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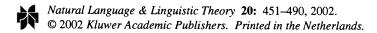
RESTRICTING SUFFIX COMBINATIONS IN GERMAN AND ENGLISH: CLOSING SUFFIXES AND THE MONOSUFFIX CONSTRAINT*

ABSTRACT. In both German and English many fewer combinations of derivational suffixes exist than should be possible, given the types of selectional restrictions that have been posited in the existing literature. For each language we found a pervasive restriction that is responsible for the missing combinations: German has closing suffixes, which individually prevent further suffixation. English allows only one Germanic suffix per word. In both languages the restriction holds for inflection and for clitics as well. For German, we also found that all closing suffixes are followed by linking elements in compounds, and that this constitutes the major productive use of linking elements. For English, we also found that Latinate suffixes are much more susceptible to combination, so that the Germanic and Latinate suffixes follow complementary patterns. Our findings for English show that the often-repeated observation that English inflectional morphology is simpler than that of related languages extends to derivation as well.

1. THE PROBLEM

Within most views of morphology, the attachment of a particular affix to a particular base is sensitive to syntactic, semantic, morphological, and phonological information in the base, usually called selectional restrictions. A well-worn example is the attachment of the adjectival prefix *un-* in English, as discussed in Aronoff (1976, p. 63). This prefix forms adjectives from adjectives, which is syntactic information. Because *un-* forms contrary negatives, it will attach only to adjectives that have contraries: **unnaval* and **unpregnant*. For both of these bases, though, the prefix *non-* is acceptable (*nonnaval*, *nonpregnant*), because it forms contradictory rather than contrary negatives. Thus, these two prefixes are sensitive to

semantic information. To our knowledge, there are no phonological re-
strictions on *un-*, but other examples are common. Morphologically, *un-* is
described in Aronoff (1976) as attaching most productively to past and
present participles and somewhat less productively to words ending in
certain other suffixes.

Within the theory of Aronoff (1976), there are no negative selec-
tional restrictions in morphology and so we expect a particular affix
to be able to attach, in principle, to any base that meets its syntactic,
semantic, and phonological conditions, regardless of the morphological
complexity of the base. Within such a theory, morphologically complex
words with morphologically complex bases like *compart-ment-al-iz-ation*
or *un-class-ifi-abil-ity* should be the norm in most languages.

In this paper, we will discuss two quite closely related languages,
English and German, showing that neither one conforms to this theoret-
ically expected pattern and that suffixation is restricted by morphological
complexity in both languages in ways that have not been remarked on in
previous literature. We will show, though, that the two languages are quite
different. In English there is a pervasive tendency, found both in inflection
and in derivation with Germanic suffixes, for a word to have no more than
one suffix. We will call this the MONOSUFFIX CONSTRAINT. In German,
there is no monosuffix constraint; however, there are suffixes, both de-
rivational and inflectional, which close the word that they end to further
suffixation. We will call these CLOSING SUFFIXES. In neither case, though,
do we find any need for negative restrictions on individual word-forming
suffixes.

Here are two simple derivational examples, one from each language.
Neither **dressingless* nor **Prüflingin* 'female examinee' is an existing or
possible word, although they should both be possible according to the
selectional restrictions of the affixes *-less* and *-in*. Both are phonologic-
ally and prosodically fine. *-less* forms adjectives from nouns, and *dressing*
is a noun, so **dressingless* should be acceptable. The putative meaning
of the word is also clear and reasonable: a salad without dressing is a
*dressingless salad. So we know of no reason for the unacceptability of this
word beyond the fact that it ends in two native suffixes. The nonexistence
of **Prüflingin* is similarly surprising: *-ling* is a personal suffix: *Prüf-er*
'examiner', *Prüf-ling* 'examinee' (i.e., 'one who is being tested'). Nouns
that take the suffix *-ling* are always masculine. Theoretically then, this base
should also be able to take the feminine suffix *-in*; words like *Lehrerin*
'female teacher' and *Wissenschaftlerin* 'female scientist' are perfectly ac-
ceptable and common. Nonetheless, **Prüflingin* and any other word of the
form **Xlingin* is impossible.

2. THE COMBINATION OF SUFFIXES IN THE LITERATURE

Within the morphological literature, there are two types of restrictions on the combination of suffixes, neither one of which can, in principle, address the type of phenomenon we are interested in. The best known type of restriction was made famous by lexical phonology and involves the segregation of affixes into classes. In English and German, all suffixes are said to belong either to class 1 or 2 and class 1 suffixes are said to always be internal to class 2 suffixes in the classic versions of lexical phonology. Regardless of whether this restriction is always true, it cannot deal with the examples at hand, because it deals with only one of three possible types of combinations, class 2 followed by class 1, and permits all instances of class 1 followed by class 2 or combinations of the same class. In the English case at hand, both -ing and -less are class 2 suffixes (neither one affects the stress of its base). Since lexical phonology does not have anything to say about the combination of two suffixes belonging to the same class, the ungrammaticality of *dressingless cannot be explained. Fabb (1988; see also Plag 1998) makes a similar observation in his discussion of how to encode restrictions on suffix combinations.

German -ling is a class 1 suffix according to Wiese (1996, p. 120). Wiese does not discuss -in but it seems clear that this is a class 2 suffix. The ungrammaticality of *Prüflingin cannot be explained, since the known class 1 suffix is the first. So the ungrammaticality of both of these cases has nothing to do with lexical phonology.

The other type of restriction is usually expressed in positive rather than negative terms, but it has to do with individual affixes, rather than with classes of affixes. So, Baayen and Renouf (1996) have shown in their study of hapax legomena in the London Times that -ness attaches most productively to monomorphemic adjectives and adjectives ending in -y (crabbiness, nerdiness, twittiness, etc.). In the same study, they show that -ity attaches most productively to adjectives ending in -able.

What both of these types of restrictions have in common and the reason that they do not help us with the cases at hand is that they deal with particular combinations, either of individual affixes or of affix types. The generalizations we are concerned with do not have anything to do with particular combinations, but rather with all combinations: certain suffixes in German prevent all further derivation (and not just some); English allows only one Germanic derivational suffix (with the exception of -ness, which combines freely), so we are not concerned with the ordering of two individual suffixes, but the general fact that there are almost no combinations of Germanic suffixes.

Fabb (1988), in his criticism of the morphological basis of level order-
ing in lexical phonology, shows that no class ordering is needed in English
because suffix combination is restricted only by selectional restrictions.
Fabb mentions two types of selection. The first is the base's word class,
which is a well-known factor. The second is the actual morphology of
the base, and here Fabb notes not only that certain English suffixes at-
tach only to words ending in other specific suffixes, but also (something
which before Fabb is only mentioned for individual suffixes and then only
in passing), that many English suffixes take only simple bases. Fleischer
(1982), for example, noted that the German suffix -*ig* attaches only to
non-suffixed bases. Although Fabb treats his observation as a well-known
fact, he was actually the first to note how widespread the restriction is for
English. Of the forty-three English suffixes that Fabb identifies, he lists
twenty-eight as "suffixes which never attach to an already-suffixed word"
(p. 532). But the main focus of Fabb's article is not this pervasive general-
ization about English. Rather it is the consequences for lexical phonology
of the actual suffix combinations that do occur. In our article, we will look
in more detail at the restriction that Fabb first identified, showing (on the
basis of a systematic analysis of a much larger data set) that there is much
more to it than simply listing those English suffixes that do not attach to
already-suffixed words, and also that the distinction between these suffixes
and those that do attach to already suffixed words is rooted in a basic
dimension of English morphology: the Germanic/Latinate dichotomy.

3. GERMAN CLOSING SUFFIXES

We will begin with the German case. In order to be able to talk about
the combinations under investigation, we will introduce some simple ter-
minology. The first suffix in any combination, the one that ends the word
to which another suffix is supposed to be added, we will call the BASE
SUFFIX. The second suffix, the one that actually forms the candidate word,
we will call the WORD-FORMING SUFFIX. The stems of German lexical
categories have a paradigm of three stem form cells, the INFLECTION
STEM FORM, the DERIVATION STEM FORM, and the COMPOUNDING
STEM FORM. The inflection stem form is the default and most lexical items
have only this single form, which normally fills the other cells as well. But
for a fairly large number of lexemes, especially nouns, one of the other
cells is filled by a distinct form. So, the compounding stem form, when
it is distinct, often contains a LINKING ELEMENT, which we will discuss
in detail in section 3.1. Some nouns have a special derivation stem form,
that may differ from the inflection stem form by, for example, an inter-

TABLE I

*tisch*stem paradigm 'table' (single stem)

Inflection stem form	*tisch*	like in *Tisch-e* 'tables'
Derivation stem form	*tisch*	like in *Tisch-lein* 'small tables'
Compounding stem form	*tisch*	like in *Tisch-tuch* 'tablecloth'

TABLE II

*blume*stem paradigm 'flower' (three stems)

Inflection stem form	*blume*	like in *Blume-n* 'flowers'
Derivation stem form	*blum*	like in *blum-ig* 'flowery'
Compounding stem form	*blumen*	like in *Blumen-wiese* 'flower meadow'

fix: *name* 'name', in *namentlich* 'namely' or *amerikan-* in *amerikanisch*, *Amerikaner*. For a smaller number of nouns, three forms must be listed. These nouns are analogous to English verbs with three distinct listed forms (*see, saw, seen*), which show that the past tense and past participle must be distinct, even though they fall together in the vast majority of cases. Sample nouns are given in Tables I–IV. While stem paradigms will not be central to our initial discussion, they will become more important in section 3.2f.

Using this terminology we can define closing suffixes as base suffixes that prevent further suffixation by word-forming suffixes. It is important to emphasize that in this work we are not interested in existing words, but rather in potential but non-existing words, gaps in paradigms, suffix combinations that are expected on other grounds, but that do not exist. We cannot use a paper dictionary in a straightforward way, because the suffix we are interested in, the possible closing suffix, is not the last suffix, but rather the second-to-last. In a paper version of a reverse dictionary only words with the same last suffix stand together and not the suffix before last (so **Prüflingchen* and **Prüflingin*, if they existed, would be found in different places in the dictionary). This means that we cannot

TABLE III

*amerika*stem paradigm (two stems, (one for derivation)

Inflection stem form	*amerika*	like in *Amerika-s* 'america's'
Derivation stem form	*amerikan*	like in *Amerikan-er* 'american' (person)
Compounding stem form	*amerika*	like in *Amerika-haus* 'America House'

TABLE IV

amt^{stem paradigm} 'office, district' (two stems, one for composition)

Inflection stem form	amt	like in *Amt-es* 'office, genitive'
Derivation stem form	amt	like in *amt-lich* 'official'
Compounding stem form	amts	like in *Amts-richter* 'district judge'

proceed directly, but must rather list every suffix that does occur word-finally, and compare the actually attested combinations of those suffixes with their possible combinations. If we find a number of word-forming suffixes that do occur finally but that are not preceded by a particular base suffix, even though we expect this combination to occur on syntactic and semantic grounds, then the base suffix in question is a candidate for being a closing suffix.

