Chapter 5

On composition and derivation: The constituent structure of secondary words in German

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0 Introduction[*]

The theory of word formation that I would like to sketch here is in two respects a "lexicalist" theory.[1]

[§] *Editors' note:* This work was originally published in one of the earliest collections of generative papers on German grammar that appeared in English (Toman, Jindřich (ed.). 1985. *Studies in German Grammar* (Studies in Generative Grammar 21), 319–376. Dordrecht: Foris.). As pointed out in the author's note *, this work is basically the English version of a German article (Höhle 1982b) to which a number of clarifying notes have been added. For reasons of comparability with the German version we have retained the unusual numbering of these notes in the present version. Otherwise, the layout and citation style have been adapted to the format chosen for this volume.

[*] An earlier version of this article has appeared as (Höhle 1982b). While the text has largely been kept unchanged, some clarifying remarks are contained in added notes (indicated by a letter after the note, e.g., note 2a). Susan Olsen has done an admirable job in translating the original version and correcting the amendments, thereby contributing to a less cryptic formulation of numerous passages.

[1] This article is based on an "Excursus on the Theory of Word Formation" from January 1976 (in Höhle 1976) which was not included in the printed version of that work; cf. Höhle (1978: 68). – I would like to thank the editors of the *Zeitschrift für Sprachwissenschaft* for some critical comments; for discussion of individual points I also extend thanks to Marga Reis and Jindřich Toman.

First of all in a general sense, inasmuch as it is not a "transformationalist" theory. This finds justification in the observation that the products of word formation – morphological elements formed from other morphemes or morpheme complexes – typically display structural and semantic properties that differ distinctly from those of syntactic phrases. (For discussion, cf., e.g., Toman (1980) and Vögeding (1981).)

Secondly in a more specific sense. It is usually assumed that a grammar contains a set of lexical entries, where a lexical entry is an *n*-tuple of characterizations of *n* different types of properties exhibited by a morpheme or morpheme complex. Usually a morpheme (morpheme complex) displays at least phonological, logical ("semantic") and categorial properties. Hence, its lexical entry will consist (in part, at least) of a phonological, a logical, and a categorial characterization. The latter specifies above all the syntactic category and the selectional properties of the element (cf. Höhle 1978: 14f.).[2]

With this background, it is natural to represent the difference between free and bound morphemes in the same manner as the differences between intransitive and transitive verbs or between "full" verbs and "helping" verbs, namely as differences in their selectional properties. Transitive verbs differ from intransitive verbs in that they select an accusative object; "helping" verbs, as opposed to full verbs, select (a class of) other verbs (for more precise discussion, cf. Höhle 1978: 77–92). Accordingly, bound morphemes select other morphemes (or classes of morphemes), to which they are thereby bound, while free morphemes do not.

These are minimal assumptions. It is my theory that, in connection with a few additional assumptions which I consider to be well-founded and/or unproblematic, these assumptions are at the same time sufficient to account for the essential features of compositions and affixal derivations.[2a]

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[2]If one seriously considers the idea that all unpredictable properties of lexical elements should be treated as part of their lexical entry, it becomes evident that various grammatical phenomena can be accounted for better in this manner than by means of syntactic transformations. For an example of such a treatment of different infinite constructions and especially the passive constructions, cf. Höhle (1978).

[2a]What is meant are the essential grammatical features. Aspects of language use have to be dealt with by other theories. Hence, I am not concerned here with questions relating to the popularity of individual patterns of word formations (often discussed under the heading of 'productivity') or with various inventions on the part of creative language users changing either grammatical rules or properties of lexical elements.

    I am restricting my attention, furthermore, to certain classical types of word formation. I have nothing to say, e.g., about syllable-based affixal derivations as in (i) or about clippings as in (ii):

    (i)   a.   *Schlaffi* 'limp-y'/"non-aggressive person" (from *schlaff* 'limp')

1 A lexicalist theory of word formation

I suggest assigning compounds an internal constituent structure in such a way that, e.g., *Schwimmbad* 'swim-bath'/"bathing establishment" is to be represented as (1a) and *denkfaul* 'think-lazy'/"mentally lazy" as (1b):

(1) a. $[_N [_V$ schwimm$] [_N$ bad$]]$
     b. $[_A [_V$ denk$] [_A$ faul$]]$

Along the same lines, I would like to assign affixal derivations an internal constituent structure such that, e.g., *Vermeidung* 'avoid-ing'/"avoidance" is to be represented as (2a) and *vermeidbar* 'avoid-able' as (2b):

(2) a. $[_N [_V$ vermeid$] [_N$ ung$]]$
     b. $[_A [_V$ vermeid$] [_A$ bar$]]$

A few remarks are necessary here.

1.1 Compounds

The representation of compounds as in (1) is widely accepted in the literature. This is intuitively reasonable since the noun *Schwimmbad* is obviously formed on the basis of the verb *schwimm-* 'swim' and the noun *Bad* 'bath'. On the other hand it is not self-evident that compounds have the structure shown in (1).

In a lexicalist theory such a structure presupposes an extension of the usual phrase structure rules to a rule like (3):

(3) $X^0 \rightarrow Y^0 \frown Z^0$

Here *X, Y, Z* are variables ranging over syntactic categories; the superscript "0" indicates in accordance with $\overline{\mathrm{X}}$-theory (cf., e.g., Jackendoff 1977), that the expansion takes place at the zero-bar level, so that Y^0 and Z^0 are lexical elements or

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   b. *Asi* "anti-social person" (from *asozial* 'anti-social')
   c. *Conti* "person injured through Contergan" (from *contergangeschädigt* 'Contergan-injured')

(ii) a. *(der) Foto* 'the*masc.* photo'/"camera" (from *Fotoapparat* (masc.) 'photo-device'/"camera"); opposed to *(das) Foto* 'the*neut.* photo'/"photograph"
     b. *(das) Mikro* 'the*neut.* microphone' (from *Mikrophon* (neut.) 'microphone'
     c. *Vorzüge* "preference shares" (from *Vorzugsaktien* 'preference-shares'); opposed to *Vorzüge* 'virtues'

derive recursively from lexical elements by (3). If *X* and *Z* have the value A (Adjective) and *Y* = V (Verb), we obtain structures like (1b) (and (2b)).

An alternative would be to postulate a special word formation rule in place of (3) which would operate on lexical entries as well as on its own output, generating secondary morphological elements. This rule could take approximately the form of (4):

(4) If φ is an element of the category Y^0 and ψ is an element of the category Z^0, then $\widehat{\varphi\ \psi}$ is an element of the category X^0.

An instantiation of (4) would be: if *schwimm* is a V and *bad* an N, then *schwimm⌢bad* is an N. According to this suggestion *Schwimmbad* is not to be analyzed as (1a) but without internal constituent structure as in (5):

(5) [$_N$ schwimm⌢bad]

Analogously for other compounds.

It is not clear from the start whether analyses like (1) in connection with a rule like (3) differ empirically from analyses like (5) in connection with a rule like (4) and, if so, whether one has advantages over the other. Certain stress phenomena to be discussed in Section 9 indicate however that (1) is more adequate than (5). I will assume therefore that for word formation constructions with the category feature [*+N*] – i.e., secondary adjectives and nouns – rule (3) and structure (1) are to be adopted. (The situation is somewhat different with verbs in that their formation possibly obeys in part other principles; I will comment on this only in passing.)

1.2 Derivations

Whereas representations of compounds as in (1) are largely accepted, an analysis of derivations as in (2) is definitely unusual. Chomsky & Halle (1968), e.g., have (6) for *blackboard* but (7) for *analyzable* (somewhat simplified in each case):

(6) [$_N$ [$_A$ black] [$_N$ board]]   (1968: 21)

(7) [$_A$ [$_V$ analiz] abl]   (1968: 86)

In this tradition *Vermeidung* and *vermeidbar* would not be represented as in (2) but as in (8):

(8)   a.   [$_N$ [$_V$ vermeid] ung]
       b.   [$_A$ [$_V$ vermeid] bar]

Analyses such as (8) differ in two respects from those of (2). (i) The bound morphemes *-ung* and *-bar* in (2) have a category label in the same fashion as the free morphemes *bad* and *faul* in (1); in (8), however, they are not marked for a category. (ii) Derivations have according to (2) exactly the same categorial structure as compounds, whereas in (8) they are essentially different in structure. The differences (i) and (ii) are obviously connected in that (ii) presupposes (i).

The difference between (1) and (8) as well as between (6) and (7) appears intuitively reasonable: according to widespread opinion the distinction between composition and derivation is of a fundamental and essential nature. It seems only proper to have it reflected in the different constituent structures assigned to the products of word formation. And the fact that *bad* and *faul* in *Schwimmbad* and *denkfaul* should have a category label seems reasonable since these elements must carry the same labels when they occur as syntactic words. One cannot, of course, argue for a category label for *-ung* and *-bar* on the basis of the same observation, since the latter do not occur as words.

Nevertheless, it is clear that within a lexicalist theory of word formation analyses like (8) are formally impossible if one retains the usual conventions for the insertion of morphological elements into phrase structures (or equivalent well-formedness conditions). No known type of phrase structure rule will generate structures of the form (9) in such a way as to allow lexical elements of the form (10) to be inserted:[3,3a]

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[3]This problem does not arise in Chomsky & Halle (1968): they presuppose a transformationalist theory of word formation. Such a theory can generate structures like (9) simply because within it syntactic transformations have the power to define almost arbitrary relations between input and output structures.

One of the many problems with Aronoff's theory (Aronoff 1976) of word formation is that he, on the one hand, tries to present a lexicalist theory but, on the other hand, formulates rules that generate structures like (10). It is not clear how such elements can be placed into a phrase marker in line with known conventions.

Lack of clarity in formal matters is not limited to Aronoff alone. Siegel, for instance, is of the opinion that Aronoff's word formation rules are "a special kind of transformation" and that they produce "Chomsky adjunction of an affix" (Siegel 1978: 189). Both assertions are misleading. In the technical sense transformations are relations which are formulated for pairs of phrase markers; Aronoff's word formation rules however are formulated for lexical entries. (For more on this distinction, cf. Höhle (1978: 10).) Furthermore, Chomsky adjunctions have the form $[_{X^n}\,[_{Y^m}\,\varphi\,]\,[_{Z^k}\,\psi\,]\,]$ or $[_{X^n}\,[_{Z^k}\,\psi\,]\,[_{Y^m}\,\varphi\,]\,]$, where $X^n = Y^m$; in Aronoff's rules however the "outer" category X^n is not necessarily related to the "inner" category Y^m (and the affix ψ does not carry a categorial label Z^k).

Wurzel (1970) suggests a very peculiar solution. It contains many unclear points; yet it is apparent that he assigns to derivations a superficial structure like (8) on the one hand while deriving them from structures which are very similar to (2) on the other (Wurzel 1970: §5.2).

[3a]It is possible, of course, to devise rules and conventions that allow structures like (9) and (10) to be generated. The point is that this requires explicit stipulations which (i) have not been spelled out and (ii) could hardly be viewed as natural extensions of general theoretical assumptions.

(9)   a. $[_N \text{ V } \varphi]$
       b. $[_A \text{ V } \varphi]$

(10)   a. $[_N \text{ V ung}]$
       b. $[_A \text{ V bar}]$

As an alternative to (2), the only other possibility provided by a lexicalist theory would be to describe derivations without internal constituent structure as in (11):

(11)   a. $[_N \text{ vermeid}\frown\text{ung}]$
       b. $[_A \text{ vermeid}\frown\text{bar}]$

(Such representations have been proposed, e.g., by Jackendoff (1975) and Hust (1978).)

   As in the case of composition, such representations presuppose again special word formation rules. If *-ung* and *-bar* have lexical entries which assign a category label to these suffixes, then a rule of the form (4) can be applied. These elements would, however, still have to somehow carry the information that they – as opposed to the constituents of compounds – are (i) obligatorily subject to this rule and (ii) may only be interpreted as the variable ψ, that is as the second component of the secondary word.

   If, on the other hand, affixes are not considered to be members of a syntactic category, the most plausible analysis would be to formulate a separate "rule" for each affix along the lines of (12):

(12)   a.   If φ is a V, then $\varphi\frown ung$ is an N
       b.   If φ is a V, then $\varphi\frown bar$ is an A

1.3 The "compositional theory of affixation"

Once again, it is not at all clear whether the differences between (2) and (11) can be directly correlated to any empirical differences and, in case (11) were to be preferred to (2), whether rules like (12) or those like (4) are superior. One thing, however, is clear: if one analyzes compositions in the way I have suggested above, then no new mechanism whatsoever is necessary for the generation of affixal derivations. Rules of the form (3) generate structures of the form (2) exactly as they do structures of the form (1). If we require bound morphemes to be represented by normal lexical entries, specifically as members of a syntactic category, representations like (2) will be generated by normal lexical "insertion" exactly like (1).

The distinction between composition and affixal derivation in this theory is not expressed in the constituent structure but rather can be reduced entirely to the use of a bound lexical element in the case of a derivation. I will term such a theory "strictly lexicalist"; and because of the formal similarity of compositions and derivations I will also call it "the compositional theory of affixation".

2 Composition vs. derivation

If one is of the opinion that there is somehow a fundamental difference between composition and derivation, one must observe that the fundamental nature of this difference has not been made clear in the literature. Instead, two types of explication are common.

2.1 First explication

The first type of explication can be formulated as in (13):

(13)   If a morpheme or morpheme complex M_S is formed on the basis of *n* morphemes (or morpheme complexes) $M_1, \dots , M_n$ of which two (or more) are *lexematic* morphemes (morpheme complexes), then M_S is a composition. If less than two lexematic morphemes (morpheme complexes) are involved, then M_S is a derivation.

This type of explication presupposes a partition of the set of lexical elements in a language into "lexematic" and "grammatical" elements. A problem arises from the start: there exists no general and reliable criterion for recognizing a "lexematic" or "grammatical" element (see, e.g., Langacker (1973: 76f., 81); he uses "lexical" in place of "lexematic"). Secondly, this type of explication suggests that the distinction is in no way essential or even noteworthy (insofar as for the subscript of M_n $n > 1$ is true). For as long as the M_i ($1 \leq i \leq n$) can be characterized as "lexematic" or "grammatical" at all, this characterization can undoubtedly be understood as a property expressed by the respective lexical entry for M_i. (This can be said at least for those "grammatical" morphemes that are assumed to play a role in derivations.) That means that the distinction between composition and derivation can be reduced entirely to independently given information concerning the M_i. In particular, (13) cannot substantiate the assumption that composition and derivation involve different rule mechanisms or that compositions and derivations have different constituent structures.

2.2 Second explication

The second type of explication can be formulated as in (14):

(14) If a morpheme or morpheme complex M_S is formed on the basis of n morphemes (or morpheme complexes) $M_1, \ldots, M_n$ of which two (or more) can occur freely, then M_S is a composition. If less than two free morphemes (morpheme complexes) are involved, then M_S is a derivation.

This type of explication differs from (13) in that in place of the dubious partition into "lexematic" and "grammatical" elements the no doubt essential partition into "free" and "bound" elements is found. (It is essential in that it is not reducible to any independently established property.) For this reason I will henceforth make reference to (14) and not to (13).[4] In other respects, the same can be said for (14) as was remarked for (13): this explication reduces the distinction between composition and derivation entirely to independently established properties of the morphemes (morpheme complexes) involved; in particular it is completely compatible with the strictly lexicalist theory which leads to representations like (1) and (2).

