

SOME CONCEPTS IN THE THEORY OF LEXICAL DIFFUSION

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In the theory of lexical diffusion it is assumed that sound change is lexically gradual, a few lexical items being affected at a time (Wang 1969). More specifically, in the lexicon of a speaker experiencing the sound change $A \rightarrow B$, there will be three classes of items: 1) those pronounced only as A; 2) those pronounced sometimes as A, sometimes as B; and 3) those pronounced only as B. Suppose that sound A is a member of the phonological category A undergoing the change $A \rightarrow B$, we can refer to the history of change in this member A in terms of three periods: the pre-change period in which A remains A; the change period in which A appears sometimes as A, sometimes as B; and the post-change period in which A appears only as B. We may call forms of items appearing in the pre-change period unchanged forms (A's), forms appearing in the post-change period changed forms (B's) and forms appearing in the change period synchronic variations which are sometimes changed forms and sometimes unchanged forms (A ~ B's). The correspondence between these forms and periods can be summarized in Table I below:

Period	pre-change	change	post-change
Form	unchanged	synchronic variation	changed
Example	A	A ~ B	B

Table I: Periods and forms of item A

When all members of category A have reached the post-change period, we say that the change $A \rightarrow B$ is completed. By that time there are only changed forms B's; otherwise the change is incomplete. An incomplete change may be either an on-going change or a half-way terminated change. It is an on-going change if some members of category A are in the midst of their change period and appear sometimes as A's and sometimes as B's. At this time there will be unchanged

*The author wishes to thank William Wang, Kung Chang, Betty Chang, Richard Stanley, Chin-Chuan Cheng, Matthew Chen, Matt Shibatani and other linguists at Berkeley for their valuable suggestions and criticism. This paper is hardly possible without the encouragement and help from Professor William Wang.

forms A's and changed forms B's in addition to synchronic variations A ~ B's. The change will be a half-way terminated change if no members of category A are found in their change period. At this time there will be no synchronic variations A ~ B's, but only the unchanged forms A's and the change forms B's.

According to traditional neogrammarian understanding, in the above situations only the completed change is a regular change, since all A's have changed to B's. The on-going change and the half-way terminated change are both irregular, since not all A's have changed to B's. Under one condition, however, an incomplete change, be it an on-going change or a half-way terminated change, can be incomplete and yet regular. This is when the sound change has affected the lexical items exclusively through a process called 'subcategorical diffusion'. Later, we will have occasion to explain the term 'subcategorical diffusion'.

An irregular change can also result from competition of two sound changes. When the time spans of two rules are partially or fully overlapping, they may enter into competition. Competing rules are at least of two kinds: rules that compete for rule inputs, or 'input-competing rules', and rules that compete for priority in the order of application, or 'order-competing rules'. A pair of input-competing rules have the general form shown in formula (1):

- (1) R1. A → B
 R2. A → C

Here, R1 competes with R2 for the rule input A. Most members of category A will be changed to either B's or C's, and a few members of category A may acquire double pronunciations, having B's in variation with C's. The occurrence of B or C in a double pronunciation B ~ C is, of course, not phonologically predictable, although sometimes this kind of variation in pronunciation corresponds loosely to variation in style, social position, speech rate and so on. In its subsequent development, the double pronunciation B ~ C may be reduced to merely B or C, or both B and C may be preserved. The forms that can be created by the above pair of competing rules in the pre-change, the change, and the post-change periods of the item A can be listed in Table II below:

If A is affected by:	pre-change period	change period	post-change period
∅	A	A	A
R1	A	A ~ B	B
R2	A	A ~ C	C
R1, R2	A	A ~ B ~ C	{ B ~ C B C

Table II: Forms created by a pair of input-competing rules

Incidentally, in terms of neogrammarian generative approach, this pair of rules would have a mutually 'bleeding' (Kiparsky 1968) or 'subtractive' (Chafe 1968) relation.

