AN IN-DEPTH PHONETIC ANALYSIS OF THE MIAMI DIALECT

by

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Table of Contents

Table of Contents i

List of Tables iii

List of Figures v

Abstract vi

Acknowledgements viii

1 Introduction 2
- 1.1 Background . . . 2
- 1.2 Experimental Design . . . 4
- 1.3 Roadmap . . . 7

2 The Low-Back Merger 9
- 2.1 Description . . . 9
- 2.2 Results based on ANAE criteria . . . 10
- 2.3 Results based on alternate criteria . . . 11
- 2.4 Discussion . . . 12

3 GOAT-fronting 14
- 3.1 Description . . . 14
- 3.2 Results based on the ANAE criteria . . . 14
- 3.3 Results based on the alternate criteria . . . 16
- 3.4 Discussion . . . 17

4 GOOSE-fronting 18
- 4.1 Description . . . 18
- 4.2 Results based on ANAE criteria . . . 20

4.3 Results based on alternate criteria 21
4.4 Discussion 23

5 FOOT-lowering 24
5.1 Description 24
5.2 Results based on the ANAE criteria 24
5.3 Results based on the alternate criteria 27
5.4 Discussion 27

6 Northern Cities Shift 29
6.1 Description 29
6.2 Results based on the ANAE criteria 30
6.3 Results based on the alternate criteria 35
6.4 Discussion 38

7 Southern Shift 39
7.1 Description 39
7.2 Results based on the ANAE criteria 39
7.3 Results based on the alternate criteria 43
7.4 Discussion 43

8 Conclusion 45

Appendix A 47

Appendix B 49

References 50

List of Tables

1.1 Speaker Demographics 5
1.2 Comparison of subject group demographics versus 2000 US Census demogr-pahics for Miami 5

2.1 Historical record of THOUGHT vowel showing the language of origin and the words in which these vowels were found (Labov et. al 2006) 9
2.2 Low-back merger results using ANAE criteria 12
2.3 Low-back merger results using alternate statistical criteria (MANOVA) 13

3.1 GOAT-fronting results using ANAE measures 15
3.2 Alternate Criteria for GOAT fronting 16
3.3 GOAT-fronting results using the alternate criteria 17
3.4 GOAT-fronting results using the alternate criteria 17

4.1 Degrees of fronting based on ANAE hertz intervals 20
4.2 GOOSE fronting results with coronal onsets using ANAE criteria 20
4.3 GOOSE fronting results with non-coronal onsets using ANAE criteria 21
4.4 Alternate Criteria for GOOSE fronting 21
4.5 GOOSE fronting results after coronals using the alternate criteria 22
4.6 GOOSE fronting results after coronals using the alternate criteria 22
4.7 GOOSE fronting results after non-coronals using the alternate criteria 22
4.8 GOOSE fronting results after non-coronals using the alternate criteria 23

5.1 FOOT lowering results using methods based on ANAE criteria 26
5.2 Alternate Criteria for GOAT fronting 27
5.3 FOOT-lowering results using the alternate criteria 27
5.4 FOOT-lowering results using the alternate criteria 28

6.1 Results of testing for Stage 1 of the Northern Cities Shift (TRAP-raising) for Miami speakers, using ANAE's AE1 measure 31
6.2 Results of testing for Stage 2 of the Northern Cities Shift (LOT-fronting) for Miami speakers, using ANAE's O2 measure 32
6.3 Results of the progression of the NCS of Miami speakers using the ANAE's ED measure 33
6.4 Results of the progression of the NCS in Miami speakers using the ANAE's EQ measure 33
6.5 Results of the progression of the NCS in Miami speakers using the ANAE's EQ measure 34
6.6 Results of the progression of the NCS in Miami speakers using the ANAE's UD measure 34
6.7 Alternate Criteria for TRAP-raising 35
6.8 TRAP-raising results based on the alternate criteria 35
6.9 TRAP-raising results based on the alternate criteria 36
6.10 Alternate Criteria for LOT-fronting 36
6.11 LOT-fronting results using the alternate criteria 36
6.12 LOT-fronting results using the alternate criteria 36
6.13 Alternate Criteria for THOUGHT-lowering 37
6.14 THOUGHT lowering results 37
6.15 THOUGHT lowering results 37
6.16 Alternate Criteria for DRESS-backing 38
6.17 DRESS-backing results using the alternate criteria 38
6.18 DRESS-backing results using the alternate criteria 38

7.1 Results of Stage 1 of the Southern Shift using ANAE measures 41
7.2 Results of Stage 2 of the Southern Shift using ANAE's measures 41
7.3 Results of Stage 2 of the Southern Shift using ANAE's measures 41
7.4 Results of Stage 3 of the Southern Shift using ANAE's measures 42
7.5 Results of Stage 3 of the Southern Shift using ANAE's measures 42
7.6 PRICE monophthongization results using the alternate statistical criteria 43

A-1 First Word List 48

A-2 Second Word List 48

List of Figures

1.1 Geographical and linguistic divisions defined by LAGS (Pederson 1988:3) 3
1.2 The Southeast Super Region, delimited by the thick red and white dotted line (Labov et al. 2006:66) 4

2.1 The distribution of the low-back merger in North America (Labov et al. 2006:66) 10

3.1 The distribution of GOAT fronting in North America (Labov et al. 2006:158) . . 15

4.1 The distribution of GOOSE fronting with coronal onsets in North America (Labov et al. 2006:154) 19
4.2 The distribution of GOOSE fronting with non-coronal onsets in North America (Labov et al. 2006:156) 19

5.1 Normalized vowel plot of Miami English 25
5.2 The relative height of the FOOT vowel in North America (Labov et al. 2006:90) 26

6.1 The stages of the NCS 29
6.2 Northern Cities Shift (Doernberger 2008) 30
6.3 The distribution of the Northern Cities Shift in North America (Labov et al. 2006:203) 31

7.1 Stages of the Southern Shift 39
7.2 The distribution of the Southern Shift in North America (Labov et al. 2006:128) 40

A-1 Interview Questions 47

Abstract

According to Labov, Ash, and Boberg's (2006) *Atlas of North American English* (*ANAE*), Miami is part of the Southeast Super Region (SESR), which is characterized as having (i) either no low-back merger (a merger of the LOT and THOUGHT vowels) or a merger in transition, and (ii) fronting of the GOAT vowel to something like [ə]. However, recent research (Cerny and Doernberger 2008) has found that there is in fact a low-back merger in Miami, which calls into question the ANAE's classification of Miami as part of the SESR. This study seeks to confirm the status of the low-back merger in Miami, as well as explore the status of GOAT-fronting, in an effort to determine whether or not Miami should continue to be classified in the SESR. Furthermore, other dialect features (fronting of the GOOSE vowel; lowering of the FOOT vowel; the Northern Cities Shift; and the Southern Shift) are also examined and analyzed to better define the Miami dialect.

Eleven speakers from Miami participated in the study, and multiple criteria were used to test for the presence of each dialect feature. In all cases, the impressionistic and absolute Hz threshold criteria used in the ANAE were used in this study. In addition, new statistical and comparative criteria are proposed here to supplement the ANAE criteria.

For the low-back merger, both the ANAE criteria and the new criteria agree that the speakers in this study generally have a full merger, confirming Cerny and Doernberger's results. In addition, both the ANAE and the new criteria agree that the speakers do not have GOAT-fronting. Thus, this study finds that, contrary to the ANAE's original analysis, the Miami dialect no longer belongs in the SESR.

Both the ANAE criteria and the new criteria show that Miami speakers pattern with most of the country in terms of GOOSE-fronting: consistent fronting after coronals, and very little fronting in all other environments. This somewhat contradicts the ANAE's original claims, which finds GOOSE-fronting across all environments in Miami.

FOOT-lowering is not a prominent dialect feature in the ANAE, but the ANAE does discuss it and define levels of lowering. The ANAE criteria showed that the speakers in this study had much lower FOOT vowels than previously reported in the ANAE, while the new supplemental criteria proposed in this study confirmed that all speakers had extreme

FOOT-lowering.

For the Northern Cities Shift, applying the ANAE criteria to the speakers in this study confirms the ANAE's original analysis of Miami having no evidence of the Shift. However, some speakers were near the borderline, and the new criteria proposed in this study appears to be a more sensitive test, showing that several speakers have undergone the first few stages of the Shift.

Both the ANAE criteria and the new criteria agree that Miami has not undergone monophthonization of the PRICE vowel, which is the trigger sound change for the Southern Shift. This is an important result, because the Southern Shift is a prominent dialect feature from a nearby dialect region.

Overall, this study finds that the Miami dialect should no longer be classified as part of the SESR, exhibits strong FOOT- lowering, and does not participate in two of the most significant chain shifts affecting North American English. Future study of the recorded data, as well as future data collection, will explore the classification of Miami as its own dialect region and examine other parts of Florida to determine whether the dialect features present in Miami are unique to the area or are prevelent in other parts of the state.

Acknowledgements

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Notation

Because this study deals with dialectical variation in the realization of phonemes, using notation systems that imply specific pronunciations can be problematic. Thus, such systems as used in the *Atlas of North American English* (Labov et al. 2006) or typical IPA usage to notate vowel phonemes (e.g., Ladefoged 1999), will be avoided. Instead, this work uses the lexical sets of Wells (1982) to notate vowel phonemes, though standard IPA usage is retained for transcriptions of actual pronunciations. Correspondence between Wells' system and the ANAE and IPA are given in the table below.

Wells	ANAE	IPA	example words
FLEECE	iy	i	*bead, seep*
KIT	i	ɪ	*bid, sip*
FACE	ey	e	*bay, say*
DRESS	e	ɛ	*bed, said*
TRAP (BATH)	æ	æ	*bad, sap*
STRUT	ʌ	ʌ	*bud, sud*
LOT (PALM)	o	ɑ	*body, sob*
THOUGHT (CLOTH)	oh	ɔ	*bought, sawed*
GOAT	ow	o	*bode, soap*
FOOT	u	ʊ	*book, soot*
GOOSE	uw	u	*boot, sued*
PRICE	ay	aɪ	*bide, side*
MOUTH	aw	aʊ	*bout, loud*
CHOICE	oy	ɔɪ	*Boyd, toyed*

Chapter 1
Introduction

1.1 Background

Little work has been done on Florida English. One of the first dialectical studies done in the South Florida area was the *Linguistic Atlas of the Gulf States* (LAGS; Pederson 1988), which reported the findings of a general dialect study done in eight southern states— Tennessee, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas. The geographical divisions presented by LAGS were based on several factors that were not all linguistic in nature. Zones mainly preserved state boundaries from east to west, while sectors reflected "traditional, natural, and historical boundaries" (Pederson Vol. 1, 2, 10). County lines, community types, and locality types also classified the different regions. As illustrated by Figure 1.1, Miami was part of the eastern zone, east Florida sector, and (formally) Dade County, and was a Jefferson type community (large industrial area) and Birmingham type locality (Urban hub; New South tourist area).

Most of South Florida was part of grid unit AZ, which included Monroe, Broward and Dade counties. Seventeen informants from this unit participated in the LAGS study, including eight from Miami. The informants participated in an interview, in which a fieldworker elicited over 1000 words by using a 135-page worksheet. LAGS made use of the recorded interview, as well as the fieldworker's hand-written transcriptions in their study. All in all, the study yielded over 8000 word tokens from Miami speakers.

Shortly after the publication of LAGS, one of the most influential dialectical studies, the *Atlas of North American English* (ANAE; Labov et al. 2006), began nationwide data collection in the hopes of defining the North American English dialect regions. One of the ANAE's acknowledged flaws is that there are several marginal areas (Florida, Charelston, El Paso, Corpus Christi) where either very few defining dialect features were recorded or the features do not match those of neighboring areas.

