Vowel Harmony: Implications for the Alternation Condition*

Catherine Ringen

Zusammenfassung: Kiparskys (1973) revidierte Version der Alternationsbedingung besagt, daß Neutralisierungsregeln nur für abgeleitete Formen gelten. Da Vokalharmonieregeln (im allgemeinen) Neutralisierungsregeln sind, verhindert diese Formulierung der Alternationsbedingung, daß Vokalharmonieregeln wurzelintern auf unabgeleitete Formen angewandt werden können. Damit verlangt diese Formulierung der Alternationsbedingung, daß der Vokalharmonie in den Wurzeln durch eine separate Morphemstrukturregel Rechnung getragen wird. Wenn aber gezeigt werden könnte, daß die Trennung der Vokalharmonieregeln in Morphemstrukturregeln und phonologische Regeln unbegründet ist, hätten wir ein gewichtiges Argument gegen Kiparskys Version der Alternationsbedingung. Der Zweck dieses Beitrages ist es, ein solches Argument zu erbringen und eine neue Version der Alternationsbedingung vorzuschlagen, die nicht nur erlaubt, die Vokalharmonie als einen einzigen Prozeß zu charakterisieren, sondern auch die Erklärungsmächtigkeit der Alternationsbedingung zu erweitern. Die 'Neue Alternationsbedingung' besagt, daß Regelanwendungen, die Merkmale ändern, nur bei abgeleiteten Formen erlaubt sind. Diese Formulierung der Alternationsbedingung verlangt, daß die phonologische Theorie dahingehend abgeändert wird, daß Archisegmente in phonologischen Repräsentationen zugelassen sind.

The purpose of this paper is to show that Kiparsky's (1973) version of the alternation condition (henceforth, the revised alternation condition) is inadequate and to propose a reformulation which not only overcomes the inadequacy, but also increases the explanatory power of the alternation condition. First, I will show that Kiparsky's revised alternation condition requires that certain processes (such as vowel harmony) be stated as two separate rules – a morpheme structure rule and a phonological rule. Second, I will argue that it is incorrect to separate rules into a morpheme structure rule and a phonological rule and that, therefore, the revised alternation condition must be rejected. Finally, I will propose a new version of the alternation condition. A consequence of this proposal is that underlying representations must contain archisegments.

Kiparsky (1973) shows that if the alternation condition is formulated as in (1), it not only excludes rules of absolute neutralization,[1] but also correctly predicts the application of a number of rules which would otherwise require language-specific global conditions.

(1) Revised Alternation Condition (strong version)[2]
Neutralization processes apply only to derived forms.

Kiparsky defines 'neutralization' and 'derived' as in (2):

(2) A rule P, A → B/XC __ DY is neutralizing if and only if there are strings of the form CBD in the immediate input of P – otherwise P is non-neutralizing. An input is derived if it is created by combining morphemes through derivation or inflection or by application of a phonological rule.

Consider, for example, the Finnish *t* → *s* rule, (t → s/ __ i) which applies across boundaries (e. g. /halut+i/ > *halusi* 'wanted' cf. *haluta* 'want'), within morphemes where *i* is derived (e. g. /vete/ > *veti* > *vesi* 'water' cf. *vetenä* 'essive'), but not when the *ti* sequence

occurs in the underlying form (e. g. *koti* 'home'). Such examples have been used to argue for the necessity of language-specific global conditions on phonological rules. In this case, the global condition would state that the $t \rightarrow s$ rule does not apply if its structural description was met by a single morpheme in the underlying form. If the alternation condition is formulated as in (1), however, there is no need for the language-specific global condition: since the $t \rightarrow s$ rule is a neutralization rule (not all *si* sequences are derived by the $t \rightarrow s$ rule) the revised alternation condition predicts that this rule can apply only to derived forms.

