The neogrammarian controversy revisited

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1. The neogrammarian and the lexical-diffusion models

One of the major breakthroughs in linguistics has been, no doubt, the neogrammarian hypothesis. The neogrammarians' position, concerning sound change, can be split up into three parts:

1. sound changes are exceptionless;
2. sound changes are conditioned by phonetic factors only;
3. sound changes are phonetically gradual and lexically abrupt.

The first part is clearly stated by Osthoff and Brugmann (1878). In the neogrammarians' practice counterexamples to it were handled by analogy. That is, grammatical structures which were disrupted by sound change could always be restored by analogy, which acted *a posteriori*. The second part has been disputed by the generative model in which phonology may be affected by the syntax and the lexicon. The third part is not stated in these words by the neogrammarians. It is, in fact, an inference from parts 1 and 2. In other words, we can say that the neogrammarians' model will predict that all the words which contain the affected sound will be modified in the same way at the same time.

A different conception of sound change, the lexical-diffusion model, was advanced, in its modern shape, in the mid-1970s. This model, derived mainly from the work on Chinese by W.S.-Y. Wang, M. Chen, H.-I. Hsieh, and C.-C. Cheng and enlarged further by the work of Krishnamurti, Sherman, Janson, Labov, Phillips, and others, challenges the neogrammarian model in its cornerstones. The case of Chinese is the most dramatic one. It shows that (a) the first part of the neogrammarian's hypothesis cannot be maintained since there are exceptions to sound change which cannot be accounted for by analogy; (b) the second part of the neogrammarian's hypothesis cannot be maintained either since Chao-Zhou has massive lexical split which cannot be accounted for in terms of phonetic conditioning; and (c) the third part of the neogrammarian's hypothesis cannot be maintained either since lexical split shows that

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it cannot be the case that all words are affected at the same time. Also, it cannot be the case that *all* sound changes are phonetically gradual. Deletions, insertions, and metatheses cannot be gradual; they have to be discrete. In short, the lexical-diffusion model will predict that sound changes are phonetically abrupt and lexically gradual. As stated in Wang and Cheng (1977: 150), 'We hold that words change their pronunciation by discrete, perceptible increments (that is, phonetically abrupt) but severally at a time (that is, lexically gradual) ...'. So, it seems that we are facing two opposing models. But it should be noticed, as Labov (1981: 270) points out, that this opposition has nothing to do with the end result of the change. In fact, the lexical-diffusion model does not forbid regularity; all it says is that irregularity is possible. Also, it does not forbid phonetic conditioning to sound change; all it says is that there may be sound changes which are not phonetically conditioned. So, as stated in Wang and Cheng (1977: 151), 'The difference lies rather in the description (and ultimately, the explanation) of the change mechanism, i.e. how the change is actually implemented.' Also, we should notice that the word, and not the sound, is the basic unit of change in the lexical-diffusion model. But there is a critical question for the lexical-diffusion model to answer: which words are affected first?

2. Further elaboration of the lexical-diffusion model

In the last ten years many substantial works have appeared in press to support the lexical-diffusion model. They are all important works but I will concentrate on just three of them, Krishnamurti (1978), Labov (1981), and Phillips (1984). These were chosen because they involve some interesting aspects of this model.

Krishnamurti (1978) presents solid evidence for lexical diffusion of apical displacement in seven Dravidian languages. Apical displacement is the name of a process by which alveolar and retroflex consonants which occur in position C' in Proto-Dravidian roots of the type *(C')VC'–V change their position to produce structures of the type *(C')C'V– in a specific subgroup of languages (Telugu, Kui, Gondi, Koṇda, Kuvi, Pengo, and Manda). According to Krishnamurti this change affects about 12 lexical items in the common stage of these languages. From this stage on the rule spreads differentially in the lexicon of these languages, affecting different proportions of the eligible items in each one of them: 72 percent in Kui, 63 percent in Kuvi, Pengo, and Manda, and about 20 percent in Gondi and Koṇda. That is, the change spreads through the lexicon and

is still in progress in some of these languages (for example, Kui and Kuvi). In this paper Krishnamurti asks an important question:

> What kind of lexical items become the early victims of a sound change? Other structural conditions for the implementation of a sound change being equal, is there anything in the semantic domain of certain lexical items, or in their frequency, that makes them more vulnerable to change than others? ... (1978: 16),

and comes close to a definite answer when he states

> The Dravidian data presented here seem to show that the lexical items registering the earliest traces of apical displacement refer to concepts fundamental to the communication and culture of the tribal groups, viz. 'two, moon/month, sacrifice, open, enter, etc.' (1978: 16).