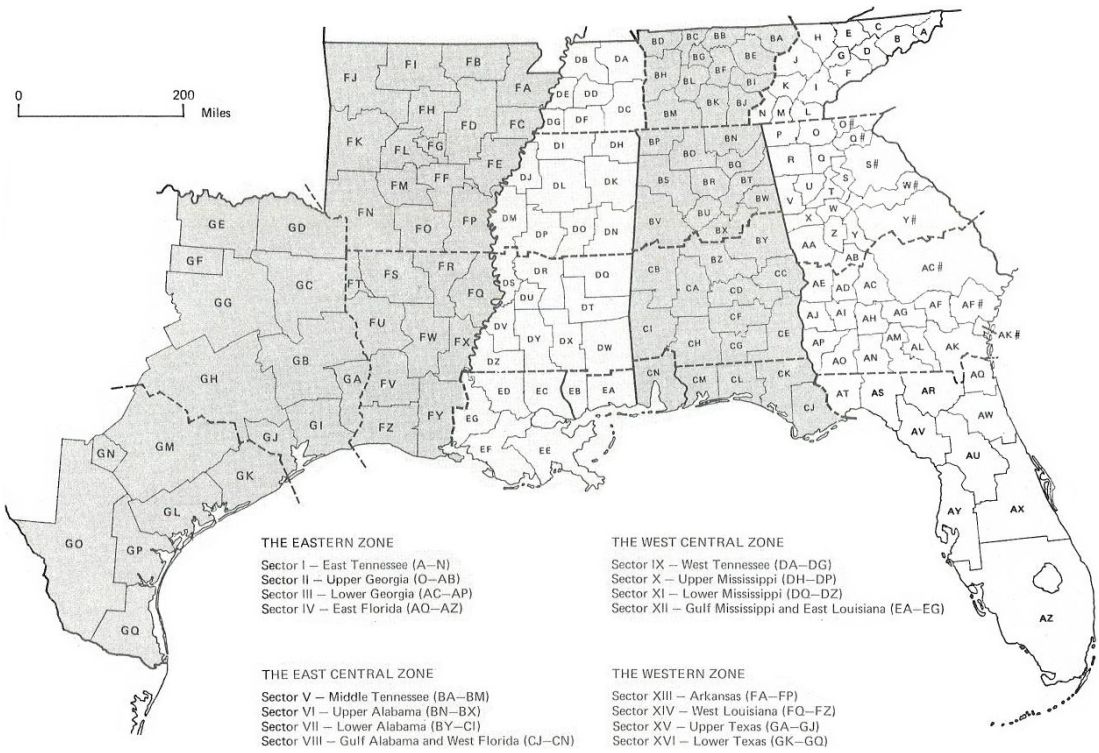

Figure 1.1: Geographical and linguistic divisions defined by LAGS (Pederson 1988:3)

The ANAE's analysis addressed this issue with the definition of the Southeast Super Region (SESR) (shown in Figure 1.2) which encompasses most of the southeastern United States, including almost all of Florida, and subsequently Miami. The SESR is defined as having a low-back merger that is not complete and GOAT-fronting.

Miami is a compelling dialect of interest because of its diverse population and status as a major urban center. As a result, the dialect is influenced by other languages and cultures and tends not to pattern with northern Florida. According to the ANAE, Miami has both a low-back merger in transition and GOAT-fronting, the defining characteristics of the SESR. Five Miami speakers analyzed by the ANAE, (two speakers with no merger, two speakers with a limited merger before nasals, and one speaker with a full merger) yielded the merger in transition status. Also, Miami was shown to have the highest degree of GOAT-fronting (F2 value $>$ 1400 Hz) based on ANAE criteria.

However, Cerny and Doernberger's (2008) study of 18 Miami speakers suggested that the low-back merger is now complete in Miami and no longer in transition. If this is the case, then Miami does not meet one of the two ANAE criteria for placement in the SESR.

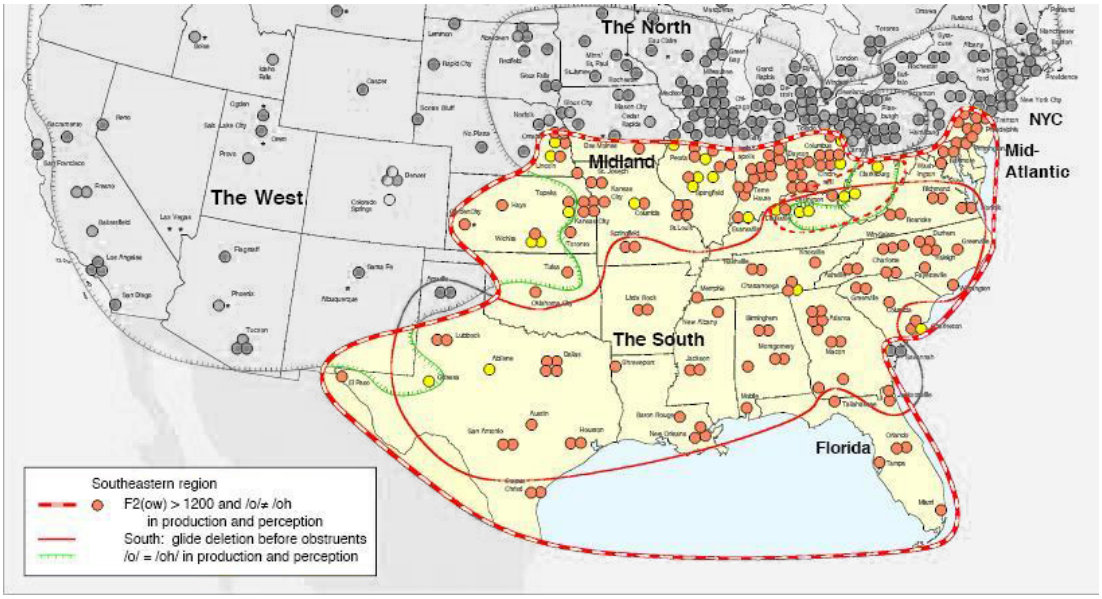

Figure 1.2: The Southeast Super Region, delimited by the thick red and white dotted line (Labov et al. 2006:66)

This raises the obvious question: If the Miami dialect does not pattern with the SESR, what does it pattern with?

1.2 Experimental Design

1.2.1 Purpose

The ANAE states that Florida is "large enough to form a region on its own, if some unique dialect features could be found" (141). The goal of this research is to confirm the results that Miami does in fact have a complete low-back merger, determine the status of the second criterion, GOAT-fronting, and provide general data for all vowels in the Miami dialect. Furthermore, this study will attempt to analyze all collected tokens, in an effort to find those possible aforementioned unique features that could define the Miami dialect. To do this, speech samples from lifelong Miami residents were collected– speakers either born in Miami or moved there before the age of 5, to ensure that the Miami dialect was their primary dialect. The speech samples allowed for the construction of a general Miami dialect vowel plot, and provided data to rigorously assess the dialect features of the SESR in Miami. This study also aims to make use of ANAE criteria to determine the status of four other dialect features– GOOSE-fronting, FOOT-lowering, the Southern Shift (SS), and the Northern Cities

Shift (NCS). Furthermore, new criteria, based on the relative position of the vowels, will be developed and used to analyze the collected data.

1.2.2 Participants

The subjects for this study are all lifelong Miami residents from the same extended social network (See 1.1 for demographics). Speakers were told that they would be participating in a research study of their speech, but no information was given to them about the specific features of interest.

speaker ID	gender	age	ethnicty
1	M	21	White
2	F	21	White
3	M	21	Latino
4	F	23	Latino
5	M	21	Latino
6	M	17	Black
7	F	36	Black
8	M	21	Black
9	F	47	White
10	F	43	Latino
11	M	35	Latino

Table 1.1: Speaker Demographics

The subject group is relatively diverse and compares favorably with the demographics of Miami residents, based on the 2000 US Census, in both gender and race, as seen in Table 1.2. This study's demographics, however, are slightly skewed in age, as this study has many younger speakers, and do not necessarily reflect the distributions of Miami as a whole.

	age			gender		ethnicity		
	0-24	25-44	44+	male	female	latino	white	black
subjects	63.7	27.3	9.0	54.6	45.4	45.4	27.3	27.3
US Census	33.9	31.1	35.0	48.3	51.7	57.3	20.7	20.3

Table 1.2: Comparison of subject group demographics versus 2000 US Census demogrpahics for Miami

1.2.3 Interview

All eleven speakers completed four tasks for the experement: a question and answer session, reading two word lists, and a perception test (see Appendix A for the task materials used).

The short question and answer session focused on family, friends, and general life in Miami, to promote a more comfortable, casual state of speech for the remaining tasks. For the two word lists, speakers were asked to read each line of five vowels clearly, pausing slightly between each line. The first list contained 24 lines (120 words total) with words representing English vowel phonemes. The tokens used for analysis were taken only from the middle three columns, in an effort to avoid any effects of list intonation on the measurements. The second list consisted of 9 rows (45 total words) with words focussing on back vowels (the GOOSE, GOAT, FOOT, LOT, and THOUGHT vowels). The final task was the low-back merger perception test, in which the interviewer elicited, implicitly, pairs of words that contrast the low-back vowels (cot, caught; Don, dawn), and then asks whether these words are the same or different in order to determine the status of the merger in perception.

All data was recorded on an Olympus VN-3100PC digital voice recorder set to the highest level of sound quality and imported on to a computer in WAV format for analysis. The interviews were conducted in locations convenient to the speaker with little external noise— either the interviewer's residence, speaker's residence, or speaker's workplace.

Throughout the phases of data collection, it became evident that not all speakers would complete the interview tasks at the same time. The first round of data collection took place August 3–8, 2008. In this round, nine speakers (1–9) participated in the question-and-answer session, read the first word list, and took the perception test. Six (1, 4, 5, 7, 8, and 9) of the original nine speakers participated in the second round of data collection, which took place October 10–14, 2008. In this round, the speakers read the second word list. In the third and final round of data collection, which took place January 3–8, 2009, the remaining three speakers (2, 3, and 6) read the second word list, and two new speakers (10 and 11) completed all four tasks of the interview.

1.2.4 Measurements

For tokens of interest from the two word lists and from the question-and-answer session, the values of the first four formants (F1, F2, F3, and F4) were measured in Praat (Boersma and Weenink 1992/2008) for each token across all speakers. Most measurements were taken from the middle of the vowel and averaged over a duration of about 0.05–0.10 seconds. The only time that this protocol was not used was when the middle of the vowel did not give a clear reading of the formant values. In these cases, a suitable interval was selected that was not near the beginning or end of the vowel, and was relatively stable over that interval (i.e., no sudden jumps or drops in the formant values).

1.2.5 Normalization

In order to help neutralize the effects of interspeaker variation, the formant measurements were normalized as in the ANAE, using Neary's (1977) log-mean normalization algorithm. First, the log-mean[1] of the formant values was computed for the entire group (G) and for each speaker (S_k), according to the following formulas:

$$G = \frac{\sum_{k=1}^{p}\sum_{j=1}^{m}\sum_{i=1}^{n}\ln(\mathrm{F}_{i,j,k})}{m\cdot\sum_{i=1}^{p}n_i}$$

$$S_k = \frac{\sum_{j=1}^{m}\sum_{i=1}^{n}\ln(\mathrm{F}_{i,j})}{m\cdot n}, k = 1,.,9$$

where p is the number of speakers (here, $p = 11$), m is the number of formants ($m = 4$) and n is the number of vowel tokens (which varies from speaker to speaker). Then, each individual speaker's entire set of formants was normalized by being multiplied by a scaling factor (F_k) given by the following formula:

$$F_k = e^{(G-S_k)}$$

That is, the normalized formant values for a given speaker ($\mathrm{F1}^*_k$, $\mathrm{F2}^*_k$, $\mathrm{F3}^*_k$, $\mathrm{F4}^*_k$) were computed by:

$$\mathrm{F1}^* = F_k\mathrm{F1} \quad \mathrm{F2}^* = F_k\mathrm{F2} \quad \mathrm{F3}^* = F_k\mathrm{F3} \quad \mathrm{F4}^* = F_k\mathrm{F4}$$

These normalized formants serve two purposes. First, they can be used to meaningfully compare each indivdual speaker's formants to some specified external value (e.g., the ANAE's cut-off of 1200 Hz for F2 when testing for fronting of the GOAT vowel). They can also be combined to artificially create a composite, "average" speaker of the Miami dialect.

1.3 Roadmap

The subsequent chapters will delve into six dialect features that could be affecting the Miami dialect, and each will begin with a brief history and description of the particular feature. Then, the ANAE's criteria, which examines the features using impressionistic methods and absolute hertz thresholds, for that feature will be applied to the data of this study to determine the feature's status in Miami. In addition, this study will introduce new comparative and

[1] The log-mean is the average of the natural logs of all formant values (F1 through F4) for the whole group (G) or for each speaker (S_k).

statistical methods to analyze the dialect features. The new, alternate criteria will define certain aspects of the vowel space, like the back, central, and mid lines, comparatively, and will determine whether certain vowels are fronted or lowered, for example, with respect to surrounding vowels in the space. These methods will be explained in more detail in each chapter. The rationale for implementing these supplemental criteria is that they address some of the difficulties that arise when using the ANAE criteria. If the ANAE calls for an impressionistic analysis, the new criteria will make use of statistical tests on the formants. Further, the new comparative criteria requires no normalization, and is less sensitive to the properties of a speaker's vocal tract, which could deform the vowel space away from absolute landmarks. Finally, each chapter will conclude with a discussion comparing the two results. The chapters focused on the dialect features are broken up into three sections. Chapters 2 and 3 delve into the low-back merger and GOAT fronting, the features of the SESR. Chapters 4 and 5 introduce two new features, GOOSE fronting and FOOT lowering, that have not been previously linked to the Miami dialect. Chapters 6 and 7 compare the data from Miami with two major chain shifts affecting North American English, SS and NCS. The thesis will conclude with Chapter 8, which will discuss the major conclusions of this study and directions for future research.

Chapter 2
The Low-Back Merger

2.1 Description

The THOUGHT vowel has a "highly skewed distribution that reflects the complex and irregular history of its composition" (Labov et al. 2006:14). This vowel is mostly the result of monophthongization of Middle English *au found in words like *law, fault, talk, hawk*, and *caught* (Jespersen 1949). This Middle English vowel has several historical derivations, all of which can be found in Table 2.1. Presently, the vowel has a typical pronunciation as [ɔ].