However, the expressions "free" and "bound" are in need of qualification. In accordance with tradition, I will say that a M_i can occur "freely" even if M_i must bear inflectional characteristics if it is to be used as a syntactic word (with the meaning held constant). A distinction between "inflection" and "word formation in a narrower sense" (= composition and derivation) as is implied by this notion of "free" is not without problems. It is supported, however, among other things by the fact that it facilitates the formulation of the principles of word formation. For example, initial adjectival and verbal components of secondary words are generally not inflected; cf. *Kurzurlaub* 'short-vacation'/"short leave" vis-à-vis *kurzer Urlaub* 'short vacation' and *Schwimmbad* vis-à-vis **Schwimmtbad*,

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[4]The relationship between the nouns *Fisch* 'fish', *Besuch* 'visit', *Pfiff* 'whistle', *Betrug* 'deceit' and the verbs *fisch-* 'fish', *besuch-* 'visit', *pfeif-* 'whistle', *betrüg-* 'cheat' is according to both (13) and (14) one of derivation, even without assuming a "zero morpheme" or "process morpheme", because these nouns are formed on the basis of less than two free (or lexematic respectively) morphemes (morpheme complexes). In cases like these the subscript of M_n may be interpreted as $n = 1$.

Under both modes of explication words like *Handschuh* 'hand-shoe'/"glove" and *Handtuch* 'hand-cloth'/"towel" can, of course, only be accounted for inasfar as they can be understood as products of productive word formation processes. To the extent that *Handschuh* denotes something that has nothing to do with shoes and *Handtuch* denotes something that does not necessarily have to do with hands – witness, e.g., *Fußhandtuch* 'foot-hand-cloth'/"foot towel" – such words have to be seen as idiomatic complexes, i.e., as lexical entries of a special kind (cf. Höhle 1978: 27f.).

*Schwimmen*en*bad*, etc.[4a,5]

Bound morphemes in the strictly lexicalist theory are generally characterized by lexical entries as illustrated in (15) for *-ung* and in (16) for *-bar*:

(15)   PhC: *ung*
        KC: $[_{X^0}$ V $[_N$___ $]]$
        LC: ...

(16)   PhC: *bar*
        KC: $[_{X^0}$ V $[_A$___ $]]$
        LC: ...

I have simplified the phonological characterization (PhC) of the morphemes by using conventional orthography; I leave the logical characterization (LC) open here. From the categorial characterization (KC) it can be seen that *-ung* is a noun and *-bar* an adjective and that both elements directly follow a sister constituent of the type Verb (to which they are consequently "bound") within a X^0 constituent. (More precise discussion of *-bar* can be found in Höhle (1978: 66f.) and Toman (1980).) By means of these lexical entries *-ung* and *-bar* are unambiguously identified as suffixes; representations like (2) are therefore to be understood as derivations and those like (1) in which only free morphemes are involved exemplify compositions, according to (14). If the distinction between composition and derivation is indeed characterized adequately by (14), then there can be no objection on these grounds to the "compositional theory of affixation".

2.3 The role of paraphrases

Certain possibilities of paraphrasing word formation constructions follow from the free/bound distinction.

Compounds can generally be paraphrased in such a way that their constituents occur as free elements in the paraphrase. For instance, one can form paraphrases of *Gartentür* 'garden-door' like (17):

[4a]When inflectional characteristics are removed from a word what remains is a 'stem'. A stem – like any other lexical element – has a set of categorial features associated to it (cf. note 16a). Many stems are free in the sense of (14) although they never constitute words by themselves (since they have to get inflectional characteristics if they are to be used as words). – The term "root" will not be used in this article.

[5]The 'unmarked' stem of a verb (which is the form generally used in word formation) is the stem of the 2.pl.pres.ind.; e.g., (*ihr* 'you', pl.) *schrei-t* 'cry', *sei-d* 'be-*t*'/"are" (the spelling *d* with *seid* is irregular), *tu-t* 'do', *woll-t* 'wish', *könn-t* 'can'. The same stem is the basis for the entire present subjunctive (e.g., (*er* 'he') *schrei-e, sei, tu-e, woll-e, könn-e*) and the infinitive (which I consider an infinite inflectional form).

(17) a. Tür, die   in den Garten führt
          'door which in the garden leads'
          "door which leads to the garden"

    b. Tür, die   den Weg, der   in den Garten führt, versperrt
          'door which the way which in the garden leads bars'
          "door which bars the way leading into the garden"

    c. Tür, die   für einen Garten bestimmt ist
          'door which for a   garden intended is'
          "door which is intended for a garden"

    d. Tür, die   aus einem Garten stammt
          'door which out a   garden stems'
          "door which stems from a garden"

    e. Tür, die   etwas   mit einem Garten zu tun hat
          'door which something with a   garden to do has'
          "door which has something to do with a garden"

Similarly one can explain *Schwimmbad* as *Bad, das dazu bestimmt ist, daß man darin schwimmen kann* 'bath which thereto intended is that one therein swim can'/"bath (i.e., establishment with a pool) which is intended to provide an opportunity to swim", and *Karl ist denkfaul* 'Karl is think-lazy' can be approximately paraphrased as *Karl ist faul hinsichtlich des Denkens* 'Karl is lazy in regard to (the) thinking'.

This possibility is excluded for derivations. In rewordings of *vermeidbar* and *Vermeidung* one can make use of the verb *vermeid-* 'avoid' but not of the suffix *-bar* or *-ung*. This follows of course from the fact that these elements are bound morphemes; and the possibility of a paraphrase is not a defining characteristic of compounds but follows from the fact that the parts of a compound can, according to (14), occur freely – provided that this is not prohibited by the interference of general syntactic regularities.

Thus, paraphrases of nominal compounds usually present no problem due to the fact that one can generally employ relative clauses as in (17). The same is, however, not possible with adjectival compounds and, since many adjectives are highly restricted in their ability to combine with other syntactic words, an acceptable paraphrase cannot always be found. Thus, the expression *betriebseigener Sportplatz* 'factory-*s*-own sportsfield'/"sportsfield owned by the factory" can be explained by (18a):

(18)   a.   Der Betrieb hat einen eigenen Sportplatz
            'the factory has an   own   sportsfield'

       b.   Karl besucht den betriebseigenen Sportplatz
            'Karl visits   the factory-*s*-own   sportsfield'

            "Karl is visiting the sportsfield owned by the factory"

       c.   ? Karl besucht den dem Betrieb eigenen Sportplatz
            'Karl visits   the the factory own   sportsfield'

       d.   ? Karl besucht den Sportplatz, den   der Betrieb als eigenen hat
            'Karl visits   the sportsfield which the factory as own   has'

            "Karl is visiting the sportsfield which is the factory's own"

As soon as the expression is embedded in a sentence as in (18b), finding a paraphrase becomes difficult. If (18c) is acceptable at all (parallel to *die dem Betrieb eigene Dynamik* 'the the factory own dynamics'/"the dynamic force intrinsic to the factory"), it probably does not carry the same meaning as in (18b); and the acceptability of (18d) is definitely questionable (although its meaning would be roughly equivalent to (18b)). Similar difficulties arise with the compounds ending in *intern* 'internal':

(19)   a.   Die Presse berichtete über werksinterne   Vorgänge
            'the press reported   over factory-*s*-internal proceedings'

            "The press reported on proceedings internal to the factory"

       b.   Die Presse berichtete über interne Vorgänge   des Werks
            'the press reported   over internal proceedings [of] the factory'

            "The press reported on proceedings internal to the factory"

       c.   Die Presse berichtete über werksinterne   Vorgänge   bei VW
            'the press reported   over factory-*s*-internal proceedings at   VW'

            "The press reported on internal proceedings at VW"

       d.   VW hat betriebsintern   eine Befragung   durchgeführt
            'VW has factory-*s*-internal a   questionnaire through-led'

            "Internally, VW has carried out a survey"

(19a) can perhaps be paraphrased by (19b), but there does not appear to be a successful way to paraphrase (19c) or (19d) (using the constituents of the compound as words). This last fact does not, of course, necessitate a characterization of compounds versus derivations extending beyond (14).

3 Similarity of suffixes to words

Derivational suffixes typically have a very general "meaning" whereas free morphemes (morpheme complexes) have typically a more specific meaning. With the most frequently used type of compounds one can speak of the first constituent (the so-called determinant, *Bestimmungswort*) semantically determining the second constituent (the so-called determinatum, *Grundwort*); whether one can speak in the same sense of the first constituent of a derivation (the so-called derivational basis) as determining the second constituent (the suffix) is, in contrast, not at all clear.

3.1 The case of *-chen*

On the other hand there seems to be no reason not to assign suffixes a logical characterization such that the meaning of the derivation follows from that of its constituents in a similar manner to that of compounds. Above all, it is important to note that one cannot answer this question intuitively: no clear intuition can decide whether, e.g., *Männchen* 'man-*chen*'/"small man" should be assigned the meaning of *kleiner Mann* 'little man' rather than of *kleines Wesen, das ein Mann ist* 'little being which is a man'; both paraphrases seem to be equally good or bad. One can see that the second paraphrase is not absurd from a comparison with the element *-zwerg* as in *Bohrzwerg* 'drill-dwarf'/"small device for drilling", *Waschzwerg* 'wash-dwarf'/"small device for washing", etc. It presumably means something like *kleiner Gegenstand* 'little device' and is semantically related but not identical to the noun *Zwerg* 'small man, dwarf'. There is no reason not to assign the diminutive *-chen* a similar meaning. Furthermore, from examples like *Frühchen* 'early-*chen*'/"baby born prematurely", *Grauchen* 'grey-*chen*'/"little grey one", *Dummchen* 'stupid-*chen*'/"little stupid one", *Geilchen* 'lewd-*chen*'/"little horny one", where *-chen* is suffixed to an adjective, we see without a doubt that the referential properties of derivations ending in *-chen* are not determined by the first constituent but rather by the suffix. Similar considerations are appropriate for other suffixes.

3.2 The case of *-fähig*

One can see, moreover, that the difference in type of meaning often found between free and bound morphemes is of a gradual nature just as the difference in bound and free homonymous morphemes (morpheme complexes) is occasionally troublesome, since there can be many different degrees of similarity

in meaning. The adjectival suffixes -*freundlich* (*waschfreundlich* 'wash-friendly'/ "easy to wash"), -*fest* (*säurefest* 'acid-firm'/"acid-resistant"), -*haltig* (*säurehaltig* 'acid-contain-y'/"acidiferous") and the nominal suffixes -*zeug* (*Hebezeug* 'lift-*e*-stuff'/"lifting gear"), -*gut* (*Lesegut* 'read-*e*-stuff'/"things to be read") are clearly recognizably related to free morphemes (morpheme complexes) whereas such a relationship is less directly present with -*echt* (*lichtecht* 'light-genuine'/"fast to light"), -*los* (*bedeutungslos* 'meaning-*s*-loose'/"meaningless"), -*mäßig* (*lichtmäßig* 'light-measure-y'/"in regard to light"), -*wesen* (*Bankwesen* 'bank-being'/"banking"), -*werk* (*Mauerwerk* 'wall-work'/"masonry"), and with -*ig, -bar, -chen, -ung, -heit, -tum* is completely nonexistent (although in some cases, at least, historically present).

Constructions with *fähig* as the second constituent show how much more complicated the situation can be than the dichotomy composition/derivation suggests. One can compare the examples in (20) with those in (21) where *fähig* presumably occurs freely in the same meaning:

(20)   a. Karl ist gehfähig
              'Karl is go-able'
           "Karl is capable of walking"

       b. Karl ist besserungsfähig
              'Karl is improvement-*s*-able'
           "Karl is capable of improvement"

(21)   a. Karl ist fähig, zu gehen
              'Karl is able   to walk'

       b. Karl ist   der Besserung   fähig
              'Karl is [of] the improvement able'
           "Karl is capable of improvement"

One of the aspects of the meaning of free *fähig* 'able' is apparently that a being is capable of an intentional action or effort. Can this aspect be found in (22)?

(22)   a. Karl ist belastungsfähig
              'Karl is burden-*s*-able'
           "Karl is capable of withstanding strain"

       b. Karl ist transportfähig
              'Karl is transport-able'
           "Karl is able to be transported"

These examples cannot be paraphrased by (23); although perhaps by (24):

(23)   a. * Karl ist   der Belastung fähig
                'Karl is [of] the burden   able'

       b. * Karl ist   des Transports fähig
                'Karl is [of] the transport   able'

(24)   a. Karl ist fähig, eine Belastung zu ertragen
                'Karl is able a   burden   to bear'
              "Karl is capable of withstanding a burden"

       b. Karl ist fähig, einen Transport zu ertragen
                'Karl is able a   transport to bear'
              "Karl is able to be transported"

The question here is whether the meaning of (22) has been properly reproduced, i.e., whether the intentional element that is present in (24) and typical for free *fähig* is really present in (22).

   If *förderungsfähig* belongs to the same class as (22), then (24) is obviously misleading, for (25a) can only be paraphrased half-way adequately by (25d), from which we can conclude that it contains no intentional element:

(25)   a. Karl ist förderungsfähig
                'Karl is promotion-*s*-able'
              "Karl is capable of advancement"

       b. * Karl ist   der Förderung fähig
                'Karl is [of] the promotion able'

       c. ? Karl ist fähig, die Förderung zu ertragen
                'Karl is able   the promotion to bear'
              "Karl is capable of withstanding the promotion"

       d. Karl kann gefördert werden
                'Karl can   promoted become'
              "It is possible for Karl to be promoted"

This conclusion is substantiated by (26a) and the other examples of (26), which obviously contain only a general element of possibility (and not intentional capability as in (21)); cf. the paraphrases in (27):

(26)   a. Eigenheime sind förderungsfähig
                'own-homes are   promotion-*s*-able'
              "Private homes are capable of advancement"

b. Bestimmte Aufwendungen sind beihilfefähig
'certain   expenditures   are subsidy-able'

"Certain expenditures are capable of receiving subsidy"

c. Karl ist kreditfähig
'Karl is credit-able'

"Karl is worthy of credit"

d. Der Wagen ist einsatzfähig
'the car   is employment-able'

"The car is usable"

e. Die Maschine ist nicht entwicklungsfähig
'the machine is not   development-*s*-able'

"It is not possible for the machine to be (further) developed"

f. Das Manuskript ist nicht druckfähig
'the manuscript is not   print-able'

"The manuscript is not printable"

(27) a. Eigenheime können gefördert werden
'own-homes can   promoted become'

"Private homes are capable of advancement"

b. Für bestimmte Aufwendungen kann eine Beihilfe gewährt werden
'for certain   expenditures   can a   subsidy granted become'

"A subsidy can be granted for certain expenditures"

c. Karl kann einen Kredit bekommen
'Karl can   a   credit receive'

"It is possible for Karl to get a credit"

d. Der Wagen kann eingesetzt werden
'the car   can   employed become'

"The car can be used"

e. Die Maschine kann man nicht (weiter) entwickeln
'the machine   can   one not   (further) develop'

"It is not possible for the machine to be (further) developed"

f. Das Manuskript kann man nicht drucken
'the manuscript can   one not   print'

"It is not possible to print the manuscript"

Fähig in (26) and probably also in (22) and (25) is therefore not identical to the freely occurring *fähig* of (21) and will have to be characterized as bound. Nevertheless their close semantic similarity cannot be overlooked.

3.3 The case of -*gerecht*

Formations with -*gerecht* as in (28a) are also informative; they have a meaning that can be compared to that of (28b):

(28)   a.   i.   bedarfsgerechte Produktion
            'need-*s*-just   production'

            "production according to the need"

      ii.   leistungsgerechte   Bezahlung
            'performance-*s*-just payment'

            "payment according to performance"

      b.   i.   Die Produktion wird   dem Bedarf gerecht
            'the production becomes [to] the   need   just'

            "The production meets the need"

      ii.   Die Bezahlung wird   der Leistung   gerecht
            'the payment   becomes [to] the performance just'

            "The payment meets the performance"

Is this *gerecht* a free element? It appears to be according to (28b). The problem is however that *gerecht werd-* in (28b) is an idiomatic expression. *Gerecht* does not occur in any other environment in the same meaning (specifically not adnominally as the adjective in (28a)), nor does *werd-* have its characteristic inchoative meaning in this connection.[6] Apparently the *gerecht* of (28a) cannot be considered a freely occurring element like others, although *gerecht* in (28b) is a syntactic word. In one understanding of "free", therefore, we have a derivation in (28a), according to (14).

