

OPACITY AND RULE LOSS

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It has been proposed by Kiparsky (1971) that the principle of transparency/opacity has an important role to play in the grammars of languages. He suggests that the unmarked interaction of rules is that which leads to maximally transparent rules, while marked interactions lead to opaque rules. From this principle then, the predicted direction of linguistic change would be toward transparent rule interaction. In keeping with this, Kiparsky suggests that opacity will tend to be eliminated in the course of change through rule re-ordering, rule generalization or rule loss. This mechanism would, then, seem to provide us with a manner of predicting when some readjustment of the grammar will take place. In spite of this, however, there are numerous readily available examples of apparent opaque rules and rule interactions which exist in the grammars of languages, there being (in many cases) no apparent attempt made to ameliorate the situation by any of the above-mentioned means. Recently, Kisseberth has taken a step in the direction of predicting when opaque rule interactions will occur in languages. His proposal is that opaque interactions are the result of the basic polarity of language--that is, "the tension in language created by conflicting pressures which are exerted on it". Thus, opaque rule interactions (that is, opaque by Kiparsky's definition) serve to keep

semantically contrasting forms phonetically separate; to preserve morphological distinctions; or to preserve underlying phonological contrasts on the surface. Similarly, Kaye has recently made the independent discovery that opaque rule interactions are tolerated if the rules are recoverable. He was led to this conclusion by the fact that there exist many instances of rules which display very natural relationships--in fact, the kinds of relationships found in language after language; yet, these all involve opaque interactions of rules. He discovered on the other hand, however, that they also all have in common the fact that the rules are always recoverable. A typical example involving opacity and recoverability is the following:

French Nasalization: /fin/ → [fɛ̃]

where the nasalization is "opaque", but recoverable.

Thus, to summarize all of these, it seems to be the case that opaque rule interactions are tolerated by languages only if such interactions are motivated--that is, if the reason (or cause) is transparent, if the language gains something from the opacity, or if the rule is recoverable. Other cases of opaque rule interactions will be unstable and an adjustment will take place in the grammar to eliminate the opacity, explaining the fact that, as Kisseberth claims, these interactions rarely, if ever, are found to remain.

At this point in our research, then, we seem to have the beginnings of a workable means of being able to predict the

direction of change in terms of rule interactions.

In this paper, I wish to consider another possible way of predicting change, in particular, rule loss, also in terms of the concept of opacity. Specifically, what I wish to show is that we need to expand our concept of opacity to include another type, namely, what I will call derivational opacity. This type of opacity does not involve rule interaction (in the usual sense of the term, that is), but rather assumes the form of rule competition or ambiguity. Rather than being distinguished by some sort of contradiction of a rule on the surface, derivational opacity is distinguished by the impossibility of determining which of two derivations a form has undergone, or, in other cases, by the impossibility of determining without the help of diacritics, which of two derivations a form is to undergo although, as the examples will show, opacity of the usual sort may also accompany the derivational opacity.

By its very nature, derivational opacity should tend to not be tolerated by languages, for it is in general not motivated in the sense that Kisseberth found apparent opaque rule interactions to be, nor in the sense that Kaye found, for, also by its very nature, it does not involve recoverability of the rule or derivational process. This type of opacity should then be predictably subject to elimination by rule loss (or generalization, in certain cases), and such elimination, both phonological and morphological does in fact appear to be the usual course of action.

Before continuing, it should be emphasized that I have by no means carried out an exhaustive investigation of cases of rule loss, and I am thus simply offering suggestions which hopefully may be a positive step in the direction of shedding some light on the nature of the processes involved in the different sorts of linguistic change.

The principle of derivational opacity can be illustrated by the following examples. (The sources of these examples are given in the bibliography). The first two examples illustrate derivational ambiguity involving surface forms, and the other two show loss resulting from derivational competition.

The first example is taken from Semai, a Malayan language spoken by about 16,000 people, and involves the interaction of several morphological processes. For roots of the canonical shape  $C_3C_2VC_1$ , there are three infixation processes. The first infixes an r between the first two consonants to form causatives:

kʔa:ç 'be humid'; krʔa:ç 'to wet something'  
 sɔŋh 'be afraid'; srɔŋh 'to frighten someone'

The second infixes a nasal to form a noun of action. The nasal then assimilates to the following consonant:

ʃʔɔ:y 'be numerous'; ʃnʔɔ:yy 'quantity'  
 sma:n̄ 'ask'; smma:n̄ 'a request'

The third is a variable infix denoting indeterminacy. This process infixes a copy of the final consonant between the first two consonants:

krəp 'be on the lookout; kprəp 'to chase'

ê?u:l 'swallow the wrong way'; êl?u:l 'suffocate'

