

THE PSYCHOLOGICAL REALITY OF WORD FORMATION AND LEXICAL STRESS RULES

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Introduction

'Psychological reality' has both a strong and a weak sense. In the strong sense, the claim that a particular level of linguistic analysis X, or postulated process Y, is psychologically real implies that the ultimately correct psychological model of human language processing will include stages corresponding to X or mental operations corresponding to Y. The weak sense of the term implies only that language users can draw on knowledge of their language which is accurately captured by the linguistic generalisation in question. For certain linguistic constructs, this weak sense embodies no more than a claim to descriptive adequacy; for example, the intuitions which the weak reading of 'psychological reality of the phoneme' predicts speakers will show are the same distributional data which led to the postulation of such a construct in the first place. This is not true of transformational rules - even to claim the weak sense of psychological reality for these is to claim that speakers can draw on knowledge at some level of the structures preceding and following application of the rule.

Lexical stress rules and word formation rules are transformational in nature. Within the grammar, the former are generally assumed to comprise part of the phonology, whereas the latter are claimed by some (Aronoff 1976) to constitute a separate stage preceding application of all phonological rules.

I wish to argue that the available evidence suggests psychological reality in the weak sense for both types of rule, as currently formulated in linguistic theory, but psychological reality in the strong sense for neither. (Note that this argument cannot be generalised to other phonological descriptions; see Fromkin (1973) for an argument in favor of strong psychological reality of abstract phonological representations).

Lexical Stress Rules

I have previously argued (Cutler 1977) that speech error evidence does not suggest the application of lexical stress rules in the production process, i.e. that lexical stress errors do not exemplify the misapplication of stress rules. What might we expect from an error in stress rule application? Fay's (1977a) argument for the strong psychological reality of syntactic transformations

is based on errors which Fay claims show that a particular rule (a) has failed to apply (what he said? for what did he say? is analysed as failure to apply Subject-Auxiliary Inversion), or (b) has applied only partially (Do I have to put on my seat belt on? is explained as application of the movement but not the deletion involved in Particle Movement). Since the function of lexical stress rules is to assign greater relative prominence to one syllable in a word than to others, one might expect that either failure to apply the appropriate rule or only partial application would result in less than the expected difference in degree of prominence between the syllables of a word. That is, if no stress rule applied at all one might expect all vowels in the word to be (equally) prominent, or, possibly, (equally) non-prominent; if, say, the Stress Adjustment Rule failed to apply one might expect a syllable to bear tertiary stress when it should be unstressed, etc.¹ But in fact lexical stress errors result always in primary word stress falling on the wrong syllable, not in lack of differentiation between syllable stress levels. Failure to apply the Alternating Stress Rule (Chomsky and Halle 1968: 78) would indeed result in stress falling on a wrong syllable, e.g. the third syllable of nightingale; but my corpus of lexical stress errors contains not a single such example.

A more complicated hypothesis could be proposed in which, for example, final consonants were misidentified, or the syllables in the word counted wrongly, so that stress ended up on the wrong syllable. But this hypothesis, like the hypothesis that a rule has not applied, in no way predicts the most striking characteristic displayed by lexical stress errors. This is that the syllable which wrongly bears stress is always a syllable which bears stress in another word with the same item. Typical errors are: economist (cf. economic); photographing (cf. photography); conflict_N (cf. conflict_V); disadvantageous (cf. disadvantage).

An explanation of these errors which does account for this curious regularity is the following: derivationally related words are in some sense stored together in the mental lexicon, with each word's individual specification including inter alia an indication of stress pattern (stressed syllable); a stress error occurs when

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1. Such errors do occur, but only when another word derived from the same base has the intruding stress pattern; e.g. [djúpIkèt] for [djúpIkət].

the stress syllable marking selected is not the one belonging to the target word, but that belonging to one of the other words in the group. (This explanation also accounts for the second, corollary, regularity exhibited by stress errors: they occur only in derived words and only in members of the Latinate section of the English vocabulary. The Germanic section of English is much less rich in morphologically related pairs of words with different syllables stressed, hence it provides less often the necessary conditions for occurrence of a lexical stress error).

