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## FOREWORD

It is indeed gratifying to recognize the degree of acceptance the *Kansas Working Papers in Linguistics* has come to enjoy, and this is especially true for the series of *Studies in Native American Languages*. Even before the call for papers went out in the fall, we had received inquiries from prospective contributors, and the response to the call itself was remarkable in quality as well as diversity.

This year the *KWPL* marks its first decade of existence, and we are publishing two numbers. Number one is devoted to theoretical issues, general linguistics and old-world languages, while number two is the fourth in the *Studies in Native American Languages* series. This number includes articles representing seven different language families from all over North America (Uto-Aztecan, Muskogean, Yuman, Siouan, Otomanguan, Athabaskan and Algic), and a great deal of original scholarship.

We wish to thank the contributors, both those whose papers appear in this volume, and those whose papers we did not include. We also wish to thank the faculty of the Linguistics department of the University of Kansas for their support and encouragement for the *KWPL* throughout the year.

## VELAR PALATALIZATIONS IN DAKOTA

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### 1.0. INTRODUCTION

Much of the phonology of Dakota is quite transparent. Like the other Mississippi Valley Siouan languages, Dakota is largely lacking in the fusion which characterizes the phonologies of languages of many of the other North American language families; some agglutination does occur, but the phonology remains in most cases shallow, little more than surface phonemics. A few more difficult phonological problems are apparent in Dakota, and have received attention in the literature; to wit, stress placement and the velar palatalization processes (there clearly are at least two). This paper deals with the latter problem.

Dakota palatalization has been described by Patricia Shaw in connection with its bearing on phonological theory (Shaw, 1978, 1980), and by Richard T. Carter in his dissertation (Carter, 1974) in the context of a complete phonological description of Dakota, as well as by Franz Boas and Ella Deloria in their grammar (Boas & Deloria, 1939). We will use these sources and Deloria's collection of texts in our examination of the problem (the inclusion of the latter source is merely corroborative, as the phenomena evidenced in the texts accord with the description given in Boas and Deloria, 1939).

Our purpose here will be twofold. First, we shall describe all the velar palatalization processes in evidence in Dakota, and determine how many there are and describe their actions. Secondly, we shall formalize these processes in terms of rules or rule schemata, describing where possible unitary processes with unitary formalization, but avoiding collapsing rules together formally without sufficient justification.

### 1.1. THE VELAR PALATALIZATIONS

Briefly stated, Dakota velar voiceless stops ( $k$ ,  $k^h$ ,  $k'$ ) are palatalized to palato-alveolar affricates (here written without the wedge, as:  $c$ ,  $c^h$ ,  $c'$ , respectively) in some prevocalic environments following front vowels ( $i, e$ ). There are however some

complexities. To describe accurately the conditions and environments of the velar palatalizations, reference must be made to morphological classes and in one case to grammatical information (it is characteristic of Dakota that the distinction between these two types of information is sometimes hazy and difficult to pinpoint). From the point of view of phonological theory, this is not desirable; it would be preferred that description of all the phonological processes refer only to segments, boundary markers placed by the syntax, and other phonological rules; but in Dakota this is only possible by shuffling a great deal of morphological information into the syntax in the form of several different types of boundaries.

In the case of Boas' and Deloria's grammar, this is accomplished by naming all the pertinent categories and describing the arrangement of allomorphs according to their places within these categories. Both Shaw (1978) and Carter (1974) arrive at the solution of distinguishing among several different boundary types, the origin of (or inspiration for) whose diversity is morphological, or (as above) grammatical (syntactic); and whose effects are phonological. Similarly, Boas and Deloria, operating without the constraint to avoid excessive morphological reference, which constraint the recent theory imposes, simply describe ad hoc a part of the palatalization phenomena which requires the later linguists to create ad hoc the device of a global reference (in this connection, the older method of description is somewhat more elegant than the current practice, as the older method requires no weakening of its concurrent theory in order to describe data the recent theory must so weaken itself accurately to describe. However, this stems largely from the greater strength of the recent theory).