In looking for potential closing suffixes, we proceed as follows:

1. The first step is to look at all word-forming suffixes and, for every one, to list which base suffixes it can attach to.
2. Is there any expected base suffix to which a given word-forming suffix does not attach? For example, if we are dealing with a de-adjectival nominal word-forming suffix like -*keit*, does it attach to all adjectival base suffixes?
3. In the simplest case, we will find that a given word-forming suffix does not attach to any base suffix at all. So, looking at all German words ending in the adjectival suffix -*ig*, we find that the word-forming suffix -*ig* attaches to nouns, but never to nouns with a base suffix. This is the type of case that Fabb first identified for English.
4. If a word-forming suffix attaches to some morphologically complex bases, but not to bases ending in a particular base suffix, then we first have to see if that gap is due to some other factor besides the base suffix in question. There may be another allomorph of this particular word-forming suffix or another word-forming suffix with the same function that attaches to stems ending in the suspect base suffix, so that the combination we are interested in is blocked. For example, English words of the form *Xableness* are very few in number, because words of the form *Xable* serve as bases for the rival word-forming suffix -*ity* instead of -*ness*. Or there may be a prosodic or semantic explanation. If any of these proves to be true, then we expect the combination not to occur for reasons that have nothing to do with closing suffixes.
5. If we find no rival word-forming suffix and no prosodic or semantic explanations for the gap, then we 'expect' the base suffix to occur with

the word-forming suffix, and so the base suffix becomes a suspected closing suffix.

Consider again the example of the German base suffix -*ling*. The word-forming suffix -*in* attaches to personal nouns to form female personal nouns. Step 1: We look in a reverse dictionary at all nouns ending in -*in* and we find that this suffix attaches to morphologically complex bases: *Lehrerin* 'female teacher', *Linguistin* 'female linguist', *Wissenschaftlerin* 'female scientist'. Step 2: Since -*ling* forms personal nouns, we expect to find words of the form **Xlingin*, but we do not. Step 3: This step does not apply, because we do find morphologically complex bases. Step 4: There are no other word-forming suffixes with the same function as -*in* that attach to base nouns of the form *Xling*. Step 5: Nor do we find any prosodic or semantic reasons for the unacceptability of **Xlingin*. We therefore expect -*ling* to be a base suffix for -*in*.

One missing suffix combination is not enough, since we do not know which suffix is responsible for the absence of the combination. If **Xlingin* is not found, perhaps this gap in the paradigm is a property of the word-forming suffix -*in*, that it does not attach to bases of the form **Xling*. But if we find two or more missing combinations whose first members are identical, then it is methodologically more reasonable to unite them as a class under the base suffix, which we call a closing suffix. This is just what we find with *Xling*, since not only **Xlingin* but also **Xlingchen* is missing but expected. -*ling* is therefore a suspected closing suffix.

For the second part of the investigation, we gather together our suspected closing suffixes and see whether they fail to occur with a number of suffixes. So we start the other way round.

6. We look at each base suffix and list all word-forming suffixes which in theory should attach to it, which we call the set of all EXPECTED SUFFIXES.

7. For each base suffix, we list the word-forming suffixes that attach to it (which we call the FOUND SUFFIXES) and also the word-forming suffixes that are EXPECTED BUT NOT FOUND.

8. If, for a given base suffix, the column with the found word-forming suffixes is empty and the column with expected but not found suffixes is not empty, the suffix is a closing suffix.

Table V is the result of applying Steps 1 through 5 of our procedure. It contains all the reasonably transparent native word-forming suffixes of Modern German. (The list is based on Fleischer (1982) and Eisenberg (1998).) The occurring words on which the table is based come from

Theissen et al. (1992). The first column lists all the word-forming suffixes. The second column gives the word class (noun, verb, or adjective) of the words formed by means of each suffix. The third column lists the word class of the base, with some simple additional syntactic or semantic information in a few cases (such as personal nouns or transitive verbs). The fourth column lists the base suffixes that actually occur with each word-forming suffix. The fifth and most important column lists the base suffixes that do not occur with each word-forming suffix, even though these suffixes are otherwise expected.

Table V reveals that there are only three word-forming suffixes that take no complex bases, although for each of them at least one base suffix was expected: $-e_{\text{suff}}$, $-ig$ and de-adjectival $-ling$. De-adjectival $-ling$ is hardly productive in contemporary German ($-ling$ seems to be used more for de-verbal nouns). So at most three suffixes in German are restricted to simple bases – this does not look like an important restriction in German.

Table VI is the result of Steps 6 through 8. It is derived from Table V, but organized according to base suffixes rather than word-forming suffixes. The first column contains all the base suffixes found in Table V. The second column contains the word-forming suffixes that attach to words ending in each base suffix. The third column contains the word-forming suffixes which are not found with each base suffix, though they are expected for that base suffix and cannot be excluded on phonological or semantic grounds. We have put brackets around the three suffixes that do not appear to occur with any base suffixes: $-e_{\text{suff}}$, $-ig$ and de-adjectival $-ling$.

TABLE V
Word-forming suffixes and their complex bases

Word-forming suffix	Resultant word class	Type of the base	Expected suffixes	
			Base suffixes found with this word-forming suffix	Expected but not found base suffixes
-bar	A	Transitive verbs	-er(n), -ier(en), -isier(en)	
-chen	N	Concrete nouns	-er, -e_Pers, (-ler),[1] (-lein)	-ling, -in
-ei, -erei	N	V	-el(n), -er(n), -ier(en), -isier(en)	
-er	N	V	-ier(en), -isier(en), -el(n), -er(n)	
-e_suff[2]	N	V		-ier(en),[3] -isier(en)
-haft	A	N, person terms, compounding stem	-er, -lings, -en	-ler?[4]
-heit	N	A	Part.perf.	
-keit	N	Complex adjectives	-bar, -ig, -lich, -sam	-isch
-igkeit			-los, -haft	
-ier(en)	V	Stems[5]		
-ig	A	V		-ier, -isier, -el, -er
-in	N	N, person terms	-er, -ler, -ist, -e_Pers[6]	-ling[7]
-isch	A	N, person terms	(-ler), (-er), -e_Pers	-ling
-isier(en)	V		Latinate adjectival suffixes	
-lein	N	N, person terms	-er	-ler, -ling, -in
-ler	N	N (except person terms), initialisms	(-schaft), (-tum)	-heit/ -keit/ -igkeit, -ung, -e_suff
-lich	A	Abstract nouns	-schaft, (-tum)	-heit[8]/ -keit/ -igkeit, -ung, -e_suff
-ling	N	V		-ier(en)?, -isier(en)?
		A	–	-bar, -ig, -lich, -sam, -los, -haft, -isch, -ern, Part.perf.
-los	A	N, compounding stem	-er, -ungs	[9]-ler
-schaft	N	N, person terms, compounding stem	-er, -ler, -e_Pers n, -innen,	-ling?
-tum	N	N, person terms, compounding stem	-er, -e_Pers n, -isten	-ler, -ling?, -in
-ung	N	V	-ier(en), -isier(en), -er(n)	

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[1] The parentheses mean that there are some words with the combination in question, but not many.

[2] We distinguish between the true suffix -e and the ending -e, which is not a word-forming suffix. We will discuss this distinction in more detail in section 3.1.

[3] Schwa normally follows a stressed syllable, so unstressed verbal suffixes like -el(n) are excluded.

[4] The question mark in this column means that we did not find any formations with this suffix combination but they do not seem to us and to other speakers as bad as other non-occurring suffix combinations.

[5] Because this suffix attaches only to nonlexical stems, we do not expect its base to end in a suffix, which is why the remaining cells in this row are empty (Fuhrhop 1998).

[6] -e_pers is a class-forming ending for personal terms, but it is not a word-forming suffix in these cases.

[7] Doleschal (1992, p. 27) also includes -erich, which can be excluded for semantic reasons: -erich builds male terms from female ones, so the suffixation of female-denoting -in to this suffix is semantically useless, because the original base already denotes the female: *Gans – Gänserich – *Gänserichin* 'goose – male goose – female male goose'.

[8] There are seven words with -heit-lich in German, but a few hundred *heit*-words from which no further derivation is allowed.

[9] Because -los as a suffix is close to the former word -los it is difficult to describe the expected bases.

TABLE VI

Which base suffix allows which word-forming suffix?

Base suffix	Occurring word-forming suffix	Expected but not found word-forming suffixes
-bar	-keit	[-ling]
-chen		
-ei/ -erei		
-el(n)	-ei, -er	[-ig]
-e$_{Pers}$	-schaft (cstf), -tum (cstf), -haft (cstf), without schwa: -in, -isch, (-chen)	
-e$_{Suff}$		-lich, -ler
-er	-schaft, -tum, -chen, -lein, -isch, -in, -haft, -los	
-er(n)	-ung, -ei, -bar, -er	[-ig]
-haft	-igkeit	[-ling]
-heit	(-lich)[10]	-lich
-igkeit		-lich
-keit		-lich
-ier(en)	-ung, -bar, -er, -ei	[-ig], [-e$_{Suff}$], -ling?[11]
-ig	-keit	[-ling]
-in	-schaft (cstf)	-chen, -tum, -lein
-isch		-keit, [-ling]
-isier(en)[12]	-erei, -ung, -er, -ei, -bar	[-ig], [-e$_{Suff}$], -ling?
-lein	(-chen)	
-ler	-schaft, -in, (-isch), (-chen)	-tum, -lein, -haft?, -los
-lich	-keit	[-ling]
-ling	-haft (cstf)	-tum, -chen, -isch, -in, -schaft,-isch, -lein
-los	-igkeit	[-ling]
-nis		
-sam	-keit	[-ling]
-schaft	-lich, (-ler)	
-t, -et, -(e)n (PartPerf)	-heit	[-ling]
-tum	(-lich), (-ler)	
-ung	-los (cstf)	-lich

With Table VI we can now name closing suffixes (in boldface in the table). If the column with occurring word-forming suffixes is empty and the column with non-occurring but expected word-forming suffixes is not empty, the base suffix is a closing suffix. For -chen, -ei/-erei, -e$_{Suff}$, (-heit), -igkeit, -isch, -keit, and -lein the column with occurring word-forming suffixes is empty. We now turn to the last column to identify the closing suffixes. The suffixes -chen, -ei/-erei, -lein cannot function as base suffixes but they cannot be called closing suffixes with certainty, because no expected word-forming suffix can be found for these suffixes. The other base

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[10] There are seven words ending in -heitlich but compared to a few hundred heit-words, the seven words seem to be negligible.

