Driving Forces in Linguistic Change

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Throughout the 20th century, our efforts to understand human language may be seen to be sharply divided into two distinct undertakings. Both spring from an acknowledgment that the language faculty, like the species, probably had a single origin. Given that perspective, one task is to discover those constant properties of language that reflect the innate biological endowment of the species, the language faculty. The other, equally challenging task, is to discover the causes of the present diversity among the language families of the world.

This report concerns the progress of efforts to achieve that understanding of the causes of diversity. At various meetings on the origin and evolution of language, I have become convinced that we will not be able to reconstruct the actual form of that original language. But if we can determine the forces that lead to diversity, and they prove to be of a general enough character that they may be assumed to have existed at a very early period in the history of the species, then we will have gained some understanding of linguistic evolution parallel to, but distinct from, the understanding of biological evolution.

First, I would like to suggest that there is no general problem of understanding diversity. The situation is radically different according to the state of communication between the speech communities being compared. When two sub-groups become separated by migration across great distances and physical barriers, we have no problem in understanding why their languages become differentiated. Random variation in structure and random replacement of the vocabulary are certain to lead to this result over time. We can restate the problem of language change as a pair of opposing propositions:

(1) When two groups are separated so that communication between them is reduced, then divergence is expected, and any degree of convergence requires an explanation

(2) When two groups are in continuous communication, linguistic convergence is expected and any degree of divergence requires an explanation

The expectations of divergence in case (1) and divergence in case (2) proceed directly

from Bloomfield's principle of density (1933:476), which argues that each communicative act is accompanied by a slight degree of convergence of linguistic systems of speaker and interlocutor. It is the defeat of these expectations that highlights the paradoxical character of certain linguistic changes. The problems confronted in the first case are exemplified by Trudgill's studies of parallel developments in postcolonial varieties of English. This report will be concerned with the surprising results of the second type, as in the divergence of African American Vernacular English from other dialects (Labov and Harris 1986, Bailey 1993), the ongoing divergence of regional dialects in North America (Labov et al. in press), and, the differentiation of men's and women's speech (Labov 1990, 2001).

Triggering events

The notion that separation of linguistic systems leads automatically to divergence demands some modification. Stability rather than change is characteristic of linguistic paradigms, which tend to be symmetrically and stable sets of oppositions. Change is typically concentrated in limited sub-systems where the basic symmetry has been disturbed by some triggering event.[1] This discussion to follow will be focused upon a series of complex events—chain shifts in the vowel systems of North America—which are each initiated by such a triggering event.

The recently discovered Canadian shift is a downward and backward movement of three short front vowels that is characteristic of younger speakers throughout Canada[2] (Clarke 1995):

(1)   /i/ -> /e/ -> /æ/ -> [a]

The linguistic motivation of this shift is clearly the merger of the historical short *o* class in *cot, Don, hock,* etc. with the long open *o* class in *caught, Dawn, hawk*, etc. In terms of sub-systems, this represents as migration of the phoneme /o/ from the sub-system of short vowels to the sub-system of long and ingliding vowels,[3] so that the chain shift is more completely represented as

(2)   /i/ -> /e/ -> /æ/ -> /o/ -> /oh/

The Canadian Shift is then a response to the creation of a hole or *case vide* in the short vowel sub-system (Martinet 1955).

2.1.2. The Northern Cities Shift is a rotation of five vowels of English as shown in Figure 1. It apparently began in the middle of the 20th century, first described in Chicago,

Detroit, Rochester and Buffalo (Fasold1969, Labov, Yaeger & Steiner 1972, Eckert 1986). The oldest and most widespread element of the shift is the general raising of the short *a* class from low front to mid front position.[4] This is the triggering event, which was followed by the lowering of long open /oh/ in *caught, hock, dawn, law,* etc. the fronting of /o/ in *cot, got, rock, sock,* etc. to center and front of center, the lowering and backing of short /e/ in *bet, bed, deck,* etc., and the backing of /^/ in *but, bud, duck,* etc.

Figure 1. The major chain shifts of North American English

The Northern Cities Shift
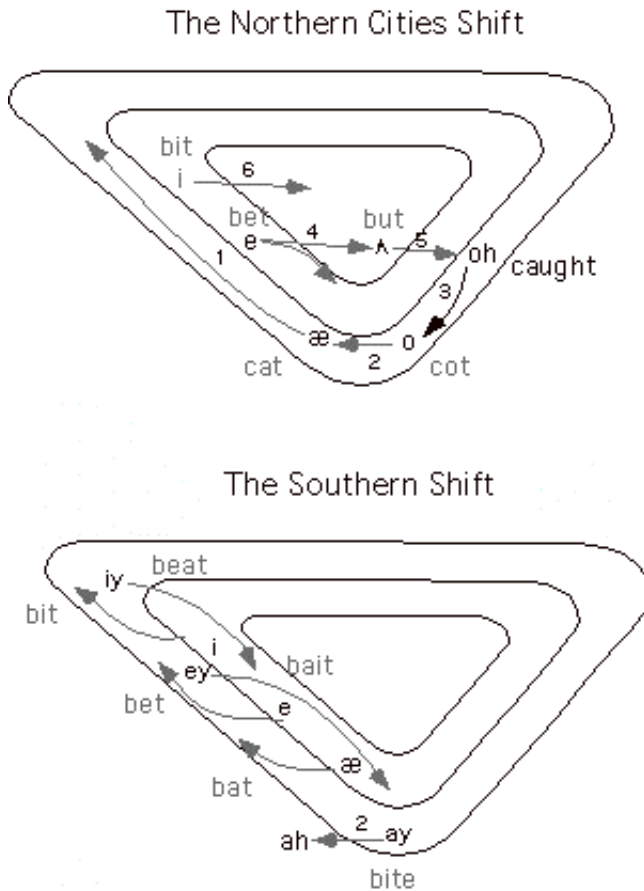
The Southern Shift

The Southern Shift, shown in the bottom half of Figure 1, represents a movement of vowels in the opposite direction from the Northern Cities Shift. It is a widespread pattern in English dialects, similar to the chain shifts found in southern England, Australia, New Zealand an South Africa. In the Southern States of the U.S., the triggering event is the monophthongization of /ay/ in *wide, wise, why,* etc. It is followed by the laxing and downward shift of the nucleus of /ey/ in *make, made, change, say,* etc. along a nonperipheral track, and then consequent laxing and lowering of the nucleus of /iy/ in *beat feed, be,* etc. This portion of the shift may then be schematized as:

/iy/ -> /ey/ -> /ay/ -> /ah/

This is then accompanied by the fronting and raising of the formerly lax short vowels /i, e, æ/ along the peripheral track, with the development of inglides.