As can be seen, two factors are suggested, frequency and semantic domain, as possible determinants of the degree of exposure of words to sound changes. But since the objective of Krishnamurti's paper is a different one, these are not pursued further.

Labov (1981) wrote a very important paper on the controversy involving the two models. Instead of arguing for one of the models at the expense of the other, Labov takes a very judicious position by evaluating the findings of both models and by examining 'the conditions under which each of the opposed viewpoints is valid' (1981: 268).

By examining the sociolinguistic data of English, Labov shows us that there are many cases which support the neogrammarian model. These cases show that all the words of a historical class are affected by a given rule (that is, it is not necessary to mark off some members of this class as lexical exceptions to the rule). They also show that the changes in question seem to be gradual and phonetically conditioned (that is, there is no evidence for discontinuities in the processes and no evidence for grammatical conditioning). Examples of this type are the raising of (ohr) and (oy), the fronting of (uw) and (ow), and others. In short, in all these cases one cannot prove that the fundamental mechanism selects individual words. They are all neogrammarian in nature, and there is no indication of splits between homonyms (compare for example the case of *no* and *know*, among others, which Labov considers in depth; 1981: 279ff.).

On the other hand, Labov has to deal with the case of the splitting of short *a*, an old problem in American linguistics. As Labov writes,

> The case of short *a* in the Middle Atlantic states is quite different. There the raising and tensing affects only a subset of /æ/, following a complex set of

conditions that vary systematically as we move from New York to Philadelphia to Baltimore (1981: 284).

The rule which accounts for the alternation between lax and tense (æ) would be as follows: if a vowel follows the segment that follows after (æ), we have lax (æ); otherwise (that is, if nothing follows the consonant that follows after [æ], or if a morpheme boundary follows after it) we have tense (æ). Labov then takes some counterexamples to this rule to check the neogrammarian model. For instance, in the case of *man* (tense), *manner* (lax), and *manning* (tense), *manning* would be a counterexample. But it could be handled in the Neogrammarian model by analogy: if *man* is tense, so is its participle. The same solution could be given for *tin can* (tense) vs. *I can* (lax). The second is lax by analogy with other auxiliaries, such as *am*, or with articles, such as *an*, which have a shwa in unstressed position. Since shwa is a lax vowel, so is the vowel in *I can*. The problem is that there is no such explanation for lax *ran*, *swan*, and *began* (compare these to tense *Dan*, *man*, *slam*, etc.). Also, Labov points out that in Philadelphia, where (æ) followed by a voice stop is lax, one always finds tense *mad*, *bad*, and *glad* (but lax *sad*). This case cannot be handled by the neogrammarian model either. Instead, it suggests lexical diffusion. Labov concludes, then, that 'not all sound change in Philadelphia is Neogrammarian' (1981: 286).

After comparing the case of short *a* with the neogrammarian changes which occur in Philadelphia, Labov gives us a list of the features that characterize the two types, which we transcribe here as Table 1 (Labov's Table 11; 1981: 296). Labov goes even further, and deeper, in his conclusions and offers us a classification of some consonant and vowel shifts reported in the literature according to their tendency to present, or not,

Table 1. *Features characterizing the neogrammarian and lexical-diffusion models*

	NG	LD
discrete	no	yes
phonetic conditioning	fine	rough
lexical exceptions	no	yes
grammatical conditioning	no	yes
social affect	yes	no
predictable	yes	no
learnable	yes	no
categorized	no	yes
dictionary entries	1	2
lexical diffusion: past	no	yes
lexical diffusion: present	no	yes

lexical conditioning, which we transcribe here as Table 2 (Labov's Table 12; 1981: 303).

