

Towards a lexical theory of phonological change

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0. Introduction

In the original version of this article (Van der Hulst 1978) I discussed the 'come-back' of a number of traditional insights into the causes and nature of phonological change. I showed how these insights have been or could be integrated in a generative model of phonological change. Here I will only give the schematic representation that resulted from this integration including some comments, speculations and afterthoughts. I stress the fact that most of what is said in this and the original paper is only a natural consequence of proposals that have been made by numerous phonologists in their attempts to criticize or improve upon the standard generative model of phonological change (Kiparsky 1965, King 1969).²⁾

1. The standard model

The standard model (SM) provides for several means to describe ('explain') phonological change. Since the phonological component is organized as a set of partially extrinsically ordered rules that map lexical representations (LR's) onto surface forms, the following changes may occur:

- (1) (i) rule addition
- (ii) rule loss
- (iii) rule simplification
- (iv) rule reordering
- (v) restructuring of LR's

(i) up to and including (iv) are called primary change. Changes in the LR's are seen as secondary (cf. below). (iii) is only a special case of rule change, but, as the SM predicts, the only case that will occur. This prediction is based on the assumption that there is an evaluation metric, which not only selects the simplest grammar for

a given set of data, but can even override the data in its desire for simplicity. This not only explains why rule change takes the special form of rule simplification,³⁾ but also why rules are lost. It is difficult to see how it could also explain rule reordering and it could clearly not explain rule addition. Both types of change remain without an explanation in the SM.

In order to explain rule reordering Kiparsky (1972) has included a set of substantive conditions in the evaluation metric in addition to the formal condition of simplicity. These substantive conditions do not refer to preferred properties of the rule system, but to preferred properties of the output of this system (partly in relation to the rules). Some cases of reordering can then be explained because the effect is an increased paradigm uniformity, while others can be explained because they result in rules that are more transparent judged from the surface forms. It will be shown in par. 2 and 3 that the introduction especially of the first substantive condition was in fact a major step to a completely different model of phonological change as far as location (in the model) and causes are concerned.

Restructuring (or rule lexicalization) takes place when a rule is added to the grammar that does not lead to allomorphy on the basis of which the rule is recoverable. The output of the added rule is interpreted as non-derived. The resulting analysis of the facts is, of course, more simple since no phonological rule is necessary: the added rule is lexicalized.⁴⁾ All diachronic processes that cause allomorphy 'remain' in the grammar as synchronic rules.⁵⁾ In the rest of this article I will only address myself to this latter case. The claim that a rule which causes no allomorphy (usually an unconditioned rule) immediately leads to restructuring is quite uncontroversial, except for advocates of a type of abstract phonology that permits absolute neutralization (Kiparsky 1968).