Examples like these show that the strictly lexicalist theory puts the real descriptive problem in its proper place. If no special restrictions were placed on the -*gerecht* of (28a), one would expect it to be able to occur freely in the same meaning in all positions typical of adjectives. Since this is not the case, this -*gerecht* will have to receive contextual restrictions which characterize it as bound. Furthermore, a lexical entry is necessary for the idiomatic expression *gerecht werd-*.

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[6]Cf. Holst (1974) for a more thorough discussion. For a discussion of similar problems with -*frei*, cf. Vögeding (1981).

From this lexical entry it will be explicitly clear in which respect *-gerecht* (28a) and *gerecht (werd-)* (28b) resemble one another and where they differ. The terminological dichotomy introduced by (14) contributes nothing at all to a better understanding of such subtle conditions as these.

3.4 Conclusion

If one believes in a fundamental distinction between composition and derivation, such cases present a problem. They do not pose a problem for the strictly lexicalist "compositional theory of affixation": the semantic and distributional properties of the second constituent (the suffix) are registered in its lexical entry, as is the case for every other morpheme. Possible relationships to other entries can be found by comparing it to these lexical entries. Inasmuch as bound morphemes (morpheme complexes) differ from free morphemes semantically, one can account for this with the usual means of the lexical entry; the form of a lexical entry is flexible enough to capture precisely and adequately all the degrees of transition between bound and free morphemes, i.e., the transition between derivation and composition (often discussed in the literature). The categorial dichotomy free/bound or composition/derivation is as such not capable of accomplishing this, neither is a three-way distinction like suffix/suffixoid/word.

It is consequently not at all necessary to differentiate formally between compositions and derivations of this type by means of special markings. There is no reason not to reduce the distinction composition/derivation to independently necessary differences in contextual restrictions described by the usual means of the lexical entry.

4 Similarity of prefixes to words

That this gradual transition from a free to a bound morpheme is a completely natural phenomenon can also be seen from first constituents, where the same observation can be made. Morphemes like *-un* (*ungar* 'un-done'/"raw, not (yet) done"), *pseudo-* (*Pseudoargument* 'pseudo-argument') or *erz-* (*erzkatholisch* 'arch-catholic', *Erzhalunke* 'arch-scoundrel'/"the ultimate swindler") occur only bound, therefore clearly as prefixes, whereas *blut* in *blútarm* 'blood-poor'/"anemic" (as opposed to *blútárm* 'blood-poor'/"bloody poor" with *blut-* a bound element here) and *Blutspur* 'blood-trace'/"blood spot" clearly corresponds to the freely occurring morpheme *Blut* 'blood'; in addition there is, however, a whole series of first constituents that in one respect are quite similar to free morphemes but

in another respect deviate semantically and/or distributionally in varying degrees from their free counterparts. This is true for, e.g., *haupt-, neben-* and *sonder-* in (29a); for *bomben-* and *mords-* in (29b) (in addition we find a combination with a suffix; *mordsmäßig* 'murder-*s*-measure-y'/"terrific"); and for *lieblings-* in *Lieblingstheorie* 'darling-*s*-theory'/"pet theory":

(29) a. i. hauptverantwortlich   Hauptursache
           'head-responsible'   'head-cause'
           "primarily responsible"   "primary cause"

      ii. Nebenregierung   Nebenberuf
           'beside-government'   'beside-profession'
           "second government"   "second job"

     iii. Sondergutachten   Sonderausschuß
           'special-assessment'   'special-committee'
           "special assessment"   "special committee"

   b. i. bómbenfést   Bómbengehált
           'bomb-*en*-firm'   'bomb-*en*-salary'
           "extremely firm"   "huge salary"

      ii. mórdstéuer   Mórdséinnahmen
           'murder-s-expensive'   'murder-s-income'
           "extremely expensive"   "huge income"

All of the following show an especially close relationship to free morphemes: *grund-* in *Grundwortschatz* 'base-vocabulary'/"basic vocabulary" and *Grundvoraussetzung* 'base-requirement'/"basic requirement"; *zwangs-* in examples like *Zwangsschaltung* 'coercion-*s*-control'/"forced synchronization", *Zwangsbremsung* 'coercion-*s*-braking'/"forced braking", *Zwangsbelüftung* 'coercion-*s*-ventilation'/ "forced ventilation"; and *kunst-* in the sense of *künstlich* 'artificial', where *künstlich* itself is a combination of this nonfreely occurring first constituent with a suffix (*-lich*), so that, as in *mordsmäßig*, a combination of a prefix and a suffix results.

With prefixes as with suffixes we can account for that which the distinction composition/derivation correctly emphasizes, namely the differentiation of free and bound morphemes, by means of the usual distributional statements in their lexical entries. All further similarities and differences between morphemes that do not follow from the free/bound distinction are also accounted for automatically with all the necessary distinctions by the independently motivated means of the lexical entry.

5 Parallels between composition and derivation

If one searches for other criteria that could support an essential distinction between composition and derivation (i.e., one not reducible to lexical properties), one will find only similarities instead of differences.

5.1 Inflection

One characteristic property of compounds is that only the second constituent, not the first, can be inflected.

We therefore find *Haustüren* 'house-doors'/"front doors", not *Häusertüren 'houses-doors', and *kopfverletzte Kinder* 'head-injured children', not *köpfeverletzte 'heads-injured'. The same is true for derivations; we have, e.g., *Chefinnen* as the plural of *Chefin* "female boss", not *Chefsin or *Chefsinnen (although the plural of *Chef* 'boss' is *Chefs*), and there exists no *köpfelose Kinder 'heads-less children', but rather *kopflose* 'head-less (pl.)'.

5.2 Linking morphemes

It is a well-known phenomenon that several (types of) first constituents in a compound require a "linking morpheme", such as the *s* in *Freiheitsstatue* 'freedom-*s*-statue', *Haltungsschäden* 'posture-*s*-faults'. These same first constituents however require the very same linking morpheme before certain derivational suffixes: we find *freiheitsmäßig* 'freedom-*s*-measure-y'/"in regard to freedom" and *haltungslos* 'poise-*s*-less'/"unpoised" with *s*. Here we have on the one hand a similarity between compounds and derivations; on the other hand this criterion divides suffixes into two groups, one group similar to the determinatum of a compound and the other, not.

5.3 Elision in coordinate structures and phonology

Under certain conditions the first or second constituent in coordinated compounds can be eliminated. Elision of the second constituent occurs in a construction which I term 'left deletion', cf. (30):

(30)   a.   Karl liebt Herbst- und (Heinz liebt) Frühlingsblumen
         'Karl loves autumn and (Heinz loves) spring-*s*-flowers'
         "Karl loves autumn flowers and (Heinz loves) spring flowers"

    b. Karl ist denk- und (Heinz ist) schreibfaul
        'Karl is think and (Heinz is) write-lazy'

        "Karl is sluggish in thought and (Heinz is) sluggish in writing"

Elision of the first constituent occurs in 'right deletion' structures as in (31):[7]

(31)   Karl verkauft Herrenmäntel und -schuhe
       'Karl sells   man-*en*-coats and shoes'

       "Karl sells men's coats and men's shoes"

Left deletion can also be found in suffixal derivations as in (32) as well as in prefixal derivations in (33):

(32)   a. hilf- und hoffnungslos
          'help and hoping-*s*-loose'

          "helpless and hopeless"

      b. erkenn-   und begreifbar
          'recognize and comprehend-able'

          "recognizable and comprehensible"

      c. Blatt- und Rankenwerk
          'leaf   and climber-*n*-work'

          "collection of foliage and tendril"

      d. Film- und Theaterwesen
          'film and theatre-being'

          "film business and theatre system"

      e. Freund- oder Feindschaft
          'friend   or   enemy-ship'

          "friendship or animosity"

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[7]There are important differences between these two types of deletion, which we need not comment on here, however. They must be kept distinct from "elisions" of the type seen in (i):

   (i)   a. Die neuen Verträge zeigen, daß der alte ___ sehr vorteilhaft   war
            'the new   contracts show   that the old   very advantageous was'

           "The new contracts show that the old one was very advantageous"

       b. Karl hat seinen neuen Mantel verkauft, nachdem Heinz sich   einen alten ___
           'Karl has his   new   coat   sold   after   Heinz himself an   old
           gekauft hat
           bought has'

           "Karl sold his new coat after Heinz bought himself an old one"

    f. Mannes- und Heldentum
       'man-*es* and hero-*en*-dom'
       "manhood and heroism"

    g. käfer- oder spinnenhaft
       'bug   or   spider-*n*-like'
       "like a bug or a spider"

(33) a. Haupt- oder Nebeneingang
         'head   or   beside-entrance'
         "main entrance or side-entrance"

      b. Ur-   oder Spätform
         'proto or   late-form'
         "prototype or late type"

Right deletion in suffixal derivations is not easy to find because this presupposes that with the same first constituent two different suffixes have to be found that are comparable in function and for this reason can contrast in a coordinated structure, which is rare. One possible example is *eisenartige oder -haltige Materialien* 'iron-kind-y or contain-y materials'/"materials similar to or containing iron". Examples for prefixal derivations are easier to find, cf. (34):

(34) a. Pseudoargumente   und -lösungen
         'pseudo-arguments and solutions'
         "pseudo-arguments and pseudo-solutions"

      b. Haupteingänge oder -ausgänge
         'head-entrances or   exits'
         "main entrances or main exits"

In the same way that a linking morpheme, for instance *s*, must accompany certain suffixes but cannot cooccur with others (e.g., *anmutslos* 'grace-*s*-less', *freiheitsmäßig* 'freedom-*s*-measure-y'/"in regard to freedom", but only *anmutig* 'grace-y'/"graceful" and *freiheitlich* 'freedom-ly'/"liberal", never **anmutsig*, **freiheitslich*), we find that the elision of a suffix is not always possible; formations like (35) are excluded:

(35) a. * salz- und mehlig   (but: salzig und mehlig)
                                          'salty and floury'

      b. * kind- und bäurisch   (but: kindisch und bäurisch)
                                          'childish and boorish'

c. * Beamt- oder Arbeiterin   (but: Beamtin oder Arbeiterin)
‘official-*in* or worker-*in*’
“female official or worker”

d. * Bestraf- oder Beförderung   (but: Bestrafung oder Beförderung)
‘punishment or promotion’

The fact that the suffix begins with a vowel cannot be the reason for this behavior, for formations like *farb-* und *lichtecht* ‘colour and light-genuine’/“colourfast and fast to light” are fine, and (36) shows that certain suffixes beginning with a consonant are also not possible in left deletion constructions:

(36)   a. * freund- oder feindlich   (but: freundlich oder feindlich)
‘friend-ly or enemy-ly’
“friendly or hostile”

b. * duld- und wachsam   (but: duldsam und wachsam)
‘tolerate-*sam* and watch-*sam*’
“tolerant and watchful”

c. * Bein- und Ärmchen   (but: Beinchen und Ärmchen)
‘leg-*chen* and arm-*chen*’
“small leg and small arm”

d. * Tisch- und Büchlein   (but: Tischlein und Büchlein)
‘table-*lein* and book-*lein*’
“little table and little book”

There is an unmistakable correlation here with certain phonological phenomena. The final voiced obstruent of the first constituent of a compound is subject to devoicing even when the second constituent begins with a vowel: the *d* in *Wanduhr* ‘wall-clock’ and in *kindähnlich* ‘child-similar’/“child-like” is voiceless. Before suffixes like *-ig*, *-isch*, *-ung*, *-er* on the other hand it remains voiced: the *d* in *Windung* ‘wind-ing’/“winding” and in *kindisch* ‘child-ish’/“childish” is voiced. This however is not a general feature differentiating compounds from derivations, for this difference runs right through the class of affixes; before the suffix *-echt* a voiced obstruent becomes voiceless as the *b* in *farbecht* ‘colour-genuine’/“colourfast”.

The same differential behavior of the different suffixes can also be found in syllabification phenomena concerning stems ending in a nasal. For instance, in the compounds *Regenauto* ‘rain-car’ and *regenähnlich* ‘rain-similar’/“similar to rain”, *regen* ‘rain’ in each case has two syllables, the second ending in [ən] or [ŋ]. Before the suffixes *-ung* and *-er* in *Beregnung* ‘*be*-rain-ing’/“irrigation” and *Beregner* ‘*be*-rain-*er*’/“irrigator”, the stem-final nasal is obligatorily syllable-initial [n].

Before *-echt*, however, we find the stem having two syllables, as in *regenecht* 'rain-genuine'/"rain-proof" with [ən] or [ŋ] in the second syllable, and never anything like **regnecht* with syllable-initial [n].

Similarly for stems ending in *l*. In compounds like *Segelohren* 'sail-ears'/"elephant ears" we only find *l* as a non-initial part of the second syllable, whereas in derivations like *Segler* 'sail-*er*'/"yachtsman" and *Umseglung* 'circum-sail-ing'/"circumnavigation" the *l* is (depending on idiolectal variation) either optionally or obligatorily syllable-initial. However, if one would suffix *-echt* to *segel*, the result *segelecht* 'sail-genuine' would obligatorily have *l* non-initially in the second syllable (although the exact meaning of the word would not be clear).

It is obvious that these properties of the different suffixes correlate also with the fact that before *-echt*, but not before *-ig*, *-isch*, *-in*, *-ung*, *-er*, a glottal stop can occur.

5.4 Boundaries

We see that suffixes do not behave uniformly with regard to elision in left and right deletion: one group acts like elements of a compound, the other does not. With regard to possible syllabification, devoicing and the glottal stop suffixes act once again partially like elements of compounds, partially otherwise; and, as it seems, with the very same distribution that occurs with the elision phenomena (and apparently also with the possible occurrence of linking morphemes[7a]).

How is this to be described? First it is important to note that we are dealing here with unpredictable lexical properties of certain suffixes. One possibility that suggests itself is to make the operation of the relevant phonological rules as well as the deletion in right and left deletions dependent on certain boundary symbols in such a manner that the elements of compounds and suffixes like those in (32) as well as *-echt* begin with a "strong" boundary (#), while the suffixes in (35) and (36) begin with a "weak" boundary (+). The #-boundary would have largely the properties that are characteristic for the so-called word boundary: devoicing and syllabification occur typically in word final position, the glottal stop in word

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[7a]That is, "linking morphemes" in general seem to occur only when deletion, devoicing, etc. are possible. There is one exception, however. We have derivations like *vierblättrig* 'four-leaf-*r*-y'/"having four leaves" and *zweirädrig* 'two-wheel-*r*-y'/"having two wheels". At first glance the *-r-* appears to be a plural suffix, witness *Blatt* 'leaf' vs. *Blätter* 'leaves' and *Rad* 'wheel' vs. *Räder* 'wheels'. This cannot be true, however, since we also have *einblättrig* 'one-leaf-*r*-y'/"having one leaf" and *einrädrig* 'one-wheel-*r*-y'/"having one wheel". So the *-r-* has to be a kind of "linking morpheme", although *-ig* can neither be deleted nor begin with a glottal stop.

initial position.[8,8a] The phenomena of left deletion confirm this: in (37a) a whole syntactic word has been deleted under identity with an element of a compound, in (37b) the opposite has happened; an element of a compound has been deleted under identity with a syntactic word:

(37)   a. professionelle und Amateurschauspieler
          'professional and amateur actors'

          "professional actors and amateur actors"

    b. Amateur- und professionelle Schauspieler
          'amateur and professional   actors'

          "amateur actors and professional actors"

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[8]Our classification of suffixes as wordlike and non-wordlike is, as Chisholm (1973; 1977) found, also largely substantiated by their metrical properties. Kiparsky (1975: 612–614; 1977: 223) subsumes this in his metrical theory, which makes essential use of boundary symbols, exactly as we do by differentially assigning them # and +.