As can be seen from Tables 1 and 2, Labov aims at a parametric distribution of the two types of change. And we also have a paradox, which Labov words as '... if Wang and his associates are right about lexical diffusion, and the Neogrammarians were righter than they knew about sound change, how can both be right?' (1981: 303). Labov's answer is, 'We have located Neogrammarian regularity in low-level output rules, and lexical diffusion in the redistribution of an abstract word class into other abstract classes' (1981: 304). But unless I am very much mistaken, that does not answer the question of which words are affected first. Table 2 gives us a clue to which processes will present one of the sets of properties listed in Table 1. But it does not give us a clue to the potential or early victims of lexical diffusion.

An attempt to answer this question is found in Phillips (1984). Phillips's paper, written in the spirit of lexical diffusion, tries to calibrate the word-frequency factor in the actuation and implementation of sound change. According to Phillips, if a change is motivated by physiological factors, acting on surface phonetic forms, it will affect first the most frequent words; on the other hand, if it is motivated by nonphysiological factors, acting on underlying forms, it will affect the least frequent words first. Instead of discussing Phillips's arguments to make her point I just want to take advantage of some of her observations on the history of a few English vowel changes. For example, Phillips states that

> ... the raising of OE /a/ to /o/ before nasals exhibits clear diffusion from the most frequent to the least frequent within word classes ..., even though it is a low-

Table 2. *Classification of vowel and consonant shifts*

	No lexical conditioning reported	Lexical conditioning reported
Vowel shifts		
within subsystems	4	1
diphthongization and monophthongization	3	1
lengthening and shortening	0	7
Consonant shifts		
change of manner	4	0
change of place	5	2

level output rule effecting a shift within the subsystem of short vowels. (1984: 321).

and that

... Ogura has shown the probability that the raising of ME ę was lexically diffused. It will be shown below that the unrounding of ME /ö(:)/ to /e(:)/ exhibits lexical diffusion according to word frequency, despite its restriction within the subsystems of short and long vowels (1984: 321).

These two statements raise some problems with regard to Tables 1 and 2. For instance, it seems that there are cases with no present lexical diffusion that had past lexical diffusion. And this may be the reason why Table 2 is not perfectly symmetrical, that is, it is not the case that we have a zero in all rows. In short, it seems that some of the cases which Labov predicts as characteristically neogrammarian were cases of lexical diffusion in their earlier stages. The question is, how can we accommodate Phillips's historical evidence with Labov's recent observations? Before we go into that, let us consider some facts of Brazilian Portuguese.

3. Pretonic raising in Brazilian Portuguese: neogrammarian change or lexical diffusion?

All dialects of Brazilian Portuguese present a variable pronunciation for [−high, −low] vowel phonemes. These vowels can be phonetically realized in three different ways: (1) as an open mid vowel ([ɛ] or [ɔ]); (2) as a close mid vowel ([e] or [o]); or (3) as a high vowel ([i] or [u]). Although none of these possibilities can be said to be exlusive of any particular dialect we can say, in general terms, that possibility (1) characterizes northern Brazilian dialects; possibility (2) characterizes southern Brazilian dialects; and possibility (3) characterizes central Brazilian dialects. That is, each one of these posssibilities is most frequently found in a specific geographic area. So, we will find the first vowel in the word *morango* 'strawberry' pronounced as [ɔ] in northern Brazil, as [o] in southern Brazil, and as [u] in central Brazil. But from now on I will exclude from my considerations the first possibility, [ɛ] and [ɔ], which are rare outside northern dialects. So, the variation I will be talking about involves [e]~[i] and [o]~[u]. Before we follow on I would like to point out that although central and southern dialects present a variation between pretonic [e]~[i] for (e), and pretonic [o]~[u] for (o), they do not have to coincide in the pronunciation of the eligible words for the process. For instance, the word *fogão* 'oven' is pronounced as [fo'gə̃w̃] in southern Brazil. But this

same word is pronounced as [fu'gə̃w̃] in central Brazil, where a form like [fo'gə̃w̃] means 'big fire' (from *fogo* 'fire' in its augmentative form) and not 'oven'.