It is clear that this explanation, by assuming stress pattern to be marked in the lexicon, implies that lexical stress rules do not apply in the course of language production.

However, there would seem to be no doubt that English speakers can draw on knowledge about the principles governing stress assignment in their language. Many experimental studies (e.g. Ladefoged and Fromkin 1968; Trammell 1978) have found that subjects' pronunciations of non-words or unfamiliar words conform fairly well to the predictions of the lexical stress rules; although Nessly (1977) used similar data collection methods to adduce evidence in favor of his own version of the rules rather than Chomsky and Halle's. Since language users normally find little difficulty in the task of assigning lexical stress in unfamiliar words, names and nonsense words, some representation of the principles underlying English stress assignment must be available to them, i.e. something more abstract than the mere aggregate of all the stress markings stored for all the individual words in their lexicon.

Word Formation Rules

Aronoff (1976:22, 46) and Halle (1973:16) specifically exclude any claim to psychological reality of word formation rules in the strong sense. Nevertheless there is evidence from speech errors which could be interpreted as favoring such a claim. Admittedly, one hardly ever finds errors in which a word formation rule seems to have failed to apply, i.e. substitution for the target word of the word or morpheme (depending on one's formulation of the rules) which formed the base of the target - say, familiar for familiarity; for one thing, preservation of target form class is one of the strongest characteristics of word substitution errors of any kind (Fromkin 1973; Fay and Cutler 1977). But errors do occur in which the wrong ending, albeit one appropriate to the form class, is produced: derival for derivation (Fromkin 1977), self-indulgement

for self-indulgence. A possible interpretation of these errors is that the wrong word formation rule has been applied.²

It will be obvious, however, that the model suggested in the previous section excludes the application of word formation rules in production as firmly as it excludes the application of lexical stress rules; if word formation rules operate, stress could not be marked in the lexicon as it would be dependent on the operation of the word formation rules. Can this model assign an interpretation to the suffix errors mentioned above? One obvious remark to be made about these errors is their similarity to prefix errors as discussed by Fay (1977b). Prefix errors result in one prefixed word substituting for another (e.g. intention for attention) or a non-word being formed by the addition of an inappropriate prefix (concustomed for accustomed). Similarly suffix errors can result in non-words (e.g. likeliness for likelihood) or in words (necessitous for necessary); these latter errors, word substitutions in which target and error differ only in the suffix, are of course difficult to distinguish from semantic errors and malapropisms). Fay suggested that prefixed words with the same stem might be stored together in the lexicon, and a prefix error result when not the target prefix but a neighbouring prefix was selected by mistake. It is clear that a similar proposal could account for suffix errors producing real words. Thus the lexical entry for a word family would be headed by the stem; the detailed entry for each member of the family would specify affixes, if any, number of syllables (see Engdahl (1978)) and an indication of which syllable should bear lexical stress. To account, however, for both prefix and suffix errors which produce non-words, the model needs to be extended, perhaps to allow the production device to select an appropriate affix from its affix inventory in cases in which the target affix became in some way momentarily unavailable. (It is noteworthy that even when an affix error includes a stress error, stress in the error occurs on a syllable which bears stress in some member of the word family.) To propose factors which might precipitate affix unavailability, i.e. which might render the affix temporarily difficult for the production device to interpret, is, however, to enter the realm of pure

2. These errors show no general tendency for affixes with + or # boundaries to prevail, or for more productive affixes to replace less productive.

speculation. It is to be hoped that more light will soon be shed on this issue; for the time being we must acknowledge that the evidence does not strongly support any particular model.

