

COVARIANT SOUND SHIFTS AND GENERATIVE PHONOLOGY

John M. LIPSKI

University of Alberta, Edmonton, Canada

ABSTRACT: Robert D. King's reappraisal of Martinet's Formulation of vocariant sound shifts is considered. King's rejection of 'push-chains' is questioned on factual and theoretical grounds (§ 2). His qualified acceptance of 'drag-chains' is also seen to lead to unsatisfactory rule-formulations (§§ 3, 4). Greater realism is urged in historical generative phonology (§ 5). Examples are drawn from English, Portuguese, Carribean Spanish, Yiddish, and Romance lenition.

1. Covariant sound shifts in diachronic phonology are well-known in the guise of Martinet's (1955) picturesque formulation of 'push-chains' and 'drag-chains'. The functional-structural approach to these multiple and obviously interrelated sound shifts has recently been reappraised within the framework of generative Phonology. King (1969a), whose name ranks among the pioneers of the application of generative grammar to problems of diachronic linguistics, has put forth a formal objection to the functional-structural approach to sound shifts of this variety. It is asserted that the traditional interpretation of such phenomena, as exemplified by the writings of Martinet, is unjustified, but that a new formulation within the framework of generative phonology can provide an explanation for at least one form of covariant sound shift, that formerly labelled 'drag-chain'.

2. According to King (1969a: 6), acceptance of the structuralist conception of push-chains involves, among other things, the acceptance of two implicit conditions:

"1. The inception of sound change, or at least of some sound change is gradual and imperceptible... the allophonic norm of a phoneme assumes a new position by infinitesimal steps.

2. Merger tends to be avoided in sound change."

The first condition is claimed to be necessary for the existence of a push-chain, since "otherwise there would exist the possibility of merger after the initial step" (King 1969a: 6). The second condition follows, of course, since without a tendency to avoid merger, the concept of push-chain would have no theoretical basis. This, then, constitutes a proof of the nonexistence of push-chains, since the generative approach as formulated by King disclaims the possibility of gradual sound change, and since of course many examples of merger can be found throughout the history of various languages.

The foregoing argument, however, seems to be dismissing the matter a little too easily. For King, as for all other orthodox generative grammarians, sound change is change in *competence*, in the underlying rule component of the grammar, rather than change in *performance*, or the actualization of these rules. However, since one is dealing here not with idealized models (i. e. the "ideal speaker-listener in a completely homogeneous speech-community" of Chomsky 1965 : 3), but with the speech patterns of communities of human speakers, the two are inextricably bound.¹ The idea of a gradual sound change does not lend itself easily to the formation of a neat set of generative rules, but such sound changes nonetheless occur. This may be most easily observed in the pronunciation of vocalic elements, where the possibility of phonetic shift via a continuum of variation is quite evident. To cite a personal example, I was raised in Northwestern Ohio, in a speech community which is considered to speak 'Mid-Western American English'. During this time I pronounced, for example, the word *pot* roughly as [pat]. When later I moved to Texas, my speech was influenced by the speakers who pronounced the same lexical item more like [paət]. Now, in my present home, I encounter the pronunciation [pət]. The end result of these various influences is that at any given time, my phonetic production of words like *potis* likely to vary in a continuous fashion among the three representations just cited, depending on a variety of 'extra-linguistic' circumstances. Put in generative terms, my personal grammar has not yet decided which, if any, rule to apply to the lexicon containing underlying /ɔ/ (or perhaps /a/), with a resulting wide phonetic output. If I remain in Alberta, at some future time my grammar will probably stabilize on the [ɔ] pronunciation. In the meantime, however, these rules have not stabilized.

Another example of the occurrence of sound change over a phonetic continuum, this time restricted to a single dialect area, is provided by many contemporary dialects of Portuguese in both Brazil and Portugal, as well many creole Portuguese dialects. Due to an increasingly strong stress accent, unstressed final vowels are greatly weakened and often drop in normal conversation. This involves the potential addition, at some future time, of a rule of final atonic vowel deletion. However, in actual speech, one hears an almost complete continuum of vocalic production, ranging from the unreduced pronunciation of final unstressed vowels to their complete suppression.