## 2. THE DATA: BOAS AND DELORIA

Because the inspiration for the present topic stems from confusion in trying to understand the Dakota velar palatalizations from the descriptions given them by Shaw and Carter it is best to begin here by briefly summarizing the data as presented in Boas & Deloria (1939). In their grammar one finds a regular process (cf. pp. 14, section 15) whereby the initial velar stops of a class of topicalizing particles (and, one assumes, only of the members of this class) with initial /k/ and /k'/ (none has initial /k<sup>n</sup>/) become palatalized to /c/ and /c'/,

respectively, following a terminal /e/ which has been "changed" from /a/. There is a catch, not to mention some incomplete explication: some of the final /e/'s from /a/ do not trigger the process; namely, those that are final in instrumental or locative prefixes. All other nominalized verb stems (these topic markers perform a nominalizing function) do trigger the process in these velars. And, when instrumental and locative nominalized verb stems appear as "nomina actoris," or otherwise as relative clauses, or in grammatical functions superordinate to that of instrumentality or locativity, to judge from the data Boas and Deloria present (cf. p. 14), it (once again) does trigger the palatalization (see below; probably this will be easily explained once the grammatical processes of nominalization, etc., have been worked out— cf. also W. de Reuse, A Grammar of the Lakhota Noun Phrase (unpublished M.A. thesis, 1983: Univ. of Kansas).

The only other palatalization that takes place following an /e/ is also narrowly restricted. In this case only the trigger is restricted, unlike the above process; any velar stop is palatalized if it follows any of the /e/-final demonstratives /le/ "this near me," /he/ "that near you," or the general demonstrative /e/ (cf. B&D, section 18, p. 16).

These two /e/-palatalizations affect different morpheme classes, and it would be difficult to unite them in our formal description (see below), or to justify the resulting unification. All the other palatalization processes described by Boas and Deloria involve a conditioning /i/.

káya	"to make"
icáqe ki <sup>n</sup>	"the instrument" (note prefix)
wakáye ci <sup>n</sup> hé	"the maker" (note relativizer /he/)
sápa	"black"
sápe ci <sup>n</sup>	"the black one"

Specifically, /i/-final pronominal prefixes, the possessive /ki-/, and the verbal and nominal general instrumental prefix /i-/ trigger palatalization in voiceless-velar-stop-initial active transitive verbs (after pronouns and possessive prefix); in nouns (with lexically marked exceptions after the nominal instrumental prefix); in instances of the verbal prefix /ka-/, and in the prefix /k<sup>hi</sup>-/ meaning "mutual contact" (see below), and the dependent verb /-k<sup>hiya</sup>/, "to cause to do

something," (after pronouns) (Boas and Deloria, cf. p. 14-5).

A second group of /i/-final morphemes fails to trigger the palatalizations: benefactive dative /ki-/; the locative adverbial prefix /i-/; and, most of the time, the verbal instrumental prefix /i-/ (except in the morpheme /ka-/, as above. Boas and Deloria also cite classes of voiceless-velar stop-initial morphemes which are not subject to the palatalization processes: "neutral" (stative) verbs, active intransitive verbs, verbs with initial fixed /ki-/, dative forms of verbs, verbs with instrumental /i-/, the /k/ of the benefactive dative prefix in nouns derived from verbs, and the /k<sup>h</sup>i-/ verbal prefix meaning "in two parts." The reader familiar with Mississippi Valley Siouan languages will have noted that some pairs of syntactically and morphologically very similar morphemes behave distinctly with regard to the /i/-palatalizations; this appears to serve the purpose of avoiding homonymy, but requires the complication of our analysis (see below). We shall investigate these pairs more thoroughly, but first we shall examine Carter's and Shaw's solutions.

k <sup>h</sup> áta	"he is warm" (stative)
nik <sup>h</sup> áta	"you are warm"
naíc'ik <sup>h</sup> ata	"he makes self warm by walking" (na- "by foot" ic'i- reflexive)
k <sup>h</sup> á	"to mean" (active transitive)
nic <sup>h</sup> á	"she means thee"
k'ú	"to give"
nic'ú	"she gives it to thee"
kilówa <sup>ñ</sup>	"to sing for another one"
nicíflowa <sup>ñ</sup>	"she sings for thee"
kic <sup>h</sup> úwa	"one pursues one's own" (possessive)
kik <sup>h</sup> úwa	"one pursues for him/her" (benefactive dative)
káya	"to make"
icáye ki <sup>ñ</sup>	"the instrument" (nominal instrumental)
ikíyut <sup>h</sup> a	"to measure, to try for s.o. without sanction" (verbal)
ikíu <sup>ñ</sup>	"to anoint with one's own"
ik <sup>h</sup> íyuksa	"to be cut by s.t. (as a thorn)"
icáb.laska	"to flatten by means of" (note ka-)
k <sup>h</sup> íza	"to fight"

