A recent sound change in Tidewater Virginia dialect : the case of /ey/

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The present study investigated a recent sound change in the nucleus of a diphthong /ey/ in Tidewater Virginia dialect. Labov (1996,1997) reported that the ***Southern Vowel Shift*** begins with the monophthongization of /ay/ followed by the lowering of the nucleus of a diphthong /ey/ along a non-peripheral track. It was however found that the rotation pattern of the target nucleus was not toward the vowel position of /ay/, but it was farther forward in the vowel space. It is therefore speculated that the expected ***Southern Vowel Shift*** has not taken place among residents in Norfolk, Virginia. It is also important to note that the movement of vowel articulation toward farther forward in the mouth might be one of the characteristics of the pronunciation of young speakers in the US.

Key words : Southern Vowel Shift, nucleus, diphthong, Tidewater Virginia, formants

Ⅰ. Introduction

There is a longstanding tradition of collecting and studying data on variation in English, some of which are concerned with vocabulary. In fact, vocabulary is one of the most apparent ways in which dialects differ, and vocabulary studies are a common way in which dialect differences are profiled. Nonetheless, sound changes among different dialects have also been extensively studied though it is more difficult to pinpoint the differences due to the involvement of more complex movements of the tongue or other organs of speech.

Labov has been one of the pioneers in the studies of sound changes taken place in American English, and he has been tracing the location of American boundaries on the basis of sound changes since 1968 (Wolfram and Shilling-Estes,1998). According to Labov (1997), American English can be divided into four major dialect regions with respect to sound changes: (1) the Inland North; (2) the South; (3) the West; and (4) the Midland. In addition, Labov (1991 cited in Wolfram and Schilling-Estes, 1998) has revealed that there is one major systematic change taken place in the American South.

The major rotation of vowel pattern in the South is known as the ***Southern Vowel Shift*** . In this change pattern, the short front vowels are moving upward, and it takes on the gliding character of long vowels. For instance, the vowel /e/ in ***bed*** takes on a glide, becoming more like ***beyd*** [beyd]. Meanwhile, the front long vowels (e.g., the

vowels of *beet* and *late*) are moving somewhat backward and downward, and the back vowels are moving forward.

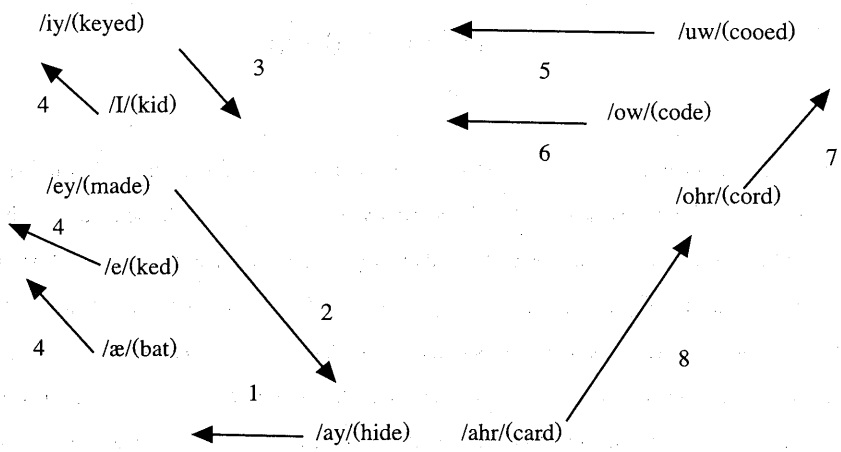


Figure 1.2 The Southern Vowel Shift (taken from Labov 1996)

Labov (1996, 1997) further investigated the rotation order of vowel shift taken place in the South. In the ***Southern Vowel Shift***, the shift is triggered by the monophthongization of /ay/, and it shifts slightly to the front. The nucleus of the diphthong /ey/ is then lowered along a non-peripheral track until it reaches the lowest vowel position. The nucleus of the diphthong /iy/ moves towards mid-center position in parallel. The short front vowels /i, e/ shift forward and up until they reach the front peripheral positions formerly occupied by /iy/ and /ey/, and /æ/ follows a parallel path towards mid-front position. The nuclei of /uw/ and /ow/ then shift forward to front and center positions. /ohr/ moves up to high back position formerly occupied by /uw/, and /ahr/ shifts up and back to the position that /ohr/ vacated.

As a continuation of the investigation of Tidewater Virginia dialect, the present study focused on one of the diphthongs - /ey/ - produced by Tidewater Virginia dialect speakers.