One must nevertheless emphasize, that these results are to be evaluated with caution: Chisholm's analyses are dependent upon several highly hypothetical assumptions and his results are not as clear for all examples as one would like.

This could be tied to another problem. The postulation of different boundaries with different suffixes accounts for a number of non-trivial observations, but it also exposes a learnability problem with suffixes beginning in a consonant. None of the phonological processes which call for the distinction between # and + before a vowel are to be found before a consonant. How, then, does a speaker arrive at the judgement that the left deletions in (32) are fine but those in (36) are bad? Possibly positive evidence is necessary here; cf. note 8a. This could also explain why in some of these cases acceptability judgements are somewhat uncertain. (Note that the existence of stems like *Ros-* and *Hak-* which are bound to suffixes with weak boundaries (cf. Section 5.5) alleviates the learnability problem for certain cases, but does not offer a general solution.)

[8a]If *-lich* and *-lein* are preceded by weak boundaries, then the rule(s) of devoicing must have recourse not only to # but also to +. Consider (i.a) and (i.b):

(i) a.   Handlung   'act-ing'/"action"   from: handel-   '(to) act'
            Segler   'sail-*er*'/"yachtsman"   from: segel-   'sail'
            Schwindler   'swindle-*er*'/"swindler"   from: schwindel-   'swindle'

    b.   handlich   'hand-ly'/"handy"   from: Hand   'hand'
            beweglich   'move-ly'/"movable"   from: beweg-   'move'
            Kindlein   'child-*lein*'/"little child"   from: Kind   'child'

In Standard German a voiced obstruent (*d* and *g* in these examples) before *l* can be realized as such if both it and *l* are part of the same morpheme, as in (i). The obstruent must be devoiced, however, if the *l* belongs to a morpheme of its own, as in (ii). This fact removes the only possible phonological evidence for distinguishing # and + before consonants. This leads us to the conclusion that the language learner proceeds under the assumption that suffixes are introduced by weak boundaries, unless he is driven to postulate a strong boundary by positive evidence in the primary data. For suffixes beginning with a consonant (or *h*) the only positive evidence is furnished by deletions (and, presumably, "linking morphemes"; but cf. note 7a).

If the occurrence of a glottal stop is essentially bound to #, then strong bound-
aries follow prefixes, for [ʔ] can always follow a prefix if a vowel follows; e.g., in
unerwünscht 'un-desired'/"unwelcome", *verursach-* 'ver-cause'/"(to) cause"; and
if one forms words like *zerinformier-* 'zer-inform' or *veroperier-* 'ver-operate',
where the main stress is on *ier*, the same regularity can be observed. Presumably
this has to do with the fact that the element that follows a prefix can in general
also occur as a word. I assume therefore that all morphemes which are not bound
to a previous element begin with #. Left deletion as in (38a) with two prefixed
verbs confirms this, and cases like (38b) do so even more, where a free word has
been deleted under identity with the second constituent of a prefixal derivation
(cf. Section 7):

(38)   a.   Er möchte ihn zer- oder verhauen
           'he wishes him *zer-* or   *ver*-beat'

           "He wants to cut him to pieces or to beat him up"

       b.   Sie   möchte ein-, (aber) er möchte entladen
           'she wishes in   (but) he wishes de-load'

           "She wants to load, (but) he wants to unload (s. t.)"

One can account for this by a redundancy rule for lexical entries.[9] If one also
assumes the convention that at the end of a syntactic phrase (perhaps only with
certain types of phrases) a # will be inserted, one obtains in a sentence a distri-
bution of boundary symbols that is obviously adequate for the most part.

5.5 Nominal stems bound to the right

The introduction of different boundary symbols (or an equivalent mechanism)
proves to be useful in other connections as well.

A large number of nouns ending in *-e* appear in certain derivations without
-e, e.g., *gedanklich* 'thought-ly'/"pertaining to thought" from *Gedanke* 'thought',
Äuglein 'eye-*lein*'/"little eye" from *Auge* 'eye', and *Röschen* 'rose-*chen*'/"little rose"
from *Rose* 'rose'. This does not justify a distinction between derivation and com-
position, for before suffixes like *-haft* and *-mäßig* it is not the *e*-less form of
these nouns that one can observe, but rather the form that also appears in
compounds: *rosenhaft* 'rose-*n*-like'/"like (a) rose", *gedankenhaft* 'thought-*n*-like'/
"like (a) thought" but not **roshaft, *gedankhaft.*

A similar situation is found with many nouns ending in *-en.* From *Haken* 'hook',
for example, we have *Häkchen* 'hook-*chen*'/"hooklet", from *Knochen* 'bone' we

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[9]The only exceptions known to me are prepositions in combination with *dar-* 'there', *wor-*
'where', etc.: in *daran* 'there-at'/"at this", *worauf* 'where-on'/"on what", etc. [ʔ] is impossible.

have *knochig* 'bone-y'/"bony". Such forms without *-en* before *-ig, -chen*, and/or *-lein* are found, for example, with the words in (39):

(39)

Boden	'ground'	Kolben	'cob, piston'
Bogen	'bow, arch'	Lappen	'rag'
Brocken	'piece'	Ofen	'stove'
Brunnen	'well'	Rahmen	'frame'
Busen	'bosom'	Ranzen	'knapsack'
Faden	'thread'	Riemen	'strap'
Garten	'garden'	Schatten	'shade'
Gaumen	'palate'	Tropfen	'drop'
Haufen	'heap'	Volumen	'volume'
Knoten	'knot'	Zapfen	'peg'

Here again we have before other suffixes (e.g. *-haft, -mäßig*) the form which appears in compounds: *knochenhaft* 'bone-like'/*hakenmäßig* 'hook-measure-y'/ "in regard to hooks".

Nouns like *Rose* and *Haken* are unusual in that their first constituent (*ros-*, *hak-*) must occur before an element with a weak boundary. Insofar as these words are not idiosyncratic so that they would have to be listed as idiomatic morpheme complexes, the lexical entries for *Ros-* and *Hak-* could be formulated as in (40):

(40)   a.   PhC: *ros*
       KC: $[_{X^0} [_N \#\_\_] [_{X^0} + \varphi]]$

   b.   PhC: *hak*
       KC: $[_{X^0} [_N \#\_\_] [_{X^0} + \varphi]]$

The behavior of a series of nouns ending in *-e* such as *Sprache* 'language' is similar to the case of *Rose* and yet differs in an interesting way. These nouns (as opposed to *Rose*, etc.) occur without *-e* in derivations and in compounds (in compounds sometimes optionally). Thus, we have *Sprachwissenschaft* 'language-science', *sprachbehindert* 'language-handicapped'/"linguistically deficient", *sprachlich* 'language-ly'/"linguistic", *sprachlos* 'language-less'/"speechless", *sprachmäßig* 'language-measure-y'/"in regard to language". The words of (41) display such a behavior:

(41)

Achse	'axle'	Kirsche	'cherry'
Ecke	'corner'	Kontrolle	'control'
Ende	'end'	Pappe	'pasteboard'
Erde	'earth'	Sache	'thing'
Farbe	'colour'	Schule	'school'
Grenze	'limit, border'	Wolle	'wool'
Kirche	'church'	Zelle	'cell'

For the cases which do not represent idiosyncratic combinations one could formulate a lexical entry as in (42):

(42) PhC: *sprach*
      KC: $[_{X^0} [_N \#\_\_] [_{X^0} \# \varphi]]$

The notations (40) and (42) will have to be supplemented with a convention that states (opposite to what we find in phonology): a weaker boundary may also occur in the place of a selected boundary, but a stronger boundary may not.[9a]

5.6 Argument inheritance

A phenomenon which upon first glance seems to be appropriate to establish an essential distinction between composition and derivation is what Toman (1980) terms "argument inheritance". This means that, for example, a verb has selectional properties which in the case of derivation are typically passed on to the derivation. Thus, the subject of a regular *-bar* formation and the genitive or *von-*phrase of a *-ung* or *-er* derivation correspond to the accusative object of a transitive verb.

Thus, the genitive object of (43b) corresponds to the accusative object of (43a). In the case of compounds, however, the first constituent cannot in general pass on its "arguments" to the compound; the genitives in (43c,d) are excluded:

[9a]If the approach embodied in (40) and (42) is correct this implies that truncation rules in the sense of Aronoff (1976) do not exist. That is not to deny the existence of haplology, of course. German has a suffix forming feminine action-nouns from verbs that shows up as *-ei* after verbal stems ending in [ər] or [əl], as in (i); with all other verbs it shows up as *-erei*, as in (ii):

(i)	a.	Schlingerei	"lurching"	from: schlinger-	'lurch'
		Hämmerei	"hammering"	from: hämmer-	'(to) hammer'
		Verbesserei	"correcting"	from: verbesser-	'make better'
	b.	Bimmelei	"tinkling"	from: bimmel-	'tinkle'
		Segelei	"sailing"	from: segel-	'(to) sail'
		Pinkelei	"peeing"	from: pinkel-	'pee'
(ii)		Schlingerei	"swallowing"	from: schling-	'swallow'
		Brüllerei	"shouting"	from: brüll-	'shout'
		Plärrerei	"crying"	from: plärr-	'cry'
		Wascherei	"washing"	from: wasch-	'wash'
		Musiziererei	"playing music"	from: musizier-	'play music'
		Säerei	"sowing"	from: sä-	'sow'

See also (53). With verbs of group (ii) *-er-* cannot be left out; with those of group (i.a) *-er-* is impossible. With (i.b) variants like *Bimmlerei, Seglerei* are marginally possible. The absence of *-er-* in (i) may well be due to a kind of haplological simplification.

(43) a. jemand   prüft   das System
          'someone checks the system'

      b. die Prüfung   des Systems
          'the check-ing [of] the system'
          "the check of the system"

      c. der Prüfvorgang   (*des Systems)
          'the check-process ([of]   the system)'
          "the checking procedure (of the system)"

      d. der Prüfungsvorgang   (*des Systems)
          'the check-ing-*s*-process ([of]   the system)'
          "the checking procedure (of the system)"

Similarly (44b) corresponds to (44a) but not (44c):

(44) a. jemand   beobachtet die Vorgänge
          'someone observes   the proceedings'

      b. die Beobachtung   der Vorgänge
          'the observe-ing   [of] the processes'
          "the observation of the proceedings"

      c. der Beobachtungsturm (*der Vorgänge)
          'the observing-*s*-tower ([of]   the processes)'
          "the observation tower (of the proceedings)"

This is the typical situation. Upon closer examination, however, it can be seen that this is not as general as seems the case. The genitive in (45a) is apparently inherited from the first constituent of the compound, cf. (45b,c):

(45) a. der Beschleunigungsgrad   der Partikeln
          'the acceleration-*s*-degree [of] the particles'
          "the degree of acceleration of the particles"

      b. die Beschleunigung   der Partikeln
          'the acceleration   [of] the particles'

      c. * der Grad   der Partikeln
          'the degree [of] the particles'

(46a) is somewhat more difficult. This expression corresponds in its meaning to (46e) and (46b). (46b) is however syntactically ambiguous: the genitive *der Pflanzen* can be related formally to either *Wachstum* or *Geschwindigkeit des Wachstums*. The relative clauses in (46c,d) indicate that semantically only the reference to *Wachstum* is possible; for this reason I assume that in (46a) the first constituent of the compound has passed on its argument to the compound:

(46) a. die Wachstumsgeschwindigkeit der Pflanzen
'the growth-*s*-speed [of] the plants'
"the plants' speed of growth"

    b. die Geschwindigkeit des Wachstums der Pflanzen
'the*fem.* speed [of] the*neut.* growth [of] the plants'

    c. die Geschwindigkeit des Wachstums, das die
'the*fem.* speed [of] the*neut.* growth that*neut.* the
Pflanzen aufweisen
plants show'

    d. ?? die Geschwindigkeit des Wachstums, die die
'the*fem.* speed [of] the *neut.* growth that*fem.* the
Pflanzen aufweisen
plants show'

    e. die Geschwindigkeit, in der die Pflanzen wachsen
'the*fem.* speed in which*fem.* the plants grow'
"the speed at which the plants grow"

There are a number of unclear cases. (47a) does not appear to me to be fully acceptable; nevertheless it is far better than (47b):[10]

(47) a. ? die Wartezeit auf den Arzt
'the wait-*e*-time on the doctor'
"the waiting time for the doctor"

    b. * das Wartezimmer auf den Arzt
'the wait-*e*-room on the doctor'
"the waiting room for the doctor"

We can see that in certain cases the inheritance of arguments is also possible in a compound. The conditions under which this occurs are not clear. I would like to suggest that on the one hand certain semantic regularities play an essential role, on the other idiosyncratic properties of the second constituents involved.

On the other hand, even in derivations the inheritance of arguments from the first constituent is not always possible. With adjectives as in (48b,d) the reason could simply be that, in general, there are heavy restrictions on the occurrence of complements to adjectives, especially when in the genitive:

(48) a. die Verfolgung der Täter
'the pursue-ing [of] the doers'
"the pursuit of the committers (of the crime)"

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[10]The examples (44), (45), (47) are gleaned from Toman (1980).

    b. dein (*der Täter) verfolgungsmäßiges Gebaren
        'your ([of] the doers) pursuit-*s*-measure-y conduct'
        "your conduct as in pursuing (the wrongdoers)"

    c. der Fahrer   des Wagens
        'the driver [of] the car'

    d. das (*des Wagens) fahrerhafte Gebaren
        'the ([of] the car)   driver-like conduct'
        "the driver-like conduct (of the car)"

With nouns as in (49b) the reason must be that the suffix blocks the inheritance of the genitive object:

(49)   a. die   Sänger   der Arie
         'the*pl. masc.* song-*er* [of] the aria'
         "the singers of the aria"

    b. die   Sängerschaft (*der Arie)
         'the*sg. fem.* singer-ship   ([of] the aria)'

    c. die Erzieherschaft   meiner Kinder
         'the educator-ship [of] my   children'
         "the guardianship of my children"

Even in (49c) the genitive is not to be interpreted as a genitive complement (to *Erzieher*) but rather as a possessive (or perhaps even as a subjective) genitive (to *Erzieherschaft*).

    A similar situation seems to hold for the suffix *-tum* (which one can use to create new words, although one seldom does). Along with (49a) we have (50a) (where *Singen*, contrary to its appearance, is most likely not a noun, cf. Section 10) and (50b), but not (50c):

(50)   a.   sein Singen   der Arie
            'his sing   [of] the aria'
            "his singing of the aria"

    b.   sein Sängertum
            'his singer-dom'
            "his singerhood"

    c. * sein/das Sängertum   der Arie
           'his/the singer-dom [of] the aria'
           "his/the singerhood of the aria"

While the genitive complements in (51) are fine, they appear to me to be more than dubious in *-chen*-derivations from the very same nouns in (52):

(51)   a. der Fahrer   des Wagens
          'the driver [of] the car'

      b. der Überwacher   des Verkehrs
          'the over-watch-*er* [of] the traffic'
          "the traffic supervisor"

(52)   a. das Fahrerchen (*des Wagens)
          'the driver-*chen* ([of] the car)'
          "the little driver (of the car)"

      b. das Überwacherchen (*des Verkehrs)
          'the supervisor-*chen* ([of] the traffic)'
          "the little supervisor (of the traffic)"

And with deverbative nouns ending in *-(er)ei* prepositional complements as in (53a,b) appear to me to have approximately the status of (47a) while genitive complements and corresponding prepositional phrases with *von* appear to be excluded:

(53)   a. die Warterei (?auf den Arzt)
          'the wait-ing (on the doctor)'
          "the waiting around (for the doctor)"

      b. die Sucherei   (?nach "authentischen" Belegen)
          'the search-ing (for   "authentic"   documentations)'
          "the searching around (for "authentic" documentations)"

      c. die Fahrerei (*solcher Wagen)
          'the drive-ing ([of] such   cars)'
          "the driving around (of such cars)"

      d. die Überwacherei (??von kleinen Verbrechern)
          'the supervise-ing (of   little   criminals)'
          "the surveillance (of minor criminals)"

      e. die Singerei (*von Arien)
          'the sing-ing (of   arias)'

Although the judgements of individual examples are not always entirely certain, one thing is sure: in considering argument inheritance we are not dealing with a problem that categorially distinguishes between composition and derivation. Rather it is dependent on the idiosyncratic and/or the semantic properties of the second constituents of word formation constructions. If this is true, it is exactly what is to be expected from a strictly lexicalist theory of word formation.

