the lexical meaning ‘north’.

/’norD/’St_{‘northern region’}: lexical stem consisting of a stem paradigm with the citation form /’norD/ and the lexical meaning ‘northern region’.

These lexical stems can be grammatically characterised by means of the following lexical categorisation:

⁶A closely related paradigm notion can be found in Stump’s (2001: 43) Paradigm Function Morphology (for discussion cf. Lieb 2005).

⁷From a mathematical point of view, directions may be modelled as families of parallel vectors with arbitrary length.

⁸Lexical stems without corresponding lexical words may be assumed for “combining forms”, insofar as the latter are best analysed not as affixes, but as stems which are “bound”, or “trapped” in the sense of Lieb (2013). Conversely, there may be lexical words without corresponding lexical stems; this arguably is the case for “nominalised adjectives” in Modern German, which are usually seen as being directly formed from adjectival words (not stems) through syntactic conversion (for discussion cf. Nolda 2013: Section 3.2.2).

- (5) noun stem in the masculine

This categorisation is modelled as a set of *stem categories*:

- (6) {NounSt, Masc-NSt}

A *stem paradigm* relates *stem forms* to paradigmatic categorisations consisting of *stem-form categories*. According to the view taken here, the form /'norD/ of /'norD/_{St}St_{north} realises the following categorisations:

- (7) a. nominal basic stem form
b. nominal compounding stem form

Or, in set-theoretic terms:

- (8) a. {Basic-NStf}
b. {Comp-NStf}

/norD/ is a compounding stem form because it can be used as a first base form in the formation of compounds like /'norD/ /,to:r/_{St}St_{north gate}.⁹ It is a basic stem form because from it all stem forms in the stem paradigm can be formed, including the singular stem form /'norD/ / [ə]n/ and the derivation stem form /nørD/, the latter being used as a base form in the derivation of /'nørD/ /lix/_{St}St_{northern}.¹⁰ In contrast, the stem paradigm of /'norD/_{St}St_{northern region} contains the derivation stem form /'norD/, which is used as a base form in the formation of derivatives like /'norD/ /if/_{St}St_{Nordic}. (For this conception of stem paradigms – with basic stem forms, inflection stem forms, as well as word-formation stem forms – cf. Fuhrhop 1998: Chapter 2.)

As a matter of fact, then, the stem paradigms of the lexical stems /'norD/_{St}St_{north} and /'norD/_{St}St_{northern region} overlap: they share at least some form–categorisation pairs. In addition, their lexical meanings are related through a semantic relation (viz. metonymy). These lexical stems therefore are variants of the same *lexicological stem*, to be called “/'norD/_{LSt}”. Similarly, the lexical words /'norD[ə]n/_{St}^W_{north} and /'norD[ə]n/_{St}^W_{northern region} are variants of the same *lexicological word*, called “/'norD[ə]n/_{LW}” here. In general, lexicological units are sets of lexical units of the same part of speech with identical or overlapping paradigms and related lexical

⁹There are also compounding stem forms like /'ja:r/ / [ə]s/ with a linking element. (Actually the lexical stem /'ja:r/_{St}St_{year} also has a compounding stem form without linking element; for discussion, cf. Section 3.1.)

¹⁰“x” denotes the phoneme underlying both [ç] and [χ] in systems of spoken Modern German.

meanings (cf. Nolda 2016, 2018).¹¹ In informal contexts, I shall denote lexical and lexicological units – be they spoken or written – by their orthographic citation forms in *italics*.

Conventionalised, “existing” lexical units like *Norden* are part of the *vocabulary* of the linguistic system; the same holds for conventionalised word-formation products like *Nordtor* and *nördlich*. The vocabulary is a subset of the *lexicon* of the linguistic system, which also includes non-conventionalised and “non-existent”, but still “possible” lexical units such as *Nordpfeil*:

- (9) Der Nordpfeil bewegt sich Richtung Norden, wie er soll. (S 0)
 the north.arrow move.3sg itself direction north as he shall.3sg
 ‘The compass needle turns north as it should.’

(“S 0” refers to an entry in the list of sources.)

In the PR view, the investigation of word formation is concerned with the formation of lexical units in the lexicon of a given linguistic system. This heuristic principle is twofold. First, it states that monosemous lexical units, not potentially polysemous lexicological units, are the objects of word-formation description. This assumption is motivated by the observation that some, but not necessarily all, variants of a lexicological unit may count as word-formation products while others may be derived by different processes, such as metonymy or metaphor. Second, word-formation description is not restricted to conventionalised lexical units in the vocabulary subset of the lexicon, because questions of conventionalisation (commonly discussed under the label of “lexicalisation”) are orthogonal to the investigation of word formation.

Word forms and stem forms are conceived as *sequences* of syntactic or morphological *atoms*. The singular stem form /'norD/ / [ə]n/, for instance, is a sequence consisting of two morphological atoms: /'norD/ and / [ə]n/, which are phonological units in a spoken linguistic system.¹² Sequences with *n* members are modelled as total functions from *position indices* {1, ..., *n*} to atoms:

- (10) {⟨1, /'norD/⟩,
 ⟨2, / [ə]n/⟩}

¹¹This conception of lexical units and lexicological units roughly corresponds to the distinction made by Cruse (1986: Chapter 3) between “lexical units” and “lexemes”.

¹²As a theory of word formation is, PR is neutral with respect to questions of phonological representation. For the sake of this paper, I make the minimal assumption that the phonological representation of atoms in spoken linguistic systems not only specifies segmental phonological properties but also suprasegmental ones, in particular syllable structures and lexical accents (cf. also Note 4).

An alternative, non-set-theoretic, notation is given in (11):

$$(11) \quad \begin{array}{cc} 1 & 2 \\ /'norD/ & /[ə]n/ \end{array}$$

The basic stem form $/'norD/$ and the pseudo-suffix¹³ $/[ə]n/$, in contrast, are unit sequences, involving a single member each:

$$(12) \quad \begin{array}{c} 1 \\ /'norD/ \end{array}$$

$$(13) \quad \begin{array}{c} 1 \\ /[ə]n/ \end{array}$$

The same holds for the word form $/'norD[ə]n/$:

$$(14) \quad \begin{array}{c} 1 \\ /'norD[ə]n/ \end{array}$$

In the following, I shall stick to notations like “ $/'norD[ə]n/$ ” and “ $/'norD/ \text{ } /[ə]n/$ ” for word and stem forms.

Forms can be combined in two ways. By *concatenation* \frown , two forms are combined by adapting the position indices in the second form without changing the overall number of atoms. For example, the concatenation of the forms $/'norD/$ and $/[ə]n/$ results in the form $/'norD/ \text{ } /[ə]n/$:

$$(15) \quad /'norD/ \text{ } \frown \text{ } /[ə]n/ = /'norD/ \text{ } /[ə]n/$$

By *fusion* \smile , the rightmost atom of the first form and the leftmost atom of the second form are merged into one,¹⁴ thereby reducing the number of atoms accordingly:

$$(16) \quad /'norD/ \text{ } \smile \text{ } /[ə]n/ = /'norD[ə]n/$$

3 Compounding

In the Pattern-and-Restriction Theory, word formation is not described syntagmatically in terms of relations between constituents in word structures, such

¹³Pseudo-suffixes of this sort are termed “morphologischer Rest” by Eisenberg (2013: 209), as pointed out by an anonymous reviewer.