Tidewater Virginia includes the Eastern shore and the coastal plains region (Tresidder, 1941, 1943). A typical Tidewater speech examined in the past is the pronunciation of a diphthong /au/. Greet and Meloney (1930) report that among educated people, 'house' is phonetically realized as [həus] or [heus] and 'town,' 'ground,' and 'cow' are realized as [tæun], [græun], and [kæu] respectively. In other words, the pronunciation of the diphthong /au/ has three variants phonetically, and its realizations are governed by a simple phonological rule. That is, when the diphthong is followed by a voiceless consonant, it is phonetically realized as [əu] or [eu]. Otherwise, it is realized as [æu].

Todaka (2000) examined the phonetic variants of /au/ using Tidewater Virginia dialect speakers and found that there was a noticeable difference between male and female subjects in the old and young groups in voiceless

environments. In both groups the percentages of [æ] tokens found among female subjects were more than twice the percentages of the male counterparts. Moreover, the difference was bigger between male and female subjects in the young group. This means that the preference of [a] to [æ] for men and that of [æ] to [a] for women in voiceless environments reported in Frazer's (1994) study still holds in this dialect. In addition, it is interesting to note that 29% (except for 'shout') of the old female (not male) subjects pronounced the nucleus of the diphthong in voiceless environments as [ə]. This prototypical pronunciation, which was once a dialect marker, is no longer used by younger subjects. The percentages of [a] and [æ] tokens by the young male and female subjects were as follows: [a] (76% for male and 20.2% for female subjects) and [æ] (24% for male and 79.8% for female subjects). Considering Frazer's (1994) findings in that [æ] was used much more frequently in free conversation, it can be speculated that (1) the prototypical Tidewater Virginia pronunciation [əu] is no longer used by younger people, and that (2) the sound change from [a] to [æ] is almost complete among younger female subjects but is still in the transitional stages among the male counterparts.

As this dialect belongs to the Southern dialects in American English, it is interesting to investigate a recent sound change taken place in the pronunciation of the nucleus of a diphthong /ey/. As mentioned earlier, it is expected to find the nucleus of the diphthong to be lowered to the position formerly occupied by /ay/.

The objective of the present study is therefore to investigate a recent sound change in the nucleus of a diphthong /ey/ in Tidewater Virginia.

Ⅱ. Methods

2.1 Subjects

Two groups of subjects were asked to participate in the present study. All of the subjects in one group were 60 years or older, and they were the residents of an elderly home. The subjects in the other group were junior high school students at a private middle school. All of the subjects were born and raised in Norfolk, Virginia.

18 subjects - 11 females and 7 males - were in the old group, and 19 subjects - 7 females and 12 males - were in the young group[注1]. The following provides some information about the subjects.

[注1] It was not possible to find the equal number of subjects in terms of sex because (1) only 18 of old people at the elderly home were born and raised in Norfolk, and (2) the number of female students was much smaller than that of male students at the middle school at which the recordings were made.

Table 1 subject information[注2]

old subjects

subject	age	sex	race	education
1	71	male	black	HS
2	77	female	white	College
3	83	female	black	7th grade
4	68	male	black	HS
5	73	male	white	College
6	87	female	white	MA
7	91	female	white	6th grade
8	78	male	black	7th grade
9	66	male	black	College
10	82	female	white	HS
11	80	female	black	MA (teacher)
12	71	female	white	4th grade
13	69	female	white	7th grade
14	64	female	white	HS
15	66	female	black	2nd grade
16	77	female	black	HS
17	77	male	black	6th grade
18	100	female	black	HS

注2 Among the subjects, subjects 3, 7, 9, 10, 14, 15, 20, 22, 23, and 35 were excluded from acoustic analyses becouse their F4 values were unreadable due to recording noises.

young subjects

subject	age	sex	race	education
20	13	female	white	JHS
21	12	female	white	JHS
22	12	male	white	JHS
23	13	female	white	JHS
24	13	male	white	JHS
25	12	male	white	JHS
26	13	male	black	JHS
27	12	female	white	JHS
28	13	male	black	JHS
29	12	female	white	JHS
30	12	female	black	JHS
31	14	male	white	JHS
32	16	male	white	HS
33	13	male	white	JHS
34	13	male	white	JHS
35	13	female	white	JHS
36	15	male	white	JHS
37	14	male	white	JHS
38	15	male	white	JHS
39	14	male	white	JHS