The LOT vowel is derived primarily from the Middle English open-o word class, found in words like *cot*, *rot*, and *Todd*. Barton (1832) reported that this vowel was unrounded and lowered to [ɑ] by the nineteenth century. In recent history, in those dialects that still distinguish between the THOUGHT and LOT vowels, lexical diffusion has caused the LOT vowel to shift to the [ɔ] before back nasals (*strong*), voiceless fricatives (*off, cloth*), and irregularly before /g/ (*log, hog*) (Labov et al. 2006:13).

language	example words
Old English	*thaw, straw, claw*
Old English	*maw, saw, draw*
Old English	*fought, taught*
Old French	*brown, pawn*
Middle English	*hawk, laundry*
Old French	*applaud, fraud, because*
Old English	*thought, daughter, brought*

Table 2.1: Historical record of THOUGHT vowel showing the language of origin and the words in which these vowels were found (Labov et. al 2006)

Labov (1966) not only produced the first ever national map of any feature of American English pronunciation, but also was one of the first linguists to provide graphical

representation of where the low-back merger occurred in the United States. A nationwide telephone survey was performed, which involved long distance telephone operators and their pronunciation of two last names, *Hawk* and *Hock*, and the results allowed for the distribution of the merger to be charted. *The Pronunciation of English in the Atlantic States* (PEAS; Kurath and McDavid 1961) also reported evidence of the merger. Labov (1966; blue isogloss), PEAS (purple isogloss), and the ANAE's (green isogloss) findings of where a full low-back merger exists are found in Figure 2.1. The merger exists in almost the entire western United States, as well as Canada and potions of the northeast and north central US. The ANAE results support Labov's (1966) findings in the West and PEAS's findings in western Pennslyvania and the upper northeast.

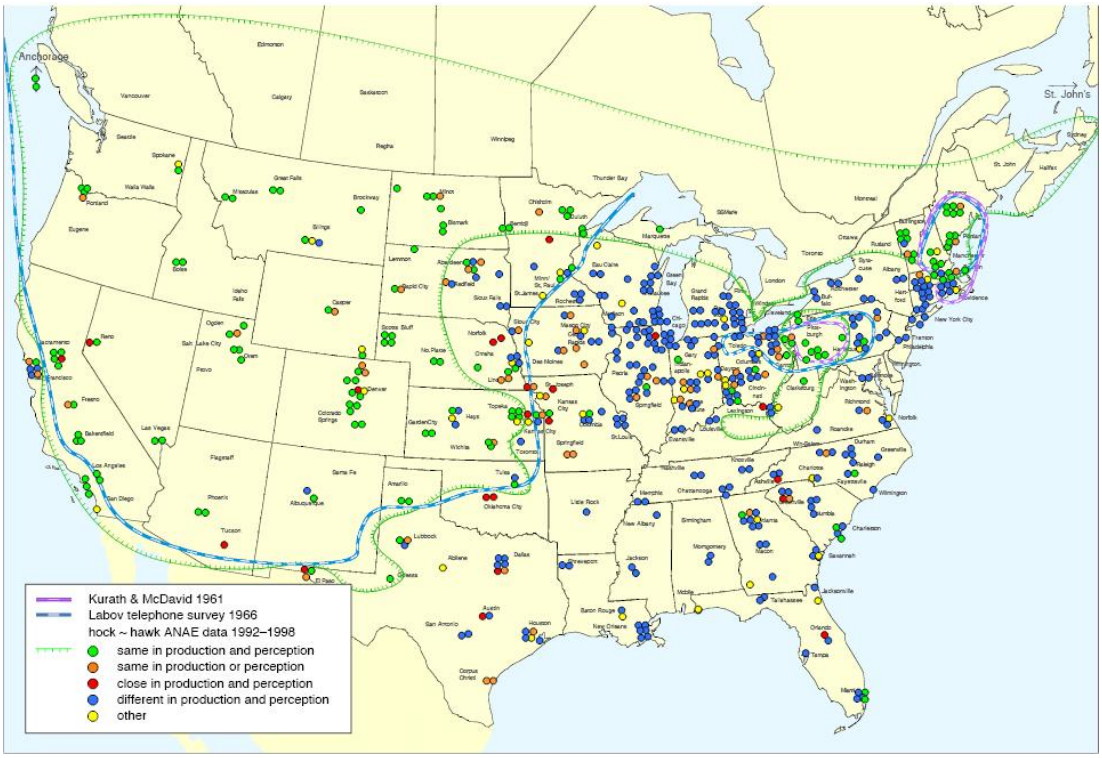

Figure 2.1: The distribution of the low-back merger in North America (Labov et al. 2006:66)

2.2 Results based on ANAE criteria

The ANAE defines a complete merger, one that occurs in both production and perception, when "the speaker judges [the word classes] to be 'the same' and the analyst judges them to be 'the same."' Thus, analysts for the ANAE make merger decisions based on participant responses and audio clips. Recall from Chapter 1 that five Miami speakers analyzed by the

ANAE (two speakers with no merger, two speakers with a limited merger before nasals, and one speaker with a full merger) yielded the merger in transition status.

To measure a merger in perception using ANAE guidelines, this study makes use of the oral perception test found in (1), in which a speaker is asked the following questions in order to determine whether or not he/she has a merger in perception. If the speaker answered 'yes' to at least two of the three yes-no questions, it indicated a merger in perception. This study found that all eleven speakers were not only merged in perception based on these measures, but none required the tie breaker question— all eleven speakers answered 'yes' to first two questions.

(1)
- What is the past tense of catch? (caught)
- What is the name for a portable bed found in hotels and shelters? (cot)
- Do these words sound the same or different?
- What is the time of the day when the sun is rising? (dawn)
- What is the shortened version of the name of a famous cartoon duck? (Don)
- Do these words sound the same or different?
- What is another name for child? (tot)
- What is the past tense of teach? (taught)
- Do these words sound the same or different?

To measure a merger in production, it appears that the ANAE used impressionistic methods, in which analysts listened to see if speakers merged the two vowels or not. To replicate this, I examined audio clips of the LOT and THOUGHT vowels and determined whether the two vowels were merged or not. These results can be found in Table 2.2. They show that all but one of the speakers have a complete low-back merger in production according to ANAE methods.

2.3 Results based on alternate criteria

In an effort to gauge the merger in production using quantitative measures, this study employed the statistical analysis used in Cerny and Doernberger (2008). This method involves using statistical tests on the formant values for each token of the low-back vowels. The tests in this study made use of F1 and F2 only and compared both vowels using a Multivariate Analysis of Variance (MANOVA) statistical test defining each vowel as an

	merger in...	
speaker	perception	production
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	–
8	✓	✓
9	✓	✓
10	✓	✓
11	✓	✓

Table 2.2: Low-back merger results using ANAE criteria

ordered pair (F1, F2) and determining whether two sets of ordered pairs are statistically distinct.

The MANOVA in this study took as the null hypothesis that the two vowels were distinct and outputted a *p*-value (a real number between 0 and 1) that determined whether the hypothesis was confirmed or rejected. If the *p*-value was greater than 0.05, then the null hypothesis was rejected, meaning that the two low-back vowels were not distinct. Table 2.3 illustrates the results of the MANOVA by displaying the speaker number, the average F1 and F2 values (in Hertz), the *p*-value, and whether the *p*-value was greater than 0.05. The results indicate that all eleven speakers have THOUGHT and LOT vowels that are not distinct. Thus, this study claims that all speakers have a merger in production based on the alternate criteria.

2.4 Discussion

The perception test revealed that all eleven speakers have a merger in perception. The ANAE's impressionistic analysis showed that ten speakers were merged in production, while the alternate statistical analysis found that all eleven were merged in production. Thus, the results are very much in favor of stating that the Miami dialect has progressed from a low-back merger in transition to a full merger. This means that Miami now fails to fulfill one of the two requirements from the ANAE for placement in the SESR, and that both the ANAE and alternate criteria are effective in producing the similar results.

	THOUGHT		LOT			
speaker	F1	F2	F1	F2	p-value	> 0.05?
1	783.33	1339.73	786.03	1284.90	0.658	✓
2	880.50	1349.65	860.89	1307.90	0.390	✓
3	756.86	1207.58	712.36	1114.20	0.161	✓
4	899.84	1410.21	892.65	1371.49	0.226	✓
5	862.21	1324.48	838.04	1291.35	0.838	✓
6	779.13	1245.64	754.88	1215.95	0.276	✓
7	837.49	1417.09	753.72	1370.00	0.119	✓
8	728.60	1267.26	721.28	1243.67	0.915	✓
9	850.88	1367.83	824.34	1326.34	0.120	✓
10	778.14	1343.08	746.43	1276.56	0.304	✓
11	745.77	1336.95	722.33	1333.37	0.338	✓

Table 2.3: Low-back merger results using alternate statistical criteria (MANOVA)

Chapter 3
GOAT-fronting

3.1 Description

GOAT-fronting is a dialect feature representing the pronunciation of the GOAT vowel farther forward in the mouth. Thus, the vowel (represented using typical IPA usage) in the word *goat* would be pronounced more like [gəʊt] rather than the typical [goʊt]. According to the ANAE, this vowel is derived from Middle English *open o, found in words like *boat, road*, and *soap*, and from Middle English dipthongal *ow, found in words like *stow, flow, know*, and *bowl* (Labov et al. 2006, 14). Five degrees of GOAT fronting are defined in the ANAE, and they are based on the mean normalized F2 (F2*) of the GOAT vowel. These values are found on the map in Figure 3.1.

The map shows that most of northern and western portions of North America are fairly conservative in their fronting of the GOAT vowel. The southeastern region shows higher degrees of fronting (represented by the red isogloss), and thus the SESR is defined as a region that has this dialect feature. Miami is defined as having the highest degree of fronting with a mean F2* greater than 1400 Hz.

3.2 Results based on the ANAE criteria

Although five degrees of GOAT-fronting are defined, the ANAE defines fronting in the SESR as a mean F2* of the GOAT vowel greater than 1200 Hz. Because Miami was said to have the highest degree of fronting, it fit perfectly in the SESR. The results of this study with respect to GOAT-fronting are illustrated in Table 3.1, which displays the speaker number, the mean F2* for the GOAT vowel, and whether or not that value was greater than 1200 Hz.

The results indicate that ten of the eleven speakers do not front their GOAT vowel. Furthermore, the one speaker that did have fronting had a mean F2* that was only 20 Hz

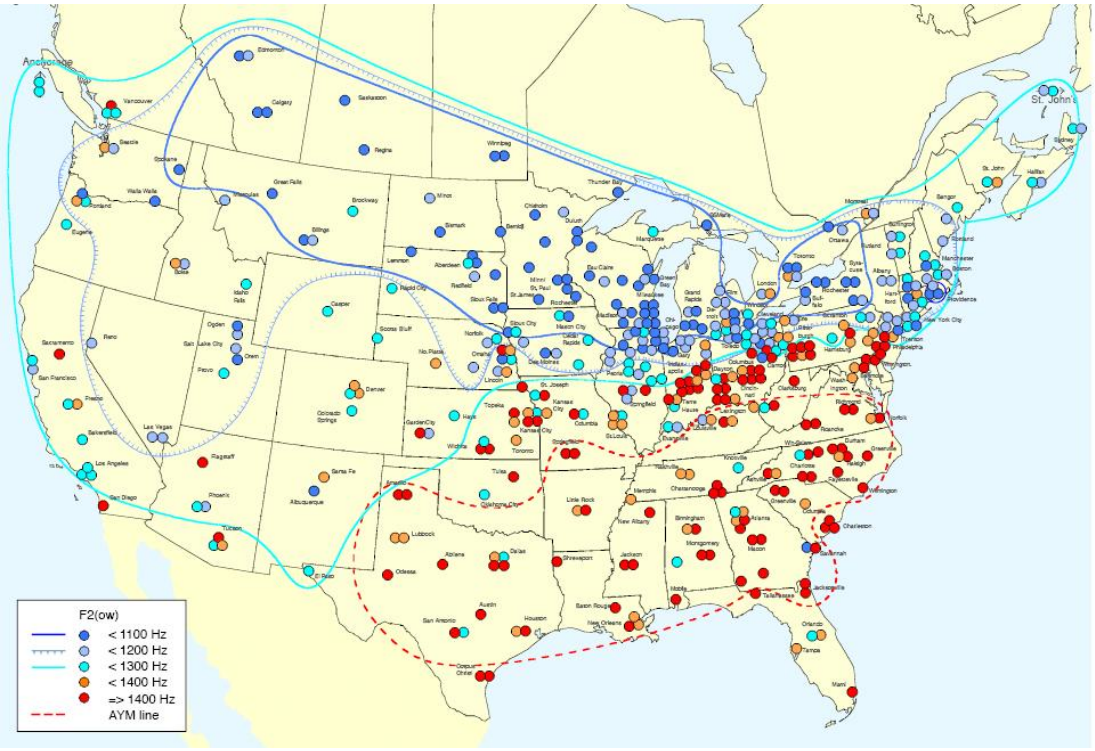

Figure 3.1: The distribution of GOAT fronting in North America (Labov et al. 2006:158)

speaker	F2*(GOAT)	> 1200 Hz?
1	1220.76	✓
2	1154.20	–
3	961.86	–
4	1143.57	–
5	1038.95	–
6	975.07	–
7	1117.99	–
8	1112.41	–
9	1163.61	–
10	1080.23	–
11	1043.81	–
group	1092.04	–

Table 3.1: GOAT-fronting results using ANAE measures

above the 1200 Hz threshold. Table 3.1 also indicates that the normalized group average has an F2 value over 100 Hz below the threshold, and thus does not exhibit GOAT fronting.

