

The intersection of sex and social class in the course of linguistic change

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ABSTRACT

Two general principles of sexual differentiation emerge from previous sociolinguistic studies: that men use a higher frequency of nonstandard forms than women in stable situations, and that women are generally the innovators in linguistic change. It is not clear whether these two tendencies can be unified, or how differences between the sexes can account for the observed patterns of linguistic change. The extensive interaction between sex and other social factors raises the issue as to whether the curvilinear social class pattern associated with linguistic change is the product of a rejection of female-dominated changes by lower-class males. Multivariate analysis of data from the Philadelphia Project on Linguistic Change and Variation indicates that sexual differentiation is independent of social class at the beginning of a change, but that interaction develops gradually as social awareness of the change increases. It is proposed that sexual differentiation of language is generated by two distinct processes: (1) for all social classes, the asymmetric context of language learning leads to an initial acceleration of female-dominated changes and retardation of male-dominated changes; (2) women lead men in the rejection of linguistic changes as they are recognized by the speech community, a differentiation that is maximal for the second highest status group.

SOME BASIC FINDINGS AND SOME BASIC PROBLEMS

Among the clearest and most consistent results of sociolinguistic research in the speech community are the findings concerning the linguistic differentiation of men and women. These results can be summed up in two distinct principles.

- (1) In stable sociolinguistic stratification, men use a higher frequency of nonstandard forms than women.

This article is a revision of "The role of women in linguistic change" given at NWAIVE-XIV in Philadelphia in 1984. I am much indebted to Anthony Kroch for raising the questions that gave rise to the original paper, and to his continued insistence that appropriate answers be found. He has also provided invaluable assistance in the re-analysis of the Philadelphia database that helped correct a number of errors and wrong directions. I am also grateful to Gillian Sankoff for extended discussion of the issues involved and many contributions to the argument of the article.

- (II) In the majority of linguistic changes, women use a higher frequency of the incoming forms than men.

Though these are valid and reliable findings, they do not fit into any larger framework that accounts for why men and women should be different in this way, or how sexual differentiation affects the course of language history. The two distinct patterns of behavior are difficult to reconcile with each other, and also contradict a number of well-established principles of linguistic change. The conceptual problems may be summed up under four headings.

The biological bias. Though Principles I and II are reported in terms of differences in behavior of the sexes, there is little reason to think that sex is an appropriate category to explain linguistic behavior. It follows that an intervening variable must be formulated in terms of distinct cultural roles assumed by male and female members of society (Eckert, 1989a). But there is as yet no general agreement on the identification of these roles or how to assign them to individual speakers.

The generality of gender. A well-accepted sociolinguistic principle is that the fluctuating course of linguistic change is correlated with and indirectly caused by social changes that alter the structure of the speech community (Meillet, 1921). In recent years, there has been increasing evidence to reinforce the view that sudden changes in linguistic systems are associated with catastrophic social events.¹ Yet sexual relations do not show the uneven and irregular character that is typical of linguistic change. They respond more slowly than other social relations to changes in the economic, political, and demographic situations. The intimate association of sexual differentiation with linguistic change in Principle II would tend to predict long-range changes that move steadily toward completion, rather than what we often find: local movements that begin suddenly and terminate in mid-course or reverse direction.

The reversal of roles. Principles I and II show two distinct kinds of differences between men and women. In the stable situations described by Principle I, women appear to be more conservative and favor variants with overt social prestige, whereas men do the reverse.² But in the unstable situations described by Principle II, it is men who show a more conservative character, and women who use forms that deviate more from the standard and are in fact stigmatized when they are overtly recognized. Efforts have been made to unify these apparently conflicting behaviors under a single interpretation, such as a tendency for women to be more sensitive to symbols of social status. But so far, no such proposals have received enough support from the data available.

*Intimate diversification.*³ Some of the strongest advances in our understanding of the diffusion of linguistic change depend on the principle of lo-

cal density (Bloomfield, 1933). On a large scale, this principle associates dialect boundaries with weaknesses in networks of communication. It rests on the assertion that each act of communication between speakers is accompanied by a transfer of linguistic influence that makes their speech patterns more alike. This type of automatic and mechanical influence underlies the gravity model that accounts reasonably well for the spread of linguistic change from the largest to progressively smaller communities (Callary, 1975; Gerritsen & Jansen, 1980; Trudgill, 1974a). The intimate relations between men and women are associated with a very large number of acts of communication in most societies and cultures. The diversification of men's and women's speech patterns in Principles I and II is therefore difficult to reconcile with the principle of local density.

The most recent general treatment of the sexual dimension of linguistic variation is Eckert (1989a). In her review of the literature, she subjected the concepts, practices, and conclusions of sociolinguists on this matter to a searching scrutiny. Some of her arguments bear directly and indirectly on the problems just outlined and will play a role in the discussion to follow.

1. The biological bias must be countered by substituting the social category of gender for the biological category of sex.
2. The intervening variables are not to be defined by cultural traits such as differences in the expressive character of speech, but rather in the relationships of power and dominance between men and women, based on differences in their economic and institutional roles.
3. A quantitative analysis of gender differentiation must anticipate the interaction of this dimension with socioeconomic class and other social dimensions, so that multivariate analysis must use a number of interactive categories (like "lower middle-class female") or, preferably, separate and parallel analyses of men's and women's speech.
4. Though the roots of gender differentiation of language are to be found in the possession and control of goods and authority, these patterns of behavior are not linked tightly to current patterns of economic opportunity, but are rather dependent on long-standing and more slowly changing cultural expectations of role behavior.⁴

Eckert also provided the most comprehensive report yet published on her own examination of the social matrix of sound change in a Northern Cities high school. Though many linguists have introduced an ethnographic perspective into their work, this is the first example of long-term participant observation that has produced a quantitative analysis of linguistic data. No other sociolinguistic study brings us closer to the social origins of sound change or gives us as clear a view of the sociolinguistic processes that determine and differentiate linguistic behavior. The present report takes a broader approach to the resolution of the problems of sexual differentiation, drawing upon large-scale surveys of the speech community. It is therefore important to begin by relating Eckert's ethnographic view of sexual differentiation

to the perspective obtained from studies of sociolinguistic stratification in the community as a whole.

SOME METHODOLOGICAL ISSUES

There are two conflicting aims that govern our approach to the understanding of language, and they are not easily reconciled. On the one hand, our effort should be to achieve the deepest understanding by minimizing the effect of observation and maximizing our view of the social context of what is happening. This is best achieved by the full participation of the observer in the social scene, with an acute sensitivity to the norms of the local culture and the local configuration of social interaction. On the other hand, we want to achieve the largest understanding of the phenomena so that our descriptions and theories bear on the general nature of the language faculty and the general character of language change. This requires not only a representative view of the speech community, but a method of investigation that allows accurate alignment and comparison of our results with those obtained in other communities. This aim is best achieved by a controlled study of the speech production of a random sample of individuals stratified by objective measures such as occupation, education, income, residence value, age, generational status, and mobility.⁵ But if the analyst is to understand how this sociolinguistic stratification comes about and how it changes in form or content, these objective data must be connected to observations of people speaking to each other in their everyday social context. Conversely, if the participant-observer is to relate interpretations of the local scene to the larger community or to language in general, a means must be found to compare such findings across social networks, dialects, and languages.

The problem of establishing these relations is severe, and no method has emerged that is completely satisfying or convincing. To see why this should be so, one must consider the opposing analytical inventories of the participant-observer and the urban survey. They share basic linguistic categories at the descriptive level and they can also converge in their theoretical approach to phonology, morphology, and syntax. Eckert drew upon the same abstract characterization of the sound change in progress that is used in our broader surveys: the Northern Cities Shift (Labov, in press). But the two approaches to the independent variables of the social context are radically different. The urban survey takes the well-known objective categories of social life as given⁶ and examines the configuration of linguistic variables across this multidimensional terrain. The goal of the procedure is to obtain new information about the distributions of linguistic behavior rather than new categories for the analysis of society. The participant-observer is guided by a much less specific social theory—one that searches for configurations of local practices, norms, rights, and obligations rooted in the local situation. It

is almost inevitable that this analysis will emerge in a different form from those of other participant-observers, in neighboring or distant communities.⁷

The social categories used in quantitative studies are far from uniform. The approach to social class may be based on occupation, education, or a combination of these with income, residence, and membership in social institutions. But one may abstract from these differences to the more general notion of a socioeconomic hierarchy, as I do in the discussions to follow. The social categories required for a comparison of the linguistic behavior of men and women are then *highest social group*, *lowest social group*, *second highest group*, and *intermediate social group*, along with other demographic concepts that refer to population size (*urban*, *rural*), immigration history (*first generation*, *newly arrived*, *established*), and age. As participant-observer, Eckert located analytical categories that are specific to the local scene—*Jocks* and *Burnouts*—but achieved generality by relating them to processes that must exist to some degree in every high school. *Jocks* and *Burnouts* are taken as prototypical examples of adolescent groups who seek their goals by conforming to adult norms or by defying and escaping from them (Eckert, 1989a, 1989b). It is likely that succeeding studies of high school social life will be informed by this distinction, but it is also logical to expect that another locally rooted analysis will add new features that stem from the special features of its local situation.

The strategy that I suggest here is to distinguish between reasonably objective facts, on which we can all agree, and interpretations of those facts, on which we can only expect partial agreement. The treatment of the main independent variable under consideration here illustrates the issues involved. Eckert's reflections on the problem of biological bias (her point 1) imply that the term *gender* is to be preferred to *sex*, because the former is a social category, the latter a biological one. If this is to be a simple substitution of terms, there would not seem to be any immediate advantage, and a danger of confounding natural gender with arbitrary linguistic gender. If we assign gender to our subjects by some other criterion than sex, we run the risk of losing any chance of replication by others. Thus, Eckert (1986) indicated that the use of advanced levels of the variable (aeh) by females is merely a byproduct of the fact that "brokers"—people who habitually relay information between groups—are high (aeh) speakers, and most brokers—but not all—are female. The concept of *broker* is well accepted in the literature of social anthropology. Nevertheless, we have no accepted and objective criteria for assigning the status of broker to any one individual. It would seem reasonable to retain our binary category of sex as *male* and *female*, and use a concept like *broker*, where it is applicable, to interpret and explain the objective findings about sexual differentiation.

The central focus of the present report is the interaction of two social dimensions—sex and socioeconomic class—in their joint correlation with sound change in Philadelphia. I present a number of inferences about the differ-

entiation of men and women that go beyond the basic findings of Principles I and II, and may contribute to the resolution of the puzzling problems outlined. The new conclusions are illuminated by Eckert's investigations of differential socialization and power and provide an alternative interpretation in light of this larger framework.

First, it is necessary to review the evidence for Principles I and II of sexual differentiation, as the degree of uniformity of the evidence is an important component of the solutions that I propose.

REVIEW OF THE EVIDENCE:
SEX AS A SOCIOLINGUISTIC FACTOR

Sexual differences are institutionalized in most languages as the grammatical category of *gender*. Natural gender, which corresponds directly to the sex of the referent, is usually blended, overlaid, or dominated by other arbitrary noun classifications as in French, Russian, or Swahili, but it is sometimes isolated as special pronouns and suffixes for male, female, and neuter referents. In current English, these linguistic differentia of sex are subject to overt discussion and change under the influence of the movement toward sexual equality in social life. Cross-cultural reviews of differences between linguistic forms used by men and women show a much wider range of phonological and morphological features as well as lexical differences in pronominal use (Haas, 1944). Haas' report on the situation in Koasati showed a clear connection with linguistic change; the women's forms were generally regarded as archaic and were used only by older women. In Muskogee, the archaic forms used by women were preserved only in tales where a female character is talking.⁸ Institutionalized differentiation of the sexes may be reflected in adjustment of forms according to the sex of the hearer as well as the speaker. These qualitative reports usually represent a sexual dimorphism that is recognized by all members of the community, is available for quotation, and is overtly taught to children by caretakers. On the other hand, the recent quantitative studies of sexual differentiation reflect patterns that are only vaguely recognized, are not taught directly, and sometimes run counter to the intuitions of linguists as well as the general public.

Principle I: For stable sociolinguistic variables, men use a higher frequency of nonstandard forms than women

This basic finding can be formulated in two complementary ways: men use more nonstandard forms, less influenced by the social stigma directed against them; or, conversely, women use more standard forms, responding to the overt prestige associated with them. Evidence for Principle I is uniform and voluminous. This section recapitulates some of the main trends summarized

in Labov (1982) and presents some more recent reports that bear directly on the argument to follow.

One of the most widely studied English variables is (ing), the alternation of [n] and [ŋ] in unstressed /ing/. Male speakers are found to use the colloquial form [in] more than females in New England (Fischer, 1958), New York City (Labov, 1966), Detroit (Wolfram, 1969), Philadelphia (Cofer, 1972), Ottawa (Woods, 1979), Norwich (Trudgill, 1974b) and 15 other cities in the British Isles (Houston, 1985), Australia (Bradley & Bradley, 1979; Shopen & Wald, 1982), and many other English-speaking regions. In a study of a single Ozark family, Mock (1979) showed that teenaged children followed the sexual differentiation of their parents in the use of (ing).

The English interdental /θ, ð/ provide a wide range of evidence for the tendency of male speakers to use more of the nonstandard affricate and stop forms: in New York City (Labov, 1966: Ch. 8), Detroit (Shuy, Wolfram, & Riley, 1966; Wolfram, 1969), North Carolina (Anshen, 1969), and Belfast (Milroy & Milroy, 1978). Negative concord shows a strong male/female difference, with men using the stigmatized form more than women in New York City (Labov, 1966), Detroit (Shuy et al., 1966), and Anniston, Alabama (Feagin, 1979).

In a single study, Wolfram (1969) documented the operation of Principle I in Detroit for nine nonstandard variants: negative concord, (ing), stop forms of *th*, simplification of final *-t, d* clusters, deletion of final apical stops, vocalization of (r), absence of third singular /s/, absence of possessive /s/, and deletion of the copula. The only nonstandard variant where there were not significant differences between men and women was the use of invariant *be*.⁹

In Canadian French, the Montreal study showed Principle I operating for a number of variables (Thibault, 1983). In Ontario, Mougeon and Beniak (1987) showed that men are much more likely than women to borrow core terms, such as English *so* (59% vs. 41%), and to use such colloquial conjunctions as *ça fait que* [fak] instead of *alors* (68% vs. 32%). Mougeon, Beniak, and Valli (1988) found men more likely to use the nonstandard auxiliary [ʒvɔ] for *je vais* (39% vs. 26%). In all these cases, women preferred the pattern characteristic of the highest social class and of formal speech.