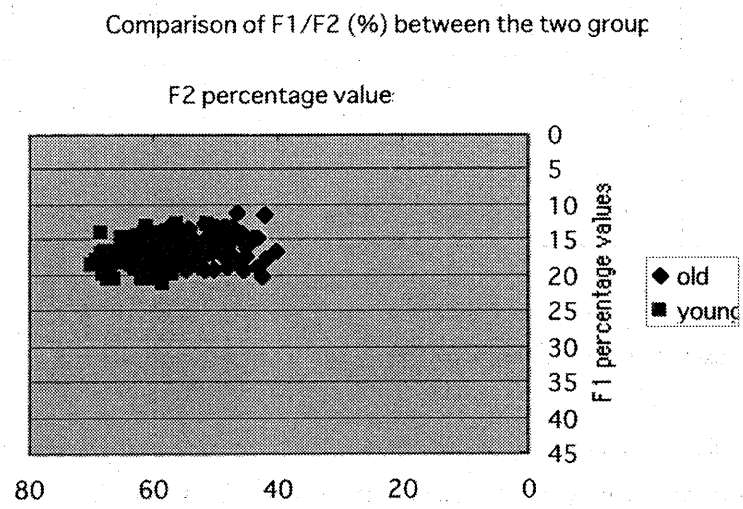
2.2 Experimental Procedures

Recordings were made at each location (i.e., a home for the aged and a private middle school in Norfolk, Virginia) using a Panasonic microphone. The read material was preamplified and recorded on a Panasonic tape recorder. All of the subjects read a list of 65 words once at a normal speaking rate. There were 5 target words in the

list. All the productions were digitized using Kay Computerized Speech Lab (CSL).

Productions were digitized at a 20-kHz sampling rate, which automatically set the low-pass filter to a cut off frequency of 8 kHz. Impulse markers (i.e., mark each glottal pulse for pitch-synchronous formant extraction) were inserted into each of the digitized waveforms, and the corresponding wideband spectrograms were obtained. In addition, a pitch-synchronous LPC derived formant history was superimposed on the formants. F1, F2, and F4 were obtained using the formant history information.

As formants produced by different individuals vary not only because of the way they pronounce words differently but also because of their anatomical differences such as the size of resonating cavities. It is therefore important to filter out such differences derived from anatomical differences when conducting a study of sound change taken place in a particular dialect. As the subjects of this study consisted of people in two age-groups, it was decided to take the average frequency of the fourth formants as an indicator of an individual's head size and then expressed the values of the first and second formants as percentages of the mean fourth formant (Ladeforged, 1993: 213). The fourth formant values of all the target words were obtained using the method mentioned above, and the first and the second formant values in frequency were then converted to percentages of the mean fourth formant value in frequency. Then, the obtained first and the second formant values in percentage of each word were plotted in a figure in a way that the percentages of the first formants of all the subjects in producing a target word would be shown on the ordinate (the vertical axis) and the percentages of the second formants would be shown on the abscissa (the horizontal axis). The following figure shows the relationship between the percentages of the first and the second formants of the nucleus of a diphthong/ey/ produced by the old and young subjects.



In addition to the acoustic analyses, all the readings were also examined auditorily to understand the relationship between the nucleus of the diphthong produced by each subject for each word.

2.3 Reading Material

A list of 65 words on which 5 target words were included was made. The words used for data analyses were: (1) same; (2) change; (3) came; (4) make; and (5) take.

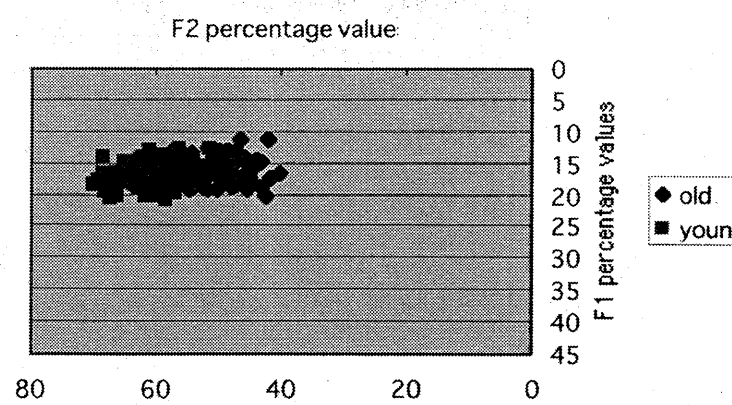
All the subjects were instructed to read the list of 65 words at a normal speaking rate. Before each recording, the subjects were asked to read the words as they would normally pronounce them.

Ⅲ. Results and Discussion

3.1 Analyses of the Nuclei of the Diphthong /ey/ based upon the F1 and F2 Percent Values of All the Target Words in terms of Age Factor

First, the F1 and F2 percent values of the nuclei of the diphthong in all the words were calculated for each subject and then were plotted in terms of age variable. The following figure indicates the distribution of the percent values of F1 and F2 of all the words produced by the old and young subjects .