3.3 Results based on the alternate criteria

The alternate criteria centers around the relative position of the GOAT vowel with respect to surrounding vowels. The concept of fronting indicates that there is a defined back line, such that if the vowel moves far enough forward with respect to this line, it is considered fronted. Thus, the goal of this alternate criteria is to define a back and central line, and determine how much fronting (if any) exists for the GOAT vowel. In terms of GOAT-fronting, three lines were defined. The back line is the minimum average F2 value of the vowels LOT, THOUGHT, and GOOSE, and this minimum vowel will be referred to as "back". Thus, the back line for a given speaker is defined as the average F2 value of their most back vowel, and the central line is defined as the average F2 value of STRUT. The midpoint of these two values was also determined, and the resulting degrees of frontness illustrated in Table 3.2, were created.

comparison	degree of frontness
F2GOAT $\leq$ F2 "back"	Back Vowel
F2 midpoint $>$ F2GOAT $>$ F2 "back"	Moderate Fronting
F2GOAT$>$ F2 midpoint	Extreme Fronting

Table 3.2: Alternate Criteria for GOAT fronting

To determine the statistical relationships between the average F2 of the GOAT vowel and the back line, an independent samples t-test was conducted. This t-test takes the input of the F2 values of the two vowels in question and outputs a *p*-value. If this *p*-value is less than 0.05, then the two vowels are said to be distinct, but if the value is greater than 0.05, the vowels are said to be not statistically distinct. It should be noted here because this fronting criteria will be used several times later in this study, that should the situation arise in which a *p*-value was between 0.05 and 0.10, and the F2 value of the vowel in question is greater than the central line, then that vowel will not be considered statistically similar to the back line. The results of these t-tests, as well as the pertinent average F2 values and the degree of fronting for each speaker are illustrated in Table 3.3 and Table 3.4. The results indicate that the eleven speakers all have the GOAT vowel as a back vowel, and thus no speaker exhibits GOAT fronting.

	F2(GOAT)	"back"	F2 "back"	F2(STRUT)	midpoint
1	1220.76	THOUGHT	1314.69	1454.68	1384.69
2	1154.20	THOUGHT	1211.09	1498.80	1354.95
3	961.86	THOUGHT	1179.31	1563.31	1371.31
4	1143.58	THOUGHT	1280.61	1500.82	1390.71
5	1038.95	GOOSE	1091.01	1481.58	1286.30
6	975.08	GOOSE	1003.01	1439.80	1221.41
7	1117.99	GOOSE	1238.69	1476.75	1357.72
8	1112.41	GOOSE	1169.05	1557.46	1363.26
9	1163.61	THOUGHT	1282.70	1591.89	1437.30
10	1080.23	THOUGHT	1232.91	1625.61	1429.26
11	1043.81	GOOSE	1256.67	1515.78	1386.23

Table 3.3: GOAT-fronting results using the alternate criteria

	GOAT$\leq$ X?	GOAT$=$ X?	p-value	Degree
1	✓	✓	0.193	Back Vowel
2	✓	✓	0.234	Back Vowel
3	✓	–	0.000	Back Vowel
4	✓	–	0.000	Back Vowel
5	✓	✓	0.509	Back Vowel
6	✓	✓	0.580	Back Vowel
7	✓	✓	0.321	Back Vowel
8	✓	✓	0.356	Back Vowel
9	✓	–	0.015	Back Vowel
10	✓	–	0.001	Back Vowel
11	✓	✓	0.079	Back Vowel

Table 3.4: GOAT-fronting results using the alternate criteria

3.4 Discussion

The ANAE criteria showed that ten out of the eleven speakers failed to exhibit GOAT-fronting, while the alternate criteria produced results indicating that no speaker fronted their GOAT vowel. The two methods produced comparable results, and it seems like the alternate criteria accounts for speaker 1, whose mean F2* for the GOAT vowel is 20 Hz shy of the ANAE threshold. Hence, the alternate criteria can be useful when a speaker's mean F2* is extremely close to an ANAE threshold.

Chapter 4
GOOSE-fronting

4.1 Description

GOOSE-fronting is a dialect feature that involves a fronter pronunciation of the GOOSE vowel resulting in a pronunciation of *goose* like [gɨs], rather than with a true back vowel as in [gus]. This vowel is derived from Middle English *$\bar{o}$, found in words like *mood, food, fool*, and *room*, which was raised to high position by the Great Vowel Shift. Words with Middle English *$\bar{u}$ that did not undergo the Great Vowel Shift, like *soup* and *you*, merged with *$\bar{o}$ to form the present-day GOOSE vowel.

The ANAE reportes that tokens of the GOOSE vowel with lateral codas pattern quite differently with respect to the formant values of the vowel, and are thus placed in a separate category. Furthermore, the ANAE reports an "unusual situation" in which the remaining tokens of the GOOSE vowel need to be divided into categories based on whether or not they possess a coronal onset. This is odd because "onsets generally have much less effect on the realization of English vowels than codas" (Labov et al. 2006:13,152). Thus, the ANAE defines GOOSE-fronting in two different environments: after coronal onsets and elsewhere.

For both environments, there are three degrees of GOOSE fronting, based on the mean F2* of the GOOSE vowel, for each environment, which can be seen graphically in Figure 4.1 and Figure 4.2. Fronting of the GOOSE vowel with coronal onsets, as illustrated by the map in Figure 4.1, is quite prevalent across North America, as most speakers interviewed had a mean F2* that was greater than the intermediate fronting threshold of 1550 Hz. There were two conservative fronting regions, represented by the blue isogloss, in eastern New England and a portion of the Great Lakes region. The map in Figure 4.2 shows that in all other environments, the US is more conservative in terms of fronting, as those areas with the lowest degree of fronting (represented by the blue isogloss) now cover almost all of the northern United States.

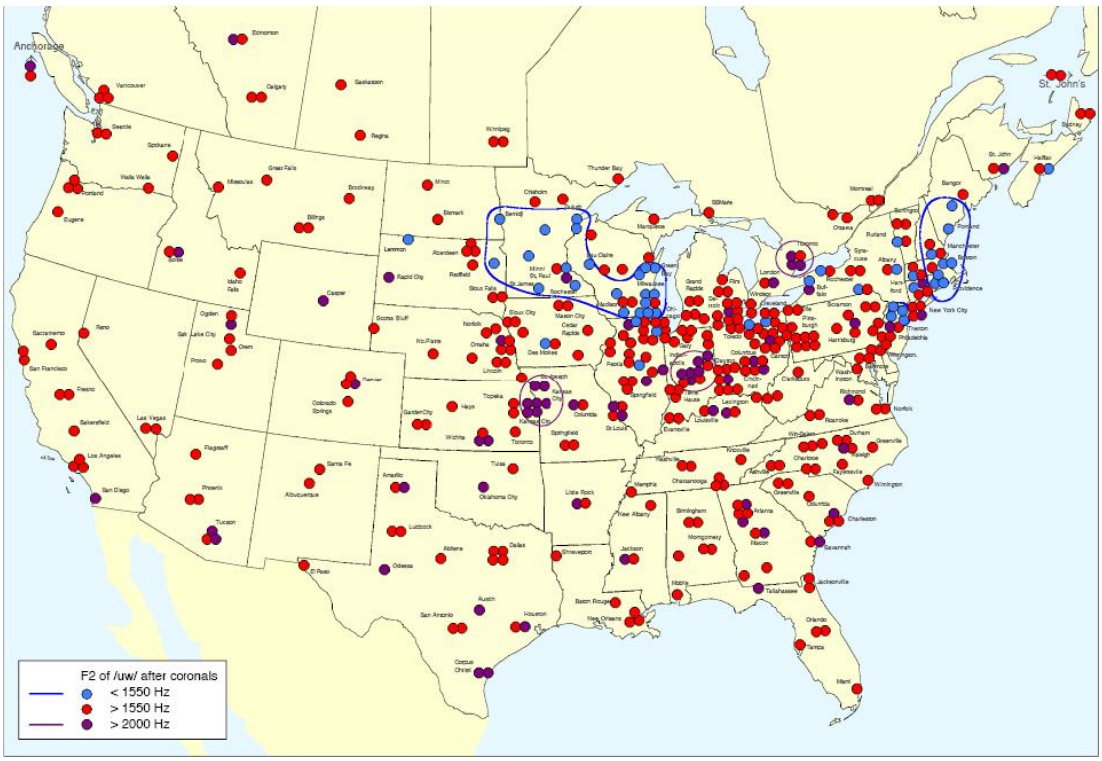

Figure 4.1: The distribution of GOOSE fronting with coronal onsets in North America (Labov et al. 2006:154)

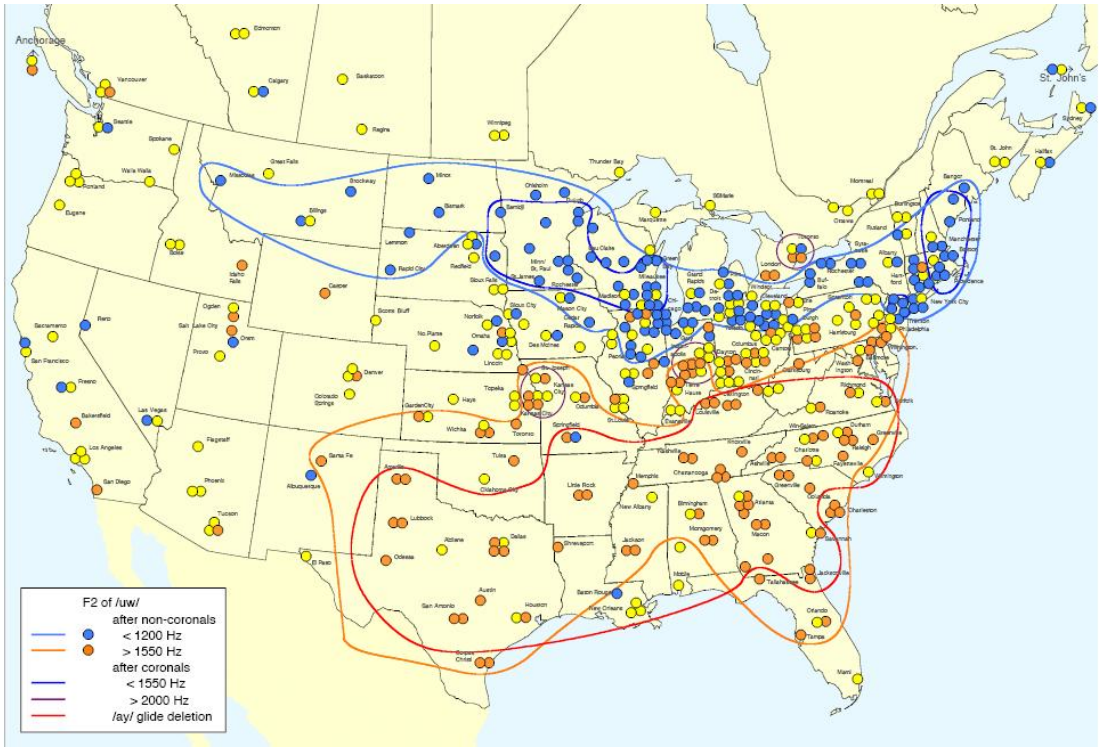

Figure 4.2: The distribution of GOOSE fronting with non-coronal onsets in North America (Labov et al. 2006:156)

In terms of Miami, the ANAE shows that there is intermediate fronting of the GOOSE vowel in both environments. The red dot in Figure 4.1, shows that Miami has a mean F2* value greater than 1550 Hz (and less than 2000 Hz) for tokens with a coronal onset, while the yellow dot in Figure 4.2, expresses Miami's mean F2* as being greater than 1200 Hz (and less than 1550 Hz).