The triggering events for these three chain shifts are all governed by general principles of linguistic change of a unidirectional character. The low back merger is controlled by Garde's principle that mergers are irreversible by linguistic means (1961). The raising of tensed short *a* along the peripheral track is governed by the uni-directional principle that in chain shifts, tense vowels rise along the peripheral track (Labov 1994). The monophthongization of /ay/ follows one of the unidirectional principles for changes of subsystems. The historical record many observed cases of monophthongization of /ay/, but no reports of spontaneous shifts of a long low central vowel to a front upgliding diphthong.

The triggering event thus introduces a disturbance into the linguistic sub-system in the form of uneven dispersion in phonological space. Martinet (1955) has developed the view that chan shifts are driven by the tendency to maximize the dispersion of elements in a system.

> Phonemes co-existing in a language tend naturally to optimize the possibilities that are available from the speech organs; they tend to be as distant from their neighbors as possible while remaining easy to articulate and easy to perceive. . .
>
> Martinet 1955:62 (tr. WL), attributed to de Groot TCLP 1931:121.

The tendency to restore maximal and symmetrical dispersion was attributed by Martinet to the speaker's the desire to maintain communicative efficiency. But chain shifts are more likely the consequences than the causes of understanding and misunderstanding, a mechanical result of the mechanism of language learning. For a stable linguistic system, this mechanism is inherently conservative. Consider a distribution like (3):

(3)
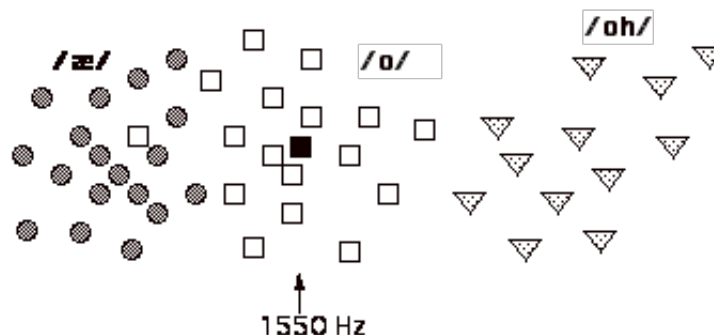
There are three low vowels: /æ/, /o/ and /oh/. A single aberrant token of /o/ is well within the /æ/ distribution. It may well be identified as /o/, and contribute to the computed mean value of /o/. But the listener may also fail to comprehend the word and the sentence it contains. In that case, it will not be contribute to the mean value of /o/. The end result will be a computed mean for the second formant of F2 as 1550 Hz (the black square).

If no sound change is involved, this mechanism of misunderstanding will have a conservative tendency, reinforcing the separation of /æ/ and /o/, and maintaining their margins of security.

Now consider a distribution such as (4). Here the vowel /æh/ has been fronted and raised, and is following an elliptical distribution that stretches towards the mid front peripheral region. The fronted token of /o/ will no longer lie within the range of the /æ/ distribution, and there is a much greater likelihood that it will be identified correctly as /o/. It will then contribute to the computation of the mean value of /o/, and accordingly, that mean will be shifted towards the front—here shown as 1571 Hz. This is the mechanism that operated in the Northern Cities Shift to produce the fronting of /o/ in response to the general raising of /æ/.

(4)

1571 Hz
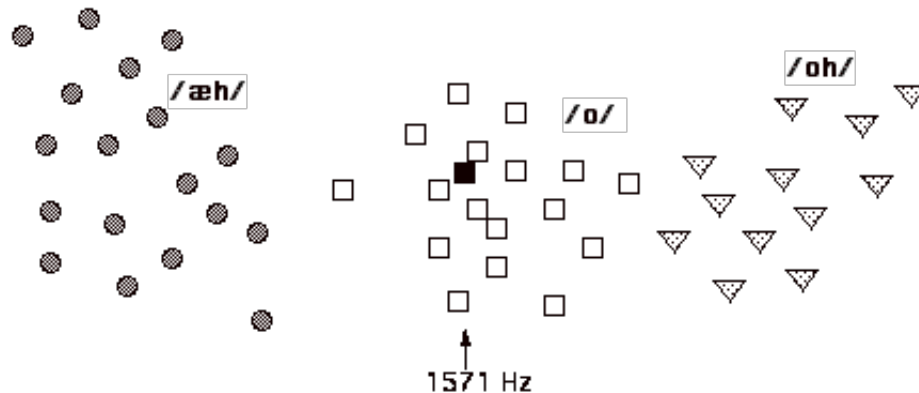
Driving forces

At this point, we have arrived at the question: what are the forces driving linguistic changes in the languages of the world? We might then conclude from the preceding discussion that the primary force that leads to the linguistic diversity is the mechanical tendency to maximize dispersion within a sub-system, producing shifts in the direction that was originally determined by the unidirectional character of the triggering event.

It should be noted that sound changes discussed so far are not governed by the principle of least effort, but are rather characterized by an increase in duration, energy and

complexity of articulation. Experiments on cross-dialectal comprehension (Labov and Ash 1996) show that they do interfere with the communication of information, just as most 19th century linguists argued (Paul 1891, Whitney 1904). The challenge to explanation is maximal for linguistic changes of this type.[5] If it can be shown that they are governed by the mechanical processes of maximizing dispersion, it will be safe to argue that the basic language design as an instrument for communicating information is operative in all cases.

Because the tendency to maximize dispersion is so general, it seems inevitable that it governed language change from the earliest period, and so, like the principle of least effort, it would give us a direct insight into the forces that molded language diversity from the very outset.

