

## On Generative Studies of Slavic Palatalization

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Historically, there is a set of changes in the Slavic language family whereby the velar segments shifted to their corresponding strident palatals before a front vowel. Dentals show a similar shift in point of articulation. A correlated change is one whereby underlying non-palatalized segments became palatalized. Generative studies of the synchronic phonology of the modern Slavic languages have been concerned with predicting the derivation of palatal stridents from underlying velars and dentals, and of palatalized consonants from non-palatalized consonants.

The articles under review here are Cohen (1969), Darden (1971), and chapter nine of Chomsky and Halle (1968), all of which are concerned with the phonological properties of palatal or palatalized segments. I should like to orient this review towards a discussion of the naturalness of phonological systems and the use of historical evidence in synchronic phonology.

The first study of palatal shift<sup>1</sup> that I would like to discuss is that given by Chomsky and Halle. The historical facts are as follows. Underneath each historical change are given the segments to which this change applies. To the right are given the results of the change in each of the three Slavic dialect groups.

	East Slavic	South Slavic	West Slavic
1st Velar Palatalization k, g, x	č, ĵ, š	č, ĵ, š	č, ĵ, š
2nd Velar Palatalization k, g, x	c, ʒ, s	c, ʒ, s	c, ʒ, s
Dental Palatalization t, d, s, z	č, ĵ, š, ž	t <sub>1</sub> , d <sub>1</sub> , š, ž	c, ʒ, š, ž

Chomsky and Halle present a synchronic analysis of modern Slavic in which they order the first palatalization before the second palatalization. Now the second Velar Palatalization can't apply to the output of the first palatalization because if this were the case all the forms given by the output of the first palatalization would be shifted to the forms predicted by the second palatalization. This does not in fact occur. They therefore have to order a rule of diphthong reduction between these rules. For East Slavic the resultant analysis is:

$$(26) \quad [-\text{ant}] + [-\text{back}] / \quad \text{---} \quad \begin{bmatrix} -\text{cons} \\ -\text{back} \end{bmatrix}$$

Monophthongization  $\left. \begin{array}{c} ay \\ oy \end{array} \right\} \rightarrow$  [nonback vowels]

(34)  $\left[ \begin{array}{c} -ant \\ -str \end{array} \right] \rightarrow \left[ \begin{array}{c} -back \\ +ant \end{array} \right] / \_ \left[ \begin{array}{c} -cons \\ -back \end{array} \right]$

(42) [+coronal]  $\rightarrow$  [+high] /  $\_ y$

I shall discuss this analysis in connection with Cohen's criticism of it. Cohen notes that the second Velar Palatalization applies only to underlying velars, so should have to refer only to [-anterior] segments. But if it did, it would incorrectly apply to the output of the first palatalization. Therefore, the ad hoc feature [-strident] must be added to the Structural Description of rule (34). Cohen correctly points out that the only reason Chomsky and Halle proposed the feature was to ensure that rules (26) and (34) were disjunctively ordered. This is, however, a criticism of Chomsky and Halle's discovery procedure, and not of their analysis, for the feature is not in fact ad hoc. Given the fact that the first palatalization precedes the second palatalization, this feature must be used in the statement of the second palatalization. The feature would then be no more ad hoc than using the feature [+high] in a rule that applied only to high vowels. What is really at issue is whether (26) precedes (34). Cohen's feature argument is irrelevant to this issue, for given this order the feature is not in fact ad hoc.

Suppose that we had two classes of underlying segments, class A and class B.

class A

$\left[ \begin{array}{c} -ant \\ -str \end{array} \right]$

class B

$\left[ \begin{array}{c} -ant \\ +str \end{array} \right]$

Now if a rule only applies to the first class, we must distinguish the difference in the behavior of the two classes by using the feature of stridency in the rule. The same situation obtains at the point at which rule (34) applies. There are two classes of anterior segments the rule could apply to, and it only applies to one of these classes.