Let us call the rule which leads from (e) to [i], and from (o) to [u], pretonic raising. This rule, PR from now on, would account for variable pronunciations such as [segu'ɾə̃sə]~[sigu'ɾə̃sə] *segurança* 'security'; [ko'migu]~[ku'migu] *comigo* 'with me'.

This phenomenon has been analyzed in the literature on Brazilian Portuguese by many linguists (Lemle 1974; Bisol 1981; Abaurre-Gnerre 1981; Passos et al. 1980; Viegas 1987). In fact, the first reference to this problem in print appears in Fernão d'Oliveira (1975 [1536]). That is, this is an old problem in Portuguese. Lemle (1974) describes PR as a categorical rule, conditioned by phonological and morphological factors. This analysis does not hold water since the exceptions to the rule are too many. The other works listed above treat PR as a variable rule, with results which are very interesting but only partially comparable since they refer to different dialects. But Viegas (1987) is, in my opinion, the most illuminating work on the problem. Viegas tries to answer the following question: is PR a neogrammarian or a lexical-diffusion process?

Let us see where PR fits in Tables 1 and 2. PR is a case of shift within subsystem and, as such, it has all the chances to present the NG features of our Table 1. Viegas, in her conclusions about PR, presents the following statements, among others (my translation):

A. The variation in the pretonic occurs in environments which allow us to observe a certain regularity of the phenomenon and to describe it as a variable phonological rule (1987: 163).

B. ... there are no environments which can account for all the cases of raising, or non-raising. That is, some items always present pretonic raising, some others never do (1987: 166).

C. There were lexical items which showed pretonic raising even in the absence of favoring environments, while there were other lexical items, with similar frequency and used in the same speech style, that never showed pretonic raising (1987: 167).

D. ... I claim that the pretonic raising rule acts first on the most frequent lexical items (1987: 168).

As it can be seen, conclusions A and B and conclusions C and D contradict each other. It is not the case that Viegas's analysis is faulty. The problem is that she is trying to make neogrammarian sense of a lexical-diffusion process. Let us consider the 'regularity' of the phonetic factors in Viegas's analysis (see conclusion A). Consider first the phonetic conditioning for rule (1), both favoring and disfavoring:

(1) (o)→⟨+high⟩ /C_\$ (X) V (Y)
[+stress]

favoring:
C is an obstruent.
X is a nasal.
disfavoring:
C is a sonorant.

Examples of the favoring factors, all with a categorical [u], are the following:

c*o*brir	g*o*verno	f*o*gueira
'cover'	'government'	'bonfire'
c*o*mida	c*o*meço	b*o*nito
'food'	'beginning'	'beautiful'

Examples of the disfavoring factor, all with a categorical [o], are the following:

m*o*delo	l*o*ção	l*o*teria
'model'	'lotion'	'lottery'

But the point is that all these cases of phonetic conditioning are contradicted in two ways:

1. There are cases of favoring phonetic factors in which (o) cannot be raised, like *colina* 'hill', *poder* 'power', *rotina* 'routine', *comício* 'rally', *cometa* 'comet', *bonina* 'purple', all of them with a categorical [o].

2. There are cases of raising of (o) in disfavoring phonetic environments, like *moleque* 'guttersnipe', *motivo* 'reason', and *moeda* 'coin', all of them with a categorical [u].

Just to give an idea of how useless the phonetic conditionings are, observe the list below:

Categorical [o]	Categorical [u]
c*o*mício 'rally'	c*o*mida 'food'
b*o*nina 'purple'	b*o*nito 'beautiful'
t*o*mada 'plug'	t*o*mate 'tomato'
p*o*mar 'orchard'	p*o*mada 'ointment'
c*o*meta 'comet'	c*o*meço 'beginning'
f*o*rminha 'little baking mold'	f*o*rmiga 'ant'
p*o*rção 'portion'	p*o*rção 'many'
f*o*lhinha 'little leaf'	f*o*lhinha 'calendar'
etc.	

As can be seen, no fine or rough phonetic conditioning can guarantee either [o] or [u].