4.2 Results based on ANAE criteria

Unlike the SESR and GOAT-fronting, the ANAE does not define a set hertz threshold for GOOSE-fronting. Therefore, this study will examine the normalized hertz values and determine which degree of fronting Miami has for both environments. The degrees of fronting are defined in Table 4.1, and the results are expressed in Table 4.2 and Table 4.3 with the speaker number, mean F2* values for the GOOSE vowel in both environments, and the degree of fronting in both environments.

degree	coronal onsets	non-coronal onsets
Minimal	$<$ 1550 Hz	$<$ 1200 Hz
Intermediate	1550-2000 Hz	1200-1550 Hz
Advanced	$>$ 2000 Hz	$>$ 1550 Hz

Table 4.1: Degrees of fronting based on ANAE hertz intervals

speaker	F2*(GOOSE)	$<$ 1550 Hz	1550–2000 Hz	$>$ 2000 Hz
1	1671.57	–	✓	–
2	1677.94	–	✓	–
3	1582.84	–	✓	–
4	1398.81	✓	–	–
5	1237.90	✓	–	–
6	1048.99	✓	–	–
7	1555.82	–	✓	–
8	1243.61	✓	–	–
9	1615.19	–	✓	–
10	1893.89	–	✓	–
11	1504.57	✓	–	–
group	1493.74	✓	–	–

Table 4.2: GOOSE fronting results with coronal onsets using ANAE criteria

The results indicate that for tokens of the GOOSE vowel with coronal onsets, six speakers mirror the ANAE results and have intermediate fronting, while the remaining five,

speaker	F2*(GOOSE)	< 1200 Hz	1200–1550 Hz	> 1550 Hz
1	1377.78	–	✓	–
2	1314.77	–	✓	–
3	996.04	✓	–	–
4	1203.05	–	✓	–
5	944.12	✓	–	–
6	957.02	✓	–	–
7	1011.56	✓	–	–
8	1094.49	✓	–	–
9	1340.91	–	✓	–
10	1134.44	✓	–	–
11	1008.77	✓	–	–
group	1125.72	✓	–	–

Table 4.3: GOOSE fronting results with non-coronal onsets using ANAE criteria

as well as the normalized group, have only minimal fronting. With respect to the GOOSE vowel with non-coronal onsets, only three speakers have intermediate fronting, while the other eight and the normalized group have only minimal fronting.

4.3 Results based on alternate criteria

The alternate criteria is almost identical to the one used in the previous chapter on GOAT fronting. The only differences are that the "back" vowel is now the vowel out of GOAT, LOT, and THOUGHT with the lowest mean F2 value, and that all tokens of GOOSE, "back", and STRUT were divided into those with coronal onsets and those without in order to account for the phonetic differences explained in §4.2. The degrees of fronting for the alternate criteria can be found in Table 4.4. The results of the data with respect to the alternate criteria and coronal onsets can be found in Table 4.5 and Table 4.6, while those in all other environments can be found in Table 4.7 and Table 4.8.

comparison	degree of frontness
F2(GOOSE) < F2 "back"	Back Vowel
F2 midpoint > F2(GOOSE) > F2 "back"	Moderate Fronting
F2(GOOSE)> F2 midpoint	Extreme Fronting

Table 4.4: Alternate Criteria for GOOSE fronting

	F2(GOOSE)	"back"	F2 "back"	F2(STRUT)	midpoint
1	1671.57	GOAT	1244.08	1522.99	1383.54
2	1677.94	GOAT	1138.03	1649.54	1393.79
3	1582.84	GOAT	974.99	1569.81	1272.40
4	1398.81	GOAT	1133.32	1552.39	1342.86
5	1237.90	GOAT	1008.05	1635.39	1321.72
6	1048.99	GOAT	1003.01	1449.01	1226.01
7	1555.82	GOAT	1109.72	1560.60	1335.16
8	1243.61	GOAT	1147.17	1658.17	1402.67
9	1615.19	GOAT	1188.25	1694.74	1441.50
10	1893.89	GOAT	1047.27	1594.08	1320.68
11	1504.57	GOAT	1066.82	1628.77	1347.80

Table 4.5: GOOSE fronting results after coronals using the alternate criteria

	GOOSE< "back"?	GOOSE= "back"?	p-value	degree
1	–	–	0.013	Extreme Fronting
2	–	–	0.000	Extreme Fronting
3	–	✓	0.074	Extreme Fronting
4	–	–	0.020	Extreme Fronting
5	–	–	0.017	Moderate Fronting
6	–	✓	0.591	Back Vowel
7	–	✓	0.087	Extreme Fronting
8	–	✓	0.336	Back Vowel
9	–	–	0.000	Extreme Fronting
10	–	–	0.000	Extreme Fronting
11	–	–	0.001	Extreme Fronting

Table 4.6: GOOSE fronting results after coronals using the alternate criteria

	F2(GOOSE)	"back"	F2 "back"	F2(STRUT)	midpoint
1	1377.78	GOAT	1189.67	1409.13	1299.40
2	1314.77	GOAT	1175.76	1448.55	1312.16
3	996.04	GOAT	944.34	1561.69	1253.02
4	1203.05	GOAT	1157.25	1423.47	1290.36
5	944.12	GOAT	1080.15	1327.78	1203.97
6	957.02	GOAT	941.17	1433.67	1187.42
7	1011.56	GOAT	1129.02	1392.89	1260.96
8	1094.49	GOAT	1066.07	1523.89	1294.98
9	1340.91	GOAT	1130.75	1523.32	1327.04
10	1134.43	GOAT	1124.17	1672.90	1398.54
11	1008.77	GOAT	1013.12	1346.28	1179.70

Table 4.7: GOOSE fronting results after non-coronals using the alternate criteria

	GOOSE< "back"?	GOOSE= "back"?	*p*-value	degree
1	–	–	0.009	Extreme Fronting
2	–	✓	0.114	Back Vowel
3	–	✓	0.246	Back Vowel
4	–	✓	0.708	Back Vowel
5	–	✓	0.119	Back Vowel
6	–	✓	0.603	Back Vowel
7	–	✓	0.300	Back Vowel
8	–	✓	0.482	Back Vowel
9	–	–	0.007	Extreme Fronting
10	–	✓	0.948	Back Vowel
11	✓	✓	0.956	Back Vowel

Table 4.8: GOOSE fronting results after non-coronals using the alternate criteria

With regards to tokens with coronal onsets, eight speakers were clearly fronted. The remaining three speakers either had moderate fronting or back vowel status. In terms of those tokens with non-coronal onsets, only two speakers exhibited GOOSE-fronting, while the other nine had GOOSE as a back vowel.

4.4 Discussion

There were a few discrepancies with respect to the ANAE and alternate criteria, especially in those tokens with coronal onsets. The ANAE criteria showed that six speakers had intermediate fronting and that five speakers had moderate fronting. The alternate criteria, on the other hand, showed eight speakers having clear signs of fronting, and only three with moderate to no fronting. Because both criteria have different degrees of fronting, it is hard to make a strong claim of which is more accurate in showing this dialect feature. However, it should be noted that both criteria predict similar results for those vowels with non-coronal onsets, as the clear majority of speakers had no fronting.

Chapter 5
FOOT-lowering

5.1 Description

This vowel is derived from those environments, mostly after labials and before /l/, of Middle English *short-u that did not undergo unrounding in the shift to modern English, as found in words like *put, push, bush*, and *fool*, as opposed to *putt, hush, mush*, and *dull*. Some Middle English *long-o words were shortened and merged with this class, mostly in those environments before /k/ and /d/, like in *hook, cook, look*, and *good* (Labov et al. 2006:13, 90). FOOT-lowering, as a dialect feature, involves the lowering of the FOOT vowel, and subsequent increase in the F1 value. This dialect feature is not featured in the ANAE, as it "does not play a prominent part in any of the sound changes discussed."

This dialect feature is being considered in this study based on the results of the normalized group vowel plot found in Figure 5.1. Recall that normalization neutralizes the natural variation between speakers, and thus a vowel plot mapping the normalized group averages of every vowel allow for inferences to be made about the entire Miami dialect. This plot shows that the FOOT vowel is significantly lower than might be expected, and thus FOOT-lowering was chosen for further investigation.

5.2 Results based on the ANAE criteria

FOOT lowering is not a dialect feature analyzed by the ANAE, but information on the relative height, or F1 value, of the FOOT vowel was given. This information is proved in Figure 5.2, where the ANAE defines four intervals for the normalized F1 value of the FOOT vowel. The map shows that there are no well-defined regional patterns associated with the height of this vowel. Miami is marked by the red dot, indicating it has normalized F1 values in the lowest interval, and thus is part of the group that has some of the highest FOOT vowels in North

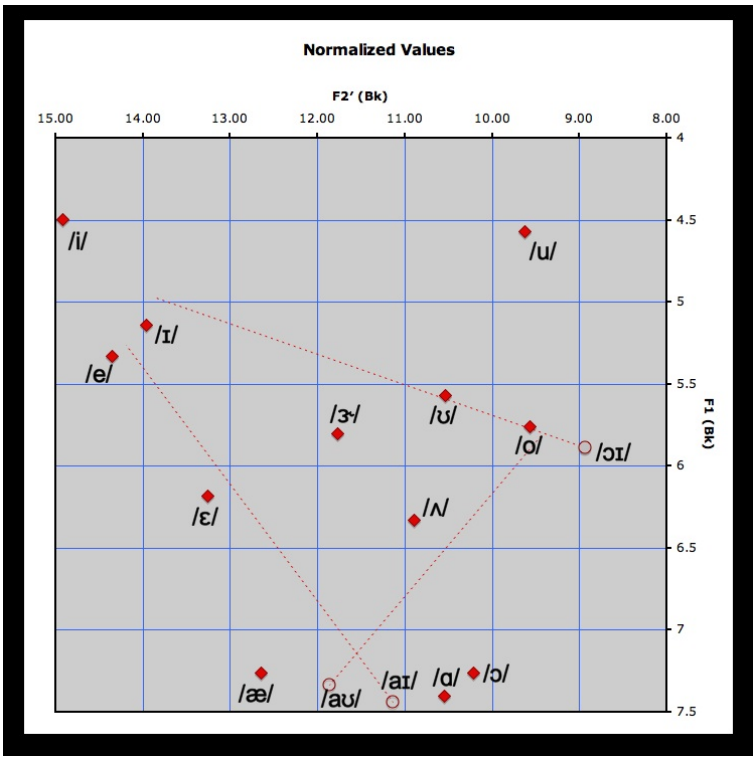

Figure 5.1: Normalized vowel plot of Miami English

America.

To analyze the data using ANAE criteria, this study makes use of the four reported intervals, which will represent vowel height and be called “high” (418–515 Hz), “near high” (515–556 Hz), “upper mid” (556–600 Hz), and “lower mid” (600–738 Hz), and determine where the collected Miami data fits.

The results (shown in Table 5.2) indicate that four speakers, as well as the normalized group average, have FOOT vowels that are either “upper mid” or “lower mid”, while the remaining seven are in the near high range. It should be noted that of those seven speakers, four were within 15 Hz of the low-central threshold of 556 Hz. The interesting aspect of these results is that none of the speakers are within the “high” range, which the ANAE reported the Miami dialect to be in.

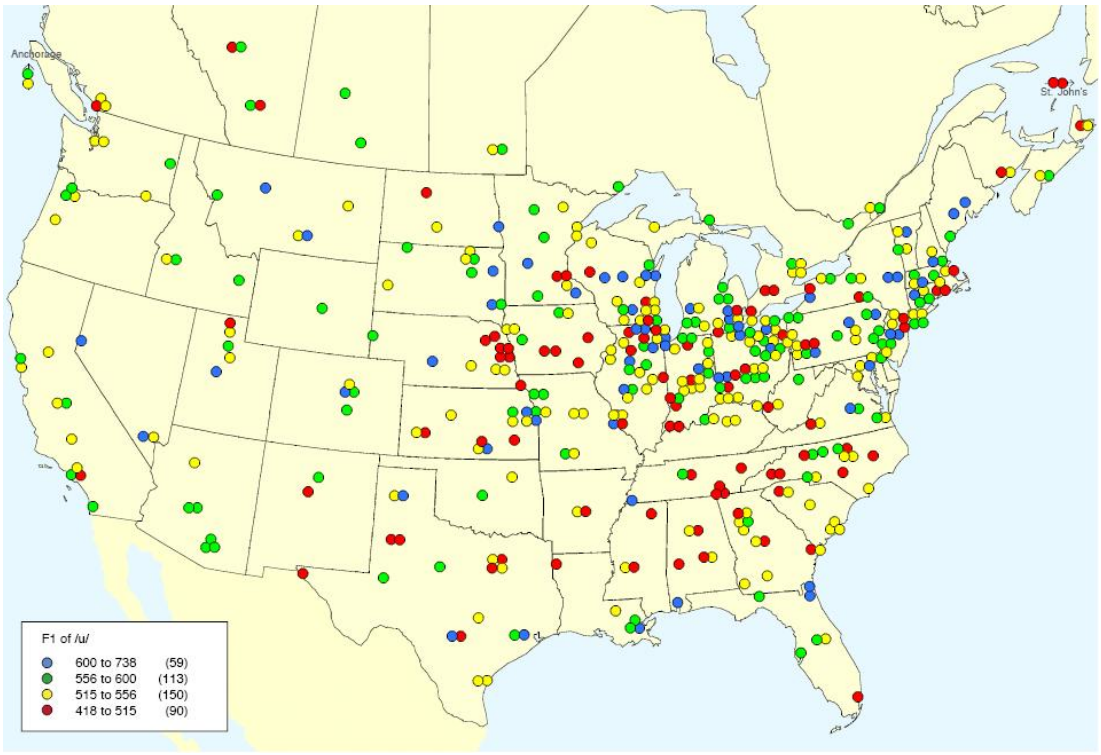

Figure 5.2: The relative height of the FOOT vowel in North America (Labov et al. 2006:90)

speaker	F1(FOOT)	vowel height
1	565.95	Upper mid
2	552.65	Near high
3	542.66	Near high
4	636.62	Lower mid
5	554.21	Near high
6	561.78	Upper mid
7	618.02	Lower mid
8	529.22	Near high
9	553.37	Near high
10	530.32	Near high
11	528.96	Near high
Norm	561.25	upper mid