¹⁴Merging atoms is discussed at length in Lieb (1999a) under the label of “phonological connection” (“phonologische Verbindung”).

as “heads” and “non-heads”; rather, it is described paradigmatically in terms of relations between lexical units functioning as products and bases.¹⁵ The main difference between compounding and blending on the one hand and other word-formation processes like derivation, conversion, or clipping on the other hand is the number of bases involved in the formation of a product: derivation, conversion, and clipping products are formed through *one-place* word-formation processes, involving one basis at a time, whereas compounding and blending products are formed from two or more bases through word-formation processes which are at least *two-place*. The same distinction holds for the formation patterns used in PR to describe those word-formation relations: derivation, conversion and clipping patterns are one-place, while compounding and blending patterns are at least two-place.¹⁶

The treatment of compounding in PR will be illustrated in Section 3.1 and 3.2 below in two case studies on selected compounds, each involving a productive compounding pattern in some system of spoken Modern German. Typical blending patterns are discussed in Section 4.1 and 4.2 in two case studies on selected blends. Of course, these formation patterns are only a proper subset of the totality of compounding and blending patterns in spoken Modern German; what is more, there will be no substantial reference to compounding or blending in written German (for two recent studies on that subject matter cf. Scherer 2013 and Borgwaldt 2013). These case studies will serve as a basis for the reconstruction of right-headedness as a descriptive term in PR in Section 5.

3.1 Case study I: *Nordtor*

In the PR view, the major task of word-formation description is to explain or predict statements of *word-formation relations* between conventionalised or non-conventionalised lexical units in a linguistic system. Consider, for example, the word-formation relation stated in (17a), which is usually symbolised as in (17b) in traditional accounts of word formation like Fleischer & Barz (2012) for Modern German:

¹⁵In comparison to Anderson’s (1992) *A-Morphous Morphology*, PR is both less radical and more uniform. It is less radical because it does not away with morphological segmentation of morphological forms into morphological atoms (“morphs”). As a matter of fact, morphological segmentation is used in this paper as a major criterion for distinguishing between compounding and blending (cf. Section 4 below). PR is more uniform because it does not rely on word structures for the description of any kind of word formation, while in *A-Morphous Morphology*, word structures are still assumed for compounding.

¹⁶The close relationship of compounding and blending is also stated by Donalies (2002: Chapter 4), who classifies blending even as a subtype of compounding.

- (17) a. *Nordtor* is formed from *Norden* and *Tor*.
 b. *Nordtor* < *Norden* + *Tor*

Using the notation for lexical words introduced in Section 2 and the ambiguous constant “S” for some specific, yet undetermined, system of spoken Modern German, we can reformulate these statements as follows:

- (18) a. $/\text{'norD, to:r/}_{\text{'north gate}}^{\text{W}}$ is formed from $/\text{'norD}[\text{ə}]n/_{\text{'north}}^{\text{W}}$ and $/\text{'to:r/}_{\text{'gate}}^{\text{W}}$ in S.
 b. $/\text{'norD, to:r/}_{\text{'north gate}}^{\text{W}} <^{\text{S}} / \text{'norD}[\text{ə}]n/_{\text{'north}}^{\text{W}} + / \text{'to:r/}_{\text{'gate}}^{\text{W}}$

An analogous word-formation relation holds between the corresponding lexical stems:

- (19) a. $/\text{'norD/} / \text{'to:r/}_{\text{'north gate}}^{\text{St}}$ is formed from $/\text{'norD/}_{\text{'north}}^{\text{St}}$ and $/\text{'to:r/}_{\text{'gate}}^{\text{St}}$ in S.
 b. $/\text{'norD/} / \text{'to:r/}_{\text{'north gate}}^{\text{St}} <^{\text{S}} / \text{'norD/}_{\text{'north}}^{\text{St}} + / \text{'to:r/}_{\text{'gate}}^{\text{St}}$

Such word-formation relations implicitly involve a *word-formation process* and a certain *formation pattern*, which are made explicit in (20) and (21):

- (20) a. $/\text{'norD, to:r/}_{\text{'north gate}}^{\text{W}}$ is formed from $/\text{'norD}[\text{ə}]n/_{\text{'north}}^{\text{W}}$ and $/\text{'to:r/}_{\text{'gate}}^{\text{W}}$ through compounding in S by means of Pattern 1.
 b. $/\text{'norD, to:r/}_{\text{'north gate}}^{\text{W}} <_{\text{comp(Pattern 1)}}^{\text{S}} / \text{'norD}[\text{ə}]n/_{\text{'north}}^{\text{W}} + / \text{'to:r/}_{\text{'gate}}^{\text{W}}$
 (21) a. $/\text{'norD/} / \text{'to:r/}_{\text{'north gate}}^{\text{St}}$ is formed from $/\text{'norD/}_{\text{'north}}^{\text{St}}$ and $/\text{'to:r/}_{\text{'gate}}^{\text{St}}$ through compounding in S by means of Pattern 1.
 b. $/\text{'norD/} / \text{'to:r/}_{\text{'north gate}}^{\text{St}} <_{\text{comp(Pattern 1)}}^{\text{S}} / \text{'norD/}_{\text{'north}}^{\text{St}} + / \text{'to:r/}_{\text{'gate}}^{\text{St}}$

According to PR, formation patterns combine for *formation means* – a *formal means* (FM), a *paradigmatic means* (PM), a *lexical means* (LM), and a *semantic means* (SM). Pattern 1 consists of the following means:

Pattern 1

FM: deaccentuation of the second base form and concatenation

PM: identity with the categorisation of the second base form

LM: identity with the categorisation of the second basis

SM: formation of a concept according to the scheme ‘entity denoted by the second basis in a classificatory relation to an entity denoted by the first basis’

Formation means are modelled as set-theoretic operations: formal means operate on forms, paradigmatic means operate on paradigmatic categorisations, lexical means operate on lexical categorisations, and semantic means operate on concepts. In Pattern 1, the means are all two-place operations, relating two arguments to one value each. Therefore, Pattern 1 can be said to be two-place, too. Generally speaking, an n -place formation pattern has an n -place formal means, an n -place paradigmatic means, an n -place lexical means, and an n -place semantic means.

I shall now illustrate the application of the means in Pattern 1. In order to do some, I shall use the following semi-formal notation:

$$(22) \quad M: \quad x_1 + x_2 \mapsto x$$

This is to be interpreted as in (23) for arbitrary two-place operations M with x_1 and x_2 in the domain of M and x in the range of M :

$$(23) \quad M(x_1, x_2) = x$$

FM in Pattern 1 assigns the form /'norD/ /,to:r/ with initial accent to /'norD/ and /,to:r/:

$$(24) \quad \text{FM:} \quad \begin{array}{l} \text{'norD/} + \text{'to:r/} \mapsto \\ \text{'norD/} \frown \text{,to:r/} = \text{'norD/} \text{ ,to:r/} \end{array}$$

This can be achieved in the following steps:¹⁷

1. The second base form /,to:r/ is deaccented to /,to:r/.¹⁸
2. The results /'norD/ and /,to:r/ are combined by means of the concatenation operation, denoted by " \frown ".

