



University of Pennsylvania Working Papers in Linguistics

Volume 16

Issue 2 *Selected Papers from NWAV 38*

Article 2

1-1-2010

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Abstract

The paper tests the generalization of the curvilinear hypothesis and the tendency of females to lead linguistic change in vocalic mergers on the basis of two mergers currently in progress in Charleston, SC: the low-back merger and the *pin-pen* merger. It is based on minimal-pair tests and on the acoustic analysis of the speech of 90 speakers, aged 8-90, representing the entire socio-economic spectrum of the city. While the low-back merger is a change from below showing a female advantage and a curvilinear effect of social class, the *pin-pen* merger shows a decreasing monotonic relationship with social class and no female lead. The difference is argued to be due to the two mergers being at different levels of conscious awareness in the community.

On the Role of Social Factors in the Loss of Phonemic Distinctions

Maciej Baranowski*

1 Introduction

Two of the most important generalizations about the role of social factors in linguistic change that emerge from the sociolinguistic studies of speech communities conducted in the last few decades are the following:

1. Women lead in linguistic change:
 - 1a. "In linguistic change from above, women adopt prestige forms at a higher rate than men." (Labov 2001:274)
 - 1b. "In linguistic change from below, women use higher frequencies of innovative forms than men do." (Labov 2001:292)
2. The *curvilinear hypothesis*: Linguistic changes from below originate in the interior social classes, rather than the highest or the lowest-status group (Labov 2001).

There is substantial evidence for the first generalization, both for changes from above and for changes from below. There are exceptions, e.g. the raising of /ay/ in Philadelphia (Conn 2002), but those usually involve isolated shifts of individual sounds, as opposed to chain shifts; the majority tendency, i.e., the female lead, is clear. Labov (2001) summarizes the evidence supporting the generalization from numerous studies conducted up to 2001.

There is less evidence supporting the second generalization. There are relatively few studies showing a curvilinear effect of social class, though this is partly due to the methodological decisions taken in many recent studies. They often use a binary division of social class (lower vs. higher, working vs. middle, etc.), which precludes the testing of the curvilinear hypothesis. Nonetheless, there are studies supporting the generalization, beginning with Trudgill's study of Norwich English (1974), the Northern Cities Shift in Detroit (Shuy et al. 1967, Fasold 1969), lenition in Panama City (Cedergren 1973), and, most importantly, the Philadelphia study conducted by Labov and his associates in the 1970s, based on 112 speakers analyzed acoustically, showing a curvilinear effect for a number of Philadelphia vowel changes (Labov 2001).

One question that arises given the evidence mentioned above is whether these two generalizations apply to mergers as well as sound shifts. Interestingly, most of the evidence for these generalizations comes from the study of sound shifts and lenition processes. Or to put it differently, whenever these generalizations are reported, the evidence used to support them comes from sound shifts or lenition processes, but almost never from mergers. In general, the evidence for the role of social factors in mergers is much less robust than in the case of vowel shifts and lenition processes. In addition, it is sometimes mixed, particularly regarding the role of gender. There have been quite a few studies of the low-back merger in the US, but not many of them look at the role of social factors, and those that do usually report no social class effect. This includes Baranowski (2007), which, based on the acoustic analysis of 43 speakers, reports no social class effect for the low-back merger in Charleston.

The goal of the current project was to investigate the role of social factors in mergers on the basis of a larger dataset, with a view to answering the question of whether mergers, just like other sound changes, show a curvilinear effect of social class and a female lead. The dialect of Charleston is undergoing six mergers and is therefore particularly suitable for testing the two generalizations. This study looks at the two most vigorous mergers in progress in the dialect: the low-back merger (*cot-caught*, *Don-dawn*, *sod-sawed*, etc.) and the *pin-pen* merger.

2 Methods

*Support from the Arts & Humanities Research Council (Research Leave Grant AH/G006873/1) is gratefully acknowledged. Thanks to Bill Labov, Sherry Ash, Aaron Dinkin, Greg Guy, Gillian Sankoff, Erik Thomas, and Dominic Watt for helpful comments and suggestions.