Since Kiparsky's revised alternation condition prevents any neutralization rule from applying within a single morpheme (unless the form is derived), adoption of this condition means that, in certain cases, a separate morpheme structure rule must be posited even though it states the same restrictions as does a phonological rule. Consider, for example, vowel harmony in Hungarian. The Hungarian vowels are listed in (3). Front harmonic vowels do not co-occur with back harmonic vowels in native, non-compound Hungarian words. The neutral vowels occur in words with front or back harmonic vowels.[3]

(3) Hungarian:

harmonic vowels				neutral vowels	
front		back			
short	long	short	long	short	long
ü	*ű*	*u*	*ú*	*i*	*í*
ö	*ő*	*o*	*ó*		*é*
e [ɛ]		*a* [ɔ]	*á*		

The vowel harmony rule in Hungarian must account for alternations such as those illustrated in (4):[4]

(4)

/ha:z+tö:l/	> *háztól*	*ház* 'house' *tól/től* 'from'
/ha:z+ro:l/	> *házról*	*ról/ről* 'from off of'
/föld+tö:l/	> *földtől*	*föld* 'earth'
/föld+ro:l/	> *földről*	

These data show clearly that the vowel harmony rule in Hungarian is a neutralization rule by Kiparsky's definition. By the revised alternation condition, therefore, vowel harmony in Hungarian would be prevented from applying root internally to non-derived forms to account for root harmony in forms such as those listed in (5).

(5)

mókus	'squirrel'	*öröm*	'joy'
alma	'apple'	*ördög*	'devil'

Thus, root harmony in Hungarian must be accounted for by a separate morpheme structure condition if Kiparsky's revised alternation condition is adopted. This is not an isolated case. Whenever a neutralization rule states a restriction which also holds within morphemes, Kiparsky's revised alternation condition will require that the latter restriction be accounted for by a morpheme structure rule and this morpheme structure rule will duplicate the neutralization rule.

Prior to 1968, most generative phonologists assumed that a phonological rule could be used both to fill in redundant specifications within morphemes and to account for alternations in affixes. In other words, it was assumed that when the same restriction held both within morphemes and across morpheme boundaries, a single rule accounted for the

restriction. More recently, however, many linguists have argued that this earlier position is incorrect, and that restrictions within morphemes should always be accounted for by morpheme structure rules or conditions which are distinct from phonological rules. When these arguments are examined, however, it turns out that they are either invalid or inconclusive. Space does not permit consideration of all the arguments.[5] I will, therefore, simply assert that none of the arguments establishes the necessity of separating all morpheme structure rules from phonological rules, and briefly consider the best-known argument – the argument by Stanley (1967). Stanley argues that it is necessary to distinguish redundancy rules from phonological rules and to require that redundancy rules state a l l generalizations about the systematic phonemic level of representation. A consequence of Stanley's proposal is that a constraint which obtains both within morphemes and across morpheme boundaries, as does vowel harmony, will be stated twice: once as a redundancy rule or morpheme structure rule and once as a phonological rule. Stanley notices this consequence, but argues that despite the duplication which results, his proposal must be adopted because it provides a fully specified input to the phonological rules, and if the input to the phonological rules is not fully specified, certain misuses of blanks are possible. The structure of Stanley s argument is as follows: Given that (i) rules are extrinsically ordered, (ii) that certain rules or rule applications are possible in natural language, (iii) that phonological representations contain blanks, then follows that it is possible to misuse blanks. Since the misuse of blanks cannot be tolerated, phonological representations should not contain blanks. But this is not a valid argument. The premises do not show that phonological representations must be fully specified a n y m o r e than they show that rules cannot be extrinsically ordered or that a particular type of rule or rule application must be excluded from natural language grammars. Thus, Stanley's argument does not establish that the input to the phonological rules must be fully specified since there are other ways to prevent the misuse of blanks. But if phonological representations do not need to be fully specified, then the sole motivation for Stanley's proposed separation of morpheme structure rules and phonological rules disappears. This means that Stanley's argument provides no evidence against the claim that a single rule should account for a restriction which holds both within morphemes and across morpheme boundaries.

Moreover, there is good reason to posit a single rule to account for processes such as vowel harmony: t h e r e s t r i c t i o n s a r e t h e s a m e w i t h i n m o r p h e m e s a s a c r o s s m o r p h e m e b o u n d a r i e s . If root harmony is characterized by a morpheme structure rule and suffix harmony is characterized by a phonological rule, then this generalization is unstated, and furthermore, a duplication in the grammar results because the morpheme structure rule and the phonological rule state identical restrictions. I conclude that there are no reasons for separating a rule such as vowel harmony into a morpheme structure rule and a phonological rule and that there are very good reasons for positing a single rule which applies both within morpheme boundaries and across morpheme boundaries. If this conclusion is correct, then Kiparsky's revised alternation condition must be rejected.