In the same way, the form /'norD/ /,to:r/ /ə/ can be formed with FM in Pattern 1:

$$(25) \quad \text{FM:} \quad \begin{array}{l} \text{'norD/} + \text{'to:r/} / \text{ə/} \mapsto \\ \text{'norD/} \frown \text{,to:r/} / \text{ə/} = \text{'norD/} \text{ ,to:r/} / \text{ə/} \end{array}$$

¹⁷Note that this is one of many equivalent formulations of FM in Pattern 1 which all give rise to the same set-theoretic operation, i.e. the same extensional relation between arguments and values. What matters in PR is which arguments and values are related by the means, not the way this is achieved. Thus, PR clearly is a declarative theory of word formation, and not a derivational or transformational one.

¹⁸Deaccentuation replaces primary lexical accents by deaccented lexical accents ("secondary lexical accents").

A paradigmatic means determines the “paradigm cells” which are occupied by the product forms. PM in Pattern 1 does so by copying the paradigmatic categorisation of the second base form to the product form:

- (26) a. PM: $\{\text{Comp-NStf}\} + \{\text{Basic-NStf}\} \mapsto \{\text{Basic-NStf}\}$
 b. PM: $\{\text{Comp-NStf}\} + \{\text{Sing-NStf}\} \mapsto \{\text{Sing-NStf}\}$
 c. PM: $\{\text{Comp-NStf}\} + \{\text{Plur-NStf}\} \mapsto \{\text{Plur-NStf}\}$

Thereby, each product form inherits its paradigmatic categorisation from the second base form; effectively, the former also inherits the inflection class of the latter as far as number marking is concerned.¹⁹ PM in Pattern 1 is an example for a *last-base-inheriting* operation, i.e. an n -place operation on categorisations (with $n \geq 2$) that copies its n -th argument to the value. Similarly, a first-base-inheriting operation copies its first argument to the value. First-base-inheriting operations, last-base-inheriting operations, etc. are *base-inheriting*.

LM in Pattern 1 is a last-base-inheriting operation, too, which copies the lexical categorisation of the second basis to the product:

- (27) LM: $\{\text{NounSt, Masc-NSt}\} + \{\text{NounSt, Neut-NSt}\} \mapsto \{\text{NounSt, Neut-NSt}\}$

This accounts, in particular, for the fact that the lexical gender of nominal compounds formed by means of this and other compounding patterns in systems of Modern German is identical to the lexical gender of the second basis. In addition, it ensures that the part of speech of compounds is identical to that of their second basis (which is trivially the case in noun–noun compounds).²⁰

Finally, SM in Pattern 1 takes care of the *word-formation meaning*, i.e. of those aspects of the lexical meaning of the product that are word-formation-related. One word-formation-related aspect of the meaning of $/\text{norD}/$ $/\text{to:r}/^{\text{St}}_{\text{north gate}}$ is the fact that any entity denoted by it is also denoted by the second basis $/\text{to:r}/^{\text{St}}_{\text{gate}}$; put differently, the second base meaning is implied by the product meaning. SM in Pattern 1 therefore has to be a *last-base-implying* operation, i.e. an n -place operation on concepts (with $n \geq 2$) such that each of its value implies the n -th argument. In the case of a *first-base-implying* operation, each value implies the first argument. First-base-implying operations, last-base-implying operations, etc. are *base-implying*. Word-formation products formed by means of a

¹⁹ As a matter of fact, inheritance of paradigmatic categorisations can also occur in derivation, as argued for in Nolda (2019: 367–368) with reference to the formation of prefix verbs in Modern German.

²⁰ No attempt is made here to further classify base-inheritance along the lines of Scalise & Fábregas (2010) who distinguish between “categorial heads” (determining the part-of-speech category) and “morphological heads” (determining other categories such as lexical gender or inflection class).

formation pattern with a base-implying semantic means are traditionally called “endocentric”; those formed by means of a pattern with a semantic means that is not base-implying are called “exocentric”.

A further word-formation-related aspect of the product meaning concerns the relation between the base meanings in compounds like $\langle /norD/ \ /,to:r/_{north\ gate}^{St} \rangle$. This is a debated matter in the literature (a recent overview can be found in Olsen 2012). Following Dowty (1979: 316–319), I assume that $\langle /norD/ \ /,to:r/_{north\ gate}^{St} \rangle$ and other compounds formed by this pattern have a word-formation meaning which involves an “(appropriately) classificatory relation” between the denotata of the bases (for discussion cf. Downing 1977):

(28) SM: ‘north’ + ‘gate’ \mapsto ‘gate in a classificatory relation to the north’

Note that the word-formation meaning ‘gate in a classificatory relation to the north’ is underspecified with respect to the lexical meaning of the product, which actually denotes gates on the north side of some building. In general, PR does not require that the word-formation meaning be identical to the lexical meaning of the product as long as the former is implied by the latter (cf. Nolda 2018).

Taken together, the formal, paradigmatic, lexical, and semantic means in Pattern 1 specify a two-place *formation operation* on *formation instances*. Formation instances are quadruples like those in (29), (30), and (31) combining arguments or values of the means in Pattern 1:

(29) $\langle /norD/,$
 $\{Comp-NStf\},$
 $\{NounSt, Masc-NSt\},$
 $\langle 'north' \rangle$

(30) a. $\langle /to:r/,$
 $\{Basic-NStf\},$
 $\{NounSt, Neut-NSt\},$
 $\langle 'gate' \rangle$
 b. $\langle /to:r/,$
 $\{Sing-NStf\},$
 $\{NounSt, Neut-NSt\},$
 $\langle 'gate' \rangle$
 c. $\langle /to:r/ \ /ə/,$
 $\{Plur-NStf\},$
 $\{NounSt, Neut-NSt\},$
 $\langle 'gate' \rangle$

- (31) a. $\langle /'norD/ /, to:r/,$
 {Basic-NStf},
 {NounSt, Neut-NSt},
 'gate in a classificatory relation to the north'
- b. $\langle /'norD/ /, to:r/,$
 {Sing-NStf},
 {NounSt, Neut-NSt},
 'gate in a classificatory relation to the north'
- c. $\langle /'norD/ /, to:r/ /ə/,$
 {Plur-NStf},
 {NounSt, Neut-NSt},
 'gate in a classificatory relation to the north'

The formation instances in (29), (30), and (31) *instantiate* the bases and products involved in the word-formation relation (21): the *base instance* (29) instantiates the first basis $'norD/'_{north}^{St}$, the *base instances* (30a), (30b), and (30c) each instantiate the second basis $'to:r/'_{gate}^{St}$, and the *product instances* (31a), (31b), and (31c) instantiate the product $'norD/ /, to:r/'_{north\ gate}^{St}$. The first and second components of those formation instances represent formal and categorial properties of one of their forms, while the third and fourth components represent categorial and semantic properties of the lexical unit itself.