Perhaps the largest body of evidence on sexual differentiation is to be found in studies of Spanish in Latin America and Spain. Fontanella de Weinberg (1974) carried out a detailed study of the aspiration and deletion of (s) in Bahia Blanca in Argentina, replicating the methods of the New York City study in some detail. She found strong evidence for Principle I operating in the choice of the three variants [s], [h], and zero. Alba (1990) reported percentages and variable rule analyses of (s) in Santiago in the Dominican Republic. The most consistent finding is that men show more weakening of /s/ than women in all environments: monomorphemic, plural, and verbal /s/. In addition, men use significantly more of the traditional nonstandard forms of /l/ and /r/ than women.

In Spain, Silva-Corvalán (1986) studied the alternation of conditional and imperfect subjunctive in *si*-clauses – the same variable that was the focus of Lavandera (1975) in Buenos Aires. Men showed more than twice the frequency of the nonstandard conditional in the sociolinguistically sensitive focus of the variable: the apodosis of counterfactual sentences. Silva-Corvalán (1981) studied pleonastic clitics in Chilean Spanish and found that men had a higher tendency to use this nonstandard form. Rissel (1989) reviewed other studies in Spain that showed women using more standard forms than men.

In Glasgow, Macaulay (1977) found that male school children used the stigmatized vowels of the local dialect more than females. An even more sensitive measure of sex differentiation is found in the use of glottal stop for /t/. Preadolescent children of both sexes and all social classes show a high level of glottal stop, about 90%. Among adults, a sharp social stratification is found with middle-class women in particular showing very little glottal stop. The adolescent groups show a high reduction in this feature among middle-class girls; middle-class boys follow suit, but only in their 20s.

Perhaps the most striking differentiation of the sexes was found by Eisikovits (1981), who studied the use of a number of standard/nonstandard oppositions in a Sydney high school. The frequencies of each variable were tabulated separately according to whether the last speaker was an adult (the interviewer) or another student. For almost all variables, girls shifted toward the standard when they were responding to the interviewer, whereas boys shifted in the opposite direction.

In Taiwanese Mandarin, Lin (1988) found that the largest single variable reflecting the use of the standard retroflex consonants in careful speech was the sex of the speaker. Women moved away from the colloquial use of apical forms to a preponderant use of retroflexion in formal styles, but men showed a much more moderate style shift.

The evidence for Principle I is not limited to urban, industrialized, or Western societies. Throughout Latin America this pattern appears in isolated rural areas as well as in large cities: in the Caribbean (López, 1983) and in various countries and languages of South America (Albo, 1970).

Not all sociolinguistic variables show a sex effect. Hibiya (1988) found no significant sex differences for the several Tokyo variables that she studied. Morales (1986) found no significant difference in the velarization of /n/ in Puerto Rican Spanish. But the overwhelming majority of the variables studied do show this effect; and until recently there were no cases reported where men appeared to favor the prestige form more than women. Three such cases appeared in a contiguous area. In Amman, for all social classes, men favored the prestige form /q/ more than women (Abd-el-Jawad, 1981). This pattern was replicated in Nablus (Abd-el-Jawad, 1987). Again, in Teheran, women used the local colloquial forms of the variables (an) and (æš) more than men in all social classes (Modaressi, 1978). This appeared to represent a global reversal of the positions of men and women in two Muslim societies, perhaps

related to the fact that in general women played less of a role in public life in those societies. However, Abd-el-Jawad (1987) and Haeri (1987) challenged such an interpretation, arguing that Classical Arabic is not comparable to the standard languages of other societies. Haeri pointed out that the closest parallel to Western norms are the modern urban forms that Muslim women actually preferred: the glottal stop for /q/ in Amman and the colloquial but prestigious Teheran forms [un] and [eš]. It would follow that women in those societies do not behave differently from women in other societies.

The principle must be qualified by the observation that for women to use standard norms that differ from everyday speech, they must have access to those norms. Nichols (1976) reported that black women on the South Carolina mainland show less tendency to switch from Gullah to English than black women who live on a sea island with tourist development. In many larger studies of the speech community are found some lower class women who do not participate in the wider system of sociolinguistic norms.¹⁰ It stands to reason that the conservative tendency of women applies only when the opportunity for it to apply is present.

Principle Ia: In change from above, women favor the incoming prestige form more than men

Many reports of linguistic change deal with alterations in the social distribution of well-known linguistic variables. These fall into the general category of *change from above*. They take place at a relatively high level of social consciousness, show a higher rate of occurrence in formal styles, are often subject to hypercorrection, and sometimes show overt stereotypes as with stable sociolinguistic variables. Because changes from above share many of the properties of stable sociolinguistic variables, it is not surprising that the role of the sexes is similar, and women lead in both the acquisition of new prestige patterns and the elimination of stigmatized forms. The importation of a new prestige pattern is essentially the adoption of a norm external to the speech community, and groups with high linguistic insecurity are most sensitive to such norms. The same groups are most susceptible to the elimination of stigmatized forms, which takes place under the vigilant stewardship of the publicly recognized dominant groups. Thus this principle is grouped under Principle I, as Ia rather than IIa.

The adoption of the (r)-pronouncing norm in New York City is led by women (Labov, 1966), and the reversal of the Parisian chain shift is equally a female-dominated change (Lennig, 1978). In Belfast, Milroy and Milroy (1985) showed that the raising of /e/ from [a] toward [e] in *neck, desk*, etc., is strongly favored by women. This is actually a reversal of the traditional lowering, and the urban Belfast women follow behind the more prestigious suburbs in this process (Milroy & Milroy, 1985:352). That it is a change from

above is shown by the fact that the more advanced forms are favored in careful speech (*ibid.*, 357).¹¹

The abandonment of traditional rural dialects is normally led by women, as in the case of the Spanish village of Uceda, documented by Holmquist (1985) for the reversal of the raising of final /a/ to /o/. Clarke (1987) demonstrates dialect shifts in Sheshatsiu, an Algonquian language of Labrador. Most of these represented the adoption of the prestigious Southwestern dialect, and women were in the lead in 5 of the 10 cases, and men in none. Thus, the sensitivity of women to prestige forms extends to societies that are not overtly stratified.

Shifts from one language to another are inevitably conscious and are always changes from above, as in the shift from Hungarian to German studied by Gal (1978, 1980). Such shifts, like the dialect redistributions, are often tightly tied to economic factors. The predominance of women therefore cannot be expected to hold when the language is associated with work situations and educational opportunities open predominantly to males, as in the case of Papua New Guinea. Here, census reports show that twice as many males as females acquire the use of English, Tok Pisin, and Hiri Motu (G. Sankoff, 1980:123, Table 5-2).

Some possible explanations

A great deal has been written to account for the sexual differentiation of language summarized by Principle I. Most of the emphasis is on the behavior of women, who are said to be more expressive than men or use expressive symbols more than men or rely more on such symbols to assert their position. This in turn is linked to differential power relationships of men and women. Women are said to rely more on symbolic capital than men because they possess less material power. The explanations offered differ primarily in their emphasis on cultural or expressive traits as opposed to the political or economic position of women. It is interesting to note that no sociolinguistic argument views this behavior of women as a form of superiority or an advantage to them. However, this does emerge in the popular view that women speak better or more correctly than men do. In disadvantaged communities, sensitivity to exterior standards of correctness in language is associated with upward social mobility. In the inner city black community, female students show greater success than males in school and greater employability. The effects of Principle I can hardly be seen as the cause but rather a symptom of an overall readiness and opportunity to take advantage of prevailing community norms.

Those explanations that focus on the behavior of men often attribute to them a set of values that oppose the standard norms, sometimes called "covert" because they do not appear in the relatively formal context of the interview situation. Values of "masculinity" or "toughness" are often assigned forms that are stigmatized as "nonstandard" or "substandard" by writers on

usage. It is easier to demonstrate the existence of the overt norms through experiments in the field, however, and the existence of such covert norms are inferred rather than demonstrated.¹²

Principle II: In change from below, women are most often the innovators

The chief focus of this discussion is not on changes from above but on changes *from below*, that is, the basic form of linguistic change that operates within the system, below the level of social awareness. These include the systematic sound changes that make up the major mechanism of linguistic change. Changes from below offer the clearest view of the effect of sexual differentiation on the ongoing evolution of linguistic systems.

The earliest report of linguistic change in progress was that of Gauchat (1905), who showed that in the Swiss French village of Charmey women were considerably ahead of men for a number of variables: the palatalization of /l/, the aspiration of /θ/, the monophthongization of /aw/, and the diphthongization of open /o/ and /e/. Gauchat's observations were basically ethnographic and individual; his remarks on the contrast between husband and wife Laurent Rime and Brigide Rime are particularly pertinent:

- ao → a Les femmes appartenant à la première génération négligent plus facilement le son qui se perd que les hommes. J'en ai été frappé plusieurs fois surtout en confrontant les époux Laurent et Brigide Rime, lui de 59 et elle de 63 ans. Dans la phrase, *la pomme est douce*, entre autres, il prononçait da^oθə, elle, daθə.
- o → a^o Comme toujours, les femmes se mettent plus facilement sur la voie de la diphthongaison que les hommes. Mme. Rime, 63 ans, m'a offert trois fois autant de cas de ao que son mari, âgé de 59 ans. . . . La dernière génération, c'est à dire tous les enfants, se range du côté des mères et prononce définitivement ao. On ne parle pas sans raison de toit paternel mais de la langue maternelle.

Hermann's revisit to Charmey in 1929 showed that both of these changes had gone to completion except for diphthongization before /r/, where his data clearly showed that women were in the lead. On the other hand, the aspiration of /θ/ in pronouns proved to be a stable sociolinguistic marker at the same level as at the turn of the century, opposing formal [θ] to colloquial [h], and here men showed a slight preponderance of [h].

Hermann provided enough data to allow us to construct a quantitative account, as shown in Table 1. This first quantitative report on sexual differentiation is particularly interesting because for those variables that proved to be true changes in progress in the real-time data, women were in the lead, whereas for those that proved to be stable cases of age-grading, there was no significant difference.

TABLE 1. *Sexual differentiation of three variables in Charmey in 1929*

| | | Men (N = 21) | Women (N = 19) |
|-----|---------------------------|--------------|----------------|
| /o/ | a ^o before /r/ | 58% | 70% |
| /e/ | e ⁱ before /r/ | 33% | 69% |
| /θ/ | h in -tu | 80% | 86% |

Source: Hermann (1929).

Principle II was found to be active in most of the linguistic changes in progress studied by quantitative means in the past several decades (for the English vowel notation used here and following, see Appendix 1). Women were in advance of men in the New York City raising of (æh) and (oh) (Labov, 1966), as well as the backing of (ah) and the fronting of (aw).

The earliest report of the Northern Cities Shift that is the focus of Eckert's work is to be found in an unpublished analysis of Fasold (1969), which examines the fronting of (æh), (o), and (oh) by 12 men and 12 women in the Detroit survey. He found that women were leading in all three cases. Eckert (1989a) showed that girls were in advance of boys for the same three variables, though not for the more recent shifts of (e) and (ʌ).

There are fewer data available on the progression of the Southern Shift than the Northern Cities Shift, but the evidence we have indicates that women are leading. In a study of nine members of an Ozark family, Mock (in press) showed the clear advance of the younger females in the lowering and backing of the nucleus of /ey/.¹³

In the southern and western United States, some of the most active sound changes involve the laxing of vowels before /l/, yielding homonymy of *steel* and *still*, *sail* and *sell*, *fool* and *full*. Nicholas (n.d.) traced the laxing of /ey/ in the Appalachian dialect of Jackson County, North Carolina, and found that women were clearly in the lead. Di Paolo (1988) found similar results for all three vowels in her Intermountain Language Survey of Salt Lake City, Utah. Adolescents were the chief exponents of the change in pronunciation, and girls led boys: 53% to 0% for (iy), 60% to 7% for (ey), 47% to 20% for (uw).

The research group headed by Guy Bailey at Texas A&M has traced the relation of sex of speaker to a number of innovations in Texas speech through the Texas Poll data of 1989. The unrounding of long open *o* to [a] leading to the merger of /o/ and /oh/ was shown by 25% of the female respondents to the poll, but by only 16% of the males. For *walk*, the percentages were 23% and 16%. The merger of /iy/ and /i/ before /l/ was indicated by the laxing of the nucleus in *field*: 33% of the female respondents showed this pattern as opposed to 28% of the males. The comparable laxing of /uw/ in *school* was shown by 48% of the females compared to 40% of the males (Bailey, Bernstein, & Tillery, in preparation).

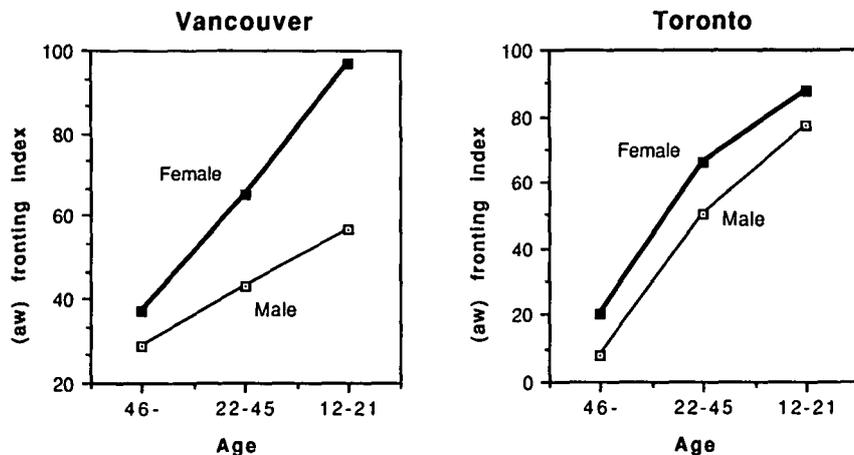


FIGURE 1. Fronting of (aw) by age and sex in two Canadian cities (from Chambers & Hardwick, 1985).

The most recent sound changes to be found in the United States involve the rapid and extreme fronting of /uw/ and /ow/ on the West Coast. Luthin (1987) showed that women lead men by a considerable margin in the new fronting of (ow) in the Berkeley area. Similar observations have been made in other coastal areas, from Seattle to Los Angeles.