This conclusion presents a dilemma: if Kiparsky's revised alternation condition is adopted, it forces unmotivated duplications in the grammar; if the revised alternation condition is rejected, it is no longer possible to deal with examples (such as the $t \rightarrow s$ rule in Finnish) that motivated the revision of the (1968) alternation condition. Notice, how-

ever, that if we assume that lexical representations are redundancy free[6] and that there is only one (phonological) rule in cases like vowel harmony, the application in the morpheme internal case can be distinguished from the (excluded) application of the $t \rightarrow s$ rule to non-derived forms such as *koti*: the root internal application (e. g. the application of Vowel Harmony in Hungarian to /almA/ > *alma*) involves filling in feature specifications whereas the application of the $t \rightarrow s$ rule to *koti* would involve changing a feature specification. This suggests that the alternation condition can be revised to state that feature changing applications are permitted only to derived forms. Let us call this the new alternation condition. The new alternation condition, like Kiparsky's revised alternation condition, excludes rules of absolute neutralization and predicts the application of rules like the $t \rightarrow s$ rule in Finnish which would otherwise require language-specific global conditions.

To see that analyses involving rules of absolute neutralization are excluded by the new alternation condition, consider Hyman's (1970) analysis of Nupe in which the rule of absolute neutralization in (6) merges underlying /a/, /ɔ/, and /ɛ/:

$$(6) \qquad \begin{matrix} V \\ [+low] \end{matrix} \rightarrow \begin{bmatrix} +back \\ -round \end{bmatrix}$$

According to Hyman's analysis, after labialization has applied to underlying /tɔ/ to give $t^{w}ɔ$, (6) applies to derive the surface form $t^{w}a$. But this latter application would be prohibited by the new alternation condition since it would be a feature changing application to a non-derived form. Thus, the new alternation condition, like Kiparsky's revised alternation condition, would exclude Hyman's (1970) analysis of Nupe. This analysis has been shown to be inadequate on independent grounds by Kiparsky (1973).

To see that the new alternation condition correctly predicts the application of rules which would otherwise require language-specific global conditions, consider the $t \rightarrow s$ rule in Finnish. The application of this rule to /halut+i/ is feature changing, but is permitted by the new alternation condition since the input *ti* is created by the combination of morphemes and is, therefore, derived. Similarly, the application of the $t \rightarrow s$ rule is feature changing when it applies to *veti* (from /vete/) and the application is permitted since the input string is derived by the application of the rule that raises word-final *e* to *i*. However, the application of the $t \rightarrow s$ rule to *koti* is blocked since this would be a feature changing application to a non-derived form.

In addition to excluding rules of absolute neutralization and predicting the application of rules such as the Finnish $t \rightarrow s$ rule, the new alternation condition is precisely the constraint necessary to prevent the misuse of blanks. In particular, the misuse of blanks which Stanley warns against crucially involves a feature changing application to a non-derived form, and thus would be prevented by the new alternation condition.

Finally, the new alternation condition predicts the exceptionality of certain items whose exceptionality is not predicted by the earlier version. Consider, for example, disharmonic loanwords such as *afääri* which violate Finnish vowel harmony restrictions. Up to now, not only has it been necessary to specify all harmonic vowels in such exceptional lexical items for the feature [back], but also to mark these items as exceptions to the Vowel Harmony rule. As Lightner (1972, p. 353) notes, however,

It would be pointless to posit an underlying segment deviant in some way only to have this deviance cancelled out by the application of the very rule which required us to set up the segment as deviant in the first place.

In other words, if we are going to set up an underlying segment as deviant in some way, it is n a t u r a l that this segment should be immune to the application of a rule which would erase that deviance. That a deviant segment should be an exception to a rule which would erase its deviance should be cost-free. Linguistic theory must somehow provide for such intimate relations between underlying representations and phonological rules.