kic <sup>h</sup> ɪzapi	"they fight each other"
ikic <sup>h</sup> ize	"weapon"
wiikiʒo	"flageolet"
	/wi i ki ʒo/
inik <sup>h</sup> inɪcapi	"woman instr. dat. whistle"
wak <sup>h</sup> ɪksa <sup>h</sup>	"they tear you in two"
nic <sup>h</sup> ɪksa <sup>h</sup>	"I wrestle with someone"
	"he wrestles with thee"
tu <sup>h</sup> wék <sup>h</sup> ɪya	"he made him see"
tu <sup>h</sup> wénic <sup>h</sup> ɪya	"he made thee see"
k <sup>h</sup> ɪyɛla	"near"
ik <sup>h</sup> ɪyɛla	"near to" (local adverbial /i-/)

### 3.0. CARTER'S "VELAR PALATALIZATION"

Carter describes the various velar palatalizations with two rules of palatalization, an ablaut rule to account for /e/ < /a/, and readjustment rules which operate ad hoc to assure correct output. Despite the latter rather powerful device, Carter (rightly) concedes that his solution still is inadequate and should be considered preliminary only. His general "Velar Palatalization Rule" is stated:

$$\left[ \begin{array}{l} -\text{son} \\ -\text{syl} \\ +\text{cns} \\ -\text{cnt} \\ +\text{ba} \end{array} \right] \longrightarrow \left[ \begin{array}{l} +\text{cor} \\ -\text{ba} \\ +\text{d.r.} \\ +\text{VPT} \end{array} \right] / \text{V} \text{ rank: @} \\ \text{[-ba]} \text{ V rank: @} \quad (\text{Carter 1974, p. 184})$$

Furthermore, it is to be applied iteratively, with rightward propagation. The feature specification [+VPT] (velar palatalization trigger) and iteration are required to make this rule account for the behavior of the benefactive dative prefix /ki-/. Recall from the description given in Boas and Deloria that the benefactive dative prefix does not trigger palatalization (while the possessive prefix /ki-/ does; /kic<sup>h</sup>úwa/ "pursues one's own," /kik<sup>h</sup>úwa/ "pursues for him/her"). The benefactive dative prefix is itself susceptible to palatalization, however, and once its initial medial /k/ becomes palatalized, then the prefix (now in the shape /ci-/) will trigger palatalization of a following active transitive verb-root-initial velar stop (/mak<sup>h</sup>ɪk<sup>h</sup>úwa/ "he chased it for me," /nic<sup>h</sup>ɪc<sup>h</sup>úwa/ "he chased it for thee").

Finally, Carter treats reduplication as a morphological process, during which the identity of segments liable to later phonological processes (e.g.: palatalization) is marked (Carter, 1974:233-4), in accordance with Ronnie Williams' "identity constraint." This appears to be as good a solution as any available to the problems of explaining the application of palatalization to these forms.

### 3.1. PROBLEMS IN CARTER'S ANALYSIS

It is apparent that Carter's analysis is in several minor ways inadequate. His treatment of the velar palatalizations fails to account for some forms in evidence, and does not narrowly enough restrict the environment for "Relative Palatalization," the rule for which he formulates:

$$\begin{bmatrix} -\text{son} \\ -\text{syl} \\ +\text{cns} \\ -\text{cnt} \\ +\text{ba} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{cor} \\ -\text{ba} \\ +\text{d.r.} \end{bmatrix} \quad \begin{array}{l} / e\# \quad \underline{\quad} \quad \text{V} \\ \text{Global constraint:} \\ /e/ < /a/ \text{ (by ablaut)} \\ \text{domain: relative clause} \end{array}$$

Here it is necessary to use a global derivational reference: the morphemes subject to this rule (see above) are not palatalized following final underlying (non-alternating) /e/, but rather only following an /e/ actively derived from /a/ in the ablaut process. Further, there are reasons to state the "basic" velar palatalization rule from Carter's analysis as two separate processes; it appears he has collapsed two processes with insufficient motivation.