At the same time, this generality would predict that sound change will move through the speech community as a constant rate. Though least effort may affect one part of the population more than another (Kroch 1978), the tendency to maximal dispersion, driven by the process of language learning outlined above, would not apply differentially to children of one social group rather than another.
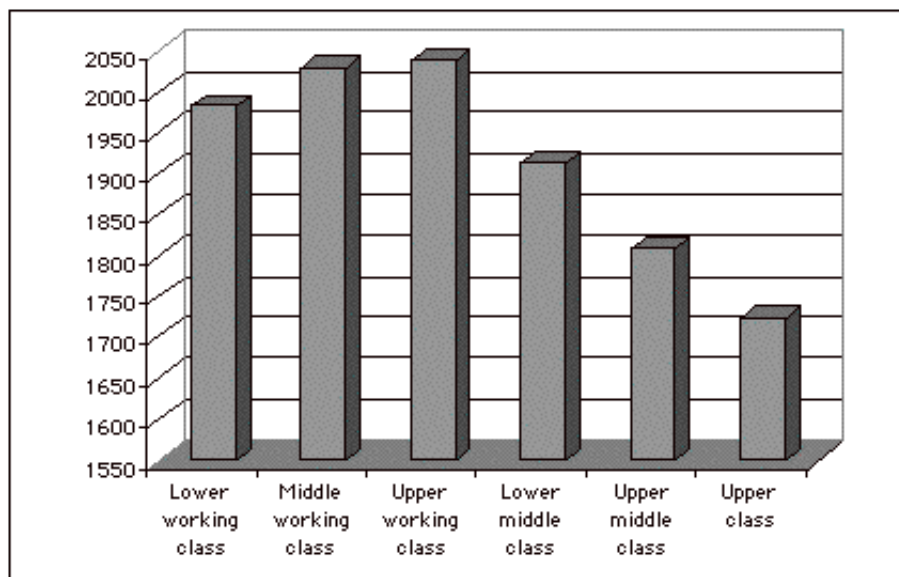
However, most of the linguistic changes in progress studied in the 2nd half of the 20th century show a high degree of social differentiation (e.g. Labov 1966, Trudgill.1974, Cedergren 1973, Haeri 1996, Sankoff 2001). Figure 2 shows the age distribution of the variable (aw)—the fronting of /aw/ in *south, out, down, now* etc, which begins with the conservative value[æo] and ends with the advanced form [e:o]. This monotonic distribution in apparent time is coupled with data from phonetic transcriptions 30 years earlier that show only the more conservative forms. [6]

Figure 2. Age stratification of the fronting of /aw/ in the Philadelphia Neighborhood study [N=112]. Vertical axis shows expected values of F2 for each age range, calculated by adding age regression coefficients to the constant [Source: Labov 2001, Ch.5].
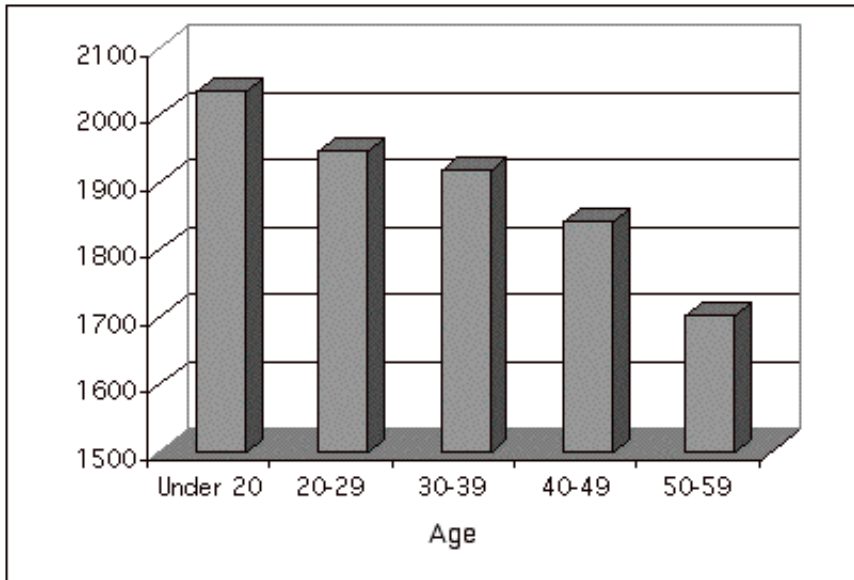
Social class distributions drawn from the same regression analysis are shown in Figure 3, with the characteristic curvilinear pattern. The upper and middle working classes are in the lead, while the lower working class is significantly behind. The middle and upper classes show progressively lower values.

Figure 3. Social stratification of the fronting of /aw/ in the Philadelphia Neighborhood Study [N=112]. Expected values of F2 calculated by adding social class regression coefficient to the constant. [Sourrce: Labov 2001, Ch. 5].

This curvilinear pattern in Philadelphia was located as a test of the hypothesis that linguistic change stems from a group located in the center of the socioeconomic hierarchy, a relationship found in New York City (Labov 1966), Norwich (Trudgill 1974), Panama City (Cedergren 1973) and Cairo (Haeri 1996). In smaller communities, it has been found that

sound changes can serve as symbols of local identity (Labov 1963, Hazen 2000, Holmquist 1988, Frazer 1983). In close studies of social networks in the high schools of Detroit suburbs, Eckert has found differentiation of stages of the Northern Cities Shift by the adolescent realizations of social class (1999). The most recent stages of the Northern Cities Shift are significantly associated with membership in the polar group of "Burn-outs," youth who show a generalized resistance to institutional norms and adult-sponsored activities.

More detailed studies of the social characteristics of the leaders of linguistic change show that they are female members of the highest status local group, upwardly mobile, with dense network connections within the local neighborhood, but an even wider variety of social contacts beyond the local area (Labov 2001, Ch. 11). Moreover, these leaders of change show a history of nonconformity in other respects, and show a life-long history of resistance to repressive or unjust authority (Labov 2001, Ch. 12). The same configuration appeared in Haeri's study of palatalization in progress in Cairo Arabic (Haeri 1996).

There are two distinct problems of explanation involved here. One is to explain the incremental pattern of Figure 2—why do younger speakers show regularly increasing higher values of the variable? The other is to account for the diffusion shown in Figure 3—how does the change spread outward in a weaker form from the leading group to groups increasingly distant in the social dimension? Most of the attention in sociolinguistic studies has been given to the second problem. Whenever these linguistic changes rise to the level of social awareness, they are normally stigmatized and rejected. Nevertheless, the curvilinear pattern and the profile of the leaders of linguistic change indicate that the driving forces behind the diffusion are positive forms of social motivation. Since most changes in progress lie far below the levels of social awareness, it is generally agreed that these positive motivations are covert, although direct evidence for their existence is minimal.

At an earlier period, arguing from general considerations, Sturtevant 1947 suggested that new linguistic forms are associated with the values and attributes of the originating group, and that speakers adopt those forms as an indication of their alignment with those values. Le Page and Tabouret-Keller developed a more elaborate description of this social process on the basis of their observations of language choice in Belize:

> The individual creates his systems of verbal behavior so as to resemble those common to the group or groups with which he wishes from time to time to be identified, to the extent that:
>> (a) he is able to identify those groups
>> (b) his motives are sufficiently clear-cut and powerful
>> (c) his *opportunities* for learning are adequate
>> (d) his ability to learn -- that is, to changes his habits where necessary -- is unimpaired.
>
>   --R. Le Page & A. Tabouret-Keller, *Acts of Identity* (1985)

This approach to the motivation of linguistic change is explicitly formulated for

choices made at a high degree of social awareness. However, it is widely cited as a motivating factor for new changes from below, like the Canadian Shift or the Northern Cities Shift,. It seems unlikely that the image of the conscious agent can apply to the more general case, but it is not impossible that speakers are unconsciously motivated to claim symbolic identity with a reference group.