[11] This -ling is the deverbal version and not the de-adjectival version which is hardly productive and restricted to simple bases; therefore the brackets are missing on this -ling.

[12] -isier(en) is a non-native suffix but it combines quite well with native suffixes, so we investigated it as well.

suffixes have expected but non-occurring word-forming suffixes, so -e_{Suff}, -*heit*, -*igkeit*, -*isch*, and -*keit* are closing suffixes.

In addition to these suffixes, we find two base suffixes that occur as compounding stem forms and each only with a single word-forming suffix that itself *demands* a compounding stem form with linking -*s*: the base suffix -*ling(s)* combines only with word-forming -*haft*, the base suffix -*ung(s)* only with word-forming -*los*. Also -*in* as a base suffix is only possible in its compounding stem form (-*innen*). If we exclude word-forming suffixes that demand a compounding stem (a topic that we will return to below) we can say that the three base suffixes -*in*, -*ling*, and -*ung* fall into the set of suffixes for which the column with occurring word-forming suffixes is empty and we may include them among the possible closing suffixes. -*in*, -*ling*, and -*ung* can be followed by a suffix only if they are 'opened up' by the linking element, a point that we will return to once we have discussed the linking element in more detail.

The full set of closing suffixes is -e_{Suff}, -*heit*/ -*keit*/ -*igkeit*, -*in*, -*isch*, -*ling*, and -*ung*.

3.1. *German Linking Elements*

We have just indicated a connection between closing suffixes and linking elements. Therefore we have to show the systematic nature of productive linking elements (following Fuhrhop 1998, pp. 187–220). We want to confine our discussion to pure linking elements – those that have a function which is independent from the inflectional system and which are also productive. Functionally independent means, for example, a plural form without a plural meaning in the compound (in the compound *Hurensohn*, 'whoreson', the referent can have only one mother; the nominative singular is *Hure* and although *Huren* looks like a plural form, functionally it is not plural). [13] We exclude plural linking elements with plural meaning (e.g., *Ärztepraxis* 'doctors' office' as opposed to *Arztpraxis* 'doctor's office'). We also exclude lexicalised compounding stems like *Gottes-*, the genitive of *Gott*, which serves as the compounding stem form of this word, as in *Gott-es-dienst* 'church service'.

The productive, independent linking elements are as follows (with examples in Table VII):

- -*s*- after a set of six suffixes: -*heit*, -*igkeit*, -*keit*, -*ling*, -*schaft*, and -*ung*.[14]

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[13] Historically, it was a genitive singular form.

[14] We exclude the Latinate suffixes, since they are less integrated in German, are morphologically and phonologically district, and have never been productive (Fuhrhop 1998).

- *-n-* with nouns ending in schwa
- *-(e)n-* for weak masculines and after the suffix *-in*

With the exception of *-schaft* and the weak masculines, the forms that are followed by productive linking elements comprise a subset of the closing suffixes. The only member of the set of closing suffixes that does not take a productive linking element is *-isch*, but since this suffix forms adjectives, it does not normally occur as the first member of compounds and so could not, in principle, be followed by a linking element.[15] We conclude that *closing suffixes are followed by a linking element*, as shown in Table VII. Most of the suffixes that take linking elements are feminine and abstract.

TABLE VII

Connection between closing suffixes and linking elements

Closing suffix	Takes the following linking element in compounds
-heit (*schönheitlich*)	*-heit-s-*(*Schönheit-s-pflästerchen* 'beauty-patch')
-igkeit (*schnelligkeitlich*)	*-igkeit-s-*(*Schnelligkeit-s-messer* 'speedometer')
-keit (*tapferkeitlich*)	*-keit-s-*(*Tapferkeit-s-medaille* 'bravery medal')
-ling (*Prüflingin*)	*-ling-s-*(*Prüfling-s-angst* 'examinee's fear')
-ung (*versicherunglich*)	*-ung-s-*(*Versicherung-s-vertreter* 'insurance salesman')
-e (*erntelich*)	– (*Ernte-helfer*, but the unmarked case is *-n* like in *Blumenvase*)
-in (*Lehrerinchen*)	*-innen-* (*Lehrerinn-en-zimmer* 'room for female teacher(s)')
-isch (*Neidischheit*)	*-isch* deletes (*Solidar-gemeinschaft* 'solidarity community')
-schaft (not a closing suffix, but takes a linking element)	*-schaft-s-*(*Wissenschaft-s-förderung* 'the promotion of science')

Most nouns ending in schwa appear in the compound with a syllabic [*n*] instead of schwa. In the writing system an *-n-* is added, which is why we call this linking element *-n-*. Examples are given in (1):

(1)   *Blume-n=wiese* 'flower meadow', *Biene-n=honig* 'bee honey', *Hure-n=sohn* 'whore's son', *Silbe-n=phonologie* 'syllable phonology', *Wiese-n=blume* 'meadow flower' ...

A less common possibility is to delete the schwa, in which case the compounding stem form has one syllable less than the inflection stem form, as

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[15] True suffixed adjectives do not occur as the first element of a compound (Fleischer 1982, p. 84). Instead, the suffix normally deletes: *Solidarischgemeinschaft*, but *Solidarge-meinschaft* 'solidarity community'; *Künstlichhonig*, but *Kunsthonig* 'artificial honey' not '*art honey'. Curiously, whenever the first element of a compound is not a free word of any category, but rather the stem of a word, then it is the stem of an *-isch* adjective. So, in the examples given, *solidar-* is not a word, *kunst* is, and *solidar-* is the stem of an adjective in *-isch*.

in (2). Schwa thus parallels -*isch*, which is discussed in footnote 14. The deletion of schwa is the older way of forming the compounding stem form. So for some stems there may be two possibilities, although it is a lexical property of the noun whether the schwa is deleted or the -*n*- is added or whether two possibilities are allowed. For example, the lexeme *kirsche* can form *kirsch* and *kirschen*; *silbe* can only form *silben* and never *silb* in compounds.

(2)   *Himbeere – Himbeermarmelade* 'raspberry jam'; *Kirsche – Kirsch=kuchen* 'cherry cake'; *Schule – Schul=bus* 'schoolbus'; *Sprache – Sprach=Wissenschaft* 'language science'.

If the base of final schwa occurs as a lexeme without the schwa, then we say that schwa is a suffix in the strict sense rather than what we will call an ENDING. Schwa is an ending if, when we remove the schwa, what remains is not a lexeme otherwise. So, for example, when we remove the schwa from *Blume* or *Kirsche*, we are left with *Blum* or *Kirsch*, neither of which is a lexeme otherwise. Therefore the schwa in *Blume* and *Kirsche* is an ending and not a suffix. If final schwa is a suffix, rather than an ending, then the compounding stem retains the schwa and does not taking the linking -*n*-. In other words, there is no distinct compounding stem for words where final schwa is a suffix. Examples are given in (3) and (4). In (3) the bases are verbs, in (4) the bases are adjectives.

(3)   *Ernt-e=helfer* 'harvest helper'; *Folg-e=schäden* 'consequent damages'; *Pfleg-e=eltern* 'foster-parents'; *Pust-e=rohr* 'blowpipe'; *Red-e=freiheit* 'freedom of speech'; *Reis-e=kosten* 'travelling-expenses'

(4)   *Frisch-e=behälter* 'freshness container'; *Güt-e=verhältnis* 'efficiency'; *Schwäch-e=Zustand* 'feeble condition'; *Schwül-e =opfer* 'victim of sultriness'; *Stärk-e=mehl* 'starch flour'.

Comparing the cases in (1) with those in (2)–(4), it seems legitimate to describe (1) as the default: Schwa can remain in the linking position only if it is a suffix; with specifically marked nouns (e.g., *Kirsche*) schwa deletes; in all other cases, the -*n*- is added. With lexicalization, sometimes the normal behavior can also be found in cases where schwa is (or was) a suffix: *Größe-n=wahnsinn* ('megalomania'). This is further evidence for the unmarked nature of the -*n*- as a linking element with nouns ending in schwa.

The linking elements -s- and -n- have an opposite distribution: -s- follows suffixes, -n- is used only if schwa is not a suffix. This may explain why schwa is a closing suffix. We assume at least two morphologically different schwas: one is an ending without a morphological function (as in words like *Blume*, where the stem *Blum-* cannot stand alone) and the other is a derivational suffix. If schwa is a suffix, further derivation is prevented, which means that it is a closing suffix. If schwa is only an ending, further derivation is possible, but in these cases schwa is always missing in the derived word: *Blume – blumig*. So we can find an explanation for closing schwa: if a word with this suffix underwent further derivation, the suffix would be deleted in the derived form, constituting unrecoverable deletion, which is disallowed on general grounds (Chomsky and Lasnik 1977).

3.2. Connection between Closing Suffixes, Linking Elements, and Compounding Suffixes

As mentioned before (section 3) the German closing suffixes are -e_Suff, -*heit*, -*igkeit*, -*in*, -*isch*, -*keit*, -*ling*, and -*ung*. All these suffixes are also responsible for special compounding stem forms (Table VII). So we can say all eligible closing suffixes have special compounding stem forms, but it cannot be said the other way round: there is one suffix, namely -*schaft*, that forms a compounding stem form with -*s* but is not a closing suffix. In addition, it is the only suffix which has both a compounding stem form (-*schaft-s-*) and chooses as a base a compounding stem form (*Jüngling-s-schaft* 'young men's society'). The surprising fact is then that it has a compounding stem form, since other suffixes that choose a compounding stem form are not closing suffixes and have no linking elements themselves.

All closing suffixes appear in a special compounding stem form; most of them with the linking element -*s*-. This connection can be described in the following way: Linking elements reopen closed stems again for further morphological processes.

So far, it looks as if the reopened closed stems can appear only as first members of compounds. In fact, they can also appear with word-forming suffixes, but only under special morphological circumstances. As noted above, a small number of word- forming suffixes choose the compounding stem form. We will call these COMPOUNDING SUFFIXES. These are -*haft*, -*los*, -*schaft*, and -*tum*. By this term, we mean that these suffixes act like the second member of a compound morphologically: they will be preceded by a linking element if the base has a special compounding stem. If the base does not have a special compounding stem, there will be no linking element. So *lehrerhaft* 'teacherlike' shows no linking element because *Lehrer*

has no special compounding stem, but *gotteshaft* 'godlike' is possible and **gotthaft* impossible, because, as noted above, *Gott* has the compounding stem *gottes-* and *-haft* is a compounding suffix.