The study investigates the progress of the low-back merger and the *pin-pen* merger in apparent time in Charleston, South Carolina. It is based on minimal-pairs tests conducted by 97 white speakers, aged 8-90, assigned to five social classes covering the socio-economic spectrum of the city (see Baranowski 2007). The minimal pairs used were *Don-dawn* and *cot-caught* for the low-back merger, and *pin-pen* and *him-hem* for the *pin-pen* merger. The speakers read out each pair and said whether the two words sounded the same, close but slightly different, or different. The speakers' judgments of each pair (their perception) were scored as 0, 1, or 2, respectively. Their actual production was judged (by the author) in the same way.

In addition, the speech of a subset of 90 speakers has been analyzed acoustically in Praat, resulting in F1/F2 measurements of the speakers' complete vowel systems. The measurements include spontaneous speech produced during sociolinguistic interviews and the minimal-pair tests mentioned above, and word-list items. The F1/F2 values have been normalized (Nearey 1977). The vowel plots below are produced with Plotnik 9.3.

The results of the minimal-pair tests and the acoustic measurements have been entered as dependent variables in a series of multiple-regression analyses, with gender, social class, and age as independent variables; the social categories of class and age are entered in a number of different ways in the analyses. The tables below report the factors that have come out as significant.

3 Results and Discussion

3.1 Low-Back Merger

Figure 2 shows the progress of the low-back merger in Charleston in apparent time on the basis of minimal-pair tests. Speakers aged 50 and over are largely distinct, whereas for younger speakers there is a smooth progression towards merger, with children and teenagers being largely merged.

Social class plays a role, but it doesn't come out as significant when entered as a single variable with five different levels, indicating that the relationship may not be linear. Indeed, when social class is entered as three separate variables representing three major social class categories, a curvilinear pattern emerges, with the class in the middle of the scale leading the change (Table 1).

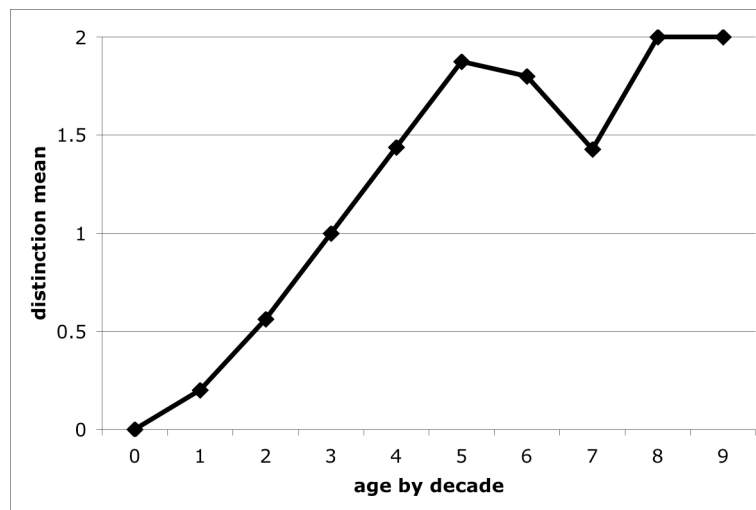


Figure 1: Merger of *cot* and *caught* in production by decade; minimal-pair test (0=merged, 2=distinct) mean values for 97 speakers.

This curvilinear effect is shown graphically for five social classes in Figure 2. The difference between the Upper Middle and the Upper Class is not significant; these two classes are not significantly different from the Working Class.

Variable	Coefficient	probability
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Constant	0.42	0.0351
Decade	0.25	≤ 0.0001
WC	-0.22	0.2072
MC	-0.41	0.0345
UC	0	•

Table 1: Multiple regression of *cot-caught* merger in minimal-pair tests; production; 97 speakers; R² (adjusted) = 42.0%.