A more general and attractive model can be derived from studies of other forms of social behavior involved in rapid change. It is useful here to distinguish between *customs*, or stable forms that are transmitted unchanged across generations, and *fashions*, forms that change rapidly within and across generations. While most language forms are stable and customary; a few rapidly changing variables may be closely compared to fashions.[7] Change and diffusion of fashions--in clothing, cosmetics-- appears to be closer to linguistic change and diffusion than any other form of behavior (Katz and Lazarsfeld 1955). A recent study of choices of personal names by Stanley Lieberson (2001) is particularly relevant here, since individuals select their children's names as a matter of conscious personal choice, without being aware of the social factors that determine that choice.

Lieberson presents data on long-term trends in personal naming. Like changes in skirt length, we can see long-term increase in choices of personal names. Figure 4 shows endings of the 50 most common names for girls born in Illinois, 1918-1987. Names ending in -a, like *Rebecca, Eva* and *Julia* have shown a steady increase over this period, along with names ending in –ie or –y like *Amy,* while the choice of names ending in –n (*Jane*) and -s (*Alice, Doris, Janice*) has declined.

While some sociologists have attributed rises of fashions in personal names to the conscious imitation of celebrities who carry those names, Lieberson shows that in almost every case the celebrity's name was already on the increase. As in the case of linguistic change, the influence of the mass media follows community change after some interval in time.

Figure 4. Endings of fifty most common girls' names in Illinois, 1981-1987
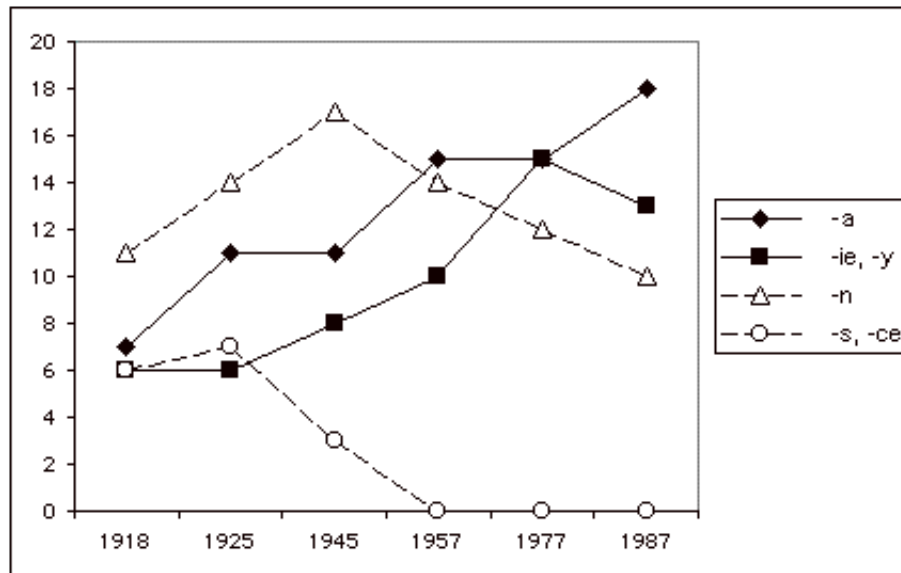
(Lieberson 2001).

        Lieberson argues is that such long term trends are the product of a structural factor, the "ratchet principle", which operates independently of other changes in social life. When a feature of social behavior is recognized as "new", forms that shift further in that direction will be preferred as in fashion, and older forms will be dispreferred as out of fashion. The parallel with sound change is quite precise, since when these forms reach limits that are physically demarcated, like the limits of the articulatory system, the direction of change may be reversed, but with other changes that differentiate the new forms from older forms. Thus when a long vowel rising reaches maximum height, it may be diphthongized and fall, as in the Southern Shift.

        The ratchet principle gives us another accounting for the unidirectional character of linguistic change. It shows us that systematic social change does not require conscious choice, and that a wide variety of changes can be driven by a structural principle of great generality. But it does not define for us the linguistic correlate of "in fashion" or "out of fashion." Furthermore, the data for ratchet principle reflects unconscious choices made by adults: it does not bear directly on the behavior of children in the process of forming and solidifying their linguistic systems. Data on personal names reflects regional trends, but it is not detailed enough to tell us whether members of all social classes are making the same choices. Nor do Figures 2-3 tell us whether all social classes are moving in the same direction and responding to the same driving forces.

        A closer examination of the behavior of social classes in Philadelphia shows that in fact they are. Figure 5 shows the distribution of individual mean values for the fronting of /aw/ in Philadelphia by age and social class, based on the same data used for Figures 2 and 3. The lines on Figure 5 are partial regression lines for indiviidual social class groups, showing the slopes and intercepts that are calculated for each separately.[8]

The regression line for the upper working class shows the steepest slope, indicating the highest rate of change, while the middle working class is just behind. This appears to be a recent development in the apparent time dimension created by age levels. The lower working class has a much shallower slope. The stratification in which the upper working class leads is therefore a characteristic of younger speakers. But what is most striking is the parallel slopes of the upper working class, middle working class, lower middle class, and the upper class. We observe the upper class following behind the working class at exactly the same rate. Whatever the cause of this remarkable phenomenon, the logic of Le Page & Tabouret-Keller cannot apply. Children of the upper class are instructed that they are *not* middle class. It is inconceivable that they are motivated to adopt progressively fronter forms of /aw/ by the desire to be identified as upper working class.

Figure 5. Scatterplot of the fronting of (aw) by age and socioeconomic class. with partial regression lines for social classes from the Philadelphia Neighborhood Study [N=112].
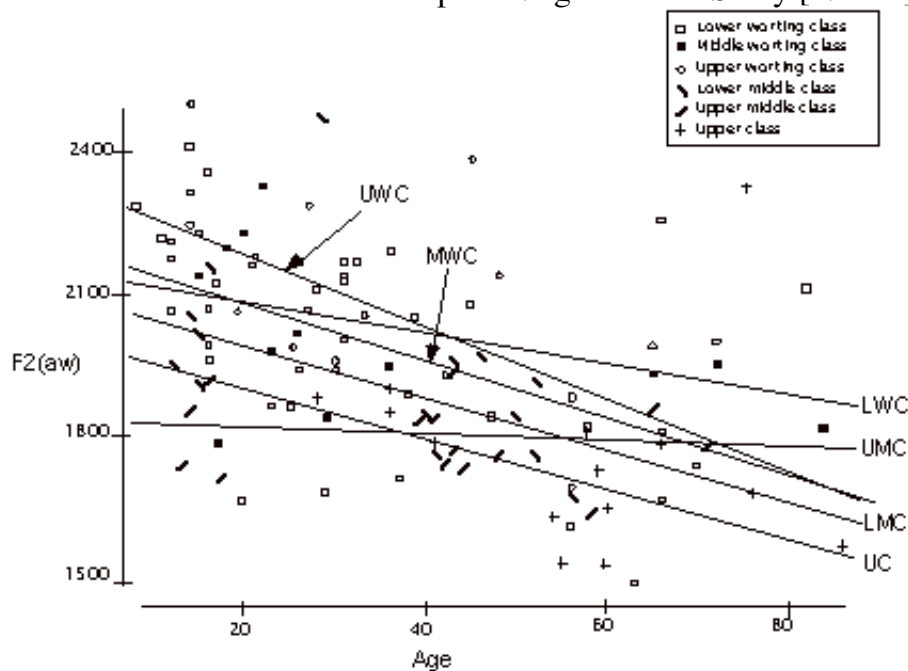