#### 3.1.1. THE TWO FORMS k<sup>hi</sup>-

Some device must be introduced to separate the two homophonous morphemes of the shape /k<sup>hi</sup>-. Unlike the situation with the dative (benefactive) and possessive /ki-/s, there is no formal reason to mark the "in two parts" prefix /k<sup>hi</sup>-/ as exceptionally exempt from the velar palatalization rule. It would thus be formally acceptable to consider the two /k<sup>hi</sup>-/s members of different morphological classes, and separated from their respective leftward environments by different types of boundaries. This is formally impossible in the case of the /ki-/s because the application of a phonological rule changes the behavior of the dative /ki-/, and as such would require a morphological change



(of a boundary type) after part of the phonology was past, assuming such a solution would require a boundary of a certain type to be used to prevent application of "Velar Palatalization" to dative /ki-/. No such change of behavior occurs in /k<sup>hi</sup>-/. However, there is no outside motivation to treat the two prefixes /k<sup>hi</sup>-/ as members of separate morpheme classes, and even less to analyze the boundary between pronominal forms to the left and "in two parts" /k<sup>hi</sup>-/ on the right as stronger than "@" (the only stronger boundary in Carter's scheme is supposed to be #, which never occurs immediately following a pronominal prefix. Cf Carter 1974:121 ff., section 3.1: "A Profile of Verbal Morphology"). In fact, the two /k<sup>hi</sup>-/s act very much like two different uses of the same morpheme, except with regard to palatalization.

So, while neither /k<sup>hi</sup>-/ changes its behavior with respect to velar palatalization and they behave differently with regard to the rule, it is undesirable to claim they are members of different morpheme classes. The best solution to explain the difference between the two prefixes /k<sup>hi</sup>-/ thus appears to be to impose a simple rule feature in the lexical entry of the "in two parts" /k<sup>hi</sup>-/: [-palatalization]. The syntax then treats both of these prefixes alike (and also /k<sup>hiya</sup>/, "to cause someone to do something"), the unmarked morphs regularly undergoing velar palatalization.

### 3.1.2. THE FORM ka-

Next, it is necessary somehow to describe the behavior of the prefix /ka-/, instrumental meaning that a verbal action is performed by striking, or some other energetic movement of the hand or some device closely associated with the hand (as an axe, etc.). The complication here is a marked application of velar palatalization in an environment (following the verbal instrumental /i-/ prefix) in which the palatalization normally fails to occur.

It is relatively easy to separate /i-/ from the velar palatalizing environment by specifying /i-/ as a member of a morpheme class which does not trigger palatalization; that is, using a boundary to block the rule. Such a solution would require the introduction of a new minor rule to account for the palatalization of /ka-/. This solution has the advantage of simplicity; it lacks for elegance. Most importantly, it makes no

unmotivated claims for the basic Velar Palatalization Rule. We must first see whether this process should be considered formally a part of the more general velar palatalization process or not. It is apparent on observation of the data that the /ka-/ instrumental prefix acts normally with respect to the velar palatalization rule (including after local adverbial /i-/, e. g.: /icág.la/ "alongside of," and so the peculiar behavior here is on the part of the instrumental /i-/ prefix. In nouns, the nominal instrumental /i-/ does trigger the palatalization, but the verbal instrumental /i-/ does not, except in /ka-/.

Apparently, we must refer to the grammatical environment of the /i-/ prefix to predict correctly its palatalizing effect on following velar stops. It behaves regularly in nominal environments, and so there is reason to include /i-/ in the regular palatalization rule. Then, the particular boundary between /i-/ and /ka-/ must be specified in the structural description of the rule, and be required obligatorily by a rule feature entered in the lexicon under /i-/, the rule appearing:

$$\begin{bmatrix} -\text{son} \\ -\text{syl} \\ +\text{cns} \\ -\text{cnt} \\ +\text{ba} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{cor} \\ -\text{ba} \\ +\text{d.r.} \\ +\text{VPT} \end{bmatrix} / \begin{bmatrix} \text{V} \\ -\text{ba} \\ +\text{LGM} \\ +\text{verb} \end{bmatrix} \text{ } \text{\textcircled{c}} \text{ } \overline{\text{V}} \text{ (ranked as above)}$$

(making reference to Carter's boundary scheme, cf. Carter 1974:124 ff.), where LGM means "lexical grammatical marker." I prefer for now to go ahead and mark the verbal environment outright; Carter claims two nearly identical boundaries, \textcircled{c} and \textcircled{s} (Carter 1974:121 ff.), the one appearing only in verbal, the other only in nominal constructions. The reassignment of boundaries in derivation is strictly analogous to marking the grammatical environment; I merely feel it is less confusing to do the latter (one of the weaknesses of Carter's work, incidentally, is his failure to summarize the uses he makes of boundaries, i.e.: the specific contrasts boundary types are used to mark, at one place in the work. His boundary scheme is based on that developed by Richard Stanley in his dissertation on Navaho, where such a complex scheme is of clearer necessity).