The point of the above discussion is that while the notion of the addition and deletion of generative rules is a useful device in the description of sound change, it should not be confused with the reality of the situation. According to generative grammarians, as previously stated, sound change is change in competence. In reality, however, one cannot achieve change in competence without

1. In fact, the very distinction between competence and performance is itself not above scrutiny. For example, considering the problems which arise when this distinction is applied to the study of aphasia, the competence-performance dichotomy has been questioned by Traill (1970), while Whitaker (1971 : 12-17) has considered the difference to be irrelevant, at least in neurolinguistic research.

first effecting change in performance. In some cases, such as metathesis, this change can be nothing but sudden,² with the result that it can perhaps be regarded as the addition of a rule to the grammar at a certain point, although it should be kept in mind that the time of such a rule addition would vary with each individual speaker. In other cases, most notably those dealing with such phenomena as vocalic changes, palatalization, and the like, it is pointless to speak of a sudden change in competence, i. e. the addition of a rule, without first admitting a change in phonetic performance.³ In fact, it is often difficult, if not impossible, to determine where the performance leaves off and the competence begins; i. e. where rule addition or phonemic restructuring has taken place. Such changes are often gradual: a Portuguese speaker who has been pronouncing final unstressed vowels does not wake up one morning and cease to pronounce them. That is to say that sound change may be perceivable in progress, often even consciously by the speakers involved. The concept of rule addition may be useful as a descriptive device in signalling the spread of a given phonetic change past a certain point, or in describing the long-range effect of a sound change, but the rejection on this basis of gradual sound change is based on a theoretical artifact rather than a real linguistic situation.⁴

The second point made above with regard to the conditions necessary for the acceptance of push-chains, namely that merger tends to be avoided, can of course be refuted by numerous examples of merger in various languages. The conclusion drawn from this fact, however, namely that if merger occurred after the first step of a sound change, then a push-chain relationship could not obtain, can also be refuted. A point neglected by this assumption is the fact that various sub-dialects may co-exist in a given area, and a merger in one of these sub-dialects is not necessarily duplicated in the others, even though the sub-dialect in which the merger occurred may represent the majority or 'prestige' pronunciation. Thus, if a group of sounds merge in a given sub-dialect, and this merger is later felt, for whatever reason, to be undesirable, the non-merged variants of a co-existent sub-dialect may be adopted. The overall effect of such a change, viewed from the outside, is the reversal of a merger.

A rather striking example of this phenomenon is furnished by several dialects of Spanish, particularly in the Caribbean area, where syllable-final *s* was

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2. In a given lexical item, that is. The spread of such a change throughout the lexicon or throughout a given speech community may take place in any of a number of fashions. See the discussion in Bhat (1968).
 3. Bhat (1970a: 50) has remarked: "Since speakers of a language cannot have any direct access to each other's competence, and the contact has to come via performance only, we do not see how the impact of performance on grammar change could be avoided here."
 4. The actual feasibility of describing sound changes as rule addition, etc., has been called into question by Bhat (1970b), who bases his skepticism on detailed studies of both regular and sporadic sound changes in various dialects of India.

first changed to an aspiration [h], and has now in many cases totally disappeared. Now word-final *s* in Spanish serves, among other functions, to separate the singular and plural of the majority of nouns and adjectives, as well as to distinguish the second and third person singular of many verb forms. For example, both *amigo* 'friend' and *amigos* 'friends' tend toward [amíʎo]; while *tiene* '(he) has' and *tienes* 'you (fam.) have' could potentially and in fact often do merge as [tjéne] in various Spanish dialects. However, the distinction singular/plural and second person/third person have not been lost in some of these dialects, although ordinarily only final *s* serves to distinguish them. A new route has been taken by many speakers for whom final *s* no longer exists, a route evidently followed *after* the above merger had occurred. For these speakers, the final vowel in forms with 'underlying' final /s/ is laxed and somewhat lowered⁵. Thus, for instance, *tienes* is realized rather like [tjéne] and *amigos* like [amíʎo] where the sub-script represents a more laxed open vocalic sound. In fact, one may predict that at some future time the underlying representations of the words now containing final /s/ will drop this phoneme and modify the representation of the preceding vowel phoneme in accordance with the present phonetic realizations. The important point, however, is that this is an example of a phonetic merger, followed by an apparent reseparation using different parameters. Admittedly this does not constitute a push-chain in the sense of Martinet, since no phoneme moves into the position vacated by the disappearance of final *s*, but it does serve to refute the above claims with regard to multiple sound shifts. This raises the possibility which, however, would be extremely difficult if not impossible to verify, of simultaneous sound shifts, which could be formalized as the addition of two or more rules at the same time.⁶

3. In view of the above objections constructed against the existence of push-chains, King proceeds to assert that these objections do not implicitly include a denial of the possibility of drag-chains, since the latter do not inherently assume the gradual sound change necessary for push-chains (as interpreted by King). In fact, it is asserted that generative phonology can provide not only a description but indeed an explanation for various types of drag-chains, by showing them to be 'generalizations' or 'simplifications' of rules. I shall briefly examine a few examples to illustrate some of the difficulties encountered in interpreting drag-chains in this fashion.