In England, the most detailed report we have on a new sound change in progress is from Trudgill's work in Norwich, in the backing of (el) in *belt*, *help*, and so forth (Trudgill, 1974b). There, women were clearly ahead of men (see also Labov, Yaeger, & Steiner, 1972, for instrumental displays of male and female Norwich speakers).

In Canada, Chambers and Hardwick (1985) traced the development of a new norm for (aw), a fronting that is first added to and then substituted for the traditional centralization before voiceless finals. Women are the innovators in both Toronto and Vancouver, as Figure 1 shows.

Of the many studies of social variation in Latin American Spanish, only a few have found sound change in progress. Cedergren's (1973) research in Panama City found that the lenition of /č/ showed a regular increase in younger age groups and that women favored the change more than men. One of the most extensive studies of change in Spanish is the investigation of the devoicing of /ž/ in Buenos Aires by Wolf and Jiménez (1979). Studies of adults and high school students across social classes showed a rapid shift toward the devoiced variable in younger age groups. Figure 2 shows some of the evidence that led Wolf and Jiménez to the conclusion that "females are the leaders in the spreading of the change and they are almost a whole generation farther along" (p. 16).¹⁴ This is indeed a change from below. There is no overt social reaction to the change in Buenos Aires, and there was no

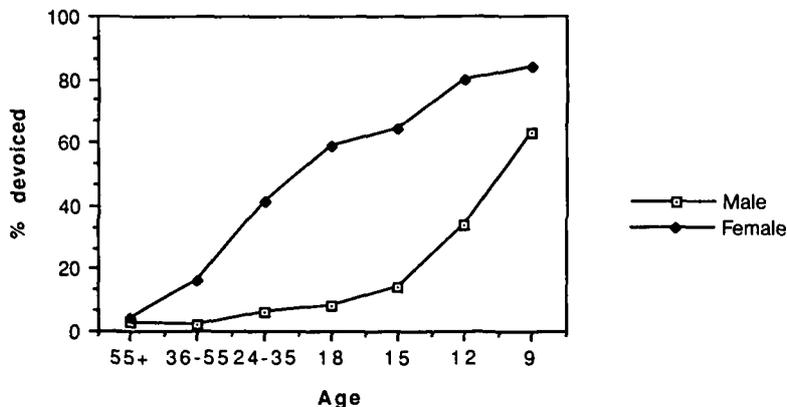


FIGURE 2. Devoicing of /ž/ in Buenos Aires by sex and age (from Wolf & Jiménez, 1979: Table 5) ($N = 12,898$).

stylistic shift when the most formal styles were compared with interview style, casual style, and candid recording.

In Hong Kong, Bauer (1982) traced the development of syllabic /m/ for syllabic /ŋ/ in the local dialect of Cantonese. The change was initiated by women in the 30–40-year-old age range. In the next generation, most teen-aged males adopted the change categorically and passed beyond the level of most women.

These cases show sexual differentiation as a dynamic situation. Depending on the stage of the change within the purview of the investigators, we see females diverging from males, as in Vancouver, females advancing ahead of and in parallel with males, as in Toronto; or males converging with the advanced position of females, as in Buenos Aires and Hong Kong. In none of these cases do we see the creation of stable sex differentiation.

The minor tendency: Men in advance

There are also a certain number of changes in progress recorded where men have been found to be in advance of women. On Martha's Vineyard, the centralization of (ay) and (aw) was led by men (Labov, 1963). As we will see, the parallel shift of (ay) before voiceless finals in Philadelphia is also dominated by men. In Norwich, Trudgill found that the unrounding of (o) was a male-dominated change. In Belfast, Milroy and Milroy (1985) found that the reverse process—the backing and rounding of /a/—is strongly dominated by men.

The mechanism of change is therefore not linked to sex differences in any clear and simple way. Either sex can be the dominant factor. But the num-

ber of cases where men are in the lead is relatively small. Furthermore, the male-dominated changes are all relatively isolated changes, such as the centralization of /ay/ and /aw/ or the unrounding of /o/. They do not include chain shifts such as the Southern Shift or the Northern Cities Shift that rotate the sound system as a whole. All those cases of chain shifting that we have been able to examine with quantitative means are dominated by women.

Some possible explanations

It would be quite satisfying if we could arrive at a straightforward grouping of male- and female-dominated changes by their phonetic character. Some of the first sound changes studied made it seem possible that females led in the upward movement of peripheral tense vowels that increased the dispersion of the vowel system, like the raising of (aeh) and (oh), whereas males led in the opposite trend: shifts that moved toward the center corresponding to a "close-mouthed" tendency, like the centralization of (ay). But this would not account in any way for the consonantal changes that are led by women, nor for other recent female-dominated movements reported recently, such as the laxing (and centralizing) of /iy/, /ey/, and /uw/ before /l/, as both Di Paolo (1988) in Salt Lake City and Bailey's research group (in preparation) in Texas found.

If there is no simple phonetic determination of the role of the sexes, we can look to some factor that weights the choice of male or female domination toward the female. One such factor is the asymmetry of the childcare situation. In all the societies that are concerned here, children learn the rudiments of their native language from their primary caregivers, who are women. Although male models are present, and no doubt effective, early exposure to the phonetic exponents of the language categories is exposure to a female pattern.

It is well established that women have the capacity to shape the behavior of male children to a norm appropriate for males.¹⁵ But the phonetic forms that the child is first exposed to are those used by women. Given a female-dominated change, boys and girls will hear relatively advanced forms from their female caregivers; given a male-dominated change, they will hear less advanced forms. The later influence of the peer group in accelerating or retarding these patterns can only operate on the basis of what has been first acquired. The asymmetry of the caregiving situation will therefore advance female-dominated changes and retard male-dominated changes.

It is interesting to note that Gauchat anticipated this view of the matter in his formulation of the situation in Charmey: "La dernière génération, c'est à dire tous les enfants, se range *du côté des mères*." Gauchat might more simply have written "du côté des femmes," but here he plainly has in mind the importance of the fact that the first steps in language learning are dominated by women. Language is then literally *la langue maternelle*. The initial bias

provided by this situation does not automatically produce a female-dominated situation. But as the major shifts that ultimately influence the language are drawn from a much larger set of minor local trends, it would also follow that many more female-dominated tendencies would reach the status that we call linguistic change.

The relative uniformity of Principles I and II

The overall weight of the evidence for Principle I appears to be stronger than that for Principle II. There are no significant exceptions for I but a significant group of opposing cases for II. Accordingly, the explanations advanced for I might seem to carry more weight. However, when we consider the relative uniformity of the evidence for each case, the situation will appear in a different light. Overall percentages show that women use nonstandard forms less frequently than men in every stable situation and use new prestige forms more frequently than men in every change from above. Yet the actual distribution of behavior across the community is not so uniform. More detailed analyses show that women in different sections of the community behave quite differently in regard to Principle I, and there is considerable interaction between sex and other social categories. The consequences of this fact bear strongly on the type of explanation that can be advanced and will also affect our ultimate approach to the problems previously outlined.

THE INTERACTION OF SEX AND SOCIAL CLASS

Social class indicators

Studies of speech communities have used a variety of indicators of socioeconomic class, but the robust effects of social stratification have emerged with a remarkable uniformity. Whether we use objective indicators—education, occupation, or income—some combination of these, or subjective measures of status, we will be referring to some generally recognized hierarchical organization of the speech community. It is the nature of stable sociolinguistic variables to become aligned with such class hierarchies in a monotonic fashion. For a prestige marker, the higher a speaker's socioeconomic status, the higher the frequency of use. For stigmatized markers, the reverse is true.

What is important is not the indicators of class, status, or power, but the reliability of the classification and the number of different distinctions made. Binary divisions into upper and lower class are of little value in sociolinguistic studies and conceal more information than they reveal. A useful view of the social distribution of a variable requires at least four divisions of the socioeconomic hierarchy, giving us two extreme or peripheral groups and two intermediate or central groups. We need these categories to get an accurate picture of the social stratification of language. We also need them to map the interaction of sex and social class, because the behavior of men and

women in these various social groups has been found to be quite different in almost every case that has been studied.

It follows that we must analyze sexual differentiation separately for each social group—not only socioeconomic class groups, but also ethnic groups, urban and rural groups, and generations. Here, the consequences of the biological bias discussed by Eckert are most evident. Of the many quantitative studies of the speech community, only a minority yields the information needed. The reasons are clear: if investigators consciously or unconsciously regard the relevant category as a biological one, they will expect the same differentials to appear everywhere. They will therefore report sex as a single category, with overall percentages for the behavior of men and women in the community that show the operation of Principle I and nothing more.

This situation could be corrected for in earlier studies that gave cross-tabulations for sex and other social factors. But the growth of multivariate analysis, with its many positive contributions, has exaggerated the problem considerably. In many of the studies cited, we find the influence of sex reported in a variable rule analysis as a single group with two factors, *male* and *female*. The degree of fit of the model is rarely reported, and the hidden interactions of sex and other social factors are irretrievably lost.¹⁶ The next section of our analysis must therefore proceed on the basis of data from a minority of the speech communities studied—primarily the earlier studies done before multivariate analysis was introduced.

Typical interaction with stable sociolinguistic variables

The reports that show cross-tabulations by sex and social class consistently show strong interactions between these factors (Anshen, 1969; Labov, 1966; Levine & Crockett, 1966; Shuy et al., 1966; Wolfram, 1969). In general, the second highest status group shows the greatest differential of men and women, along with the highest degree of linguistic insecurity and the sharpest slope of style shifting (Labov, 1966). The tendency to avoid stigmatized forms and prefer prestige forms is greatest for the women of the lower middle class, and is often minimal for the lower class and upper middle class. Figure 3 shows the characteristic pattern of stigmatized forms in the well-known pattern of negative concord for black speakers in Detroit (Wolfram, 1969). On the left is the display of percentage of negative concord. The absolute sex differences between the two intermediate groups are greater than the differences for the two extreme groups. But the important point is the extremely low percentage for lower middle-class women. Compared to the upper middle-class norms, the male figure goes up, whereas the female use declines. The lower middle class is radically different from the others, as shown by the ratios of male to female use shown on the right.

An even more striking example of interaction is to be found in Holmquist's (1985, 1988) study of the variable (o) in rural Uceda in northern Spain. Table 2 shows the effect of sex on the tendency to raise unstressed /o/

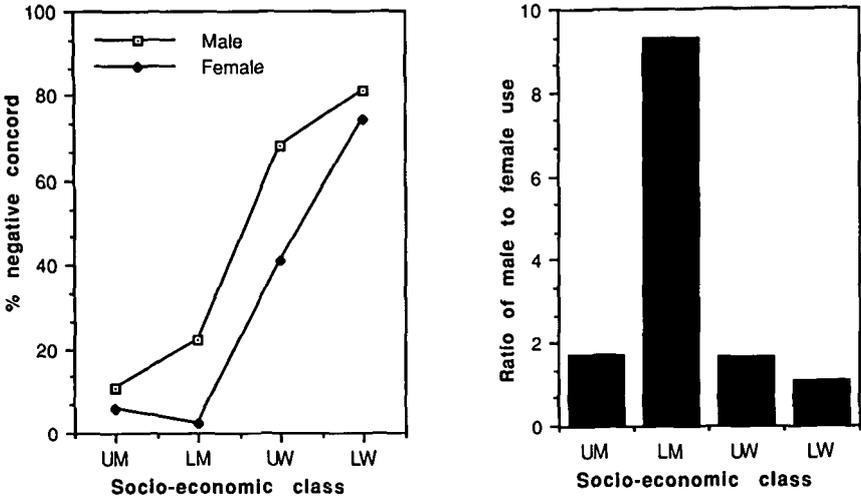


FIGURE 3. Sexual differentiation of negative concord for black speakers in Detroit (from Wolfram, 1969:162).

to [u]. The powerful effect of sex operates on farming families who hold close to the rural tradition (with indigenous animals), on farmers who have switched to conventional dairy stock, and even more strongly on students. But there is no difference at all among workers—men and women who do not earn a living from the land.

It is clear that no biological or universal property of women can account for distributions of this kind. Holmquist found the explanation in a rational mode of behavior: the raising of /o/ is symbolic of affiliation to a farming economy that holds far less social and economic attraction for women than for men.

Such extreme interaction of sex and social class is characteristic of well-established variables that are overtly recognized in the community and have risen to the level of publicly recognized stereotypes. They show extreme style shifting as well as class stratification. This appears clearly in Trudgill's (1974b) data on (ing) in Norwich, displayed in Figure 4. Here, all social groups preserve the expected male-female relationship in both casual and careful speech, except the lower middle-class women, who cross over lower middle-class men with a dramatic shift from casual to careful speech. Figure 4 shows the sharp division between middle- and working-class groups that is characteristic of the Norwich data. With the shift from casual to formal speech, lower middle-class women also shift from an alignment with the working class to an alignment with the middle classes. The other groups show a very shallow slope of style shifting by comparison. In contrast to lower middle-class women, lower middle-class men show only a small, probably nonsignificant shift in the other direction.

TABLE 2. *Effect of sex and social group on raising of /o/ in Ucieda*

| | Mean Closure Value | Standard Deviation | No. of Informants |
|-------------------------------|--------------------|--------------------|-------------------|
| Farmers with mountain animals | | | |
| Males | 227 | 26.88 | 6 |
| Females | 186 | 40.24 | 6 |
| Farmers with dairy animals | | | |
| Males | 178 | 38.88 | 14 |
| Females | 112 | 20.35 | 4 |
| Workers | | | |
| Males | 79 | 18.27 | 4 |
| Females | 79 | 30.16 | 5 |
| Students | | | |
| Males | 114 | 16.86 | 3 |
| Females | 48 | 22.9 | 3 |

Source: Holmquist (1988: Table 5.5).

