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Productivity – Structural Restrictions

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Abstract

The paper deals with the structural restriction in English derivation mainly based on Ingo Plag's work *Morphological Productivity: Structural Constraints in English Derivation* (1999). Chapter II presents the problems with defining productivity within qualitative and quantitative approaches. Chapter III brings a review of restrictions on productivity with the focus on general mechanisms. Chapter IV is an abstract of Plag's critique on Fabb's suffix-driven selectional restrictions. In his attempt to explain empirical data within English derivation, Plag proposes base-driven selectional restrictions and general morphological constraints, which according to his argumentation work simultaneously.

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1. Introduction

Any morphological theory should make predictions which words are possible words of a language and which words are not. The fact that some morphological rules according to which complex words are structured or formed are used more often than the others, gives rise to questions like which mechanisms regulate the productivity of morphological rules, is the productivity of a rule the result of structural factors, conditioned by pragmatic factors, or an inherent non-derivable property of any morphological rule?

Standard dictionaries of linguistic terminology refer to the term productivity as “the creative capacity to produce and understand an indefinitely large number of sentences (Crystal 1991 in Plag 1999: 5).” According to Bauer (2003: 338) “A process is said to be productive to the extent that it can be used in the creation of new forms in language.” While the role of productivity in syntax is not regarded as problematic, the works on word-formation devote to productivity more place. Most publications provide loose definitions like “the possibility to coin new complex words according to the word formation rules,” which do not explain what conditions the exceptions and differences such as (Plag 1999: 6):

- The restrictions to the possibility of forming new complex words are often unclear: Word formation rules may predict the existence of words which are unattested: the attachment of the nominalizing suffix *-ity* to adjectival bases ending in *-ous* which is attested by forms such as *curious* – *curiosity*, *capacious* – *capacity*, *monstrous* – *monstrosity*, but not with **gloriosity* and **furiosity*.
- Word formation rules are often formulated in such a way that they prohibit formations that are nevertheless attested: person nouns ending in *-ee* can only be formed from transitive verbs: *employee*, *addressee*. However sometimes even transitive verbs can take *-ee*: *escapee*, *standee*.
- Some affixes occur with a large number of words, whereas others are only attested with a small number of derivatives.

For Plag (1999: 7) a central distinction in morphology is the one between ‘possible’ and ‘actual’ words. While ‘possible’ or potential word can be defined as “a word, existing or non-existing, whose morphological or phonological structure is in accordance with the rules of the language,” the concept of ‘actual word’ is harder to define. If we set the definition “words that are in use”, we should define what *being in use means*. Whether it means that the majority of the speech community is familiar with the word or that the word finds its place in dictionaries, sometimes because it was selected according to the set criteria (e.g. *greenth*, because it occurs in the works of George Eliot) it is not clear (Bauer 2003: 76-79).

The answer to the question, should be complex words listed in the lexicon? gives two conflicting models of the processing and storage of morphologically complex forms. Many psycholinguistic studies have demonstrated that the economy of storage must be counter-balanced by the economy of processing. The full listing model claims that all words, complex and simplex are stored as single words and accessed directly without any intermediate operation, and so economizes cognitive costs. In contrast to that, the decomposition model rests on the assumption that storage is more costly than processing. Plag (1999: 11) provides Frauenfelder’s and Schreuder’s observation that the direct route will be more successful for high frequency word forms and those word forms that are problematic for the parser. The authors of the most recent studies confirm this view by demonstrating that the

processing of simplex words depends both on the token frequency of complex word containing the word as a stem and on the number of different complex words (types) that contain the simplex word as a stem. In other words the size of the so-called morphological family co-determines the processing of the word.

2. Defining productivity

2.1 Qualitative approaches

The first major question for Plag (1999: 11-12) is whether productivity is a quantitative or qualitative notion. If productivity is of qualitative nature then a process of affixation could be either present or not. His observation is that productivity is rather a gradual phenomenon, that morphological processes are either more or less productive than others. Bauer (2003: 70) similarly points out that "productivity is not all or nothing, but a matter of more or less."

The second question is whether productivity is a non-derivable property of word formation rules or a property that results from other mechanisms. What is clear is that productivity of a rule is never unrestricted. The restrictions can be found in the words that may serve as bases, and in other phonological, morphological, syntactic, and semantic conditions on possible bases. Therefore it is crucial to determine the limits within which affixes are productive.

Plag (1999: 12-13) lists some definitions that can be found in morphology textbooks. Bauer's definition from 1983 claims that a word formation is productive "if it can be used synchronically in the production of new forms." Spencer's definition from 1991 considers a rule productive if it is "regularly and actively used in the creation of totally new words." Schultink's definition from 1961 in Booij's translation goes:

Productivity as a morphological phenomenon is the possibility which language users have to form an in principle uncountable number of new words unintentionally, by means of morphological process which is the basis of the form-meaning correspondence of some words they know.

Plag sees Schultink's notion of unintentionality problematic. He claims that distinction between unintentional expansion of lexical stock, which is unconscious implementation of morphological rules and the intentional creation of new words is not so clear. The former is often referred to as morphological productivity, the latter as morphological creativity. He argues that not only unproductive but also productive rules can be applied intentionally, e.g. *-ize* neologisms coined to designate new concepts in science.

The second problem concerns the criterion of uncountability. According to Schultink (Plag 1999:15-16) the productive rules give rise to an in principle uncountable number of forms whereas unproductive rules can yield a fixed number of derivatives. The two de-adjectival nominalizing suffixes *-th* and *-ness*, Plag begins his argumentation, support Schultink's definition. The unproductive suffix only attaches to a limited number of bases, whereas *-ness* can occur with any adjective. But it is different with *-ment*, which is productive only with bases that contain the prefixes *en-* or *em-* (*eN-*). And since this prefix is no longer productive, the number of possible -

ment forms is also limited. Thus according to Schultink's criterion of uncountability the attachment of *-ment* must be considered unproductive.