Now it is clear why it is important if a suffix chooses the compounding stem form: further derivation of a word with a closing suffix is made possible by the reopening linking element. Therefore, compounding suffixes can attach to words ending in closing suffixes. Some examples follow:

(5)   *jüng-ling-s-haft* 'like a young man'; *schön-heit-s-los* 'beauty-less'; *Lehr-er-inn-en-schaft* 'community of female teachers'; *bedeut-ung-s-los* 'meaningless'; *Jüng-ling-s-tum* 'pride in being a young man'; *ernt-e(*n)-los* 'harvestless'.

These examples reveal clearly that the closing nature of the closing suffixes is not due to any syntactic or semantic factors, but is purely morphological. We cannot rule out phonological reasons completely, though it is difficult to imagine what such reasons would be. In the case of at least *-heit*, we do find seven words of the form *-heitlich*, which argues directly against a phonological solution. An additional problem for a purely phonological account is the fact that the schwa ending does not close a word, though the phonologically identical schwa suffix does.

The compounding suffixes are highly restricted: in principle these can only be suffixes developed from a word on its own (the so-called grammaticalized suffixes) because other suffixes do not take a compounding stem. And the grammaticalized suffixes that choose the compounding stem (*-haft*, *-los*, *-schaft*, and *-tum*) have at least the following phonological properties: a stressable vowel, and a consonantal onset and coda. The vowel is never the lax [I] that is very common in German derivational suffixes and which seems not to be stressable at all. This is not to say that a grammaticalized suffix must take a compounding stem. The suffixes *-lich* and *-heit*, for example, were once full words, but do not take a compounding stem. One may surmise that the process of grammaticalization is not yet complete in the case of *-haft*, *-los*, *-schaft*, and *-tum*.

At first glance it looks as if the special behavior of the compounding suffixes is restricted to closing base suffixes because closing suffixes are responsible for special compounding stem forms. When we introduced the linking elements we pointed out that we show only the systematic behavior of *productive* linking elements. Besides the closing suffixes, there are many nouns with lexicalized linking elements (or lexicalized compounding stems) in German and there is one other class of nouns that productively

shows special compounding stems, the weak masculines (6a).[16] This gives us two more possibilities to test the special behavior of the compounding suffixes, and as expected, we find the compounding stem before the compounding suffix with these two classes as well, but importantly, they do not show the compounding stem before other suffixes ((6b) with lexicalized first members):

(6)a.   *Bär-en-käfig* – *bär-en-haft* – *bär-ig* 'bear's cage – like a bear – beary'; *Student-en-leben* – *Student-en-schaft* – *student-isch* 'university life – the student body – student-like'

b.   *Vertrag-s-artikel* – *vertrag-s-los* – *vertrag-lich* 'article of contract – without a contract – contractual'; *Gott-es-furcht* – *gott-es-haft* - *gött-lich* 'fear of God – godlike – godly',

Therefore, word formation with a compounding stem does not occur only when a closing suffix combines with a compounding suffix, it is simply that the closing suffixes form the only productive class of potential stems (besides the weak masculines).

What makes a particular suffix a closing suffix? One possibility is that these suffixes close a word prosodically (Booij 1985; Wiese 1996). This would also explain why closing suffixes take linking elements: a word ending in a closing suffix is a closed phonological word and so can only combine by means of compounding. But it is difficult to see what it is about just these suffixes that causes them to close a word prosodically, rather than in some other way. Why are *-haft* or *-schaft* not closing suffixes? In the same vein, what does it mean to say that the word is closed prosodically? Is there some independent test for prosodic wordhood that just these closing suffixes meet? Additionally, we should be able to assimilate the compounding suffixes to the same account, perhaps by saying that these suffixes attach only to full prosodic words. But as we have just seen, these suffixes do not only attach to words ending in closing suffixes (cf. *lehrerhaft* above. Of course, one could say that in this case *Lehrer* is a prosodic word, but this would be purely stipulative). In short, it is possible that there is some connection between the closing suffixes and prosodic wordhood, but we are not convinced that prosody provides a full explanation. As we will show in section 4.4, prosodic factors also seem to be at work in English, but do not appear to be fully responsible for the phenomenon in question.

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[16] Weak masculines form the genitive singular and the plural forms with *-(e)n*. Most of the weak masculines end in schwa and behave like other nouns ending in schwa (e.g., *Blume*) in derivation and composition but not in inflection.

3.3. Closing Suffixes and Stem Paradigms

With the connection between closing suffixes and linking elements we can complete our discussion of the stem paradigm. For most nouns, there is no special form listed in the derivation stem cell of the paradigm and so the cell is filled by the inflection stem form, which is a default. For some nouns, the cell has its own form listed. What makes these closing suffixes special is that the cell in the paradigm where the derivation stem belongs *is missing*, and so the stem paradigm is defective. Because this cell is missing, further derivation is impossible. But there is a systematic connection between the compounding stem form and derivation stem cell: If the derivation stem cell is missing, which is our theoretical way of saying we have a closing suffix, then there is always a special compounding stem form. The word will be open to further derivation, but only with a compounding suffix, the type of suffix that selects the compounding stem cell. Functionally, for these closing suffixes, the compounding stem cell takes the place of the missing derivation stem cell. The language thus has a way of getting around the morphological defect of these suffixes, but not entirely: only those few suffixes that demand compounding stems can be used for further derivation.

TABLE VIII

Versicherungstem^{stem paradigm} 'insurance' (no derivation stem cell)

Inflection stem form	*versicherung*	like in *Versicherungen* 'insurances'
Compounding stem form	*versicherungs*	like in *Veersicherungsvertreter* 'insurance salesman', *versicherungslos* 'without insurance'

An astute reader might take the apparent complementarity of the derivation stem form/cell and the compounding stem form/cell as evidence that they are always reducible to a single category. But they are not always complementary: nouns with lexicalized linking elements may have distinct derivation and compounding stem forms: [17]

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[17] These linking elements are lexicalized and here they do not have the function of opening a closed stem. The fact that nouns with lexicalized linking elements allow further derivation without the linking element is no contradiction to our claim that the reopening is the normal function of linking elements. This reopening is a new function of the linking elements and they did not have this function originally – at the beginning they were simply conserved inflectional suffixes. At some point in the process of reanalysis they took on this new function, but only in productive cases, and the lexicalized stems have remained as a residue of the original system.

(7)   *Geschichte* 'history' - *geschicht-lich* 'historical' - *Geschicht-*
       s-buch 'historical work'; *Widerspruch* 'contradiction' -
       widersprüch-lich 'contradictory' - *Widerspruch-s-geist* 'contra-
       dictory attitude'.

Additionally, if we reduce the derivation and compounding stem forms to a
single category, then we cannot represent the fact that linking elements ap-
pear only in compounding stem forms and that, except with compounding
suffixes, the compounding stem form appears only in compounds.

3.4. *Connection with Inflection in German*

German nouns inflect for number and case. If a noun form has a number
suffix and also a case suffix, the case suffix is always the last, as can be
seen in dative plural forms like *Kind-er*$_{pl}$-*n*$_{dat}$ 'to children'. Certainly, not
every noun form has a case suffix but if it has one, the word form is closed:
no other suffix can follow. Commonly these suffixes are called terminal.
And the verbal inflection has terminal suffixes as well; these are the per-
son suffixes which normally also show the number like in *leg-te*$_{pret}$-*st*$_{2.ps\,sg}$
('laid'). It is apparent then, that German inflection has closing suffixes.
    By closing suffix we do not mean that this suffix is always the last
element in the word, only that it is the last suffix of its kind. So, a closing
derivational suffix like *-ling* cannot be followed by another derivational
suffix, but it can be followed by an inflectional suffix, indeed by more than
one: *Prüfling-e*$_{pl}$-*n*$_{dat}$ 'to examinees'. The unstressed direct object pronoun
es 'it' is a clitic, inasmuch as nothing can intervene between the verb and
the object pronoun. A closing inflectional suffix can be followed by a clitic
object, as in (8). If the clitic is part of the phonological word, as is normally
assumed, then the closing inflectional suffix is not word-final, but merely
inflection-final.

(8)   Du legtest (*gestern) es auf den Tisch
       You put (*yesterday) it on the table.

Within Bybee's (1985) order of inflectional suffixes a functional reason
can be found for terminal suffixes: They are the suffixes with the least
semantic and the most syntactic information – the syntactic information
is outermost and therefore easily detected by the syntax (Eisenberg 1998,
p. 211f.). Such an explanation cannot be found for closing derivational
suffixes yet, but perhaps it means something that German inflection as well
as German derivation have closing suffixes; a similar connection will be
found in English.

4. THE ENGLISH MONOSUFFIX CONSTRAINT

Having found closing suffixes in German, we decided to look for the same phenomenon in other languages. We turned to English, because the two languages are closely related but also generally felt to be quite different morphologically. We therefore repeated for English what we did with Tables V and Table VI for German. The first step is again to name all derivational suffixes and to indicate their obvious selectional restrictions. Our list is based on Bauer (1983), Fabb (1988), and Marchand (1969). This part of our investigation is close to Fabb (1988). But we go beyond Fabb in two points. One is that suffixes can also be sensitive to the Latinate/Germanic distinction (Aronoff 1976; Anshen et al. 1986). The term *Latinate* comes from Aronoff (1976) and is largely equivalent to Marchand's (1969) use of the term *Neo-Latin*, which he reserves for morphological patterns that originated in Latin or Greek and have come into English either through learned borrowings or through French. This term is etymological, but the etymological distinction is reflected in the modern language. The larger question of exactly how the etymological distinction is reflected in the synchronic grammar of a naïve speaker of English, who cannot be expected to know the origins of words, is an empirical question, only a small part of which we will answer here. Preliminary indications are that speakers use at least partly prosodic cues to distinguish Latinate from Germanic vocabulary and morphology (Anshen et al. 1986). The second addition is that we again take the categorial selection of the suffixes more seriously, which leads us to expect certain morphologically complex bases. As with German, we are looking for missing combinations.