The formation operation specified by Pattern 1 takes base-instance pairs like $\langle (29), (30a) \rangle$, $\langle (29), (30b) \rangle$, and $\langle (29), (30c) \rangle$ as arguments and assigns to them the product instances (31a), (31b), and (31c), respectively. From a logical point of view, there is nothing that would exclude base-instance pairs in the domain of this formation operation where the first base instance is, say, a singular stem form like $'norD/ / [ə]n/$; this, however, is excluded on empirical grounds. In addition, it must be taken care of co-occurrence restrictions on base instances. For example, the compounding stem form $'ja:r/$, occurring in just a few conventionalised compounds like $'ja:r/ /, bu:x/'_{yearbook}^{St}$, is compatible only with a handful of stem forms, whereas compounding with the compounding stem form $'ja:r/ / [ə]s/$ (already mentioned cf. Note 9 in Section 2) is fully productive. Last, but not least, the base instances in the domain of our formation operation have to be restricted to instances of noun stems.

Thus, only a proper subset of the domain of the formation operation specified by Pattern 1 is actually used for word formation in S. This subset is the *formation restriction* which is associated with Pattern 1 in S. It restricts what bases are available for word formation in S by means of Pattern 1; indirectly, it also

restricts what products which can be formed in S from those bases by means of the pattern.

The formation restriction associated with Pattern 1 in S can partially or totally be identified in a word-formation grammar of S in terms of declarative constraints like those in Restriction 1, which consists of a *formal constraint* (FC), a *paradigmatic constraint* (PC),²¹ and a *lexical constraint* (LC):

Restriction 1

FC: The base forms are compatible.

PC: The paradigmatic categorisation of the first base form contains Comp-NStf.

The paradigmatic categorisation of the second base form contains Basic-NStf, Sing-NStf, or Plur-NStf.

LC: The lexical categorisations of the bases contain NounSt.

In other cases, there may be reason to include a *semantic constraint* (SC) or a *general constraint* (GC).²² As a matter of fact, all of the above constraints are input-related, applying to components of base instances. In other cases there may also be output-related constraints on the product instances which the formation operation specified by Pattern 1 assigns to the base instances (cf. Section 4.)

Word-formation processes are conceived in PR as one-place functions from *n*-place formation patterns to the *n*-place formation operations specified by the patterns; the word-formation processes are said to be *n*-place themselves. The word-formation process of two-place compounding (comp²), for example, is a

²¹The paradigmatic constraint in Restriction 1 effectively excludes Comp-NStf and Der-NStf from the paradigmatic categorisation of the second base form because, at least in Modern German systems, word-formation stem forms are not necessarily inherited by the product. For instance, the only compounding stem form in the paradigm of /'be:r/St 'berry' is /'be:r/ / [ə]n/; in the paradigm of the compound /'erD/ /'be:r/St 'strawberry', however, the compounding stem form is /'erD/ /'be:r/, not /'erD/ /'be:r/ / [ə]n/. A similar point can be made for /'frau/St 'woman' and /'juŋ/ /'frau/St 'virgin': the former has both a derivation stem form with umlaut (as in /'froi/ /'lain/) and a derivation stem form without umlaut (as in /'frau/ /'lix/), whereas the latter only has a derivation stem form with umlaut (/juŋ/ /'froi/ /'lix/).

²²An example for a general constraint would be the requirement that the second basis of a compound must be a compound itself. Such a constraint is needed for the formation restriction associated with the compounding pattern by means of which a product like /'lanD/ / [ə]s/ /'fu:l/ /'amt/St 'federal education authority' with non-initial accent is formed from the noun stem /'lanD/St 'federal state' and the compound /'fu:l/ /'amt/St 'education authority'. Of course, apart from this general constraint, there are further, in particular semantic, constraints (cf. the study of Benware 1987).

function from two-place formation patterns like Pattern 1 to the two-place formation operations specified by them. As a rule, two-place compounding is involved in word-formation relations like (20) and (21) between two bases and one product. When the arity is clear from the context, I shall continue to speak of “compounding” (“comp”) *tout court*.

Given this conception, the word-formation relation stated in (21) can be logically derived in PR from the word-formation theory and a word-formation grammar of S. This derivation requires, in particular, that the following conditions hold:

1. There is a base-instance pair instantiating $/\text{norD}/_{\text{north}}^{\text{St}}$ and $/\text{to:r}/_{\text{gate}}^{\text{St}}$ in the formation restriction associated with Pattern 1 in S.
2. The formation process specified by Pattern 1 assigns to those base instances a product instance instantiating $/\text{norD}/_{\text{north gate}}^{\text{St}}$.
3. The word-formation process comp in S assigns this formation process to Pattern 1.

In the case at hand, there are three base-instance pairs which fulfil these conditions together with one product instance each:

- the base-instance pair $\langle (29), (30a) \rangle$ with the product instance (31a);
- the base-instance pair $\langle (29), (30b) \rangle$ with the product instance (31b);
- the base-instance pair $\langle (29), (30c) \rangle$ with the product instance (31c).

Each of them can be used for explaining or predicting the word-formation relation (21) in PR (for the logic of explanation and prediction in PR cf. Nolda 2018).²³

Word-formation relations obtained in this way are *direct* word-formation relations. Such word-formation relations can be explicitly stated in PR as follows:

²³Since PR does not presuppose any word structures which represent the formation history, forms like /'norD/ /,to:r/ /ə/ and their categorisation as plural stem form can be motivated by word-formation as well as by inflection. In the former case, exemplified above, the stem form /'norD/ /,to:r/ /ə/ is formed from the stem forms /'norD/ and /'to:r/ /ə/ by means of FM in Pattern 1, and its paradigmatic categorisation {Plur-NS_{tf}} is copied by PM in Pattern 1 from the paradigmatic categorisation of /'to:r/ /ə/. In the latter case, /'norD/ /,to:r/ /ə/ is formed from the stem form /'norD/ /,to:r/ by the formal means in a certain inflectional formation pattern ('plural formation by means of suffixation with /ə/'), and the paradigmatic means in that pattern determines its categorisation as plural stem form. (A similar point is made in Nolda (2019: 369) for the formation of past-tense stem forms of prefix verbs in Modern German.)

- (32) a. /'norD/ /to:r/_{St}St_{north gate} is directly formed from /'norD/_{St}St_{north} and /to:r/_{gate}St through compounding in S by means of Pattern 1.
- b. /'norD/ /to:r/_{St}St_{north gate} $\llcorner_{\text{comp(Pattern 1)}}^S$ /'norD/_{St}St_{north} + /to:r/_{gate}St

From this direct word-formation relation between the lexical stems /'norD/_{St}St_{north}, /to:r/_{gate}St, and /'norD/ /to:r/_{St}St_{north gate}, the *indirect* word-formation relation (33) between the corresponding lexical words can likewise be logically derived in PR (for details cf. again Nolda 2018):

- (33) a. /'norD_{to:r}/_{St}^W_{north gate} is indirectly formed from /'norD[ə]n/_{St}^W_{north} and /to:r/_{gate}^W through compounding in S by means of Pattern 1.
- b. /'norD_{to:r}/_{St}^W_{north gate} $\llcorner_{\text{comp(Pattern 1)}}^S$ /'norD[ə]n/_{St}^W_{north} + /to:r/_{gate}^W

3.2 Case study II: *Nordosten*

The object of the next case study is the compound *Nordosten*. The lexical word /'norD'ost[ə]n/_{St}^W_{north-east} and its stem /'norD/ /'ost/_{St}St_{north-east} are formed as follows in the linguistic system S under discussion:

- (34) /'norD'ost[ə]n/_{St}^W_{north-east} $\llcorner_{\text{comp(Pattern 2)}}^S$ /'norD[ə]n/_{St}^W_{north} + /'ost[ə]n/_{St}^W_{east}
- (35) /'norD/ /'ost/_{St}St_{north-east} $\llcorner_{\text{comp(Pattern 2)}}^S$ /'norD/_{St}St_{north} + /'ost/_{St}St_{east}

Pattern 2 consists of the following means:

Pattern 2

- FM: deaccentuation of the first base form and concatenation
- PM: identity with the categorisation of the second base form
- LM: identity with the categorisation of the second basis
- SM: formation of a concept according to the scheme 'sum of the entities denoted by the bases'

The formation restriction associated with Pattern 2 in S satisfies the constraints in Restriction 2:

Restriction 2

- FC: The base forms are compatible.