Furthermore, Plag claims that the criterion of uncountability becomes entirely vacuous. He illustrates his point with six 20th century neologisms with the prefix *-eN* attested in the *OED*, all apparently creative or analogical formations. For two of these, *endistance* and *embrittle*, *-ment* nominalizations are attested, and it seems that the other four (*encode*, *envision*, *emplane*, *enhat*) could also undergo the *-ment* nominalization. This shows that the rule of *-ment* attachment is productive with an intentionally defined class of base words. Thus, only in principle, an uncountable number of *-ment* derivatives can be created.

Another problematic point concerning current qualitative definitions is the difference between rules and analogies. Plag (1999: 17-22) rejects Becker's purely analogical model of morphology. According to Becker's model the only difference between analogies and rules is their productivity, with other words a quantitative difference. Plag points out that it is crucial to distinguish two entirely different senses of the word *rule*. One is more or less synonymous with *regularity* and expresses a descriptive generalization. The other sense of *rule* is equivalent to a procedural operation. Plag claims that representational or derivational models have a number of important advantages over traditional procedural-derivational models:

Such models do not transform underlying input strings into surface representations by subjecting them to an ordered set of manipulating procedures, but make crucial use of representations and conditions that constrain the forms of such representations.

In representational models the idea of a rule is that of regularity, while in procedural models is that of an operation.

The second reason for rejecting analogical model is that it fails to make strong predictions about possible and impossible forms.

There is also psycholinguistic evidence against purely analogical models. Plag argues that recent psycholinguistic researches (Marcus et al. 1995, Jaeger et al. 1996 in Plag 1999) have presented strong evidence against single system theories, which hypothesize that, both regular and irregular past tense forms are computed by the same mechanism.

Plag also makes difference between 'redundancy rules' or 'via rules' and productive rules. The former are generalizations across existing words, "whose function is to relate morphology complex words in the lexicon to words with the similar morphological/phonological make-up (Plag 1999: 21)." One of the semantic and phonological regularities is the case of the verbalizing suffix *-en*:

The meaning of *-en* derivatives is: 'make X', and the morphosyntactic restrictions on possible bases are: *-en* attaches to monosyllabic adjectives that end in an obstruent, especially /t/ and /d/.

2.2 Quantitative approaches

The idea of potentiality, which is central to qualitative definitions of productivity, can be expressed either in statistical terms of probability or some other way. We shall briefly present some of them.

One of the most widely used and the most widely rejected is the definition that says that the productivity of an affix can be measured by counting the number of attested types with that affix at a given point of time. Its critics reject it by arguing that there can be many words with a given affix, but nevertheless the speakers will not use the suffix very often to make up new words (Plag 1999: 22).

Lieber's definition (1980 in Plag 1999: 23) suggests that the productivity of an affix should be equated with the number of forms that could potentially be derived with that affix, but according to the critics forgets the actual words.

Aronoff (1973 in Plag 1999: 22) suggests a productivity index, which is the ratio of actual to possible words. Anshen and Aronoff (1981 in Plag (1999: 23) point out the weakness of the proposal, that it makes wrong predictions for extremely productive (e.g. *-ness*) and for completely unproductive processes (e.g. *-th*). But how to count the number of possible words, since the number of possible formations on the basis of a productive rule is, in principle, uncountable? A partial solution is provided by Baayen (1989 in Plag 1999:24). He proposes the potentiality measure (I) as the quotient of the number of possible forms (S) and the number of actual forms (V) with a given affix in a sufficiently large corpus of text. The number of possible forms is calculated by using certain statistical model.

One could define 'productivity' as the number of new formations in a given period with a given affix. The weakness of this idea is that it presupposes the reliability of the dictionaries used. Baayen and his co-workers (1989, 1992, 1993 in Plag 1999: 25-34) avoid this weakness by developing text-corpus-based statistical measures of productivity. There are two central productivity measures that are proposed, namely 'productivity in the narrow sense (*P*)', and 'global productivity (*P**)'.

The productivity in the narrow sense *P* is defined as the quotient of the number of hapax legomena *n* (1) with the given affix and the total number of tokens *N* of all words with that affix in a suitable text corpus.

$$P = n_1 / N$$

But what have unobserved types (hapax legomena) to tell about productivity. In short, according to Baayen and other authors the number of hapax legomena of a given morphological category correlates with the number of neologisms of that category. They try to illustrate that the fewer tokens of a given type are attested, the more likely it is that the type is a neologism.

There lies a problem in 'with a given affix', which gives rise to two questions. The first is which words can be considered to bear the affix in question. With, for example, *-ity* it is doubtful whether the forms like *entity*, *quantity* and *celebrity* are morphologically complex forms.