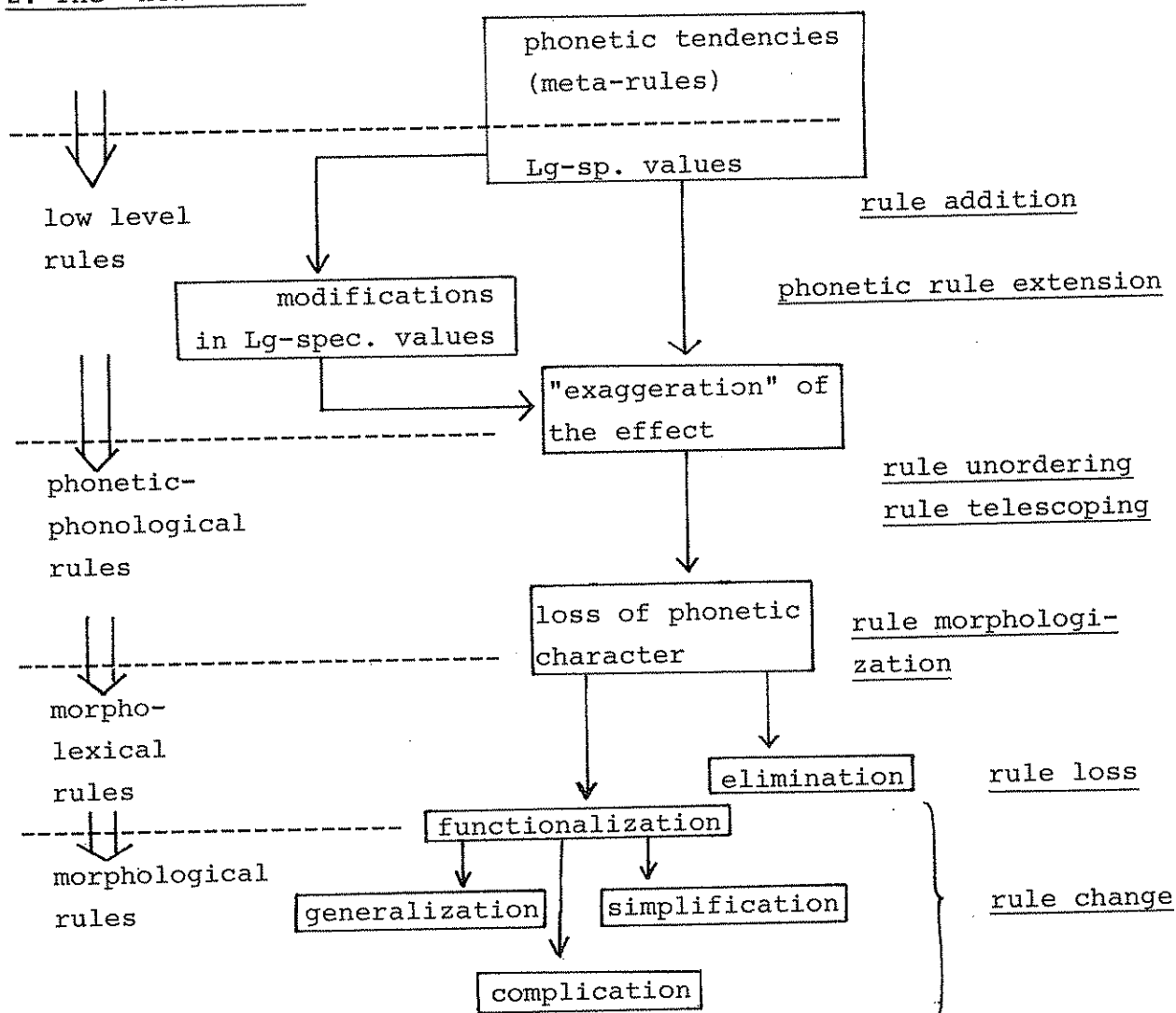
It is claimed in the SM that rule addition is characteristic of change in adult speech, while the other types of change typically occur during the process of language acquisition.⁶⁾ The names for the latter types are therefore inadequate because e.g. rules are not lost, they are being not acquired; rules are not reordered, they are being differently ordered.

Another type of change that may occur, besides the loss or addition (or modification?) of a lexical item, is the loss or addition of so-called rule features. However, since in the SM the rule

boundedness of phonological change was emphasized,⁷⁾ little attention was paid to the role and consequences of changes in the lexicon (cf. par. 3).

An important claim of the SM is that change is change in competence. It is of course not denied that changes also take place in the output (except in the case of restructuring), but those changes are the result of changes in the rule system and not the other way round. After all it was a 'force' that worked on the rule system ('simplicity') that caused the changes. Again little attention was paid to the fact that every instance of the change rule addition was a counterexample to the simplicity explanation and thus perhaps to the claim that all change is change in competence.

2. The 'new' model



At the highest level we find a set of meta-rules (MR's), expressing phonetic tendencies. Their status is that of empirical hypotheses. The effect of these tendencies are to be found in all languages, but not in every language to the same extent. MR's explain (or predict) the direction of phonetic change and the order (if any) in which segments will be involved. They do not predict at what particular time a change will take place, nor why there are language-specific values. The rules that result from the substitution of variables for language-specific values are called low level or detail rules. An explanation of MR's falls within the scope of phonetic theories (Chen 1973, Foley 1977).⁸⁾

The adoption of a set of MR's has two advantages. First, they do justice to the fact that rule addition (the inception of language-specific values) and 'simplification' in phonetic rules (changes in language-specific values, from now on to be called phonetic rule extension), are two sides of the same phenomenon: phonetically motivated change (sound change). Second, an explanation is given within the theory of rule addition and a proper explanation is given of phonetic rule extension, which has nothing to do with 'formal simplicity'.

Given the presence of language-specific rules the following type of change may occur as far as the structural change is concerned. The effect of the rule may be 'exaggerated'. Why this is so (and why there are language-specific values in the first place) can, at least in part, be explained within sociolinguistic theories of sound change in progress (Labov 1972).