Figure 3.1 Comparison of F1/F2 (%) between the two groups



As can be seen from the figure, there is a noticeable difference between the subjects in the two age-groups. That is, the F2 percent values of the young subjects are much higher than those of the old counterparts though no apparent difference between the F1 percent values between them can be found.

This means that the young subjects produced the nucleus of the diphthong /ey/ farther forward in the mouth than the old counterparts. As mentioned earlier, the expected movement based upon Labov's *Southern Vowel Shift* was toward the vowel position formerly occupied by /ay/. In other words, the movement should have been farther backward and towards the bottom of the vowel space. However, no such a movement could be observed from the present data when the data were analyzed based solely upon age variable.

3.2 Analyses of the Nuclei of the Diphthong /ey/ Based upon the F1 and F2 percent Values of All the Target Words in terms of Age and Sex Variables

The following figures show the plots of the percent values of F1 and F2 based on the two factors. Figure 3.2 indicates the comparison of the F1 and F2 percent values of the male subjects in the two groups while Figure 3.3 shows that of the female counterparts.

Figure 3.2 Comparison of F1/F2 (%) by age and sex factors (male)

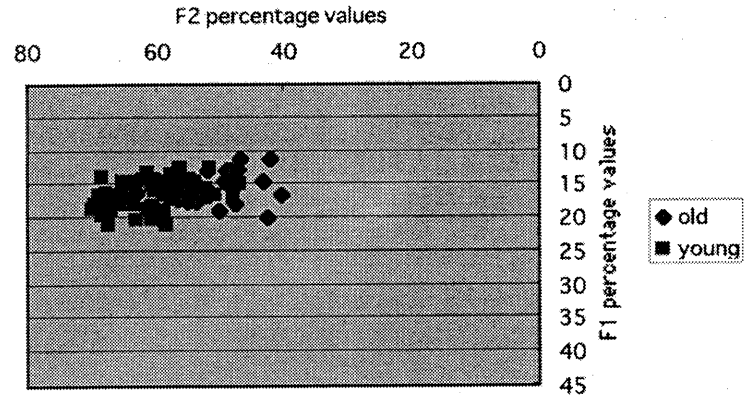
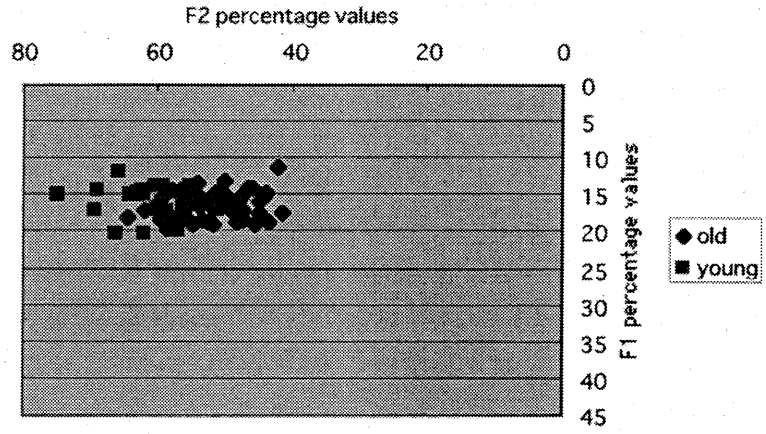


Figure 3.3 Comparison of F1/F2 (%) values by age and sex factors (female)



As can be seen above, the same tendency can be observed in the two figures. In other words, both the young male and female subjects pronounced the nucleus of the diphthong farther forward in the vowel space when compared with the old counterparts. In addition, no apparent difference in the F1 percent values can be found between the two groups in terms of the two factors.

3.3 Word-by-Word Analyses of the Nucleus of the Diphthong /ey/ in terms of Age and Sex Factors

3.3.1 Male Subjects

The following figures indicate the comparison of F1/F2 percent values of the nucleus of the diphthong /ey/ in each target word.