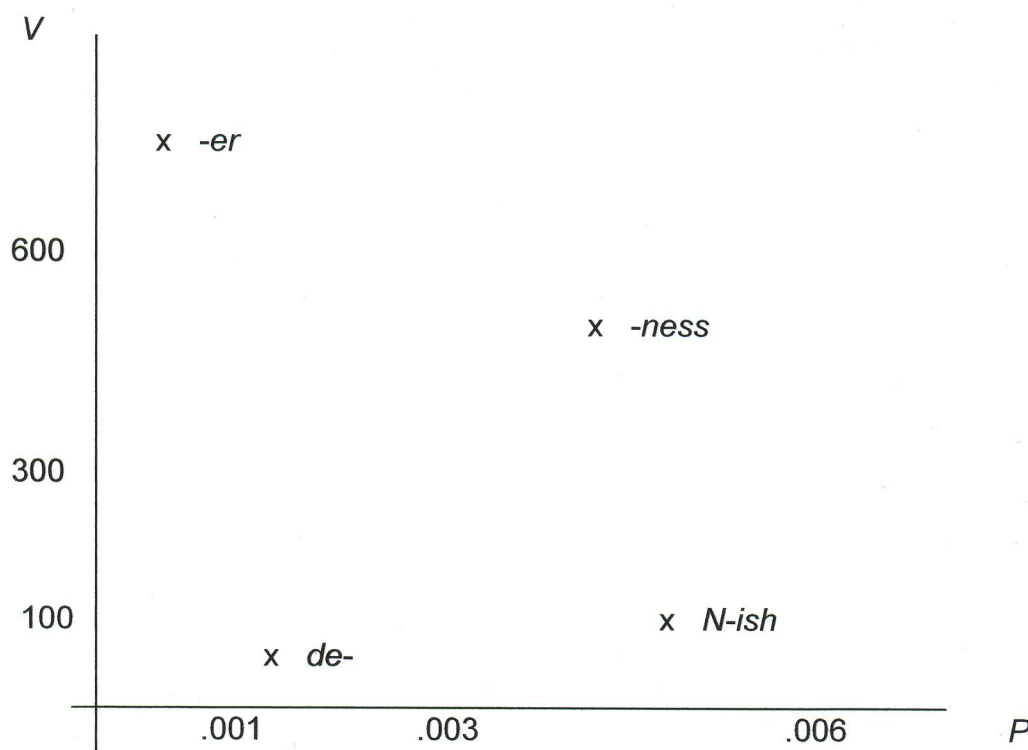
The second question concerns the sampling of multiply affixed words, for example, the suffix *-ize* in combination with *-able* in a word like *conventionalizable*. If the base verb *conventionalize* is a hapax legomenon and it is not attested elsewhere in the corpus, should one count *conventionalizable* also as a hapax belonging to the category of *-ize* derivatives? Another example is a possible adjective *conventionalised*. If it were a case of the derivational suffix *-ed*, the token would be counted under *-ed*, and if it were a case of inflectional (participial) suffix *-ed*, the token would be counted under *-ize*. (Plag 1999: 29)

Assuming that the problems above can be overcome, the productivity of an affix can be easily interpreted and calculated. Taking into account the equation

$$P = n_1 / N$$

a large number of hapaxes leads to a high value of P , while a large numbers of high frequency items leads to a high value of N and consequently to a decrease of P .

Faced with some undesired results Baayen (1992 in Plag 1999: 30-31) has elaborated a bi-dimensional measure of productivity, 'global productivity'. The chart below presents global productivity of some English suffixes. The degree of productivity P (the degree of probability of encountering new formations) is on the horizontal axes, the extent of use V (the number of forms with the given affix) on the vertical axes.



Global productivity of some English suffixes (Plag 1999: 31-33, from Baayen 1992)

Plag interprets the chart as follows. The suffix *-ness* has a high global productivity, i.e. *-ness* is both often used and there is a high probability to encounter new formations; the prefix *de-* is rarely used and it is less likely to be used to coin a new word. On the other hand with *-er* and *-ish* one parameter is high while the other is low. The suffix *-er* is often used, but is rarely employed in new formations, whereas the denominal suffix *-ish* is versatile in creation of new forms but occurs rarely in the corpus.

One process is more productive than the other. However, there follows an important question: what is the reason and what factors are responsible for the relative productivity of a process? The fact is that no word formation process is totally unrestricted and there is a number of different factors that can play a restrictive role.

3. Restrictions on productivity

3.1 Rules and restrictions

Structural restrictions are an important factor influencing productivity, but not the only one. The productivity of a word formation rule is an epiphenomenon, as it is crucially dependent on the restrictions imposed on the bases or the derivatives. On the other hand, the application rate, the implementation of a word formation process is often governed by extra-linguistic factors. (Plag 1999: 37-41)

Productive processes are semantically and phonologically transparent and have a high proportion of low frequency types. Psycholinguistic experiments have shown that speakers are able to glean from their linguistic environment the frequency of lexical items, and if the process does not meet the criteria of transparency and high quantity of low frequency items, they think that this process cannot be used to coin new words. Even if the number of transparent low-frequency items in the environment drops, they indicate that the process has become less productive. One reason could be that the number of possible bases has decreased, as it is the case with verbal *-en*, where the number of monosyllabic adjectives is limited. Much of that, however, depends on pragmatic factors.

One of the most obvious factors is fashion. The frequency rates of some affixes, for example, *mini-*, *-nik* in English; and *Mega-*, *Giga-*, and *Supra-* in German (Ruf 1996 in Plag 1999: 39), varies. They are results of extra-linguistic developments in society.

Another general pragmatic constraint is 'a need for a new form'. Such a new form may have two functions, the capacity of labelling a new concept of referent and the condensation of information, for stylistic purposes, e.g. *potty* (adj.) → *pottyness* (n.). Kastowsky (1996 in Plag 1999: 39) calls this latter function 'recategorization'. By attaching, for example, a diminutive suffix to a name, the speakers also express their attitude, thus 'attitudinal function'.

Lipka (1996 in Plag 1999: 40) introduces the concept of hypostatisation, which says that existence of a word suggests the existence of an entity.

No matter which determinants govern the application rate of a rule, many linguists agree that we should first aim at describing the class of possible derivatives of a given category in structural terms, and then examine which pragmatic factors influence its degree of exhaustion. Plag (1999: 41) continues with the observation that a lot of work remains to be done to describe more accurately the structural properties of word-formation rules on English. He finds the problem of stacking restrictions and the problem of rival derivational processes the most acute ones.

3.2 Structural restrictions: Rule-specific mechanisms

Structural restrictions may be divided into those which are considered to be peculiar to the individual rule and those which are the consequence of a more general mechanism that operates on all morphological processes (Plag 1999: 42-44).

The first type of structural restrictions is the restrictions that are only operative in a specific process – rule specific constraints. They may concern the properties of the base or the derived word; e.g. the English personal suffix *-ee* and the adjectival suffix *-able*, both of which are often claimed to attach only to transitive verbs. Rule-specific

constraints make reference to the kinds of morphological processes involved in a process, for example by prescribing a certain combination of affixes; e.g. the nominalizing suffix *-ity* may not be attached to adjectives ending in *-ory*, **satisfactority*.

Phonological constraints may involve segmental and prosodic restrictions; e.g. the deverbal nominalization suffix *-al* occurs only on stress final verbs like *recíte* or *propóse* and verbal *-en* only attaches to monosyllabic bases that end in an obstruent.

