

Productivity and exponence

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Abstract: The experimental results reported in Clahsen's target article clearly distinguish regular from irregular processes and suggest a basic difference between items that are productively formed and items which are stored in the lexicon. However, these results do not directly implicate any particular combinatory operation (such as affixation), nor do they distinguish inflectional items from other productive formations.

Clahsen's target article presents interesting support for a cognitive architecture that formally distinguishes lexical entries from combinatory operations. The results summarised here highlight a fundamental difference between regular and irregular morphology that can be readily understood if regular forms are defined by combinatory operations, and irregular forms are retrieved from the lexicon.

Yet, although the priming and imaging studies clearly distinguish regular from irregular processes, these studies are compatible with various ideas about the nature of combinatory operations and the organisation of lexical information. It is thus useful to factor out the claims and assumptions in the present article that represent inessential implementation details or reflect parochial features of German in order to isolate the conclusions that are directly supported by the experimental results.

Three issues of particular linguistic interest are enumerated below and briefly elaborated in the following paragraphs.

1. The contrast between regular and irregular processes is consistent with the claim that regular formations, unlike irregulars, access and manipulate stem entries of a lexeme. However, in the absence of studies showing independent affix priming, there is no direct support for the view that affixes also have lexical entries that are accessed in the formation of regulars. Hence the present studies are neutral between the "item and arrangement" model advocated by the author and an "item and process" model of the sort developed by Anderson (1992).

2. The declared focus on inflectional phenomena is too narrow and arguably misplaced, given that the verbal participles discussed in the article behave in significant respects like derivational stems. The studies thus motivate a central opposition between productive formations, whether inflectional or derivational, and the irregular items stored in the permanent lexicon.

3. The account of the contrast between regular and irregular forms rests on two main claims: (a) "that a given lexeme [entry] may have more than one stem" (Aronoff 1994, p. 41), and (b) that irregular stems of a lexeme may be accessed independently of the basic stem. The inflectional or derivational status of irregular forms is again of subsidiary importance, though there are grounds for treating them as derivational. Moreover, although the inheritance-based entries in section 3 exhibit a concise and efficient format for organising lexical information, none of the studies reported here bears on the choice between this format and alternatives in which irregular forms are exhaustively listed. The key point is that retrieval of irregular forms does not require access to – and concomitant activation of – the basic stem.

Productivity and affixation. The idea that irregular processes involve frozen alternations that are stored in lexical entries enjoys relatively widespread theoretical and experimental support. The conflation of "productive" with "affixal" processes is an entirely different matter; it is neither the case that all productive processes are affixal nor the case that all forms that can be "decomposed into stem + affix" reflect productive processes. The subtractive processes that define nominative nouns in Lardil (Hale 1967), perfective verbs in Papago (Zepeda 1983), or the "incomplete phase" in Rotuman (Churchward 1940) involve productive operations that cannot be described as affixal without trivialising the notion of affixation. Conversely, German plurals such as *Hunde*, "dogs,"

which can be assigned the transparent stem + affix analysis *Hunde*+e, are nevertheless frozen irregular forms.

The opposition between affixation and structured entries thus reflects a parochial property of modern German, namely, that all productive paradigmatic morphology is affixal. Insofar as this overlap is clearly contingent rather than necessary, either productivity or affixation can be identified as the property that determines the experimental contrasts between regular and irregular formations:

1. The essential property of regular formations is that they are formed *productively* by symbolic operations, whether affixal or nonaffixal, whereas irregulars are listed and retrieved.

2. The essential property of regular formations is that they are formed by *affixation*, in contrast to productive nonaffixal formations and nonproductive irregular forms.

Both theses are possible a priori, but the null hypothesis from a linguistic perspective is surely that productive processes will pattern together and that the primary opposition in German is accordingly between productive formations and frozen forms that are listed in the lexicon.