- PC: The paradigmatic categorisation of the first base form contains Basic-NStf.
 The paradigmatic categorisation of the second base form contains Basic-NStf, Sing-NStf, or Plur-NStf.
- LC: The lexical categorisations of the bases contain NounSt.
- SC: The bases denote entities of the same sort for which a sum operation is defined.

Note that PC in Restriction 2 requires that the first base form is categorised as a basic stem form. By this requirement it is predicted that there are no specific compounding stem forms – and thus no linking elements – occurring in compounds of this type.²⁴ SC ensures that the semantic types of the base concepts are appropriate for SM in Pattern 2.

FM in Pattern 2 differs from the formal means in Pattern 1 only with respect to accentuation. In the present example, the product forms /,norD/ /'ost/ and /,norD/ /'ost/ /[ə]n/ have final accent:

- (36) a. FM: /,norD/ + /'ost/ \mapsto
 /,norD/ \frown /'ost/ = /,norD/ /'ost/
- b. FM: /,norD/ + /'ost/ /[ə]n/ \mapsto
 /,norD/ \frown /'ost/ /[ə]n/ = /,norD/ /'ost/ /[ə]n/

PM and LM in Pattern 2 are identical to the paradigmatic and lexical means in Pattern 1. These last-base-inheriting operations copy their second argument to the value:

- (37) a. PM: {Basic-NStf} + {Basic-NStf} \mapsto {Basic-NStf}
 b. PM: {Basic-NStf} + {Sing-NStf} \mapsto {Sing-NStf}
- (38) LM: {NounSt, Masc-NSt} + {NounSt, Masc-NSt} \mapsto {NounSt, Masc-NSt}

In the example at hand, LM in Pattern 2 happens to apply trivially since both bases have the same lexical gender.

The main difference between Pattern 1 and 2 arguably is the semantic means. SM in Pattern 2 constructs concepts expressing the sum of the entities denoted by the bases:

- (39) SM: 'north' + 'east' \mapsto 'sum of north and east'

²⁴ A similar point is made by Becker (1992: 29) with respect to copulative compounds like *Fürst-bischof*, which have no linking elements either.

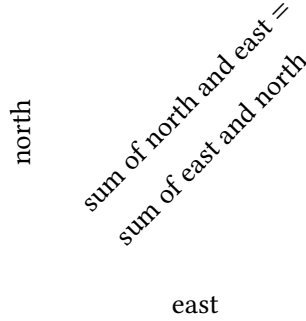


Figure 1: Sum of directions

Here, “sum” is understood in a broad sense covering arithmetic sum as in the formation of the “complex numeral” *hunderteins*, mereological sum as in the formation of the “fusional compound” *Mecklenburg-Vorpommern*, sum of directions as in the formation of the “intermediate-denoting compound” *Nordosten*, etc.²⁵ As illustrated in Figure 1, the sum operation on directions works in an analogous way to the sum operation on vectors, the only difference being that vectors have a length and an orientation, whereas directions have an orientation only (cf. Note 7 in Section 2 above). Obviously, SM in Pattern 2 is not a base-implying operation: the direction denoted by the product is denoted neither by the first basis nor by the second basis. This semantic means has another characteristic property instead – it is a *commutative* operation, i.e. an *n*-place operation (with $n \geq 2$) whose values are independent of the order of its arguments:

(40) SM: ‘east’ + ‘north’ \mapsto ‘sum of east and north’ = ‘sum of north and east’

Commutativity of semantic means can be used to distinguish in arbitrary linguistic systems *S* between coordinative word formation (like the formation of /,norD/ /ost/St_{‘north-east’} through compounding in *S* by means of Pattern 2) and subordinative word formation (like the formation of /'norD/ /,to:r/St_{‘north gate’} through compounding in *S* by means of Pattern 1):

Definition 1

Let $n \geq 2$.

n-place *coordinative word-formation* in *S* is that *n*-place word-formation process in *S* whose arguments are all *n*-place formation patterns in *S* with a semantic means that is commutative.

²⁵ “Complex numeral”, “fusional compound”, and “intermediate-denoting compound” are Wälchli’s (2009) descriptive terms. In general, such compounds are exocentric, while “appositional compounds” like English *singer-bassist* are endocentric (for discussion, cf. Olsen 2014).

Definition 2

Let $n \geq 2$.

n -place *subordinative word-formation* in S is that n -place word-formation process in S whose arguments are all n -place formation patterns in S with a semantic means that is not commutative.

By applying this terminology to the products themselves, we can distinguish between coordinative (or “copulative”) products and subordinative (or “determinative”) products in S being formed through of coordinative or subordinative word formation in S , respectively. The compound $/\text{norD}/ \text{ } / \text{ost}/_{\text{north-east}}^{\text{St}}$, then, is a coordinative compound in S because it is formed through coordinative compounding in S , while $/\text{norD}/ \text{ } / \text{to:r}/_{\text{north gate}}^{\text{St}}$ is a subordinative compound in S formed through subordinative compounding in S . Note that for $/\text{norD}/ \text{ } / \text{ost}/_{\text{north-east}}^{\text{St}}$ being a coordinative compound in S , it is both necessary and sufficient to be formed through coordinative compounding in S – i.e. through compounding by means of a formation pattern with a commutative semantic means; it is irrelevant, however, whether or not there is in S a conventionalised synonymous lexical unit $/\text{ost}/ \text{ } / \text{norD}/_{\text{east-north}}^{\text{St}}$ = ‘north-east’ with “reversed bases”.

4 Blending

It is a debated matter in the literature whether blends result from word formation or word creation. Proponents of the latter position cite as arguments: deliberate formation, deviant patterns, unpredictable forms, and more or less intransparent meanings (cf., in particular, Ronneberger-Sibold 2006, 2015). Others argue that blending is a word-formation process *sui generis* with specific, but systematic, formation patterns (an opinion hold, *inter alia*, by Müller & Friedrich 2011). In the view taken here, there exists a subset of blends in Modern German systems that, although deliberately created, are formed through a word-formation process by means of formation patterns which are very similar to the compounding patterns discussed in Section 3 above. With appropriate restrictions, these patterns can be used to form conventionalised as well as non-conventionalised blends (a point also made by Schulz 2004). Among these patterns, I shall discuss two by means of which blends like *Naturlaub* or *Kurlaub* can be formed from bases with an overlapping part.