The existence of the last infixation process causes ambiguities to arise, for if the root-final consonant is r or a nasal, the infixed form will be identical in form to the causative and the noun of action respectively:

pde:r 'to say something'; prde:r 'to speak, cause to say'

êdo:n 'to lean on something'; êndo:n 'the act of leaning', or 'to lean' (in general)

It turns out to be the case that roots in final nasals present little problem, since the noun of action functions like all other nouns, while the indeterminate preserves the role of a verb, and the verb and the noun are quite distinct in Semaï syntax. The causative, however, since it functions as a verb, has syntactic properties which are the same as those of the indeterminate, which is also a verb. Forms from roots in final r are thus opaque with respect to the morphological rule which infixes an r to form causatives and to that which copies the root-final consonant to form indeterminates. This opacity assumes the form of derivational (and morphological) ambiguity, for it is impossible to determine, from the surface forms, which morphological derivational process a form has undergone. This undesirable situation is in the process of being ameliorated through rule loss. In several Western dialects the indeterminate is now formed by infixing a glottal stop, thus eliminating the possibility of morphologically ambiguous formations:

Western dialects:	<u>old form</u>	<u>new form</u>	
	tsgɔs	tʔgɔs	'to be hard' (indeterminate)
	srlɔ:r	sʔlɔ:r	'to pile up' (indeterminate)

The second example is taken from Early Middle Indic (represented here by Pāli) and involves interactions between certain phonological and morphological processes. In Early Middle Indic, the morphological process commonly referred to as full-grade formation was accomplished by the addition of the vowel a to the underlying root vowels i, u, and a, as follows:

- /i/ → (full-grade) /ai/ → (by contraction) e. /pis-/ → pes-
- /u/ → (full-grade) /au/ → (by contraction) o. /phus-/ → phos-
- /a/ → (full-grade) /aa/ → (by contraction) ā. /vah-/ → vāh-

Although there is good evidence that the above full-grade formation process was operative in pre-Pāli and to some degree in historical Pāli, it is nevertheless the case that in most categories characterized by full-grade root formation we find a newer type of formation having taken over nearly completely. This newer type of formation consists of the underlying root with an epenthetic vowel i between the root and the suffix, as shown in the following examples:

chind-i-ssa-, future of chind-; bhuñj-i-tum, infinitive of bhuñj-. The degree of extension of this newer process in the verbal categories of Pāli is quite asymmetrical, for, it is only in the full-grade categories that it has undergone such a large extension. In categories characterized by other ablaut grades, many inherited formations remain, the new process having spread

only to a limited degree. A look at verbal forms with the root vocalism a reveals a possible reason for the above-mentioned asymmetry. As the following examples show, the majority of forms with a do not show the full-grade long ā, but short a:

a. Majority typehattar- < /har-tar-/  
kattum < /kar-tum/  
mantar- < /maññ-tar-/  
vattar- < /vatt-tar-/  
vatthum < /vas-tum/b. Minority typekātum < /kar-tum/  
hātum < /har-tum/

The occurrence of forms with short a is due to two constraints in the language. One of these constraints prohibits long vowels in closed syllables. When a long vowel occurs in a closed syllable, there are two possible ways of resolving the problem-- either the vowel must be shortened or the following consonant cluster must be simplified. There is, however, a constraint on consonant cluster simplification to the effect that two consonants separated by a morpheme boundary may not undergo further simplification. Thus, a form such as /hār-tar-/  
(→ hāt-tar-) must be simplified, and since the majority of forms have the shape shown in column (a) above rather than that in column (b), we can assume that the phonological constraint on consonant simplification takes precedence over the preservation of the long ā, which is the marker of the category. Although the reasons for the precedence of the constraint on

consonant simplification over the full-grade process are clear, a discussion of them is far beyond the limits of this paper. The forms with short a are thus opaque with respect to the morphological rule of full-grade formation. We might thus assume that the (incipient) loss of the morphological full-grade formation rule was due to this opacity. Consideration of certain other facts of the language reveals, however, that there is a much more serious degree of opacity involved than that just noted. The facts indicate that, for reasons which are, again, beyond the scope of this paper, some verbal formations consist simply of the underlying root--that is, no ablaut process having applied to it--and the suffix--that is, without the epenthetic vowel i:

ettum < /es-tum/ infinitive

pittha < /pis-ta/ participle

kattha < /kas-ta/ participle

dissa- < /dis-ssa-/ future

missa- < /min-ssa-/ future

In light of the existence of such forms, it is impossible to determine which derivational process forms with short a have undergone--that is, there is ambiguity as to whether these forms have undergone lengthening and subsequent shortening or whether they are derived from the underlying root. Thus, the vowel shortening which takes place in full-grade formations not only produces surface opacity, in that the full-grade formation rule is contradicted on the surface, but it also creates

opacity with respect to the derivational process which the forms have undergone.