A pair of order-competing rules, on the other hand, has the general form shown in formula (2) below:

- (2) R1. $A \rightarrow B$
R2. $B \rightarrow C$

Here, R1 and R2 can be ordered with R1 preceding R2, or with R2 preceding R1. In the former order, R1 and R2 will change A to C; and in the latter order, R1 and R2 will change A to B rather than to C (R2 will not affect any A's). Of course, in both orders, B will be changed to C. If only R1 affects A, A will be changed to B rather than to C; and if only R2 affects B, B will be changed to C, while A will remain A. The forms that can be created by this pair of order-competing rules can be listed in Table III below:

If A or B is affected by:	pre-change period	change period	post-change period
\emptyset	$\begin{cases} A \\ B \end{cases}$	A B	A B
R1	A	$A \sim B$	B
R2	B	$B \sim C$	C
$R1 > R2$	$\begin{cases} A \\ B \end{cases}$	$A \sim B \sim C$ $B \sim C$	C C
$R2 > R1$	$\begin{cases} A \\ B \end{cases}$	$A \sim B$ $B \sim C$	B C

Table III: Forms created by a pair of order-competing rules

In terms of neogrammarian generative approach, R1 would stand in a 'feeding' (Kiparsky 1968) or 'additive' (Chafe 1968) relation to R2, if it is ordered to precede R2.

A pair of competing rules are regarded as completed when each one of the pair is completed. As has been mentioned, a change is regarded as completed when all the items of the category being affected by this change have reached their post-change stage. Two competing rules, whether incomplete or completed, will result in an irregular change for the obvious reason that not all A's are changed to B's but some A's are unpredictably changed to C's. However, a pair of competing rules may result in a regular change if each rule has proceeded exclusively by 'subcategorical diffusion'.

We can now briefly discuss the concept 'subcategorical diffusion'. In the change $A \rightarrow B$, each time only some instances of A are changed to B. In other words, only some instances of A reach the post-change period. These instances may be all the members of a phonological subcategory Ax of A, may be some members of a phonological subcategory

Ax of A, or they may be random items which do not form or belong to a phonological subcategory Ax. When these instances are all the members of Ax, we call such an implementation 'lexical diffusion by subcategories', or 'subcategorical diffusion'; otherwise, we call an implementation 'lexical diffusion not by subcategories' or 'non-subcategorical diffusion'. If only subcategorical diffusion occurs in an incomplete change and if at the time when the change is examined, the conditions of change can be stated in terms of subcategories, the change will be incomplete but still regular. In the case of a pair of competing rules, if a competing rule or a competing order only affects certain subcategories while another competing rule or another competing order only affects certain other subcategories, and if at the time when the change is examined the conditions of change can be stated in terms of the subcategories, then the result of the competition will be a regular change.

The subcategories in a lexical diffusion are of two kinds. The first kind may be called 'homogeneous subcategories'. Homogeneous subcategories are subcategories of homogeneous ranks in the sense that they occur on the same level in a binary distinctive feature tree. Suppose, for example, that in a language having four vowels i, e, u and o, a change takes place which will palatalize the velar fricative x into š. Furthermore, suppose that this change is examined by linguists at four particular stages. At stage 0, x remains x in all items; at stage 1, x in all items appears as š before the high front vowel i; at stage 2, x in all items appears as š before the front vowels i and e; at stage 3, x in all items appears as š before front vowels i and e and also before the high back vowel u but not before the low back vowel o; and at stage 4, x in all items appears as š before all vowels. In terms of neogrammarian generative approach, these four stages can be represented by formula (3) below:

(3)

stage 0.	x	remains	x	
stage 1.	x	→	š / -	$\left[\begin{array}{l} \text{vowel} \\ +\text{front} \\ +\text{high} \end{array} \right]$
stage 2.	x	→	š / -	$\left[\begin{array}{l} \text{vowel} \\ +\text{front} \end{array} \right]$
stage 3.	x	→	š / -	$\left\{ \begin{array}{l} \left[\begin{array}{l} \text{vowel} \\ +\text{front} \end{array} \right] \\ \left[\begin{array}{l} \text{vowel} \\ +\text{back} \\ +\text{high} \end{array} \right] \end{array} \right\}$
stage 4.	x	→	š	

