ADOLESCENT ETHNOLINGUISTIC STABILITY AND CHANGE: A LONGITUDINAL STUDY

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ABSTRACT

MARY ELIZABETH KOHN: Adolescent Ethnolinguistic Stability and Change: A Longitudinal Study

(Under the direction of Elliott Moreton and Erik Thomas)

Most sociolinguistic studies rely on apparent time, cross-sectional methods to analyze language change. On the basis of apparent time data, sociolinguists have hypothesized that cultural processes of lifespan change create predictable cycles of linguistic behavior in which adolescents lead in the use of vernacular variants and advance sound change (Eckert 1997). While adolescence is hypothesized to be central to vernacular optimization and language change processes, only longitudinal studies reveal whether individuals change their linguistic behavior in predictable ways across adolescence. Furthermore, longitudinal data about individual trajectories of change allow linguists to confirm or disconfirm apparent time data.

As a longitudinal study of over 67 African Americans from infancy to post-high school, the Frank Porter Graham (FPG) study presents a unique opportunity to document language variation across the lifespan. This analysis is the first longitudinal acoustic analysis of vocalic variation from childhood to early adulthood. Because African American English (AAE) vowels in the Piedmont region of NC are stable, this study can explore the extent to which life-stage variation influences participation in ethnolinguistic vowel systems without the confound of a change in progress. Additionally, because longitudinal trajectories of AAE morphosyntactic/consonantal variables are documented,

comparisons across linguistic subsystems reveal the extents and limits to which life-stage patterns predict linguistic cycles of behavior.

This study focuses on a subset of 20 individuals at approximately ages 9, 12, 15, and 20. Although all participants are from the Piedmont region of NC, individuals come from two communities with different demographics. Hierarchical regressions show that, while participation in AAE vowels strongly correlate with community and school demographics, stable vocalic variables do not undergo aggregate-level peaking patterns consistent with age-grading. Instead, stable aggregate patterns camouflage idiosyncratic individual trajectories. A lack of group patterns for vowel variation across adolescence suggests that life-stage variation does not affect all linguistic systems equally; age-grading is a minority pattern perhaps associated with stereotyped features and/or morphosyntactic/consonantal variables. Because age-grading is not a predominant pattern for non-stereotyped vocalic variation, apparent time peaks in adolescent vowel data should not be taken for granted as a default product of age-grading.

ACKNOWLEDGEMENTS

The Piedmont region of North Carolina is home to a unique community of linguists with an unparalleled dedication to collaboration and mentorship. This community has been a constant source of support and inspiration to me as I've gone on my academic journey. I count myself lucky to have had the direct supervision of such generous, talented, and insightful individuals as I've had on my dissertation committee. My co-chairs, Elliott Moreton and Erik Thomas, were not only exceedingly generous with their time, but also provided complementary perspectives that greatly strengthened the project. They are model scholars, and I hope to live up to their examples of innovation, thoroughness, and commitment to the field. Bruno Estigarribia's keen insight kept me on my toes and forced me to think beyond the scope of my discipline, and Mike Terry's enthusiasm and encouragement kept my motivation up. I also join a line of linguists who are both indebted to and inspired by Walt Wolfram, whose kindness and humanity serve as an example of the power of inclusive leadership. Walt's strength-based approach to mentorship allows all of us in the North Carolina Language and Life Project (NCLLP) consortium to develop our own voices and paths, and I can only hope to try to carry on that tradition with my future students.

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LIST OF ABBREVIATIONS

AAE	African American English
AAVS	African American Vowel System
AE	Appalachian English
CDS	Child-Directed Speech
EAE	European American English
FPG	Frank Porter Graham
NCS	Northern Cities Shift
NYC	New York City
PRV	Predominant Regional Variety
SAAE	Standard African American English
SDA	Second Dialect Acquisition
SEAE	Southern European American English
SLA	Second Language Acquisition
SVS	Southern Vowel Shift
UNC-CH	The University of North Carolina at Chapel Hill

“Linguists frequently study linguistic change, but an equally interesting phenomenon is linguistic stability or resistance to change” Macauley (1977: 2)

CHAPTER 1

THE QUESTION

Transitions between life stages, particularly from childhood to adolescence and adulthood, have a profound impact on an individual’s identity formation and social networks as well as involvement with and orientation towards social institutions. These cultural transitions potentially influence trajectories of linguistic change across the lifespan. While language acquisition studies incorporate longitudinal methods to document individual linguistic progression, similar studies beyond early acquisition are rare so that post-early acquisition trajectories of language variation remain under-documented (Sankoff 2005). Though sociolinguists hypothesize that life-stage changes create predictable cycles of linguistic behavior, particularly that individuals are hypothesized to advance sound change and increase the use of vernacular features during adolescence (Labov 2001; Eckert 1997), the paucity of middle childhood and adolescent longitudinal research leaves a gap in empirical evidence for testing assumptions of post-acquisition stability and change. Additionally, longitudinal studies serve as an important complement to more common cross-sectional studies, as an understanding of how individual lifespan variation corresponds to community patterns of variation and change improves interpretation of apparent-time/cross-sectional data that includes adolescent speech.