Let us see now if we can have better luck with (e). Rule (2) is the most general formulation for (e) raising:

$$(2)\quad (e)\rightarrow\langle +\text{high}\rangle\ /(X)\_\_(Y)\ \$\ (Z)\qquad \underset{[+\text{stress}]}{V}\qquad (W)$$

and we have the following favoring and disfavoring effects

favoring:
X is null and Y is an alveolar fricative.
X is null and Y is a nasal.
Z is a sonorant.
The stressed vowel is high.
disfavoring:
X is an obstruent.
The stressed vowel is not high.

Examples of the favoring factors, all with a categorical [i], are the following:

*e*scola	*e*spelho	*e*stado
'school'	'mirror'	'state'
*e*nsina	*e*mprego	*e*ntrar
'teaches'	'employment'	'to come in'
p*e*rigo	f*e*liz	s*e*mestre
'danger'	'happy'	'semester'

Examples of the disfavoring factors, all with a categorical [e], are the following:

g*e*ral	s*e*reno	d*e*finir
'general'	'serene'	'define'
s*e*mana	s*e*tembro	m*e*tade
'week'	'September'	'half'

But, again, one can find counterexamples to most of these effects. The two first favoring effects — initial (e) followed in the same syllable by an alveolar fricative or by a nasal — are the strongest. In fact, there are no words with an (e) in this environment which have a categorical [e]. All we can have — and do have, according to Viegas's data — is variation between [e] and [i]. This happens in words like *experiente* 'expert', *entender* 'to understand', *envio* 'I send', and a few others. On the other hand, all the other favoring effects are easily contradicted. Compare, for example, categorical [i] p*e*rigo, f*e*liz, and m*e*nino 'boy' with categorical [e] p*e*rito

'specialist', felino 'feline', and meninge 'meninges'. The same opacity is found for the disfavoring factors. We have words with categorical [i] in spite of the fact that they have a [−high] stressed vowel and that (e) is preceded by an obstruent:

pequeno 'small'
senhora 'lady'
debaixo 'under'
etc.

Again, we can see that the phonetic context does not guarantee too much. Compare the following pairs and homonyms:

Categorical [e]	Categorical [i]
mendigo 'beggar'	mentira 'lie'
meninge 'meninges'	menino 'boy'
semente 'seed'	semestre 'semester'
sensível 'sensible'	sentia 'I felt'
medita 'he meditates'	medida 'measure'
Peru 'Peru'	peru 'turkey'
preciso 'precise'	preciso 'I need'
sentido! 'attention!'	sentido 'sorry'
etc.	

It is difficult to support any sort of phonetic regularity for PR, contrary to Viegas's claim. What we have here is a case of lexical diffusion. PR has all LD characteristics listed in Table 1, even the lack of social affect (see Viegas 1987: 139–151). It is in Table 2 that PR does not fit well. Also, high frequency of occurrence does not seem to be an interesting factor for selecting the first victims of PR. *Cebola* 'onion' and *cenoura* 'carrot', which have a categorical [e], are much more frequent than *ceroula* 'drawers', which has a categorical [i].

4. Neogrammarian or lexical-diffusion model?

Chen and Wang (1975) draw a clear line between the actuation and the implementation of sound change in terms of explanation. Basically, the actuation of a sound change has to do with inherent constraints of the physiological and perceptual apparatus of the language user, while the implementation of a sound change takes place by lexical diffusion. Chen and Wang set up their point on the basis of data from Chinese, English, and Swedish. But, as Labov shows us, there are many attested cases

which support the neogrammarian model. As we have seen, Labov tries to accomodate the two models by assigning to each of them a certain type of sound change, low-level output rules with the neogrammarian model and abstract phonological changes with the lexical-diffusion model. But since we seem to be unable to tell *a priori* which one is which, Labov's conciliatory proposal does not help too much. My own position is more radical than Chen and Wang's, and I will say that *all* sound changes are lexically implemented, that is, there are *no* neogrammarian sound changes (although we can have neogrammarian long-term end results). The facts are as follows:

a. There are sound changes which do not fit the neogrammarian model (the tensing of short *a*, the case of Chao-Zhou, for example). that is, we have to admit lexical diffusion.