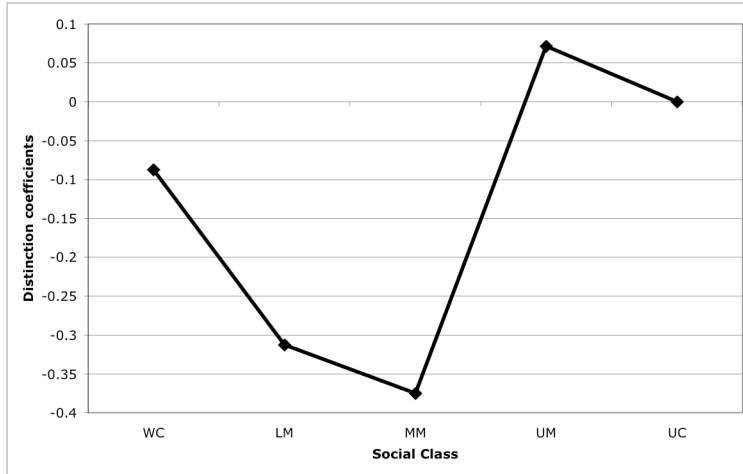


Figure 2: Curvilinear pattern in *cot-caught* merger in minimal-pair tests; regression coefficients for five social classes (97 speakers).

When we look at the two vowels acoustically across the 90 speakers analyzed, two things seem to be going on in apparent time: the backing of /o/, as in *cot*, and the lowering of /oh/, as in *caught*, leading to what is a merger by approximation. The start and end points of the change are illustrated in the next two figures, showing the distribution of the two low back vowels for an 82-year-old Charlestonian (Figure 3) and her 15-year-old grandson (Figure 4).

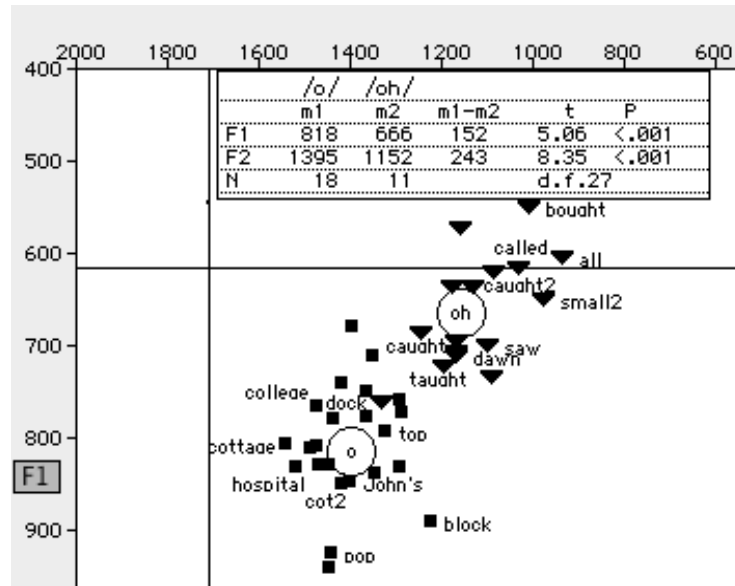


Figure 3: Elizabeth O., 82, Charleston, SC, Upper Class (grandmother of Peter O. in Figure 4).

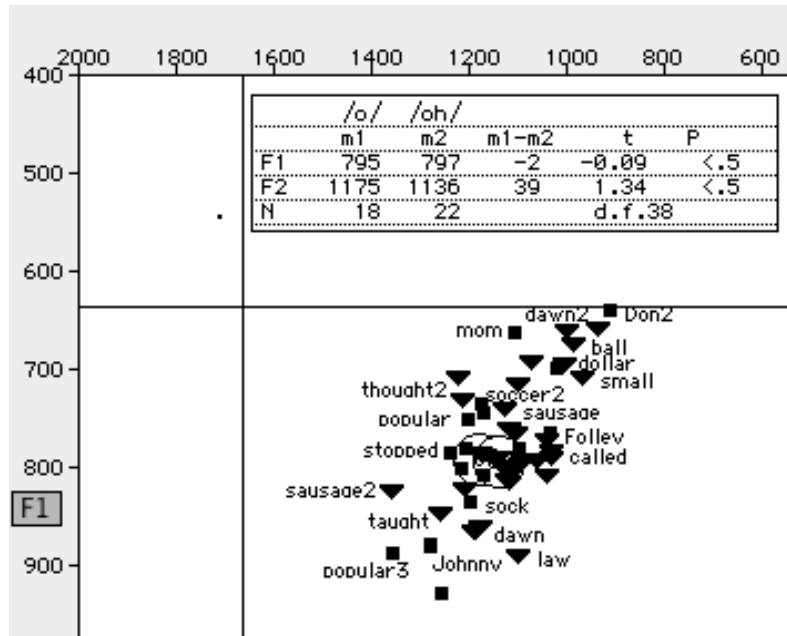


Figure 4: Peter O., 15, Charleston, SC, Upper Class (grandson of Elizabeth O. in Figure 3).