Sometimes, however, there is a question whether the restriction is indeed rule specific or the consequence of a more general restriction. It is also often uncertain whether one deals with a morphological or a phonological phenomenon. The third problem concerns the location of the restrictions. There is often a question whether an affix selects its base or vice versa.

3.3 Structural restrictions: General mechanisms

The compilation (Plag 1999: 45) of the most important general restrictions as they can be found in the pertinent literature is listed below:

- a. the word base hypothesis (Gauger 1971)
- b. the compositionality hypothesis
- c. the binary branching hypothesis (Bréal 1904, Scalise 1984)
- d. locality conditions (Siegel 1977)
- e. recursion and repetition constraints
- f. the open-class base hypothesis
- g. the unitary base hypothesis (Aronoff 1976)
- h. the unitary output hypothesis (Scalise 1984, Szymanek 1985)
- i. blocking (Paul 1896, van Marle 1985, 1986, Rainer 1988)
- j. stratal constraints (Bloomfield 1933)

Points *g-j* will be briefly described below.

3.3.1 The unitary base hypothesis

It is widely assumed that certain affixes only attach to bases of certain syntactic category. For example, *-ness* is said to attach only to adjectives to form nouns (*emptiness*); *-able* attaches only to verbs to form adjectives (*breakable*), *-al* attaches only to nouns to form adjectives (*constitutional*). Such facts have led to the formulation of the so-called unitary base hypothesis (UBH), which says that the syntacticosemantic specification of the base is always unique (Plag 1999: 47-48).

Some affixes, however, can attach to two distinct classes of bases. Aronoff (1976 in Plag 1999:47-78) avoids this rule by claiming that, for example, nouns and adjectives form a natural class by sharing the feature [+N], as it is with the adjective-forming suffix *-ly*, which attaches to nouns (*manly*, *weekly*) and to adjectives (*goodly*, *northerly*).

In those cases where lexical categories do not form a natural class, Aronoff (1976 in Plag 1999: 48) suggests that an entirely different homophonous process must be assumed. For example, the suffix *-able*, which combines with verbal stems (*breakable*, *perishable*) as well as with nouns (*serviceable*, *fashionable*), there are

two *-able* rules, one deverbal with the meaning 'can be VERBed', the other denominal with the meaning 'characterised by NOUN'.

3.3.2 The unitary output hypothesis

The unitary output hypothesis captures the idea that the derivatives formed on the basis of a certain word formation process can be characterized uniquely in terms of their phonological, semantic, and syntactic properties. Plag (1999: 49) sees two main objections. One is that given the wide-spreadedness of stem and affix allomorphy it can be seriously doubted that the affixation indeed produces a phonologically unique output. The other is semantic. For example, English deverbal nominalizing *-al* (*arrival*) is in no sense semantically related to adjectival *-al* (*conventional*). Plag's observation is that the affixes differ in their meaning but each type of derivative is semantically uniform.

3.3.3 Blocking

Blocking refers to non-existence of a lexeme because of prior existence of another lexeme. Such a lexeme is either a synonymous competing form (**stealer – thief*) or a homonymous form (*liver* 'someone who lives'; *liver* 'inner organ').

Plag (1999: 50) does not assign real significance to homonymy blocking since almost in all cases the would-be blocked derivative is accepted if used in an appropriate context; e.g. *liver – Is life worth living? It depends on a liver*. The functionalists' explanation, which states that languages universally avoid ambiguity, fails to answer the question why languages tolerate innumerable ambiguities. That is why Plag refers to synonymy blocking as a more fruitful concept.

Rainer (1988 in Plag 1999: 51), who developed the most pronounced theory of blocking to date, distinguishes between two forms of blocking, type-blocking and token-blocking.

Token-blocking involves the blocking of potential regular forms by already existing synonymous forms (**arrivement – arrival; *stealer – thief*). It occurs under three conditions: synonymy, productivity, and frequency. Thus an existing word can block only a newly derived word if the words are synonymous. The condition of productivity says that a blocked word must be a potential word, derived on a basis of a productive rule. The third condition refers to the assumption that not only idiosyncratic and simplex words can block productive formation, but stored words, can do so. The storage of words is largely dependent on their frequency. Plank (1981 in Plag 52) contributes an aspect that the blocking of a newly derived word does not occur in those cases where the speaker does not activate the already existing alternative form. It may happen in children language where the alternatives are not yet present and in adult speech errors, when lexical access fails.

Type blocking, which Plag finds less well understood, concerns the interaction of more or less regular rival morphological processes (*decency vs. decentness*). According to van Marle's Domain Hypothesis, Plag (1999:52) writes, rival suffixes are organized in such a way that each suffix can be applied to a certain domain. Thus we can distinguish between affixes with an unrestricted domain (general case; e.g. *-ness*, which may apply to practically any adjective) and affixes with restricted domain (special cases; e.g. *-ity*, the applicability of which is limited by certain constraints).

We can further distinguish between two kinds of special cases, systematic and unsystematic ones. While there is a rule that governs the distribution of systematic special case, the unsystematic special case is lexically governed (definable only by a token). The interaction between general cases and special cases allows predictions about possible and impossible derivatives, for example, that there is a tendency of general case to be systematically curtailed by domains of special cases. Rainer (1988 in Plag 1999: 53) refers to it as type-blocking. Aronoff (1976 in Plag 1999: 53) gives a good example, by regarding formations ending in *-ness* ill-formed where the base of an adjective ends in *-ate*, *-ent* or *-ant* (*decency* – ?*decentness*). It is important to add that type-blocking could be demonstrated in discourse contexts that specify synonymous and non-synonymous interactions.