Table 5.1: FOOT lowering results using methods based on ANAE criteria

5.3 Results based on the alternate criteria

The alternate criteria for FOOT lowering is analogous to GOAT- and GOOSE-fronting. Because the focus is on lowering, the regions created are based on mean F1 values. To determine the high-line in the vowel space, the "high" vowel is the vowel out of FLEECE and GOOSE, the two English high vowels, that has the lowest mean F1 value. The next determination is the upper-mid line, which will be based on the "upper mid" vowel: the average F1 values of the PLAY and GOAT vowels. Finally, the midpoint of these two values is calculated, and the degrees of lowering based on the regions created were determined. These designations can be found in Table 5.2, while the results with respect to the alternate criteria can be found in Table 5.3 and Table 5.4. The results indicate that all eleven speakers have clear signs of FOOT lowering.

comparison	degree of lowering
F1(FOOT) $\leq$ F1 "high"	Raised
F1 midpoint $>$ F1(FOOT) $>$ F1 "high"	No Lowering
F1 "upper mid" $>$ F1(FOOT)$>$ F1 midpoint	Moderate Lowering
F1(FOOT) $>$ F1 "upper mid"	Extreme Lowering

Table 5.2: Alternate Criteria for GOAT fronting

	F1(FOOT)	"high"	F1 "high"	F1 "upper mid"	midpoint
1	565.95	GOOSE	434.26	532.32	483.29
2	552.65	GOOSE	453.31	504.61	478.96
3	542.66	FLEECE	361.13	526.21	443.67
4	636.62	GOOSE	469.49	631.05	550.27
5	554.21	FLEECE	363.33	555.92	459.63
6	561.78	GOOSE	475.22	551.77	513.50
7	618.02	GOOSE	455.82	628.17	541.99
8	529.22	FLEECE	429.10	558.07	493.59
9	553.37	GOOSE	391.38	517.51	454.45
10	530.32	FLEECE	390.29	525.69	457.99
11	528.96	FLEECE	406.89	514.55	460.72

Table 5.3: FOOT-lowering results using the alternate criteria

5.4 Discussion

The ANAE criteria had difficulty determining the degree of lowering, as four speakers barely missed the hertz threshold needed to be considered lowered. The alternate criteria, on the

	FOOT< "high"?	FOOT= "high"?	*p*-value	degree
1	–	–	0.000	Extreme Lowering
2	–	–	0.000	Extreme Lowering
3	–	–	0.000	Extreme Lowering
4	–	–	0.000	Extreme Lowering
5	–	–	0.000	Extreme Lowering
6	–	–	0.000	Extreme Lowering
7	–	–	0.000	Extreme Lowering
8	–	–	0.004	Extreme Lowering
9	–	–	0.000	Extreme Lowering
10	–	–	0.000	Extreme Lowering
11	–	–	0.000	Extreme Lowering

Table 5.4: FOOT-lowering results using the alternate criteria

other hand, accounts for these difficulties and shows that in fact all eleven speakers have extreme lowering of the FOOT vowel. Hence, this study has possibly uncovered a dialect feature not previously known to be associated with the Miami dialect.

Chapter 6
Northern Cities Shift

6.1 Description

The Northern Cities Shift (NCS; Labov et al. 1972; Labov 1981; Eckert 1999; Gordon 2001) is a chain shift indicative of the speech in northern US cities around the Great Lakes, like Detroit, Chicago, Buffalo, Rochester, and Syracuse. The shift is triggered by the raising of the TRAP vowel and it involves the rotation of the TRAP, LOT, THOUGHT, DRESS, KIT, and STRUT vowels, as illustrated by stages of the shift found in Figure 6.1.

1. The TRAP vowel raises around IPA [ɛ], [e], or even [ɪe]
2. The LOT vowel fronts towards the position left by the TRAP vowel
3. The THOUGHT vowel lowers towards the position left by the LOT vowel
4. The DRESS vowel backs to the position of the STRUT vowel
5. The STRUT vowel backs towards the position left by the THOUGHT vowel
6. The KIT vowel lowers towards the position left by the STRUT vowel

Figure 6.1: The stages of the NCS

The first report of the NCS appeared in an unpublished paper by Fasold (1969), which was based on Shuy, Wolfram, and Riley's (1967) impressionistic study of Detroit speech, which noted that lower-middle class women were leading in the TRAP raising and LOT fronting sound changes. Three years later, Labov, Yager, and Steiner (1972) described a chain shift of five vowels based on acoustic analysis of interviews in Detroit, Chicago, Buffalo, Rochester, and Syracuse. In 1986, Eckert first observed the fifth stage of the NCS, STRUT backing, in Detroit. As further work began showing the lowering of the THOUGHT vowel, the complete rotation of the shift, is illustrated in Figure 6.2, became clear. The NCS

is one of the defining features of the Inland North, a dialect region defined by the ANAE and represented by the blue-white isogloss in Figure 6.3.

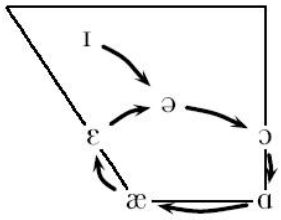

Figure 6.2: Northern Cities Shift (Doernberger 2008)

6.2 Results based on the ANAE criteria

The ANAE measures the progress of the NCS by using five quantitative measures defined in (2)– AE1, O2, ED, EQ, and UD. The results of these measures, with respect to ANAE data, can be found in Figure 6.3, in which each of the five measures occurs within the given isoglosses (AE1-red, O2-light brown, UD-dashed line, ED-royal blue, EQ-white and orange).

(2)
- AE1 (TRAP-raising): the mean normalized F1 of the TRAP is less than 700 Hz
- O2 (LOT-fronting): the mean normalized F2 of the LOT vowel is greater than 1450 Hz
- EQ (relative positioning of the TRAP and DRESS vowels): the TRAP vowel, with respect to the DRESS vowel, is either lower and backer, lower and fronter, or higher and fronter, which creates a four quadrant system that measures the advancement of the first four steps of the shift.
- ED (relative positioning of the LOT and DRESS vowels): the mean normalized F2 value of the DRESS vowel – the LOT vowel is less than 375 Hz.
- UD (relative positioning of the LOT and STRUT vowels): the mean normalized F2 of the STRUT vowel is greater than that of the LOT vowel

The AE1 measure is used to determine the progress of Stage 1 of the NCS, TRAP-raising. Stage 1 is said to have occurred if the mean F1* of the TRAP vowel is less than 700 Hz. The results of this study with respect to the AE1 measure are found in Table 6.1, which

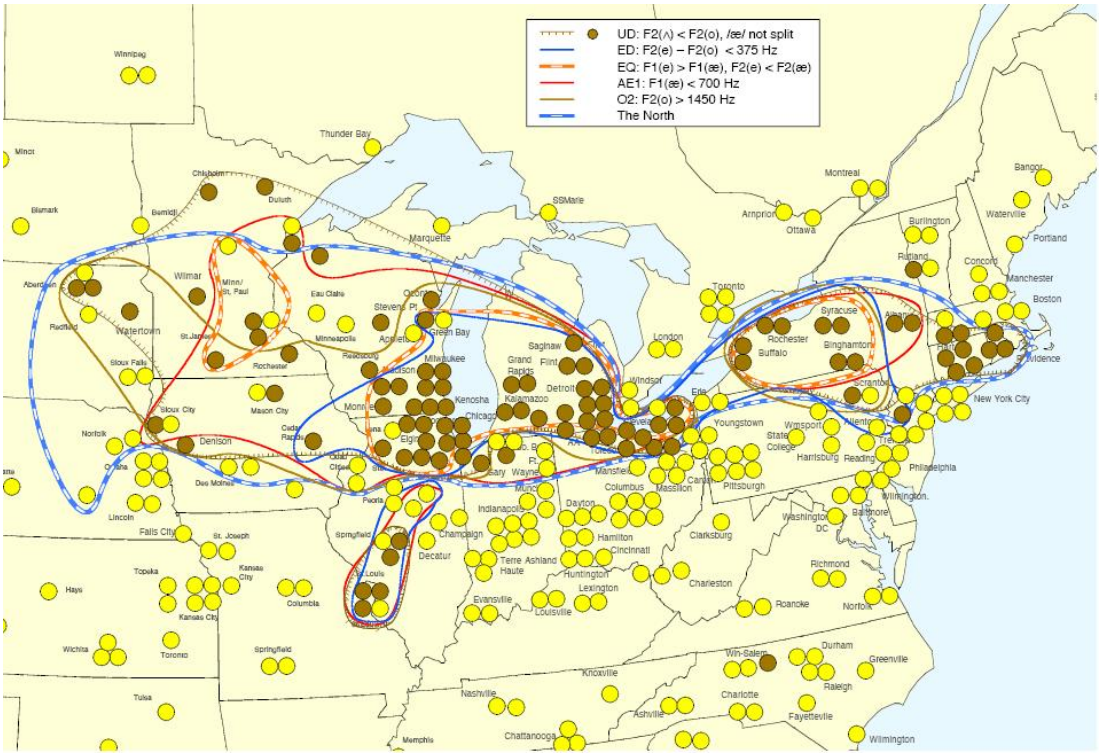

Figure 6.3: The distribution of the Northern Cities Shift in North America (Labov et al. 2006:203)

speaker	F1*(TRAP)	< 700 Hz?
1	744.15	–
2	867.74	–
3	781.63	–
4	855.68	–
5	854.03	–
6	750.92	–
7	675.40	✓
8	683.60	✓
9	853.14	–
10	865.15	–
11	789.41	–
group	791.64	–

Table 6.1: Results of testing for Stage 1 of the Northern Cities Shift (TRAP-raising) for Miami speakers, using ANAE's AE1 measure

displays the mean F1* of the TRAP vowel, and whether or not the value is less than 700 Hz for each speaker.

The O2 measure determines whether Stage 2 of the NCS, LOT-fronting, has occured. This measure checks whether or not the normalized F2 value of the LOT vowel is greater than 1450 Hz. The results, speaker number, normalized mean F2 value, and whether or not the value is greater than 1450 Hz, are displayed in Table 6.2.

speaker	F2*(LOT)	$>$ 1450 Hz?
1	1370.79	–
2	1249.75	–
3	1278.14	–
4	1316.77	–
5	1353.42	–
6	1272.08	–
7	1409.73	–
8	1332.84	–
9	1322.82	–
10	1297.15	–
11	1396.59	–
group	1327.28	–

Table 6.2: Results of testing for Stage 2 of the Northern Cities Shift (LOT-fronting) for Miami speakers, using ANAE's O2 measure

The ED measure examines the relative position of the LOT and DRESS vowels. This measure, which checks whether or not the difference in the normalized F2 value of the DRESS and LOT vowels is less than 375 Hz, is a crucial measure of the NCS because it tracks the progress of the shift up to Stage 4. The results, which display speaker number, normalized F2 values of the DRESS and LOT vowels, the difference of those two values, and whether or the difference is less than 375 Hz, are found in Table 6.3.

The EQ measure examines the relative positioning of the TRAP and DRESS vowels. For Stage 4 of the NCS to occur, the TRAP vowel is said to be higher and fronter than the DRESS vowel. Quantitatively, this is represented by whether or not the mean F1* of the DRESS vowel is greater than the mean F1* of the TRAP vowel, and the mean F2* of the DRESS vowel is less than the mean F2* of the TRAP vowel. These results, which include the mean F1* and F2* of the TRAP and DRESS vowels, and the inequality measures, are displayed in Table 6.4 and Table 6.5.