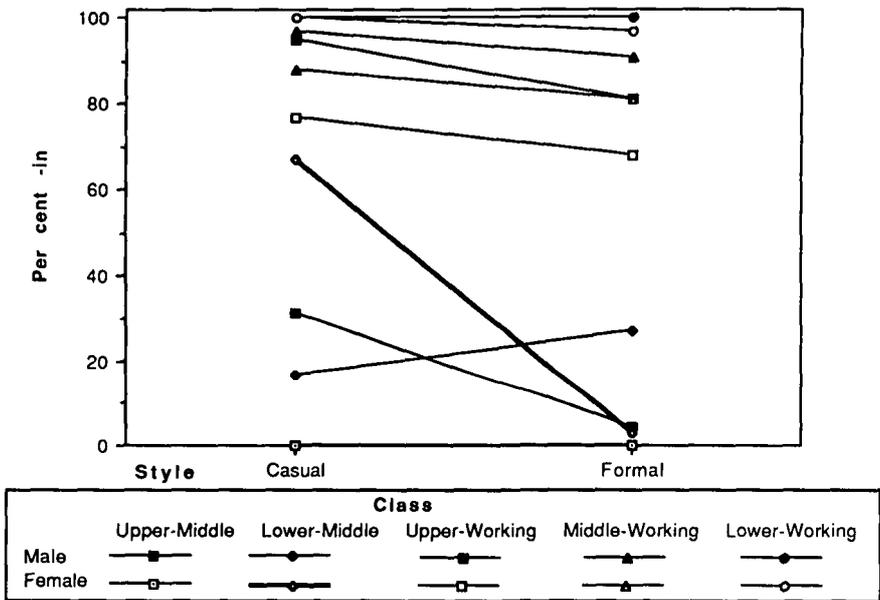


FIGURE 4. Shifts of style in spontaneous speech by sex and class for (ing) in Norwich (adapted from Trudgill, 1974b).

The radical realignment of the female speakers lies at the heart of the "hypercorrect behavior of the lower middle class," which has been seen for some time as an important element in the mechanism of linguistic change (Labov, 1972: Ch. 5). All systematic style shifting is aligned toward a par-

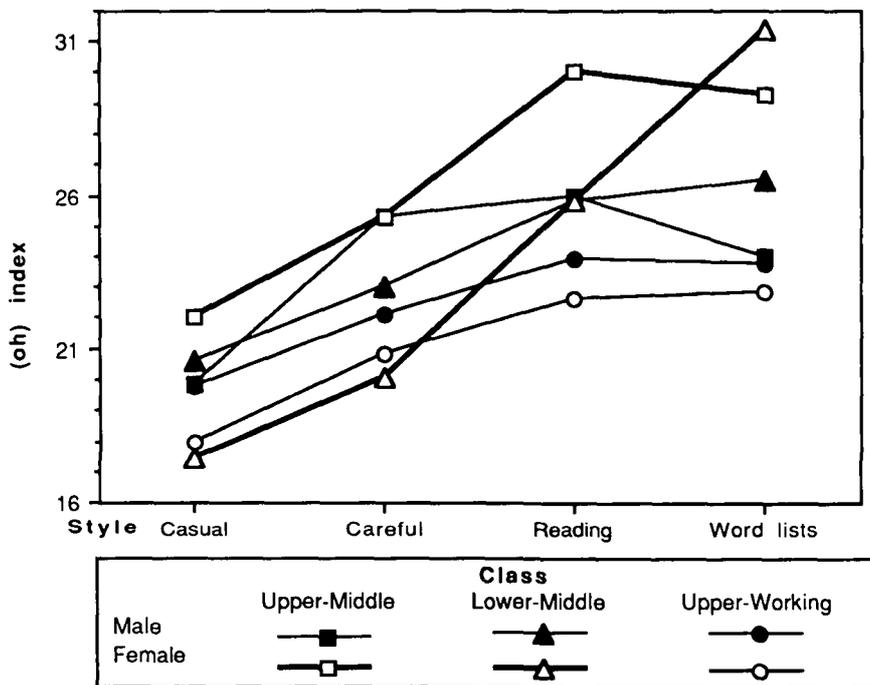


FIGURE 5. Style shifting of (oh) by three socioeconomic groups in New York City.

ticular target, usually the level set by a higher status group. By “hypercorrect behavior” is meant a shift of a linguistic variable that passes beyond this target.¹⁷ Past findings have highlighted three separate points:

1. In sociolinguistic variation, the second highest status group shows the steepest slope of style shifting, the most self-correction and hypercorrection, the greatest difference between norms and behavior in self-report tests, highest levels in linguistic insecurity tests, and the strongest tendency to stigmatize the speech of others in subjective evaluation tests for that variable (Labov, 1972: Ch. 5).
2. Women exceed men in all the features listed under (1).
3. The greatest differences between men and women are found among members of the second highest status group.

Is this hypercorrect behavior of the second highest status group distinct from the hypercorrect behavior of women? Or is the hypercorrect behavior of the second highest group entirely a contribution of the female members of that group? Figure 5 approaches that question by a reanalysis of one of the New York City variables that featured strongly in the original discussions of hypercorrect behavior: the raising of (oh) in *lost*, *coffee*, *chocolate*, and

so forth. The (oh) index ranges from 10–40. A mean value of 10 would show consistent use of a high vowel [ʊ:ʔ]; a mean value of 20 corresponds to an upper mid [o:ʔ]; a mean of 30 to a lower mid [ɔ+:ə], and a mean of 40 to a low vowel [ɔ] or [ɒ]. Older conservative New York City speakers show an index around 30; most adults use values around 20 in spontaneous speech; the most advanced younger speakers reach 10 in casual and/or excited speech.¹⁸

Figure 5 shows four stylistic contexts on the horizontal axis, ranging from casual speech to word lists. The vertical axis is the (oh) index, with the most advanced forms of the sound change at the bottom and the most corrected forms at the top. Separate values for men and women for three socioeconomic class groups are plotted. The bold lines show the two groups with the greatest slope of style shifting: upper middle-class women (open squares) and lower middle-class women (open triangles). The hypercorrect behavior of the lower middle-class women is evident. In casual speech, they use the most advanced, vernacular vowels with a mean of 17.5, whereas the upper middle-class women show the most conservative forms in that style. The two lines make a parallel upward movement toward careful speech; the gap begins to close in reading style; and in word lists, lower middle-class women pass the target. The lower middle-class women also cross over the level of lower middle-class men. They begin with more advanced forms than the men, converge with them at reading style, and go far beyond them in word lists. On the other hand, working-class men and women (open and solid circles) show a small parallel style shift that preserves the differences between them for all styles.

There are striking parallels between Trudgill's data in Figure 4—a stable linguistic variable—and the New York City data in Figure 5—a change in progress. The combined evidence suggests that the hypercorrect behavior of the second highest status group may be entirely a contribution of the female members of that group. On the other hand, differences between men and women are not confined to that social group but are reflected to a greater and lesser degree across the social spectrum. For a change in progress like (oh), the male–female differences are confined to a part of the social spectrum closest to the innovators; for a stable variable like (ing), these differences are found in all social groups, again to the greatest extent in the second highest status group.

Some further explanations

The extreme type of interaction seen in Figures 3, 4, and 5 has strong implications for our understanding of the role of women in sociolinguistic variation. As noted, the rapid shift of women away from their vernacular forms when the context of speech becomes more formal is associated with other forms of linguistic behavior, such as a comparatively high level of “linguistic insecurity” (Labov, 1966; Owens, Thompson, & Baker, 1984; Trudgill, 1972). The index of linguistic insecurity involves the proportion of cases in which people distinguish between the way they speak and another way of

speaking that is “correct.”¹⁹ This behavior may be viewed more positively as the ability to recognize an external standard of correctness²⁰ and to acquire new standards of appropriate symbolic behavior. Following Eckert’s argument, extreme attention to external standards can be coupled with the weaker economic base of women, their relative powerlessness, and the oppressive nature of social stratification. On the other hand, it might be argued that Principle I is actually a byproduct of social mobility.

The salient fact about the interaction of sex and social class is that the greatest difference between men and women is found in the group with the most extreme style shifting and the greatest recognition of external standards of correctness. This is regularly the second highest status group. In social terms, it is the lower middle class; in occupational categories, it is white-collar workers and small entrepreneurs; in educational levels, it is those who have more than high school and less than college training. Women in this group are certainly not the least powerful in the social spectrum. On the contrary, they frequently have considerably more political and economic power than working-class or lower-class women. Moreover, they frequently make more money and have more opportunity than their upper working-class male partners.

To pursue these issues further, we must ask whether a similar interaction of sex and social class can be found in linguistic change from within the system, that is, change from below.

*The question of interaction in linguistic change
from below*

One cannot compare the interaction of sex and social class directly for stable and changing linguistic variables, because the patterns of distribution by social class are quite different. Recent research has pursued the description of these patterns vigorously, as one strategy for the explanation of change: the search for the innovators of linguistic change. The most substantial finding is that change from below is associated with a *curvilinear pattern*, where greater use of the new form is shown by the intermediate groups (upper working and lower middle) than the extreme groups (upper middle and lower working). This contrasts with the *monotonic pattern* of stable sociolinguistic variables previously examined.

The interaction of sex and social class has proved to be critical for our understanding of the curvilinear pattern and the explanation of linguistic change. The developments that have led to this situation may be outlined as follows:

1. 19th- and early 20th-century accounts of the causes of linguistic change led to the expectation that the innovators of change would be located either in the highest or the lowest social stratum, depending on the theoretical view adapted.
2. Meillet (1921) argued that the sporadic course of linguistic change can only

be understood by association with sporadic changes in the composition of the speech community.

3. Sturtevant (1947) proposed that initial linguistic changes are originally associated with particular social groups, and the progress of the change depends on their adoption by neighboring groups who associate them with the social traits of the initiators. Variation between newer and older forms is associated with competition between social groups, and continues only as long as that competition endures.
4. Labov (1965) outlined a mechanism of linguistic change that may begin with a group located anywhere in the social spectrum.
5. Kroch (1978) pointed out that no change from below had been associated with an upper-class or upper middle-class group, and argued that such changes are always initiated with working-class groups, who favor more natural linguistic processes.
6. Labov (1973)—on the basis of evidence from New York City (Labov, 1966), Norwich (Trudgill, 1974b), and Panama City (Cedergren, 1973)—pointed out that, in addition, no lower-class or lower working-class group had been found to initiate change, and argued that the change from below was associated with a curvilinear pattern in the socioeconomic hierarchy.
7. The Philadelphia Project on Linguistic Change and Variation confirmed the predicted curvilinear pattern for all but one of the new and vigorous changes in that community (Labov, 1980). As the evidence to be cited shows, the innovators of change are located among the highest status members of the local community: lower middle class and upper working class.²¹

At this point, we must consider the possibility that the curvilinear pattern is a byproduct of the sexual differentiation of linguistic variables. Let us suppose that linguistic change is in general led by the working class and that a majority of these changes are more advanced among female speakers. If the advancing change is associated with female behavior, it is not unlikely that working-class men will withdraw from it and that this reaction will be greater in the lower working class. Such an interpretation would lead us to predict that a curvilinear pattern will not be found in male-dominated changes, nor among females, but only among males for female-dominated changes.²²

If this proves to be the case, the interaction of sex and social class would be the critical organizing factor in the process of linguistic change. The balance of this article examines this question through evidence from a further analysis of the Philadelphia data.

THE INTERACTION OF SEX AND SOCIAL CLASS IN PHILADELPHIA

The Philadelphia vowel system and its evolution

The Philadelphia speech community was selected for a detailed investigation of the social location of linguistic change because a very large section of the segmental phonology of the dialect was involved in active change.²³ As the

northernmost of the southern cities, Philadelphia displayed most features of the Southern Shift (Labov, in press): a chain shift of (ahr) → (ohr) → /uhr/ in the back,²⁴ and the fronting of the nuclei of (uw), (ow), and (aw), except before liquids. The upgliding diphthongs show radically different behavior according to whether the vowel is free (F) or checked (C). Free vowels are considerably in advance of checked ones. In addition, Philadelphia shows a split of the short *a* class into a tense /æh/ and lax /æ/ in closed syllables, like most cities of the middle Atlantic and southern states, with a consequent raising and fronting of the tense form to high position.²⁵ This (æh) variable can be separated into three classes of tensed vowels.

(æhN): before front nasals /m/ and /n/ in *ham, man, hand, etc.*

(æhS): before voiceless front fricatives /f,θ,s/ in *laugh, bath, pass, etc.*

(æh\$): before voiced stops in the three words *mad, bad, glad.*

The checked versus free distinction also affects the front upgliding vowels /iy/ and /ey/. But the traditional opening of the nuclei of these vowels is reversed for /ey/ in checked position. (eyC) shows very strong age coefficients that indicate that it is becoming higher and fronter among younger speakers.

The nucleus of /ay/ also shows a strong allophonic differentiation, but in this case, vowels before voiceless obstruents are opposed to all others. The allophone (ay0) before voiceless obstruents is strongly centralized, and usually backed, among younger speakers. The other allophones of /ay/, before voiced consonants and finally, do not participate in this movement.

The investigation of the Philadelphia sound system that produced the current evidence involved the following steps:

1. *The neighborhood study*: long-term semiparticipant studies of 10 Philadelphia neighborhoods, involving from one to four interviews with 180 speakers.²⁶
2. *The telephone survey*: a random sample of 60 listed telephone users, involving relatively brief interviews of 15–20 minutes.
3. *Acoustic analysis*: analysis of the vowel systems of 116 speakers, using a linear predictive coding algorithm on the frequency domain data provided by a hardware spectrum analyzer.
4. *Normalization*: the reduction of all data to single referential system that eliminates most of the effects of differences of vocal tract length of men and women, using the geometric mean algorithm of Nearey (1977).
5. *Regression analysis*: the normalized F1 and F2 means of the analyzed speakers were entered into a stepwise regression analysis that yielded significant correlations with 18 independent variables, including age, sex, occupation, education, income, house upkeep, mobility, ethnicity, neighborhood, foreign language use, generational status, and communication patterns.

The coefficients for the Philadelphia vowels are entered into systems of linear equations of the form:

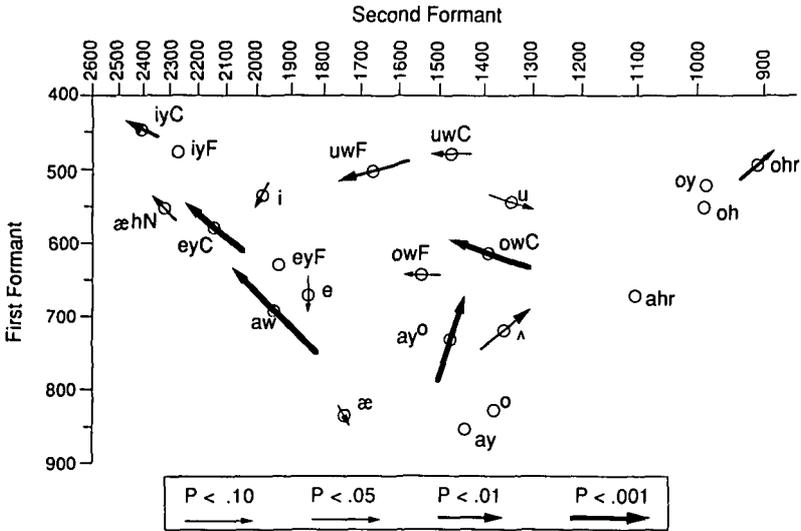


FIGURE 6. Movements of Philadelphia vowels in apparent time. Circles show mean values for 116 speakers in the Neighborhood Study. Vectors connect values for groups 25 years older & younger than the mean. __F = free vowel; __C = checked vowel; __0 = before voiceless finals.