Recall that the prefix /i-/ of local adverbs does not trigger palatalization of following velars. This

should raise the question why it fails to do so, a question Carter fails to address. Either it is of a similar morpheme class to the verbal and nominal prefixes with the same shape (albeit a different function), or it is not. If it is of a similar class, then the adverbial prefix /i-/ must carry a lexical rule feature [-VPT]. This prefix is never preceded within the word by any environments susceptible to or triggering the velar palatalization and of course is not itself susceptible to the process, so there is no forthcoming evidence as to whether this feature would be identical to that carried by the benefactive dative /ki-/ prefix; it may be subscribed or otherwise orthographically distinguished from the latter if one feels inclined compulsively to separate these two morpheme classes until or unless some evidence is found to unite the causes of their similar behavior. Certainly, however, the prefix /i-/ of local adverbs (unlike the dative /ki-/) never is changed to [+VPT]. Because it would require the creation of yet another boundary type to account for the behavior of this prefix /i-/, no other motivation for which is evident (Carter already uses seven different boundary types, cf.: Carter 1974:124-9; this /i-/ is associated only with the unmarked morpheme boundary /+/ in his scheme), it would be better to mark this prefix with a rule feature of some sort. Dakota typically avoids homonymy in some way such as this, similarly as with the different behavior of the two prefixes /k<sup>h</sup>i-/ (cf.: Carter 1974:187 ff., section 3.5.).

Note that the instrumental prefix /ka-/ also behaves irregularly with regard to this local adverbial /i-/, as witnessed in the above example /icáŋ.la/. It thus appears some minor rule extending the environment for palatalization of the velar in /ka-/ may be necessary; or may also be described by including the local adverbial prefix /i-/ in the same morpheme class as the verbal and nominal instrumental /i-/s, and extending the rule feature [+LGM] to include both of the prefixes lexically marked [-VPT<sub>x</sub>] (the subscript <sub>x</sub> being that notational device referred to above).

### 3.1.3. DEMONSTRATIVES

It remains to consider whether the palatalization of velar stops following the demonstrative pronouns ending in /e/ is correctly described as part of the general Velar Palatalization Rule, or should be (at

least tentatively) separately described. Recall that only this very limited set of /e/-final prefixed or preposed morphemes (e, le, he) triggers velar palatalization, except where the /e/ vowel is produced by ablaut; these are the only organic, or lexical /e/s that trigger palatalization. Carter does not mention this class in his work specifically, and so the question remains what sort of boundary occurs over which they may condition palatalization; he does include all front-vowel-final morphemes bounded by a boundary weaker than his /@/. Boas and Deloria make no note of it, but there is also a verbal prefix /e-/, meaning "on or at," which does not trigger velar palatalization (it is not too common. Cf.: Buechel 1970:136), e.g.: /ekáya/ "to make a thing at a place," /ék<sup>h</sup>axtaka/ "to barely touch there." As yet I have found no examples of this morpheme co-occurring with /ka-/: such examples might shed light both on this problem with the Velar Palatalization Rule and with the status of local adverbial /i-/ (whether this latter is a member of the same class of morphemes as the verbal and nominal instrumentals).

The demonstratives/evidentials/deictics (what you will) are preposed to nouns and adverbs. It thus is apparent that Carter has yet another process included in his Velar Palatalization Rule only questionably related to the main process, and operating in a different morphological environment. Recall that adverbial /i-/ is not palatalizing; it would be unusual, not to say unnatural, to create a mechanism to palatalize velars after nonhigh front vowels that did not also have the same effect after high ones (at least synchronically this seems a bit odd). Also recall that nominal instrumental /i-/ does trigger palatalization.

