

XVIII. LINGUISTICS*

Prof. R. Jakobson
 Prof. A. N. Chomsky
 Prof. M. Halle
 Prof. L. M. Kampf
 Prof. A. L. Lipson
 Prof. H. Putnam
 Dr. G. H. Matthews

Dr. Paula Menyuk
 T. G. Bever
 J. A. Fodor
 C. Fraser
 Barbara C. Hall
 J. J. Katz

S. J. Keyser
 D. T. Langendoen
 T. M. Lightner
 P. M. Postal
 J. Reitzes
 J. J. Viertel
 D. E. Walker

A. A DESCRIPTIVE CONVENTION FOR TREATING ASSIMILATION AND DISSIMILATION

Assimilation and dissimilation are phonetic processes that can be found in almost any language. In their most common form these processes determine the value of a feature with reference to the value of the same feature in some adjacent segment. Thus, for instance, in many languages voicelessness and voicing in obstruent clusters are determined by the value of the feature in the last segment in the sequence. In order to describe such processes, we introduce the convention of using Greek lower-case letters as variables ranging over the values + or -. Thus, the assimilation of voicing/voicelessness just mentioned will be represented in this description as

$$(1) \quad [+obstr] \longrightarrow [a \text{ voiced}] \text{ in the env. } \text{---} \left([+obstr] \right)_o \begin{bmatrix} +obstr \\ a \text{ voiced} \end{bmatrix}.$$

Hence if the right-hand a is -, the obstruent in question is [-voiced]; if the right-hand a is +, the obstruent is [+voiced]. In order to handle dissimilation, that is, cases in which a given feature must change value in adjacent segments, it is natural to take $-a = -$, if $a = +$, and $-a = +$, if $a = -$. Thus, for instance, in a language without glides in which all words are of the CVCV structure, we would have a rule

$$(2) \quad [X] \longrightarrow [a \text{ cons}] \text{ in the env. } [-a \text{ cons}] \text{---},$$

where X stands for an arbitrary complex of features.

The conventions above allow us to treat in a simple fashion two additional processes that previously could be handled only with great difficulty. The first of these is exemplified by certain Slavic languages in which $/e/ \longrightarrow /æ/$ and $/o/ \longrightarrow /u/$ in the environment before nasal consonants.¹ This process can now be formalized as follows:

$$(3) \quad \begin{bmatrix} -comp \\ -diff \\ a \text{ grave} \end{bmatrix} \longrightarrow \begin{bmatrix} -a \text{ comp} \\ a \text{ diff} \end{bmatrix} \text{ in the env. } \text{---} [+nasal].$$

The second case of interest is one in which a given segment S_1 is replaced by another

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segment S_2 , and S_2 in turn is replaced by S_1 . T. G. Bever² has described such a case in Menomini in which, in a given context, all occurrences of /a/ have to be replaced by /æ/, and vice versa. This can now be handled quite simply by the following rule

$$(4) \quad [a \text{ grave}] \longrightarrow [-a \text{ grave}] \text{ in the env. E.}$$

M. Halle

References

1. G. H. Matthews has drawn my attention to a parallel case in Hidatsa in which /e/ \longrightarrow /i/ and /o/ \longrightarrow /ɔ/. It can be readily seen that this process can be formalized by replacing [a grave] in formula (3) with [-a grave].

2. T. G. Bever, Oral paper presented at a Linguistics Seminar, Research Laboratory of Electronics, M.I.T., June 15, 1962.

B. THE PROTO-SLAVIC DIPHTHONGS

We shall assume that proto-Slavic had four vowels

	i	u	e	o
diffuse	+	+	-	-
grave	-	+	-	+

These vowels could occur also in sequences of two: ii, ou, oo, ui, and so forth (long vowels will be regarded as sequences of two identical vowels) and they could also precede liquids: il, ol, and so forth. We shall be concerned here only with sequences consisting of a nondiffuse vowel followed by a diffuse vowel. As is well known, these four diphthongs yield in the later language the following reflexes:



It is evident that for all diphthongs except oi, gravity and diffuseness of the second vowel are assimilated by the first vowel. To handle this assimilation, we require a rule of the form

$$(1) \quad \begin{bmatrix} +\text{voc} \\ -\text{cons} \\ -\text{diff} \end{bmatrix} \longrightarrow \begin{bmatrix} a \text{ grave} \\ +\text{diff} \end{bmatrix} \text{ in the env. } \longrightarrow \begin{bmatrix} a \text{ grave} \\ +\text{diffuse} \end{bmatrix}.$$

We shall see, however, that in order to account for the reflexes of oi this rule will have to be modified somewhat.

We assume that flattening (rounding) is redundant in accordance with the rule

$$(2) \quad [a \text{ grave}] \longrightarrow [a \text{ flat}],$$

that is, all grave (back) vowels are rounded, all front vowels are unrounded.

We next postulate assimilation of gravity

$$(3) \begin{bmatrix} +\text{voc} \\ -\text{cons} \end{bmatrix} \longrightarrow [a \text{ grave}] \text{ in the env. } \longrightarrow [a \text{ grave}].$$

As a consequence of rule (3) the four diphthongs are represented by öi, ei, ou, and yu, respectively. Observe that the modification in gravity (backfront) has not caused any of the four diphthongs to coalesce.

The diphthongs beginning with a flat (rounded) vowel are next metathesized.¹

$$(4) \quad XY \longrightarrow YX \text{ in the env. } \longrightarrow [+cons],$$

where X is [+flat] and Y is [+vocalic].² As a consequence of (4), there are now six different reflexes of the original four diphthongs:

$$oi \begin{matrix} \swarrow \ddot{o}i \\ \searrow i\ddot{o} \end{matrix} \quad ei \quad ou \begin{matrix} \swarrow ou \\ \searrow uo \end{matrix} \quad eu \longrightarrow \gamma u$$

The two falling diphthongs are then subjected to progressive assimilation

$$(5) \quad [-diff] \longrightarrow \begin{bmatrix} a \text{ diff} \\ a \text{ grave} \\ a \text{ flat} \end{bmatrix} \text{ in the env. } [a \text{ grave}] \longrightarrow .$$

Hence $i\ddot{o} \longrightarrow ie$, but $uo \longrightarrow uu$.

Finally, the rising diphthongs undergo regressive assimilation:

$$(6) \quad \begin{bmatrix} +\text{voc} \\ -\text{cons} \end{bmatrix} \longrightarrow \begin{bmatrix} a \text{ flat} \\ +\text{diff} \end{bmatrix} \text{ in the env. } \longrightarrow \begin{bmatrix} a \text{ flat} \\ +\text{diff} \end{bmatrix}$$

thereby converting $\ddot{o}i \longrightarrow ii$, $ei \longrightarrow ii$, $ou \longrightarrow uu$, and $\gamma u \longrightarrow uu$.

It may be observed that if in rule (6) both occurrences of [+diff] were replaced by [β diff], rule (6) would cause $ie \longrightarrow ee$, which may possibly be realistic, since we know that the metathesized reflex of oi falls together with the reflex of long e.

M. Halle

References

1. There is still no firmly motivated convention for representing metathesis. The formulation in (4) must be regarded as provisional.

2. Note that metathesis operates also when Y is a liquid. In these cases, however, there is considerable dialectal variation. I hope to discuss this problem in a subsequent report. The idea of treating the development of all Slavic diphthongs as an instance of metathesis was first proposed by R. Jakobson, *Remarques sur l'évolution phonologique du russe moderne*, *Travaux du Cercle linguistique de Prague*, II (1928).