Although longitudinal studies of adolescent and adult linguistic variation and change are uncommon, recent longitudinal research on African American English (AAE) morphosyntactic and consonantal variation suggests that many iconic AAE features undergo age-grading, in which adolescents decrease their use of vernacular variants as they enter adulthood (Rickford & Price 2013; Van Hofwegen & Wolfram 2010; Wolfram & Van Hofwegen 2012). It remains to be seen whether age-grading is a pervasive pattern that affects variables across linguistic subsystems or if it is restricted to stereotyped and/or morphosyntactic features. Without empirical longitudinal evidence, a number of questions remain:

- Do individuals change their linguistic behavior in predictable ways across adolescence? And, are adolescent trajectories of change isomorphic across linguistic subsystems?
- How do individual trajectories relate to synchronic community patterns in terms of vowel variation over late adolescence and early adulthood?
- How do trajectories of variation for AAE across adolescence correlate with and reflect societal structures?
- What does variation and stability during late adolescence and early adulthood reveal about the nature of language change over the lifespan?

The Frank Porter Graham (FPG) database provides the first opportunity to empirically explore these questions longitudinally. While previous adolescent longitudinal studies consist of case studies or are limited in their temporal progression (Baugh 1996; Carter 2006; De Decker 2006; Eisikovits 1998; Moore 2004; Rickford & McNair-Knox 1994; Rickford & Price 2013; Sankoff 2007; Wagner 2008), the FPG project has followed 67 African Americans from infancy to adulthood (Burchinal, Roberts, Hooper & Zeisel 2000), representing the largest and most comprehensive longitudinal study of AAE ever undertaken.

Using the FPG database, which now spans the first 20 years of life (Burchinal, Roberts, Hooper & Zeisel 2000), I identify the stability and change of acoustic variants in the vowel space during adolescence, and compare these trajectories with other linguistic subsystems, in particular, the morphosyntactic and consonantal changes observed by Van Hofwegen and Wolfram (2010; Wolfram & Van Hofwegen 2012). The inclusion of four time points, starting in childhood and ranging to early adulthood, allows for a true longitudinal analysis of trajectories across adolescence. As the first longitudinal acoustic analysis of vocalic variation across the adolescent and early adult lifespan, this study enriches insight into how the cultural context of growing up predicts engagement in variable linguistic systems.

The community examined in this study provides an ideal testing ground for theories regarding the importance of adolescence in life-stage variation, as well as the interaction between societal structures and participation in ethnolectal vowel variation. The African American Vowel System (AAVS) represents a stable vowel system that has been present in the region for almost a century, even as rapid changes are evident in the Predominant Regional Variety (PRV) of the region (Dodsworth & Kohn 2012). While participation in the AAVS spans over three generations, evidence reviewed in Chapter 3 indicates that who participates in this system and to what extent are highly variable with the PRV. As a collection of socially-correlated stable variables, components of the AAVS have the potential to serve as resources in adolescent identity work, a core component of life-stage change (Eckert 1997). Because the AAVS is a stable system, life-stage variation can be assessed without the complicating factors of a change in progress.

This study illustrates that, while the AAVS highly correlates with school and community demographics, group adolescent trajectories for these variables are not consistent with age-grading. These results contrast with patterns observed in contemporary analyses of consonantal and morphosyntactic vernacular AAE variables in the corpus in which participants as a group use more vernacular features during adolescence than during childhood or adulthood (Van Hofwegen & Wolfram 2010; Wolfram & Van Hofwegen 2012). While sociolinguists hypothesize that age-grading is a common component of lifespan change across adolescence (Chambers 2003; Eckert 1997), these findings suggest that community-level patterns of age-grading may be restricted to a select suite of highly salient variables.

As more longitudinal studies of adolescent and adult speech emerge, evidence about post-acquisition stability and change complement apparent-time/cross-sectional studies by establishing models of individual linguistic lifecycles. Increased documentation of life-stage trajectories for a variety of linguistic variables not only elucidates the nature of individual variation across the lifespan, but improves interpretation of apparent-time/cross-sectional data. Because age-grading does not appear to be a majority-pattern for non-stereotyped vowel variation, it should not be assumed that adolescent peaks in apparent-time vowel data reflect processes of age-grading.