5. This fact has been registered in various studies of Spanish. In particular, this phenomenon has been analyzed spectrographically by Clegg (1967).

6. Some possible examples of push-chain relationships of the sort envisaged by Martinet can be found in the development of the Romance vocalic system. For example, in early Portuguese, the Romance diphthong *au*, which had existed outside of the 7-vowel system in Portugal, is thought by some to have merged with open *o*, with its former place being filled by the formation of the new diphthong *ou*. Lack of accurate chronological evidence, however, prevents the verification of this and similar suppositions.

One example treated by King (involves a change evidently) occurring in Proto-Eastern Yiddish, which has been reconstructed with the following system of long vowels :

ī	ū
ē	ō

Now the interest centers around two changes which occurred in Southern Yiddish, which is derived from the proto-dialect : first we have the change $\bar{u} > \bar{u}$, followed by $\bar{o} > \bar{u}$ (closely paralleling a change which occurred in Old French). As a description of the former change, King posits the addition of the rule :

$$(1) \quad \left[\begin{array}{c} \bar{V} \\ + \text{high} \\ + \text{round} \\ + \text{long} \end{array} \right] \longrightarrow [-\text{back}]$$

This rule then becomes 'generalized' to include the latter change :

$$(2) \quad (a) \quad \left[\begin{array}{c} \bar{V} \\ \ll \text{high} \\ + \text{dnuor} \\ + \text{gnol} \end{array} \right] \rightarrow \left[\begin{array}{c} - \ll \text{back} \\ + \text{high} \end{array} \right]$$

Two principal objections to this interpretation may be raised, one on the theoretical machinery employed, the other on the validity of the application of such rules, which I shall outline below.

First of all, a closer examination of rule (2) is necessary. It can be seen that, although compacted into one statement, (2) is in reality two separate phonological rules :

$$(3) \quad a.) \quad \left[\begin{array}{c} \bar{V} \\ + \text{high} \\ + \text{round} \\ + \text{long} \end{array} \right] \longrightarrow \left[\begin{array}{c} -\text{back} \\ +\text{high} \end{array} \right]$$

$$b.) \quad \left[\begin{array}{c} \bar{V} \\ - \text{high} \\ + \text{round} \\ + \text{long} \end{array} \right] \longrightarrow \left[\begin{array}{c} +\text{back} \\ +\text{high} \end{array} \right]$$

Note that in (3a) the feature [high] appears redundantly on both sides of the equation, while the redundant feature of (3b) is [back]. However, due to the formulation of (2), there is no way of avoiding this redundancy. King, however, claims that the variable alpha counts less in the 'simplicity metric' than either plus or minus, and consequently that (2) is a 'simplification' of (1). In fact, Contreras (1969) has specifically proposed that in evaluating phonological rules, alpha variables count half as plus or minus values. Applying this proposal to (1) (2), and (3a, b), we see that the addition of redundant specifications adds up to at best an equal measure of simplicity between (1) and (2).

A further objection to the claim that an expression such as (2) is indeed a simplification or generalization of (1) results from the fact that the alpha variable in (2) is used as the coefficient of a *different* feature on either side of the equation, a practice which is labeled as dubious even in some of the 'classic' works on generative phonology (cf. Chomsky & Halle 1968 : 352).

In addition, it is not immediately evident that drag-chairs in general are simplifications of any sort, alpha-variable or otherwise. For example, a rather well-documented drag-chain is the process of consonantal lenition in the Romance languages, in which (voiceless) geminates degeminated, voiceless stops became voiced, and voiced stops became fricatives, all in intervocalic position. Using the labial order as an example, this may be schematized as :

$$(4) \quad -pp \longrightarrow -p \longrightarrow -b \longrightarrow -\beta-$$

The first change in (4), namely the spirantization of intervocalic voiced stops, may be represented as :

$$(5) \quad \begin{bmatrix} \bar{C} \\ +vce \\ -cont \end{bmatrix} \longrightarrow [+cont] \quad / \quad \underline{V} \underline{V}$$

Employing (somewhat arbitrarily) the feature 'strong' to distinguish the geminates from the other consonants, the full process of consonantal lenition which ensued from (5) may be stated as :

$$(6) \quad \begin{bmatrix} \bar{C} \\ \leftarrow \text{strong} \\ \beta \text{ vce} \\ -cont \end{bmatrix} \longrightarrow \begin{bmatrix} \leftarrow \text{strong} \\ -vce \\ \hat{\beta} \text{ cont} \end{bmatrix} \quad \underline{V} \underline{V}$$

Aside from numerous formal objections to such rules, it can be seen that (6) is actually more complex formally than (5). It is also not evident that the rather intricate notation required to express (6) represents a 'generalization' of (5), although the lenition process itself is of course a series of interrelated developments.