6 Synthetic compounds

A variety of interesting theoretical questions arise in connection with a special type of word formation, the so-called synthetic compounds.[11] These (in my interpretation) contain compounds which do not occur freely as a word (as we expect of ordinary compounds), but rather only as a constituent of another word.

6.1 Affixal synthetic compounds

Formations such as (54) belong here:

(54)	angriffslustig	'attack-s-desire-y'	"aggressive"
	baulustig	'build-d.'	"desiring to build s.th."
	ehelustig	'matrimony-d.'	"eager to get married"
	heiratslustig	'marriage-s-d.'	"eager to get married"
	kauflustig	'buy-d.'	"inclined to buy"
	lernlustig	'learn-d.'	"studious"
	reiselustig	'travel-d.'	"fond of travelling"
	schaulustig	'look-d.'	"curious"
	streitlustig	'quarrel-d.'	"belligerent"
	tauschlustig	'exchange-d.'	"fond of exchange"
	trinklustig	'drink-d.'	"fond of drinking"
	unternehmungslustig	'undertake-ing-s-d.'	"adventuresome"

They have not been formed with the adjective *lustig* 'pleasure-y'/"cheerful, comical", the meaning speaks against this: someone who is 'streitlustig' is not necessarily cheerful or comical. Neither would it be correct to analyze *lustig* as a suffix; it is clearly reducible to the components *-ig* as an adjectival suffix and *lust* in one of the meanings that the noun *Lust* can have, namely 'desire': someone who is 'streitlustig' is belligerent, desiring a fight, and someone who is 'baulustig' has the wish to build a home. One way to describe this relationship is to analyze it as a *-ig*-derivation from a compound *Baulust* which, however, only occurs in this derivation; just like the similar formation *arbeitswütig* 'work-s-anger-y'/"mad

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[11]In German various terms are in use here, among them *Zusammenbildung* 'together-formation'. This most frequently used term appears to me quite appropriate because its literal meaning is as unclear as the essential properties of the construction itself. The occasionally used term *Wortgruppenableitung* 'word-group-derivation' is misleading inasfar as it suggests the identification of, e.g., *braunäug-* brown-eye' in *braunäugig* "having brown eyes" with the syntactic group *braune Augen* 'brown eyes'. The differences are, however, far-reaching.

with work" can be understood as a derivation from the free compound *Arbeitswut* 'work-*s*-anger'/"work rage".[11a]

This type of formation is very popular, e.g., with expressions of quantity (quantifiers and cardinal numbers) as the first component of the compound (55) or with an ordinal number or a normal adjective (56):[11b,12]

[11a]There are speakers who find *Baulust, Kauflust, Reiselust* and some others quite unobjectionable. This is just what one would expect, given the possibility of compounding. The remarkable fact is that such free compounds are, to varying degrees, less than fully acceptable for many speakers. This constitutes what I term the distributional problem of synthetic compounds in Section 6.3.

The situation is in fact slightly more complex in that *lustig* in the sense of 'having the desire to' does occur as a syntactic word in expressions like (i), pointed out to me by Susan Olsen:

(i) Sie macht nur, wozu sie lustig ist
'she makes only where-to she desire-y is'

"She only does what she wants to"

This use of *lustig* appears to be restricted to relative clauses of the form *wozu x lustig sei-*. It seems that all speakers who use words of the pattern (54) do not use this idiomatic expression, so it can hardly be causally involved in the establishment of (54).

[11b]Actually, *mehr* 'several' in *mehrgliedrig* (55a) and *Mehrfamilienhaus* (57) is a bound element, distinct from the free adverb *mehr* 'more' and related to the free adjectival stem *mehrer-* 'several'. This does not affect the point of the discussion, since there is no **Mehrglied, *Mehrfamilie* or **Mehrhaus*. This bound *mehr-* also appears, e.g., in *mehrfach* 'several times, manifold' where *-fach* is a suffix taking cardinal numerals and quantifiers as in *zweifach* 'twofold, double', *vielfach* 'many times, multiple'.

[12]Contrary to appearances, formations like *innerfamiliär* 'inner-family-ar'/"within the family" and *außerparlamentarisch* 'outer-parliament-ar-y'/"outside of parliament", etc. (cf. Latour (1976) for more material) have no relationship to synthetic compounds. The prefixes *inner-* and *außer-* combine here, rather, with referential adjectives. (That the adjectives are potentially or usually referential can be seen from examples like *die parlamentarische Forderung* 'the parliamentary demand' which means approximately the same thing as *die Forderung des Parlaments* 'the demand of parliament'. Expressions like *wissenschaftliche Ergebnisse* 'scientific results' are ambiguous. Occasionally they have the meaning of *Ergebnisse, die wissenschaftlichen Charakter haben* 'results that are scientific in character', but they also, not uncommonly, have the (different) meaning of *Ergebnisse, die Wissenschaftler (die Wissenschaft) erzielt haben (hat)* 'results that are arrived at by scientists (science)'. This is the referential meaning of the adjective *wissenschaftlich* 'scientific'.) That these prefixes do not combine with nouns "before" an adjectival suffix is placed on this complex (in which case the structure of a synthetic compound would be the result, e.g., [[*inner⌢famili*] [*är*]]) is shown beyond doubt by examples like those in (i) where the adjectives *deutsch* 'German', etc. are not derived from a noun and are clearly referential; cf. (ii):

(i) *innerdeutsche, innerenglische, innerliberale, innerlinke (Vorgänge)* 'inner-German, inner-English, inner-liberal, inner-left (proceedings)'/"(proceedings) within Germany, England, the liberal wing, the left wing"

(ii) *die deutsche/liberale Zusage, mehr Waffen zu liefern* 'the German/liberal promise to deliver more weapons'

(55) a. allseitig   'all-side-y'   "from all sides"
          vielstimmig   'many-voice-y'   "polyphonic"
          beidhändig   'both-hand-y'   "with both hands"
          mehrgliedrig   'several member-*r*-y' "having several members"
          eintägig   'one-day-y'   "one day's"
          einzellig   'one-cell-y'   "unicellular"
          dreimastig   'three-mast-y'   "three-masted"
          dreimonatig   'three-month-y'   "three-month"
          viersitzig   'four-seat-y'   "with four seats"
          viertaktig   'four-rhythm-y'   "in a four-beat rhythm"
          fünfachsig   'five-axle-y'   "having five axles"
          sechsprozentig   'six-per cent-y'   "of six per cent"

      b. Vielweiberei   'many-woman-*erei*'   "polygamy"
          Beidhänder   'both-hand-*er*'   "ambidexter"
          Einzeller   'one-cell-*er*'   "unicellular organism"
          Dreimaster   'three-mast-*er*'   "three-master"
          Viersitzer   'four-seat-*er*'   "vehicle with four seats"
          Viertakter   'four-rhythm-*er*'   "s.th. characterized by a four-beat rhythm (e.g., engine)"
          Fünfachser   'five-axle-*er*'   "vehicle with five axles"
          Sechsprozenter   'six-per cent-*er*'   "bond bearing six per cent interest"

(56) a. drittstellig   'third-place-y'   "third-rate"
          letztmalig   'last-time-y'   "for the last time"
          zweitklassig   'second-class-y'   "second rate"
          altjüngferlich   'old-spinster-ly'   "old-maidish"
          altsprachlich   'old-language-ly'   "of classical languages"
          breithüftig   'broad-hip-y'   "having large hips"
          buntfarben   'multicoloured-colour-*en*' "many-coloured"
          dickhäutig   'thick-skin-y'   "thick-skinned"
          feingliedrig   'fine-member-*r*-y'   "with delicate limbs"
          ganztägig   'whole-day-y'   "around the clock"
          geringwertig   'slight-worth-y'   "of small value"
          großräumig   'large-room-y'   "having (a) large room, of large area"
          hochwertig   'high-worth-y'   "of high value"
          jungmädchen-haft   'young-girl-*haft*'   "maidenly"

langfristig	'long-term-y'	"long-term, in the long run"
nacktsamig	'naked-seed-y'	"with gymnosperms"
scharfzüngig	'sharp-tongue-y'	"with a wicked tongue"
südländisch	'south-land-*isch*'	"from the south"
unterschwellig	'under-threshold-y'	"subtle"
unterseeisch	'under-sea-*isch*'	"submarine"
weitmaschig	'wide-mesh-y'	"with wide meshes"

b.
Zweitkläßler	'second-class-*ler*'	"second grader"
Dickhäuter	'thick-skin-*er*'	"pachyderm"
Kurzflügler	'short-wing-*er*'	"rove beetle"
Langschäfter	'long-shaft-*er*'	"top boots"
Nacktsamer	'naked-seed-*er*'	"plant having gymnosperms"
Südländer	'south-land-*er*'	"s.o. from the south"

6.2 Synthetic compounds within compounds

One could suspect bound compounds to be particular to derivations, constituting a criterial distinction between (suffixal) derivation and composition. In reality, however, each one of these constructions that is in any way accessible to comparison has a parallel in constructions whose second component is a free element and not a suffix:

(57)
Allradantrieb	'all-wheel-drive'	"all-wheel drive"
Vielvölkerstaat	'many-people-*er*-state'	"country inhabited by many peoples"
Mehrfamilienhaus	'several-family-*n*-house'	"multi-family dwelling"
Eintagsfliege	'one-day-*s*-fly'	"ephemera"
Zweibettzimmer	'two-bed-room'	"double room"
Dreimastsegler	'three-mast-sailboat'	"three-master"
Dreimonatsrate	'three-month-*s*-rate'	"three-monthly instalment"
Viertaktmotor	'four-rhythm-motor'	"four-cycle motor"
Fünfachslastzug	'five-axle-truck'	"truck with five axles"

The examples in (57) have the same first constituents as *fünfachsig, Fünfachser*, etc. and they are bound to the second constituent in (57) in the same way they are in (55). (Especially noteworthy are cases like *Allwetterflugzeug* 'all-weather-airplane'/"all-weather airplane" and probably also *allstündlich* 'all-hour-*ly*'/ "hourly" in whose paraphrases *jed-* instead of the expected *all-* occurs: *Flugzeug für jedes/*alle(s) Wetter* 'airplane for every (kind of) weather', *jede/*alle Stunde* 'every hour'.) On the other hand the first constituents of *einäugig* 'one-eye-y'/"one-eyed", *zweibeinig* 'two-leg-y'/"two-legged", and *Zweibeiner* 'two-leg-*er*'/"being having two legs", for example, also occur freely: one can refer to a person as *Einauge* 'one-eye'/"person having (only) one eye" or *Zweibein* 'two-leg'/

"person having two legs"; cf. also *Dreirad* 'three-wheel'/"tricycle" and *Einbaum* 'one-tree'/"canoe made from one piece of log".

The first constituents of compounds like those in (58) are constructed like the first constituents in (56) and are bound in both cases:[12a]

(58) Altkleidersammlung   'old-dress-*er*-collection'   "collection of old clothes"
      Altmännerleiden   'old-man-*er*-suffering'   "old man's disease"
      Dickschwanz(renn)maus 'thick-tail-(run)-mouse'   "pachyuromys duprasi"
      Ganztagsbeschäftigung 'whole-day-*s*-occupation'   "full-time job"
      Ganzwortmethode   'whole-word-method'   "method of reading and writing whole words"

      Großraumwagen   'large-room-wagon'   "freight car"
      Jungmädchenfreuden   'young-girl-joys'   "young girl's joys"
      Kaltwetterfront   'cold-weather-front'   "front of cold weather"
      Kurzstreckenradar   'short-stretch-*n*-radar'   "short-range radar"
      Kurzzeitgedächtnis   'short-time-memory'   "short-term memory"
      Langstreckenflug   'long-stretch-*n*-flight'   "long-distance flight"
      Langzeitkommission   'long-time-commission'   "permanent committee"
      Leichtlohngruppe   'light-salary-group'   "low wage group"
      Schönwetterperiode   'beautiful-weather-period'   "period of fine weather"
      Unterseeboot   'under-sea-boat'   "submarine"

Examples like (59), in contrast, have the same form as these first constituents but are not bound:

(59) Alteisen   'old-iron'   "scrap iron"
      Billigprodukt   'cheap-product'   "cheap ware"
      Dickmilch   'thick-milk'   "curdled milk"
      Eigenheim   'own-home'   "private home"
      Erstausgabe   'first-edition'   " original edition"
      Flachdach   'flat-roof'   "flat roof"
      Ganzaufnahme   'whole-photograph' "full-length portrait"
      Hochschrank   'high-closet'   "overhead closet"
      Kleinwagen   'small-car'   "compact car"
      Sauermilch   'sour-milk'   "curdled milk"

[12a]However, I recently came across *Großraum* used in the sense of 'large room'. (*Großraum* in the sense of 'extended (urban) area' has been well-established for a long time.) This may be a kind of backformation from *Großraumbüro* 'large-room-office'/"(typing) pool". – In the technical language of athletics, *Langstrecke* "long distance", *Kurzstrecke* "short distance" can sometimes be heard, presumably from *Langstreckenlauf* 'long-stretch-run'/"long-distance race", etc. – Recall also the remarks in note 11a.

Schwermetall	'heavy-metal'	"heavy metal"
Starkbier	'strong-beer'	"strong beer"
Starrachse	'rigid-axle'	"single axle"
Trockeneis	'dry-ice'	"dry ice"
Weichkäse	'soft-cheese'	"cream-cheese"
Zweitwagen	'second-car'	"second car"

6.3 Two problems

If one analyzes such synthetic compounds as having a compound as the first constituent, as I do, two problems arise.

I would like to term the first problem the distributional problem. It arises in a similar fashion in all theories, but does not even receive recognition as a problem in the literature known to me. It is the question of why these first constituents do not generally occur in free form. Why do, for example, *fünfachsig, Fünfachser, Fünfachslastzug* occur, but not **Fünfachse*? On the one hand, completely idiosyncratic restrictions cannot be the entire reason since this word formation pattern is unusually productive. On the other hand I have emphasized that formations of the type **Fünfachse*, etc. do indeed exist freely, cf. (59).[12b] It is not the goal of this article to solve the distributional problem.