Inflection and derivation. A second confounding factor in German concerns the relation between productivity and inflection. Although the distribution of the -s plural exponent establishes its productivity in German, it is the distribution of plural forms in -s that determines the inflectional status of -s. Irregular plurals are found in a range of derived formations, including compounds *Gäst*+e+buch, "guestbook," derived nominals *Mütter*+schaft, "motherhood," and adjectives *löcher*+ig, "full of holes." Plurals in -s do not occur within such derived forms; despite the fact that [s] is found within compounds in German, "[c]ompounds such as **Auto*+s+versicherung, "car insurance," or **LKW*+s+gebühr, "truck fee," do not exist" (Wiese 1996, p. 146). The conventional view that derivation precedes inflection accounts for this contrast, if -s is treated as inflectional. This account also suggests that irregular plurals are derivational stems that, like basic stems, may be mapped onto identical inflected items.

This account extends as well to plurals such as *Rakete*+n "rockets," and *Frau*+en, "women," which occur in compounds such as *Rakete*+n+stufe, "rocket stage," or *Frau*+en+chor, "female choir." The view that compounding applies to derivational stems reconciles the existence of these compounds with the arguments of Penke et al. (1999) and Wunderlich (this issue) that feminine plurals in -n are productive derivational forms. In contrast, these compounds are problematic if only "irregular plurals (because they have lexical entries) can be fed into the compounding process" (sect. 5.2, para. 2).

Parallel considerations support a derivational treatment of participial verb forms in German, which feed productive derivational word-formation processes. The regular past participle *gereist*, "travelled," can be converted into a lexical adjective, which may occur attributively or undergo subsequent lexical compounding, as in *ein vielgereister Kanzler*, "a much-travelled chancellor." The resulting compound may, like any other adjective, be nominalised, as in *die Vielgereiste*, "the much-travelled ones." The irregular participle *betrunken*, "drunk," exhibits similar conversions in *der schwerbetrunkene Mann*, "the heavily-drunk man," and *die Schwerbetrunkene*. The fact that past participles, unlike finite forms, feed such canonically derivational processes suggests that the operations that define regular participles in -t are likewise derivational rather than inflectional.

Structures and operations. In sum, while inflectional paradigmatic processes are often productive (in German), not all productive paradigmatic processes are inflectional. The contrast between inflectional processes and irregular patterns can again be viewed as a special case of the general distinction between productive operations and stored forms. The relevant opposition here is not between inflectional and noninflectional phenomena but rather between items that are stored in the permanent lexicon and elements that are defined from items in the lexicon by productive, possibly inflectional, operations.

Although the choice of German eliminates confounding frequency effects in English, German retains other confounding factors. Filtering these out strengthens the main line of argumentation in this article by isolating the core properties that distinguish regular from irregular forms.

Lexical storage and regular processes

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Abstract: Clahsen's claim that output forms of productive processes are never listed in the lexicon is a consequence of the rule/list fallacy, empirically incorrect, and not necessary for the hypothesis that the human language faculty has a dual structure, that is, a lexicon and a set of rules.

The basic claim made by Clahsen is that there are processing differences between regular and irregular inflection and that this is evidence in favour of a model of the human language faculty that consists of two basic modules, a lexicon and a set of rules. Irregular forms are listed in the lexicon, and regular forms are produced by rule. Although I accept this basic distinction of two modules, I believe that Clahsen's identification of irregularity and storage is incorrect: There are several reasons for assuming that, in addition to irregular forms, regular forms can, and sometimes must, be listed in the lexicon.

To begin, Clahsen's reasoning suffers from the "rule/list fallacy" (Langacker 1987, p. 29), the idea that listing forms and also accounting for them by rule are mutually exclusive. This is by no means necessarily true, and I will argue below that this position is incorrect. The capacity of the human memory is so vast that the storage of regular forms of high frequency is possible, and quite advantageous in terms of speed of processing. So, why would the language user not be so efficient as to store highly frequent regular forms if this speeds up processing?