Formant value in Hz = Constant + $a * \text{age} + b * \text{sex} \dots$
 i.e., F2 (aw) = $2170 - 4.16 * \text{age} + 96 * \text{sex} \dots$

where sex = 1 if female, 0 if male.²⁷ Thus, the predicted value for a group of females 35 years old would be $2170 - 4.16 * 35 + 96 = 2120$ (Hz), whereas males of the same age would show, all other things being equal, a value of $2170 - 4.16 * 35 + 96 * 0 = 2024$.

Age coefficients: Philadelphia sound changes in apparent time

Figure 6 is a graphic portrayal of the movements of Philadelphia vowels in apparent time. The circles represent the mean values for the entire population of 116 speakers.²⁸ The arrows through each circle show the size of the age coefficient. The head of the arrow is at the predicted value of F1 and F2 for a group 25 years younger than the mean, and the tail of the arrow for a group 25 years older than the mean, all other things being equal. This diagram, combined with evidence from the Telephone Study and from earlier observations in real time, allows us to set up a series of five levels of sound changes.²⁹

1. *completed changes*: the backing and raising of (ahr), which shows no age coefficients.
2. *almost completed changes*: the fronting and raising of (æh) along the front peripheral path; the backing and raising of (ohr) along the back peripheral path.³⁰
3. *mid-range changes*: the fronting of (uw) and (ow) except before liquids.
4. *new and vigorous changes*: the fronting and raising of the nucleus of (aw);³¹ the reversal of the lowering of the nucleus of checked (eyC), with fronting and raising along the front peripheral path; the centralization and backing of (ay0) before voiceless finals.
5. *incipient changes* (which are frequently below the level of significance): the lowering of (i) and (e) along the front nonperipheral path; the raising and backing of (ʌ); the raising and fronting of checked (iy).

The division of these sound shifts by their relative age is an important factor in the analysis of the interaction of sex and social class with the age distributions. The new and vigorous changes show us the pattern of change from below—before any significant social reactions to them have taken place. The almost completed changes, and in particular the raising and fronting of the (æh) variables, shows us the pattern of sound changes that are overtly recognized and stigmatized.³²

The sex coefficients

The classification of sound changes by level will be useful in presenting the sexual differentiation of these processes. Table 3 groups the changes by their relative age as indicated by real-time data and lists the significant or near-significant regression coefficients for age and sex. In each case, the coefficient is shown for the most characteristic formant: F1 for raising and lowering, F2 for fronting. The movements along the front and back peripheral path regularly show the strongest social correlations with the fronting dimension rather than raising, and F2 coefficients are shown for these. Note that F1 effects that are numerically smaller may be proportionally larger than F2 effects because perceptually the F2 dimension is logarithmic rather than linear. The figures shown without asterisks are of questionable significance, where p is greater than .05 but less than .10. They conform to the overall pattern of Table 3, where the coefficient indicates that all other things being equal, females show more advanced forms of the changes for all but the raising of (ohr) and the centralization of (ay0). The centralization of (ʌ) appears to be linked to the latter, as they represent parallel shifts of the same nucleus.

The completed change (ahr) shows a residual female advantage in backing. We might expect this to be replicated in the backing of (ohr) as it advances slowly in a merger with /uhr/, because this process is linked with (ahr) in a chain shift. But the only sexual differentiation of (ohr) is found in the F1 dimension.

TABLE 3. *Sex and age coefficients for Philadelphia sound changes*

| Variable | Age | Sex | |
|------------------------------|---------|------------------|----------------|
| | | Female-dominated | Male-dominated |
| Completed (ahr) F2 | 0 | 43* | |
| Almost completed (æhN) F2 | -1.94** | 70** | |
| (æhS) F2 | -1.64* | 51 | |
| (æhʒ) F2 | -2.93** | 124** | |
| (ohr) F1 | .97** | | 17* |
| Mid-range (uwF) F2 | -4.10* | 60 | |
| (uwC) F2 | -2.54* | 115* | |
| (owF) F2 | -4.31** | 99 | |
| (owC) F2 | -3.03** | 66* | |
| New and vigorous (aw) F2 | -5.08** | 99** | |
| (eyC) F2 | -3.42** | 63* | |
| (ay0) F1 | 2.04** | | 32** |
| Incipient (i) F1 | -.25 | | |
| (e) F1 | -1.01* | 16 | |
| (æ) F1 | -.55 | 35* | |
| (ʌ) F1 | 1.11** | | 29* |

$p < .10$; * $p < .05$; ** $p < .01$.

Among the nearly completed changes, all three allophones of (æh) are listed, and all three show a female advantage, significant in two of the three cases. This, of course, represents the pattern of spontaneous speech, which is almost uncorrected in Philadelphia. Controlled styles show the same effect as in New York City, where women display the most advanced forms of a stigmatized variable in their casual speech and the least advanced forms in the corrected responses of word lists and minimal pairs.

The mid-range changes—the fronting of (uw) and (ow)—show a consistent female advantage, except for the most advanced form, which was also apparently the earliest: (uwF). This suggests that the female advantage in the fronting of these vowels will disappear as the changes reach completion with fully fronted, nonperipheral nuclei, in contrast with the case of the (æ) variables.

The strongest female advantage appears in two of the new and vigorous changes, (aw) and (eyC). But here we also find that the third of these, (ay0), shows a significant effect of male domination. This third case is parallel with the centralization of /ay/ in Martha's Vineyard, which was strongly favored by males.³³

The overall pattern of sexual differentiation established by these figures

fits the results of the earlier literature reviewed. A sizeable majority of sound changes show women in the lead. The Philadelphia data add the further information that there is some degree of correlation between the degree of activity of the sound change and the size of the female advantage. As in previous studies, there are a few cases where this tendency is reversed, and men lead women.

The curvilinear pattern in Philadelphia

Labov (1980) presented the Philadelphia evidence for the confirmation of the hypothesis of a curvilinear pattern. A significant curvilinear social class pattern appeared in two of the three new and vigorous changes—the same ones that showed a female advantage in Table 2. The social dimension was represented there by a combined index of socioeconomic status, made up of three equally weighted indicators: occupation, education, and residence value. Further investigation has shown that occupation has the strongest correlations with the sound changes involved, and house residence the weakest. In fact, the single indicator of occupation has a slight advantage over the combined index in consistency and strength of the correlations, and this indicator will be used throughout the presentation to follow. The occupational classification is essentially that of the U.S. Census: Unemployed, Unskilled labor, Skilled Labor, Clerical, Managerial, Professional (and owners). Women who were currently working were classified by their own occupations. Married women not working received the classification of the breadwinner of the family. Retired people were classified according to their last occupation. In the analyses to be presented, the small unemployed group is combined with unskilled labor.³⁴

Figure 7 presents a combined view of seven social variables across the five occupational classes. These display the results of inserting the occupational coefficients x_i in the linear equation:

$$\begin{aligned} \text{Vowel formant} = & \text{Constant} + x_0 * \text{sex} + x_1 * \text{age} + x_2 * \text{unskilled} \\ & + x_3 * \text{clerical} + x_4 * \text{managerial} + x_5 * \text{professional}, \end{aligned}$$

where age is the numerical value for a given speaker, sex is 0 for male and 1 for female, and each of the occupational classes takes on a value of 0 or 1, depending on whether that speaker is classified in that occupational group. Thus, for a member of the managerial class, x_4 would be 1, and x_2 , x_3 , and x_5 would all be 0.³⁵ To achieve a unique solution where such dummy variables are concerned, one factor in each factor group must be a residual factor, which is always represented by 0 and is not entered into the algorithm. This will appear in the final analysis with a value of 0.00, and the significance of the other factors in the group will be measured by their degree of departure from 0.00. Thus, male is assigned 0 in the sex group, and the sex coef-

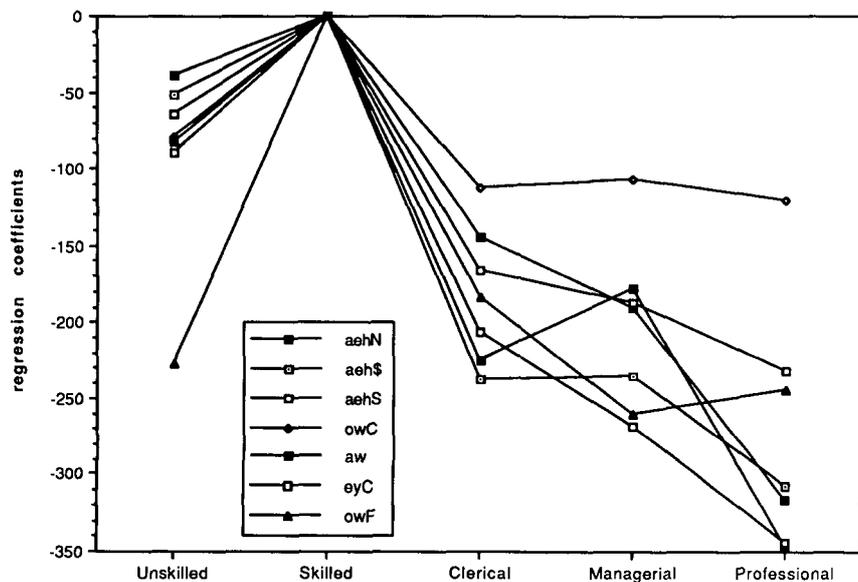


FIGURE 7. The curvilinear pattern in the Philadelphia Neighborhood Study as reflected in occupational coefficients of multiple regression analysis, weighted for the number of tokens for each speaker. *Skilled* occupation is fixed at 0.00 as the reference group.

ficient represents the effect of a speaker being female as opposed to male. As our main purpose is to test the hypothesis of a curvilinear pattern where the *skilled* occupational group is the most advanced, it is the relationship of the surrounding occupational groups to this one that must be tested. The *skilled* group is therefore the residual group and appears with the 0.00 value in Figures 7-9.

Figure 7 shows a curvilinear pattern for seven variables. (The numerical data on which this and the following two figures are based are given in Appendix 2.) The connected lines trace the pattern of five occupational coefficients for each variable. For all seven, there is a significant negative value for the *unskilled* class as compared with the *skilled* class.

The most advanced mean position is shown for (æhN) before nasals; behind this are (æhS) and ($\text{æh\$}$). The rates of change also differ: ($\text{æh\$}$) is considerably higher than the other two. It should also be noted that (æhN) is the most prominent in social awareness, most often corrected, and most often stigmatized in subjective reaction tests as an indication of the "harsh, nasal sounds" in the Philadelphia dialect. In Figure 7, the three squares representing the (æh) variables are less differentiated than the others. The smallest differential between the *unskilled* and *skilled* classes is shown for the most

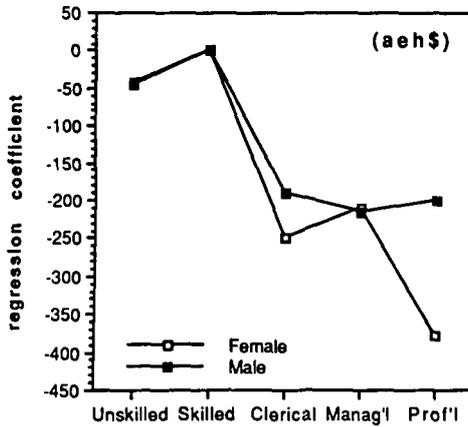
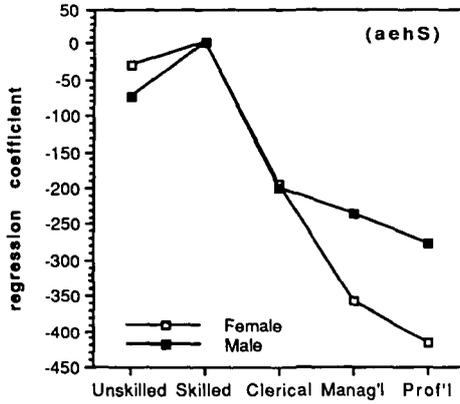
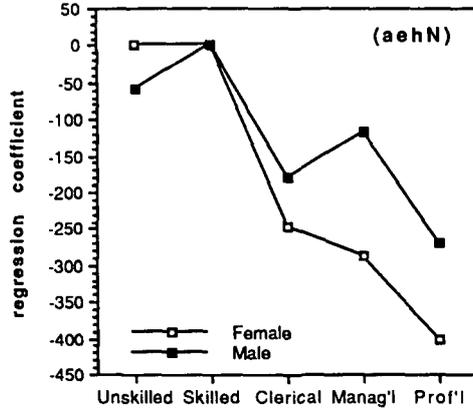


FIGURE 8. Occupational coefficients by sex for the (æh) variables.

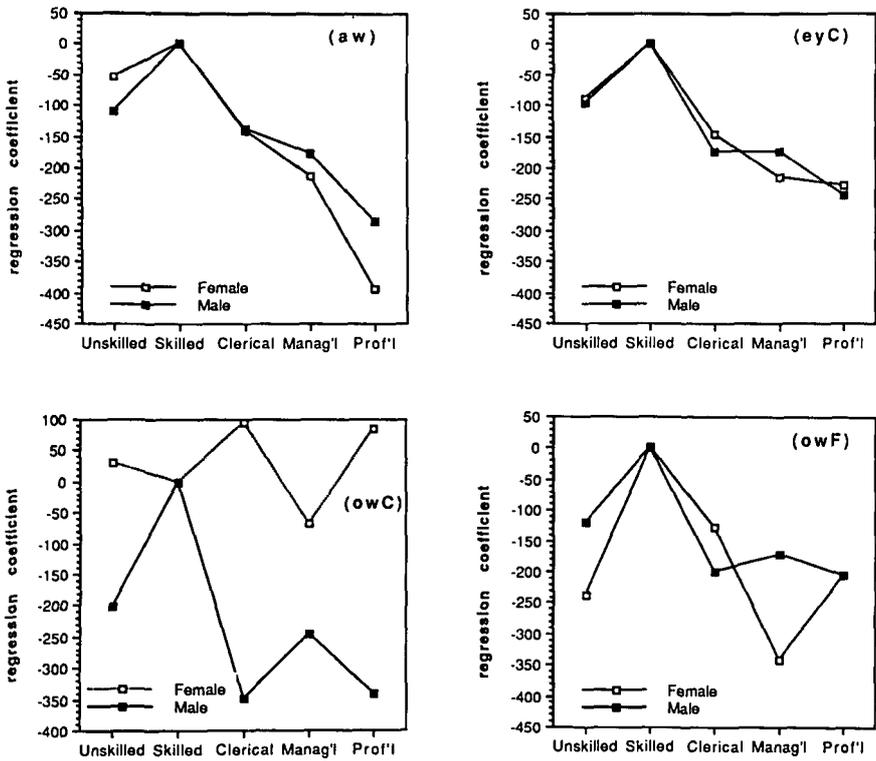


FIGURE 9. Occupational coefficients by sex for new and vigorous changes.

advanced allophone, as is the greatest differential for (æh\$), the variable with the highest rate of change.