The second problem is of more formal nature; it can best be discussed by turning to an example. One instance of the pattern illustrated in (56a) is *langfädig* 'long-thread-y'/"having long threads", one component of which is related to *Faden* 'thread'. According to our discussion it should have the constituent structure of (60):

(60) $[_A [_N [_A \text{\#}lang] [_N \text{\#}fäd]] [A +ig]]$

Moreover, the nominal element *fäd* should have the categorial characterization (61), parallel to (40b):

(61) $[_{X^0} [_N \text{\#}\underline{\quad}] [_{X^0} + \varphi]]$

This means that *fad* is bound to a subsequent element φ with a weak boundary and that φ should be a sister constituent to *fad*. This condition is, however,

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[12b]To be more exact, examples with expressions of quantity like **Fünfachse* that occur freely seem to always be semantically exocentric, like *Einauge, Dreirad, Dreifuß* 'three-foot'/"tripod", etc. (Some possible exceptions, pointed out to me by Jürgen Lenerz, are: *Dreisprung* 'three-jump'/"hop, skip, and jump", *Mehrkampf* 'several-competition'/"allround competition", *Dreiklang* 'three-tone'/ "triad".) One would hope to find general principles from which this follows. The restrictions with normal adjectives illustrated in (56) and (58) seem much more mysterious, since there are large numbers of (semantically endocentric) examples like (59).

not fulfilled in (60). It is not *fäd* but *langfäd* that has the desired right sister constituent.[13,13a] This does not, however, imply that either (60) or (61) has to be abandoned. As we will discuss more closely in Section 8, the productive compounding rule for German states that the grammatical properties of a compound are determined by the grammatical properties of its final component. This means in this case that the compound *langfäd* takes over from its final component *fäd* the categorial characterization (61) and hence must be bound to an appropriate element. One can assume that for exactly this reason *fäd* itself is not subject to the restriction (60). This restriction has been transferred over to the compound, so to speak. Under this assumption (61) does not contradict (60).

If (60) is correct, a problem could arise with left deletion. In such constructions sequences which stand between two strong boundaries are deleted; the resulting gap does not have to be a constituent. In (62) for example, the deleted sequence *Lösung ein* is not a constituent:

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[13]Williams (1981) proposes a variant of the strictly lexicalist theory in which this problem does not occur: he does not use analyses like (60) but instead would assume a compound of *lang* and *fädig*. Such a grouping is not excluded on formal principles but it violates the principle of strict semantic compositionality (cf. note 13a): the meaning of *lang* 'long' would have to combine with that of *fädig* (presumably: 'having threads') to that of *langfädig*. In view of this it is worthwhile to explore the consequences of a strictly compositional analysis like (60); all the more since Williams does not present convincing reasons for his analysis. He simply finds support in a grammatical tradition according to which a strong boundary may never occur inside a weaker boundary in English. However, on the one hand, the criteria for the identification of different boundaries in English are not unproblematic in nature, cf. Strauss (1979) (and at any rate not identical with the criteria that we have used for German). On the other, it is not at all evident that this grammatical tradition is empirically well-founded.

[13a]Since one of the main motivations for my account of synthetic compounds is the principle of strict compositionality, some comments may be in order.

We must distinguish between 'compositional' and 'strictly compositional'. An expression *E* is semantically compositional if its meaning is completely determined by the semantic and the syntactic properties of the parts of *E* (and, perhaps, prosodic properties of *E*) according to general rules. *E* is semantically strictly compositional if only the semantic and the syntactic properties of the immediate constituents of *E* enter into the determination of *E*'s meaning. It is an empirical fact that non-idiomatic expressions of natural languages are compositional, but it is obviously not the case that all non-idiomatic expressions are strictly compositional.

A rather unusual type of violation of strict compositionality is illustrated in (i):

(i) Weil   es jedoch   lange nicht geregnet hat, ist der Boden ausgetrocknet
     'because it however long   not   rained   has, is the soil   parched'

     "However, because it hasn't rained in a long time the soil is parched"

(62) Karl tritt für die große ___ und Heinz tritt für die kleine Lösung ein
      'Karl steps for the great   and Heinz steps for the small solution in'
      "Karl pleads for the large solution and Heinz pleads for the small solution"

In (63) the deleted sequence *fädig* is also not a constituent, according to (60):

(63) lang- oder kurzfädig
      'long or   short-thread-y'
      "having long or short threads"

No problem results from this if left deletion is formulated as the deletion of a variable. If one, however, assumes that left deletion deletes a constituent in each case (iteratively, where appropriate), (62) would have to have the intermediate stage (64) and (63), the intermediate stage (65), and this is unacceptable:

(64) Karl tritt für die große Lösung ___ und Heinz tritt für die kleine
      'Karl steps for the great solution   and Heinz steps for the small
      Lösung ein
      solution in'
      "K. pleads for the large solution and H. pleads for the small solution"

(65) * langfäd-   oder kurzfädig
      'long-thread or   short-thread-y'

Here *jedoch* 'however', which is contained in the clause introduced by *weil* 'because', has semantic scope over the entire sentence, i.e., the meaning of *jedoch* does not enter into the determination of the meaning of the *weil*-clause, and the meaning of the entire sentence is determined in part by *jedoch* although it is not an immediate constituent of the sentence. A *weil*-clause cannot contain *jedoch* if it is not in the Vorfeld (i.e., in front of the finite verb *ist*). Example (ii) is unacceptable with *jedoch*:

(ii) Der Boden ist ausgetrocknet, weil   es (*jedoch) lange nicht geregnet hat
      'the soil   is parched   because it (however) long not rained   has'

We also find violations of strict compositionality in complex words. For instance *langgeschwänzt* 'long-*ge*-tail-*t*' means 'having (a) long tail'; its immediate constituents are the free elements *lang* 'long' and *geschwänzt* "having (a) tail". Under common assumptions about rules for building up semantic representations there is no way to get "having a long tail" from "long" and "having a tail". The theory of Williams (1981) will have no problem with *langgeschwänzt* because it denies the relevance of the principle of strict compositionality in word formation. However, given the fact that constructions like *langgeschwänzt* are rare and felt to be rather obsolete (as opposed to *langschwänzig*, with the same meaning) and that, in general, violations of strict compositionality appear to fall into a few closely defined types, it seems advisable to make every effort to save the principle of strict compositionality wherever possible.

Just how important this fact is for the analysis (60) cannot be discussed further here; it is, however, not evident that (60) is refuted by this.[14]

6.4 Conclusion

When binary constituent structures are assumed for synthetic compounds there are always unfavorable consequences in the application of the usual definitions, such as with (14). If one isolates in *fünfachsig* and *Fünfachslastzug* the compound *fünfachs*, this does not occur freely; therefore both are derivations. (The same can be said if one considers *fünf* as an immediate constituent of the word; since *achsig* or *Achslastzug* do not occur freely they would again be derivations according to (14).) These bound morpheme complexes are, however, different from normal prefixes in that they derive from productive word formation processes (involving only free elements); this is exactly the characteristic distributional problem of the synthetic compounds.

We have seen that there are complicated relations between the free and bound occurrence of morphemes (or morpheme complexes) and that the terminological division into composition and derivation is in no way at all helpful in handling this. In addition, it must be recognized that entirely apart from the problems they pose in derivations (as *fünfachsig*), synthetic compounds exist and are interpretable in compounds (as *Fünfachslastzug*). Derivations and compounds follow the same regularities here, so that once again the relationship between composition and derivation has been demonstrated in a rather peculiar case.

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[14]This kind of problem is well-known from the discussion of different deletion operations suggested in the literature. One would like, for instance, to derive (i) from (ii) for syntactic and semantic reasons:

(i) Karl hat mehr Hunde gesehen, als er zugibt
'Karl has more dogs seen than he admits'

"Karl has seen more dogs than he admits"

(ii) Karl hat mehr Hunde gesehen, als er zugibt, daß er Hunde gesehen hat
'Karl has more dogs seen than he admits that he dogs seen has'

"Karl has seen more dogs than he admits that he has seen dogs"

(iii) Karl hat mehr Hunde gesehen, als er zugibt, daß er Katzen besessen hat
'Karl has more dogs seen than he admits that he cats owned has'

"Karl has seen more dogs than he admits that he has owned cats"

The problem here is that (iii) is completely unacceptable for many speakers, so that for them (ii) is not only clumsy but totally impossible.

7 The verbal complex

I would like to bring attention to a special type of synthetic compound which is generally overlooked in the literature: formations such as *aufschlüsselbar* 'open-key-able'/"capable of being itemized", *Aufschlüsselung*, 'open-key-ing'/"itemization". They are usually not recognized as synthetic compounds because elements like *auf* are regarded as verbal prefixes. In fact they are not prefixes at all. They occur as syntactic words. For ease of exposition I will assume here that they belong to a syntactic category VZ ('Verbzusatz'/'converb').

7.1 VK as a constituent

Frequently converbs form a constituent together with the (finite or infinite) verb which I will call the verbal complex (VK), for example in (66), (67) and (68):

(66) a. weil   Karl das Glas einsetzt
          'because Karl the glass in sets'
          "because Karl inserts the glass"

      b. weil   Karl den Plan durchführt
          'because Karl the plan through leads'
          "because Karl carries our the plan"

      c. weil   Karl Heroin ausführt
          'because Karl heroin out leads'
          "because Karl exports heroin"

(67) a. Karl will   das Glas einsetzen
          'Karl wants the glass in set'
          "Karl wants to insert the glass"

      b. Karl hat den Plan durchgeführt
          'Karl has the plan through led'
          "Karl has carried out the plan"

      c. Karl braucht das Heroin nicht auszuführen
          'Karl needs   the heroin not   out to lead'
          "Karl need not export the heroin"

(68) a. Einsetzen will   Karl das Glas
          'in set   wants Karl the glass'
          "Karl wants to insert the glass"

b. Durchgeführt hat Karl den Plan
  'through led   has Karl the plan'
  "Karl has carried out the plan"

c. Auszuführen braucht Karl das Heroin nicht
  'out to lead   needs   Karl the heroin not'
  "Karl need not export the heroin"

The fact that the converb and the verb in (68) are found together in the Vorfeld (in front of the finite verb) is a strong indication that they in fact form a constituent. The verb cannot occupy the Vorfeld without its VZ, as (69) demonstrates:

(69) a. * Setzen will   Karl das Glas ein
     'set   wants Karl the glass in'

 b. * Geführt hat Karl den Plan durch
     'led   has Karl the plan through'

 c. * Zu führen braucht Karl das Heroin nicht aus
     'to lead   needs   Karl the heroin not   out'

Apparently the Vorfeld cannot be occupied by V (or by a X^0 constituent generally, if X^0 is not a maximal projection by itself) but only by VK (or another X^n constituent, $n > 0$); even in cases like (70) one will have to analyze the verb in the Vorfeld as representing a VK:

(70) a. Schlagen will   Karl den Hund
     'hit   wants Karl the dog'
     "Karl wants to hit the dog"

 b. Gebracht hat Karl den Bullen
    'brought has Karl the bull'
    "Karl brought the bull"

Also in gapping the combination VZ⌢V proves to be a constituent. (71a-c) where no combination with a VZ occurs are generally acceptable:

(71) a. Karl liebt Hunde und Heinz ___ Katzen
      'Karl loves dogs   and Heinz   cats'

 b. weil   Karl Hunde liebt und Heinz Katzen ___
     'because Karl dogs   loves and Heinz cats'
     "because Karl loves dogs and Heinz, cats"

 c. Karl führt Heroin aus und Heinz ___ Marijuana ein
     'Karl leads heroin out und Heinz   marijuana in'
     "Karl exports heroin and Heinz imports marijuana"

d. * weil   Karl Heroin ausführt und Heinz Marijuana ein ___
'because Karl heroin out leads and Heinz marijuana in'

e.   weil   Karl Heroin ausführt und Heinz Marijuana ___
'because Karl heroin out leads and Heinz marijuana'

"because Karl exports heroin and Heinz, marijuana"

But (71d) which entails a VZ⁀V sequence is excluded (for many speakers); (71e) in which the whole sequence has been deleted, on the other hand, is fine. From this we can at least conclude that VZ⁀V forms a constituent (that is distinct from VP).

7.2 Immediate constituents of VK

That such sequences are to be analyzed into two immediate constituents and do not form as a whole one verb follows from the convergence of phonological (prosodic), morphological and syntactic differences that exist between sequences of this kind and sequences that clearly form one word.

7.2.1 The first constituent is stressed more strongly than the second in sequences with VZ. This is normal and follows from the rule that within verbal expressions a subsequent constituent is always more weakly stressed than the preceding one. For this reason, sequences without complements are fully stressed, cf. (72a);[15] if a complement appears, it carries the primary stress (72b); the same goes when more than one complement is present (72c):

(72) a. i. weil   Karl gerne i̇ßt
'because Karl gladly eats'

"because Karl likes to eat"

     ii. weil   Karl häufig fliegt
'because Karl often flies'

"because Karl flies often"

   b. i. weil   Karl gerne Tausendfüßler   ißt
'because Karl gladly thousand-foot-*ler* eats'

"because Karl likes to eat centipedes"

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[15]The numbers indicate, following Chomsky & Halle (1968), the relative prominence of stress: the smaller the number the stronger the stress.

    The 'stress rule' alluded to in the text is, of course, exceedingly oversimplified. The stress assignments given in (72) do, however, represent the essential features of so-called normal stress. For an explication of this concept, cf. Höhle (1982a).

     ii. weil   Karl häufig nach München fliegt
                'because Karl often to   Munich flies'
                "because Karl flies often to Munich"

     iii. weil   Karl jetzt essen möchte
                'because Karl now eat   wishes'
                "because Karl wants to eat now"

  c. i. weil   Karl jetzt Tausendfüßler essen möchte
                'because Karl now centipedes   eat   wishes'
                "because Karl wants to eat centipedes now"

     ii. weil   Karl häufig nach München geflogen wird
                'because Karl often to   Munich flown   becomes'
                "because Karl is often flown to Munich"

     iii. weil   Karl   der Schwester die Hand auf die Brosche legte
                'because Karl [to] the nurse   the hand on the brooch laid'
                "because Karl put his hand on the nurse's brooch"

Within the verb the situation is exactly the opposite. In comparable morphological sequences which are clearly one word, the second constituent, the verbal stem, carries in general a stronger stress than the first, cf. (73):

(73) a. weil   Karl das Hindernis ùntertáucht
          'because Karl the obstacle   under-dives'
          "because Karl swims under the obstacle"

     b. weil   Karl   dem Kerl   ùnterlág
          'because Karl [to] the   fellow under-lay'
          "because Karl was defeated by the fellow"

     c. weil   Wolken den ganzen Himmel überzíehen
          'because clouds   the entire sky   over-pull'
          "because clouds are spreading over the entire sky"

     d. weil   Karl die Kiste dùrchsúcht
          'because Karl the box   through-searches'
          "because Karl searches through the box"

7.2.2 The inflectional prefix *zu* occurs directly before the infinite verb. With the verbs of (73) we therefore get, e.g., *weil er es zu ùntertáuchen versucht* 'because he

it to under-dive tries'/"because he tries to swim under it". The prefix *ge* cannot occur here because it is bound to the position before primary stress, cf. Kiparsky (1966). In the sequence VZ⌒V, on the other hand, *zu* und *ge* occur naturally in front of the verb and not before VZ; we therefore find (74a) but not (74b):[15a]

(74) a. i. weil Karl das Heroin ausgeführt hat
      'because Karl the heroin out led has'

     "because Karl exported the heroin"

   ii. weil Karl den Plan durchzuführen scheint
     'because Karl the plan through to lead seems'

     "because Karl seems to carry out the plan"

 b. i. * weil Karl das Heroin geausführt hat

   ii. * weil Karl den Plan zu durchführen scheint

7.2.3 Above all, however, it is the verb alone of a verbal complex without the VZ which is subject to the syntactic rules of the placement of the finite verb, cf. (75):

(75) a. Karl führt Heroin aus
    'Karl leads heroin out'

   "Karl exports heroin"

 b. * Karl ausführt Heroin

Morpheme sequences of the type (73) however are, as one expects of words, only permutable as wholes, cf. (76a) vs. (76b):

(76) a. i. Karl ùnterlág
     'Karl under-lay'

     "Karl was defeated"

   ii. Wolken ùberzíehen den Himmel
     'clouds over-pull   the sky'

     "Clouds are spreading over the sky"

 b. i. * Karl lág ùnter

   ii. * Wolken zíehen den Himmel über

[15a]It seems natural to assume that *tauch-*, which is a free verbal stem, is a V^0 even when contained in a prefixal derivation like *ùntertáuch-* 'under-dive'/"swim under (something)". If so, *zu* and *ge* must not be placed before the minimal V^0 contained in V^0 but rather must prefix to a maximal V^0. VZ⌒V cannot be a V^0, under these assumptions.