4.1 Case study III: *Naturlaub*

The first blend to be discussed is *Naturlaub*. It appears to be more or less conventionalised in certain varieties of Modern German and occurs in two major graphematic forms:²⁶

- (41) Naturlaub im Norden (S 0)
nature.vacation in.the north
'nature vacation in the north'
- (42) Grüße aus dem NatUrlaub (S 0)
greeting.PL out.of the nature.vacation
'greetings from nature vacation'

In the linguistic system S under discussion (some specific system of spoken Modern German), the corresponding lexical word /na'tu:rlauB/_{'nature vacation'}^W and its homophonous stem /na'tu:rlauB/_{'nature vacation'}St are formed as follows:²⁷

- (43) /na'tu:rlaub/_{nature vacation}^W <_{blend(Pattern 3)}^S
 /na'tu:r/_{nature}^W + /u:rlaub/_{vacation}^W
- (44) /na'tu:rlaub/_{nature vacation}St <_{blend(Pattern 3)}^S
 /na'tu:r/_{nature}St + /u:rlaub/_{vacation}St

As to Pattern 3, I propose to assume the following means for it:

Pattern 3

FM: deaccentuation of the first base form and fusion before the overlapping part²⁸

PM: identity with the categorisation of the second base form

²⁶In the German Reference Corpus (DeReKo-2018-I), *Naturlaub* and *NatUrlaub* are the only graphematic forms with more than one token (141 tokens and 102 tokens, respectively). The relatively high number of *NatUrlaub* tokens may be due to the fact that this form is also a brand name (cf. Friedrich 2008: 413).

²⁷ According to the analysis proposed here, the blend /na'tu:rlauB/_{nature vacation}St has the base stem form /na'tu:rlauB/ with a single morphological atom. The homonymous compound /na'tu:r/./lauB/_{nature foliage}St, however, has a bipartite base stem form /na'tu:r/./lauB/ with two morphological atoms and an additional, deaccented, lexical accent on the second atom.

²⁸The *overlapping part* of two forms f_1 and f_2 is the largest common part of the last non-affix atom in f_1 and the first non-affix atom in f_2 that contains a syllabic full vowel and spans up to a syllable boundary. Different lexical accents are ignored.

- LM: identity with the categorisation of the second basis
 SM: formation of a concept according to the scheme ‘entity denoted by the second basis in a classificatory relation to an entity denoted by the first basis’

The formation restriction associated with Pattern 3 in S should satisfy the following constraints:

Restriction 3

- FC: There is exactly one non-affix atom in the first base form.
 There is an overlapping part of the base forms.
 The second base form has a primary lexical accent on or after the overlapping part.
 The base forms are segmentally distinct from the product form.
 PC: The paradigmatic categorisation of the first base form contains Basic-NStf.
 The paradigmatic categorisation of the second base form contains Basic-NStf, Sing-NStf, or Plur-NStf.
 LC: The lexical categorisations of the bases contain NounSt.

As in Restriction 2, PC in Restriction 3 requires that the first base form is categorised as a basic stem form. There are no empirical reasons to assume specific compounding or blending stem forms here; in particular, there are no linking elements occurring in Modern German blends (Müller & Friedrich 2011: 78).

FM in Pattern 3 assigns the product form /na'tu:rlauB/ (a unit sequence) to the base forms /na'tu:r/ and /'u:rlauB/.²⁹

- (45) FM: /na'tu:r/ + /'u:rlauB/ \mapsto
 /nat / \bigcirc /'u:rlauB/ = /na'tu:rlauB/

²⁹For the sake of the argument, I assume that in the linguistic system S under discussion (some specific system of spoken Modern German), the vowel in the first syllable in /'u:rlauB/ is typically realised as a long, smoothly cut, tense vowel – as in the phonetic transcription of *Urlaub* by the Duden (2015: 872).

This is achieved in the following general way:³⁰

1. The first base form /na'tu:r/ is deaccented to /na̠tu:r/.
2. The overlapping part /u:r/ and any part after it are deleted in /na̠tu:r/.
3. Any part of /'u:rlauB/ before the overlapping part /u:r/ is deleted.
4. The results /nat/ and /'u:rlauB/ are combined by means of the fusion operation, denoted by " \bigcirc ".

In (45), the deaccented lexical accent introduced in step 1 is removed with the overlapping part /u:r/ in step 2. This is not the case in the formation of blends like *Triolade* (cf. Friedrich 2008: 479):

- (46) /,tri:ɔ'la:də/St_{bar with three types of chocolate} \leftarrow ^S_{blend(Pattern 3)}
 /'tri:ɔ/St_{trio} + /ʃoko'la:də/St_{chocolate}

Here, the accented syllable in the first base form /'tri:ɔ/ is before the overlapping part /o/. The lexical accent is thus not removed in step 2:

- (47) FM: /'tri:ɔ/ + /ʃoko'la:də/ \mapsto
 /,tri: / \bigcirc / ɔ'la:də/ = /,tri:ɔ'la:də/

As to step 3, it does not delete anything in (45) since the overlapping part /u:r/ is at the very beginning of the second base form.³¹ For a non-trivial example consider the blend *Mordsee* (cf. Friedrich 2008: 408):

³⁰Of course, this is just one of many equivalent formulations of FM in Pattern 3 (cf. Note 17 in Section 3.1).

There is another blending pattern in systems of spoken Modern German for blends where the first base form contains more than one non-affix atom. As far as I can see, this pattern differs from Pattern 3 only with respect to the formal means which works in the following way:

1. The second base form is deaccented.
2. The overlapping part and any part before it are deleted in the second base form.
3. Any part of the first base form after the overlapping part is deleted.
4. The results are combined by means of the fusion operation.

Put in a nutshell, this formal means is "deaccentuation of the second base form and fusion after the overlapping part". This pattern can be used not only to form (non-conventionalised) blends like /'zelB/ /st/ /morD/ /ze:/St_{'suicidal North Sea'} where the overlapping part is a proper part of an atom, but also in borderline cases like /'fraiB/ /,tif/ /,tenis/St_{'desktop-ping-pong'} (Schulz 2004: 300) where the overlapping part spans a full atom.

³¹This is the case because in the view taken here, there is no underlying initial glottal stop in the base form /'u:rlauB/. If one would assume a base form with such a consonant, then the latter would be deleted in step 3 anyway.

$$(48) \quad /'morD/ \ /ze:/'_{murderous\ North\ Sea}^{St} \leq^S /'morD/'_{murder}^{St} + /'norD/ \ /ze:/'_{North\ Sea}^{St}$$

In this case, step 3 deletes a non-empty part of the second base form $/'norD/ \ /ze:/'$ before the overlapping part $/orD/$:

$$(49) \quad \text{FM: } /'morD/ + /'norD/ \ /ze:/' \mapsto \\ /m \quad / \bigcap /' \quad orD/ \ /ze:/' = /'morD/ \ /ze:/'$$

The output-related constraint in Restriction 3 according to which the base forms are segmentally distinct from the product form is a necessary condition for the recoverability of the bases.