A much greater differential between *unskilled* and *skilled* class is shown for the new and vigorous changes, with a much more significant exemplification of the curvilinear pattern. The values of the *unskilled* class for the new and vigorous changes (aw) and (eyC) are grouped closely together below, along with (owC). All of these, including the very low value for (owF), are at a significance level of $p < .001$.

To the right of the *skilled* class, the values for all classes are significantly lower. For the most advanced changes, there is a very steep and regular social stratification: the higher the occupational class, the greater the negative coefficient. The middle range change (owC) does not show such a steep slope, and the only significant division of the population is between the *skilled* class and the others.

The fronting of (uw) does not show any marked social stratification. This is true of (uwC), which shows a female sex advantage, and (uwF),

which does not. Though (uw) is structurally parallel to (ow) in the development of the Philadelphia dialect, it is apparently not as sensitive to social differentiation.³⁶

No evidence appears of a curvilinear pattern for the (ay0) variable, which was also exceptional in its reversal of the dominant pattern of sexual differentiation.

Interaction of social class and sex

The results displayed in Figure 7 provide strong support for the curvilinear pattern as the characteristic mode of development. Because the new and vigorous changes display the greatest differentiation of the *skilled* working class, it seems likely that the innovators of change are located in that group. It also appears that there is an association between female domination of a change and the curvilinear pattern. The next step in the analysis is therefore to carry out separate multivariate analyses for males and females and to see if the curvilinear pattern holds for both sexes. If the curvilinear pattern is a byproduct of the retreat of lower working-class males from a female-dominated change, the curvilinear relations of Figure 7 will appear only in the male analysis, but not in the female.

Figure 8 shows the results for the nearly completed changes, the raising and fronting of (æh) as reflected in the increase of F2 in apparent time. These showed the minimal evidence for a curvilinear pattern in Figure 7, with the least effect for the most advanced changes. Figure 8 shows that the ordering of these three allophones in Figure 7 is also correlated with the differentiation of the sexes. The weakness of the curvilinear pattern for (æhN) seen in Figure 7 is seen in Figure 8 to be entirely dependent on the behavior of women, who show no differentiation at all for *unskilled* and *skilled* speakers. The difference between men and women is less for (æhS), and the sexes are identical for the (æh\$), the least advanced item with the highest rate of change. On the right hand side of the three diagrams, we can see the opposite pattern: a decreasing differentiation of men and women. The most highly stigmatized item (æhN) shows the greatest differentiation of women in the *managerial* and *professional* classes, and (æh\$) the least.

Figure 9 displays the patterns for the new and vigorous changes, (aw) and (eyC). The case of (aw) shows a curvilinear pattern for both men and women, but with a differentiation of the sexes in the expected direction. Women show less difference between the *unskilled* and *skilled* classes than men, and a sharper slope of differentiation for the *managerial* and *professional* classes. This variable resembles the intermediate pattern of (æhS) but with a considerably greater distance between *unskilled* and *skilled* speakers. On the other hand, (eyC) shows no difference at all between the sexes. The two curves are practically identical.

The third and fourth diagrams in Figure 9 show the results for the (ow) variables. For the checked variable (owC), the curvilinear pattern appears

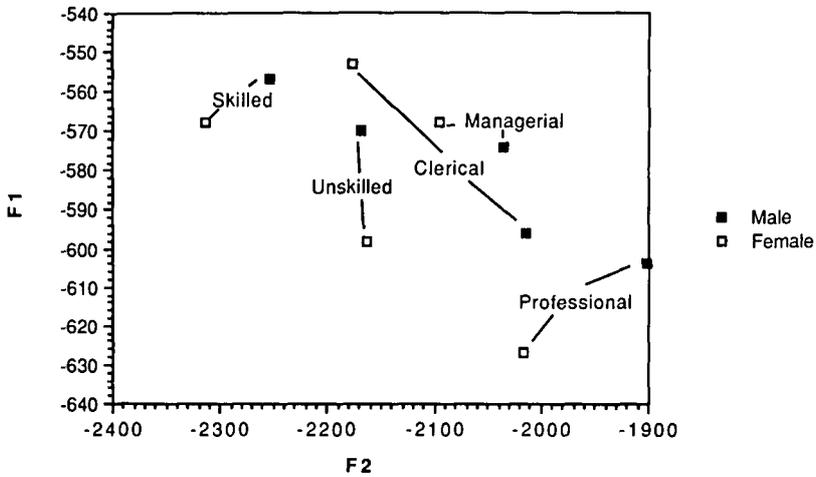


FIGURE 10. Mean values for (eyC) F1 and F2 for five occupational groups in the Philadelphia Neighborhood Study.

only for males; females show an irregular and nonsignificant fluctuation. In the case of (owF), both show a curvilinear pattern, the only case where the female *unskilled* group is lower than the male *unskilled* group. On the whole, there is less regularity in the fronting of (ow) and (uw) than for the front vowels, and the fluctuations for these mid-range changes do not throw any further light on the problems we are addressing here.

For a more direct representation of these differences as they appear in phonological space, Figure 10 plots the mean values of (eyC) for both F1 and F2. It is evident here that the *skilled* group is clearly in advance of all others. There is a clear separation between the *skilled* group and the others. The *unskilled*, *clerical*, and *managerial* groups are associated in the center of the diagram, and the *professional* group is isolated at the lower right. Note that if we had selected F1 to measure the rate of change, the same curvilinear pattern would emerge but with the *clerical* group as the most advanced. This alternation between interior socioeconomic groups is typical of linguistic change from below. In some cases, it is white-collar workers or the lower middle class who are in the lead; whereas in others, it is the *skilled* workers or the upper working class.³⁷ On the whole, F2 gives us a more regular view of the tensing and raising of the front vowels in Philadelphia, with more significant coefficients for all variables.

Does sexual differentiation create the curvilinear pattern?

How can we best interpret these results? On the one hand, there is ample evidence to support the curvilinear pattern and the location of the innovators

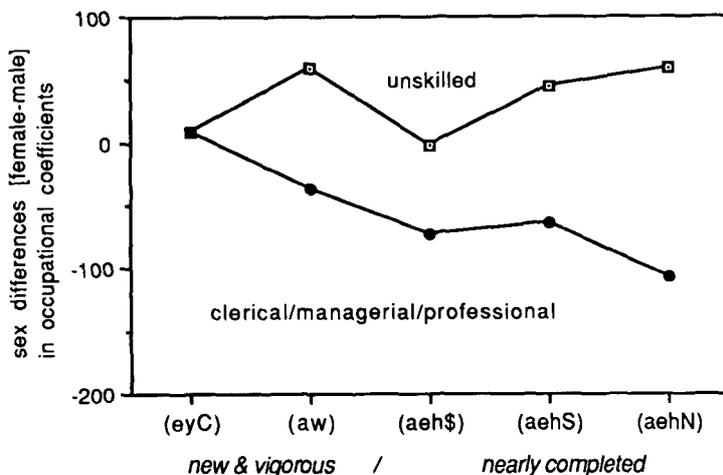


FIGURE 11. Sex differences in occupational coefficients for five Philadelphia sound changes. Upper line = values for *unskilled* group. Lower line = mean values for *clerical, managerial, and professional* groups.

of change in an interior social group. On the other hand, there is ample evidence for the differentiation of the sexes and a closer association of the curvilinear pattern with males than with females.

The key to the situation appears to lie in the temporal stratification of the variables. The youngest change that gives us full data on change in progress is the raising and fronting of checked /ey/: the variable (eyC). There is no trace of this variable in the earlier literature. It represents the reversal of the long-standing trend to open the nuclei of front upgliding diphthongs in Philadelphia, following the pattern of the Southern Shift in the southern United States and southern England. Though we have evidence that this sound change contributes to misunderstanding within and across dialects,³⁸ it lies far below the level of conscious attention. No phonetician or popular writer on Philadelphia dialect detected it before our instrumental results showed the change in progress. On the other hand, the raising and fronting of (aw) is a continuation of the process of fronting that led from an earlier [au] to the conservative Philadelphia [æu], and may also be associated with the raising and fronting of tense /æh/. Thus, (aw) is a further development of an old phenomenon, whereas (eyC) is a new phenomenon entirely. Subjective reaction tests show a consistent stigmatization of advanced forms of (aw). It is not surprising then that (aw) is shifted toward the pattern of the oldest changes in progress, (æhN), (æhS), and (æh\$).

Figure 11 shows the gradual evolution of the sexual differentiation of the Philadelphia sound changes, separating the lower class on the one hand from the middle classes on the other. The horizontal axis orders the sound changes

from the newest changes on the left to the oldest on the right. The vertical axis registers the difference between the occupational coefficients found in separate multiple regression analyses of female and male speakers. The upper curve shows the differentiation of male and female speakers in the *unskilled* occupational group. No differentiation is found for the newest change, (eyC), but a distinct female advantage appears for the others. The irregularity of (æh\$) is probably due to the relatively small amount of data.³⁹

The lower curve in Figure 11 is the female-male difference of the mean values of the coefficients for the three middle-class groups: *clerical*, *managerial*, and *professional*. For (eyC) there is again no significant difference between males and females, as we have seen. The rest of the sound changes show a steadily decreasing value, indicating that in the middle classes, the tendency for women to use more conservative values than men increases over time. The net result is a steady increase in sexual differentiation as sound changes become older.⁴⁰

Figure 11 should not be interpreted to mean that there is no differentiation of (eyC) for men and women. The normalized mean values for men and women for F2 of (eyC) differ by 90 Hz, and Table 3 indicates a significant advantage for women with a sex coefficient of 63 Hz.⁴¹ Figure 11 only shows that for (eyC), the effect of occupation does not differ by sex. As a whole, it recapitulates the view derived from Figures 7-8: at the outset, sex does not interact with social class, but does so increasingly as change progresses.

The pattern of Figure 11 foreshadows the gradual elimination of the curvilinear pattern in favor of a monotonic pattern, where the sociolinguistic variable becomes aligned with the socioeconomic hierarchy as well as with stable sociolinguistic variables such as negative concord or (ing). This process obviously does not operate uniformly for men and women. Figure 11 shows that the first stages in this process of sexual differentiation are not the withdrawal of men from a female-dominated change, but rather a negative reaction of women to a growing social awareness of the change.

The role of women or the role of men?

In most discussions of sex differences in language, the emphasis is placed on the special behavior of women. The issue is sometimes raised as to whether one should focus on the behavior of men instead. In the case cited earlier of Australian adolescents (Eisikovits, 1981), the males seem to be the initiators of sexual differentiation. In that study, the boys reversed the normal direction of accommodation and distanced themselves even further from the speech of the interviewer in speech immediately following hers. The initial formulation of Principle I in this article describes the behavior of men, though the complementary statement about women would have served equally well. *But in this section, evidence has mounted that women are as a rule the active agents of sexual differentiation.* In Figure 4, one group stands out from

all the others: lower middle-class women, who show a very different slope of style shifting from all other groups. No male group shows such a departure from the general pattern. The interaction of sex and social class leaves us no choice but to focus on women's behavior, and to assess its effect on linguistic change. As the innovators of most linguistic changes, women in intermediate social classes spontaneously create the differences between themselves and men. In adopting new prestige features more rapidly than men, and in reacting more sharply against the use of stigmatized forms, women are again the chief agents of differentiation. In particular, women in the second highest status group respond more rapidly than men to changes in the social status of linguistic variables, and men usually follow behind with a lesser degree of investment in the social values of linguistic variation.⁴²

The rise and fall of sexual differentiation

In the first section of this article, some of the general principles that emerge from Eckert's analysis of the Northern Cities Shift in the Detroit area were introduced, but her particular conclusions were not considered. Figure 4 and Table 2 of Eckert (1989a) provide a remarkable parallel to Figure 11 of this article. They show a similar replacement of one distributional pattern by another as one moves from the earliest stages of a sound change to the oldest. In this case, the oldest change is also the raising and tensing of short *a*, but the other stages of the Northern Cities Shift are different from the Philadelphia sound changes. The shift that Eckert documented is from social class conditioning in the early stages (in the form of a Jocks vs. Burnout difference) to sexual differentiation in the later stages. She concluded by questioning whether sexual differentiation is present in the early stages of change, because it was not significant in the backing of (e) and (ʌ) in the Detroit area. The many examples of sexual differentiation of sound change in progress that I have cited in the first half of this article may not bear crucially on the question, because in most cases they do not report the earliest stages.

Our instrumental studies allow us to attack this issue directly by adding a number of sound changes at an even earlier stage than (eyC) and (aw). Regression analyses were carried out for all Philadelphia vowels; among these it is possible to identify *incipient* changes that show small but consistent shifts across apparent time. Some of the age coefficients are significant at the .05 level, whereas others are not. But the pattern of parallel movement and the association with the more significant changes do indicate the possibility of sound change in progress. The incipient changes show only sporadic correlations with social class, ethnicity, or neighborhood—probably all the results of chance fluctuation. However, one can find some regular patterns of sexual differentiation that include incipient changes, new and vigorous changes, and changes almost completed.

