CHAPTER TWELVE

On the Alleged Correlation of Markedness and Rule-function

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In their contribution to this volume Houlihan and Iverson (H & I) claim that "phonologically-conditioned neutralization rules convert relatively marked segments into relatively unmarked segments" (page 61). As a corollary to this principle they further claim that "phonologically-conditioned rules which produce exclusively marked segments from relatively unmarked ones are allophonic" (page 61). Sanders in his paper (also found in this volume), states, "except for a few minor differences, mostly non-substantive, Houlihan and Iverson's constraints seem *essentially related as the segmental counterparts of the representational constraints on derivational function* determined by Maximalization of Terminality and the Law of Unmarked Terminality" (emphasis mine/JDK, page 88).

In this paper I will show that the above claims of H & I are false. It should be noted that to the extent that these claims fall out as automatic consequences of Sanders' equational phonology, that theory is also in peril. I would also like to suggest that the view of language which prompted the line of research undertaken by Houlihan, Iverson and Sanders is equally unfruitful and leads inevitably to the mistaken claims to be found in the current discussion.

A discussion of the counterexamples which I am about to present would be pointless in the absence of a competing theory which could handle them as well as the evidence cited by the authors to support their position. In the absence of such a theory one would merely relegate these examples to the ample class of linguistic facts which remain mysterious, with the expectation that some eventual modification to the theory will render them comprehensible. In fact, most of the positive evidence cited in H & I follows from the theory of markedness de-

veloped in Chomsky and Halle (1968). The principles proposed by H & I in no way follow from this competing theory. I maintain that these data which I am about to present constitute genuine counter-examples rather than mysterious unexplained cases compatible with no known theory and should, accordingly, result in the abandonment of all theories in which they play an essential role.

To resume briefly the claims involved here, H & I state that rules which convert marked segments into unmarked segments must be neutralization rules. They follow the definition of a neutralization rule similar to that of Kiparsky (1976). According to this definition, a rule A → B /C____D is neutralizing if the string CBD is found in the class of inputs to this rule. CBD may exist as a part of an underlying form or may be created by a rule which must apply prior to the application of the rule in question. All rules which are not neutralizing are allophonic.

The fact that neutralization rules generally result in less-marked segments is hardly surprising given the notion of markedness (Chomsky and Halle 1968, chapter 9; see also Waugh's comments on this subject in this volume) and the above definition of a neutralization rule. Since the presence of marked segments in a language typically implies the presence of their unmarked counterparts, it is to be expected that rules that result in unmarked segments will do so in the context of a phonological inventory that already contains these segments. Similarly the claim that rules resulting in relatively marked segments are allophonic rules follows from the fact that marked segments are found less frequently and are thus less likely to be found among the underlying phonemes of a language or as the output of another phonological rule applying before the rule in question. It follows, then, that the fact that H & I's principles are *generally* true is in no way an argument in their favour. The one original point of their analysis is that the correlation between markedness and neutralization rules plays some constraining role in the set of possible phonologies. It is precisely this point that I will show to be false.

I will first discuss a case in which a rule converting marked segments to unmarked ones is an allophonic rule. This example involves a rule from Algonquin which creates segments that already exist in the inventory of underlying segments. It is not a neutralization rule since these underlying segments are not present in the context of this rule. If one assumes, as do H & I for similar examples, that even non-alternating forms undergo this rule, then the rule is allophonic. I agree with H & I's

analysis of these cases (i.e., the fact that such cases do not involve neutralization rules). Since such cases remain problematic for a number of phonologists, I will first present a structurally identical case from Quechua which involves a rule changing unmarked segments into marked ones. H & I's principle will handle the Quechua case only if the rule is considered allophonic; but then they cannot handle the Algonquin case. If, however, one should treat this rule as neutralizing, the Algonquin case is no problem but the Quechua one no longer works. I remain convinced that both rules are allophonic and that it is the Algonquin one that poses the problem for H & I. In any event there is no way out.

The Quechua data are taken from Solá and Parker (1964) and from discussions with my colleague Claire Lefebvre. Originally Quechua had a three-vowel system given in (1).

(1) Original Quechua vowel system included:

i u
a

and a rule which lowered high vowels to mid in the environment of a post-velar:

(2) Lowering [+ voc] ⟶ [− high] % [+ cons, − high, + back]
(% = mirror image)

This is exactly as H & I would have it. Rule (2) converts unmarked segments (*i,u*) into marked ones (*e,o*). It is clearly allophonic since *e* and *o* arise only as the result of this rule.