In the model this 'exaggeration' is accounted for by a change in the status of the rule involved. There is no sharp criterion (formal or substantive) that justifies this step, but there is reason to believe that the exaggeration affects the phonetic nature of the rule in two ways. First, the rule starts interfering with 'function' (Van Coetsem, Hendricks & Siegel, forthcoming). On the one hand it is realized that the rule destroys formal aspects that bear meaning and on the other hand the formal effect of the rule may receive a 'meaning' itself. Second, although each diachronic step may be small, the synchronic rule will each time express a more drastic change. In other words, the successive diachronic process will be telescoped in one synchronic rule.

The next important step is called rule morphologization. This type

of change has no theoretical status in the SM since in the synchronic model on which the SM is based no distinction is being made between rules that do and rules that do not have a phonetic motivation (i.e. automatic versus non-automatic).

It is a ~~matter~~ of dispute whether this change is caused by loss or obscuration of the phonetic factors that trigger the rule or causes the rule to lose its phonetic character. The first possibility may occur when the triggering factor is destroyed by a subsequent change or when a subsequent change feeds the rule. Both developments make the original rule opaque. The second possibility may occur when the formal effect of a rule is interpreted as a morphological operation or part of a morphological operation (functionalization). It has been shown that there is a tendency on the part of language users to formulate rules in terms of morphological environments even if a phonetically completely transparent rule could be formulated too (Skousen 1975). An explanation of this tendency might be that speakers prefer formal differences to be associated with semantic differences (cf. Hooper 1976, 86). If it is true that the exaggeration of the phonetic effect of a rule also affects the phonetic character of a rule, as was suggested above, then both tendencies probably reinforce each other. However, the first possibility (that morphologization is caused and not the causer) may not be ruled out, since there are morphologized rules that are associated with a random group of words rather than with a particular morphological operation. E.g. in Dutch a small group of nouns having a non-tense vowel show a tense vowel in their plural forms, but a subset also in forms with a diminutive suffix. It might be argued that the rule, that originally tensed (or lengthened) vowels in open syllables was made opaque by a rule that deleted schwas and thereby closed syllables. A result of this rule was that a large number of non-tense vowels suddenly stood in an open syllable.⁹⁾

The further destiny of morpho-lexical rules is determined by the tendency that also caused their existence (at least in part, presumably): the desire on the part of language users to associate differences in form with differences in meaning and vice versa. Many linguists have stressed the relevance of this one-form-one-meaning principle, also called Humboldt's universal.¹⁰⁾

If the rule is not incorporated in a morphological operation, it is bound to be lost. The extra formal difference brought about by

the rule is redundant and it is in conflict with the one-form-one-meaning principle. This tendency is especially strong in flectional paradigms and it hardly affects isolated forms. E.g. in Dutch a lot of nouns that once had a tensed vowel in the plural have now lost it. Note that the 'loss' of a rule has nothing to do with formal simplicity, then. It is the transparency of the output that causes the loss of a rule once it has become non-phonetic.

If a rule is incorporated in a morphological operation or is the morphological operation it has more chance to remain. If there is competition of another morphological rule that is more productive, the rule may of course eventually get lost after all. The one-form-one-meaning principle does not only apply to stems but also to affixes: each semantic operation must be associated with one and only one formal operation.

A remaining rule may be generalized (cf. fn. 3) in that it is applied to new lexical items or simplified in that it loses a redundant subrule. The first thing happened to Umlaut in German, the second to Ablaut in Dutch. The original rule (informally):

$$\left[\begin{array}{c} \text{V} \\ \text{class III} \end{array} \right] \rightarrow \left\{ \begin{array}{ll} \text{i} & / \text{ PRES} \\ \text{a} & / \text{ PRET SING} \\ \text{o} & / \text{ PRET PLUR, PART PRET} \end{array} \right\}$$

was "simplified" (caused by the one-form-one-meaning principle: i in PRES, o in PRET) to:

$$\left[\begin{array}{c} \text{V} \\ \text{class III} \end{array} \right] \rightarrow \left\{ \begin{array}{ll} \text{i} & / \text{ PRES} \\ \text{o} & / \text{ PRET} \end{array} \right\}$$

E.g. Middle Dutch vinden vand vonden gevonden
 Modern Dutch vinden vond vonden gevonden

On the whole the German Umlaut case nicely illustrates the "live cycle" of a rule as it is expressed in the model (for a discussion see Robinson 1975). A morpholexical rule may also be complicated as the result of 'indirect modification'. Since many things can happen to a morpholexical rule we must use a neutral term such as rule change to refer to all possible cases (cf. Van Coetsem 1975a, b, and fn. 3).