1.1. Life-stage variation: how does linguistic behavior change as children mature into adults?

When compared to older generations adolescents frequently stand out, often using more innovative or vernacular forms and showing great flexibility in terms of linguistic change. This pattern, known as the adolescent peak, has been repeatedly observed in apparent time (see Section 2.1). Eckert hypothesizes that adolescents use more vernacular and more innovative variants as they establish independent identities from their families, which, in turn, advances sound change:

> Adolescence is the focus of the development of the social use of the vernacular, and in general is seen as the time when linguistic change from below is advanced. Adolescents lead the entire age spectrum in sound change and in the general use of vernacular variables, and this lead is attributed to adolescents' engagement in constructing identities in opposition to – or at least independently of – their elders (1997: 163).

Under this hypothesis adolescence is a special life stage in linguistic development. The language of adolescents is set apart by two processes. First, adolescents push sound change forward and increase their use of vernacular forms as part of the socio-cultural transition from childhood to adolescence. Second, some young adults shift away from local or stigmatized variants during the transition between adolescence and early adulthood as they gain adult marketplace responsibilities or come into contact with other linguistic varieties in social institutions such as university systems or the military (Bigham 2012; Prichard & Tamminga 2011; Wagner 2008, 2012b). Under this model, the cultural process of growing up is predicted to influence post-acquisition trajectories of linguistic behavior. These depictions of life-stage changes are mostly established on the basis of trend studies and apparent-time studies for morphosyntactic and consonantal features that compare adolescents to adults (e.g. Ash 1982; Cedergren 1990, 1973; Labov 2001), as well as detailed ethnographic studies of adolescent speech (Bucholtz 1999; Eckert 1989; Fought 2003; Habick 1993; Labov, Cohen, Robins & Lewis 1968; Mendoza-Denton 2008).

Despite the attention given to life-stage variation, without longitudinal analyses, linguists are left with only a snapshot of linguistic behavior and a set of assumptions about change over the lifespan. While previous research on adolescent speech illustrates the connection between linguistic variability and social structure, only longitudinal studies can provide empirical evidence that adolescent linguistic behavior shifts and changes with the inevitable changes in social structures that individuals experience as they grow and develop into adults. Specifically, longitudinal analyses that track linguistic behavior from childhood through early adulthood are necessary to identify in what ways adolescents differ from their childhood and adult selves and how individuals linguistically transition through the life stages of childhood, adolescence, and adulthood.

This study illustrates the extent and limits to which adolescent speech stands out from adjacent life stages through the incorporation of four time points starting at approximately age 9 and ending at approximately age 20. Within Chapter 5 I provide evidence that aggregate-level trajectories for stable vocalic variation are inconsistent with patterns of adolescent peaking. As a group, the adolescent time points do not significantly differ from childhood time points for the majority of the variables analyzed. However, while aggregate-level results largely show group stability, individuals display idiosyncratic trajectories of vowel variation across adolescence. These results suggest that aggregate patterns of age-grading for stable vowel variables may be a minority pattern for life-stage variation, as adolescents do not pull from all linguistic resources in identical ways when they construct their adolescent linguistic identities.

These results contrast with patterns observed in contemporary analyses of consonantal and morphosyntactic vernacular AAE features in the corpus (Van Hofwegen

& Wolfram 2010; Wolfram & Van Hofwegen 2012). Trajectories of change for stereotyped morphosyntactic and consonantal variables at the aggregate level are consistent with age-grading, unlike patterns observed for vocalic variables. Life-stage variation does not appear to affect all linguistic subsystems in predictable ways because trajectories of change are mostly variant-specific (Chapter 6). While age-grading has been identified as a common component of lifespan change across adolescence, these findings suggest that community-level patterns of age-grading may be restricted to a select suite of highly salient variables. Evidence from this study shows that adolescent peaks at the aggregate level do not occur across all types of linguistic variables.

1.2. Implications for apparent-time research: what is the relationship between individual trajectories and community patterns of variation and change?

Due to constraints on data collection and resources, the majority of sociolinguistic analysis relies on the apparent-time construct (Bailey, Wikle, Tillery & Sand 1991; Labov 1963[1972]; Tillery & Bailey 2003). The apparent-time construct tracks sound change by comparing community speech norms across generations of speakers in a cross-sectional design. Under this model differences between the speech of older and younger generations are interpreted as a reflection of language change within the community. However, linguistic instability at the individual level can confound the interpretation of apparent-time data.

Longitudinal studies increasingly suggest that individuals can continue to modify their language throughout the lifespan both in the direction of community change (Harrington, Palethorpe & Watson 2000; Sankoff & Blondeau 2007), such that apparent-time comparisons may underestimate linguistic change, as well as in opposition to the direction of community change (Sankoff & Wagner 2011), such that apparent-time comparisons may overestimate linguistic change. Building on Labov (1994), Sankoff identifies five potential relationships between synchronic patterns of community variation observed in apparent time and individual trajectories of change (Table 1.1, see also Figure 1.1-Figure 1.4).