For German, we did not do exact counts, because the patterns are clearer and because we are dealing with individual pairs of suffixes, rather than with a general property of the system. English has many more exceptions, which means that we must look at a larger data set and use numerical evidence. Luckily, we have a tool available for English, namely the *Oxford English Dictionary on CD-Rom*, which allows for such numerical manipulation of large sets of data. The results of our investigation of English, which incorporates nouns, are given in Tables IX and X. Table IX contains the word-forming suffixes that attach productively to Germanic bases.[18] Most of these suffixes are of Germanic origin, the exceptions being *-able*, *-ee*, and *-ess*. *-able* is unique among English suffixes in that it attaches to

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[18] We have excluded *-ing*. This suffix ambiguously forms either a participle or a gerund (both of which we take to be inflectional) or a derived nominal, which we take to be derivational. There is no way to distinguish the derived nominals in the OED except on a case-by-case basis (and each decision is a delicate task), and the OED lists 25,434 words ending in *-ing*. We do not list all words ending in *-ed* for a similar reason.

both Germanic and Latinate bases productively. *-able* itself is Latinate, since Latinate suffixes can attach to it (*-Xability*). By contrast, *-ee* and *-ess* have become Germanic, at least insofar as they do not allow further suffixation. Table X contains those word-forming suffixes which attach productively to Latinate bases (and also, in a few cases, to proper names). In Table IX (Germanic bases), we count only bases that are themselves truly suffixed. So, for example, we do not count every word ending in the orthographic sequence *-erdom*, but only words where the base of *-erdom* is a word (*bakerdom* but not *butcherdom*). In Table X we list the full count given by the OED, which may include non-suffixed bases, because it is much more difficult to decide with the Latinate vocabulary whether the bases are truly suffixed. If most of the bases are not truly suffixed, we placed an asterisk after the number. In these cases, the 'base suffix' is what we have called an ending in our discussion of German schwa: the base of the ending is not a word nor even a common stem. A simple example is *creator*, where *-ate* is an ending, because **cre* is not a word or a common stem. The same string may sometimes be a suffix and sometimes be an ending, as with German schwa. So, we would say that *-ate* is a suffix in the word *activate*, since *active* is a word. Similarly, *-ize* is a suffix in *idolize* but an ending in *tantalize*.

We are dealing with derivational morphology, where no constraint is absolute. So, although our constraint rules out *Xingless*, as we noted early on, we do find one word in *Walker's Rhyming Dictionary* (Walker 1936) of this form (*meaningless*) and six in the OED, but this is a very small number compared to the number of nouns ending in *-ing*. We also emphasize that the constraint is meant to be synchronic, applying to present-day English. The OED is panchronic, which is both an advantage and a disadvantage. We see the disadvantage when we look at words of the form *Xener*, of which we find thirty-two in the OED, the highest number of any Germanic suffix combination. But when we look at the actual dates of formation of these words, we find only one in the twentieth century (*safener*), three in the nineteenth, and many from the seventeenth. So from a synchronic point of view, the pattern is not productive. Frequency is also relevant, although the nature of the OED meant that we could not measure it systematically: exceptions tend to be either relatively high frequency words like *meaning-less* (with a frequency of 15 per million in Francis and Kucera (1982)) or very low frequency, sometimes nonce forms.

TABLE IX
Which **Germanic** bases are taken by which suffix?

Word-forming Suffix	Resultant Word-class	Type of the base	Base suffixes found with this word-forming suffix	Expected but not found base suffixes	number with base suffix /total number
-able	A	V	-en (1)		1/4192
-dom	N	N, Person	-er (8), -ess (3), -ee (1), -ing (2), -ist (2)		16/530
-ed	A	N	-ant (1)	All other nominal suffixes	
-ee	N, Person	V	-ize (5), -ate (8)	-ify, -en	13/2122
-en	V V	A N	-th[19]	-able, -ful, -ish, -some, -less, -ly	
-er	N, Person	V	-ify (117), -ize (355), -en (32), -ate (3)		507/21577 Germanic 32
-ess	N, Person	N, Person	-er (29) , -or (43)	-ee	72/1061 -ness, -less, Germ 29
-ful	A	N	-ance (1), -ed (2), -er (3), -ing (4), -th (3), -y (1), -dom (2)	-ness, -hood, -ship, -ling	16/1355 Germanic 15
-ful	A	V		-ify, -ize, -ate, -en	
-hood	N	N, Person	-ly (9), -y (5), -ed (1), -er (5), -ess (2), ing (2)	-ee	24/466 Germanic 24
-ish	A	N	-er (5), -y (4), -al (1), -ent (1)	-ness, -hood, -dom, -ship	11/2779 Germanic 9
-less	A	N	-ion (12 suffixed), -ing (6), -ism (1), -er (7), -ance (2), -th (8), -dom (3), -ess (1), y (1)	-ship, -hood, -ling, -ness	41/2172 Germanic 26
-less	A	V		-ate, -en, -ify, -ize	
-ling	N	N	-er (4)	-dom, -ess, -ee, -hood, -ing, -ism, -ist, -ness, -ship, -th	4/3235[20] Germanic 4
-ly	A	N, Person	-er (7)	-ee, -ess	
-ness	N	A	All adjectival suffixes		3312/8196
-ness		Adv		-ly	
-ship[21]	N	N, Person	-ee (1), -ian (1), -er (20), -or (9), -y (1), -ess (1)		33/1582 Germanic 24
-some	A	N (A,V)			0/456
-y	A	N	-ist (5), -ism (1), -th (1), -ess (2), -er (~30)	-dom, -hood, -ness, -ship, -ing, -ling, -ee	39/15466[22]
-y	N				Germanic 33
-y	A	V		-ate, -ize, -en	
-y	N				

TABLE X
Which **Latinate** bases are taken by which suffix?

Word-forming Suffix	Resultant Word-class	Type of the base	Base suffixes found with this word-forming suffix	Expected but not found base suffixes	number with base suffix/total number
-able	A	V	-ize (10), -ify (57), -ate (98)		165/4192
-acy	N	A [+lat]	Substitutes -ate		
-age	N	N [+lat], Pers	-or (38*), -er (5/106)	-ist	43/2034
-age	N	V [+lat]		(-en), -ify, ize, -ate	
-al	A	V [+lat]	-ify (1)	-ate, -ize	759/10745
-al	A	N [+lat]	-ation (257), -ion (347), -ment (120*), -ism (34)	-age, -ance, -ant, -ist, -ity	
-an	N	Names, [+lat]	-ic (164)		264/8176
-(i)an	A	Names, [+lat]	-al (100*)	-ive	
-ance	N	V [+lat]		-ify, -ate, -ize	0/1265
-ant	N	[+lat], Stem			2443
-ant	A	[+lat], Stem			
-ary	A	N, [+lat]	-ion (206), -ment (58*)		264/ 1690
-ate	V	[+lat]	-ic (404*), -ion (112*), -ive (21*), -or (202*)		739/7323
-ation	N	V, [+lat]	-ify [23](371), -ize (1070)		1441/5570
-ic	A	N, [+lat]	-ist (631), -ism (22), -an (201*), -or (174*)		1028/9288
-ify	V	N, [+lat]	-or (1), iv (1)	-age -an, -ance, -ant, -ion, -ism, -ist, -ment, -ity	5/590
-ify	V	A	-ish (1), -ly (2)	-al, -ic, -ive, -ary, -ous, -ory	
-ion	N	V, [+lat]	-ate (5570, may be -ation)	-ify, -ize	5570/8747
-ism	N	N, Names [+lat]	-ion (139)		1321/3953
-ism	N	A, [+lat]	-ive (51), -ic (208), -al (433), -an (485), -er (5 where -er is a suffix with a base)		
-ist	N, Person	N, [+lat]	-ion (359), -ment (8*)		1070/4386
-ist	N	A, [+lat]	-ive (46), -ic (106), -al (420), -an (131)		

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[23] If -ation combines with -ify the resulting ending is -ification. Also new words can be formed with this: *yuppiefication* (OED).

TABLE X
Continued

-ity	N	A, [+lat]	-ive (181), -ic (251), -al (625), -an (57), -ous (299), -able (810), -ar (135; 3 -ary),		2391/3814
	(N)	(N)	-or (33*, may be -ory)		
-ive	A	V, [+lat]	-ate (991)	-ize, -ify	991/2695
-ize	V	N, [+lat]	-ion (73), -ation (6), -ment (9*), -er (1), -ant (24*), -ism (2), -ist (3), -or (95*)	-age, -ity	971/2789
-ize	V	A	-ive (15), -ic (129), -al (396, 34 with ionalize), -an (218)	-ous, -ary, -ory	
-ment	N	V, [+lat]	-ize (19), en (5), -ify (1)	-ate	25/2536
-or	N	[+lat]	-ate (1025), maybe the ending -ator		1025/3091
-ory[24]	A	V (or agent noun), [+lat]	-ate (745)	-ize, -ify	745/1501
-ous	A	[+lat], stem	-ory (95, mostly 'rare')		95/6605

In the German investigation we did not list Latinate suffixes at all, while in the English investigation we listed both kinds of suffixes, because Latinate suffixes are much more integrated in English than in German, presumably because English borrowed many more words from Latin and French than German did (Anshen and Aronoff 1999).

In using the feature Latinate, we follow Marchand, for whom it is not necessary that the bases of Latinate suffixes are Latin or French words, but only that "the coinage is Latin" (Marchand 1969, p. 238). Note also that we decided to make the type of the base (the selectional type) and not the type of the suffix, the main criterion for the feature. We are dealing here with the combination of suffixes, so for our investigation it is important if a suffix only combines with Latinate bases or also with Germanic bases. If the suffix also attaches to Germanic bases it is fully integrated and it does not matter where it comes from (for example -ee and -ess, which may be etymologically Latinate, but which attach to Germanic bases). We segregated the two kinds of suffixes, because even in English they have different selectional properties. Dividing the suffixes into these two selectional types (those that select Germanic bases and those that select Latinate bases) reveals a major distinction between them, the MONOSUFFIX CONSTRAINT:

(9)   Suffixes that select Germanic bases select unsuffixed bases.

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[24] -ory combines only with the verbal ending -ate. The ending -atory results which looks like -at-or-y, so maybe there is not adjectival suffix -ory at all, but it is a combination of -or and -y.

The monosuffix constraint does not apply to suffixes that select Latinate bases. This is revealed quite nicely in those few cases of Germanic suffixes that attach productively to suffixed words. In every such instance besides -ness (which is a global exception), the base suffix is Latinate. So, -er attaches productively to two base suffixes, -ify and -ize, and although it attaches to the Germanic verbal suffix -en, this combination is not product- ive, as we showed above. Similarly -ship attaches to Latinate words ending in -or, but only to simple Germanic words. The distribution of these two suffixes as well as that of -able is expressed very nicely if we think of the two selectional restrictions – takes a Germanic base and takes a Latinate base – not as complementary, but rather as distinct. We may then say that these three suffixes select both types of base. If the base is Germanic, it may not be complex, because of the monosuffix constraint.