So far nothing has been said about rule reordering. It has been said that this type of change is an artefact of a theory that is reluctant to restructure the LR's (Anttila 1972, 1978). Partly this is true. All changes from bleeding into counterbleeding order can be described in terms of restructuring, either with direct result in the surface (Koefoed 1974) or in combination with the addition of an inverted rule, the subsequent loss of which effects the surface forms (Vennemann 1972a). The second possibility is ruled out if we assume that allomorphs are stored in the lexicon instead of being derived by a rule from invariant LR's (cf. par. 3).

A change from counterfeeding into feeding order is of course not reordering, but unordering, since feeding order is intrinsic (cf. Stampe 1969, Vennemann 1972b). Unordering is likely to occur when a rule is added that feeds an already present rule. Of course instead of unordering the result of the addition of a feeding rule may also be that the fed rule becomes non-phonetic (cf. above) or is lost (cf. fn. 8).

We end up with the following situation. Rule simplification in the SM has been split up in two types of change: 'simplification' in phonetic rules (phonetic rule extension) and 'simplification' in morpholexical rules (rule change). In both cases formal simplicity was seen not to be the cause of the change. Rule addition has received an explanation in the theory. Rule loss was also attributed to other causes than the desire for simplicity. Substantive conditions that were introduced in the SM to explain cases of rule reordering (cf. par. 1) are used to explain rule morphologization, rule loss and rule change, but not to explain rule reordering since this type of change has been eliminated, apart from the case of unordering for which the motivation is phonetic (extension of phonetic rule to newly created environments). From this it follows that the value of 'formal simplicity' to explain phonological change is small or non-existing.

3. Afterthoughts: primary change in the lexicon

In the preceding section it was implicitly assumed that primary change is located in the rule component. On this assumption the model follows the SM: changes take place in the rule component and this explains why change is rule bounded. This applies to sound change as

well as to analogical change. For example, if a certain type of allomorphy disappears from the language, we explain this by saying that the rule has disappeared. Since rules are generative in that they derive the alternating surface forms from an invariant LR, the loss of the rule explains why the allomorphy has disappeared. However, there are several reasons why this approach is probably wrong.

First, it has been argued that allomorphy governed by morpho-lexical rules must be represented in the lexicon directly. The idea that this kind of allomorphy is produced by rules that work on invariant LR's must be given up (cf. Hooper 1976, Leben and Robinson 1977). Consequently the status of morpho-lexical rules must be changed. They become some sort of redundancy rules. Now if these rules do not derive allomorphs, in what way then could their loss affect the appearance of allomorphs? The only sensible view on 'rule loss' within a theory that stores allomorphs in the lexicon is the following. The actual change that is taking place is the loss or non-acquisition of one (or more) of the allomorphs. Nothing happens to the rule. This means that we must allow for restructuring to have direct consequences in the output (cf. Koefoed 1974). However, when all the relevant cases of allomorphy have disappeared, the redundancy rule disappears too, because there is no need whatsoever for its existence. So allomorphy is not lost because the rule is lost, but just the reverse: the rule is lost because the allomorphy is lost.¹¹⁾

Second, we have seen that a motivating factor for rules to be lost was the one-form-one-meaning principle. If we assume that this principle is a 'force' on the lexicon, just like the formal condition of simplicity was a force on the rule component, then it is only logical to say that change is change in the lexicon.

Third, the rule boundedness of phonological change appeared to be overstressed. In numerous cases change is lexically gradual, i.e. the relevant lexical items are affected one at a time. This process has been called lexical fading by Dressler (1972).¹²⁾

These three factors make it very likely that change in the rule system is secondary to changes in the lexicon, at least as far as 'analogical change' is concerned. However, also with regard to sound change there is reason to assume that changes in the rule system are secondary.

In the theory of lexical diffusion the view is defended that phonetic change is lexically gradual, i.e. not all relevant lexical

items are affected at the same time (Wang 1977). Labov (1972) calls this phenomenon decomposition. At a first stage of a change only a small group of items is affected. This group gradually grows until at a certain point in time 'the rule is felt' (cf. Chen 1977). As a result most of the relevant items appear to change simultaneously, leaving only a small group behind that is again gradually affected or remains as a residue. How should the first stage be accounted for in the SM (or the 'new model')? Should we assume that a rule is added to the grammar, which receives the formal status of a minor rule working only on lexical items marked by rule features? And should we furthermore assume that these factors are for some reason being lost (simplicity?) until the minor rule becomes a major rule, which does not work on the items marked by exception features, which will or will not be lost in the course of time (cf. Chen 1977)? It seems to me that this is a highly complicated description of a simple process of diffusion.