Figure 5 is not exceptional. The other Philadelphia variables show even more consistently the phenomenon of parallel slopes for all social classes. This result articulates with another puzzling aspect of linguistic change. Sometimes the social differentiation of sound change in progress leads to stable social stratification, as in the case of negative concord in English, *ne* deletion in French, aspiration and deletion of /s/ in Spanish and Portuguese. But more often, the change goes to completion, affecting all members of the speech community equally. Thus the oldest stratum of Philadelphia sound changes is the backing and raising of /ahr/ in *car, card,* etc, to lower mid back position. At present there is no social differentiation of this feature: upper class, middle class, working class Philadelphians have the same phonetic range, with no significant regression coefficients for age, gender or social class. Philadelphia also shows a complex lexical split of the short *a*

class into tense and lax members. The oldest working class speakers and the oldest upper class speakers show the same distribution: tense *a* before voiceless fricatives and front nasals except for irregular verbs and weak words, tense *a* before *mad, bad, glad* but lax *a* for all other syllables closed by /d/.

It is often thought that speech communities are nested within each other, down to the level of the individual. Empirical studies show that this is not so. We find that the great metropolis of more than a million inhabitants is a unity. It is marked by an extraordinary geographic uniformity of structure, a high degree of agreement in the evaluation of social variables, and a high degree of social differentiation of stable sociolinguistic variables and changes in progress. In many ways, this degree of uniformity is more difficult to account for than divergence. How is it that the entire community shows rising levels of linguistic change, even though the changes were initially identified with speakers who cannot be taken as reference groups for everyone?

Rising Levels

Our understanding of complex chain shifts like the Northern Cities Shift was initially based on exploratory studies of a few large cities: Chicago, Detroit, Buffalo. The triggering event of the NCS, the raising of /æ/, appeared to follow the cascade model of diffusion from the largest city to the next largest city and so on down (Callary 1975). When the Atlas of North American English was completed, the view we obtained of the NCS was quite different. Every measure of the progress of the chain shift showed a uniform distribution across a vast area of the North extending from western New York State (Rochester, Syracuse, Buffalo) to northern Ohio (Cleveland, Toledo) Michigan (Detroit, Flint, Grand Rapids, Kalamazoo), northern Illinois (Chicago, Joliet, Peoria) and southeastern Wisconsin (Madison, Milwaukee). This area is the Inland North: a conurbation of some 34,000,000 people across 88,000 square miles, the second greatest concentration of population in the United States. It was settled by a stream of westward migration proceeding by the Erie Canal in New York State, across Lake Erie and Michigan to Chicago, and now represents a concentration of industrial cities surrounding the waterways of the St. Lawrence River and the Great Lakes.

One of the most sensitive indices of the progress of the NCS is the EOD measure. Since the fronting of /o/ is accompanied by a backing of /e/, the end result is a sharp reduction in the front-back difference between these two phonemes. In the most advanced speakers, /e/ is directly above /o/. As a general criterion, any speaker for whom the /e/-/o/ difference is less than 375 Hz is a full participant in the NCS. Figure 6 is a map of the area where each such speaker is shown by a black circle. The broken grey isogloss shows the

outer limit of the general raising of /æ/ which is the triggering condition for the NCS; the black isogloss is the outer limit of all the communities where a majority of the speakers are participants in the NCS. Since this is a change in progress, there must always be some older speakers who are not participants. Nevertheless, the high degree of homogeneity of the Inland North is evident.

The southern limit of the NCS is the North/Midland boundary, one of the sharpest divides in North American dialectology, and each measure of the progress of the shift bundles on this line. South of this line, there is a narrow corridor running along the highway from Chicago to St. Louis. The traditional dialect of St. Louis (involving the merger of *far* and *for*) has almost completely disappeared, and the city has become in island of the Northern Cities Shift, almost completely aligned with Chicago in the development of its vowel system.

Figure 6. The geographic distribution of the Northern Cities Shift in the Inland North as shown by the front-back approximation of /e/ and /o/ [Source: Atlas of North American English]
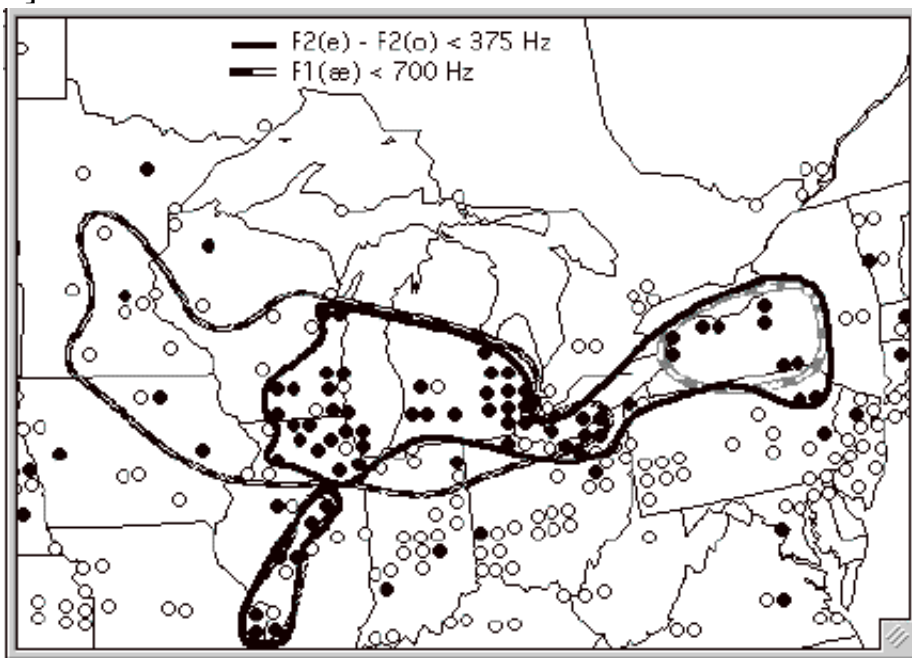

The sweeping uniformity of the Northern Cities Shift area makes it difficult to assign the social motivation to local practices. It is true that people in Rochester are aware that they have a local accent; but they do not know that it is the same local accent that is found in Buffalo and Syracuse and Rochester, and that it is progressing at the same rate as in all these other cities. What social processes can account for the steadily rising levels of the NCS across this vast area? The answer to this question does not lie in any one social factor, but in the interrelations among them.