7.3 Conclusion

All these phenomena follow naturally from the assumption that VZ⌢V sequences do not form a constituent of the type V^0 (in this case we would have compounded or derived verbs), but rather one of the type V^1 (= VK). I therefore postulate a phrase structure rule like (77) for German:

$$(77) \quad VK \rightarrow \left(\left\{ \begin{array}{c} VK \\ VZ \end{array} \right\} \right) V$$

It generates on the one hand combinations of VZ and V and on the other (by means of the recursive introduction of VK) verbal sequences like *(weil Karl den Hund) geschenkt gekriegt zu haben scheint* '(because Karl the dog) donated received to have seems'/"because Karl seems to have received the dog as a present"; cf. Höhle (1978: 78f.).

What is remarkable about the VZ⌢V complexes in the analysis is not so much their syntactic behavior as the fact that they are so highly idiomatic. The meaning of *áussèh-* 'out look'/"look in appearance" or *(sich) vórsèh-* '(oneself) before look'/ "take care of oneself" does not come about regularly from the meaning of the converb and the verb. Furthermore, several verbs exist only in connection with VZ; e.g., *bürger-* only occurs with *ein* (meaning 'naturalize') and *aus* (meaning 'expatriate'), and *schlüssel-* occurs only with *auf*.

Since VZ⌢V sequences according to this discussion do not occur freely as words (but rather, where this appears to be the case, always form a syntactic phrase of the type VK), formations like *Aufschlüsselung* and *aufschlüsselbar* must be considered synthetic compounds with the constituent structure of (78):[15b]

[15b]Bound compounds like *aufschlüssel-* occur before other suffixes as well, of course; e.g., *Aufschlüsselei* "itemizing" (cf. note 9a), *Aufschlüßler* "person who itemizes". They can also occur as first components of compounds, as in *Aufschlüsselvorschrift* 'itemize-instruction'/"instruction for itemizing". Examples are numerous; e.g., *Abhöraffaire* 'from-hear-affair'/"bugging affair", *Abziehbild* 'from-tear-picture'/"transfer-picture", *Anziehsachen* 'at-tear-things'/"clothes", *Aufputschmittel* 'on-putsch-means'/"inciting drug", *Aufblasvorrichtung* 'on-blow-device'/"device for blowing up", *Aufschäumtechnik* 'on-foam-technique'/"technique of foaming up", *Durchhaltevermögen* 'through-hold-*e*-ability'/"power of endurance". However, nominalizations like *Aufschlüsselungsvorschrift* 'itemizing-*s*-instruction'/"instruction for itemizing" are often preferred.

Formally it would be possible to analyze *Aufschlüsselung* as composed of *auf* and *schlüsselung*. The main reason for preferring (78) is once again strict compositionality: if *schlüsselung* were a constituent, it would receive no interpetation, since the verb *schlüssel-* has no meaning by itself. Hence, the whole word could have no meaning either under a strictly compositional assignment of meaning.

The distributional problem of synthetic compounds reappears here, of course: why can the compound *aufschlüssel-* not occur as a free element? With verbs, however, this problem is much

(78) a. $[_N [_{X^0} [_{VZ} \text{auf}] [_V \text{schlüssel}]] [_N \text{ung}]]$

      b. $[_A [_{X^0} [_{VZ} \text{auf}] [_V \text{schlüssel}]] [_A \text{bar}]]$

The constituent X^0 is a compound which does not occur freely; due to the regularity of composition (cf. the following section) $X = V$ so that the selectional properties of *-ung* and *-bar* are not violated.

8 The regularity of composition

The previous sections have made it clear that there are no fundamental differences between composition and affixal derivation which would render support for assigning them different types of constituent structure. Up until now we have not discussed how the categorial classification of a bound morpheme can be determined. A simple observation is important here.

In German compounds there is an asymmetry in the function of the components of the compound which I term the 'regularity of composition'. The syntactic category of a compound is completely determined by the second component in that it is identical with that of the second component. The first component, on the contrary, exerts no influence in this sense. Thus, the noun *Käfig* 'cage' can be combined with the noun *Tiger* 'tiger' to form *Tigerkäfig* 'tiger cage', with the adjective *groß* 'large' to form *Großkäfig* 'large cage' and with the verb *wohn-* 'live' to form *Wohnkäfig* 'living cage'; the compound is in each case a noun of the same category as *Käfig*. With respect to the inflectional and the most important distributional properties of the word the first component could be omitted without changing anything. The second component is in complete agreement with the compound in these points. In this formal syntactic sense compounds are always endocentric.

There is a comparable asymmetry with derivations. Within a derivation the first component exerts no influence upon the syntactic category of the structure. This is determined exclusively by the second component. It is irrelevant whether the first component is a prefix or a free element. Prefixes do not alter the syntactic category in principle and, since many of them combine with several different

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more general; verbal compounds of any type are not freely used at all in German. (There is a very restricted way of using expressions that look like verbal compounds. These are mostly backformations of the type *uraufführ-* "play for the first time" and *bauspar-* "invest into a building society", briefly remarked upon in Höhle (1978: 34). This phenomenon has so far defied any theoretical interpretation.)

Note that the bound compound *aufschlüssel* in *Aufschlüsselung* does not have the stress pattern of derivations as in (73) but has main stress on the VZ. It follows that the stress rules operating within V^0 are able to distinguish between free VZ and bound verbal prefixes.

categories, the resulting category is not predictable on the basis of the prefix.[16]

If the first component of a derivation is not a prefix it is a free element (or a bound compound as with synthetic compounds); the second component is then not a word but a suffix. The category of the derivation is determined entirely by the suffix. Thus, an adjective like *grün* 'green', a noun like *Glück* 'fortune' or a verb like *begreif-* 'comprehend' may combine with *-lich*; the resulting words *grünlich* "rather green", *glücklich* "happy", *begreiflich* "comprehensible" are all adjectives. Combined with *-er* we have the noun *Eigentum* 'property' as in *Eigentümer* "proprietor" and the verb *bewohn-* 'inhabit' as in *Bewohner* "inhabitant", where the derivation is always a noun. The suffixes which derive nouns determine at the same time not only the category of the derivation but also its inflectional class and its gender.

These properties of suffixes are extremely mysterious if one postulates "rules" like (12); they are completely natural if we assume that suffixes have their own syntactic category just like other morphemes (morpheme complexes). This idea is especially plausible with nominalizing suffixes. Non-complex nouns differ from the members of the other categories among other things in that they have a non-variable, unpredictable gender. The gender of nouns ending in *-ung*, etc. is however predictable, namely on the basis of the suffix; nouns in *-ung* are feminine, nouns in *-er* are masculine, nouns in *-chen* are neuter. It is completely consistent to state that this gender is inherent to the respective suffix. If this is true, then one can sensibly consider the suffix itself to be a noun, just like a word such as *Tag* 'day' is sufficiently characterized as being a noun by the fact that it has inherent gender (namely, masculine). The same considerations hold with respect to the inflectional category typical of nouns. From the simple regularity that the second component determines the category of the whole it follows automatically that a deverbative word ending in *-ung*, since *-ung* is a noun, is likewise a noun, while

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[16]This holds, as was emphasized in the beginning, for adjectives and nouns. The situation appears to be different with verbs: prefixes like *ent-* 'de-' (*entkern-* 'destone'/"stone") and *be-* (*berohr-* '*be*-pipe"'/"supply with (a) pipe") are usually considered verbalizing prefixes, with the implication that the second component is to be marked N and not V. This seems to me very dubious for several reasons. These derivational processes are presumably much more complex. In particular I assume that direct denominal formations similar to participles of the type *behaart* '*be*-hair-*t*'/"having hair", *beschuht* '*be*-shoe-*t*'/"wearing shoes", *enteisent* 'de-iron-*t*'/"deferrized", *verwanzt* '*ver*-bug-*t*'/"buggy" (for which there are no verbs **behaar-*, **verwanz-*, etc. in general use) are largely underestimated in the systematic role they play. While derivations with such prefixes evidently need not be verbs, prefixes are not needed to derive verbs either. In a substantial number of verb formations direct shifts in category can be observed, as in *miau-* '(to) meow' from an onomatopoetic expression *miau* of dubious category (cf. *die Katze macht "miau"* 'the cat does meow') and *barzel-* "behave like Barzel" (Mr. Barzel is a German politician). It can be seen from these facts that the role of prefixes in the formation of verbs is not nearly as unproblematic as is commonly assumed.

all words ending in *-lich* are adjectives because *-lich* is an adjective. Just as with compounds the first component could theoretically be eliminated without altering the inflectional or categorial properties. This test is prohibited only by the trivial fact that suffixes by definition cannot occur without the first component; it is only for this reason that suffixal derivations cannot be endocentric.

These considerations are not applicable to prefixes since the first component of a derivation is irrelevant for the category of the whole, exactly as in compounds. For this reason their categorial status must remain undetermined or arbitrary where there is no relationship to a free form which could offer us a clue. Clear evidence for the category of a prefix could in principle be found when a prefix combines directly with a suffix and the suffix is in general bound to elements of certain categories only. Such cases are rare, but do exist; among them are *künstlich* 'artificial' and *mordsmäßig* 'terrific', mentioned in Section 4. Even if a suffix combines with different categories like our *-lich* – with nouns as in *ängstlich* 'fear-ly'/"fearsome", adjectives as in *ärmlich* 'poor-ly'/"rather poor" and verbs as in *begreiflich* 'comprehend-ly'/"comprehensible" – so that it cannot be directly inferred which category this *künst-* belongs to, such examples provide evidence at any rate for the assumption that affixes always belong to a certain category; for suffixes do not combine randomly with every possible category or with first components that have no category at all.[16a]

[16a]The case of *mordsmäßig* is more transparent in this respect: *-mäßig* combines almost exclusively with a noun. The only exceptions are some instances of verbal stems as first components. Note that the type *mordsmäßig* (an evaluative first component plus a suffix) is by no means exotic in German. Bound first components similar to *mords-* are *knall-* in (i), *bomb-* in (ii), *ries-* in (iii) and *pfund-* in (iv). An example of more recent coinage is *wahnsinn-* in (v):

(i)	knállrót	'bang-red'	"glaring red"
	knallig	'bang-y'	"glaring"
(ii)	Bómbengehált	'bomb-*n*-salary'	"huge salary"
	bombig	'bomb-y'	"huge"
(iii)	Ríesenfréude	'giant-*n*-joy'	"tremendous joy"
	riesig	'giant-y'	"tremendous(ly)"
(iv)	Pfúndsáufsatz	'pound-*s*-article'	"great article"
	pfundig	'pound-y'	"great"
(v)	Wáhnsinnsfréude	'madness-*s*-joy'	"terrific joy"
	wahnsinnig	'madness-y'	"terrific"

While it seems reasonably plausible that, in some cases, bound first components are members of normal syntactic categories, this may be doubtful for certain others, e.g. for *un-* 'un-'. This need not be a formal problem, however. Let us say that formally a category is an *n*-tuple (*i, CF, IF, …*) with $n \geq 2$. The first member of the *n*-tuple is a natural number indicating the bar level of projection, $0 \leq i \leq m$, where *m* is the maximal level. (The value of *m* may vary with the type of category.) The second member *CF* is a set of specified categorial features. There may be a

9 Derivation with and without a suffix

I have thus far given reasons for why it is sensible to assign compositions and derivations analogous constituent analyses. I have not yet explained why secondary words should have an internal constituent structure at all and not just certain boundary symbols or equivalents thereof that have to be assumed at any rate for the treatment of phonological phenomena. In addition to the question of whether (1) and (2) are to be given preference over (5) and (11), the related question arises with affixless derivations like *Tritt* 'kick, step' from *tret-* '(to) step' whether they are to be analyzed in a parallel fashion to [$_N$ [$_V$ *verfolg*] [$_N$ *ung*]] as [$_N$ [$_V$ *tritt*]] or indeed [$_N$ [$_V$ *tritt*] [$_N$ $\emptyset$]].

The strictly lexicalist theory makes a prediction with respect to such affixless derivations. It is based on the regularity of composition.

The constituent structure types that we have seen up to this point are: the simple word without an added element (which naturally has exactly one category marking) and words with several components (whose category is determined by the final component). Since for simplex words the final immediate constituent of the word is identical to the word itself one can state the generalization that the category of a word is identical to the the category of its final immediate constituent. Since *Tritt* is a noun the final immediate constituent according to this theory – either *Tritt* itself or $\emptyset$ – must be a N; it would not be possible for *Tritt* to be a V as is asserted in the analysis [$_N$ [$_V$ *tritt*]]. According to this theory only [$_N$ *tritt*] or [$_N$ [$_V$ *tritt*] [$_N$ $\emptyset$]] is to be expected. It is obvious that the assumption of a zero morpheme is problematic and is in need of careful justification at any rate; what we expect in view of the regularity of composition is therefore [$_N$ *tritt*]. We will examine this prediction with the help of certain stress phenomena.

Nouns and adjectives are in general stressed as far forward as possible (as long as no suffix that causes a deviant accentuation like *-eí, -ál* occurs). We find *Bevólkerung* '*be*-people-*er*-ing'/"population" but *Überbevölkerung* 'over-population' just like *máßig* 'measure-y'/"moderate(ly)" but *übermáßig* 'over-measure-

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universal set of features ([$\pm$ N] and [$\pm$ V] among them) which each category may draw upon. Categories capable of bearing inflection will have a third member, *IF*, a set of (specified) inflectional features; and there may exist more members. There is no reason to assume that every category is characterized by the same features differing only in their specifications (as + or -) or even by a constant number of specified features. Plausibly, a language learner will postulate a specified feature for a given linguistic element only if observable grammatical properties of the element lead him to do so. An element that does not display properties relevantly expressed by some specified feature will not be characterized by such a feature. Thus, the (uninflected) stems of adjectives, nouns and verbs that are relevant for word fomation may differ from the corresponding inflected words just by having an empty *IF*. Similarly, the *CF* of a prefix like *un-* may be empty if *un-* never displays properties relevantly expressed by a (specified) categorial feature. This does not imply that such a prefix is a member of no category.

y'/"excessive". Verbs, on the other hand, are generally stressed on the stem, even if a stressable element appears before the stem. Thus we have *tréiben* 'drive' and also *untertréiben* 'under-drive'/"understate" and *übertréiben* 'over-drive'/"exaggerate". Similarly, the *miß-* in *Míßwirtschaft* 'mis-economy'/"mismanagement" and in *míßliebig* 'mis-love-y'/"unpopular" is stressed while *mißáchten* 'mis-regard'/"disregard" takes the primary stress on the verbal stem. How do adjectives and nouns that are formed on the basis of such verbs behave then? If the stress is determined by the category of the secondary word, which in a sense may be the simplest assumption, they would have to have initial stress; if it is determined by the category of the basis, they would have to be stressed on the stem. A contamination resulting from an interaction of both stress rules would also be conceivable.

There do not seem to be any examples of relevant compounds in common use. One can, however, use and understand ad hoc formations like *Durchsuchmethode* 'through-search-method'/"method of searching", *Unterführweise* 'under-lead-manner'/"manner of channeling (under s. t.)", *Überstehversuch* 'over-stand-trial'/"attempt to survive". Even if these formations are somewhat marginal, it is still clear how they are to be stressed. They have in any case verbal stress on the first component, so that *durch-, unter-, über-* are unstressed. From this we can conclude that the category of the compound is of no consequence and only the category of the respective component of the compound is relevant for the stress of the individual compound parts. With this conclusion we have found reason to assume structures like (1) for compounds.