A possible test of the issue would be this: if there are underlying, as well as derived, [-anterior] segments, we could see whether or not the rule (34) applied to them. If it did not, we would know that [-strident] is intrinsic to the rule and thus not ad hoc. If the rule did in fact apply to such underlying segments, but not to segments derived from (27), we would know that the features were used to block (34) from applying to the output of (26).<sup>3</sup>

We do, in fact, have evidence on this point. Consider the following data from Russian:

/ilyič̃/ 'Ilyich'  
 /ilyič + e/ loc. sg., \*/ilyic + e/  
  
 /obruč̃ + at'/ 'betroth'  
 /obruc + enie/ 'betrothal', \*/obruc + enie/  
  
 /obl'egč̃ + at'/ 'to make easy'  
 /obl'egc + is/ 2 sg. 'you facilitate', \*/obl'egciš̃/  
  
 /sm'eš̃ + at'/ 'to mix'  
 /sm'eš + enie/ 'mixture', \*/smešenie/  
 /sm'es + is/ 'you mix', \*/smesis/

I have seen no discussion of this point, but it appears that when an underlying strident palatal occurs before a front vowel, it is not shifted by the second palatalization. Therefore, the feature strident is intrinsic to rule (34) and is not an ad hoc device. Cohen says 'Furthermore, the choice of feature is arbitrary. The feature [+back] would do as well' (307). But this is a nonargument. Note that

$$\left[ \begin{array}{l} +\text{cons} \\ -\text{voc} \\ +\text{cor} \\ -\text{ant} \end{array} \right]$$

specifies all and only those segments which are

$$\left[ \begin{array}{l} -\text{voc} \\ +\text{cons} \\ +\text{high} \\ -\text{back} \end{array} \right].$$

The segment /č̃/ can be specified either

$$\left[ \begin{array}{l} +\text{cor} \\ -\text{ant} \\ -\text{contin} \\ -\text{voice} \end{array} \right] \quad \text{or} \quad \left[ \begin{array}{l} +\text{str} \\ -\text{contin} \\ -\text{voice} \end{array} \right] \quad 5$$

This arbitrary feature effect is not a defect of Chomsky and Halle's analysis, but of the nature of the feature framework (if, indeed, it is a defect).

As Cohen says of his second argument, the feature reversal argument, 'this argument is a direct consequence of the ad hoc and arbitrary use of [-str] in the SD of rule (34)' (307). But since his first argument against Chomsky and Halle doesn't go through, neither does his second.

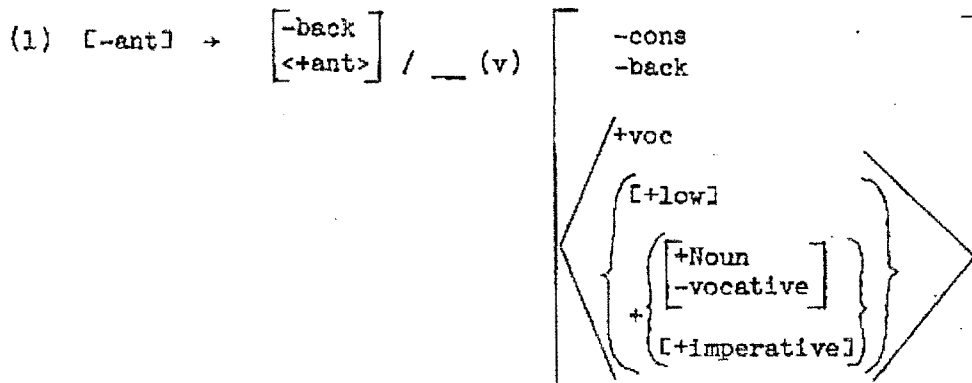
Cohen's real arguments are as follows.

(1) both palatalizations can optionally occur across /v/:  
 nom. sg. vlūxvu 'magician', nom. pl. vlūsvi, voc. sg. vlūšve.  
 We would then need an optional /v/ in the environment of two separate rules.