The following view seems more natural. At first, the exaggeration of a low level rule only affects a couple of words.¹³⁾ This is described as a change in the lexicon, where the most common pronunciation of word forms is stored. There is no rule and the 'cost' of the new pronunciation is equal to that of all unpredictable aspects of word forms. The new pronunciation may then spread to other words until at a particular time a rule is felt: 'all former A's are now pronounced as B's in environment C'. Thus the addition of a rule is secondary to changes in the lexicon. But what happens next? We have a rule, but it does not yet affect all the relevant lexical items. Do we need rule features to account for this? The rule feature solution is unattractive since the items still to be affected are no exceptions in the usual sense. A possible solution has been proposed by Leben & Robinson (1977). In the theory of upside-down phonology it is not necessary to use rule features, since the only thing rules do is undo the effect of diachronic processes. A rule that has not (yet) undergone the diachronic process will not undergo the synchronic upside-down rule simply because it does not meet its SD. However, it has been argued (e.g. by Pollack 1977) that a drawback of the upside-down model is that the distinction between phonetic processes and learned (morpholexical) rules is obliterated. And indeed, unless we find it necessary to store beside the most common all other pronunciations of a word form in the lexicon, right-side up

rules must be maintained (even if we assume that LR's are fully specified). And since a new pronunciation is usually tied up with a particular style level it is desirable to assume that once a rule is felt it works right-side up. But then we do need the rule feature solution.

Presumably, there is one way out. We do not have to assume that 'the' rule that is felt is the ultimate rule resulting from the diachronic process. A description of a process of vowel shortening in Western Flemish (Devos and Taeldeman 1974) has led me to the conviction that language users may formulate what we might call interim rules, i.e. rules that account for the process of shortening only in a well defined phonological or even morphological environment, while at the same time the change is spreading further (in the lexicon), presumably until another rule is felt. We could then say that the ultimate general rule is a generalized rule and that it is the sum-total of collapsing a series of successive rules (cf. Van Coetsem 1975, 1). However, this is a very speculative solution, which stands in need of further corroboration.

NOTES

1. The original version of this paper was written in December 1977. It was revised for this volume in March 1979.
2. Cf. Vennemann (1972b); Kiparsky (1972); Hooper (1976), chapter 6; Hogg (1977); Robinson (1977); Van der Hulst (1979a).
3. Van Coetsem (1975a: 16 and 1975b: 275) stresses the fact that rule complication also occurs (cf. Lipski 1973). Van Coetsem prefers the term rule modification which not only covers both phenomena, but is in addition non-evaluative just like 'addition', 'loss' and 'reordering'. Rule modification may occur as the result of the application of another rule whose output is lexicalized. This indirect modification often leads to complication (e.g. the ablaut rule in Germanic languages). Direct modification often leads to simplification. But even this need not be true, at least not in the standard notation; cf. Ralph 1975, 167 ff.
4. This may of course result in a different kind of rule: a redundancy rule; cf. Vennemann 1972b: 202. In fact a diachronic process may lead to a phonological rule and a redundancy rule at the same time; cf. Kiparsky 1972: 216.
5. This claim has been challenged by Vennemann (1972a), who argues that restructuring may take place even if the diachronic rule is synchronically recoverable. The output of the original rule

may be part of a category that is felt as more basic. This results in restructuring plus rule inversion. Cf. Van der Hulst (1979b).

6. This claim has been challenged by Van Coetsem (1975b).
7. Cf. Kiparsky (1965: 50) and Robinson (1977: 69).
8. Hooper (1976: 85-86) proposes to use the term rule modification instead of rule addition, since in practice added rules are usually only 'exaggerations' of already present low level rules. However, here I mean by rule addition the inception of language-specific values.
9. It is said that such developments may also cause the sudden loss of the fed rule (cf. Stampe 1969).
10. Especially Anttila (1972, 1978) and Vennemann (1972a & b).
11. Another view on rule loss that differs from the standard theory, but is opposite to the view defended here, can be found in Hogg (1979), where it is claimed that rule loss is a necessary precondition for analogical leveling.
12. Robinson (1978) argues for the gradualness of analogical changes with reference to the same changes that Kiparsky used to argue for the rule boundedness. I think that it is beyond doubt that numerous cases of analogical leveling or extension are gradual rather than abrupt.
13. According to Labov this may not be true for very low level effects, which involve simple phonetic parameters (low, front). Such very small change affects all relevant lexical items without a trace of lexical diffusion (Hasselt: Workshop March 16, 1979).

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