The change in the acoustic position of the two vowels in apparent time can be seen in Figures 5 and 6. F2 of /o/ is decreasing in apparent time (Figure 5), and F1 of /oh/ is increasing in apparent time, that is, the vowel is lowering (Figure 6). Both shifts are led by women, that is, women are ahead of men in the acoustic approximation between the two vowels. The female lead in the backing of /o/ is confirmed in a multiple-regression analysis shown in Table 2.

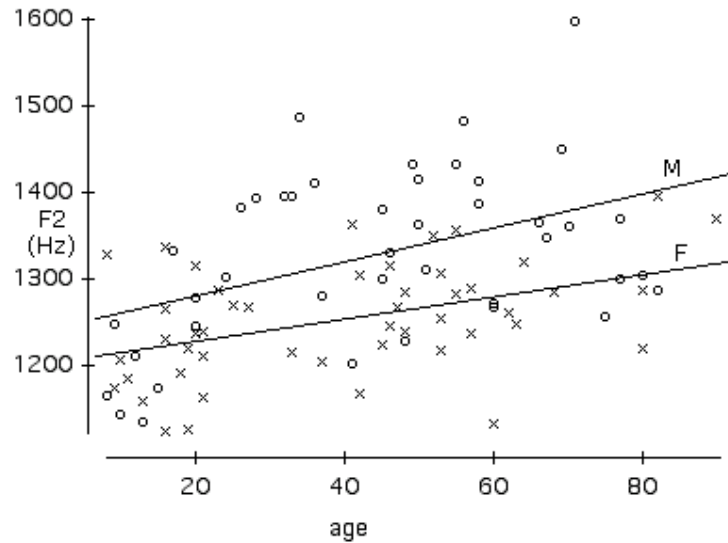


Figure 5: Backing of /o/ (*cot*, *top*, etc.) by gender (90 speakers); F: crosses, M: circles.

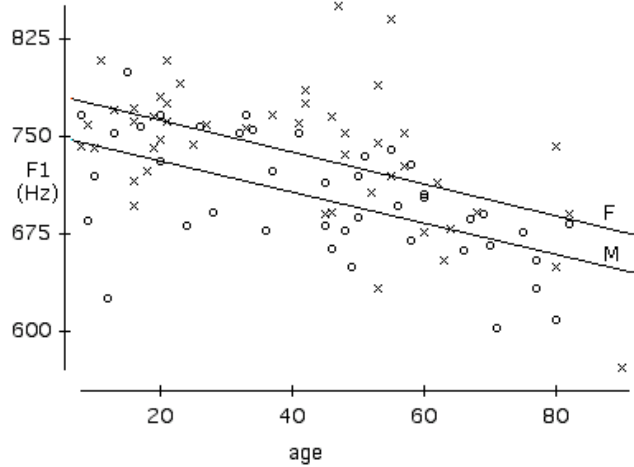


Figure 6: Lowering of /oh/ (caught, dawn, etc.) by gender (90 speakers); F: crosses, M: circles.

Variable	Coefficient	probability
Constant	1306.01	≤ 0.0001
Age	34 Hz	0.0003
Female	-66 Hz	≤ 0.0001
WC	-50 Hz	0.0061
MC	-68 Hz	0.0009
UC	0	•

Table 2: Backing of /o/ (F2 of *cot*, *Don*, etc.) (90 speakers); R² (adjusted) = 39%.

Table 2 also shows a strong effect of social class, displaying a curvilinear pattern with the class in the middle of the scale showing the lowest expected F2, that is, leading the phonetic shift of the vowel. The curvilinear effect is presented graphically for five social classes in Figure 7. It is the same curvilinear pattern seen in the minimal-pair test results in Figure 2. This time, however, the evidence is of a different kind; it is based on the acoustic approximation between the two vowels. The result is consistent: the social class in the middle leads in the merger. This gives us added confidence that the result, though subtle (as is often the case in changes from below which are still in progress), is nevertheless real.