(2) There is no independent motivation for the rule of diphthong reduction.

(3) We can predict where the 2nd Velar Palatalization occurs syntactically (i.e. by morphological category).

The only reason for the diphthong reduction rule is to keep certain velars out of the environment for the first palatalization, so that they later undergo the second palatalization. If we assume that diphthongs have been restructured as underlying front vowels, we can collapse rules (26) and (34). The second Velar Palatalization occurs when the velar precedes /e/, or certain [-back] vowel affixes, i.e. any noun affix in any case but the vocative, or a verb affix in the imperative. Otherwise, the first Velar Palatalization applies. The rule is then:



This discussion brings up a point in regard to the naturalness of phonological rules. There is no other justification for the rule of diphthong reduction, so it seems implausible that Russian children should learn it. But given the lack of diphthong reduction, rules (26) and (34) can be collapsed into a single rule, and the extreme similarity in environments and effects indicate that they are in fact a unified process. The difficulty of Chomsky and Halle's analysis is the methodological one of assuming that diachronic order of rules gives evidence as to their synchronic order. Halle has stated (1962),

It has been proposed here that the primary mechanism of phonological change is the addition of rules to the grammar. ...If now we assume that rules are added always singly and always at a given spot in the grammar, then *it follows that the synchronic order of rules will reflect the relative chronology of their appearance in the language.*

Using this principle, many people have taken the historical phonology of a language and proposed this as a synchronic analysis. What is ignored here is the crucial matter of reformulation of phonological systems. Suppose rule B is added after rule A such that A precedes B and this is a non-feeding order. Then the rules are reordered to come into feeding order, so that B precedes A. Rules could also be reordered (after one of them had been added) to change from non-bleeding order into unmarked bleeding order to minimize rule opacity. We then cannot propose diachronic order as a basis for synchronic order.

Likewise, at some point underlying forms must be reformulated (or else the underlying forms of modern English would be the same as the underlying forms for Old English). Specifically, I agree with Cohen that the old diphthongs in Slavic have become underlying front vowels. The Chomsky-Halle analysis is then highly unnatural in terms of the type of rule order and underlying forms that are posited for the speaker of Russian.

The idea that segments which were formerly derived might become restructured as underlying segments is broached in Darden (1971). In discussing the phenomenon of palatalization, he takes issue with Lightner's claim that there are no underlying palatalized segments in Russian (Lightner MS). Many words end in palatalized consonants in Russian. Lightner posits a short front vowel following such segments which conditions palatalization and is then deleted. The rules are:

$$(2) [+cons] \rightarrow \begin{bmatrix} +high \\ -back \end{bmatrix} / \_ \begin{bmatrix} +voc \\ -cons \\ -back \end{bmatrix}$$

$$(3) \begin{bmatrix} +voc \\ -cons \\ +high \\ -tense \end{bmatrix} \rightarrow [-high] / \_ C_1 \begin{bmatrix} +voc \\ -cons \\ +high \\ -tense \end{bmatrix}$$

$$(4) \begin{bmatrix} +voc \\ -cons \\ +high \\ -tense \end{bmatrix} \rightarrow \emptyset$$

Historically, the short jers  $\bar{b}$  and  $\bar{b}$  were lowered to /e/ and /o/ respectively in certain positions and deleted in others. We have another case where the synchronic description mirrors the historical development.

Lightner's derivation of tat' 'thief' would be as follows.

	nom.sg.	gen.sg.
U.R.	tat + $\bar{b}$	tat + i
palatalization	tat' $\bar{b}$	tat'i
jer deletion	tat'	tat'i

Darden claims that since a final /t/ always appears phonetically as /t'/ in the  $\bar{i}$ -declension, it has become an underlying /t'/, i.e. the stem is tat'- in all forms. I agree with Darden for two reasons:

(1) The rule of jer deletion which is needed to condition surface palatalization is a case of absolute neutralization; we should thus seek another explanation where possible.