There is no doubt at all, however, that the facts of word formation have a claim to psychological reality in what we have identified as the weak sense. All the speech error evidence which has been discussed above and which has been interpreted as support for a model of the mental lexicon in which related words are stored together also provides clear support for the psychological reality of morphological structure. A considerable body of psycholinguistic evidence also supports this conclusion (e.g. Taft and Forster 1975). Whether or not rules of word formation of the particular type proposed by Aronoff are available to English speakers to generate new and nonce words is however uncertain. Aronoff and Schvaneveldt (1978) report that subjects in a lexical decision study are more likely to produce false positive responses to non-words formed with the productive suffix -ness than with the less productive suffix -ity, a result predicted by Aronoff's model.

However the results of an informal study of my own were less clearcut. In this study subjects were asked to choose between two candidates for words to fill what amounted to a gap in the language (e.g. to choose between excusal and excusement for 'act of excusing'); each pair of neologisms comprised one word formed with a # boundary (-ness, -ment, -ise, -ish, -y) and another formed with a + boundary suffix (the latter, which often result in stress falling on the suffix rather than on the stem, are considered to be less productive than the # boundary suffixes). Many of the words used were listed in the OED, but none in the Concise Oxford Dictionary, and in fact none of the 12 subjects, graduate students and faculty in psychology and language, claimed to recognise any word.

Since I used only 24 pairs and made no attempt to cover all possible combinations the results can hardly be considered conclusive. Nevertheless some interesting tendencies came to light. In general, subjects showed approximately equal preference for the more and the less productive endings. All subjects preferred excusal to excusement and despisal to despisement, although the OED lists all 4 forms; similarly, subjects preferred amassal and adressal although the OED lists only amassment and addressment. -ness was preferred to -ity for sinister (OED lists both sinisterity and sinisterness for 'quality of being sinister') and incestuous (OED: -ness only),

but accidentality was preferred to accidentalness (OED has both). For verb formations subjects seemed not to be able to make confident choices, and no clear trends emerged; an indication of the confusion can perhaps be seen in the fact that whereas more subjects preferred rapidify to rapidise for 'make rapid', vapidise was chosen more often than vapidify for 'make vapid'. Adjectives revealed yet another pattern of results in that subjects formed two clear groups, those who consistently preferred the less productive + affixes and chose, e.g., spectatorial, plumageous, and dowagerial, and those who consistently chose the more productive # affixes, i.e. spectatorish, plumagy, dowagerish.

The most that can be extracted from these findings is the conclusion that English speakers do not exhibit a great degree of unanimity in their choice of nonce formations. However some light is shed on the psychological reality of word formation processes by a comment made by several subjects independently, namely that although words formed with the + affixes (-al, -ity, -ify, -ial, -ous) were aesthetically more pleasing and would be preferred as permanent additions to the vocabulary, a # affix would generally be more useful to achieve understanding in everyday conversation. Thus although villagerial might in general be preferable to villagerish as an English word, the latter would be more likely to get the message across to an audience not expecting an unfamiliar word. Words with # affixes, which leave stress on the stem, are in other words recognised by speakers to be morphologically more transparent.

Conclusion

Morphological structure is psychologically real in that English speakers are aware of the relations between words and can form new words from old. The principles underlying lexical stress assignment are psychologically real in the sense that speakers know the stress pattern of regularly formed new words. The extent to which such knowledge proceeds from competence in the language or awaits conscious insight into morphological relationships is however unclear. It has frequently been suggested to me that morphological influences apparent in my stress error corpus results from error collection within a highly literate and linguistically sophisticated population. If so, then a speaker of English who knows, for example, the words economic and economist but is unaware of any relation between them should presumably not produce a stress error involving either of them. There is certainly no reason why

the structure of the mental lexicon should not be altered as a result of new knowledge about word structure being incorporated in the form of newly set up groupings or connections. But it is also possible that we know more than we are aware of. Recall Fay's discussion of prefixed words; how many of us are consciously aware, for example, that the stem spect in respect appears also in expect? It is at least possible that our mental lexicon could contain such knowledge even if we were not capable of making conscious use of it.

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