4. Regardless of the validity of the theoretical aspects of the rules described above, the feasibility of their application can also be called into question. In a case such as the double vowel shift in Southern Yiddish outlined above, the construction of a rule such as (2) assumes that first a rule such as (1) was added to the grammars of the speakers involved and then, at some indeterminate future time, the rule was generalized to (2) using the *same underlying representations*. In other words, although the period intervening between the addition of the first rule and its subsequent 'generalization' may be several generations or in fact centuries (as in the example of Romance consonantal lenition), one is forced by the theory to assume that no phonological changes intervene between the inception of the first rule and its 'generalization.' The logical, and yet absurd result of such reasoning is the positing of historical relics, which have not

existed for hundreds of years, as underlying forms, merely to achieve the proper configurations of generative rules (which, alas, is done by many investigators striving to capture the maximum 'generalities' of languages). Near the end of King's aforementioned paper, one finds a description of a massive sound shift which occurred in *são Miguel Portuguese*, in the Azores, where $u > \ddot{u}$, $o > u$, $\text{ɔ} > o$ and $a > \text{ɔ}$. To account for these shifts in terms of rule generalization, King first proposes the following rule:

$$(7) \quad \left[\begin{array}{c} \text{V} \\ + \text{ back} \\ \llcorner \text{ high} \\ \beta \text{ low} \\ \sphericalangle \text{ round} \end{array} \right] \longrightarrow \left[\begin{array}{c} - \llcorner \text{ back} \\ - \beta \text{ high} \\ - \sphericalangle \text{ low} \\ + \text{ round} \end{array} \right]$$

He then concedes that "it seems unlikely that this kind of rule would be found in the phonology of a real language", especially since it allows for several impossible cases within the permutations of variables, such as [+high, +low] etc. This situation can be overcome, however, if one assumes that after the rule changing u to \ddot{u} had been 'generalized' (by the above method) to include the change of o to u , the resulting u and \ddot{u} then became phonemic and the process was repeated with the remaining two changes. This reasoning seems totally vacuous, since it assumes that underlying forms remain intact, until some arbitrary point, at which time a phonemic restructuring takes place, thus facilitating the formulation of otherwise unworkable rules. It seems highly unlikely that a child will incorporate into his grammar underlying forms which he has never heard, a fact recognized elsewhere by King himself (King 1969b: 81f.).

5. While the generative treatment of phonology by the positing of abstract and often unrealized forms may perhaps be justified in certain cases, the extension of these forms to implausible representations required only to make previously formulated rules resolve themselves should be given up. At some point the *reality* of the data in question must be examined, since after all one of the claims of generative grammar is the approximation of a model of the language acquisition process. Treatments such as the one examined in this paper lend little credence to some otherwise well-motivated linguistic disciplines, and indicate that historical linguistic claims should be examined with closer adherence to the facts.

REFERENCES

- Bhat, D. N. S. 1968. Is sound change gradual? *Linguistics* 42.5-18.
 ———. 1970a. Review of King (1969b). *Indian Linguistics* 31.49-57.
 ———. 1970b. A New hypothesis on language change. *Indian Linguistics* 31.1-13.
 Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge: M. I. T. Press.
 Chomsky, Noam; Halle, Morris. 1968. *The Sound pattern of English*. New York: Harper and Row.
 Clegg, J. H. 1967. *Análisis espectrográfico des los fonemas /a e o/ en un idiolecto de La Habana*. The University of Texas at Austin, M.A. diss.

- Contreras, Heles. 1969. Simplicity, descriptive adequacy, and binary features. *Language* 45.1-8.
- King, Robert D. 1969a. Push chains and drag chains. *Glossa* 3.3-21.
- . 1969b. *Historical linguistics and generative grammar*. Englewood Cliffs, N.J. : Prentice-Hall.
- Martinet, André. 1955. *Économie des changements phonétiques*. Berne : Francke.
- Traill, A. 1970. Transformational grammar and the case of William Ndlovu, aphasic. Johannesburg, South Africa : University of the Witwatersrand. Unpublished ms.
- Whitaker, Harry A. 1971. *On the representation of language in the human mind*. Edmonton, Canada : Linguistic Research.

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