There are only two suffixes in Table IX that contradict our finding, -ess and -ness. Most of the bases for -ess are nouns ending in -er and -or. There are fewer simple bases. But certain specific properties of -ess may help us to defend the monosuffix constraint.

- Most of the -er-ess and -or-ess combinations are a few hundred years old and there are no new ones.
- Many of the existing combinations are shortened by syncope, for ex- ample waitress, so the base suffix has no syllabic nucleus any more; the morphophonological transparency is lost. This shows a high de- gree of lexicalization for the apparently suffixed base of -ess. There are also (admittedly rare) words that suggest that -ress may have be- come a suffix in its own right: architectress, advocatress, goatress, hermitress, presidentress, sophistress. For none of these do we have a corresponding word ending in -er or -or: *architector, *sophistor, etc.
- -ess only attaches to -er and -or and not to other person terms like -ee, -ent (only example studentess), although -or is also a Latinate suffix.

We conclude that -ess is not a productive suffix anymore. The reason has been traced to the pragmatics: Because English has no gender it is not necessary to show the sex of a person. A morphological reason can now be given: Normally -ess follows other suffixes (person suffixes). The mono- suffix constraint says that such a behavior is not optimal for contemporary English and it has therefore become unproductive. The same reason may lie behind the absence of any productive diminutive suffix in English.

-ness is different: it remains highly productive when attached to a num- ber of suffixed bases. Our answer here is very simple: -ness is an exception to the monosuffix constraint, albeit the only one in the language. But its exemption helps us solve an analytical puzzle: how can we distinguish between the monosuffix constraint and closing suffixes?

A priori, the absence of any particular suffix combination [[stem + base suffix] + word-forming suffix] can be caused by the base suffix or by the word-forming suffix. If a given base suffix does not allow any word-forming suffix, this base suffix might be a closing suffix (as in German), and if a given word-forming suffix does not allow any preceding base suffix, we say that this word-forming suffix is restricted to simple bases (German schwa may be an example of this). The Germanic part of English allows only one derivational suffix, which we could attribute to either reason: English Germanic word- forming suffixes are restricted to simple bases *or* English Germanic suffixes are closing suffixes. The exceptional behavior of -*ness* shows that it is the first: English Germanic word-forming suffixes are restricted to simple bases with the exception of -*ness*. If English Germanic suffixes were all closing suffixes, then all the adjectival suffixes would have to be viewed as exceptionally non-closing only when they are followed by -*ness*. When not followed by -*ness*, the same suffixes would be closing suffixes. So the exceptionality of -*ness* cannot be expressed properly within the closing suffix framework.

4.1. Latinate Suffixes

For the Latinate suffixes only, we distinguish between NON-LEXICAL STEMS and lexical bases. All Latinate suffixes occur frequently with non-lexical stems. The word *lexical*, for example, ends in the suffix -*al*, but neither *lexic* nor *lex* is an English word. With Germanic affixes, by contrast, non-lexical stems are found so infrequently that they are the object of linguistic jokes:

(10)   How couth his behavior is!

In Table X, all Latinate suffixes occur with non-lexical stems, but if the base of a suffix is indicated in column three specifically as stem, then it only occurs with non-lexical stems and never or hardly ever with lexical bases.[25]

Although English morphology has a highly productive Latinate component, the fact that only the Germanic suffixes obey the monosuffix constraint shows that the two types of suffixes are still distinct in English. Furthermore, although Latinate suffixes may disobey the constraint, they attach to unsuffixed words much less commonly than Germanic suffixes do, and they normally attach to suffixes which also carry the feature Latinate, so the picture drawn here is that there are two different word-formation

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[25] For these few stem-taking suffixes, there are no base suffixes, but we do not expect any.

systems, especially within the combination of suffixes, one Germanic and
one Latinate. Latinate suffixes do not attach frequently to free monomorph-
emic stems, while Germanic suffixes, for the most part, do (this is the
monosuffix constraint). Latinate suffixes attach frequently to free poly-
morphemic stems, while Germanic suffixes (except *-ness*) do not. So, the
two types of suffixes are largely in complementary distribution.

To some extent, this division correlates with the distinction between
class 1 and class 2 suffixes (Siegel 1974) that formed the historical founda-
tion of lexical phonology. Class 1 suffixes are by and large Latinate, while
class 2 suffixes are Germanic. But nothing in Siegel's theory or in lex-
ical phonology accounts for the monosuffix constraint; within both these
frameworks, combinations of two or more suffixes of the same class are
permitted.

The main evidence for separating class 1 (Latinate) and class 2
(Germanic) suffixes is prosodic structure: class 1 (Latinate) suffixes are
stress-shifting and class 2 (Germanic) suffixes are stress-neutral. And this
may be how a speaker divides them nowadays (Marchand's 'Latin coin-
age'; Cutler 1981). Only stress-shifting suffixes can combine with each
other; non-stress-shifting suffixes cannot combine. One might conclude
that the monosuffix constraint is caused prosodically. We show below that
there may well be a tight connection between the monosuffix constraint
and prosodic structure but the monosuffix constraint cannot be reduced
completely to prosodic structure.

Once we say that English Germanic suffixation obeys the monosuffix
constraint, it is impossible to know whether there are any closing suffixes
within that part of the vocabulary. So, *-ness* cannot be followed by another
suffix (e.g., **kindnessful*), but we can attribute this fact to the monosuffix
constraint (if we assume that the exceptionality of *-ness* is expressed in
terms of its selection; as a suffix, it obeys the constraint). Within the Lat-
inate component, English does appear to have at least one closing suffix:
-ity. Other Latinate nominal suffixes can be further suffixed:

(11)   *form-ation-al, nation-al-ize, behavior-ist-ic, athlet-ic-ism*

The problem with *-ity* is not phonological. Suffixing *-al* to a word ending
in *-ity* would produce words ending in the string *-itial*, which is permitted,
since we find it in words like *initial* or *interstitial*. Thus, English needs both
notions: closing suffixes and the monosuffix constraint, but in different
parts of the vocabulary.

Table XI (constructed by means of steps 6–8 in section 3) helps to find
closing suffixes: If a base suffix does not allow further derivation but there
are expected word-forming suffixes, or more pragmatically if the second

column is empty and the third column is not, the base suffix is a closing suffix. This is true for *-age*, *-ance* and *-ity*, and all these suffixes are again nominal suffixes. In compiling this table, we were very conservative in listing the expected suffixes. Within the Latinate lexicon there are often sets of suffixes with the same function, said to be in competition. We decided to expect no more than one member of each set, so that we did not list the others as expected. The sets each form adjectives, verbs, person terms, and abstract nouns. Also, when the occurring words with a given word-forming suffix numbered less than ten, we included the actual number value in the table. We did not attempt to construct an equivalent table for the Germanic suffixes, because the monosuffix constraint rules out most combinations.

4.2.   *Hapax Legomena (Baayen and Renouf)*

Our investigation was done only with the dictionary (supplemented occasionally by the intuition of speakers as to whether some particular words exist or not). Such dictionary- based research is criticized, for example by Aronoff (1976) and Baayen and Renouf (1996), because dictionaries, by their very nature, do not list the most productively formed words. Baayen and Renouf are mostly concerned with the productivity of certain suffixes and on that point their arguments are quite convincing. But our concern is not productivity, but rather whether certain suffix combinations (or for the Germanic part of English most suffix combinations) are possible at all. And therefore dictionary work and speaker's intuition should be fine. As it happens, for the suffixes Baayen and Renouf investigated in their study of hapax legomena (words found only once) in a very large corpus, their statistical results support our points: Of eighty-four novel adjectival *-ly* words, only eleven have suffixed bases and only six of them occurred more than once. As they themselves note, "Apparently, denominal *-ly* is hardly productive when attached to derived nouns" (p. 82). They note that "Adverbial *-ly*, on the contrary, is extremely productive with a wide range of base words, both simplex ... and complex (p. 83). We will argue below (section 4.3.3) that adverbial *-ly* is an inflectional suffix, so that the indiscriminate distribution that Baayen and Renouf find is expected. Although we have shown that *-ness* is an exception to the monosuffix constraint, even for *-ness* they found many more monomorphemic bases than suffixed bases, which demonstrates the strong effect of the monosuffix constraint even for a suffix which may override it. The last suffix that they investigated is *-ity*. Because it is Latinate, we do not expect it to be subject to the monosuffix constraint, and indeed in their data it is not. Of the 280 hapax legomena that they identify, more than 25 percent (77) are based on the single suffix *-able*. In short, although Baayen and Renouf criticize

TABLE XI

Which **Latinate** base suffix allows which **Latinate** word-forming suffix?

Base suffix	Occurring word-forming suffix	Expected but not found word-forming suffixes
-able	-ity	
-acy	Substitutes -ate	
-age		-al, -ize
-al	-(i)an, -ism, -ist, -ity, -ize	
-an	-ic, -ist, -ity	
-(i)an	-ism, -ize	
-ance		-al
-ant	-ize	-al
-ent		
-ary	-ity (3)	-ize
-ate	Substitutes -acy, -ion (may be -ation), -ive, -or, -ory	
-ation	-al, -ize (6)	
-ic	-(i)an, -ate, -ism, -ist, -ity, -ize	
-ify	-al (1), -ment (1), -ation	-ive
-ion	-al, -ary, -ate, -ism, -ist, -ize	
-ism	-al, -ic, -ize (2)	
-ist	-ic, -ize (3)	
-ity		-al, -ize
-ive	-ate, -ify (1), -ism, -ist, -ity, -ize	-(i)an$_N$
-ize	-ment, -ation	-ive
-ment	-al, -ary, -ize (9), -ist	
-or	-age, -ate, -ic, -ify (1), -ize, -ity	
-ory	-ous	-ize
-ous	-ity	-ize

dictionary studies, their results based on hapax legomena in large corpora fully agree with our own findings at every point where the two overlap.

4.3. *Other Types of Morphology in English*

The monosuffix constraint also holds for English inflection (which is all Germanic): English inflection does not permit two suffixes. This observation is true on its face, but we will also give more subtle evidence from both nominal and verbal morphology for the operation of the monosuffix constraint.