As can be seen from (45), FM in Pattern 3 reduces the number of atoms: the number of atoms in the product form is lower than the total number of atoms in the base forms.³² Such *fusioning* formal means can be used to define “blending” and “compounding” for arbitrary linguistic systems S .³³

Definition 3

Let $n \geq 2$.

n -place *blending* (blend^n) in S is that n -place word-formation process in S whose arguments are all n -place formation patterns in S with a formal means that is fusioning.

Definition 4

Let $n \geq 2$.

n -place *compounding* (comp^n) in S is that n -place word-formation process in S whose arguments are all n -place formation patterns in S with a formal means that is not fusioning.

³² A similar point is made by Plank (1981: 198), who states: “das Resultat einer Kontamination soll den Eindruck einer einfachen morphologischen Einheit ohne interne Konstruktionsfuge erwecken [the result of blending shall give the impression of a simple morphological unit without an internal construction boundary]”. As a consequence, the first base form can, in principle, be recovered not only by reference to the phonological material up to the overlapping part (if any) but also by reference to material after it. As pointed out by Schulz (2004: 296), in *Tragikomik*, which is formed by means of another blending pattern from the bases *Tragik* and *Komik*, the final *ik* helps to recover the first base form. Similarly, there may be blends where the second base form can be recovered by reference to material before the overlapping part. Such effects are excluded in compounds because of the internal morphological boundary.

³³ By Definitions 3 and 4, two-place word-formation processes are effectively partitioned into two-place compounding and two-place blending. A further candidate for a two-place word-formation process is reduplication which, however, is assumed here to be a one-place process, producing a total or partial copy from a single basis.

(By convention, the arity specification “2” in “blend²” and “comp²” is dropped if $n = 2$.)³⁴ Those definitions can be supplemented in word-formation theory by an empirical hypothesis stating that the formal means in any blending pattern are not only fusing but also shortening.³⁵

PM in Pattern 3 is identical to the paradigmatic means in Pattern 1 and 2. Again, this last-base-inheriting operation copies the paradigmatic categorisation of the second base form to the product form:

- (50) a. PM: $\{\text{Basic-NStf}\} + \{\text{Basic-NStf}\} \mapsto \{\text{Basic-NStf}\}$
 b. PM: $\{\text{Basic-NStf}\} + \{\text{Sing-NStf}\} \mapsto \{\text{Sing-NStf}\}$

LM in Pattern 3 – likewise identical to the last-base-inheriting lexical means in Pattern 1 and 2 – copies the lexical categorisation of the second base to the product:

- (51) LM: $\{\text{NounSt, Fem-NSt}\} + \{\text{NounSt, Masc-NSt}\} \mapsto \{\text{NounSt, Masc-NSt}\}$

As a consequence, the product has the same lexical gender as the second basis.

SM in Pattern 3 is the same as the last-base-implicating semantic means in Pattern 1. Applied to the base meanings in (44), it determines the following under-specified word-formation meaning:

- (52) SM: ‘nature’ + ‘vacation’ \mapsto ‘vacation in a classificatory relation to nature’

Since this semantic means is not commutative, $/\text{na}^t\text{u:rlauB}/_{\text{nature vacation}}^{\text{St}}$ is a subordinative blend (cf. Friedrich 2008: 413, who classifies this blend as determinative and endocentric). Thus, as argued independently by Müller & Friedrich (2011: Section 5) and others, the dichotomy between subordinative and coordinative products, introduced above for compounds, carries over to blends.

³⁴Compounding processes with an arity greater than 2 might be assumed in Modern German for tripartite coordinative compounds like *rot-grün-blau*, arguably denoting the mereological sum of red, green, and blue parts. For potential tripartite blends in Modern German cf. Friedrich (2008: Section 4.6).

³⁵In contrast to axioms, theorems, hypotheses, etc., definitions are non-empirical since they can be neither true nor false. This distinction between non-empirical definitions and empirical sentences is blurred in much of the linguistic literature (for discussion cf. Budde 2012: Section 2.2). For instance, shortening is used by Müller & Friedrich (2011: 78) and others as a *defining* criterion for blending, by means of which blending is distinguished from compounding. In my view, this is problematic because the notion of compounding should not exclude by definition the existence of compounding patterns with formal means that involve shortening operations such as apocope.

4.2 Case study IV: *Kurlaub*

The object of the last case study is the conventionalised blend *Kurlaub*:

- (53) Der Kurlaub werde eingeschränkt, nur für „notwendige
the health.cure.vacation restricted.3SG.PASS.SBJV only for necessary
Kuren“ sollten Rentenversicherer und Krankenkassen noch
cure.PL shall.3PL.SBJV pension.insurance.PL and health.insurance.PL still
zahlen.
pay
'Combinations of health cure and vacation will be restricted, pension
insurances and health insurances shall only continue to pay for
"necessary cures".'

In the linguistic system S, the lexical word /'ku:rlauB/_{health cure plus vacation}^W and its stem /'ku:rlauB/_{health cure plus vacation}St are formed as follows:

- (54) /'ku:rlauB/^W 'health cure plus vacation' <^S_{blend(Pattern 4)}
 /'ku:r/^W 'health cure' + /'u:rlauB/^W 'vacation'
- (55) /'ku:rlauB/St 'health cure plus vacation' <^S_{blend(Pattern 4)}
 /'ku:r/St 'health cure' + /'u:rlauB/St 'vacation'

Pattern 4 combines means from Pattern 2 and 3:

Pattern 4

- | | |
|-----|---|
| FM: | deaccentuation of the first base form and fusion before the overlapping part |
| PM: | identity with the categorisation of the second base form |
| LM: | identity with the categorisation of the second basis |
| SM: | formation of a concept according to the scheme 'sum of the entities denoted by the bases' |

Restriction 4 contains the corresponding constraints from Restriction 2 and 3:

Restriction 4

- FC: There is exactly one non-affix atom in the first base form.
There is an overlapping part of the base forms.
The second base form has a primary lexical accent on or after the overlapping part.
The base forms are segmentally distinct from the product form.

- PC: The paradigmatic categorisation of the first base form contains Basic-NStf.
The paradigmatic categorisation of the second base form contains Basic-NStf, Sing-NStf, or Plur-NStf.
- LC: The lexical categorisations of the bases contain NounSt.
- SC: The bases denote entities of the same sort for which a sum operation is defined.

FM in Pattern 4 is identical to the formal means in Pattern 3 and assigns the fused product form /'ku:rlauB/ to the base forms /'ku:r/ and /'u:rlauB/:

$$(56) \quad \text{FM: } /'ku:r/ + /'u:rlauB/ \mapsto /'k \quad / \bigcirc /'u:rlauB/ = /'ku:rlauB/$$

PM and LM in Pattern 4 are the same as the last-base-inheriting paradigmatic and lexical means in the patterns discussed so far:

$$(57) \quad \text{PM: } \{\text{Basic-NStf}\} + \{\text{Basic-NStf}\} \mapsto \{\text{Basic-NStf}\}$$

$$(58) \quad \text{LM: } \{\text{NounSt, Fem-NSt}\} + \{\text{NounSt, Masc-NSt}\} \mapsto \{\text{NounSt, Masc-NSt}\}$$

In particular, the lexical means ensures that the product inherits its lexical gender from the second basis.