b. There are sound changes which are supposed to be, by some theoretical criterion, neogrammarian in nature. On closer examination, though, they turn out to be cases of lexical diffusion (Brazilian Portuguese PR, for example). On the other hand I do not know of any case whose analysis starts out as lexical diffusion and, on closer examination, reveals itself as neogrammarian.

c. There are sound changes which show no present lexical conditioning (that is, they are regular) but which had past lexical conditioning. Phillips (1984: 321–322) gives us some indications of cases of this type for English.

d. If the neogrammarians had no control of the transition from X to Y in a change of the form X→Y/Z, how can one guarantee that this change was not lexically implemented? All we have is the end result, and even if it is completely regular, that does not prove that the process was not lexically implemented in its earlier stages.

So, as a starting point, I will say that all changes are lexically implemented. Now, how can we explain the fact that some changes show, at some point, a total regularity? I will say that a sound change of the form X→Y/Z may reach ultimate regularity iff Z offers a natural phonetic environment for Y. For instance, in many Brazilian dialects /t/ is phonetically realized as [č] before [i]. And in these dialects this is exceptionless. My proposal is that rule (3)

(3) t→[č]/__ i

was implemented lexically; that is, at an earlier stage some words had the sequence [... ti ...] while others had the sequence [... či ...]. But since [i] presents a natural phonetic environment for palatal [č], rule (3) reached complete regularity. Let us take a second example. In most Brazilian dialects /ey/ may be reduced to [e] in word-internal position before /š/, /ž/ and /ɾ/. So, for *peixe* 'fish' we have ['peyši] or ['peši]; *beijo* 'kiss' we have ['beyžu] or ['bežu]; *cheiro* 'smell' we have ['šeyru] or ['šeru]. But for

/ey/ before nasals the situation is not that clear. We may have reduction in some words but not in others. reduction may occur in *queima* 'burns' ['kẽ(ỹ)mɐ]; *treino* 'training' ['trẽ(ỹ)nu]; *teima* 'insists' ['tẽ(ỹ)mɐ]; *pimenta do reino* 'black pepper' ['ĩẽ(ỹ)nu]; but not in *reino* 'kingdom' ['ĩẽỹnu]; *Reinaldo* a masc. name [ĩẽỹ'nawdu]; etc.

Also, it is said that /ey/ reduction cannot occur before stops. In fact it cannot occur in *peito* 'chest' ['peytu] or *meiga* 'kind' ('meygɐ], but it may occur in *manteiga* 'butter' [mɜ̃'te(y)gɐ]. That is, where Z is a natural phonetic context for Y, regularity may take place; where it is not, irregularity appears and we find lexical selection. In short, I claim that a natural phonetic environment may destroy, in the long run, the lexical barriers for a sound change.

Let us go to the last question now: what factors are responsible for the lexical barriers? What may 'protect' a word from undergoing a sound change? We know very little about this point, and all I will say here is simply tentative. I would say that at least three factors may act as inhibitors to sound changes: proper names, social class reaction, and formal speech styles. Proper names are probably the clearest cases. It is a well-known fact that names of persons, cities, rivers, mountains, etc., may preserve an old form and resist change. The effect of social-class reaction is found in the negative attitudes of the upper classes toward changes initiated in the lower strata (see Kroch 1978). This has a delaying effect and not a real inhibiting effect. Anyway, it gives temporary protection to some words (not to all words, it should be noticed, since correction is applied to words and not to sounds). As for the inhibiting effect of the formal speech styles, Madureira (1987) has shown that the vocalization of (lh), which has restructured a specific set of words in the lower classes in Belo Horizonte, is almost absent from the speech of the middle classes in the formal styles. But this vocalization process is reaching the middle-class group, as a variable rule, in the same words which lead restructuring in the lowest social group, through the informal speech styles.

We may now try to outline a tentative answer to the following question: which words are affected first? The earlier victims of a sound change of the form X→Y/Z are the words which present the following features (not necessarily in this order):

a. X occurs in a common noun.
b. Z offers a natural phonetic environment to Y.
c. X is part of a word which occurs in informal speech styles.

While the actuation of a sound change has to be conceived in abstract terms which simply justify its *raison d'être*, its implementation cannot be removed from the performance conditions.

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