Table 1.1: Possible relationships between individual and community variation as illustrated in Labov (1994), expanded in Sankoff (2005: 1004), and discussed in Wagner (2012b)

		Individual	*Community*	*Synchronic Pattern*
1.	Stability	Stable	Stable	Flat (no apparent change)
2.	Age-Grading	Unstable	Stable	Monotonic slope with age
3.	Generational Change	Stable	Unstable	Monotonic slope with age
4.	Community Change	Unstable	Unstable	Flat(no apparent change)
5.	Lifespan change	Unstable	Unstable	Monotonic slope with age

Interest in the relationship between individual trajectories of change and community variation emerges from the observation that aggregate, synchronic patterns can mask multiple patterns of longitudinal behavior. Authors such as Labov (1994) and Sankoff (2005) observe that monotonic slopes for age in synchronic data can correspond to age-grading in which linguistic variation remains stable at the community level even as individuals undergo life-stage change (Figure 1.1), generational change in which individuals are stable while new generations bring in more advanced forms of a linguistic change (Figure 1.2), or lifespan change in which individuals undergo change in the same direction as community change (Figure 1.3). Age-grading is a cyclical process in which each successive generation uses heightened levels of a variant at a predictable stage in life. In an apparent-time study that relies on comparisons between age groups to identify language change, age-graded patterns appear identical to language change patterns. One generation will stand out from other generations for the linguistic feature in question (Figure 1.1).

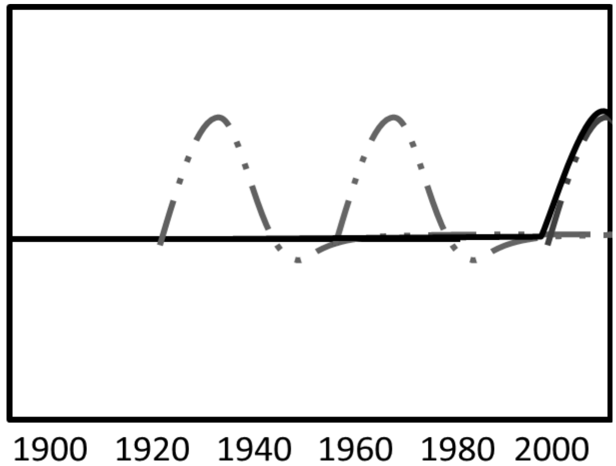

Figure 1.1: Age-grading

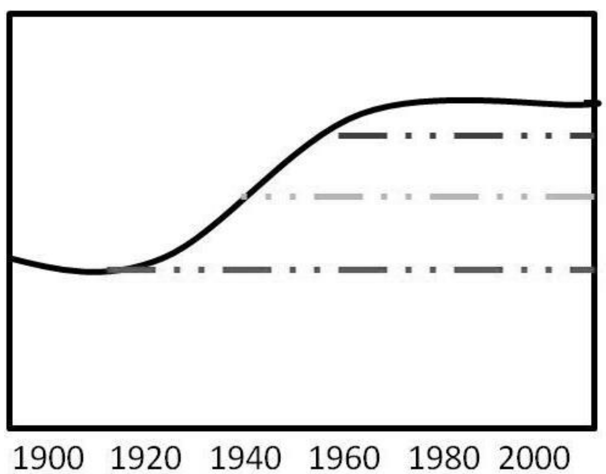

Figure 1.2: Generational change

Generational change has traditionally been conceptualized as a pattern in which each successive generation advances a sound change, but remains stable across the lifespan. This corresponds to a monotonic distribution in apparent time with stability at the individual level (Figure 1.2).

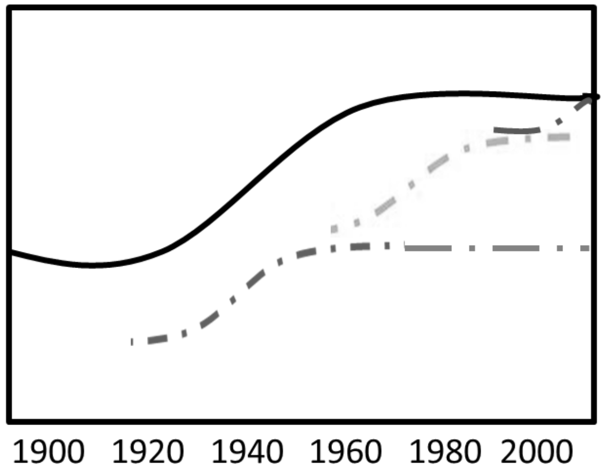

Figure 1.3: Lifespan change

Lifespan change is a process in which individuals change in the direction of community change in real-time. When lifespan change occurs apparent-time analyses can underestimate linguistic change as older age groups will have advanced their use of the linguistic variable in question alongside the community under analysis (Figure 1.3).