(2) Lightner's theory assumes the validity of the free-ride principle. There is an independent rule of palatalization. Therefore,

Lightner argues, consonants before a front jer can catch a 'free ride' on this rule. We can then eliminate palatals from the underlying inventory. The notion of simplicity metric is at issue here. It is not immediately obvious whether elimination of underlying segments can be purchased at the price of writing unnatural and unmotivated rules. In this case, our 'free ride' has a hidden cost attached. Caveat emptor.

I would like to discuss Darden's putative historical justification for his position. He notes that irregular masculine i-stems (which had front vowel endings) changed to regular o-stems. In this case the underlying back vowels of the endings were fronted (by a rule fronting vowels after palatal consonants, see Darden (1970)). This means that the stem ended in a palatalized consonant. When the back vowels of the o-declension were added, we find /tat'/ conditioning fronting of the vowel, not /tat/ followed by a back vowel. Darden says:

One example cannot be expected to prove a theory. It may, however, disprove a theory. If a theory predicts that something is impossible, and we find that it occurs, then the theory must be wrong. The single example provided by this paper can be taken as proof that the theory that underlies Lightner's analysis of Russian is incorrect. (330)

However, his example does not disconfirm Lightner's analysis, because:

(1) There is no reason to suppose that shift of paradigms should not be conditioned by surface forms rather than underlying forms, and there is a surface palatalized consonant in tat'.

(2) We can order fronting of vowels after palatalization (indeed, we have to if there is no underlying palatalization). The derivation includes a new rule (5) and proceeds as follows:

(5)  $V \rightarrow \emptyset / \_ + V$

U.R.	tat + a
palatalization	tat' + a
V truncation	tat' + <u>a</u>
V fronting	tat' + e

It should also be pointed out that Darden's historical evidence is dubious. The attested form is  $\tau a \tau \alpha$ . However, the symbol  $\alpha$  stood for /-ja/ as well as /e/ at the time of the records that Darden cites.

In short, I agree with Darden's conclusion, that we need to set up underlying forms different from surface forms only when the phonology of the language gives evidence that the child would learn that underlying form. His putative historical argument is not, however, convincing. In other words, it does not disprove Lightner's analysis. Both approaches can handle the data. The issue is that in order to eliminate underlying palatals Lightner and Chomsky and Halle have to add rules which one would not suppose to exist unless one already knew

the history of the language. The situation with palatalization is the same as with palatal shift. While one might look at the history of the language in order to find clues for an analysis, this is a method to be used with extreme care. There are at least two rules in this paper, diphthong reduction and jer deletion, which are at best highly dubious candidates for contemporary rules. If these fall, then the absence of underlying palatal and palatalized consonants is highly problematic. This is a reflection of the fact that at some point, the underlying forms and rules will cease to reflect their diachronic order.

#### Footnotes

1. I shall use 'palatal shift' to refer to a shift of a segment to a palatal point of articulation. 'Palatalization' will refer to adding the secondary feature of palatalization to a segment.
2. For South Slavic there is a minor adjustment of rule (42). For West Slavic, dental palatalization and the second Velar Palatalization have slightly different forms. In addition, the dental palatalization precedes the second Velar Palatalization.
3. We would also have an interesting case of a global condition on a phonological rule, since we would have to distinguish derived from nonderived segments.
4. Where /c/ is an affricate /ts/, -enie is a nominal ending, -is is 2 sg. verb ending. Forms in slashes are near-surface or phonetic.
5. I am indebted to various students in Linguistics 601, Autumn Quarter 1971, Ohio State University, for pointing this out to me.
6. The rule must in fact be

$$\begin{bmatrix} -ant \\ -str \end{bmatrix} \rightarrow \begin{bmatrix} -back \\ +ant \end{bmatrix} / \dots$$

for reasons given in my discussion of the feature of stridency. /obruc/ 'hoop', nom. pl. /obruc + i/, although Cohen's rule predicts \*/obruci/.

7. There is justification for rule (5). See Lightner MS.

#### References

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