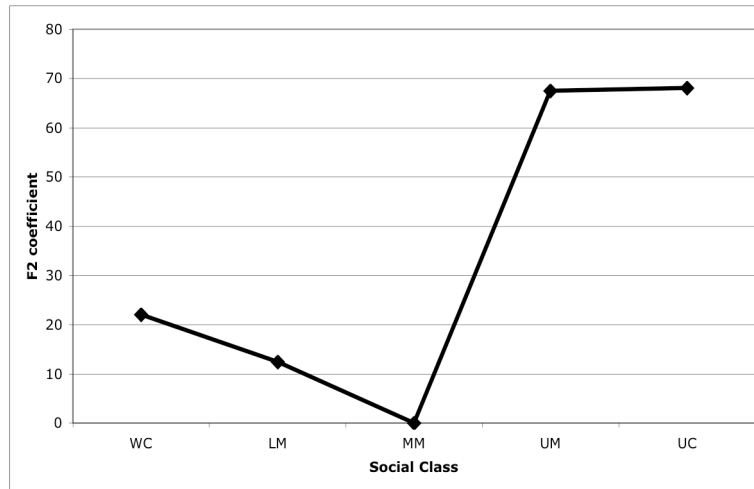


Figure 7: Curvilinear pattern in the backing of /o/ (*cot*, *Don*, etc.); 90 speakers.

To summarize, the low-back merger in Charleston shows a curvilinear pattern for social class and a female lead acoustically. There are no overt comments from the informants; it seems to be below the level of conscious awareness and shows no signs of social evaluation.

3.2 *Pin-Pen Merger*

Charleston is a marginal Southern dialect in that it lacks the defining feature of Southern phonology, i.e., the Southern Shift (Baranowski 2007). However, it has been acquiring the *pin-pen* merger, which is present throughout the South and is also found at scattered points across the US (Labov et al. 2006). Figure 8 shows the acquisition of the merger in apparent time on the basis of minimal-pair tests. Most speakers in their 70s and older have a distinction, whereas most younger speakers are largely merged, with children and teenagers completely merged. Although there is a clear progression towards merger in apparent time, it isn't as smooth as in the case of the low-back merger. There is more variation, which is largely due to social class.

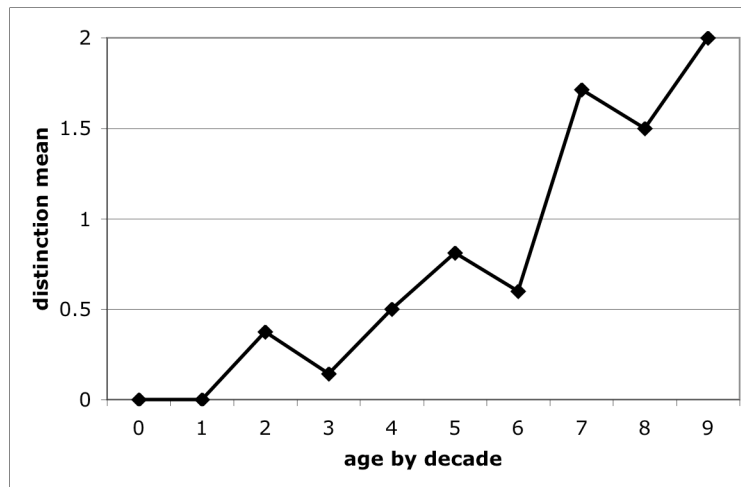


Figure 8: Merger of *him* and *hem* in production by decade; minimal-pair test (0=merged, 2=distinct) mean values for 96 speakers.

The social class effect is different from that of the low-back merger. As Table 3 shows, the social class pattern is not curvilinear. It is a monotonic decreasing relationship, that is, the higher the social class, the lower the degree of merger (Figure 9). This social class effect is significant in both perception and production, but the differences between the social classes are greater in the informants' perception than in their actual production. Perception lags behind production in the *pin-pen* merger, especially for the highest social class.

Production R^2 (adjusted) = 46.3%			Perception R^2 (adjusted) = 47.5%		
Variable	Coefficient	prob	Variable	Coefficient	prob
Constant	0.18	0.2363	Constant	0.24	0.2266
Decade	0.18	≤ 0.0001	Decade	0.25	≤ 0.0001
WC	-0.57	≤ 0.0001	WC	-0.68	0.0001
MC	-0.34	0.0217	MC	-0.45	0.0189
UC	0	•	UC	0	•

Table 3: Multiple regression of *him-hem* merger in minimal pairs in perception and production.