Stability observed in apparent time could reflect real-time stability or communal change, in which all community members change in concert, such as when a community adopts a new lexical item. A third possible relationship between individual trajectories and community variation not mentioned in Sankoff's assessment is that community stability may correspond to non-monotonic change at the individual level, in which individuals display non-cyclical patterns of change across the lifespan (Figure 1.4). In this scenario apparent-time analyses would correctly assess community stability, but individual dynamicity would not be apparent. Data reviewed in Chapters 5 and 6 align with this pattern: group stability masks individual non-cyclical variation. Rather than unilateral trajectories of change, adolescents show independent non-monotonic paths for stable vocalic variation across the lifespan that corresponds to community stability.

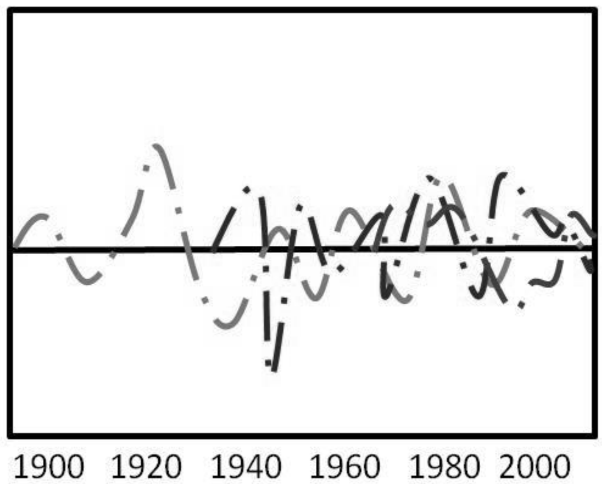

Figure 1.4: Community stability may correspond to non-cyclical individual trajectories of variation.

These observations highlight an inherent limitation of apparent-time studies: individual trajectories of change across the lifespan complicate interpretation of cross-sectional data. Longitudinal studies serve as an important complement and challenge to apparent-time data as they document the extents and limits to which individuals change across the lifespan. It is particularly crucial to identify the extent to which group patterns of age-grading are an expected component of the linguistic lifecycle as age-grading can confound the interpretation of apparent-time data. The more that is known about which types of variables undergo age-grading and when in the lifespan age-grading is likely to occur, the more judiciously linguists can interpret apparent-time data.

Longitudinal data is crucial for the interpretation of adolescent peaks observed in apparent time as these peaks may represent either age-grading or lifespan change. Life-stage changes associated with adolescent peaks (Section 1.1) may take the form of age-grading (Figure 1.1), or lifespan change (Figure 1.3). In apparent time, these two patterns appear identical, giving rise to the adolescent peak discussed in Section 1.1. The patterns may also reflect a combination of age-grading and change so that they are not mutually exclusive, as is probably the case for features like invariant *be* in AAE or quotative *be like.*

Labov (2001) suggests that adolescent peaks observed in apparent time provide an important clue to how sound change occurs within a community. Under his hypothesis, children first acquire the linguistic system of their primary care-giver. However, at some point "children must learn to talk differently from their mothers," a process Labov labels *vernacular reorganization* (2001:415). To Labov, the existence of the adolescent peak for changes in progress demonstrates that children advance sound change by altering their speech until they reach a period of grammatical stabilization (see Figure 1.5). Specifically, he hypothesizes that girls[1] will use their mother's system until about age four. From age four until age 17[2] these girls push the sound change forward year by year. As such, younger girls are expected to have less advanced sound changes than their older siblings because they have not had the same amount of time to push the sound change forward. Because sound changes appear to advance as logistic functions, incrementation will occur as a logistic function, leading to the s-curve observed for language change (Labov 1994). This model predicts an adolescent peak for girls during the middle stages of the sound change when the sound change advances more rapidly, but not in the later stages or earliest stages when the change advances in slower increments.

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[1]Labov does not suggest that boys undergo the same kind of vernacular reorganization; but, rather, have similar levels of participation in sound changes as their mothers. The gender divide for vernacular reorganization provides a possible model for the female lead in most sound changes.

[2]Labov acknowledges that real-time studies indicate that individuals can continue modifying their speech as adults. As such, he suggests that this age limit may have to be refined.