In the post-contact era Quechua has acquired an enormous number of loan words primarily from Spanish. Many of these words contain the mid-vowels *e* and *o* in non-post-velar contexts. It is generally assumed that these two vowels have been incorporated into Quechua's inventory of underlying phonemes, and accordingly Quechua now has the system shown in (3).

(3) Present Quechua vowel system

i u
e o
a

Forms such as those in (4) show that *e* and *o* are no longer predictable variants of their corresponding high vowels. Further, the word for 'gourd' shows that these vowels may also appear in words of Quechua origin.

(4) puru 'feather' pero 'but'
poro 'gourd' piruru 'whorl'

The lowering rule (2) must still be assumed to be present in Quechua because of alternations such as those in (5).

(5) taki-y 'to sing' take-q 'singer'
tusu-y 'to dance' tuso-q 'dancer'

Assuming that all morpheme-internal instances of *e* and *o* in the context of *q* as in *moqo* 'knee', *qena* 'quena,' *toqa-* 'spit (v)', *meqoř* 'better', are derived from /i,u/ (this is the position of Solá and Parker (1964:10) as well as that assumed implicitly in H & I), one may maintain rule (2) as an allophonic rule since *e* and *o* would not show up in the context of *q* in underlying forms. A problem may arise in morpheme-final position (Quechua has no prefixes). There appear to be no Quechua verb stems in *-o*. Thus an alternation such as *takiy - takeq* would not contrast with hypothetical *takey - takeq* and the allophonic status of the rule may be preserved. This precisely parallels the Algonquin case to be discussed below. Nouns, however, may end in *-e* or *-o* although they appear to be relatively rare: *poro* 'gourd', *koso* 'large corral', *klase* 'type'. There is an enclitic that contains an initial *-q*, viz. the topic marker *-qa*. If this enclitic triggers lowering, i.e., *masu-qa* [masoqa], then we may have to alter the status of lowering to that of a neutralization rule because of the contrastive situation shown by such forms as *koso - kosoqa* vs. *masu - masoqa*. If such were the case, this would violate H & I's principle from the other direction—a rule converting unmarked segments to marked ones would be a neutralization rule. Let us assume that we can maintain (2) as an allophonic rule and that Quechua does not provide a counter-example to H & I's principle. We have now prepared the groundwork for considering the Algonquin case.

Algonquin consists of a series of dialects spoken near the Ontario-Québec border. These dialects belong to the Ojibwa complex of the *Algonquian* (note the spelling difference) family. Many of these dialects have a rule which devoices initial obstruents (I will deal with data from Lac Simon; David Jones has reported a similar phenomenon at Maniwaki). This initial devoicing rule turns relatively marked segments (voiced) into relatively unmarked ones (voiceless) and ought to be a neutralization rule following H & I's principle. In fact, it is an allophonic rule. Although both voiced and voiceless obstruents exist in Algonquin, only voiced obstruents occur in word-initial position—the context in

which initial devoicing applies. The lack of (underlying) word-initial voiceless obstruents is due to a word structure constraint which excludes them in this context. Now it may seem perverse to claim that a language has both a word structure constraint excluding word-initial voiceless obstruents and a phonological rule that devoices all word-initial obstruents. Once the historical processes that led to this state of affairs are understood, the situation seems much less bizarre.

Proto-Algonquian is assumed to have the following obstruent system:

(6) Proto-Algonquian Obstruents
simple p t k θ s š
cluster Xp Xt Xk Xθ Xs Xš (where X = ʔ, h, θ, n, s, š)

Proto-Algonquian also contained the word structure constraint (7).

(7) Proto-Algonquian WSC
No word may begin with a consonant cluster.

At some point early in the history of Ojibwa-Algonquin a number of clusters were simplified. Specifically, obstruent clusters with initial ʔ, *h*, θ became "fortis" consonants (traditionally written as geminates by Algonquianists), that is, voiceless (pre or post) aspirated consonants. These changes resulted in the early Ojibwa-Algonquin obstruent system shown in (8) and a modified version of the WSC shown in (9).

(8) Early Ojibwa-Algonquin Obstruents
simple p t č k s š
fortis pp tt čč kk ss šš

(9) Early Ojibwa-Algonquin WSC
No word may begin with a cluster or fortis consonant.

Doubtless at the early stage it was possible to derive fortis consonants from underlying clusters and hence retain the original formulation (7) of the WSC. In the course of history the source of these fortis consonants has become more and more opaque from a synchronic point of view and the modified WSC (9) became necessary at some point. The situation described here still holds for some conservative Northern and Western Ojibwa dialects.