3.3.4 Stratal constraints: Level ordering, Lexical Phonology, and the Latinate Constraint

The Level ordering refers to a set of generalizations as follows. Some affixes impose stress shift on their bases, but others do not. Thus there are two kinds of boundaries, the word or strong boundary '#' and the morpheme or weak boundary '+' (Chomsky – Hale 1968 in Plag 1999: 54-55) and from this two kinds of affixes, #-affixes and +-affixes. #-affixes attach to words and are outside the domain of cyclic phonological rules like stress assignment, whereas +-affixes do not block the application of such rules. For example:

- a. *átom* – *átom+ic* – *átom+íc+ity*
- b. *átom* – *átom#less* – *átom#less#ness*

The Affix Ordering Generalization (Selkirk 1982 in Plag 1999: 55) says that +-affixes, or 'class I' affixes are always attached before, and 'class II' affixes after stress assignment. A formation like *átom#less+ity* violates the generalization.

Later on more refined stratificational models, which distinguish between two levels of strata, were developed. Spencer (1991 in Plag 1999: 55) lists a number of affixes and their stratal affiliation:

Class I suffixes:

+ion, +ity, +y, +al, +ic, +ate, +ous, +ive, +able, +ize

Class I prefixes:

re+, con+, de+, sub+, pre+, in+, en+, be+

Class II suffixes:

#ness, #less, #hood, #ful, #ly, #y, #like, #ist, #able, #ize

Class II prefixes:

re#, sub#, un#, non#, de#, semi#, anti#

A stratal model of morphology has a great advantage, as only one mechanism is needed to explain a whole range of restrictions. However, its empirical weakness is that the generalizations are both too weak and too strong. There are numerous counterexamples where class II affixes attach inside class I suffixes (*-ist-ic, -ize-ation*), *-able* is sometimes stress shifting sometimes not. The model on the one hand rules out many combinations that are actually attested and on the other hand permits combinations that never occur.

Another assumption which is independent of level ordering is Lexical Phonology. Linguists like Booij (1994 in Plag 1999: 57) have pointed out that phonological and morphological rules apply in tandem.

The Latinate Constraint is an alternative to the idea of level ordering. Plag (1999: 58) by refining different authors' observations distinguishes between three types of suffixes in English. The first type only combines with native stems (only verbal *-en*), the second type only or primarily attaches to Latinate stems (e.g. adjectival *-ive* and *-al*, nominal *-ity* and *-cy*, or verbal *-ize*), while the third type combines with both kinds of stems (majority of Germanic affixes and some Latinate affixes like *-ment* and *-able*). Affixes and stems, according to the Latinate Constraint belong to one of the three categories, expressed by the features [+ Latinate], [- Latinate] or [± Latinate] and may combine only if etymological features are compatible.

All the criteria above have one thing in common none of them can be applied in a strict fashion, since counterexamples can be found.

4. The combinability of derivational suffixes

Our aim in this chapter is to present Fabb's account on selectional restrictions on the one hand and Plag's alternative account concerning the same affixes on the other.

4.1 Fabb's selectional restrictions

Fabb (1988 in Plag 1999: 64) launches the most pronounced empirical attack on level ordering by claiming that English suffixation is constrained only by selectional restrictions. Plag (1999: 63-90), with exception to his criticism of level ordering, rejects Fabb's account. He proposes an alternative account, which explains the patterning of data as a result of base-driven and not exclusively affix-driven (as with Fabb) selectional restrictions, paradigmatic morphological processes, and independent principles and constraints of English morphology.

Fabb investigates the combinability of 43 English suffixes that attach to free forms. His conclusion is that the level ordering limits the number of combinations from a possible 1849 to 50. In his approach he finds only 50 combinations attested. He proposes a model of English derivation that contains four kinds of suffixes grouped according to the restrictions they show.

Group 1:

Suffixes that do not attach to already suffixed words (28 out of 43).

Group 2:

Suffixes that attach outside the other suffix (6 out of 43).

Group 3:

Suffixes that attach freely (3 out of 43).

Group 4:

Problematic suffixes (6 out of 43).

Plag (1999: 63-90) deals mainly with two questions: whether Fabb's observations are empirically correct and to what extent the stacking restrictions of affixes may be explained by independent mechanisms of English morphology instead of idiosyncratic affix-driven selectional restrictions.

While Fabb uses Walker's *The Rhyming Dictionary* (1924) and his own collection of items, Plag enlarges the data with Lehnert's *Rückläufiges Wörterbuch der Englischen Gegenwartssprache* (1971) and the *OED on CD* (1994). Plag is aware of the problems concerning obsolete, rare and 'esoteric words'. He decides to preserve labels *obsolete* and *rare* as they stay in OED and not to omit 'esoteric words', i.e. attested words that are nevertheless unfamiliar to most native speakers or otherwise somehow strange.

4.2 Suffixes that do not attach to already suffixed words (28/43)

Plag subdivided this group of 28 suffixes into several subgroups (examples are Fabb's) as follows (Plag 1999: 76):

a. abstract-noun-forming suffixes:

deverbal	-age (steerage)
	-al (betrayal)
	-ance (annoyance)
	-ment (containment)
	-y (assembly)
denominal	-age (orphanage)
	-hood (nationhood)
	-ism (despotism)
	-y (robbery)

b. person-pronoun-forming affixes:

denominal	-an (librarian)
	-ist (methodist)
deverbal	-ant (defendant)

c. relational-adjective-forming suffixes:

deverbal	-ful (forgetful)
	-ant (defiant)
	-ory (advisory)
	-ive (respective)
denominal	-ful (peaceful)
	-ous (spacious)
	-y (hearty)
	-ly (ghostly)
	-ish (boyish)
	-an (reptilian)
	-ed (moneyed)
deadjectival	-ly (deadly)

d. verb-forming suffixes:

denominal	-ate (originate)
	-ify (classify)
	-ize (symbolize)
deadjectival	-ify (intensify)

4.2.1 Abstract-noun-forming suffixes (9)

Plag (1999: 68-76) claims that Fabb's approach tells only that already suffixed words and then attached by abstract-noun-forming suffixes *-age*, *-al*, *-ance*, *-ment* and *-y* are not attested. However, even here there are a few exceptions (e.g. *enlightenment*). He further claims that we are not dealing with selectional restrictions of the nominalizing suffixes (i.e. affix-driven restrictions), but with restrictions imposed by the base (i.e. base-driven suffixes).