The UD measure examines the relative positioning of the LOT vowel and the STRUT VOWELS. It measures whether or not the normalized F2 value of the STRUT vowel is greater

speaker	F2*(DRESS)	F2*(LOT)	F2*(DRESS) − F2*(LOT)	< 375 Hz?
1	1798.43	1370.79	427.64	–
2	1904.97	1249.75	655.22	–
3	1932.05	1278.14	653.90	–
4	1544.35	1316.77	227.58	✓
5	1825.54	1353.42	472.12	–
6	1767.08	1272.08	495.00	–
7	2290.99	1409.73	881.26	–
8	1834.99	1332.82	502.15	–
9	2086.60	1322.82	763.78	–
10	2061.34	1297.15	764.18	–
11	1845.98	1396.59	449.38	–
group	1889.83	1327.28	562.55	–

Table 6.3: Results of the progression of the NCS of Miami speakers using the ANAE's ED measure

speaker	F1*(DRESS)	F1*(TRAP)	F1*(DRESS) > F1*(TRAP)?
1	635.41	744.15	–
2	662.58	867.74	–
3	654.50	781.63	–
4	685.88	855.68	–
5	673.19	854.03	–
6	636.73	750.92	–
7	577.94	675.40	–
8	590.05	683.60	–
9	639.26	853.14	–
10	634.24	865.15	–
11	610.63	789.41	–
group	637.56	791.64	–

Table 6.4: Results of the progression of the NCS in Miami speakers using the ANAE's EQ measure

speaker	F2*(DRESS)	F2*(TRAP)	F2*(DRESS) < F2*(TRAP)?
1	1798.43	1728.33	–
2	1904.97	1498.80	–
3	1932.05	1563.31	–
4	1544.35	1500.83	–
5	1825.54	1481.58	–
6	1767.08	1439.80	–
7	2290.99	1476.75	–
8	1834.99	1557.46	–
9	2086.60	1591.89	–
10	2061.34	1625.61	–
11	1845.98	1515.78	–
Norm	1889.83	1519.96	–

Table 6.5: Results of the progression of the NCS in Miami speakers using the ANAE's EQ measure

than that of the LOT vowel, to determine the progress of the NCS. These results are displayed in Table 6.6.

speaker	F2*(STRUT)	F2*(LOT)	F2*(STRUT) > F2*(LOT)?
1	1454.68	1370.79	–
2	1498.80	1249.75	–
3	1563.31	1278.14	–
4	1500.83	1316.77	–
5	1481.58	1353.42	–
6	1439.80	1272.08	–
7	1476.75	1409.73	–
8	1557.46	1332.84	–
9	1591.89	1322.82	–
10	1625.61	1297.15	–
11	1515.78	1396.59	–
group	1519.96	1327.28	–

Table 6.6: Results of the progression of the NCS in Miami speakers using the ANAE's UD measure

The results, based on the ANAE criteria, show that no one speaker exhibits significant evidence of the NCS. Speakers 7 and 8 barely exhibit Stage 1 (TRAP-raising) and then fail to show evidence of Stage 2. Furthermore, the normalized group average also fails to meet any of the five criteria. Thus, we can conclude based on ANAE criteria that the NCS has not occured to any noticeable extent in Miami.

6.3 Results based on the alternate criteria

Five alternate criteria, one for each of the five stages, were created for this study. However, the analysis stopped when all eleven speakers no longer exhibit stages of the shift. The first stage is TRAP raising and the degrees of raising are found in Table 6.7. In this case, the "lower mid" line is defined by the average of the DRESS and the THOUGHT vowels. The results are found in Table 6.8 and Table 6.9 and they illustrate that four speakers exhibit signs of raising.

comparison	degree of raising
F1(TRAP) $\geq$ F1(LOT)	Lowered
F1 midpoint $<$ F1(TRAP) $<$ F1(LOT)	No Raising
F1 "lower mid" $<$ F1(TRAP)$<$ F1 midpoint	Moderate Raising
F1(TRAP) $<$ F1 "lower mid"	Extreme Raising

Table 6.7: Alternate Criteria for TRAP-raising

	F1(TRAP)	F1(LOT)	F1 "lower mid"	midpoint
1	744.15	801.49	735.30	768.40
2	867.74	815.33	735.99	775.66
3	781.62	801.09	720.35	760.72
4	855.68	840.22	766.73	803.48
5	854.03	881.04	783.08	832.06
6	750.92	795.66	709.91	752.79
7	675.40	833.14	681.06	757.10
8	683.60	766.31	691.18	728.75
9	853.14	822.88	734.03	778.46
10	865.15	751.53	684.64	718.09
11	789.41	779.04	689.13	734.09

Table 6.8: TRAP-raising results based on the alternate criteria

Because four speakers exhibited the trigger of the Northern Cities Shift, the next step was to analyze those speakers under the alternate LOT-fronting criteria. This method is almost identical to that of GOOSE-fronting and GOAT-fronting, with the small change being that the "back" vowel is now the vowel that has the minimum F2 out of THOUGHT, GOAT, and GOOSE. The criteria is found in Table 6.10 and the results are found in Table 6.11 and Table 6.12. The results indicate that all four speakers who exhibit stage 1, also exhibit stage 2, LOT fronting.

The next step was to check Stage 3 of the NCS, THOUGHT lowering. It should be noted, however, that because the low-back merger has already been shown to be complete,

	TRAP $\geq$ LOT?	TRAP $=$ LOT?	p-value	degree
1	–	–	0.048	Moderate Raising
2	✓	✓	0.252	Lowered
3	–	✓	0.512	Lowered
4	✓	✓	0.412	Lowered
5	–	✓	0.627	Lowered
6	–	–	0.020	Moderate Raising
7	–	–	0.000	Moderate Raising
8	–	–	0.023	Moderate Raising
9	✓	✓	0.118	Lowered
10	✓	✓	0.126	Lowered
11	✓	✓	0.730	Lowered

Table 6.9: TRAP-raising results based on the alternate criteria

comparison	degree of frontness
F2(LOT) $\leq$ F2 "back"	Back Vowel
F2 midpoint $>$ F2(LOT) $>$ F2 "back"	Moderate Fronting
F2(LOT)$>$ F2 midpoint	Extreme Fronting

Table 6.10: Alternate Criteria for LOT-fronting

	F2(LOT)	"back"	F2 "back"	F2STRUT	midpoint
1	1370.79	GOAT	1220.76	1454.68	1337.72
6	1272.08	GOAT	975.08	1439.80	1207.44
7	1409.73	GOAT	1117.99	1476.75	1297.37
8	1332.84	GOAT	1112.41	1557.46	1334.94

Table 6.11: LOT-fronting results using the alternate criteria

	GOAT $\leq$ "back"	GOAT $=$ "back"?	p-value	degree
1	–	–	0.008	Extreme Fronting
6	–	–	0.000	Extreme Fronting
7	–	–	0.000	Extreme Fronting
8	–	–	0.008	Moderate Fronting

Table 6.12: LOT-fronting results using the alternate criteria

THOUGHT-lowering is expected for all speakers. The criteria for the relative positioning alternate measure is found in Table 6.13, and the results with respect to that criteria are found in Table 6.14 and Table 6.15. To define the lower-mid line, the only remaining lower-mid vowel, DRESS is used, and to define the "low" line, the lowest vowel (highest mean F1) between TRAP and LOT was used. The results, as expected, indicate that the THOUGHT vowel has lowered for all four speakers.

region	degree of frontness
F1(THOUGHT) $\leq$ F1(DRESS)	No Lowering
F1 midpoint $>$ F1(THOUGHT) $>$ F1(DRESS)	Moderate Lowering
F1(THOUGHT)$>$ F1 midpoint	Extreme Lowering

Table 6.13: Alternate Criteria for THOUGHT-lowering

	F1(THOUGHT)	F1(DRESS)	"low"	F1 "low"	midpoint
1	804.26	635.41	LOT	801.49	718.45
6	770.90	636.73	LOT	795.66	671.20
7	749.81	577.94	LOT	833.14	705.54
8	758.60	590.05	LOT	766.31	678.18

Table 6.14: THOUGHT lowering results

	THOUGHT $\leq$ DRESS?	THOUGHT $=$ DRESS?	p-value	degree
1	–	–	0.001	Extreme Lowering
6	–	–	0.000	Extreme Lowering
7	–	–	0.008	Extreme Lowering
8	–	–	0.000	Extreme Lowering

Table 6.15: THOUGHT lowering results

Because all four speakers exhibited Stage 3, Stage 4 of the NCS, DRESS-backing was checked. The criteria for this is very similar to the fronting criteria used throughout the discussion, except it occurs in the opposite direction. In this case, the front line is defined by the mean F2 of the TRAP vowel, and the central line is defined by the mean F2 of the STRUT vowel. The alternate criteria can be found in Table 6.16 and the results based on that criteria can be found in Table 6.17 and Table 6.18. The results indicate that none of the remaining four speakers have the DRESS backing sound change indicative of Stage 4, and thus they have only progressed to Stage 3 according to the data.

comparison	degree of backness
F2(DRESS) $\geq$ F2(TRAP)	No Backing
F2 midpoint $<$ F2(DRESS) $<$ F2(TRAP)	Moderate Backing
F2(DRESS)$<$ F2 midpoint	Extreme Backing

Table 6.16: Alternate Criteria for DRESS-backing

	F2(DRESS)	F2(TRAP)	F2(STRUT)	midpoint
1	1798.43	1728.32	1454.68	1591.50
6	1767.08	1597.16	1439.80	1518.48
7	2290.99	1986.06	1476.75	1731.41
8	1834.99	1716.69	1557.46	1637.08

Table 6.17: DRESS-backing results using the alternate criteria

	DRESS $>$ TRAP?	DRESS$=$ TRAP?	p-value	degree
1	✓	✓	0.279	No Backing
6	✓	✓	0.149	No Backing
7	✓	–	0.005	No Backing
8	✓	–	0.040	No Backing

Table 6.18: DRESS-backing results using the alternate criteria

6.4 Discussion

There is no previous research that suggests that Miami should have dialect features indicative of a chain shift that takes place almost exclusively in the Great Lakes region. The ANAE criteria mirrors this claim, as only two Miami speakers in this study exhibited any signs of Stage 1 of the NCS, and further, neither speaker partook in Stage 2. The alternate criteria told a different story, however, as four speakers exhibited the first three stages of the NCS. Because of past dialectical work and even the information given by the normalized vowel plot found in Chapter 5, it is clear that the Miami dialect does not undergo the NCS. For this reason, the ANAE criteria seems to be better adept at verifying the progression of the NCS. It should be noted, however, that for the two speakers that had Stage 1 with the alternate criteria and not with the ANAE criteria, their F1 values for the TRAP vowels were the next lowest among all speakers when using the ANAE criteria, and thus the alternate criteria could just be a more sensative measure of the NCS.

Chapter 7
Southern Shift

7.1 Description

The Southern Shift (Labov, Yager, and Steiner 1972, Labov 1994) is a chain shift affecting the PRICE, FLEECE, KIT, FACE, and DRESS vowels, and was originally defined as the collection of three vowel shift patterns: back chain shift before /ɪ/, the parallel fronting of back upgliding vowels, and the present day ANAE Southern Shift. This study will only be concerned with the Southern Shift, as presented in the ANAE, which involves the three stages found in Figure 7.1. The Southern Shift is one of the defining features of the South, a dialect region defined by the ANAE and illustrated in Figure 7.2.

1. The monophthongization of the PRICE vowel to IPA [aː]
2. The reversal of the FACE and DRESS vowels, with the FACE vowel pronounced more like [ɛ] and the DRESS vowel pronounced more like [eɪ]
3. The reversal of the FLEECE and KIT vowels, with the FLEECE vowel pronounced more like [ɪ] and the KIT vowel pronounced more like [i]

Figure 7.1: Stages of the Southern Shift

7.2 Results based on the ANAE criteria

The ANAE measures the progress of the Southern Shift using three measures: the Stage 1 glide deletion measure, the Stage 2 measure, and the Stage 3 measure. The results of these measures, with respect to the ANAE data can be found on the map in Figure 7.2. The map illustrates that Stage 1 occurs in most of the southern part of the continental US, as shown by the red isogloss. Stage 2 is almost as prevalent as Stage 1, with the only exceptions being

most of Georgia and parts of Tennessee and Texas. Stage 3 occurs primarily in Alabama and eastern Tennessee.