The intersection of social class and gender

Sociolinguistic studies of the speech community find that linguistic variation is correlated with a small number of social variables: age, gender, social class, race/ethnicity, urban/rural status and location in social networks. While internal constraints on variation are typically independent of each other, it is normal to find strong interaction among the external factors. Typically, the differentiation of stable linguistic variables by gender varies across social classes: in particular, the second highest status group shows the greatest gender differences (Labov 1966, Wolfram 1969, Eckert 1999, Labov 2001). Linguistic changes from below show a somewhat simpler configuration: one or the other gender is usually in advance for all social classes (Labov 1990). In the great majority of cases, it is women who are ahead—usually by a full generation (Gauchat 1905, Herman 1929, Labov 2001).

A close look at the five stages of the Northern Cities Shift shows an even more interesting relationship between gender and social class. Figure 7 is derived from Eckert's close-grained study of the Northern Cities Shift, showing correlations with the two polar adolescent social class groups (Jocks vs. Burnouts) and gender. As noted above, Burn-outs are the group who reject adult-dominated institutions and norms. Jocks, in contrast are the groups who seek advancement and success by conforming to those norms, and following the educational path to upward mobility.[9] The vertical axis shows the mean percent of tokens that were impressionistically rated as "advanced" for each stage; the horizontal axis shows the five stages of the Northern Cities Shift of Figure 1.

Figure 7. Correlations of five stages of the Northern Cities Shift with gender and social category in a Detroit suburban high school (based on Eckert 1999)
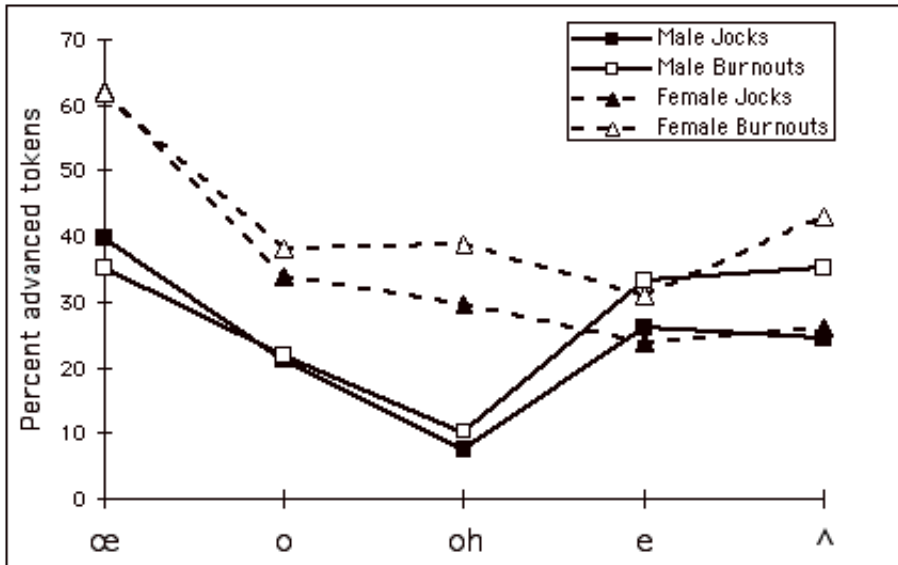
The most recent stages of the Northern Cities Shift are at right: the backing of /e/ and /^/. For these, the most significant differences are social category: the Burnouts show significantly greater values than the Jocks, and gender differences are not significant. But for the three older stages, this situation is reversed: social category is not significant but gender is a major differentiating factor. Eckert interprets these data as evidence that sound change is driven among adolescents by its adaptation and association to a local "community of practice".

If this analysis holds for the Northern Cities Shift in general, then the social symbolism must have a very broad base, since as Figure 6 shows, the same process can be observed throughout the Inland North. If the driving force behind the Northern Cities Shift is to be found in individual acts of identity, then we have to determine what that identity is. [10]

A closer view of the social mechanism of linguistic diffusion will develop the role of the two-step flow of personal influence in social networks, the trajectory of socially mobile individuals and the generalized role of non-conformity as a social trait. Such movements internal to the community may be located within the larger trends of regional differentiation that the Atlas of North American English provides. Table 1 shows a regression analysis of the influence of social factors on measures of the progress of the Northern Cities Shift. The parallels with Eckert's analysis are surprising, considering the fact that the Atlas is an instrument for examining geographic, not social, distribution., With only 1-2 subjects for most communities, it was not designed as a test of hypotheses on social factors.[11] The regression analysis therefore takes advantage of whatever variation in age and education

was found among the 71 respondents located in the Inland North.

.The older stages of the change are reflected in the first two lines, showing the raising and fronting of /æ/. As the oldest stage of the change, it is so close to completion that no significant age coefficient is found. Gender is a strong and significant factor favoring the change. The relative reversal of /æ/ and /e/ is a measure that combines an early and late stage of the change.[12] A significant age coefficient appears, along with gender. For the remaining measures in lines 4-6, age coefficients are found that indicate vigorous change in progress in apparent time, but no gender coefficients.

For the Atlas data, the most complete information on a social class index is found for education. Educational levels are divided into EL(ementary), 0-8 years; some HighSchool (9-11 years); High School (12 years); Some college (13-15 years); College graduate (16 years); Graduate school (16+). The oldest change, raising and fronting of /æ/, shows a small favoring effect for high school graduation. The newer changes are favored more strongly by speakers with less than high school education. These are the drop-outs who correspond to the Burn-outs of Eckert's analysis: those who reject the institutional path to upward mobility through education.

The fact that the Atlas data corresponds so closely to Eckert's detailed ethnographic and linguistic analysis considerable confidence to the correctness of these findings. It therefore becomes even more urgent to address the question of why social category correlations gives way to gender correlation. Is this pattern in any way related to the problem of accounting for rising levels throughout the community, and the eventual completion of linguistic change for the community a whole?

To answer these questions, we will return to the issue of gender differentiation, and examine the behavior of men and women in the course of linguistic change more closely.

Table 1. Regression coefficients for age, gender and education for Telsur speakers of the Inland North [N=71] for 6 measures of the Northern Cities Shift. p values: * < .05, ** < .01, *** < .001. EAEQ: /æ/ higher and fronter than /e/; EOD: F2(e) – F2(o) < 375 Hz; UHOH F2(^) < F2(oh). Positive figures indicate influences in the direction of the change in progress.