### 3.2. CARTER'S "RELATIVE PALATALIZATION"

Having reviewed the descriptive problems with Carter's basic Velar Palatalization Rule, let us briefly examine his global "Relative Palatalization" rule. Carter's rule "Relative Palatalization" (Carter 1974:218-20) clearly does not adequately describe the globally constrained process whereby the initial velar stops of a class of topicalizers (see above) are palatalized after a stem-final /e/-grade ablauted vowel. His rule correctly predicts that all such structural descriptions met in relative clauses will be palatalized, but incorrectly implicates the corollary statement that no such structural descriptions other

than in relative clauses will give rise to the palatalization process. In fact, the only group of SD's excepted from (as I shall call it) "Ablaut Palatalization" are instrumental nouns (carrying the /i-/ instrumental prefix) when in other than a relative clause; in relative clauses these too undergo the palatalization. It appears that Carter misapprehended Boas' and Deloria's examples illustrating this alternation as emphasizing the importance of the syntactic domain of the process generally. Several of his examples in fact (cf.: Carter 1974:219; /icáye ki<sup>n</sup>/ "the tool," /wakáye ci<sup>n</sup>hé/ "the one who made it," etc.) are identical Lakota to those examples found in section 15, p. 14 of Boas and Deloria. In this light, Carter's statement (Carter 1974:219), "Although there may be other syntactic environments beside relative clauses which exhibit this palatalization, our knowledge of Dakota syntax is not adequate to characterize them," now appears phlegmatic.

In fact, it is easy (but awkward) to rewrite the rule to correctly describe the data. Carter's ablaut rule:

$$\text{Ablaut: } \begin{bmatrix} a \\ +\text{ABL} \end{bmatrix} \longrightarrow \begin{bmatrix} e \\ i^n \end{bmatrix} / \text{---} ] \text{ VERB } \begin{bmatrix} X \\ +\text{ABT} \\ \# \\ = \\ ] \text{NOUN} \\ \# \text{na}^n \\ +\text{ktA} \end{bmatrix}$$

Ablaut Palatalization:

$$\begin{bmatrix} -\text{son} \\ -\text{syl} \\ +\text{ba} \\ +\text{cns} \\ -\text{cnt} \end{bmatrix} \longrightarrow \begin{bmatrix} +\text{cor} \\ -\text{ba} \\ +\text{d.r.} \end{bmatrix} \begin{matrix} / e < A \# \text{---} V \\ \left\langle \begin{matrix} \text{---} \\ \text{---} \end{matrix} \right\rangle ] \text{instrumental} / \text{ind} \\ \left\langle \begin{matrix} \text{---} \\ \text{---} \end{matrix} \right\rangle ] \text{relative} \\ \text{clause} / \text{dep} \end{matrix}$$

The line under the leftward environment shows that the angled-bracket restriction only applies when this environment is in the syntactic domain of an instru-

mental (NP, by definition; though not necessarily causally. All the /e/-grade kV, etc., particles are nominalizing topicalizers), then for the rule to operate, the whole SD must fall within the domain of a relative clause, thus the line under the entire SD. The capital /a/ (/A/) is a Siouanists' symbol for this ablauting vowel, common among all the Mississippi Valley Siouan languages.

#### 4. SHAW

The discussion of the Ablaut Palatalization rule is a convenient point at which to move to examination of Shaw's article, as this latter is predominantly concerned with the global reference to the origin of the triggering vowel /e/ required to make the rule work accurately.

Shaw examines the Dakota palatalization phenomena with the goal of testing Paul Kiparsky's constraints on global reference in phonological rules (Kiparsky 1973). She begins by viewing the palatalizations as a unified process; in this form, the palatalization rule is understandably confusing. The different behavior of the processes triggered by /i/ and /e/ lead Shaw to examine the domain of the palatalizations following each vowel respectively, and eventually (Shaw 1978:242) to separate the two rules in her scheme. This she does after effectively settling the issue of excrescent /k/s in reduplicated forms by showing that they are not illustrative of reversed or hindered intramorphemic palatalizations (Shaw 1978:234-9), an issue that Boas and Deloria (1939:14) leave unexamined while using reduplicated data to suggest an earlier, now opacified intramorphemic process. Carter (1974:226) provides a rule of dissimilation whereby a coronal noncontinuant is made into a velar before another coronal consonant (this solution is parallel to Shaw's, but formalized, while Shaw's is not; cf.: *ibid.*). As we are not concerned here with problems other than that earlier alluded to in connection with Dakota reduplication, we shall not further examine the phenomenon here.