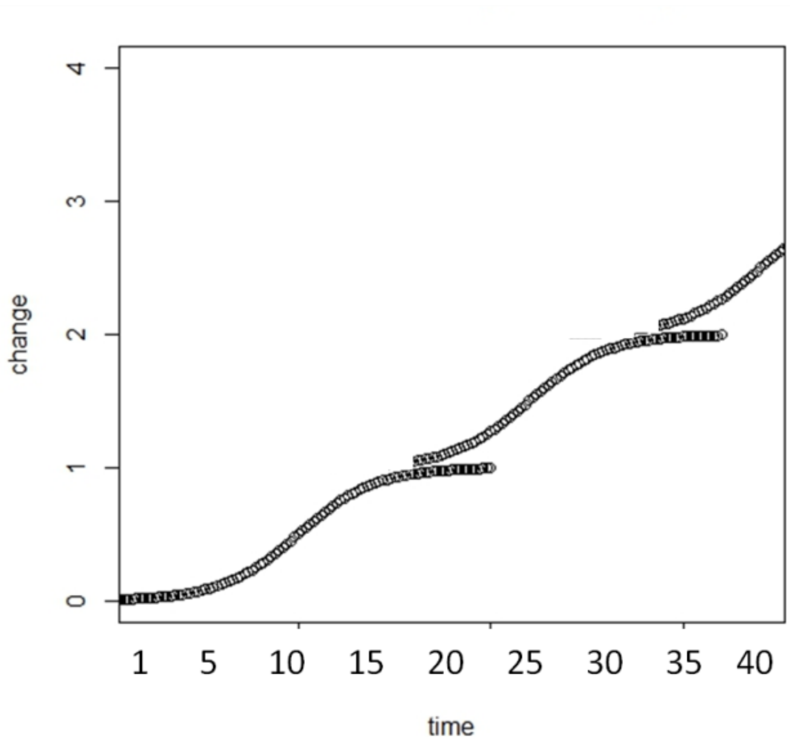

Figure 1.5: Vernacular Reorganization in Real Time. Each curve represents lifespan change for one generation.

Adolescent peaks in apparent time that might be attributed to language change could also reflect a pattern of age-grading. The identification of typical trajectories for stable, socially-indexed vocalic variation provides an important point of comparison for apparent-time studies of language change. The more that is known about individual trajectories of language variation across childhood and adolescence in relationship to community patterns of variation, the easier it will be to tease apart adolescent peaks attributed to language change from adolescent peaks attributed to age-grading. As a result, an understanding of the relationship of the adolescent individual to synchronic community patterns is a crucial issue for the study of language variation and change. Results presented in Chapters 5 and 6 show that aggregate patterns of adolescent peaking do not occur for stable vocalic variation for the population under analysis. This result suggests that adolescent peaks for vocalic variants are not a default pattern related to age-grading, bolstering the position that adolescent peaks for variables undergoing a change in progress correspond to incrementation through vernacular reorganization.

1.3. AAE and life-stage variation: how do ethnolects interact with Predominant Regional Varieties over the lifespan?

Due to an overwhelming focus on the processes underlying language change, research into the linguistic behavior of stable variation is rare in sociolinguistics; accordingly, the relationship between individual trajectories of life-stage variation and stable sociolinguistic variables remains an underexplored topic (Wagner 2012a). Only a handful of stable variables in English, such as multiple negation, copula absence, velar nasal fronting, and interdental fricative stopping,[3] receive attention within the field of sociolinguistics. Yet, as illustrated by the quote introducing this chapter, an understanding of the patterning of stable variation, or resistance to change, is equally important in providing insight into the ordered heterogeneity of the speech community. This is particularly true when one explores the relationship between ethnolects and PRVs, in which patterns of resistance to sound change have been observed (Bernstein 1993; Gordon 2000; Henderson 1986; Labov & Harris 1986; Thomas 1989). In the Piedmont region of North Carolina an AAE vowel system has been present for almost a century (Figure 1.6 and Section 3.4.2 illustrate the time-depth of AAE vowels in the region). Because AAE vowels are stable in the region and longitudinal trajectories of AAE morphosyntactic/consonantal variables are documented, this analysis can explore the

[3]Multiple negation is defined as "[t]he marking of negation at more than one point in a sentence (e.g. *They didn't do **nothing** about **nobody***)" (Wolfram & Schilling-Estes 2006: 400). Copula absence is defined as the absence of the copula, as in *she smart*. Velar nasal fronting is a process in which the velar nasal [ŋ] is realized as an alveolar nasal [n], as in *swimmin'* for *swimming*. Interdental fricative stopping occurs when the voiced or voiceless interdental fricatives [ð] and [θ] are realized as alveolar stops [d] or [t] as in *dey* for *they* or *ting* for *thing*.

extent to which life-stage variation influences linguistic subsystems without the confound of a change in progress. The longitudinal study of AAE vowels offers the opportunity to identify the extent to which stable vowel system show life-stage variation, as well as how ethnolects interact with PRV systems across the lifespan.