It is interesting to note that the situation just described is in accord with the findings of Kisseberth and Kaye, described in the introduction, which indicate that opacity seems to be tolerated by languages if it is motivated or if the reason for the opacity is transparent. Thus, we might not expect the full-grade formation rule to have been lost simply as a result of the opacity created by shortening of the root vowel a, for the shortening is clearly motivated by the phonological constraint on consonant simplification. And, although it is of course impossible to know whether or not the rule would have been lost had only this latter situation obtained, we do have evidence that more factors were involved.

The third example is from Avestan, the oldest attested Iranian language and involves two assimilation rules. One rule, which is Iranian, is commonly referred to as Bartholomae's Law and changes voiceless stops to voiced aspirated stops following voiced aspirates: \*/drugh-ta/ → \*drug-dha (with de-aspiration of the first voiced aspirate). Voiced unaspirated stops, however, underwent regressive assimilation: \*/bhag-ta/ → \*bhaxta (with spirantization of the first voiceless stop). At a later stage, the voiced aspirated stops were de-aspirated, and the situation at this stage is thus one in which some voiced stops undergo regressive assimilation (that is, those which had original simple voiced stops) while others cause

progressive voicing assimilation (that is, those which, at this stage, have underlying representations like /drug-ta/ : ( → drugda) < \*/drugh-ta/). Both of these rules are found to be operative in the earliest attested stages of Avestan. In the later stages, however, the rule of progressive assimilation appears to have been lost and forms like /drug-ta/ < (\*/drugh-ta/) now undergo the progressive assimilation rule: /drug-ta/ → druxta (just like /bag-ta/ → baxta).

Thus, the loss of Bartholomae's Law (through the loss of voiced aspirates) rendered both the progressive assimilation rule and the rule of regressive assimilation opaque in a sense, for there then existed two minor rules--that is, two competing derivations of voicing assimilation for forms with identical underlying representations, necessitating in essence that every form be marked for which of the two rules it has to undergo. Thus, although neither of these rules is opaque by Kiparsky's original definition, since neither is actually contradicted on the surface, each rule can be considered opaque with respect to the other, since they perform different operations on identical underlying structures. Loss of one of these rules eliminated the derivational ambiguity (or competition) by making it possible for all forms with identical underlying representations to undergo the same rule.

The last example is representative of a particular (and common) type of derivational opacity. This type arises when originally distinct segments merge into one, with phonological

rules which affected one of the segments not affecting the other after the merger occurs. This type can be illustrated with an example from the Algonquian languages. The sequence of rules is as follows:

a.  $*\theta \rightarrow *\hat{s}/\_\_\_\_\_\_ *i$

b.  $*\theta \rightarrow *i$

c.  $i \rightarrow \hat{s}/\_\_\_\_\_\_ i$  (original i's are exceptions)

d.

(a)  $i \rightarrow \hat{s}/\_\_\_\_\_\_ i$  (generalized to all i's (in most languages))

(b) Entire palatalization rule is lost (in Delaware)

As the above rules indicate, Proto-Algonquian  $*\theta$  palatalized to  $*\hat{s}$  before  $*i$ .  $*\theta$  subsequently became  $*i$ , thus merging with original  $*i$ . Original  $*i$ , however, was not palatalized to  $\hat{s}$  by a following i. Thus, after the merger of  $*\theta$  and  $*i$ , there was a rule which palatalized i to  $\hat{s}$  before i and numerous exceptions to the rule. The exceptions were eliminated in two ways. In most Algonquian languages, the palatalization rule was generalized to all i's. In Delaware, however the palatalization rule was entirely lost. These exceptions to the palatalization rule of course had rendered the rule opaque. In addition, however, the manner in which this type of opacity arises causes a sort of derivational opacity to arise also, for, in such cases, the exceptions are necessarily so numerous that derivational competition exists (in this case) between palatalization of i and no change of i before i.

Although exceptions always cause a rule to be opaque in

the strict sense of the term, the normal case is that in which a rule applies to the vast majority of forms with only a few forms being exceptional. In such cases, the degree of opacity is slight and there is no actual derivational competition; and rules of this sort, along with their exceptions seem to survive for long periods of time.

Finally, it should be noted that in situations of the type just described, either rule loss or generalization can resolve the problem.

In conclusion, it should be added that derivational opacity, although its existence appears not to be motivated, as is the case with opaque rule interaction, seems to nevertheless not be subject to elimination to the extent that we find opaque rule interaction eliminated. This would seem to me to be due to the fact that there are many degrees of derivational opacity, making it of course difficult to draw a line for predicting when the opacity is great enough to actually cause a derivational ambiguity (or competition). Hopefully, however, we will be able to find enough cases such as those which I have just described to make it possible to make use of the notion of derivational opacity for predicting (at least some) types of linguistic change.

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