The top figure in Figure 12 presents such a pattern for six vowels that involve changes in F1. The horizontal axis shows three incipient changes on the

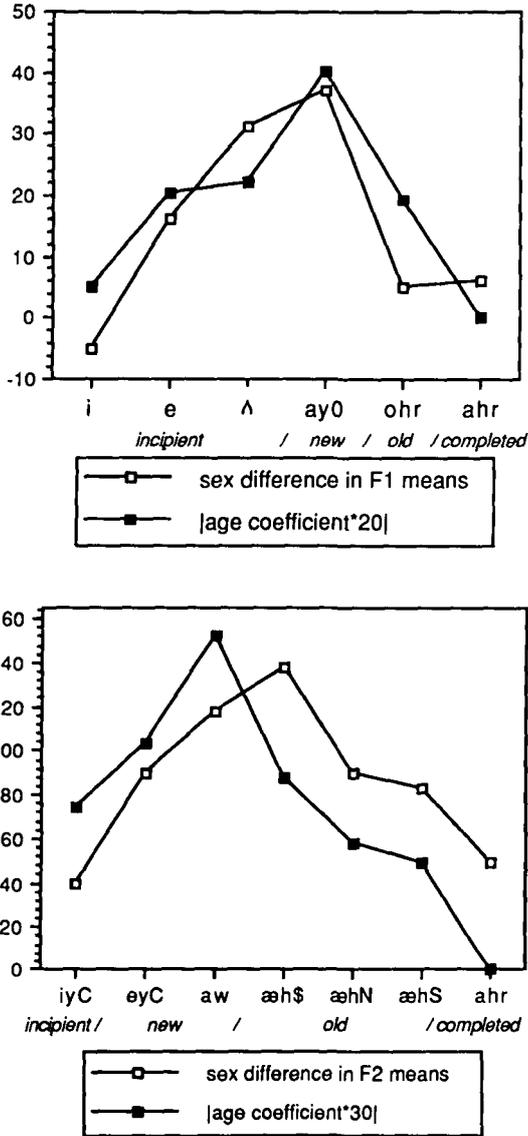


FIGURE 12. Age coefficients and mean sex differences in Hz for six vowel changes involving F1 and seven vowel changes involving F2.

left: the lowering of short (i) and (e) and the raising of (ʌ). These are followed by one new and vigorous change, the centralization of (ay0). Next is a nearly completed change, the raising of (ohr) in *more*, *board*, and so forth, and then a completed change: the raising of /ahr/ to lower mid position. For each

vowel, empty squares show the simple difference in the F1 means in Hz for males and females (as *female-male*). A second point is plotted for each vowel, indicated by the solid squares: the absolute values of the age coefficients for the sound change as a whole for men and women combined, multiplied by 20.

The rise and fall of these two curves is very similar. The multiplier 20 was chosen mechanically for the age coefficients to allow a close comparison of the two curves, but it has an interesting interpretation. The top figure in Figure 12 shows that a difference roughly equivalent to one generation is found between men and women for sound changes at all stages.

The bottom figure in Figure 12 shows the corresponding data for the sound changes that crucially involve F2 movements. At the extreme left, the fronting of (iyC) is shown as an incipient change. At the extreme right, the completed change /ahr/ is supplied, this time analyzing the backing component. Again, the two curves are quite similar in contour, but they do not match as closely in value. A factor of 30 was selected to permit the best comparison. The greatest difference between the two curves is found with (æh\$), which—as we have seen—is the least reliable. In general, the curves are skewed so that the age coefficients are relatively greater at the beginning, and the sex effect is relatively greater in the older changes. This suggests a parallel with Eckert's findings in Detroit, which are largely dependent on F2 differences. But it is also clear that sexual differentiation is present at the beginning in the expected direction and follows the development of the change with very similar contours. Again, the sexes differ at each stage by a value roughly equal to one generation.

RESOLVING PROBLEMS IN THE SEXUAL DIFFERENTIATION OF LANGUAGE

These results may throw some light on the four problems raised in the first section.

1. *The biological bias.* Two of the findings presented here indicate that biological factors are not likely to have much value in accounting for the sexual differentiation of language: (a) the fact that Principle II does not apply in a minority of cases, and (b) the fact that Principle I interacts strongly with social factors. However biological bias, more or less unconscious, may underlie the summary treatments of sexual differentiation that conceals the crucial interactions.

A biological bias is not avoided by dropping the category of men and women as independent variables, but rather by tracing the differential behavior of men and women through a wide variety of social factors. It is only this information that will permit the development of interpretive categories that will command general agreement.

2. *The generality of gender.* The general character of the male/female difference is manifested most clearly in the independence of sex and social class in the early stages of change. To the extent that they participate in the change, all social classes behave in roughly the same way at this stage.

As noted at the outset, the irregular course of sound change is best correlated with fluctuations in the social class makeup of the speech community. We have also seen that the second highest status group plays a crucial role in sexual differentiation of later stages. To the extent that sexual differentiation interacts with the social class structure, the differential behavior of men and women will be correlated with local changes in space and time. As different populations move into the position of *second highest social group*, the rise and fall of sexual differentiation in that group will play a crucial role in the trajectory of the change.

3. *The reversal of roles.* Is there a single factor that would account for the opposing types of sexual differentiation in stable and changing linguistic situations? The answer that is provided here is no. Figures 7-12 indicate two processes at work that are quite distinct in their history, their motivation, and their interaction with social factors. Sexual differentiation at the beginning of a linguistic change appears to be independent of other social factors. This suggests a mechanical process that is the same for all social classes. Sexual differentiation toward the end of a linguistic change interacts strongly with many social factors—not merely socioeconomic class as here and in Holmquist (1988), but local orientation (Labov, 1963) and race and ethnicity (Poplack, 1978). This points to a socially sensitive mechanism of sound change that involves the different roles that men and women play, the cultural norms that govern their behavior, and their relative power and opportunities for improving their life chances.
4. *Intimate diversification.* The problem of intimate diversification concerns the apparent inconsistency between sexual differentiation and the well-accepted principle of local density that would tend to level out any such differences at an early stage. There is a simple and mechanical process of differentiation that would resolve this inconsistency and account for the differentiation of the sexes in the early stages of sound change.

This differentiation logically begins in the acquisition of the first forms of the language by the language learner from the primary caregiver, as first implied in Gauchat's observations and developed further in the third section of this article. In all the societies studied so far, that caregiver is most often a female—a mother, grandmother, aunt, female babysitter, or day-care worker. Let us consider again the consequences of this fact. When a language learner encounters tokens of a female-dominated change in progress, it will be in the relatively advanced form used by the primary caregiver. In the case of a male-dominated feature, like the centralization of (ay0), the learner will encounter a less advanced form from the same caregiver. The simple logic of the situation will inevitably accelerate the advance of female-dominated forms and retard the advance of male-dominated forms. This process is consistent with the principle of local density, because it involves the quantitative effect of differential patterns of communication between the sexes, leading to a preponderant effect of female-dominated

changes without any intersection with attitudes, emotions, or local cultural norms.

Principle I, which interacts massively with such factors, cannot be attributed to such a simple, mechanical effect. What then is the constant factor that is responsible for the gross uniformity of Principle I? It is important to note here that the differences between men and women in their reactions to linguistic change are not qualitative but quantitative. Both men and women respond to the general principle that whenever people become aware of a change in the mechanism of their language, they reject it. The right-hand sides of Figures 7, 8, and 9 gave us a clear view of the development of such a reaction formation in the community: class stratification becomes sharper as sound changes near completion. There is no mode of behavior shown here peculiar to women. Rather, we see that what women are doing, men are also doing, to a lesser degree. The left-hand sides of Figures 7, 8, and 9 appear to show that as lower-class women use more of the stigmatized sound changes as time goes on. This is an unwanted consequence of the fact that we took the skilled working class as a fixed point in order to follow the curvilinear pattern. What actually seems to be happening is that the stigmatization of the sound changes affects the women of the skilled working class more strongly than the men, and the result is the leveling out of the social class coefficients for women. The sex differential that develops across the social spectrum is therefore a quantitative, not a qualitative difference between men and women.

Such quantitative differences between men and women certainly need explanation and further explorations on the basis of detailed observations of locally situated structures like that of Eckert (1989a). In this report, I have tried to reconstruct the base of objective fact that underlies Principle I in a way that will guide further interpretations. Though we are not likely to achieve any kind of unanimity in the interpretation of these social patterns, there are some directions that seem to me to be ruled out on the basis of these findings. Given the maximization of Principle I in the second highest status group, it is difficult to maintain that the cause is the relative powerlessness of women in relation to men. It seems more likely that in the United States, the forces behind this principle are associated with upward mobility and a relative increase in the power of women in this group as opposed to other sectors of society.

The explanation of Principle II is more provocative from a linguistic point of view. Principle II, as we have seen, is less regular than Principle I in the sense that there is no way to predict in any given case whether men or women lead at the beginning of a linguistic change. The suggestion I have given — that it is a result of the asymmetry of the caregiving situation — is consistent with the probabilistic character of this principle and with its independence of social factors. It is not immediately obvious how to design an empirical study that would test this idea, but it is a goal worth considering for future work.

NOTES

1. The effects of such global catastrophes—wars, invasions, revolutions, migrations, and epidemics—directly affect numbers of people who are in direct communication within the speech community. Less directly, they effect changes in the socioeconomic hierarchy, the dominance of ethnic groups, the relationship of the city to the countryside, and the rights and duties of generations toward each other. In turn, such social changes result in the emergence of new class dialects (Kökeritz, 1953; Wyld, 1936), the redefinition of prestige dialects (Feagin, 1979; Labov, 1966), the diversification of local dialects (Labov, Yaeger, & Steiner, 1972), the development of new racial dialects (Bailey & Maynor, 1987), the decay and disappearance of rural dialects (Alturo & Turrell, 1990; Holmquist, 1988), and the importation of rural features into an urban setting (Abd-el-Jawad, 1981; Frazer, 1983).

2. In actual fact, many of the standard forms preferred by women are not conservative but innovative, and it is men who play the conservative role in retaining a preference for older forms, like the use of *don't* with third person singular subjects or the /in/ forms of the participle. But though this view of the matter may accord with the history of the language, it is not the general view that most people have, and preference for forms with overt prestige is usually seen as a preference for the older and more established way of speaking.

3. The nature of this fourth problem was called to my attention by Gillian Sankoff.

4. These principles reflect my own interpretations of Eckert's discussion, based as much on my own findings as on her treatment, and may not have done justice to the subtlety and clarity of her thinking on these matters. The reader is referred to Eckert (1989a) for a more definitive statement.

5. For many reasons, the individual face-to-face interview is the basic means of achieving such a controlled study.

6. This is not entirely true, as it is not uncommon for analysts of variation to reverse the procedure and examine the distribution of linguistic behaviors without any reference to given linguistic categories, using the a-theoretical approach of principal components or multidimensional scaling (Horvath & Sankoff, 1987; Poplack, 1981). But the interpretation of the results is necessarily in terms of recognized social categories, and this approach is actually a complement to an analysis that focuses more directly on language with social facts as independent variables.

7. The distance between the two approaches has been reduced by a number of modifications and combinations of the two basic methods, abandoning some of the strengths of each to gain some of the advantages of the other. Thus, the Philadelphia Project on Language Change and Variation confined its random sample to a brief telephone survey and gathered the main body of information by long-term, semiparticipant investigations of selected neighborhoods. A fine-grained study of interaction was obtained by recording one speaker through an entire day (Hindle, 1980), and this was interpreted against the background of the neighborhood telephone surveys. In Eckert's study of the Detroit suburbs (1989a), the measures of sound change that form the dependent variable were gathered from recorded conversations with the investigator, rather than the free conversation of natural groups. Connections with objective measures of social status are provided in Eckert (1989b).

Between these two polar opposites lies an approach to the study of small groups that is intermediate in several respects. Milroy and Margrain (1980) utilize general network analysis that is free of reference to the specific properties of any particular group (also Bortoni-Ricardo, 1985; Milroy & Milroy, 1985). But as the interaction of network analysis with sex has not been a major concern of this work so far, I do not consider it in this review.

8. For further references on sexual differentiation, see the reference note following Hymes' reprinting of the Haas article (1944:228).

9. It should be pointed out that the Detroit interviews were more comparable to the interviews of the New York City Lower East Side study, carried out by whites in a relatively formal setting, than to the Harlem or Philadelphia studies in the black community, and therefore offer the maximum opportunity to observe the differential response of black men and women to a formal situation.

10. Labov (1966) presented several such cases. Silva (1988) suggested that this is the case for the reversal of the traditional backing of /a/ in São Miguel Portuguese; but the male predominance for his 12 informants was not statistically significant.

11. In contrast, the backing of /a/, a new vernacular tendency, is led by men and is favored in the least monitored styles (see later discussion).

12. The most relevant types of experiments deal with social class differences in subjective evaluation of speech rather than sex differences. Labov, Cohen, Robins, and Lewis (1968) showed that evaluations of speech as an indication of fighting ability were the inverse of evaluations of job suitability, but it should be noted that this pattern of response was much clearer for middle-class subjects than for working-class subjects.
13. The same family that registered the conservative behavior of females in respect to (ing) noted earlier in Mock (1979).
14. These conclusions were based on studies across five or six years of 36 college-educated adults, 12 lower-class adults, and 240 high school students aged 9–18 years. They were verified by a separate analysis of 90 speakers from the sample of Lavandra (1975).
15. Schieffelin's examination of language socialization among the Kaluli of New Guinea (1990) is a detailed study of this process. Chapter 8 gives an ethnographically sophisticated view of "The Socialization of Gender-Appropriate Behaviors" and also reviews other anthropological work in this area. It has also been shown that women use more advanced forms for female-dominated changes when they are interacting with intimate female friends (Hindle, 1980). But this is a relatively minor adjustment compared to the difference between male and female norms.
16. This is not a weakness of the variable rule program, which was designed primarily for the analysis of internal linguistic factors where we can expect independence. Rather, it is a defect in the unreflecting use of this mode of multivariate analysis to deal with social factors. Given the assumption of independence in the operation of the variable rule program, vigorous efforts must be made to locate interaction wherever one suspects it is to be found, as in the relation between sex and social class.
17. This sense of "hypercorrect" is distinct from but related to the more traditional concept of hypercorrection, where speakers create new forms by applying the reversal of a stigmatized rule to forms that had never undergone that rule. Overshooting a quantitative target can lead to a systematic change in the language, whereas hypercorrect forms, if generalized, will alter underlying forms or introduce irregularities into paradigms.
18. The variable (oh) is not corrected by everyone; when New Yorkers do attempt to correct it, they go beyond any forms found in the New York Vernacular and produce unpredictable alternations of [a], [ɒ], and [ɔ], with mean values ranging from 30 upward.
19. In the self-report tests of Labov (1966) and Trudgill (1972), a parallel distinction appears between the way people speak and the way they report that they speak.
20. Looked at in this way, many lower-class people are handicapped in the absence of this ability, as shown by a very low index of linguistic insecurity.
21. Additional evidence for the higher status of the innovators is derived from correlations with indices of communication patterns as well as observations by the semiparticipant-observers of the neighborhood studies, but for the purposes of this article, it will be sufficient to establish their status in the hierarchical system of occupations.
22. This issue was first raised by Anthony Kroch, in response to the first presentation of this article at NWAVE-XIV in 1984.
23. The speech community being discussed here is the white community of Philadelphia and does not include the large black population (38%). With rare exceptions, black speakers do not participate in the sound changes of the white vernacular community, and in many respects, Philadelphia is divided into two distinct speech communities with different grammars and phonologies. Within the white community, there is a very high degree of structural uniformity, with close to 100% agreement on the distribution of words in phonemic categories and the phonological rules that operate upon these categories (Labov, 1989).
24. The third element of this chain shift is shown in slashes as /uhr/ because it is not a variable, does not move further away, and the end result is a merger almost completed with the variable (ohr).
25. For a detailed account of this distribution, see Labov (1989).
26. Recordings in these series were made with a full-track Nagra IV-S or Nagra III tape recorder and Sennheiser 214 dynamic lavalier microphones. Field methods are described in Labov (1984).
27. Each coefficient is evaluated statistically by a value of *t*. For the value of 4.16, $t = 4.7$, with 90 degrees of freedom, so that $p < .01$. The number of degrees of freedom represents one less than the number of speakers included in the analysis.
28. In each case, the actual number of speakers may be less than the total, because for any given vowel, a few speakers may have had less than the number of tokens required to be included in the analysis. *N* actually ranges from 115 for (i) to 104 for (oy).