Acoustically, only speakers in their 70s and older show phonetic separation between the nasal allophones of /ɪ/ and /e/; some tokens overlap but the means are clearly separated. When we look

at all the speakers analyzed acoustically, we can see the two vowels becoming closer to each other in apparent time, with most speakers below the age of 70 showing considerable phonetic overlap.

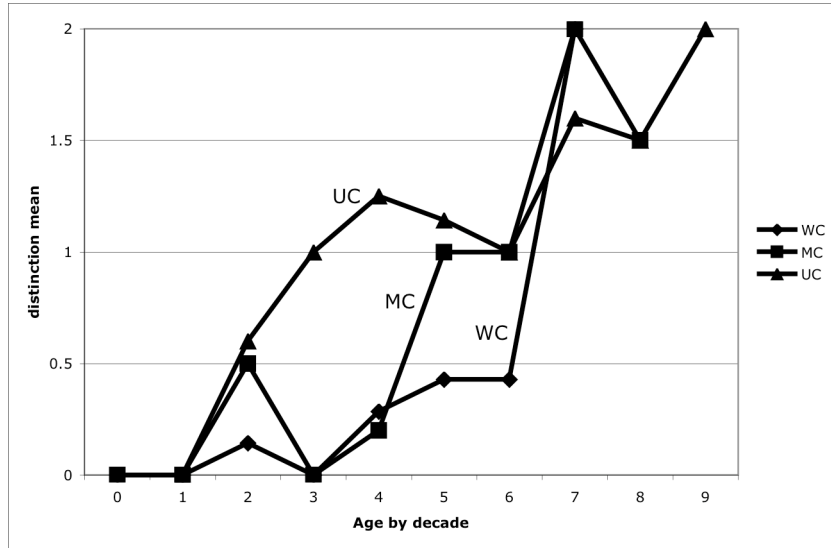


Figure 9: *him-hem* merger by social class; production in minimal pairs (96 speakers).

There is social class stratification, with higher classes showing more phonetic separation, as opposed to the curvilinear pattern seen for the low-back merger. Figure 10 presents the *pin-pen* merger acoustically in apparent time by social class. The community as a whole is going in the same direction, towards merger, showing some subtle social stratification.

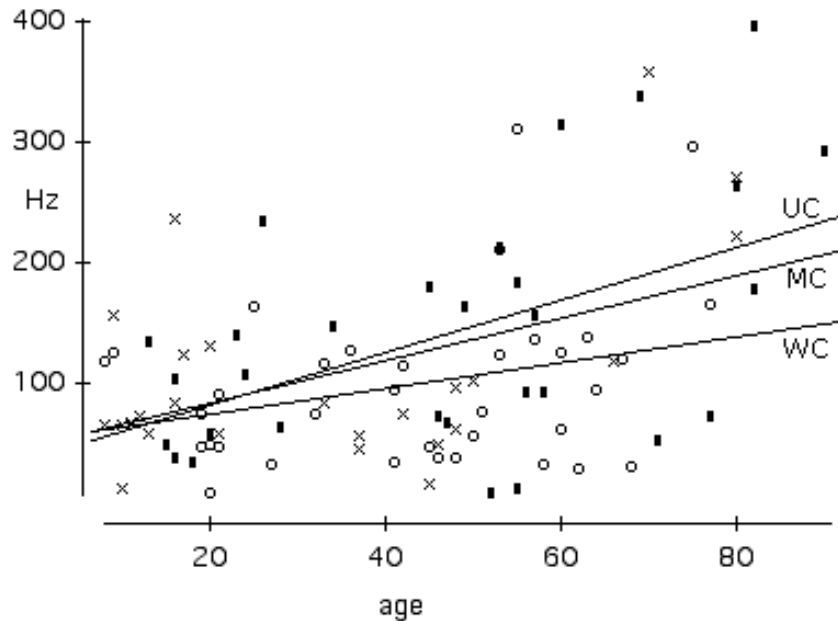


Figure 10: Cartesian distance between /iN/ and /eN/ in apparent time by social class (90 speakers); UC: rectangles, MC: crosses, WC: circles.