Plag begins his explanation with the observation that the only verbs that contain a suffix in English are those ending in *-ify*, *-ize*, *-ate*, and *-en*, thus the only verb types the above mentioned suffixes can potentially attach.

As *-ity*, *-ize*, and *-ate* share certain characteristics that distinguish them from *-en*, these nominalizing suffixes will be treated first. Dictionaries and the native speaker's intuition tell that verb bases ending in these three suffixes can take nominalizing suffixes as follows:

<i>-ify</i>	<i>-ification</i>	(phonologically conditioned allomorphs of <i>-ation</i>)
<i>-ize</i>	<i>-ation</i>	
<i>-ate</i>	<i>-ion</i>	

Thus suffixes *-age*, *-al*, *-ance*, *-ment*, and *-y* are just as impossible as the inappropriate phonologically conditioned allomorphs (e.g. **magnify-ation*, **magnify-ion*, **magnify-ance*, **magnify-al*). Plag concludes that with the affix-driven approach we can only predict impossible combinations involving *-age*, *-al*, *-ance*, *-ment*, and *-y*, but fail to predict the possible ones (*-ation*).

The suffix-driven approach does not answer the question why the derived verbs do not take *-age*, *-al*, *-ance*, *-ment*, or *-y* as suffixes. Plag proposes the base-driven approach according to which the verbal suffixes in question take only the competing *-ation* suffix (and the general *-ing* suffix to which no restriction seems to apply).

As for the verbal bases in *-en*, Plag argues, in principle all nominal suffixes can be attached to it. There is a small number of such derivatives attested (e.g. *enlightenment*). Here it seems that the Latinate Constraint does not explain the selectional restrictions. The suffix *-en* is [- Latinate] and is thus incompatible with [+ Latinate] suffixes like *-ation* and *-y* but compatible with [\pm Latinate] suffixes like *-ance*, *-age*, and *-al*.

It seems that *-ance* and *-al* are restricted to verbal bases that have final stress (with few counterexamples e.g. *burial* and *utterance*). This means that all bases exhibiting non-final stress do not take these suffixes. While *-age* and *-y* seem to be lexically governed as there is no way to predict which verbal stem they attach to.

There remains only one suffix combination that is still problematic verbal *-en* followed by nominalizing *-ment*. The sources like the *OED* show these counterexamples to Fabb's claim:

(re-)awakenment, *enlightenment*, *enlivenment*, *fastenment*, *(dialectal)*,
disheartenment, *dizenment*, *chastenment* (rare), *lengthenment* (rare),
worsenment.

Plag explains that the small number of attested derivatives in *-enment* results from a number of restrictions on *-ment*. There is a relatively high number of bases that

contain a prefix (like *a-*, *re-*, *dis-*). It seems that stems containing the prefixes *eN-* and *be-* and ending in suffix *-en* if anything take *-ment*.

What about the denominal abstract-noun-forming suffixes *-age* (*orphanage*), *-hood* (*nationhood*), *-ism* (*despotism*), *-y* (*robbery*)? Fabb claims that these suffixes do not attach to already suffixed bases. However, a number of counterexamples can be found in the *OED*, e.g.:

-ism (the frame of mind): *absenteeism, expansionism, libertarianism*;
-hood (person, personality, sex, condition, quality, rank): *creaturehood, farmerhood, beggarhood, loverhood*;
N-age: *cooperage, lighterage, portorage*;

Suffixed bases to which the suffixes in question attach are clearly in the minority. Plug explains that the look at the meaning of the suffixes reveals that the low rate may be the consequence of the semantics of *-age*, *-hood*, and *-ism*. The semantics of the bases and suffixes rules out a great number of possible derivations. On the other hand the majority of attested derivations involve person-nouns as bases, where the said semantic problems do not arise.

Denominal noun-forming *-y* is regularly found with base ending in agentive suffix *-er* (*archery, patchery, pottery*), which is contrary to Fabb's claim that *-y* attaches only to non-suffixed bases.

4.2.2 Person-noun-forming suffixes (3)

Let us look at the denominal person-noun-forming suffixes *-an* (*librarian*), and *-ist* (*methodist*). Since the meaning of *-ist* is 'adherent of a doctrine/attitude' and of *-ism* is 'doctrine or attitude', we find numerous examples of already suffixed nouns that take *-ist*, e.g. *abortionist, expansionist, consumerist, conventionalist*.

According to Plag (1999: 77-78) the suffix *-an* is more problematic. First of all Fabb does not tell whether he treats *-ian*, *-an*, *-oan*, and *-onian* as allomorphs or not. The cases of *-an* suffixation that definitely do not involve preceding suffix are restricted to proper nouns and place names (*Pennsylvanian, Chomskyan, Andersonian*) or nouns ending in *-ia* or *-y*. Plag claims that it is this morphological property of the members of the semantically defined domain of *-(i)an* suffixation which is responsible for the impression that *-(i)an* does not attach to suffixed stems.

The group of stems ending in *-y*, according to Plag, can be argued to be morphologically complex and thus refuting Fabb's claim. The morphological complexity can be seen from the paradigm: *barbaric, barbarous, barbarian, barbary* (*barbar-y*).

The deverbal person-noun-forming suffix *-ant* (*defendant*) denotes a personal or material agent. Possible verbal bases involve bases ending in *-ify*, *-ize*, *-ate*, and *-en*. In short, according to Plag a small number of derivatives ending in *-ant* can be attributed to the two rival domains of agent nominalizations, *-er/-or* being the general case and *-ant* the special case. The rival suffix can be used productively in the semantically distinguishable domains of medical/pharmaceutical/chemotechnical and legal/corporate jargon for words denoting substances and persons, e.g. *disinfectant, repellent, consultant, defendant*. That is why the attested derivative *tetanizant* ('an agent or substance that causes tetanus') does not come as a surprise. Although being in the semantic domain of the special case, a large number of derivatives are attested with *-er* (e.g. *atomizer, carbonizer, crystalizer, calibrator, chlorinator*,

defibrillator). From this it can be concluded that the special case does not pre-empt the general case.