Rather, we return to the central goal of Shaw's article. In his 1973 paper, Kiparsky suggested three conditions which might be required of any phonological rule, if it be allowed to make (global) reference to the earlier stages of the derivation of the shapes to which it applies. It turns out that two of the conditions

appear to hold, while the third requires some revision to fit the data. Specifically, Kiparsky's constraints predict

1. Rules cannot look back at any arbitrary stage of a derivation. They need only distinguish between derived and non-derived representations and the constraint is always that the rule applies to the former only.
2. Not any arbitrary rule can look back, but only a certain type of rule, namely a neutralization rule.
3. Application to derived forms only can be required generally of non-automatic obligatory neutralization rules. It can be made obligatory for all neutralization rules only if absolute neutralization can be eliminated completely.

(Kiparsky 1973; cf.: Shaw 1974:227)

Shaw's revision of Kiparsky's first constraint requires the constraint to distinguish between "actively" derived and "passively" derived representations. Actively derived forms are produced when some still present segment(s) of the intermediate representation (IR) have been changed by the active application of an earlier phonological rule such that they are no longer in the same shape as that of the segment in the UR. Passively derived forms are produced by the juxtaposition of segments caused by compounding, segment deletion, etc. Shaw's revision is that in Dakota Ablaut Palatalization and Klamath Vowel Shortening, the rule needs to separate out, and apply to, IRs produced actively. Passively derived IRs are not liable to the rules.

Shaw's rule schema for Dakota velar palatalization is presented this way:

$$\begin{bmatrix} k \\ kh \\ k' \end{bmatrix} \longrightarrow \begin{bmatrix} c \\ ch \\ c' \end{bmatrix} / \left\{ \begin{array}{l} i \left\{ \begin{array}{l} + \\ / \end{array} \right\} \\ e \left\{ \begin{array}{l} \# \\ = \end{array} \right\} \end{array} \right\} \begin{array}{l} \overline{v} \\ \text{global condition:} \\ /e/ < /A/, \text{ by ablaut} \end{array} \quad (\text{Shaw 1978:242})$$

It is imperative to note here that the /e/-grade ablauting environment in Shaw's formulation of the Dakota ablaut rule includes a class of morphemes missed both in Carter and in the phonology exposition in Boas and Deloria: dependent verbs. (//iyáyA=ktA#k'éyaš// → /iyáy<sup>h</sup>kte c'eyas/ "he was going to go on, but....") Here the boundaries are /=/, the clitic boundary, and /#/ , the word boundary.

### 5.0. REANALYSIS

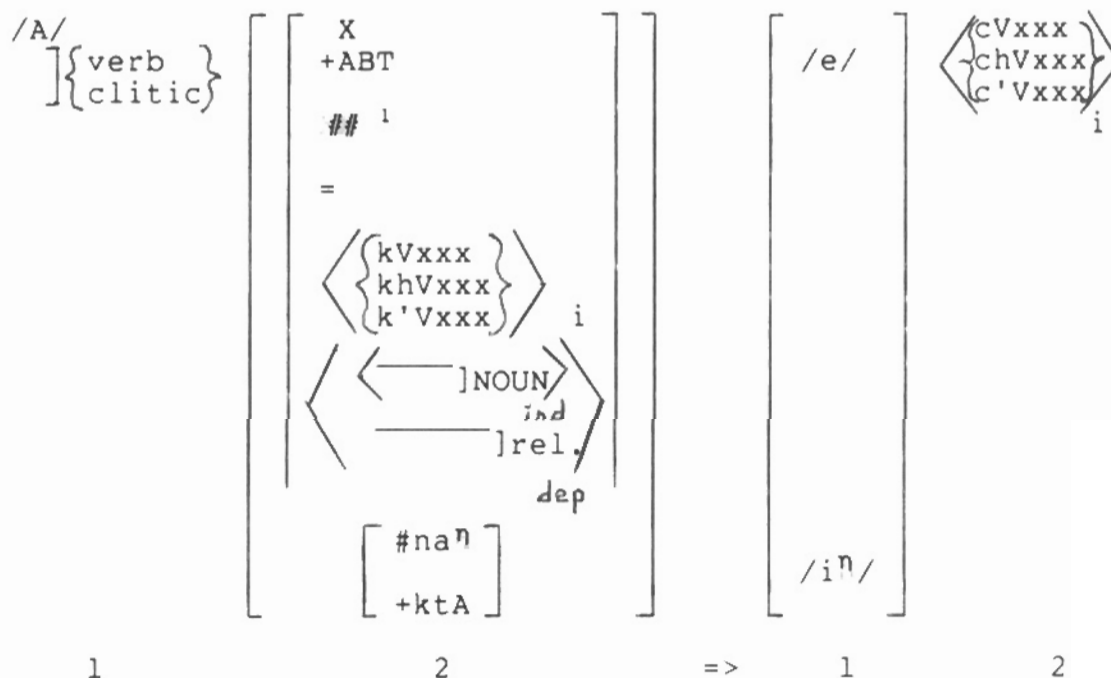
It is an unorthodox solution I suggest for the ablaut palatalization problem in Dakota. As is apparent from the discussion above, the two major palatalization processes in Dakota are best described and formalized separately; there is in fact little reason to consider uniting them. As I stated discussing Boas' and Deloria's descriptions, and as is explicit in Shaw's rule schema, no underlying /e/s except those of the demonstrative pronouns condition velar palatalization; Carter's rule incorrectly does not prohibit other organic /e/s from conditioning the process. It is necessary to amend Carter's Velar Palatalization Rule to specify the conditioning environment to the left of the velar stop as [+hi] to correct this oversight. The Ablaut Palatalization Rule, now unequivocally separated from Velar Palatalization, I propose to include as part of the larger ablaut process and formalize it as such. Because there is a more "normal" /e/-induced palatalization following the /e/-from-/A/, we can avoid collapsing these rules undesirably and make it easier to keep the demonstratives' minor rule separate from the Velar Palatalization Rule at the same time. Also, if the one specific rule to which a global reference must be made by Ablaut Palatalization is collapsed together with this latter process, we no longer need to make the global reference. In essence, we look on palatalization as a codicil on Ablaut, rather than looking on Ablaut as a necessary precondition to palatalization in these forms.