	Age	Female	Education
F1(ae)		34*	HS 40*
F2(ae)		85**	HS 61*
EAEQ	1.34*	31*	
EOD	3.77**		Some HS 72*
F2(e)	3.20**		EL 238*
UHOH	1.99*		< HS 135

Gender asymmetry in language acquisition

        We return to the well-established fact that women are in advance of men in a majority of the linguistic changes in progress that have been studied by quantitative methods (Labov 1990). Furthermore, the difference between the two genders is not a small one. Figure 8 shows male and female patterns by age for the devoicing of (j) in *calle, llame,* etc. in the Spanish of Buenos Aires (Wolf and Jiménez 1979). Women show a much higher percentage devoicing from the outset, and males follow slowly behind. The dotted arrows suggest, moreover, that this is a lag of one generation. Males 24 to 15 years olds approximate the values of women 38 to 55 years old, and 12 year old males have values in the range of women 24 to 35 years old. It is equally important to note that as the change nears completion the differences between males and females seem to disappear.

        Figure 8. Per cent devoicing of (zh) by gender in Buenos Aires Spanish (Wolf and Jiménez 1979).
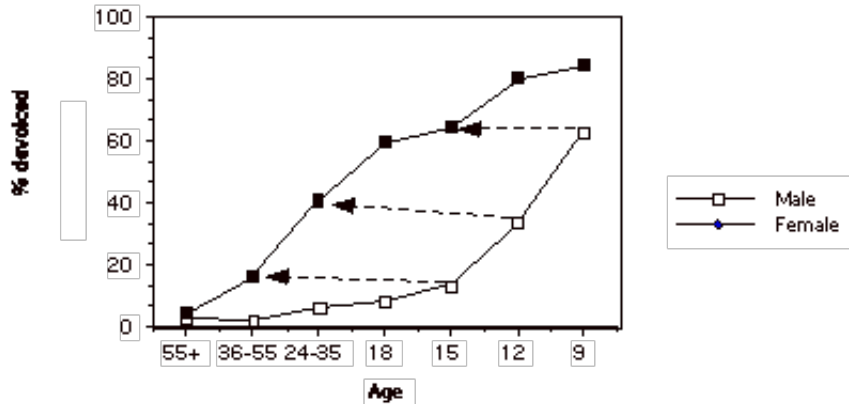

        Figure 9 shows the results of separate regression analyses for men and women of the fronting of /aw/ in the Philadelphia Neighborhood Study. Instead of a single quantitative age coefficient, six dummy coefficients are used to represent membership in an age decade for each individual, yielding a more detailed picture of the trajectory of the change in apparent time. A new regression line is drawn through the six decades for women; it is evident that the six points come very close to the line, and that for women, the progression is in fact linear. The r^2 figure of .961 indicates that 96% of the variance of the six hollow squares is accounted for by the straight line.

        For men, the pattern is much less linear; the regression line for the six points shows an r^2 of only .788. Furthermore, the men follow a step-wise stepwise progression, whch forms three distinct generations. The relationship between the generations is even clearer than in Figure 8. In the first generation, 50 to 70 years old, men have nuclei for (aw) at a low level (F2 of 1700 Hz is the level of /æ/), while women are already advanced to about 1850 Hz (the level of /E/). In Generation II, age 20 to 50 years old, the males are abruptly advanced to the same level that women occupied in Generation I, while women have

steadily climbed to the level [e]. Finally, in Generation III, the male children show a second abrupt rise to equal the level of women in Generation II.

Figure 9. Expected values of F2 of /aw/ by decade in separate regression analyses for men and women in the Philadelphia Neighborhood Study.
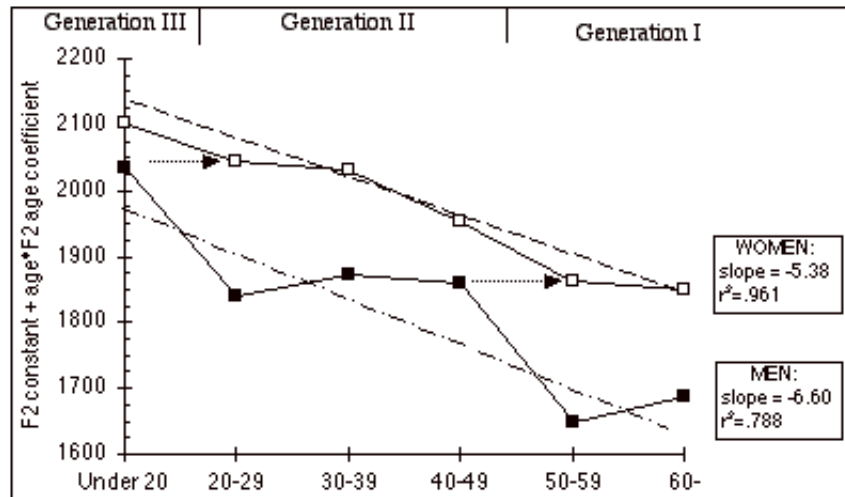
The mechanism responsible for this quantitative pattern seems clear. We begin with the asymmetry of first language acquisition in regard to gender. The vast majority of language learners acquire their first language in close contact with a female caretaker, not a male. Given this fact, let us consider the progression of a female-dominated sound change, and assume that the use of this form effects, to one degree or another, a symbolic claim to female identity. At the outset, girls and young women will advance the change in a linear fashion in a mechanism still to be determined. Males, on the other hand, will not participate but remain at the base level that they acquired from their mothers. After 25-30 years, the first children will enter the speech community whose mothers were affected by the change, and they will inevitably acquire that phonetic level in their first steps of language learning— boys and girls at essentially the same level. Again, the girls will increment their level of the variable throughout pre-adolescence, adolescence and to some undetermined degree, in early adulthood, while males again remain at the level of first acquisition. In the third generation, males acquire the level of women of Generation II. At this point the change may be close to completion, and differences between males and females begin to shrink.

The data of Figures 8-9 support this scenario. It explains not only the step-wise progression of males, but also the fact that women predominate in most linguistic changes from below. The same logic that will accelerate and bring to completion a female dominated change will retard and even eliminate a male-dominated change. In the case of the male-

dominated change, the second generation of males will not acquire advanced forms at first acquisition, but will instead begin at the low level of their mothers. Though they may acquire some incremented forms from their peers, the progress of the change will inevitably be slower than for female-dominated changes and may in fact be terminated at an early stage.