The differences between the social classes become clearer when we look at the difference in height between the two vowels in just the minimal pairs (Figure 11). The F1 difference is a more reliable measure than Cartesian distance in this case, because minimal-pair tokens tend to get tense

and peripheral, resulting in considerable fronting. The monotonic social stratification pattern is confirmed in a multiple-regression analysis in Table 4.

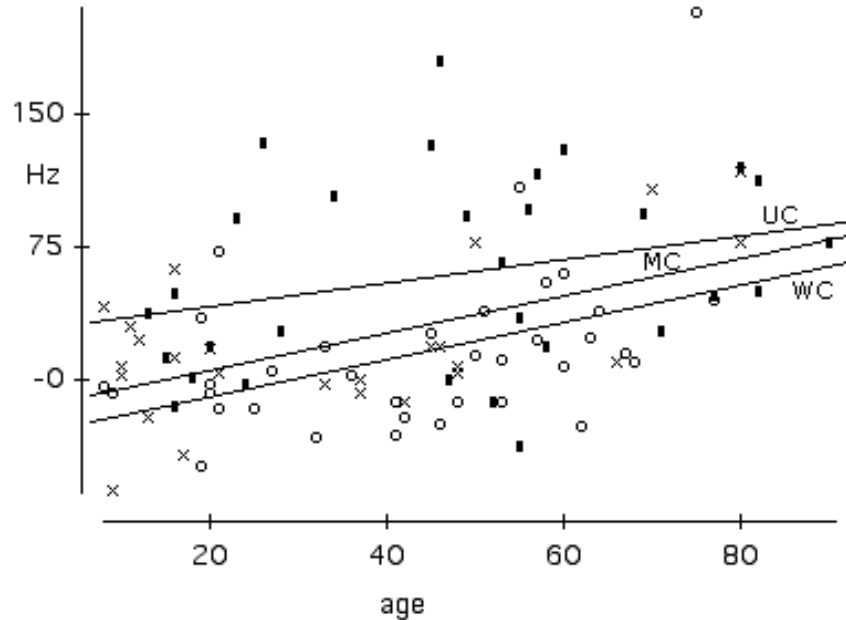


Figure 11: F1(eN)-F1(iN) in apparent time by social class in minimal pairs (90 speakers); UC: rectangles, MC: crosses, WC: circles.

Variable	Coefficient	probability
Constant	16.8370	0.2046
Age x25	23 Hz	≤ 0.0001
WC	-41 Hz	0.0004
MC	-28 Hz	0.0261
UC	0	•

Table 4: Multiple regression of F1/eN/-F1/iN/ in minimal pairs (90 speakers); R^2 (adjusted) = 27.0%.

The fact that the social class differences are amplified in formal speech (minimal pairs), combined with the fact that the speakers' perception (their judgements) of the merger lag behind their actual production, suggests that this merger, as opposed to the low-back merger, is above the level of conscious awareness and shows some social affect. It may also be, at least for some Charlestonians, associated with other marked speech patterns of the Inland South. This is confirmed by the overt comments offered by a number of the informants during their minimal-pair tests:

MATTHEW R., 60, UPPER MIDDLE CLASS: Pin, pen [sounds high], uh, pin, uh, and I th- I think they sound different. I probably... People often misunderstand when I use those words so probably... uh they sound more the same than I realize. Pin is something you stick with, and pen is what you write with.

DAVID B., 82, UPPER CLASS: In Charleston you'll get a difference between pin and pen. In Columbia you might not. In Charleston it would be different. Pin and pen. And the same thing for him and hem.

CATHY O., 57, UPPER CLASS: Pin and pen. Now, to me they sound differently but I hear an awful lot of people who pronounce them the same. Pin, obviously, is a sharp needle-like instrument, and pen [sounds high, close to *pin*] is a writing instrument.

WALTER B., 66, MIDDLE CLASS: Pin and pen. [laughs] They never sound the same to me

except when other people say ‘em. I think they always say pin. But uh, but we... Pin is something you get stuck with and pen is something you write with. [laughs] I’m sorry, I get very tickled about that.

It should be noted that no one gets tickled about the low-back merger; there are no such comments for the *cot-caught* or *Don-dawn* pairs.