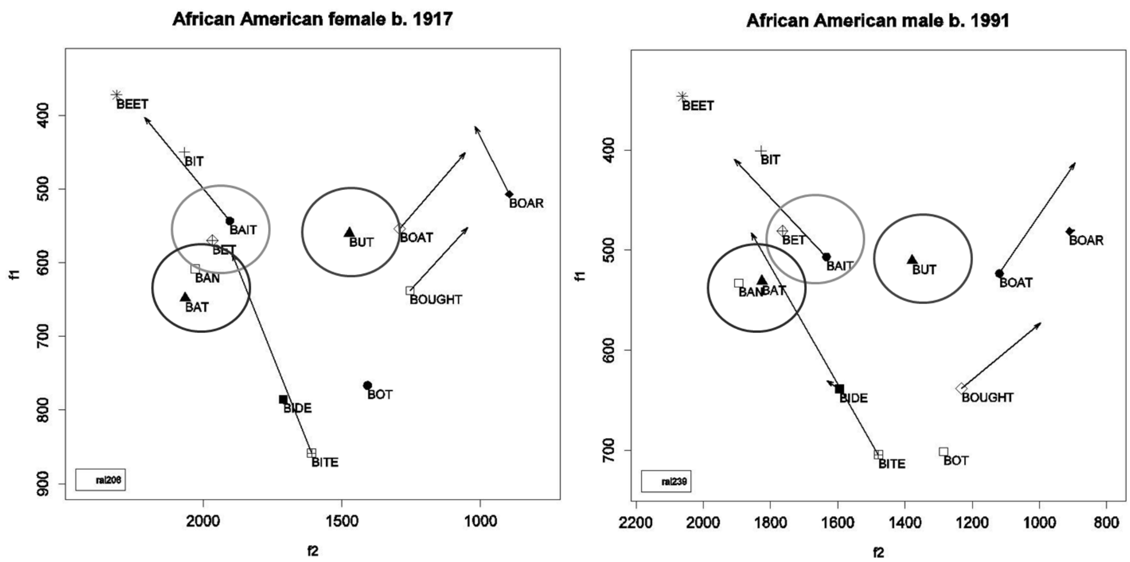

Figure 1.6: Two vowel charts with AAE vowel variables from middle class African American participants born 74 years apart (Raleigh, North Carolina).

More recent, innovative research has begun to track the development of AAE across the lifespan. Rickford and McNair-Knox's work with Foxy Boston (1994), Cukor-Avila's study of African American teens as they shift from a rural school to a more urban school (2000), and Baugh's (1996) longitudinal study of four African American men illustrate the influence of life-stages on participation in vernacular AAE. These studies show that individuals use fewer vernacular AAE features as adults than as adolescents. Recent research at FPG confirms and expands upon these previous studies through the inclusion of earlier time points and a larger sample size (Van Hofwegen & Wolfram 2010). This research confirms that children generally increase their use of vernacular

AAE variables during middle school and high school, perhaps indicating that the adolescent peak is a significant trait of life-stage variation in AAE. These real-time data provide evidence that individual relationships with ethnolectal variation across the lifespan are subject to age-grading.

These previous studies, however, focus on canonical morphosyntactic variables and selected consonantal variables of AAE (e.g. Rickord 1999; Green 2002). In general, the study of sound changes within AAE has taken a back seat to the study of well-known morphosyntactic and consonantal variables. Although the last fifteen years have witnessed the emergence of research regarding AAE vowels, the subject remains vastly understudied when compared to regional European American vowel variation and AAE morphosyntactic variation. Further, the studies addressing AAE vowel variation tend to be divorced from other AAE features. Even as researchers urge the field to consider AAE as a systematic whole, a split in the focus of analysis across linguistic subsystems may conceal how such systems work in concert to index ethnic identity. So, while longitudinal studies of AAE illustrate shifting trajectories of development on the morphosyntactic level, little is known about how the sounds of AAE develop alongside these discrete variables. Do children who demonstrate significant changes in morphosyntactic vernacularity from childhood to their teen years also demonstrate parallel changes in the vowel system? If not, what might this indicate about the relationship between vocalic variation and morphosyntactic variation in AAE and ethnolects in general? A comparison of trajectories of change for morphosyntactic and vocalic AAE variables in Chapter 6 shows that while participation in the AAVS corresponds to community-level demographic variables, morphosyntactic and vocalic variables do not in general change intandem across adolescence. Age-grading for the AAVS, unlike vernacular AAE variables, is idiosyncratic and constrained.