The new alternation condition does precisely this. It p r e d i c t s, for example, that the Finnish Vowel Harmony rule cannot apply to disharmonic loanwords such as *afääri*, and thus these forms need not be specified with an exception feature (such as [-Vowel Harmony]). The application of Vowel Harmony to these (non-derived) forms would be feature changing and thus is prevented by the new alternation condition.

In summary: I have argued that Kiparsky's revised alternation condition must be rejected because it requires the unmotivated duplication of phonological rules by morpheme structure rules. I have proposed that the alternation condition be reformulated to exclude feature changing applications to non-derived forms. This formulation does everything that Kiparsky's revised version does and more: it predicts the exceptionality of a l l lexical items that contain violations of phonological rules. A consequence of adopting the new alternation condition is that phonological theory must be modified to allow blanks or archisegments in phonological representations.

Footnotes

* I am grateful to N. Clements, K. Houlihan, G. Iverson, A. Kousoudas, T. Perry, G. Sanders, J. Wirth, and W. Wood for their very helpful comments and suggestions on earlier drafts of this paper, and to A. Meier for translating the abstract.

1) Actually, Kiparsky (1968, 1973) leaves the question open of whether rules of absolute neutralization are to be (totally) excluded from grammars. The reformulation proposed in this paper is a reformulation of the strong alternation condition.

2) The weak version of the (1973) alternation condition states that n o n - a u t o m a t i c neutralization rules apply only to derived forms. A rule P, A → B/XC __ DY, is said to be non-automatic if and only if there are strings of the form CAD in the immediate output of P, otherwise P is automatic. The weak version of the revised alternation condition actually bears no relation to the original alternation condition (Kiparsky, 1968) since the former does not exclude any of the rules of absolute neutralization that the latter was designed to exclude – they are all a u t o m a t i c neutralization rules. Thus, it is only the strong version of the revised alternation condition that is a r e f o r m u l a t i o n of the original alternation condition.

3) There is some disagreement about the status of *e* (= [ɛ]). Vago (1976) and Stong-Jensen (1973) classify *e* as a neutral vowel. See Esztergar (1971) and Ringen (1975 and to appear a) for arguments that *e* is, in fact, best treated as a harmonic vowel. The status of *e* is not crucial to the present discussion.

4) For motivation of these underlying forms, see Vago (1973).

5) See Ringen (1975 and to appear b) for further discussion.

6) This assumption is not new. It was made by all generative phonologists prior to 1967. For additional arguments that lexical representations are redundancy free, see Hooper (1975). For arguments that MSCs have no place in generative grammar, see Clayton (1976).

References

Clayton, M. (1975) "The redundance of underlying morpheme structure conditions." Language 52. 295 – 313.

Esztergar, M. (1971) A generative phonology of nouns and vowel harmony in Hungarian. Unpublished Ph. D. Thesis, University of California, San Diego.

Hooper, J. (1975) "The archi-segment in Natural Generative Phonology." Language 51. 536 – 560.

Hyman, L. (1970) "How concrete is phonology?" Language 46. 58 – 76.

Kiparsky, P. (1968) "How abstract is phonology?" Indiana University Linguistics Club mimeograph. Published as Part 1 of Kiparsky, 1973.

Kiparsky, P. (1973) "Phonological representations." Three Dimensions of Linguistic Theory, ed. by O. Fujimura. Tokyo: TEC Corp.

Lightner, T. (1972) Problems in the theory of phonology, Volume 1: Russian and Turkish phonology. Edmonton: Linguistic Research, Inc.

Ringen, C. (1975) Vowel Harmony: theoretical implications. Unpublished Ph. D. Thesis, Indiana University.

Ringen, C. (to appear a) "Another view of the implications of Hungarian vowel harmony." Ms.

Ringen, C. (to appear b) "The alternation condition and archisegments." Ms.

Stanley, R. (1967) "Redundancy rules in phonology." Language 43. 393 – 436.

Stong-Jensen, M. (1973) "Two conditions in phonology." Orange Papers, Syracuse Studies in Linguistics, Vol. 1.

Vago, R. (1973) "Abstract vowel harmony systems in Uralic and Altaic languages." Language 49. 579 – 605.

Vago, R. (1976) "Theoretical implications of Hungarian vowel harmony." Linguistic Inquiry, 7. 243 – 263.