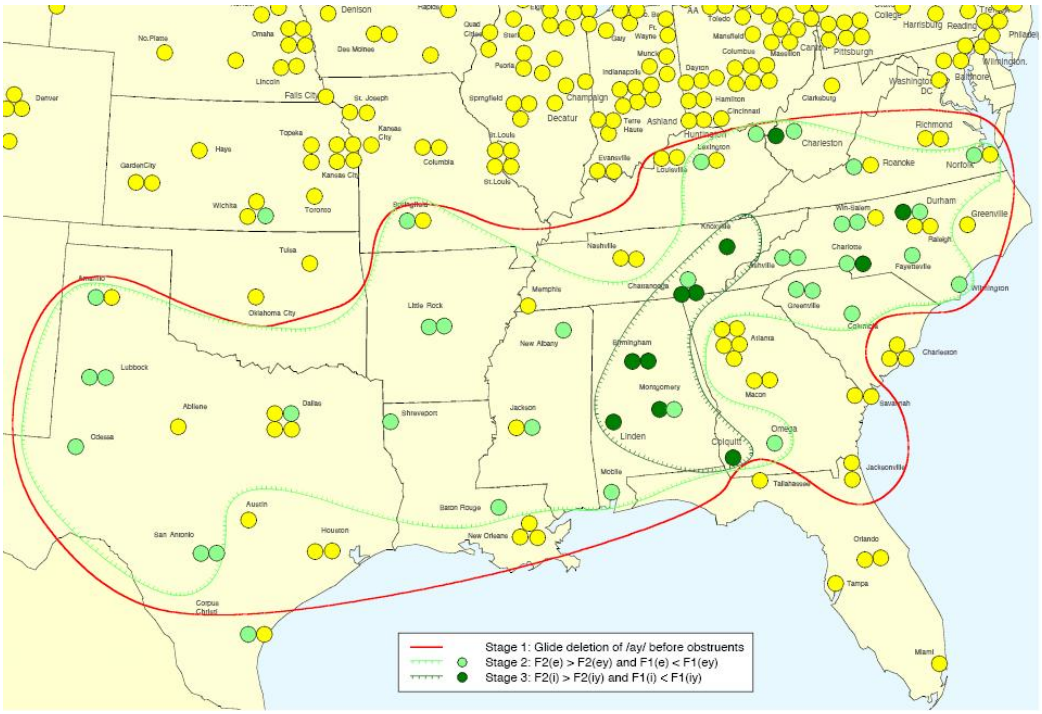

Figure 7.2: The distribution of the Southern Shift in North America (Labov et al. 2006:128)

The Stage 1 glide deletion method involves the monophthongization of the PRICE vowel word-finally and before voiced obstruents. However, it was unclear exactly what methods were used to determine this feature, so this study made use of impressionistic methods to determine whether there is monophthongization or not. The audio clips that contained tokens of the PRICE vowel were examined and judgments were made as to the state of Stage 1 for each speaker. The results are found in Table 7.1.

The Stage 2 measure involves the relative positioning of the FACE and DRESS vowels. To achieve Stage 2, a speaker must have a DRESS vowel that is higher and fronter than the FACE vowel. Quantitatively, this means that the mean F1* of the DRESS vowel is less than that of the FACE vowel, and that the mean F2* of the DRESS vowel is greater than that of the FACE vowel. These results are found in Table 7.2 and Table 7.3.

The Stage 3 measure involves the relative positioning of the FLEECE and KIT vowels. To achieve Stage 3, a speaker must have a KIT vowel that is higher and fronter than the FLEECE vowel. Quantitatively, this means that the mean F1* of the KIT vowel is less than

Speaker	PRICE monophthongization
1	–
2	–
3	–
4	–
5	–
6	–
7	–
8	–
9	–
10	–
11	–

Table 7.1: Results of Stage 1 of the Southern Shift using ANAE measures

speaker	F1*(DRESS)	F1*(FACE)	F1*(DRESS) < F1*(FACE)?
1	635.41	527.69	–
2	662.58	546.33	–
3	654.50	524.49	–
4	685.88	627.21	–
5	673.19	533.25	–
6	636.73	549.22	–
7	577.94	600.79	✓
8	590.05	559.50	–
9	639.26	532.92	–
10	634.24	529.57	–
11	610.63	505.26	–
group	637.556	548.75	–

Table 7.2: Results of Stage 2 of the Southern Shift using ANAE's measures

speaker	F2*(DRESS)	F2*(FACE)	F2*(DRESS) > F2*(FACE)?
1	1798.43	1970.82	✓
2	1904.97	2229.41	–
3	1932.05	2257.99	–
4	1544.35	2048.45	–
5	1825.54	2096.13	–
6	1767.08	2183.38	–
7	2290.99	2245.48	✓
8	1834.99	2028.84	–
9	2086.60	2041.28	✓
10	2061.34	2302.29	–
11	1845.98	2221.75	–
Norm	1889.83	2147.80	–

Table 7.3: Results of Stage 2 of the Southern Shift using ANAE's measures

that of the FLEECE vowel, and that the mean F2* of the KIT vowel is greater than that of the FLEECE vowel. These results are found in Table 7.4 and Table 7.5.

speaker	F1*(KIT)	F1*(FLEECE)	F1*(KIT) < F1*(FLEECE)?
1	600.18	487.13	–
2	527.16	507.53	–
3	491.83	361.13	–
4	557.99	470.93	–
5	480.25	363.33	–
6	551.68	487.47	–
7	499.99	465.52	–
8	476.26	429.10	–
9	536.35	395.79	–
10	492.32	390.29	–
11	491.93	406.89	–
Norm	515.95	435.68	–

Table 7.4: Results of Stage 3 of the Southern Shift using ANAE's measures

speaker	F2*(KIT)	F2*(FLEECE)	F2*(KIT) > F2*(FLEECE)?
1	2083.03	2035.05	✓
2	1962.44	2451.06	–
3	2018.13	2384.19	–
4	1890.51	2223.09	–
5	2012.75	2346.32	–
6	2004.27	2422.09	–
7	2403.30	2430.15	–
8	1948.07	2310.72	–
9	2051.52	2229.66	–
10	2274.35	2499.10	–
11	2109.29	2464.11	–
Norm	2061.91	2338.59	–

Table 7.5: Results of Stage 3 of the Southern Shift using ANAE's measures

The results indicate that none of the speakers, nor the normalized group average, has undergone any of the stages of the Southern Shift, except for Speaker 7 who was shown to have undergone Stage 2. This, however, is not as relevant because the speaker did not undergo the trigger, Stage 1.

7.3 Results based on the alternate criteria

Because PRICE monophthongization is the trigger for the Southern Shift, the alternate criteria for this feature was examined first, and if it was determined that no speaker exhibited this dialect feature, then Stages 2 and 3 were not checked. Recall that in Chapter 2, to supplement the ANAE's impressionistic analysis of the low-back merger in production, this study made use of the MANOVA statistical test to compare ordered pairs of F1 and F2. It turns out that the same analysis can be done to determine the status of the PRICE value because the two parts of the diphthong are represented using an ordered pair of F1 and F2. Thus, a MANOVA was used in the exact same manner as in Chapter 2, to produce a p-value. If the p-value was less than 0.05, then the two vowels were distinct, and thus there existed no PRICE monophthongization. The results of this are found in Table 7.6, and they show that no speaker exhibits the first stage of the Southern Shift.

	PRICE1		PRICE2			
speaker	F1	F2	F1	F2	p-value	> 0.05?
1	765.24	1388.09	558.76	1910.73	0.000	–
2	892.78	1621.28	589.82	2485.13	0.000	–
3	755.87	1436.46	522.62	1985.32	0.000	–
4	877.88	1534.62	597.85	2248.10	0.000	–
5	823.80	1472.70	496.79	2292.56	0.000	–
6	773.66	1529.32	526.42	2140.15	0.000	–
7	825.36	1621.12	645.57	2005.38	0.000	–
8	709.57	1484.12	524.09	1927.41	0.000	–
9	832.58	1575.64	510.79	2374.57	0.000	–
10	841.93	1598.15	549.00	2343.89	0.000	–
11	707.99	1497.02	554.82	2069.72	0.000	–

Table 7.6: PRICE monophthongization results using the alternate statistical criteria

7.4 Discussion

While the tests for all three stages of the Southern Shift were performed in the section on the ANAE criteria, only the analysis for Stage 1 was necessary. The impressionistic analysis of PRICE monophthongization showed that no speaker underwent the trigger for the Southern Shift, and thus even if they had Stages 2 or 3, it would be attributed to a different sound change. In the alternate criteria, there were definitive results indicating that the trigger of the shift had not been undergone and thus, there was no need to examine Stages 2 and 3. As

for comparing the the two methods, both predicted the actual results particularly well, and both appear to be accurate measures of the Stage 1 of the Southern Shift.

Chapter 8
Conclusion

This study examined six dialect features and checked their status in Miami English. It was motivated by the ANAE's classification of Miami into the Southeast Super Region, based on the fact that the Miami dialect was said to have both a low-back merger in transition and GOAT-fronting. In terms of the low-back merger, the Miami dialect has gone from in transition to a full merger, based on the fact that both the impressionistic ANAE criteria and the statistical alternate criteria showed a merger in production. Coupled with the fact that all speakers had a merger in perception, this study confirms the work done by Cerny and Doernberger (2008) who first showed that Miami had progressed to a full merger. Both methods also showed that Miami speakers do not front the GOAT vowel, and thus the Miami dialect now fails to meet both criteria for placement in the SESR.

With this new revelation, that in fact the Miami dialect seems to sit in limbo lacking a defined dialect region, it was important to examine other possible dialect features that could define the area. The first new feature examined was GOOSE-fronting, which exists in some form, quite widely across the US. The results of this study indicate that across both the ANAE and alternate criteria, Miami speakers pattern very similarly to the US as a whole, based on the fact that some degree of fronting is fairly common in tokens with coronal onsets, and that fronting is more conservative elsewhere. The next dialect feature of interest, FOOT-lowering was considered after seeing an unexpectedly low FOOT vowel in the normalized vowel plot found in Chapter 5. The results of this study based on the ANAE criteria somewhat contradict the original ANAE results in the sense that Miami speakers lower their FOOT vowel more extensively and frequently than found in the ANAE. The alternate criteria in the current study provided more conclusive results when it showed that all speakers exhibited extreme lowering of the FOOT vowel.

The final step in the analysis part of the study was to examine the possible presence in the Miami dialect of chain shifts affecting large portions of the US. The results of the first chain shift, Northern Cities Shift, which there was no prior evidence of in Miami, did

not fully agree with the ANAE. The ANAE methods showed that Miami speakers did not exhibit the shift, but the alternate criteria showed that four speakers underwent the first three stages. Despite the differences in results, the two measures tend to be consistent with each other (the two speakers that were said to have Stage 1 in the alternate criteria but not in the ANAE had the two closest mean F1* values to the 700 Hz threshold), and thus the alternate criterion tends to be more sensitive. It has yet to be determined whether this is better or worse in terms of identifying the shift, and once such a conclusion has been reached, then the alternate criteria could potentially be modified. The results of the Southern Shift, a chain shift affecting regions hundreds of miles north of Miami, indicate across both methods that the Miami dialect does not exhibit any signs of the shift.

These results, and this study as a whole, are important in the sense that they create a gap in the North American English dialect regions. Once considered a part of the SESR, Miami now stands outside. The question now becomes: Where does Miami fit in and what dialect features define it? The work done in this study indicates that Miami has a low-back merger, FOOT-lowering, and GOOSE-fronting in some environments. These features and these results now become the beginning steps toward classifying the Miami dialect.

There are a few aspects of this study which could be improved to strengthen the results. First, it would be good to expand the subject group with subjects from different social networks and from a more diverse set of age and socio-economic groups. Next, the interview process should be more uniform by having each speaker perform all four tasks in a single session. This study lacked such a procedure, as some speakers read the second word list at a date later than the question-and-answer session and the first word list. Further, this study could be improved with a word list that contained more places and manners of articulation. Finally, stricter protocols for analyzing the phonetic material in Praat should be established, such as specifying more well-defined algorithms for selecting intervals to be measured.

Recall from Chapter 1 that the ANAE considered Florida to be a region that was big enough to have its own dialect, but was not defined as one because the necessary features were unknown. Future work on this topic would examine more closely and broadly the Florida dialect. The results provided by this study only show what is happening in Miami English. It is important to compare features of Miami to other locations in Florida (Ft. Lauderdale, West Palm Beach, Orlando, Tampa, etc.) to determine if there is a larger Florida dialect, and if so, what its features are and where its boundaries are. Finally, because Miami is such a diverse place both racially and ethnically, future work could focus on certain dialects, like African American Vernacular English or speakers who speak English as a second language, that represent such diversity.

Appendix A

- Describe some of your favorite parts about growing up and living in Miami.
- Describe some of your favorite hobbies or activties that you do for fun.
- Describe some of your most interesting friends or family members.
- Tell me about a happy memory from your childhood.
- What is the square root of 6,824?

Figure A-1: Interview Questions

sewer	tag	pop	caught	you
sister	bat	cot	taught	care
rather	term	fine	join	pearl
maid	bid	took	birth	marry
where	pain	hen	can	blue
fix	bean	tame	ten	war
lore	cam	Don	pawn	lure
hire	own	tomb	come	race
fee	dim	burn	time	shower
hour	coin	down	team	lane
water	beep	take	beg	fire
beer	bead	tape	depth	win
ship	soap	tube	but	bored
bar	tip	foot	bird	time
say	tide	choice	bowed	carry
car	bite	Boyd	doubt	need
teen	gone	dawn	bone	hair
near	spoon	bun	bin	shine
there	boat	hoop	bug	pull
pit	beak	pout	toyed	sing
high	pike	Burt	book	bag
shirt	dig	dud	boot	mitten
paper	tap	bet	bait	why
clock	town	Nathan	life	end

Table A-1: First Word List

blue	cop	sawed	food	fix
race	choke	could	sob	bar
shine	cough	Duke	tote	teen
mitten	scotch	jaws	do	pit
end	pop	balk	book	high
war	caught	boot	code	sister
pearl	put	tube	dope	care
love	foot	boat	took	hair
you	dock	crazy	serious	fee

Table A-2: Second Word List

Appendix B

This appendix is found on an accompanying CD. There are three folders on the CD, which contain the question-and-answer session, first word list, and second word list audio files for all eleven speakers.

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