According to the "compositional theory of affixation" we expect exactly the same result for suffixal derivations, and this expectation is fulfilled. Derivations ending in *-ung, -er, -bar, -sam, -lich* whose first component is identical to a verb or a regularly modified (by umlaut) form of a verb have the stress pattern of verbs, namely on the stem, cf. (79):

(79) a. Durchsúchung   'through-search-ing'   "search"
          Hintertréibung   'behind-drive-ing'   "hindrance"
          Mißhándlung   'mis-act-ing'   "ill-treatment"
          Übersétzer   'over-set-*er*'   "translator"
          Unterságung   'under-say-ing'   "prohibition"
          Wiederhólung   'again-fetch-ing'   "repetition"

      b. hintergéhbar   'behind-go-able'   "deceivable"
          mißdéutbar   'mis-interpret-able'   "in danger of mis-
                                                     interpretation"
          unterháltsam   'under-hold-*sam*'   "entertaining"
          widersétzlich   'against-set-ly'   "insubordinate"
          wiederhólbar   'again-fetch-able'   "repeatable"

Nouns, on the contrary, which are formed from verbs without a clearly identifiable suffix have the stress pattern of nouns; the examples in (80) have stress on the initial component although the corresponding verbs are stressed on the stem:

(80) Míßbrauch   "abuse"   cf. mißbráuch- 'mis-use'/"abuse"
     Míßtrauen   "distrust"   cf. mißtráu-   'mis-trust'/"distrust"
     Überblick   "survey"   cf. überblíck-   'over-look'/"survey"
     Überfall   "sudden attack" cf. überfáll-   'over-fall'/"attack suddenly"
     Úmriß   "outline"   cf. umréiß-   'around-draw'/"outline"
     Wíderspruch "contradiction"   cf. widerspréch- 'against-speak'/"contradict"
     Wíderstand   "resistance"   cf. widerstéh-   'against-stand'/"withstand"
     Wíderstreit   "conflict"   cf. widerstréit- 'against-quarrel'/"conflict"

Since in addition to this type derivations with *-ung* are often possible, we have doublets as in (81):

(81) hinterfútter-:   Hinterfútterung   Hínterfutter
     'behind-line'   "lining"   "lining"
     "line"

     übertrág-:   Übertrágung   Übertrag
     'over-carry'   "transfer"   "carry-over,
     "carry over"   transfer"

     unterhált-:   Unterháltung   Únterhalt
     'ùnder-hold'   "maintenance"   "maintenance"
     "maintain"

     unterláss-:   Unterlássung   Únterlaß
     'under-let'   "omission"   "intermission"
     "omit"

     unterrícht-:   Unterríchtung   Únterricht
     'under-straighten' "instruction,   "instruction"
     "instruct"   information"

     unterschéid-:   Unterschéidung   Únterschied
     'under-separate'   "distinction,   "distinction,
     "distinguish"   discrimination"   difference"

     widerrúf-:   Widerrúfung   Wíderruf
     'against-call'   "revocation"   "revocation"
     "revoke"

Interestingly, this rule holds also for derivations in *-t*: *Únterschrift* 'underwriting'/"signature" (cf. *unterschréib-* 'under-write'/"sign"), *Übersicht* 'over-view'/ "survey" (cf. *überséh-* 'over-view'/ "survey"), *Míßgunst* 'mis-favor'/"envy" (cf. *mißgönn-* 'mis-grant'/"envy"). This is, upon first glance, surprising since this *-t* was at least at one time a productive suffix. Upon second glance it is a confirmation of the "compositional theory", for this *-t* is synchronically no longer productive in any sense of the word. Suffixes like *-nis*, for instance, are also no longer regularly used in spontaneous word formation (and are in this sense also not productive), ad hoc formations are however entirely possible and intelligible; thus, one could form from *erzwing-* 'er-force'/get by force", *begreif-* 'comprehend', *hell* 'bright' the abstract nouns *Erzwängnis* 'enforcement', *Begreifnis* 'comprehension', *Hellnis* 'brightness', which means that the speaker can identify the suffix *-nis* and its function and can use it in applying rules (even if he does not usually do so). On the other hand it is entirely inconceivable that a speaker would construe a new abstract noun in *-t* spontaneously. This means that the speaker in fact not only does not use the suffix but that he is not able to use it, that he therefore does not identify it as such. In fact he cannot identify it, for in order to do so, he would have to be able at the same time to identify a rule which would derive the consonant before the *-t* from the consonant of the verb; cf. Wurzel (1970: 238ff.). It seems clear to me that this rule is not learnable synchronically.[16b] There is a relationship of mutual correspondence between *schreib-* and *Schrift*; it is however completely lexicalized and could not be formulated in derivational rules. The *-t* will have to be analyzed as a component of a variant of the stem which itself is not decomposable (i.e., *schrift*, but not *schrif+t* derived from *schreib-*). Hence, the stress pattern of these words is entirely regular for they are not suffixal derivations synchronically but rather derivations without a suffix like *Míßbrauch* and *Überfall.*

It can be observed from pairs like *Únterschied – Unterschéidung* that there are two different stress patterns typical of deverbative nouns. These stress patterns are not idiosyncratic, but rather each belongs to a well established paradigm: one holds generally for nouns, the other is the characteristic pattern for verbs in general.

The difference, since it is connected to the category distinction, is not statable in an obvious way if *Unterschied* and *Unterscheidung* have the same internal constituent structure. For that would mean that both derivations must either have the stress pattern typical of verbs, since they are formed from verbs, or the

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[16b]*Fahrt* 'travel-*t*'/"journey" from *fahr-* 'travel' is about the only example that does not involve a mutation of the verbal stem which is unpredictable from the system of German phonology.

stress pattern typical of nouns, since both are nouns. The fact that *Unterschied* is stressed like a noun allows us to conclude that this morphological sequence has no other marking than that of a noun, which is necessary in any case. The fact that *unterscheid* in *Unterscheidung* does not display the stress typical of nouns allows us to conclude that this sequence is not marked as a noun (although *Unterscheidung* must be marked as a noun; we already know from our treatment of compounds that it is not necessarily the category of the secondary word but rather that of its immediate constituents that is relevant to stress). Since *unterscheid* has the stress of a verb, it is sensible to mark it as V. Thus we obtain the structures [_N_ *unter⌢schied*] and [_N_ [_V_ *unter⌢scheid*] [_N_ *ung*]]. With this the structures of (2), as distinct from those in (11), have found justification.

The difference between *Unterschied* and *Unterscheidung* that we have found is exactly what one would expect on the basis of the "compositional theory of affixation", and I know of no other theory that predicts such a distinction or could even characterize it naturally. In particular, the usual theory makes the distinction in the wrong place, in that the primary distinction is drawn between composition and derivation and only secondarily are subclasses of both types of word formation discerned. It separates suffixal derivations from compounds and places them together with suffixless derivations; the constituent structure of both derivational types is then looked upon as essentially the same but distinct from that of compounds.

10 Nominal infinitives

The strictly lexicalist theory of word formation brings to attention several problems concerning the so-called nominal infinitive that are easily overlooked in other theories.

I have characterized infinitives that are dependent on verbs as verbal inflectional forms. Even if an infinitive is not dependent on a verb it can still have clear verbal characteristics, cf. (82a):

(82) a. Kleine Katzen oft   streicheln macht   Karl Freude
         'small cats   often pet   makes [to] Karl joy'
       "Often petting small cats is a joy for Karl"

      b. Karl macht sich   die Freude   des
         'Karl makes himself the joy   [of] the
         Kleine-Katzen-oft-Streichelns
         small cats often pet-*s*'
       "Karl allows himself the joy of petting small cats often"

This apparent verbal construction can be combined however with an article and can take the genitive *-s*, as can be seen in (82b).

In contrast to these, there are formulations as in (83) which apparently have a purely nominal character:

(83) Sein häufiges Streicheln   kleiner Katzen macht   Karl Freude
      'his frequent pet   [of] small   cats   makes [to] Karl joy'
      "The frequent petting of small cats is a joy for Karl"

These are usually termed nominal infinitives. They have (as, of course, (82) also) the stress pattern typical of verbs: *Widersprechen* and *Hinterlegen* in (84) are stressed on the stem:

(84) a. Karls ewiges Widespréchen
          'Karl-*s* eternal against-speaking'
          "Karl's continual contradicting"
      b. sein häufiges Hinterlégen   großer Geldsummen
          'his frequent behind-lay [of] large   money-sums'
          "his frequent depositing of large sums of money"

According to the preceding discussion *Widersprechen* should then be analyzed as (85):

(85) [$_N$ [$_V$ wider⁀sprech] [$_N$ en]]

One may hesitate here, however. The form of this nominal infinitive is without exception identical to that of the verbal infinitive, especially with the irregular (in that the regular *-e-* is missing) infinitives *sein* 'be' and *tun* 'do'. This doubt is less than decisive, but I wish to take it seriously because it appears to be of heuristic interest.

We have already seen in (82b) that an infinitive can show simultaneously verbal and nominal features. The nominal features can be increased step by step along a certain hierarchy, cf. (86):

(86) a. das häufige Kleine-Katzen-Streicheln
          'the frequent small cats pet'
          "the frequent petting of small cats"
      b. * das Oft-Streicheln   kleiner Katzen
          'the often pet   [of] small   cats'
      c. das häufige Streicheln   kleiner Katzen
          'the frequent pet   [of] small   cats'
          "the frequent petting of small cats"

The accusative object can only be replaced by a genitive when adverbial expressions are given adjectival form.[16c] The transition from (82a) via (86a) to (86c) suggests that in (84b) as well as in (86c) and (83) we have a verbal infinitive just as in (82a).

Several observations support this assumption. Verbs that obligatorily take a reflexive lose the reflexive when nominalized, cf. (87) vs. (88):

(87) a. Karl weigert sich,   das zu tun
          'Karl refuses himself that to do'

          "Karl refuses to do that"

      b. Karl bewirbt sich   um   den Posten
          'Karl applies himself around the post'

          "Karl applies for the job"

      c. Karl strengt sich   an, das zu schaffen
          'Karl strains himself at   that to accomplish'

          "Karl makes every effort to accomplish that"

      d. Karl verabredet sich   mit Heinz
          'Karl agrees   himself with Heinz'

          "Karl makes an appointment with Heinz"

[16c]Replacement of the accusative by the (postnominal) genitive is also blocked by a dative:

   (i)   dein ewiges Den-Kindern-süße-Bonbons-Schenken
          'your eternal [to]-the-children-sweet-candies-give'

          "your continual giving the children sweet candies"

   (ii)   *dein ewiges Den-Kindern-Schenken   süßer Bonbons
          'your eternal [to]-the-children-give   [of] sweet candies'

   (iii) dein ewiges Schenken   süßer Bonbons
          'your eternal give   [of] sweet candies'

          "your continual giving of sweet candies (to s.o.)"

 Prepositional phrases expressing a goal, however, do not block such a replacement:

   (iv)   dein Den-Ball-in-die-Ecke-Werfen
          'your the-ball-in-the-corner-throw'

          "your throwing the ball into the corner"

   (v)   dein In-die-Ecke-Werfen   des Balls
          'your in-the-corner-throw [of] the ball'

          "your throwing of the ball into the corner"

(88)   a.   Karls   Weigerung (das zu tun)
           'Karl-*s* refuse-ing (that to do)'
           "Karl's refusal (to do that)"

       b.   Karls   Bewerbung (um   den Posten)
           'Karl-*s* apply-ing   (around the post)'
           "Karl's application (for the job)"

       c.   Karls   Anstrengung (das zu schaffen)
           'Karl-*s* at-strain-ing (that to accomplish)'
           "Karl's efforts (to accomplish that)"

       d.   Karls   Verabredung (mit   Heinz)
           'Karl-*s* agree-ing   (with Heinz)'
           "Karl's appointment (with Heinz)"

With the nonlexicalized 'nominal infinitive' in (89), on the other hand, some element corresponding to the reflexive must appear, i.e., a reflexive accusative, not a genitive:

(89)   a.   Karls   *(Sich-)Weigern
           'Karl-*s* (himself-)refuse'
           "Karl's refusing"

       b.   Karls   *(Sich-)Bewerben
           'Karl-*s* (himself-)apply'
           "Karl's applying"

       c.   Karls   *(Sich-)Anstrengen
           'Karl-*s* (himself-)at-strain'
           "Karl's making efforts"

       d.   Karls   *(Sich-)Verabreden
           'Karl-*s* (himself-)agree'
           "Karl's making an appointment"

Furthermore, nonlexicalized 'nominal infinitives' appear in general to resist compounding. Hence we find the compounds in (90), but no analogous formations as in (91); those in (92) are to be understood as verbal constructions:[16d]

[16d]This is to be expected since in general verbs that are not (part of) the determinans of a complex word do not serve as the determinatum of a compound; cf. note 15b.

(90) a. Bischofsverfolgung
          'bishop-*s*-pursue-ing'
          "pursuit of bishops"

      b. Fischfang
          'fish-catch'
          "catching of fish"

      c. Tierbeobachtung
          'animal-observe-ing'
          "observation of animals"

      d. Schuhreparatur
          'shoe-repair'
          "repair of shoes"

(91) a. * das Bischofsverfolgen
            'the bishop-*s*-pursue'

      b. * das Fischfangen
            'the fish-catch'

      c. * das Tierbeobachten
            'the animal-observe'

      d. * das Schuhreparieren
            'the shoe-repair'

(92) a. das Bischöfe-Verfolgen
          'the bishops pursue'
          "(the) pursuing bishops"

      b. das Fische-Fangen
          'the fishes catch'
          "(the) catching fishes"

      c. das Tiere-Beobachten
          'the animals observe'
          "(the) observing animals"

      d. das Schuhe-Reparieren
          'the shoes repair'
          "(the) repairing shoes"

While some speakers find the distinction between (91) and (92) somewhat subtle, the verbal character of (non-lexicalized) infinitives comes out very clearly when the first component of the secondary word cannot be interpreted as an object of the verb:

(i)   Herbstsäuberung (der   Kasernen)   * Herbstsäubern
      'autumn-clean-ing ([of]the barracks)'   'autumn-clean'
      "cleaning (of the barracks) in autumn"

(ii) Stallfütterung   * Stallfüttern
      'stable-feed-ing'   'stable-feed'
      "stall-feeding"

(iii) (die)   Kinderarbeit   * (das)   Kinderarbeiten
      'the $_{fem.}$ child-*er*-work'   '(the $_{neut.}$) child-*er*-work'
      "(the) child labour"

(iv) Dauerverfolgung   * Dauerverfolgen
      'duration-pursue-ing'   'duration-pursue'
      "continuous pursuit"

(v)   Sonderbeobachtung   * Sonderbeobachten
      special-watch-ing'   'special-watch'
      "special observation"

I suggest generating all nonlexicalized nominal infinitives by means of a rule like (93):

(93) $N^k \rightarrow \dots V^n \dots$

It will have to be left to future studies to determine the value of k (possibly variable $0 \leq k \leq m$, where m is the maximal bar level of a projection) and whether n is constant. At any rate, $n > 0$ so that VK will be dominated by V^n. Nominal infinitives like (94) which contain a dependent verb are a natural outcome of this rule:

(94)   a.   das erwünschte Kritisiertwerden
              'the desirable   criticized-become'
              "the desirable condition of being criticized"

        b.   das bedauerliche Aufhörenmüssen
              'the regrettable   on-hear-must'
              "the regrettable necessity to stop (here)"

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