4.3.1. *Regular Inflection*

English nouns show inflection for plural and genitive. There is no dis-
tinction between genitive singular and genitive plural in spoken language
(the written language shows the difference between them by an apostrophe
(Quirk et al. 1985, p. 319)):

(12)a.   The spy's companion was a woman.

    b.   The spies' companions were women

But it is possible to pronounce two instances of [s] in a row, as in *Max's
house*, so the impossibility of **spies's* cannot be explained phonologically,
since [spajzəz] is phonologically well-formed. But we can now provide a
simple morphological basis for the restriction: the monosuffix constraint,
operating on inflection, says that only one inflectional suffix is allowed.
The genitive adds a strong argument to our regularity: the missing dis-
tinction leads to a systematic ambiguity and a quite important difference
(between singular and plural) cannot be made systematically.[26]

The monosuffix constraint also holds for verbal inflection: the only
place where two inflectional suffixes could be expected is third person
sg. past tense (*he *lookeds*) but the personal suffix is missing here. To an
English speaker, this sequence of suffixes is so implausible that we do not
even wonder why it should be ruled out. But in closely related languages
like German, an equivalent sequence is perfectly normal (e.g., *du sag-te-st*
'2sg. say-past-2sg.'). Nor do we know of any good historical phonological
reasons for the loss of the past tense person and number suffixes in English.
Lass (1992) notes that the second person suffix was still found in the past
tense in Late Middle English, in forms like *lovedest*, which are exactly ana-
logous to the German form, long after the phonological demise of person
suffixes. Our point is that English has only two true inflections for finite
verbs, the past tense and the third person, and they cannot combine.

It has long been recognized that the suffix *-ing* may be either inflectional
or derivational (Chomsky 1970). The monosuffix constraint predicts that
if *-ing* is derivational, it may be followed by an inflectional suffix, but
not if it is inflectional. This is true. (13a–b) are acceptable, because *-ing*

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[26] The English genitive is sometimes called a clitic, because it attaches to full phrases
(e.g., *the king of England's hat*). However, it is neither a simple clitic nor a special clitic in
the sense of Halpern (1998). It may be a phrasal affix (Anderson 1992). In any case, it is
distinct from the simple clitics of English and so we have included it with the affixes.

is derivational, but (13c), where *-ing* is inflectional, cannot be pluralized, although the two acts of leaving are distinct.

(13)a.   The dressing's flavor is off

b.   How many dressings do you have

c.   I was surprised at John's and Mary's leaving(*s).

4.3.2. *Irregular Inflection*
There is a difference between irregular nominal and verbal inflection. If a noun has an irregular plural (*men, children, alumni*), then the genitive marker does show up in the plural (*men's, children's, alumni's*), so the restriction is not syntactic or morphosyntactic, but purely morphological. These irregular plural forms are very few, though, and all idiosyncratic. There is no productive plural suffix or any other productive morphological process in these forms, so another productive and transparent suffix – the genitive suffix – is allowed.

But the 'irregular' verbal preterite forms do not allow the 3rd person singular suffix *-s* – *he rangs, *he sangs*. Two questions follow from this form. (1) Why do the nominal and verbal irregular inflections behave differently? (2) The strong verbs form their preterite forms with ablaut and not with a suffix at all, so what is the connection between the missing *-s* and the monosuffix constraint?

First, the difference between irregular nominal inflection and irregular verbal inflection in English is quite clear: The strong verbs are much more regular because the English language has many more of them and even in language acquisition children produce strong verb forms like *clunk* for the past tense of *clink* (Bybee and Slobin 1982) or *slung* for the past tense of *slay* (Bybee 1985), though we do not expect them to produce nonce *en*-plural forms in English. Also children produce forms like *feets*, which show that they do not analyze the irregular plural.

Second, we used the term 'monosuffix constraint' because normally inflection and derivation in English are done by means of suffixes. The fact that the preterite form is *he rang* and not *he *rangs* shows that the constraint must cover at least ablaut as well. This supports the claim that the monosuffix constraint is not (only) caused by prosodic structure as we will show below but is purely morphological: Both – the suffixation and the ablaut – are treated in the same way by the monosuffix constraint. To generalize the monosuffix constraint to morphological processes we should check the prefixes as well; counterexamples can be found easily

like *misunderstand*. But with prefixes there has been much discussion of whether they are phonological words on their own or not; the violation of the monosuffix constraint can be a further argument for the differentiation between prefixes and suffixes. We will not go in further details on prefixation at this point.

4.3.3.   *-lier, *-liest

As shown in Aronoff (1976) the *-ly* adverbs cannot form a comparative or superlative form with *-er* (**quicklier*) or with *-est* (**quickliest*), although the adjectival suffix *-ly* freely allows such forms (*friendlier, friendliest*). There are instead two other ways to express this semantic pattern: *he ran quicker/more quickly*. With our monosuffix constraint this problem can be solved, with some consequences for the morphological description of *-ly*. Because only one suffix of each type, derivational and inflectional, is allowed, the ungrammaticality of **-lier* follows directly, so long as the suffixes *-ly* and *-er* are from the same type. This means they are both derivational suffixes or they are both inflectional suffixes; both possibilities are discussed in the literature independently from the monosuffix constraint (Kiparsky 1982; Zwicky 1989). Because *-ly* also attaches to already suffixed words (*boyishly, woefully, thanklessly, squeakily*), according to the monosuffix constraint, it should be an inflectional suffix, since it would violate the constraint if it were derivational.

Zwicky (1989, p. 145f.) asks if the adverb-formation with *-ly* might be a case of inflection. His main argument against calling it inflection is that *-ly* changes the syntactic category, i.e., the word class. We are comparing German and English, and German has no adverb suffix like English *-ly*. Normally adjectives can be used as adverbs or better as adverbials, which indicates that this is not a word class but a syntactic function. And this could also be the point in English – it can be deleted by comparison (*he ran quicker*) and such a deletion is quite uncommon for derivational suffixes. In other words, if the adverb is not a word class, then *-ly* does not change word class. Zwicky's argument against the inflectional status of *-ly* thus disappears.

Sometimes it is noted that *-ness* also takes adverbs as a base (*oftenness, seldomness*) but no instances of $li]_{Adv}$ *-ness* can be found (**quickliness*, etc.), although $li]_{Adj}$ *-ness* is perfectly permissible (*motherliness*, etc.) (Marchand 1969, p. 335). Even though *-ness* is the only suffix that is not restricted to simple bases, the adverbial suffix *-ly* cannot be a base suffix for *-ness*. But if *-ly* is an inflectional suffix, it cannot be a good base suffix in any case, because base suffixes should be derivational and derivation is internal to inflection. The fact, that $li]_{Adv}$ *-ness* does not exist supports our

view that -*ly* is inflectional. The fact that -*ness* attaches to simplex adverbs supports our claim that adverbs are a subclass of adjectives.

Another argument might be weaker but in our view of English morphology it also points in the same direction. It deals with the Latinate suffixes. We said that normally the two types of suffixes are separate: Latinate derivational suffixes combine with Latinate bases and Germanic derivational suffixes combine with Germanic bases. But this is not true for inflectional suffixes: the Latinate derivational suffixes also occur with Germanic inflectional suffixes, for example, the plural of *demonstration* is *demonstrations* and so on. And similarly the adverbial suffix -*ly* combines with Latinate derivational suffixes. This uncommon combination of Germanic with Latinate suffixes is also expected if -*ly* is an inflectional suffix.

(14)   *professionally, Christianly, symbolically, curiously, unprintably, visibly, pleasantly*

4.3.4. *Clitics*

Clitics form a separate layer from derivation and inflection. As in German, it is possible in spoken English for a clitic to follow an inflectional suffix:

(15)a.   The boys'll be here

   b.   Your drink's ready and Mary's'll be out soon.[27]

We never find forms like *she'sn't*. (Quirk et al. 1985, p. 123f.). Either the auxiliary *is* or the negative *n't* may contract, but not both. Similarly, for modal auxiliaries, we find *she won't* or (in British English) *she'll not*, but no form like *she'lln't*. If the contracted forms of the auxiliaries and the negative are clitics, then this restriction follows from the monosuffix constraint, here operating as a MONOCLITIC constraint. What we have, then, is a single constraint operating independently on each class of morphological structure, where these classes are defined by the syntax, not the phonology.[28]

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[27] English orthography forbids two apostrophes in one word, but *Mary's'll* is perfectly acceptable in speech.

[28] Frank Anshen has pointed out to us that contradiction of *have* to *of* or *a'* is possible after the negative: *couldn't of, couldn't a'*. We have no explanation for these cases.

4.4. Prosodic Structure

There is only one derivational suffix which is not syllabic (-*th*); the other suffixes add a syllable to the base. The monosuffix constraint admits only one derivational suffix for each word. So we might imagine that the monosuffix constraint is caused by the prosodic structure. We could propose a purely prosodic constraint which says that English words (except compounds) with two syllables are more optimal than those with three syllables. Such a constraint also includes the base of morphologically complex words, so it entails that most bases should be monosyllabic. This seems to be the case for a large number of suffixed words but there are also many for which this is not true: for every suffix we found a sizable set of bases with more than one syllable. Examples of familiar words are given in Table XII. In all the examples, the main stress precedes the final syllable of the stem, giving the same prosodic pattern that would result from a sequence of two suffixes.

TABLE XII

Germanic suffixes in English with monomorphemic polysyllabic stems

SUFFIX	EXAMPLES WITH STEMS WITH >ONE SYLLABLE
-*dom*	*christendom, martyrdom, officialdom*
-*ful*	*colorful, powerful, sorrowful*
-*hood*	*adulthood, bachelorhood, brotherhood*
-*less*	*featherless, numberless, shadowless*
-*ship*	*censorship, championship, citizenship*
-*some*	*burdensome, cumbersome, quarrelsome*
-*y*	*butchery, jealousy, velvety*

What is true is that very few of these polysyllabic bases are morphologically complex in the strict sense (i.e., end in a suffix which itself is attached to a free form). So the monosuffix constraint is caused by morphological and not purely phonological factors. There might be a connection to a preferred prosodic structure and it can be shown easily that the monosuffix constraint supports such a preference but the monosuffix constraint cannot be substituted by a purely prosodic structure and cannot be explained by the prosodic structure.

The identity in form of the adjectival and adverbial -*ly* suffixes provides another argument against a purely prosodic account. As we have seen, the adjectival suffix obeys the monosuffix constraint but the adverbial suffix is perfectly permissible with suffixed words, no matter how many syllables

they may have (*prosodically*, *inspirationally*, *leaderlessly*). This contrast cannot be accounted for by any prosodic constraint.