      We must consider the possibility that male children of Generation II will not remain at the level of initial acquisition, but lower their use of the variable in reaction against a pattern identified with female behavior. Though there are no data showing this, it might well occur to some degree.[13] However, it assumes that first language learners associate their initial input with female behavior. This seems unlikely, since this will be the common form that they hear from girls and boys of the same age. It is much more likely that the level of first language acquisition will be accepted as the unmarked, or default level, of the speech community. Thus the effect of women transmitting the results of language change to their male children is the loss of the associated feature of female identity. As girls enter the speech community and observe gender differences in use among adults and adolescents, they will engage in further incrementation, and it will be this higher level of the variable that becomes a marker of female identity.

      Thus to the extent that male children acquire advanced level of a linguistic change from their mothers, that level will be transformed from a gender-marked form of language to the unmarked form characteristic of the speech community as a whole. The rising levels of linguistic change are then a response to this mechanism of transmission, which in most cases will eliminate the gender difference altogether.

The salience of gender

      This focus on gender differences does not yet account for the spread of a linguistic change throughout the speech community to create the homogeneous structural base in which further change takes place. Nor does it account for the remarkable pattern that we have observed of the shift of social category to gender correlations. I would now like to put forward an hypothesis of Gender Salience to account for these patterns. The proposed principle is that the transformation of social category correlations seen in Figure 7 and Table 1 is general. It can be argued that among the social dimensions that are correlated with language variation, gender is privileged and that shifts will regularly proceed in that direction.

      In support of this position one can begin with the now generally accepted view that gender as it affects language is not a biological but a social category. Furthermore, gender is

the largest and most comprehensive social category that a community can have, dividing the population into two equal halves. It is even more important to note that gender is the most salient category from a child's point of view. In the years of early language acquisition, it is quite possible that a child will see very little of social class or ethnic differences, meet people from the level of urban organization as itself, and remain within a closed network of people with mutual obligations. The only social category that will inevitably obtrude upon the child's consciousness is gender, and there is considerable evidence that gender is the most salient and important category for young children.

This being so, it is inevitable that the data on language variation will be subject to re-interpretation by language learners, and that this re-interpretation will favor gender. It would follow that the shift that we observe in Figure 7 and Table 1 is not an accident, but the most favored type of progression to be observed in the history of a complex set of linguistic changes.

The origins of linguistic diversity

We are now ready to push the argument backward in time. We have been studying the development of a complex vowel system in a complex society. What features of this development may be seen characteristic of linguistic change in general, at whatever level of linguistic and social organization?

First, it seems clear that limited language diversity can arise in many ways, products of accidental breaks in communication networks, or has as been argued many times, through re-interpretations in the process of language learning (Halle 1962, Lightfoot 1997). Most variations are the results of population movement and the resultant dialect mixture (Payne 1980, Kerswill & Williams 1999). Within a speech community, the general tendency towards accommodation and the pressure of community norms will generally. eliminate these variations.

The triggering event that leads to extensive systematic change is the insertion or removal of a category from a sub-system in a direction determined by unidirectional constraints on linguistic change. The principle of maximal dispersion then applies within that sub-system as a driving force for continued change.[14]

Sociolinguistic variation is parasitic upon such linguistic variation. It is an opportunistic process that reinforces social distinctions by associating them with particular linguistic variants. Though in principle any social category may be associated with linguistic change in progress, it is the culturally dominant groups of society that are normally in the lead,. The use of linguistic forms to increase distinctiveness of particular groups is a driving force for the acceleration of change

The diffusion of linguistic change to neighboring groups in the social hierarchy or geographic dimension is influenced to some degree by the tendency to accommodation and imitation by adults. This mechanism leads to the outward diffusion of progressively weaker forms.

The major acceleration of diffusion within a community is the result of the reinterpretation of social category differences as gender differences. Once a social category correlation is reinterpreted as a gender difference, it is subject to the basic mechanism of reinterpretation as the unmarked community level, leading to rising levels of linguistic change for the community as a whole.

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[1] The notion of a "triggering event' demands some investigation, since it must be assumed that every event in the history of a language was itself preceded or triggered by some other event. The term is here confined to some event that proceeds from causes relatively external to the sub-system affected: the borrowing of a new element from another language or dialect; or the migration of an element of a sub-system to another sub-system.

[2] Not including, however, the Atlantic Provinces (Labov et al. in press).

[3] In Canada, this merged low back phoneme is a low back rounded vowel. It is clear that the members of /o/ are no longer members of a short vowel class, since they are now members of a phoneme that can occur in final position (*law, saw,* etc). In English, short vowels are identified by the constraint against word-final position.

[4] Almost all North American English dialects show raising of /æ/ in some environments, particularly before nasals, but the Inland North area where the NCS is found is the only one in which all allophones of /æ/ are lengthened, fronted and raised, including *black, flat, advertisement, athletics,* and other words that are always low front lax vowels in other dialects.

[5] "It is safe to say that we speak as rapidly and with as little effort as possible, approaching always the limit where our interlocutors ask us to repeat our utterance, and that a great deal of sound change is in some way connected with this factor. (Saussure 1949:386) It might seem more appropriate to consider least effort to be a constraining factor than a driving force.

[6] The figures shown here, and all figures from the Philadelphia study to follow are based on the normalized mean values of acoustic measurements of F1 and F2, using the log mean normalization to eliminate the main effects of differences in vocal tract length (see Labov 2001, Ch. 5).

[7] In the study of personal influence by Katz and Lazarsfeld (1955), the closest parallels to patterns of linguistic change are found in the domain of fashions and cosmetics, where younger women are the opinion leaders.

[8] The social class groups represent divisions of a 16-point index equally weighted for education, occupation and house value. For details see Chapter 5 of Labov 2001.

[9] As Eckert makes clear, there is a large intermediate class between these polar groups who sometimes define themselves as "in betweens," but orient themselves to this polarity in one way or another. Figure 7 shows data only for the polar groups.

[10] Eckert has recently suggested that the more general formulation of the identity assigned to the Northern Cities Shift might be 'urban' (NWAVE 2000 presentation). However, the most recent analyses of ANAE materials shows that city size is not a significant factor for most stages of the NCS.

[11] Although the Atlas procedures required that any telephone respondent who was born and raised in the area be accepted as representative of that area, there was an additional policy that each community be represented by at least one woman under 40, if possible.

[12] This is a Boolean function that ranges from 0 to 1. Values are here multiplied by 100 to show roughly the same range as other features.

[13] In a study of Sydney adolescents, Eiskovits 1981 found that girls shifted their use of non-standard variables in the standard direction whenever their turn of speech was directly after hers; for five of the eight variables, boys shifted in the opposite direction.

[14] This may apply to semantic, syntactic, morphological or phonological systems, though our knowledge of the principles governing phonological change is perhaps the most highly developed.