4.2.3 Relational-adjective-forming suffixes (12)

As for the deverbal suffixes **-ful** (*forgetful*), **-ant** (*defiant*), **-ory** (*advisory*), **-ive** (*restrictive*) Plag (1999: 79-80), contrary to Fabb, claims that it is primarily phonological, morphological or semantic properties of the base plus independent constraints that decide on the attachability.

The deverbal suffix **-ful** attaches only to monosyllabic verbs or disyllabic verbs with ultimate stress, which automatically rules out all suffixed verbs (trisyllabic or verbs which have no final primary stress, e.g. *-en*, *-ize*, *-ate*).

The deverbal suffix **-ant** attaches regularly to verbs with ultimate primary stress, especially to Latinate verbs. Suffixed verbs thus fall out. Some counterexamples (e.g. *acidifiant*, *calorifiant*, *personifiant*) show that sometimes semantic considerations overrule conflicting morphological constraints.

The deverbal suffix **-ory** actually attaches to already suffixed verbs. There seems to be a phonological constraint that only verbs ending in a consonant may take **-ory** (*-ate*: *acceleratory*, *calculatory*, *stipulatory*, but not *-ify*). Verbal bases ending in *-en* are restricted to take **-ory** due to the effects of a semantic or pragmatic nature. The Latinate constraint also rules out **-ory**, since native suffix *-en* does not accept a [+Latinate] suffix.

The deverbal suffix **-ive** occurs only with [+Latinate] bases which have /d/, /t/, or /s/ as their final consonant. Thus the Latinate Constraint together with the phonological constraint permit only bases ending in *-ate* to accept **-ive** (e.g. *accelerative*, *complicative*).

What are the selectional restrictions of the denominal adjectival suffixes **-ful** (*peaceful*), **-ous** (*spacious*), **-y** (*hearty*), **-ly** (*ghostly*), **-ish** (*boyish*), **-an** (*reptilian*), and **-ed** (*moneyed*)? Plag (1999: 81) shows that some of the complex nouns are more or less systematically excluded from the domains of the adjectival suffixes in question. Nouns ending in *-ion* take *-al*, *-ment* take *-al/-ary*, *-ing* and *-ant* are also used as adjectival endings, *-ism* nouns convert into adjectives by replacement of *-ism* by *-ist* or *-istic*, nouns ending in *-ist* are homophonous to their corresponding adjectives, or take *-ic*. There are also a number of counterexamples to Fabb's claim: *N-ful* (*healthful*, *meaningful*), *N-ous* (*treacherous*, *traitorous*, *harmonious*), *-y* (*Japanesy*, *healthy*, *wealthy*, *ancestry* and many more in *-or* (*agent*) + *-y*).

The denominal suffix **-ly** attaches to nouns denoting human being (*Christianly*, *teacherly*). There is, however, a rival morphological process of *-like* affixation.

There are also a number of counterexamples with **N-ed** (e.g. *kingdomed*, *qualified*, *conditioned*). For adjectival denominal **-an** (*reptilian*) the same arguments hold as with nominal denominal **-an**.

There are no counterexamples on the deadjectival adjective-forming suffix **-ly**. But according to Plag there is no need for selectional restriction on **-ly**, because the suffix in question is completely unproductive in the modern language.

4.2.4 Verb-forming suffixes (4)

As for the type *N-ate*, Plag (1999: 82-84) reminds us of the fact that the productive rule of *N-ate* formation is semantically restricted to chemical substances, whose

names usually do not involve suffixes. Fabb's example (*originate*) and some others, Plag claims, are not productive formations but must be individually listed.

The verb forming suffix *-ify*, denominal and deadjectival, are restricted to the bases that have ultimate primary stress or end in [ɪ]. Since there are very few such suffixes (*-ee*, *-eer*, *-esque*, *-ese*; *-ly*, *-y*) there are few possible suffix combinations.

The denominal suffix *-ize* attaches to already suffixed nouns quite often, if we assume that the stem is a noun and not an adjective (e.g. *computerize*, *christianise*, *preacherize*, *protestantize*). According to Fabb, deadjectival *-ize* belongs to a group of problematic suffixes four in number. The consequence of such Fabb's grouping is the existence of two distinct homophonous *-ize* suffixes. Plag (1999:83) claims that, both in terms of meaning and in terms of phonology, denominal and deadjectival suffixes can be unified.

To conclude the overview of Fabb's group 1, Plag claims that base driven selectional restrictions, semantic and phonological constraints are conceptually and empirically superior to Fabb's selectional restrictions.

4.3 Suffixes that attach outside one other suffix (6/43)

This group involves 6 out of 43 suffixes. The suffixes are as follows:

- noun-forming *-ary* (attaches to *-ion*, e.g. *revolutionary*);
- adjective-forming *-ary* (with the same property, e.g. *revolutionary*);
- denominal *-er* (attaches again only to *-ion*, e.g. *vacationer*);
- *-ic* (only occurs after *-ist*, e.g. *modernistic*);
- *-(at)ory* (only occurs after *-ify*, e.g. *modifier*);
- deadjectival *-y* (only occurs after *-ent*, e.g. *residency*).

For the noun-forming *-ary* Plag (1999: 84-85) adds the attested combinations with *-ate* and *-ment* as in *commendatory*, *complementary*, *sacramentary*, *sedimentary*, *supplementary*. The same is true for adjective-forming *-ary*.

The denominal *-er* attaches to at least *-ure*, *-ist*, *-ance*, *-ment*, *-age*, and *-ar* as in *adventurer*, *allegorister* (rare), *annoyancer*, *aphorismmer* (obsolete), *assurancer*, *astrologer* (the combination *-log-ist* supersedes *-log-er*), *baggageer*, *conjecturer*.

Fabb's observation concerning *-ic* is, according to Plag, empirically correct. Plag, however, again suggests the empirical and theoretical advantage of a base-driven restriction over a suffix-driven one. If we say that *-ist* takes only *-ic* as an adjectival suffix, we also tell that *-ist-al*, *-ist-ive* and *-ist-ent* are ungrammatical.