Figure 3.4 F1/F2 (%) by age and sex (male): 'same'

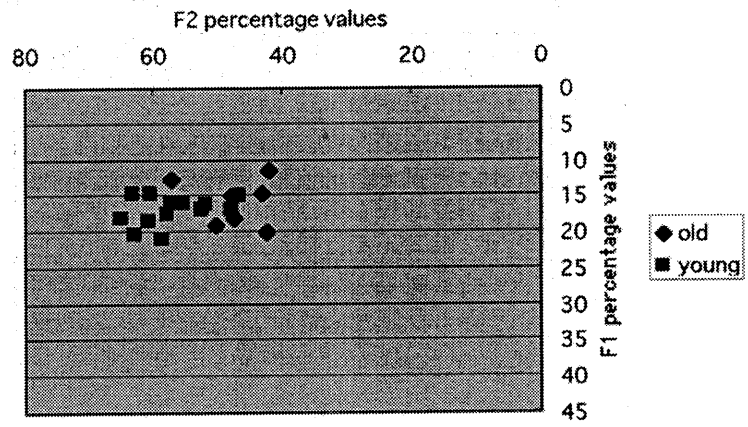


Figure 3.5 F1/F2 (%) by age and sex (male): 'change'

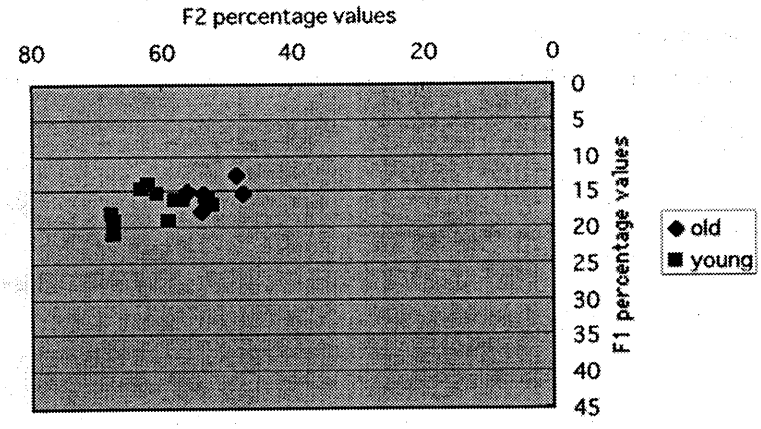


Figure 3.6 F1/F2 (%) by age and sex (male): 'came'

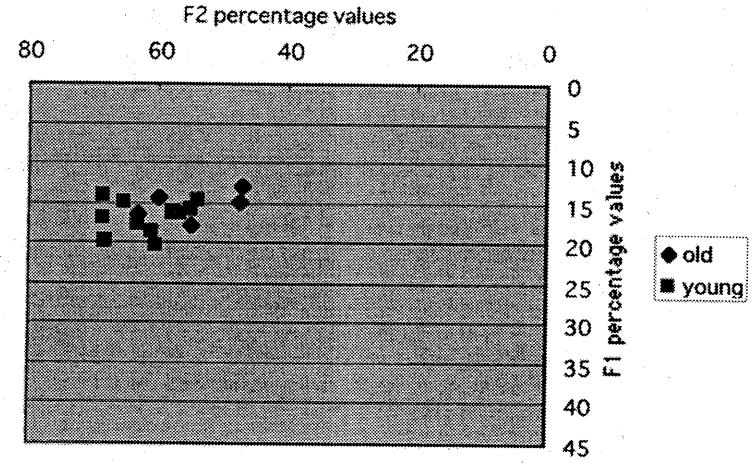


Figure 3.7 F1/F2 (%) by age and sex (male): 'make'

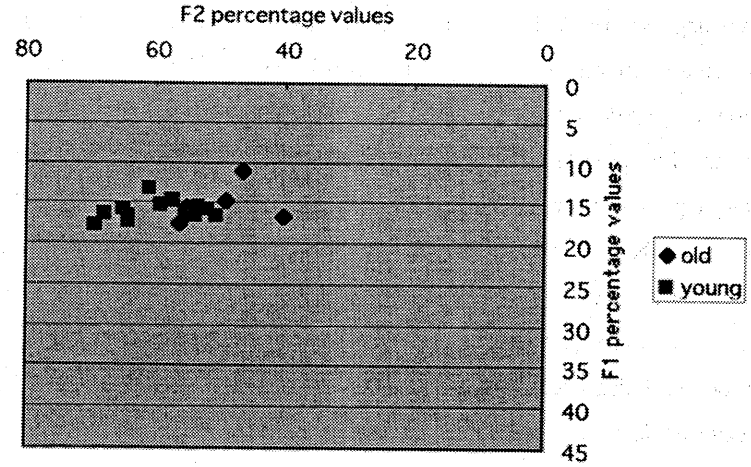
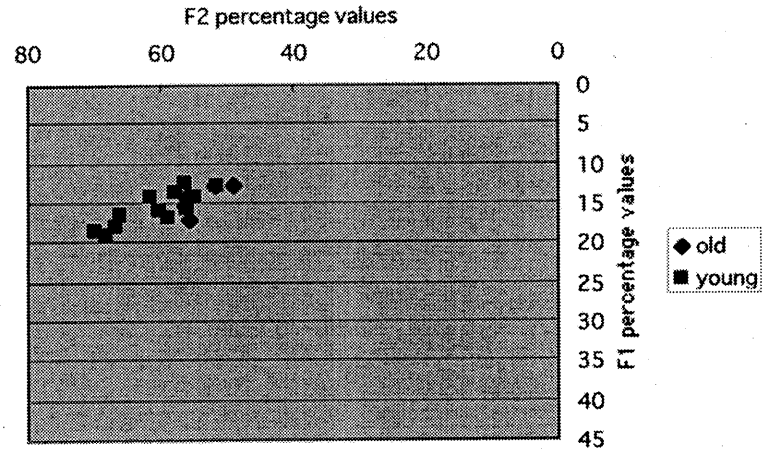