29. The age vectors from the Telephone Study correspond well to those shown here (Labov, 1980), though the smaller amount of data and the lower quality of the phonetic signal obscure some of the smaller effects. Real time observations of De Camp (1933), Tucker (1944), and Kurath and McDavid (1961) allow us to conclude that most of these changes in apparent time correspond to changes in real time.
30. In Figure 6, the (æh) variables are represented only by the /æhN/ allophone; the other two show parallel movements somewhat behind, overlapping with /eyC/.
31. This shift shows a concurrent lowering of the target of the glide from /u/ to /ɔ/.
32. The stylistic reaction to the variable (æh) in Philadelphia is by no means as vigorous as in New York City, where speakers from all social levels show correction even in spontaneous speech. In Philadelphia, correction of (æh) is confined to middle-class speakers and occurs primarily in controlled styles. But the variable is a social stereotype ("the harsh, nasal a") and shows very sharp stratification. (ohr) shows considerable correction in controlled styles, especially in minimal pairs, but is much less prominent than (æh). (ahr) is fixed and shows no correction at all.
33. This is parallel to the development of (aw) in Canada, studied by Chambers and Hardwick (1985). Women in Vancouver and Toronto favor the fronting of the nucleus, as well as the reversal of the traditional centralization, which is accordingly stronger among men. Chambers and Hardwick also found a new phonetic development among younger Toronto males: a phonetic backing and rounding of the nucleus to [ɔw]. Backing is also the dominant direction for Philadelphia (ay⁰), though the only sexual differentiation is found in the F1 dimension.
34. If the nonwhite population had been included in this survey, the unemployed and unskilled groups would be considerably larger. As our population is limited to the white residents of Philadelphia, it is skewed on the social class dimension toward the upper working class.
35. More extended analyses were conducted with other social variables such as residence value, house upkeep, foreign language knowledge, generations in the United States, ethnicity, and neighborhood. The variables listed in the text proved to be the most robust, and in most cases, the effect of other variables was not significant. The effect of ethnicity proved to be a powerful factor in the fronting of back vowels and was included in all analyses for those variables.
36. There is also much more random fluctuation in the /uw/ values, and a higher rate of errors in measurement, due to the problems of separating the first formant from voicing energy.
37. See Cedergren (1973) for such an alternation in the development of (ch) in Panama City.
38. As, for example, a misunderstanding in which "make us slaves" was heard as "make us leave."
39. Only three words are involved with this allophone, and many speakers show only a few tokens. Thirteen of the 116 speakers have no data in spontaneous speech, and the total number of tokens is only 299, as compared to 710 for (æhN).
40. When the changes are completed, the differences between the sexes normally disappear. Thus, for the completed backing and raising of (ahr), there are no significant differences between males and females for any occupational group.
41. Figure 11 does not show developments in the upper working class because the *skilled* workers were taken as the point of reference for the others in all of these analyses of sexual differences. It should therefore not be taken to mean that there is no sexual differentiation in the *skilled* working class, where women are clearly in the lead.
42. A clear illustration of this principle appears in Gal (1978). The shift from Hungarian to German was correlated with membership in nonpeasant networks for both men and women to about the same degree (78% and 74%, respectively). But the correlation with age was much less for men than women (69% and 93%, respectively).

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APPENDIX 1

VOWEL SYMBOLS USED

The following symbols are used throughout this report to identify the English word classes involved in linguistic change in American English. These categories represent the common base from which current sound changes in the United States proceed. The phonemic / / symbols indicate that these categories are in contrast in the most conservative varieties considered; the notation is neutral as to whether the Middle English vowels are the underlying forms for this dialect. This symbol set is not adequate or appropriate for many English dialects, which preserve contrasts not shown here and in many cases do not have systematic diphthongization of the long vowels.

| Checked Vowels | | Free Vowels | | | | | | | |
|----------------|------------|-------------|------------|-----------|------------------|------|--------------------|------|--------------------|
| | | Ugliding | | Ingliding | | | | | |
| | | Front | Back | | | | | | |
| /i/ | <i>bit</i> | /u/ | <i>put</i> | /iy/ | <i>beat, be</i> | /iw/ | <i>suit, dew</i> | /ih/ | <i>idea</i> |
| /e/ | <i>bet</i> | /ʌ/ | <i>but</i> | /ey/ | <i>bait, bay</i> | /aw/ | <i>bout, bough</i> | /eh/ | <i>yeah</i> |
| /æ/ | <i>bat</i> | /o/ | <i>pot</i> | /ay/ | <i>bite, buy</i> | /ow/ | <i>boat, bow</i> | /æh/ | <i>man, halve</i> |
| | | | | /oy/ | <i>quot, boy</i> | /uw/ | <i>boot, boo</i> | /ah/ | <i>father, pa</i> |
| | | | | | | | | /oh/ | <i>caught, law</i> |

APPENDIX 2

AGE, SEX, AND OCCUPATIONAL COEFFICIENTS FOR TEN PHILADELPHIA SOUND CHANGES IN PROGRESS

The coefficients in Appendix 2 are derived from stepwise multiple regression applied to the normalized means for all subjects in the Philadelphia Neighborhood Study (see table on pp. 253–254). For each variable, three multiple regression runs are reported: all subjects ($N = 116$) together, women only ($N = 53$), and men only ($N = 63$).

- (eyC) checked /ey/ in *snake, made*, etc.
- (æhS) tensed /æh/ before voiceless fricatives in *pass, laugh*, etc.
- (æhN) tensed /æh/ before front nasals, in *man, hand*, etc.
- (æh\$) tensed /æh/ in *mad, bad, and glad*.
- (aw) the /aw/ phoneme in *house, down, now*, etc.
- (ay0) /ay/ before voiceless finals in *light, bike, pipe*, etc.
- (owC) checked /ow/ in *road, boat*, etc.
- (owF) free /ow/ in *know, row*, etc.
- (uwC) checked /uw/ in *shoot, mood*, etc.
- (uwF) free /uw/ in *too, show*, etc.

The age coefficients for age are to be multiplied times the age of the subject to yield the expected contribution of age to the value of the formant in Herz; all other coefficients are simply the value in Herz to be added to a constant to give the expected formant position for subjects who are members of that group, all other things being equal.

First formant coefficients are negative if the contribution of that independent variable is towards higher vowels, and positive if it is towards lower vowels.

Age coefficients are negative if younger speakers show higher values, and positive if younger speakers show lower values. Thus a value of 1.18 for the age coefficient for all speakers for (eyC) means that younger speakers show lower values, that is, for them, F1 for checked /ey/ is relatively lower and the vowel is relatively higher.

Where sex is an independent variable, the value of 1 is assigned to female subjects, 0 to male speakers, that is, the male group is the reference group against which female values are calculated.

A given subject can have a value of 1 for only one of the four occupational groups shown: unskil. = unskilled workers and unemployed; cler. = clerical; mang. = managerial; prof. = professional. Speakers who show 0 in all four groups are members of the unlisted reference group of "skilled workers."

The significance level is shown for all coefficients, as shown by *t* tests in the multiple regression, where degrees of freedom are greater than 100 and less than 113: 'p > .05; *p < .05; +p < .01; #p < .001.

| | Age | Sex | Unskil. | Cler. | Mang. | Prof. |
|----------------------|--------|------|---------|-------|-------|-------|
| <i>First Formant</i> | | | | | | |
| <i>(eyC)</i> | | | | | | |
| All | 1.18# | 4= | -16* | -18' | -20' | -2' |
| Women | 0.75+ | | 26* | -19' | -6' | 32' |
| Men | 1.50+ | | 10' | 9' | -5' | -4' |
| <i>(æhS)</i> | | | | | | |
| All | 0.77* | -4' | 18' | 56+ | 68+ | 80# |
| Women | 0.62' | | -6' | 61* | 123+ | 128# |
| Men | 1.08* | | 25' | 43' | 46' | 34' |
| <i>(æhN)</i> | | | | | | |
| All | 0.58* | -10' | 25' | 34' | 28' | 93# |
| Women | -.54 | | 0' | 22' | 26' | 105# |
| Men | 0.71* | | 50' | 51' | 41* | 87* |
| <i>(æh\$)</i> | | | | | | |
| All | 0.35' | -35# | 17' | 40' | 56* | 91# |
| Women | -.09' | | 27' | 41' | 81' | 104* |
| Men | 1.05' | | -6' | 9' | 18' | 53* |
| <i>(aw)</i> | | | | | | |
| All | 2.31# | -10' | 16' | -2' | 19' | 42' |
| Women | 2.78# | | 16' | 5' | 12' | 116* |
| Men | 2.05# | | 10' | -8' | -2' | 6' |
| <i>(owC)</i> | | | | | | |
| All | 0.40' | 22+ | -5' | -1' | 15' | 11' |
| Women | 0.73' | | -16' | -6' | 14' | 37' |
| Men | 0.67* | | 23' | 24' | 63* | 36' |
| <i>(owF)</i> | | | | | | |
| All | -0.27' | 30* | -2' | 6' | 21' | 29' |
| Women | 0.19' | | -17' | -11' | 38' | 30' |
| Men | 0.54' | | 5' | 21' | 14' | 19' |
| <i>(uwC)</i> | | | | | | |
| All | 0.40' | 22* | -5' | -1' | 15' | 11' |
| Women | 0.21' | | 11' | -7' | 27' | 16' |
| Men | 0.48' | | 0' | 8' | 17' | 34' |

(continued on next page)

| | Age | Sex | Unskil. | Cler. | Mang. | Prof. |
|----------------------------------|---------|------|---------|-------|-------|-------|
| <i>First Formant (continued)</i> | | | | | | |
| (uwF) | | | | | | |
| All | -0.35' | -1' | -3' | 1' | -26' | -19' |
| Women | -0.60' | | 15' | 20' | -20' | -1' |
| Men | -0.05' | | -8' | -32' | -45' | -45' |
| (ay0) | | | | | | |
| All | 2.13# | 44# | 14' | 27' | 16' | 32' |
| Women | 1.78# | | 8.13' | 15' | 25' | 68* |
| Men | 2.42# | | 15' | 18' | 5' | -27' |
| <i>Second Formant</i> | | | | | | |
| (eyC) | | | | | | |
| All | -3.36# | 80* | -90# | -166# | -187# | -232# |
| Women | -2.45+ | | -89+ | -146* | -215+ | -227+ |
| Men | -4.24+ | | -98+ | -174* | -173+ | -245+ |
| (æhS) | | | | | | |
| All | -2.16* | 36' | -64' | -206# | -268# | -344# |
| Women | -1.81' | | -29' | -196# | -357# | -416# |
| Men | -2.64* | | -74' | -201+ | -236# | -277# |
| (æhN) | | | | | | |
| All | -2.017+ | -50+ | -39' | -225# | -178# | -347# |
| Women | -0.96' | | 0' | -246# | -287# | -401# |
| Men | -3.48# | | 59' | 180+ | 119+ | 270# |
| (æh\$) | | | | | | |
| All | -2.52+ | 108# | -52' | -238# | -235# | -307# |
| Women | -1.73' | | -46' | -249' | -211# | -377* |
| Men | -3.77+ | | -43' | -190' | -215' | -200+ |
| (aw) | | | | | | |
| All | -4.79# | 93# | -83' | -145+ | -191# | -317# |
| Women | -4.60# | | 53' | -141' | -214* | -393# |
| Men | -5.43# | | -111' | -138' | -178+ | -286+ |
| (owC) | | | | | | |
| All | -3.17+ | 56' | -79' | -113' | -107' | -120' |
| Women | -3.80+ | | 30' | 93' | -67' | 83' |
| Men | -2.57' | | -203+ | -348# | -244+ | -341+ |
| (owF) | | | | | | |
| All | -5.08+ | 79' | -227' | -184' | -261' | -244' |
| Women | -6.81' | | -240' | -129' | -341' | -205' |
| Men | -3.67+ | | -120* | -199+ | -171+ | -206+ |
| (uwC) | | | | | | |
| All | -2.29* | 79* | 79' | 159+ | 38' | -56' |
| Women | -3.17* | | 58' | 193' | -74' | -162' |
| Men | -1.59' | | 74' | 154' | 99' | 58' |
| (uwF) | | | | | | |
| All | -3.87* | -49' | -60' | -43' | -170' | 40' |
| Women | -3.12' | | 98' | 50' | -82' | -36' |
| Men | -5.61' | | -237' | -177' | -288' | 224' |
| (ay0) | | | | | | |
| All | 1.18# | 11' | -21' | -8' | 36' | -43' |
| Women | 1.79+ | | -20' | 29' | 40' | -84' |
| Men | 0.68' | | -20' | -2' | 38' | 19' |