Verbs ending in *-ate* productively take *-ory* as an adjectival suffix. The same is with the base-driven restriction that verbs ending in *-ify* regularly take *-atory* as an adjectival suffix (there is an alteration of *-ify* into *-ific*).

Plag argues that noun-forming *-y* attaches not only to *-ent*, but also to adjectives ending in *-ate* (accompanied by a change of the final plosive into a homorganic fricative (e.g. *intimacy*, *privacy*, *literacy*, *federacy*, *accuracy*).

4.4 Suffixes that attach freely outside other suffixes (3/43)

This group involves *-able*, deverbal *-er*, and deadjectival *-ness* which are, according to Fabb, subject to no selectional restrictions other than those involving part of

speech. Plag (1999: 85-86) warns that none of these suffixes can be blindly attached to all adjectives. It is necessary to posit additional restrictions, for example, that *-able* does not attach to verbs ending in postconsonantal liquid (e.g. **doublable*, **saddlable*, **wriggleable*).

4.5 Problematic suffixes (6/43)

This group created by Fabb involves:

- the denominal suffix *-al* (attaches to *-ion*, *-ment*, and *-or*)
- the nominalizing suffix *-ion* (attaches to *-ize*, *-ify*, and *-ate*)
- the nominalizing suffix *-ity* (attaches to *-ive*, *-ic*, *-al*, *-an*, *-ous*, and *-able*)
- the three deadjectival suffixes *-ism*, *-ist*, and *-ize* (attach to *-ive*, *-ic*, *-al*, and *-an*)

Let us explain Plag's arguments (Plag 1999:87-88) against Fabb's speculations on affix-driven restrictions concerning the denominal suffix *-al*. Plag claims that *-al* attaches also to derivatives involving nominal bases in:

- *-ure* (*apertural*, *cultural*)
- *-ent/-ant* (*presidential*, *componential*)
- *-ance/-ence* (*concordantial*, *conferential*)
- *-cede* (*insecticidal*, *suicidal*)
- *-ory* (*laboratorial*)
- *-ary* (*secretarial*)
- *-ive* (*relatival*, *substantival*)

Plag points out that most of these nominal suffixes take *-al* regularly, but rival processes, especially *-ous* may intervene: the form ending in *-ous* is lexicalized (*adventurous*), sometimes doublets exist (*medicamental* (rare) /*medicamentous*/*medicamentary*), or *-ous* form has become obsolete in favour of the *-al* derivative (*matrimonious*).

Plag also explains that if there are no attested combinations of *-al* preceded by the Latinate nominal base suffixes *-ity* and *-ism*, it does not speak against the Latinate Constraint. The Latinate Constraint, he says, does not preclude the operation of additional restrictions of different kind. He proposes the base-driven selectional constraint, namely *-ism* only allows adjectivization through *-ist(ic)*, and a general semantic constraint. The latter does not allow the formation of the relational adjectives by suffixation to quality nouns that are derived from adjectives (**-ity-al*, **-ity-ary*, **-ness-y*). He speculates that such forms would be synonymous with the root.

Plag offers the Latinate Constraint as the explanation for the distribution of *-ion*. The Latinate verbal suffixes *-ize*, *-ify* and *-ate* take *-ation* (i.e. the respective allomorph) as an abstract-noun-forming suffix. Thus the problematic behaviour of the suffix *-ion*, Plag concludes, is the natural consequence of the properties of the Latinate verbal suffixes.

With the nominalizing suffix *-ity* Fabb does not offer just a suffix-driven constraint. He observes that *-ity* attaches to Latinate bases in general, and in addition, *-ity* only attaches to non-glide consonants. The latter restriction rules out the combinations involving *-ory* and *-ary*. However, Plag (1999: 88-89) shows that with adjectives ending in *-ary* the nominalizing suffix *-ity* is possible, e.g. *complementarity*,

supplementarity (rare). He explains that all the derivatives in *-ory* are nominalizations of bases ending in the string *-or* (*minor/minority*), not in the string *-ory*. With adjectives in *-ory*, he says, the nominalization involves replacement of *-ory* by *-ion* (*satisfactory/satisfaction*), or suffixation by *-ness*.

Plag also argues that there are two more adjectival [+ Latinate] suffixes that can be followed by *-ity*: *-ar* (e.g. *polarity*, *peculiarity*, *scalarity*) and *-ile* (e.g. *infantility*), while the possible combination *-ant-ity* is blocked by *-ance*.

Advocating the base-driven approach Plag proposes the explanation that *-ory* is not marked for any specific abstract noun suffix; it undergoes the most general process, *-ness* suffixation, whereas *-ant* is marked for *-ce* or *-cy*.

In addition to the four suffixes Fabb finds to precede *-ism*, Plag adds three more attested suffixes: *-ile* (*infantilism*), *-able* (*probabilism*), and *-ar* (*particularism*). Plag observes that it seems that only semantic-pragmatic factors speak against forms involving more picturesque adjectival suffixes, as he says, preceding *-ism/-ist*.

According to Plag the same arguments as to *-ism* and *-ist* apply to *-ize*. There is a whole range of additional adjectival suffixes that may precede *-ize* (e.g. *redundantize*, *privatize*, *probabilize*, *permeabilize*, *respectablize*, *terriblize*, *particularize*, *familiarize*, *seniorize*, *exteriorize*). It seems that the Latinate Constraint rules out bases with Germanic suffixes, there are also phonological and pragmatic factors, and token-blocking present at excluding some of the bases.

5. Conclusion

In his work *Morphological Productivity: Structural Constraints in English Derivation* (1999) Ingo Plag argues that Fabb's generalization concerning English suffixes is substantially flawed. Instead of Fabb's suffix-driven selectional restrictions, which are at least insufficient to explain systematically occurring patterns, Plag proposes base-driven selectional restrictions and general morphological constraints like the Latinate Constraint and blocking and some others. In his argumentations to explain why individual affixes fail to attach to certain bases Plag shows that it is the natural consequence of more than one constraint working simultaneously. In other words there is often more than one constraint that rules out potential derivatives.

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