Second, there are many examples of regular, productive morphological rules that nevertheless require lexical listing of words of the corresponding form. For instance, the pluralisation of Dutch nouns consists of the addition of one of two competing suffixes, *-s* or *-en* (*e* stands for schwa). The choice between these two suffixes is made as follows: *-s* after a stem ending in an unstressed syllable, *-en* after a stem ending in a stressed syllable. The effect is that a Dutch plural noun will always end in a trochaic foot (Booij 1998). However, there are several classes of exceptions to this pattern. For instance, English loan words such as *tram* and *flat* have plural nouns in *-s* (*trams*, *flats*), although we would expect the plural forms *trammen* and *flatten*, the forms produced by many Dutch children during the process of language acquisition. That is, although affixation with *-s* is a regular rule, we also have to list a number of plural nouns in *-s* in the lexicon, the positive exceptions to this rule. This observation does not cause severe problems for Clahsen's model, but shows that the same affix can sometimes be attached by rule to a stem, whereas in other cases it may be part of a lexical entry.

A serious problem for Clahsen's claim that the existence of a productive, regular process implies that its outputs are not listed in the lexicon is the observation that words might be regular from the formal point of view, but semantically idiosyncratic. For instance, many Dutch past participles are formally regular but semantically irregular. Examples are *gezet* (stem *zet*, "to put") "fat" and *gesmeerd* (stem *smeer*, "to smear") "fast, fluent." These words have to be listed because their meaning is unpredictable from that of the stem and the affix; thus, formal regularity does not preclude the necessity of a word being listed.

There is another kind of linguistic evidence that can be used for deciding on the storage of a word, and it is not used by Clahsen: phonological change. The relevance of this kind of evidence can

be illustrated again with data from Dutch. Dutch exhibits the effects of Prokosch's Law for Germanic languages, the rule that stressed syllables must be heavy. The consequence of this law in Early Middle Dutch was that short vowels were lengthened in open syllables, which arose through affixation with the plural suffix *-en*. Thus, Dutch got alternations such as

- (1) da[a]g "day" d[a:]gen "days"
 w[e]g "way" w[e:]gen "ways"
 sch[i]p "ship" sch[e:]pen "ships"

Although these plural forms with long vowels in their first syllables were completely regular, they must have been stored as such, because, after the loss of this process of open-syllable vowel lengthening, these plural forms kept their long vowels. This is possible only if these forms were stored as such at the time that they were still regular. There are many more examples in the historical linguistics literature of relics of once-regular phonological processes, relics that could survive only because the relevant words have been lexically stored.

Hence it is in my opinion unnecessary, in order to defend a dual structure of the language faculty, to make the claim that the output forms of regular, productive rules are never stored. On the contrary, this claim is patently false.

There is another specific claim that relates to this problematic aspect of Clahsen's position. Clahsen argues that it is true for English and German that only irregular inflected forms can feed word-formation processes such as compounding. Clahsen invokes this argument to support the claim that regular inflection is in a module of the grammar different from that of irregular inflection and that word formation takes its input forms from the lexicon only. Even if this claim were correct for English and German, it cannot follow from the universal organization of the human language faculty, because there are many languages in which regular inflection feeds word formation. This empirical issue has been discussed in relation to the so-called split morphology hypothesis of Perlmutter (1988); in another paper (Booij 1993) I have provided ample evidence against the claim that regular inflection does not feed word formation. For example, regular Dutch past participles (regular regarding both form and meaning) can freely feed adjectival nominal affixation with *-e* "ness," as in (*het*) *vertelde* "what has been told." Moreover, as has been argued by Booij (1977), word formation processes are fed not only by listed words but also by possible words, that is, words for which there is no evidence that they are listed. Hence, the presupposition that word formation is fed by inputs from the lexicon only is incorrect.

In sum, Clahsen's evidence should be taken to support the claim that there is a fundamental distinction between lexicon and rules. However, this by no means implies that regular inflected forms cannot be stored in that lexicon. Moreover, even outputs of inflectional rules that are not stored may feed word formation.

Use impacts morphological representation

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Abstract: The distinction between regular and irregular morphology is not clear-cut enough to suggest two distinct modular structures. Instead, regularity is tied directly to the type frequency of a pattern. Evidence from experiments as well as from naturally occurring sound change suggests that even regular forms have lexical storage. Finally, the development trajectory entailed by the dual-processing model is much more complex than that entailed by associative network models.

The separation of usage from structure is a traditional practice in linguistics dating back to Saussure's (1916/1973) distinction between *langue* and *parole*. Clahsen subscribes to this dichotomy,