Figure 3.8 F1/F2 (%) by age and sex: 'take'



The young male subjects produced each target word much farther forward in the vowel space (i.e., F2 dimension) in general. However, there seems to be slight differences between the F2 distributions of each target word. Only a few difference between the two groups can be seen in the case of 'came'. This can be speculated that the preceding consonant /k/ has to be produced near the soft palate so that the F2 difference between the subjects in the two groups becomes smaller compared to the other target words. A similar finding can be made about 'change'. However, a noticeable difference can be found in the cases of 'make' , 'take' and 'same' as was expected. This is because all of the preceding consonants are either alveolar or bilabial. Therefore, the fronting of the nucleus of the following diphthong was much more prominent in these cases for the younger male subjects. In addition, it can be speculated that the final consonant /k/ in the cases of 'make' and 'take' might have been produced farther forward in the mouth for the younger subjects. As the number of tokens differs due to the disproportionate number of male subjects in the two groups, no statistical analyses were carried out in the present study.

Another interesting finding here is that none of the young male subjects produced the target nucleus as it had been expected. In other words, in the *Southern Vowel Shift*, the shift is triggered by the monophthongization of /ay/, and it shifts slightly to the front. The nucleus of the diphthong /ey/ is then lowered along a non-peripheral track until it reaches the lowest vowel position. If so, the nucleus of the target diphthong should have been lowered along a non-peripheral track. It was however found that the nucleus was not lowered but was actually fronted in the

present study. Since women are reported to be the leading edge of language change (Frazer, 1994), the following section deals with the results found among the female subjects.

3.3.2 Female Subjects

The following figures indicate the comparison of F1/F2 (%) values of the nucleus of the diphthong /ei/ in each target word.

Figure 3.9 F1/F2 (%) by age and sex (female): 'same'

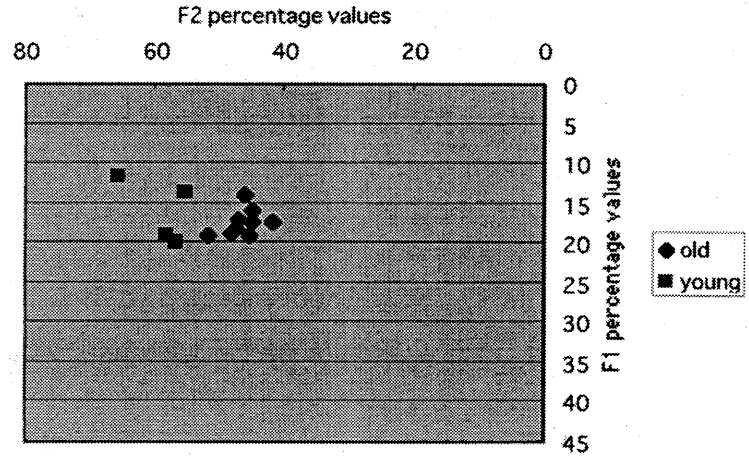


Figure 3.10 F1/F2 (%) by age and sex (female): 'change'

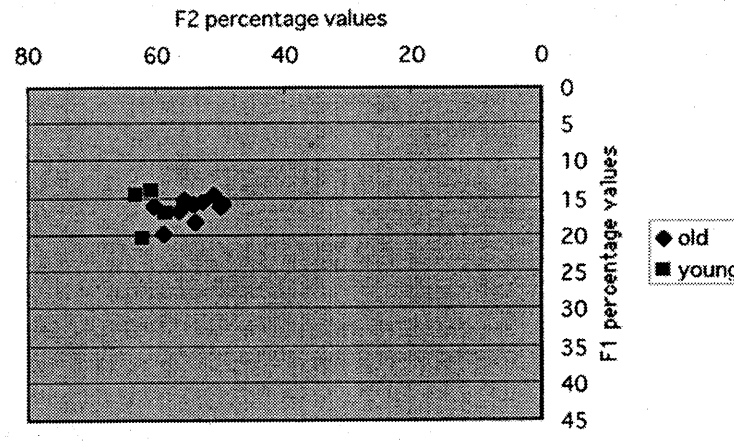


Figure 3.11 F1/F2 (%) by age and sex (female): 'came'