3.3 Charleston Chain Shift

Note that Table 4 shows no gender effect; there is no female lead in the *pin-pen* merger, as opposed to the low-back merger. One reason for this may be that this is what we might expect if the merger is indeed above the level of conscious awareness. Women might not be expected to lead a change which is above the level of awareness and at the same time shows some negative social affect. This is essentially the same mechanism by which women, all other things being equal, tend to use prestigious forms at higher rates than men (Labov 2001). Whatever the exact nature of this mechanism (which, admittedly, is a matter of some debate, and is beyond the scope of this paper), one might not be surprised to see no female lead in a change which is, however mildly, negatively perceived.

But there is also a structural reason. If we look at the low-back merger in Charleston in the larger context of the whole vowel system, rather than a single isolated change, we can see that the two vowels are part of a larger change in progress. It turns out that not only do we have the backing of /o/, as in *cot*, in apparent time, but also the backing of short-a before non-nasals, as in *cat*. Furthermore, we also have the lowering of /e/, as in *pet*. In other words, there is a whole chain shift in progress in Charleston, essentially a form of Canadian Shift (Figure 13). Importantly, it is led by women; each of the component vowel shifts shows a statistically significant female advantage.

As mentioned in the beginning, the exceptions to the majority tendency (the female lead) happen to be isolated shifts, not connected to the rest of the system. Sound changes involving groups of sounds connected with each other, as in chain shifts, have been found to be led by women (Labov 2001). Given this generalization, it is not surprising to see a female advantage in the low-back merger, part of a larger chain shift, and no female lead in the *pin-pen* merger, an isolated change.

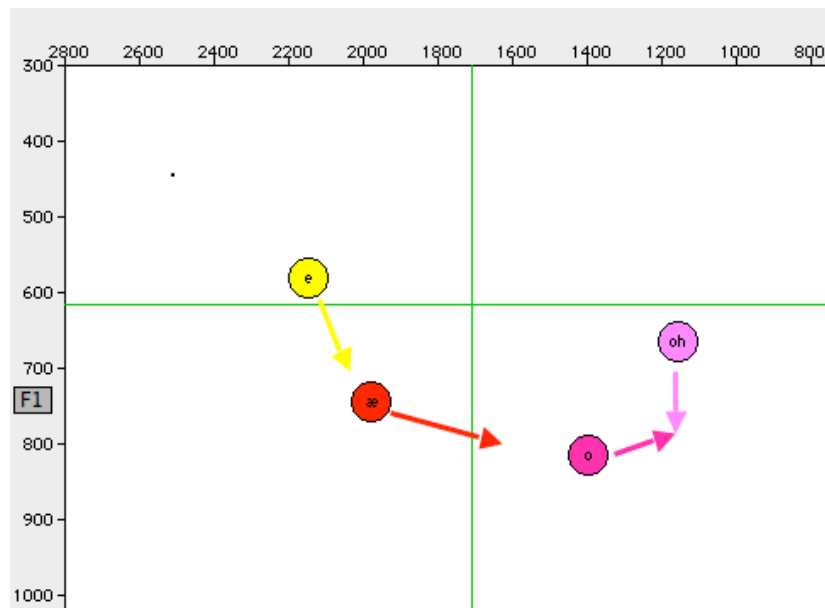


Figure 13: Charleston Chain Shift.

4 Conclusion

Table 5 summarizes the differences between the two mergers in Charleston.

<i>cot-caught</i> merger	<i>pin-pen</i> merger
<ul style="list-style-type: none"> • female lead • curvilinear pattern for social class • no overt comments - below the level of conscious awareness • embedded in the larger context of connected changes in the vowel system - chain shift 	<ul style="list-style-type: none"> • no gender difference • monotonic (decreasing) social stratification • overt comments - above the level of conscious awareness • isolated change

Table 5: Summary.

Once we have data from a large enough number of speakers, representing at least three socio-economic levels, it becomes apparent that mergers, just like other changes from below, show a curvilinear pattern and are led by women. Mergers are usually invisible to social evaluation, devoid of social affect, but there may be exceptions, such as the *pin-pen* merger, which may be associated with a particular region or social group. This merger seems to be slightly above the level of conscious awareness—it is thus likely not a change from below in Charleston—and appears to show negative social evaluation. In such exceptional cases, we may see monotonic social stratification (rather than a curvilinear pattern) and no female lead.

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