### 5.1. TR RULES vs. GLOBAL REFERENCE

At the same time, we avoid the powerful device of a global derivational constraint by collapsing these two rule, it is done at the expense of admitting one other powerful formal tool: (a) transformational rule(s). However, this may be looked on as a net reduction in the power of the theory used to describe Dakota; TR rules



are only formal hardware to describe combinations of processes the more orthodox format cannot handle, whereas the global reference is a software device, and makes claims for the workings of language the TR rules do not (TR rules do make claims about the types of processes which are systematically linked, of course). We want our rule to say: "the /A/ segment is subject to ablaut variations based on its rightward environment; some environments change /A/ to /e/, some others change it to /i<sup>n</sup>/. In addition to this, if the conditioning environment of the front-nonnasal-mid vowel happens to be a velar-stop--vowel sequence, the velar stop is palatalized." Thus we view the entire process as one of fronting. Citation forms for the /A/-final words have the /a/ grade for Dakota speakers (cf. Buechel, 1970), and other Mississippi Valley languages with the /A/ ablaut do not show this palatalization process (R.L. Rankin, "Structure of Kansa" class notes and other personal communication). Note that this formalization is explicitly not attempting to make any claims about the psychologically real, however. As a first attempt to formalize this complicated process, I submit the following:



It may be helpful to refer to the earlier formalization of the ablaut process to understand this schema.

## 6. CONCLUSION

In summary, then, we have two major rules, and two minor rules (one of which has not been formalized here; any stem-initial (verb or noun) velar stop is palatalized after the /e/ final vowel of the demonstrative class), and a number of lexical rule features which must be present. These rule features account for the lack of strict homonymy between the pairs of morphemes shaped /ki-/ and /k<sup>h</sup>i-/. The other minor rule describes the behavior of the /ka-/ prefix.

This can by no means be considered anything but a preliminary consideration of the Dakota palatalization phenomena; the rules, and especially the Ablaut &c. rule, are all candidates for revision. However, all the little points on which one or another of the previous treatments of the subject have been lacking<sup>2</sup> now have been gathered. It is to be hoped that at some future date, new fieldwork based on this collation will affirm the details of the data heretofore available. It is also necessary at some future time to determine what differences, if any, are evident among the several varieties of Dakota with regard to palatalization (as well as a general description of the state and peculiarities of the Dakota dialects--particularly of the Lakhota groups. There has been some indication (Walt Hull and K.L. Miner, personal communications, and Miner, 1981) that there are significant differences among the dialects not rigorously described to date.). Also, it will eventually be necessary to incorporate this treatment of the palatalizations into a revised complete synchronic description of Dakota phonology.

## NOTES

1. Carter's /##/ is equivalent to Shaw's /#/
2. or simply disagreed, e.g., /e/-induced palatalization

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