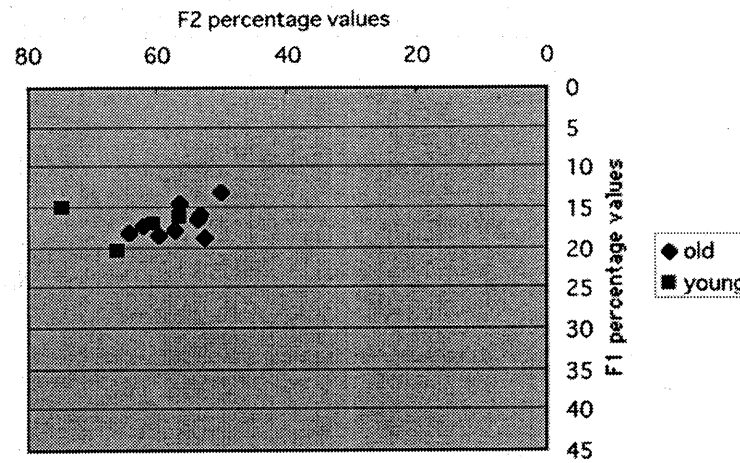


Figure 3.12 F1/F2 (%) by age and sex (female): 'make'

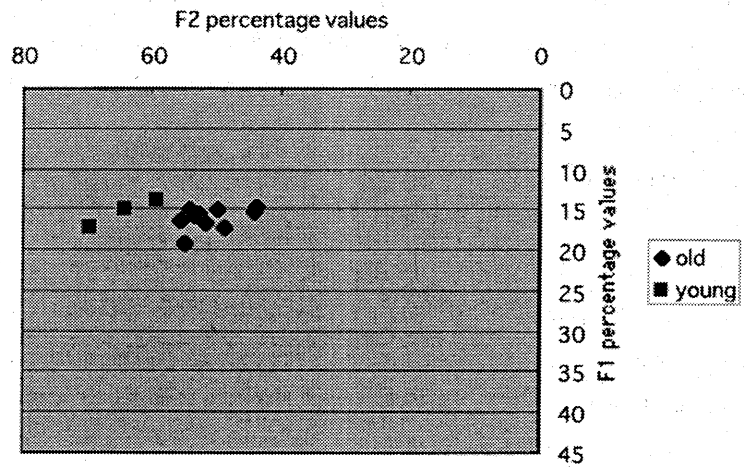
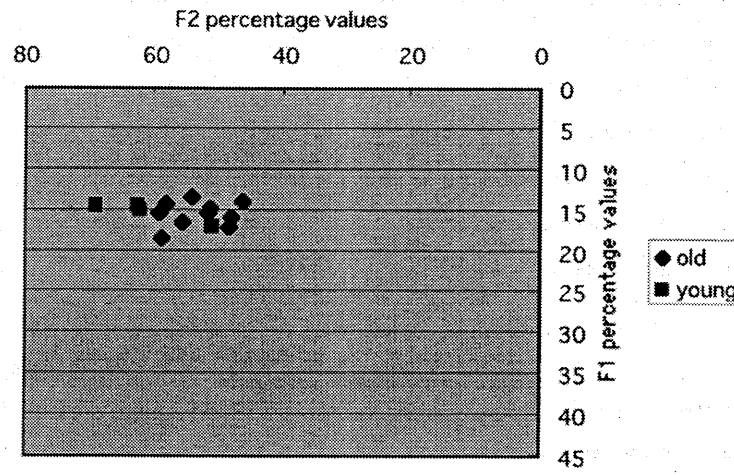


Figure 3.13 F1/F2 (%) by age and sex (female): 'take'



The young female subjects produced each target word farther forward in the vowel space (i.e., F2 dimension) in general as was found in the case of the young male subjects. In addition, similar phenomena found in the case of the young male subjects can also be observed here. Only a few difference between the two groups can be seen in the case of 'came' and 'change.' However, noticeable differences can be found in the cases of 'make', 'take' and 'same.' These findings seem to support the speculation made in the above section. In other words, the observed differences were bigger or smaller depending upon the preceding consonant type. When the preceding consonant was velar, only a slight difference was found. On the other hand, when the consonant was either alveolar or bilabial, a more clear-cut distinction was found.