From a neogrammarian generative point of view, the development from stage 1 to stage 2 is a 'rule simplification' (Kiparsky 1968), since the condition of change is simplified from [+front, +high] to

merely [+front]. And so is the development from stage 3 to stage 4. The development from stage 2 to stage 3, however, would be called a 'rule complication', if such a term may be used, rather than a rule simplification. In a case like this, one is tempted to ignore stage 3 and claim that the palatalization here is purely a process of rule simplification which involves a simplification from the condition [vowel, +front, +high] to the condition [vowel, +front] and finally to the condition [vowel]. On the other hand, a typical lexical diffusion solution for a case like this would be to claim that the palatalization proceeds by a homogeneous subcategorical diffusion and that in each stage a subcategory of the phonological category 'velar fricative x followed by a vowel' is affected. In stage 1, it is the subcategory 'x followed by i'; in stage 2, it is the subcategory 'x followed by e'; in stage 3, it is the subcategory 'x followed by u'; and in stage 4, it is the subcategory 'x followed by o'. In such a solution, formula (4) will be adopted in place of formula (3):

(4)	stage 0.	xV	remains	xV
	stage 1.	xi	→	ši
	stage 2.	xe	→	še
	stage 3.	xu	→	šu
	stage 4.	xo	→	šo

The second kind of subcategories may be called 'heterogeneous subcategories'. These subcategories are of heterogeneous ranks in the sense that they occur on various levels in a binary distinctive feature tree. For example, when stage 3 and stage 4 are collapsed in formula (4), formula (4) becomes a subcategorical diffusion in two lower-ranked subcategories i and e, and one higher-ranked subcategory 'back vowels'. The collapse of stage 3 and stage 4 has the corresponding effect of removing stage 3 in formula (3) and thus obtaining a rule simplification in formula (3) in which the context is expanded from 'high front vowel' in stage 1 to 'front vowels' in stage 2 and finally to 'vowels' in stage 4. However, when stage 1 and stage 2 are collapsed, formula (4) becomes a subcategorical diffusion in one higher-ranked subcategory 'front vowels' and two lower-ranked subcategories u and o. The collapse has the corresponding effect of removing stage 1 from formula (3) and obtaining a rule complication from stage 2 to stage 3 and also a rule simplification from stage 3 to stage 4.

Although as a notational device subcategorical diffusion is sometimes comparable to rule simplification, as a linguistic concept the former cannot be easily replaced by the latter. To be sure, the concept 'rule simplification' in phonology is particularly significant in emphasizing that a sound change may start out small, gradually gaining in its domain of influence. But it can be misleading if it is taken to imply the false claim that the domain of influence is generally a heterogeneous subcategorical diffusion which proceeds from

a lower-ranked subcategory such as xi in our palatalization case above, to a higher-ranked subcategory such as 'x followed by front vowels', and finally to the highest-ranked subcategory 'x followed by all vowels'. The concept 'subcategorical diffusion', however, merely claims that when subcategorical diffusion takes place, the subcategories may either be homogeneous or heterogeneous. Rule simplification, rule complication and even context change, by which we mean a complete change in the context of a rule, can happen in homogeneous or heterogeneous subcategorical diffusion. For example, suppose that a language has four initial voiced stops: the labial b, the dental d, the palatal ǰ and the velar g. Suppose that the devoicing of these four voiced initials is through a process of homogeneous subcategorical diffusion in the order $g > d > b > \check{g}$, then these four stages of diffusion can be represented in formula (5):

- (5)
- | | | |
|----------|-------------------------|--|
| stage 1. | [+voiced] → [-voiced] / | $\begin{array}{c} \overline{(g)} \\ -\text{anterior} \\ -\text{coronal} \end{array}$ |
| stage 2. | [+voiced] → [-voiced] / | $\begin{array}{c} \overline{(d)} \\ +\text{anterior} \\ +\text{coronal} \end{array}$ |
| stage 3. | [+voiced] → [-voiced] / | $\begin{array}{c} \overline{(b)} \\ +\text{anterior} \\ -\text{coronal} \end{array}$ |
| stage 4. | [voiced] → [-voiced] / | $\begin{array}{c} \overline{(\check{g})} \\ -\text{anterior} \\ +\text{coronal} \end{array}$ |

In formula (5), from stage 1 to stage 2 is a process of context change; from stage 2 to stage 3 is a process of rule simplification; and from stage 3 to stage 4 is a process of context change. Obviously in a case like this, the question whether a process is a rule simplification, rule complication or context change is not very interesting. Rather, the relevant question here is whether formula (5) represents a subcategorical diffusion and if it does, what kind of subcategorical diffusion it is.

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