In Eastern Ojibwa dialects, including Algonquin, the former fortis-simple (lenis) distinction has been replaced by a voicing distinction. The former simple consonants which were unaspirated and redundantly voiced in at least some contexts are now voiced consonants. The former

clusters which developed into the fortis consonants (aspirated and voiceless) are now the voiceless consonants. This situation is illustrated in (10) with the required modification to the WSC shown in (11).

(10) Eastern Ojibwa-Algonquin Obstruents
voiced (former simple) b d j g z ž
voiceless (former aspirated) p t č k s š

(11) Eastern Ojibwa-Algonquin WSC
No word may begin with a cluster or a voiceless consonant.

It is worth noting here that the historical developments described here are neither unnatural nor, in themselves, uncommon. Constraints against initial clusters, simplifications of consonant clusters, and changes from an aspirated-unaspirated distinction to a voiceless-voiced distinction are each well attested in diachronic studies. What is crucial here is that the *confluence* of these events results in a synchronic system where a voiced-voiceless distinction which is contrastive elsewhere does not exist in word-initial position. Only voiced obstruents are found there. (This is a case of "static neutralization" in H & I's terminology.) This contrast is not neutralized in this position; it is simply absent.

This brings us to the Algonquin situation. The picture here is as described for Eastern Ojibwa-Algonquin. The one difference is that several Algonquin dialects have added a rule of initial devoicing. Data illustrating this rule are given in (12) below (these data are my own from the Lac Simon dialect).

(12) a.	tigošin	'he arrives'	kidigošin	'you arrive'
	či:ma:n	'canoe'	kiji:ma:n	'your canoe'
	ki:niba:	'he slept'	kigi:niba:	'you slept'
b.	kitiga:n	'cultivated field'	kika:t	'your leg'

The data of (12a) show the alternation between an initial voiceless and a non-initial voiced consonant. In (12b) we see the direction of the rule: it must be an initial devoicing rule and not a non-initial voicing rule. Non-initial voiceless consonants abound morpheme-internally: *kitiga:n*, and morpheme-initially: *kika:t* (-ka:t 'leg' is a dependent noun and is obligatorily preceded by a prefix. It does not constitute a violation to the WSC). The initial devoicing rule is completely transparent. There are no word-initial *phonetic* voiced obstruents. Initial devoicing, while not as common as final devoicing, seems a reasonably natural process. It is reported in Tübatulabal, Mordve Erza and Kirghiz. And

so it has come to pass that Algonquin has both a WSC excluding word-initial voiceless obstruents and a phonological rule that devoices all word-initial consonants. This phonological rule is an allophonic rule since a contrast is not neutralized by this rule. The difference between this allophonic rule of initial devoicing and a neutralization rule such as German final devoicing is shown in (13).

(13)

Algonquian Initial Devoicing	German Final Devoicing	
tigošin - kidigošin	rat - räder	/vcd/ vcl ~ vcd
absent because of WSC	tat - täter	/vcl/ vcl ~ vcl
ki- 2nd person prefix	unt	non-alternating

Given the allophonic status of the initial devoicing rule non-alternating initial obstruents are derived from initial voiced ones (cf. H & I's treatment of English schwa). Algonquin thus provides us with a clear case of a rule converting marked to unmarked segments which is an allophonic rule.

It can also be shown that the corollary to the markedness constraint is incorrect. These are cases of rules converting unmarked segments into marked ones that are neutralization rules.

An interesting example having this property is the dialect of French spoken by the Algonquins of Lac Simon (and perhaps other villages as well). The French spoken there is similar in most respects to Quebec French. One of the hallmarks of Quebec French is a rule of affrication given in (14).

(14) Quebec French Affrication

$$\begin{bmatrix} t \\ d \end{bmatrix} \longrightarrow \begin{bmatrix} t^s \\ d^z \end{bmatrix} / \_\_\_\_ [-\text{cons}, +\text{high}, -\text{back}]$$

Following this rule *tu* is pronounced [t^{s}y]; *dire* [d^{z}ɪ^{j}r]; *tiens*, [t^{s}j$\tilde{\text{e}}$], and so on. This rule presents no problem for H & I since the only source of these affricates is rule (14). Quebec French possesses the affricates *č* and *j* which are found primarily in English loanwords. These latter affricates are nonetheless completely integrated into the Quebec French consonant system. Some examples are: *jean* 'jeans,' *djinne* 'gin,' *botch* '(cigarette) butt,' *scratcher* 'to scratch,' *botcher* 'to botch, louse up,' *pitcher* 'to throw,' *ponnetcher* 'to punch (a time-clock),' *patcher* 'to patch,' *djobbe* 'job.' Algonquin French differs from Quebec French in one important respect. Rule (14) has been modified in this dialect so that the resulting affricates are alveo-palatal rather than alveolar.