It is also important to note that none of the young female subjects produced the target nucleus on a non-peripheral track as it had been expected. Instead, all of them produced the nucleus farther forward in the F2 dimension (i.e., on a peripheral track).

Based on the results of the present study, the following inferences can be made about recent sound changes taken place in Tidewater Virginia dialect: (1) No apparent ***Southern Vowel Shift*** has taken place in this area; and (2) younger speakers articulate vowels farther forward in the mouth.

Concerning the first issue, it is speculated that the triggering rotation pattern of the Southern Vowel Shift might have not taken place so that the lowering of the nucleus of the diphthong /ey/ was not observed. In other words, the monophthongization of /ay/ might not have occurred in this area. It means that the vowel position of the /ay/ has not been vacated so that there is no way that the nucleus of /ey/ can be lowered. It is because sufficient perceptual distance between vowels has to be kept in order for listeners to auditorily distinguish them.

A further support for the above inference comes from the fact that "the distribution of the ***Southern Vowel Shift*** is largely confined to the traditionally defined South (Wolfram and Schilling-Estes, 1998: 140)." They further state that the Vowel Shift is more prominent in rural areas of the South because of the less influence of the speech of non-southerners to that of southerners. If so, Norfolk is a relatively large city in which one of the largest naval bases in the US is located. In addition, all of the young subjects are students at a private school where most of them are whites. It is therefore assumed that their pronunciation might not have been a representative of the pronunciation of young people living in this area.

Regarding the second assumption, an interesting report has been made about the pronunciation of young speakers:

> Young speakers, especially socially mobile ones, appear to be breaking with local speech patterns in favor of broader regional and perhaps even newly developing national ones. As the United States becomes more completely urbanized (integrated) in its social structure, the language will necessarily reflect that trend. The movement seems to be toward articulation of vowels farther forward in the mouth.... (Dictionary of American Regional English, 1985: xlix)

In addition, Todaka (2000) examined the pronunciation of the nucleus of /au/ using the same subjects, as mentioned earlier. It was found that the articulation of the target nucleus by the young subjects was made much farther forward in the mouth when compared to that of the old counterparts. It is therefore possible to speculate that the movement towards farther forward in the mouth in the articulation of vowels is indeed occurring among young speakers. It is however important to keep in mind that the lowering of the nucleus of the diphthong /ey/ should occur once the rotation pattern of the ***SouthernVowel Shift*** has taken place. If so, it is further speculated that the rotation patterns observed among southern dialect speakers might be the same for both young and old speakers; however, the coordinative movements of vowel articulation in general might take place in a relatively forward position in the case of young speakers when compared with those of old counterparts. It is interesting to investigate the coordinative vowel shift patterns of young and old speakers in an area where the ***Southern Vowel Shift*** has already begun.

In summary, it can be said that the young subjects - both male and female - produced the target nucleus much farther forward in the F2 dimension than the old counterparts for every target word. The observed differences varied from word to word depending upon the type of the preceding consonant. In addition, there is a tendency among young speakers to articulate vowels farther forward in the mouth. Moreover, it is speculated that the coordinative rotation pattern of the ***Southern Vowel Shift*** reported previously has not taken place among residents in Norfolk, Virginia.

Ⅳ. Conclusion

The present study investigated a recent sound change in the nucleus of a diphthong /ey / taken place in Tidewater Virginia dialect.

The subjects in two age-groups were selected and were asked to read a list of 65 words on which 5 target words were included. Based upon the acoustic analyses, no apparent differences in the F1 (%) dimension could be found when age and sex variables were taken into consideration. However, a noticeable difference was indeed found in the F2 (%) dimension. In other words, the young subjects -both male and female- pronounced the target nucleus farther forward in the vowel space. However, the results were different from the expected rotation pattern of the Southern Vowel Shift. That is, the nucleus of the diphthong /ey/ should have been lowered along a non-peripheral track. It is speculated that the general rotation pattern of the Southern Vowel Shift has not taken place among residents in Norfolk, Virginia as the Vowel Shift has been reported to be more advanced in rural areas of the South than metropolitan areas.

It is also interesting to note that the movement of vowel articulation farther forward in the mouth has been found to be one of the characteristics of the pronunciation of young speakers. If so, further studies need to be conducted to investigate the coordinative vowel rotation pattern and compare the pattern between young and old speakers in an

area where the *Southern Vowel Shift* has already taken place.

V. References

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