SM in Pattern 4 is identical to the semantic means in Pattern 2:

$$(59) \quad \text{SM: } \text{'health cure'} + \text{'vacation'} \mapsto \text{'sum of health cure and vacation'}$$

The sum operation involved in this example combines events, e.g. health-cure treatments in the morning and vacation activities during the rest of the day. These combined events denoted by the product are denoted neither by the first basis nor by the second basis (at least not as a whole); this is what is to be expected from a semantic means that is not base-implying.³⁶ Since the semantic means is commutative, /'ku:rlauB/St_{'health cure plus vacation'} is a coordinative blend (also classified as coordinative and exocentric by Friedrich 2008: 387).

5 Conclusion

In the case studies in Sections 3.1, 3.2, 4.1, and 4.2, I discussed the word-formation relations (32), (35), (44), and (55), repeated here for convenience:

³⁶SM in Pattern 4 may involve sum operations of quite different sorts. In the case of the blend /demokra'tu:r/St_{'democracy plus dictatorship'}, for example, SM assigns to the base concepts 'democracy' and 'dictatorship' a concept that denotes the combination of two political systems which neither is a proper democracy nor a full-fledged dictatorship.

- (60) $/\text{'norD}/ \text{'to:r}/_{\text{'north gate}}^{\text{St}} \leq_{\text{comp(Pattern 1)}}^{\text{S}} / \text{'norD}/_{\text{'north}}^{\text{St}} + / \text{'to:r}/_{\text{'gate}}^{\text{St}}$
- (61) $/\text{'norD}/ \text{'ost}/_{\text{'north-east}}^{\text{St}} \leq_{\text{comp(Pattern 2)}}^{\text{S}} / \text{'norD}/_{\text{'north}}^{\text{St}} + / \text{'ost}/_{\text{'east}}^{\text{St}}$
- (62) $/\text{'na'tu:rlauB}/_{\text{'nature vacation}}^{\text{St}} \leq_{\text{blend(Pattern 3)}}^{\text{S}}$
 $/\text{'na'tu:r}/_{\text{'nature}}^{\text{St}} + / \text{'u:rlauB}/_{\text{'vacation}}^{\text{St}}$
- (63) $/\text{'ku:rlauB}/_{\text{'health cure plus vacation}}^{\text{St}} \leq_{\text{blend(Pattern 4)}}^{\text{S}}$
 $/\text{'ku:r}/_{\text{'health cure}}^{\text{St}} + / \text{'u:rlauB}/_{\text{'vacation}}^{\text{St}}$

“S” stood for some specific, yet undetermined, system of spoken Modern German. The products in those word-formation relations – the subordinative compound $/\text{'norD}/ \text{'to:r}/_{\text{'north gate}}^{\text{St}}$, the coordinative compound $/\text{'norD}/ \text{'ost}/_{\text{'north-east}}^{\text{St}}$, the subordinative blend $/\text{'na'tu:rlauB}/_{\text{'nature vacation}}^{\text{St}}$, as well as the coordinative blend $/\text{'ku:rlauB}/_{\text{'health cure plus vacation}}^{\text{St}}$ – are *right-headed* in the following sense. All of them are *categorially determined* by the last basis, i.e. they are formed by means of a formation pattern with last-base-inheriting paradigmatic and lexical means. Some of them – viz. $/\text{'norD}/ \text{'to:r}/_{\text{'north gate}}^{\text{St}}$ and $/\text{'na'tu:rlauB}/_{\text{'nature vacation}}^{\text{St}}$ – are also *semantically determined* by the last basis, because they are formed by means of a formation pattern with a last-base-implying semantic means.

Presupposing the Pattern-and-Restriction Theory, these headedness properties could be established independently of any word structures; in particular, no reference was made to “heads” or “non-heads”. Rather, it was demonstrated that those properties are based on properties of the formation patterns by means of which products are formed from bases through certain word-formation processes. These processes are not restricted to compounding, but apply in principle also to blending. Put differently, headedness properties of compounds and blends can be identified in the Pattern-and-Restriction Theory solely on the basis of word-formation relations and the involved formation patterns – without the assumption of “head constituents”, which are notoriously difficult to ascertain for blends. In the paradigmatic approach followed in this paper, headedness thus emerges as an epiphenomenon of the word-formation relations between lexical units in a linguistic system. This notion is readily reconstructed as a descriptive term, but has no theoretical significance in such an approach to word formation.

Appendix

List of symbols

Notational conventions:

“St”: lexical stem.

“W”: lexical word.

Symbols for categories:

“Acc-Nf”: nominal word form in the accusative.

“Basic-NStf”: nominal basic stem form.

“Comp-NStf”: nominal compounding stem form.

“Dat-Nf”: nominal word form in the dative.

“Der-NStf”: nominal derivation stem form.

“Fem-NSt”: nominal stem in the feminine.

“Masc-N”: nominal word in the masculine.

“Masc-NSt”: nominal stem in the masculine.

“Neut-NSt”: nominal stem in the neuter.

“Nom-Nf”: nominal word form in the nominative.

“Noun”: noun.

“NounSt”: noun stem.

“Plur-NStf”: nominal stem form in the plural.

“Sing-Nf”: nominal word form in the singular.

“Sing-NStf”: nominal stem form in the singular.

Symbols for word-formation relations:

“<”: word-formation relation.

“≤”: direct word-formation relation.

“<”: indirect word-formation relation.

Symbols for word-formation processes:

“blend”: (two-place) blending.

“comp”: (two-place) compounding.

Variables:

“*f*”: sequences of morphological or syntactic atoms.

“*M*”: two-place operations.

“*n*”: natural numbers ≥ 1 .

“*S*”: linguistic systems.

“*x*”: arguments or values of two-place operations.

Ambiguous constant:

“*S*”: some specific system of spoken Modern German.

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Headedness and/or grammatical anarchy?

In most grammatical models, hierarchical structuring and dependencies are considered as central features of grammatical structures, an idea which is usually captured by the notion of “head” or “headedness”. While in most models, this notion is more or less taken for granted, there is still much disagreement as to the precise properties of grammatical heads and the theoretical implications that arise of these properties. Moreover, there are quite a few linguistic structures that pose considerable challenges to the notion of “headedness”.

Linking to the seminal discussions led in Zwicky (1985) and Corbett, Fraser, & McGlashan (1993), this volume intends to look more closely upon phenomena that are considered problematic for an analysis in terms of grammatical heads. The aim of this book is to approach the concept of “headedness” from its margins. Thus, central questions of the volume relate to the nature of heads and the distinction between headed and non-headed structures, to the process of gaining and losing head status, and to the thought-provoking question as to whether grammar theory could do without heads at all.

The contributions in this volume provide new empirical findings bearing on phenomena that challenge the conception of grammatical heads and/or discuss the notion of head/headedness and its consequences for grammatical theory in a more abstract way. The collected papers view the topic from diverse theoretical perspectives (among others HPSG, Generative Syntax, Optimality Theory) and different empirical angles, covering typological and corpus-linguistic accounts, with a focus on data from German.