(15) Algonquin French Affrication

$$\begin{bmatrix} t \\ d \end{bmatrix} \longrightarrow \begin{bmatrix} \check{c} \\ j \end{bmatrix} / \_\_\_\_ [-\text{cons}, +\text{high}, -\text{back}]$$

In all other respects the rule is unchanged. Notice, however, that the results of this rule are identical to the already existing affricates. Alongside of *chip* '(potato, poker) chip,' *cheap* 'stingy; of poor quality,' *djobbe* 'job', *juke-box* 'jukebox', there are words like *jir* (<dire), *pčit* (<*petite*), *sorčir* (<*sortir*). Furthermore, this affrication must be considered a rule because of alternations like [*parčir*] 'to leave', [*parte*] 'you (pl) leave'. Rule (15) is then a neutralization rule, since underlying *č* and *j* occur in similar environments ([swiče], [skrače]). Algonquin French affrication is a rule which changes unmarked segments to marked ones and is (contra H & I) a neutralization rule.

This does not appear to be a unique case of this type. Fruitful areas of investigation are languages which have at various points in their history undergone a palatalization process only to have a second palatalization process come into the language, which has not yet been rendered opaque by subsequent developments. The Montagnais dialects (the eastern branch of the Cree complex of the Algonquian family) contain underlying *č* (or *c*) as a result of a Proto-Algonquian palatalization rule (t → č) which has since become quite opaque. They subsequently underwent velar palatalization (k → č; *č* has changed to *c* in some dialects, i.e., those that have *c* also as a result of the first palatalization). The exact status of velar palatalization in modern Montagnais is not clear and so cannot be considered a counter-example to H & I in the absence of further research.

Cajun and Acadien French have two palatalization processes: velar palatalization before some front vowels and dental palatalization before the palatal glide. These two processes are stated informally in (16).

(16) Cajun-Acadien French Palatalizations

a. Velar $\begin{bmatrix} k \\ g \end{bmatrix} \longrightarrow \begin{bmatrix} \check{c} \\ \check{j} \end{bmatrix}$ / ____ front vowel

b. Dental $\begin{bmatrix} t \\ d \end{bmatrix} \longrightarrow \begin{bmatrix} \check{c} \\ \check{j} \end{bmatrix}$ / ____ y

Note that the *y* drops after the application of (16b). Examples of the first process taken from Acadien include these: *dejøle* < dégueuler 'vomit', *dejize* < déguisé 'disguised', *či* < qui 'who'. Dental palatalization is illustrated in akajẽ <Acadien, jø < dieu 'god', čẽ< tien 'yours'. The former process is quite opaque and probably does not function as a synchonic rule of these dialects. If this is so, palatalized velars are to be represented as such in underlying forms. The latter process, dental palatalization, appears to be more regular. If this proves to be the case, and more research is needed in this area, then dental palatalization would

be a neutralization rule. This would constitute another violation of H & I's principle.

In this paper I have attempted to exemplify violations of H & I's principle: rules creating relatively unmarked segments which are allophonic (Algonquin) and rules creating relatively marked segments which are neutralizing (Algonquin French). I wish to emphasize that the fact that H & I's principles generally hold is completely beside the point. This fact follows from general notions of markedness such as those discussed in Chomsky and Halle (1968). It is clear that the sorts of principles proposed by H & I play no role in constraining the class of possible phonologies. The fact that Algonquin had no voicing contrast in word-initial position did not prevent an initial devoicing rule from arising in that language. The fact that the underlying alveo-palatal affricates existed in Algonquin French (perhaps also in Acadien-Cajun) did not block the entry of a subsequent palatalization rule.

The above examples also show how events occurring in the course of the history of a language may lead to seemingly peculiar synchronic states. Approaches to phonological structures based on principles of the sort discussed here (see also Sanders' contribution to this volume) appear hopelessly simplistic. Language change is triggered by a variety of factors. It is far from clear that these factors operate in harmony. Nor is it to be expected that they will produce uniform results. The failure of H & I's principle should come as no surprise.

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