Another possibility is to formulate a constraint that combines both morphology and phonology: derivation must be done in one syllable. This proposed constraint is morphological, because it distinguishes between the stem and what follows it, but it is also prosodic, since it refers to the syllable structure of this part of the word. Support for such a constraint would come from the fact that we do find words with two suffixes, of which the first is -*th* (*lengthen*, *truthful*), and this constraint permits just such suffix combinations. Of course, we know that -*th* has not been productive since the early seventeenth century, so it is not clear if this argument has much force. Thus, we cannot decide between a purely morphological constraint (only one suffix permitted per native word) and a combined morphological/prosodic one of the sort just proposed.

Even with the inflectional system there is a connection between prosodic preferences and the monosuffix constraint but the prosodic structure is neither an explanation nor a substitution for the monosuffix constraint. So, it is also true that inflection must be done in no more than one syllable, even though most English inflection is non-syllabic (-*s*, -*ed*, ablaut). We might call this the MONOSYLLABLE constraint. But a monosyllable constraint would not account for the same range of facts that a purely morphological constraint does. For example, we have said that the constraint against genitive plurals follows directly from the monosuffix constraint. But the surfacing of two instances of [s] in the genitive plural would normally add only one extra syllable, not two: *dogs'*, *dogses. So forms like *dogses would not be ruled out by the monosyllable suffix constraint, but they are ruled out by the monosuffix constraint.

One might propose a different constraint for inflection: do not add any syllables (the NO-SYLLABLE constraint). This constraint is violated by participles, since the participial suffix -*ing* is always syllabic. We would also have to account for the fact that -*ed* is syllabic after a coronal stop: *waited*, which we could attribute to post-lexical phonology. But such a constraint could not rule out *dogses, since the extra syllable would have to be inserted by the same post-lexical phonology that permits *waited*. So here, too, the monosuffix constraint both rules out the proper case (*dogses) and allows the proper case (*waited*), which the prosodic constraint cannot do.

Neither purely prosodic constraint can account for the third person plural preterite for verbs, *she helpeds. We have ruled such a form out by the monosuffix constraint, but the monosyllable and no-syllable prosodic constraints would both permit it, since the non-occurring form adds no extra syllabic material. We conclude that the monosuffix constraint must

be stated morphologically for both derivation and inflection, although we suspect that some prosodic factors may be part of its motivation.

4.5. *English as an Isolating Language*

As we have seen, English allows only one suffix of each type, although there are suffixes which can combine with each other. It is a well-known fact that earlier stages of English had many more inflection suffixes than the language has today and that one of the major changes from Old English to Modern English was the loss of inflection. Thus, Jespersen says: "there is a complete disappearance of a great many of those details of inflexion, which made every Old English paradigm much more complicated than its modern successor, such as distinctions of persons and numbers, and nearly all differences between the infinitive, the imperative, the indicative, and the subjunctive ... " (1923, p. 180). For this reason it is sometimes suggested that English is becoming an isolating language. Jespersen writes that "English ... steers a middle course though inclining more and more to the Chinese system" (1934, p. 61). Robertson echoes Jespersen's sentiment: "so far as inflection is concerned, English has quite clearly become in the course of time less and less like Latin, and more and more like Chinese" (1954, p. 112). Perhaps the monosuffix state is only the last step before becoming an isolating language but there is always this one suffix and perhaps this state is also stable.

5. COMPARING GERMAN AND ENGLISH

5.1. *Endstation Hauptwort*

The word-formation systems of both languages investigated have a clear tendency to build more nouns. There are more noun-forming suffixes than any other kind and compounds are overwhelmingly nominal. This tendency can be summarized in a term created by Ross: *Endstation Hauptwort*, 'last stop noun'. Ross is concerned with syntactic categories and with showing that nouns are the last stop on a continuum that begins with verbs. According to Ross,

to pass ... [along the continuum] is to move in the direction of syntactic inertness and to move away from syntactic freedom and volatility. To wax metaphorical, proceeding along the hierarchy is like descending into lower and lower temperatures, where the cold freezes up the productivity of syntactic rules, until at last nouns, the absolute zero of this space, are reached (Ross 1972, p. 317).

Although Ross did not explicitly extend his observation to morphology, Peter Eisenberg (1998) did. And both of the restrictions we found (clos-

ing suffixes and the monosuffix constraint) point in this same direction. Looking at the closing suffixes first, we see that all the German closing suffixes except -isch are nominal suffixes, which supports the tendency for nouns not to undergo further derivation. German does not support a strong morphological version of 'Endstation Hauptwort', which predicts that no nouns undergo adjectival or verbal derivation, since there are also non-closing nominal suffixes in German that allow a further adjectival suffix (e.g., wissenschaftlich 'scientific'). Also, the ungrammaticality of *Prüflingin does not follow directly from the principle of 'Endstation Hauptwort', because the non-occurring *Prüflingin would be a noun. In other words, the fact that German closing suffixes are almost entirely nominal lends some support to Ross's constraint, but the fact that not all nominal suffixes close the word to further derivation weakens the constraint somewhat.

Similarly for English: English has no productive native verb-forming suffix (-ify is Latinate and -en has never been very productive). The mono-suffix constraint says nothing directly about nouns, since adjective suffixes are also found, but the only Germanic suffix which takes COMPLEX bases in English, -ness, attaches to adjectival suffixes to form nouns. So any words formed with two Germanic suffixes must be nouns, which is in the spirit of Ross's principle. As with the German closing suffixes, the English monosuffix constraint cannot be explained by Ross's principle, which in its strong form says that adjectival suffixes should not be allowed at all. But both new restrictions support the tendency.

5.2. *The Different Behavior of Latinate Suffixes in Both Languages*

We exclude the Latinate suffixes from the new restrictions for both languages. In English they behave quite differently as we have already shown. Now we want to complete some remarks for German Latinate suffixes.

The connection between closing suffixes and linking elements in German seems to be less strict for Latinate suffixes. -ität behaves nearly like a native suffix in German because it has bases which are existing words in German like relativ – Relativität; nevertheless it takes only foreign bases. -ität seems to be a closing suffix. For example, no adjective suffix can occur after it and it takes a linking element in composition (Relativität-stheorie). Therefore -ität behaves like a native closing suffix. But -ität also has other properties that make it the best-integrated Latinate suffix in German (Fuhrhop 1998). It has the same function as -heit/-keit/-igkeit, and its base is complementary with the bases of these suffixes (Fuhrhop 1998, p. 124). Also, the connection between the linking element and the property of being a closing suffix shows that -ität is a very well-integrated suffix in

German. Since *-ität* is borrowed and not a native suffix etymologically, it is surprising that it takes the linking element *-s*.

-ation seems not to be a suffix in German (although it is much more transparent than *-ion*), because it is difficult to find evidence that any word ending in *-ation* was formed in German and not borrowed. We will therefore regard both *-ation* and *-ion* as endings (in our technical sense). Both of these endings take a linking element in composition (*Operationssaal* 'operating room', *Funktionsanalyse* 'function analysis') but for both we find some examples with further suffixes:

(16)   *funktion-al; operation-ell; profession-ell; proportion-al; sensation-ell*

These endings behave like the suffix *-schaft*; they take linking elements but they do not close the stems. Although they take linking elements, we suggest that this is because of the analogy to German abstract feminine suffixed nouns, which for the most part take linking elements (see section 3.1).

We have seen that the restrictions that we have identified for Germanic suffixes do not hold for Latinate suffixes in both languages. What about language change? For English, many words with two suffixes were already borrowed, so English had no influence, two suffixes could not be prevented, and the monosuffix constraint was not extended to the Latinate part of the derivational morphology. In German, the opening function of the linking elements is new. And maybe the fact that some Latinate endings take linking elements is the first step towards integration. The second step, for a suffix that takes linking elements to be a closing suffix, could not occur because the words with two suffixes are borrowed, too, and not formed in German. Only if German begins to form words with more than one Latinate suffix can we expect to find evidence on whether Latinate suffixes are truly closing suffixes.

6. CONCLUSION

We began with the observation that German and English do not allow every suffix combination that should be allowed within the common selectional restrictions. With our new – additional – restrictions we can account for the missing suffix combinations. We find one restriction for each language, though the restrictions themselves are quite different. German quite readily allows words with more than one suffix (*Steig-er-bar-keit* 'comparability'), so that German morphology is closer to the Latinate morphology than to

the Germanic morphology of English, and the closing suffixes themselves can follow other suffixes:

(17)   *Klass-ifizier-ung* 'classification', *Katalog-isier-er-in* 'female cataloger', *Freund-lich-keit* 'kindness'

But it seems that even in German, derivation is not as recursive as compounding. And this non-recursivity is caused by closing suffixes, because in a suffix row there will be at one point a closing suffix and this is the end of the suffix row. In a long enough string there will always be a closing suffix because German has several closing suffixes and most of the suffixes forming abstract nouns are closing suffixes; so, for example, a person term will be formed, from this an adjective will be formed, and from this adjective another person term may not be really needed so this adjective will only be the base for an abstract noun suffix, and then the stem is closed:

(18)   *lehr(en)* 'teach' (verb) →
         Lehrer 'teacher' (person term) →
         lehrerhaft 'like a teacher' (adjective) →
         Lehrerhaftigkeit 'teacherlikeness' (*-igkeit* is a closing suffix).

Therefore, the property of some particular suffixes may have a general effect for the word-formation system in German. Nonetheless, the German closing suffixes are of a different nature from the English monosuffix constraint – the monosuffix constraint affects the whole English morphological system very directly, whereas the closing suffixes are properties of particular suffixes and the effect for the derivational system is more indirect.

The linking elements are another important difference between English and German. We mentioned a connection between linking elements and closing suffixes in German. English does not have linking elements in compounds or if it has linking elements like the formerly possessive marker in *devil's food cake* (cf. *angel food cake*) they are not similar to German linking elements – they are not as grammaticalized as in German. So German has linking elements and closing suffixes and the connection between them is quite clear. English has neither linking elements nor closing suffixes (with the possible exception of *-ity*).

We must confess in closing that our major findings all remain mysteries to us. We do not know why German has closing suffixes or why closing suffixes all take linking elements. We do not know why English has a monosuffix constraint. It does help to distinguish the Germanic from the Latinate vocabulary and thus might be useful in acquisition, but this raises

the further question of why a language should partition its vocabulary in this way. And how does a child learn the distinction between the two vocabulary types? We have used etymology as a rough guide to the division, but no child has access to history. Some may disparage the surprising nature of our findings as a direct result of the inductive method that we used in this work. In our defense, we point out only that our surprising findings arose precisely because we employed an inductive method. We hope that these findings will be explained within some deductive framework, though we know of none that can do so at present.

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