1.4. The corpus

The FPG project provides a unique opportunity to test the adolescent peak hypothesis with empirical data, as well as explore the connection between morphosyntactic variability and variable vowel production in AAE. The FPG study is a longitudinal database that began with 88 African American children in 1990 and followed participants from infancy through post high school, collecting a battery of academic, social, and demographic data across dispersed time points (Burchinal, Roberts, Hooper & Zeisel 2000). The linguistic development of each child has been recorded and preserved alongside their demographic, social, and educational history. Such data provide a narrative of linguistic development rather than a simple snapshot. Because the study includes longitudinal measures of childhood, adolescent, and early adult speech the question of whether adolescence stands out from other life stages can be tested empirically. Additionally, because analyses of morphosyntactic and consonantal variation have been completed, trajectories of change across linguistic subsystems can be compared. This current study examines multiple time points not only to provide context for the adolescent analysis, but also to identify trajectories of change. Longitudinal studies that rely on two time points offer suggestive evidence for change, but whether or not such change will follow peaking, monotonic, or stable patterns cannot be confirmed without multiple temporal data points. The inclusion of multiple time points in this analysis allows differentiation between complex fluctuating patterns of variation and monotonic or peaking patterns of change.

1.5. Chapter outline

Over the course of this dissertation I present an analysis of linguistic variation across the lifespan in order to illuminate the relationship between life stages and linguistic variation. I consider the relationship of individual trajectories of change to patterns of stability and change in terms of the surrounding speech community, and what this evidence suggests about individual negotiations between ethnolectal variation and PRV systems.

In Chapter 2, I discuss previous research on the linguistic flexibility of the individual across the lifespan, as well as relevant longitudinal studies and studies of child vowel variation. Because life-stage change is potentially limited by a loss of plasticity over the lifespan, I further review relevant research from adult longitudinal studies and studies of Second Dialect Acquisition (SDA). The third chapter provides the linguistic context of the study by including a review of AAE vowel research and a description of the FPG linguistic ecology. While several rapid and on-going changes have been identified in the vowel system of the region's PRV speech variety (Dodsworth & Kohn 2012), less is known about the vowel system of the local AAE variety. I present evidence from the Southeast Raleigh Project illustrating the longevity and stability of the AAVS in the region. Additionally, I discuss AAE vowel studies to contextualize the longitudinal analyses in the chapters which follow. Chapter 4 describes the field sites and the participants in the current study and addresses some of the challenges of working with child data, particularly relating to the normalization of vowels.

In Chapter 5 I explore the relationship between community demographics and participation in the AAVS as assessed through school demographic information. I then directly address the adolescent peak hypothesis through a longitudinal analysis of the vowel space at the 4th grade, 8th grade, 10th grade, and post-high school time points. Do the children show vocalic change across these time points? Or do the vowel spaces remain stable? If change occurs between the 4th and 8th grade time points, do children continue to advance this change across high school? Or does the rate of change decrease with age? The contribution of this chapter is two-fold. First, it provides empirical evidence for intense individual variation for stable variants across the lifespan. Second, it presents evidence for a correlation between participation in the AAVS and school demographics.

Chapter 6 compares trajectories of change for vocalic features with trajectories of change for morphosyntactic and consonantal features. Previous analyses of the FPG recordings indicate dramatic differences in linguistic behavior for morphosyntactic and consonantal variants across these time points (Renn 2009; Van Hofwegen & Wolfram 2010; Wolfram & Van Hofwegen 2012). In line with the adolescent peak, participants in the 8th grade use more vernacular variants. Because correlations between vernacular speech and certain vowel patterns have been identified (Kohn & Farrington 2011), I additionally ask whether the 8th grade participants use more extreme variants of these vowel patterns. Should vowels be expected to change in tandem with other segmental and morphosyntactic features? If they don't, what might this reveal about the connection between subsystems in the grammar?

Only a longitudinal study that compares different linguistic subsystems can illustrate the relationship between individual trajectories of change and group patterns of synchronic variation. An understanding of how children linguistically develop in a complex sociolinguistic world is key to illuminating whether life-stage patterns predict linguistic cycles of behavior. Because of the importance of life-stage variation for AAE variation, this may be particularly true for African American youth. Observations regarding life-stage trajectories for the FPG participants not only enhance understanding of the role of life stages in predicting variation, but illuminate our understanding of the relationship between ethnolects and PRVs as individuals grow up in a linguistically diverse world.

CHAPTER 2

LINGUISTIC LIFE-STAGES AND CHANGE ACROSS THE LIFESPAN

The interaction of language with social structures is not constant over the lifespan. Institutions such as school, work, and family structures produce environments in which gender, age, and social segregation correlate with various life stages. Many linguists have noted that it would be surprising if an individual's relationship with these structures did not impact language use, resulting in predictable patterns of linguistic variation over the course of the lifespan (Chambers 1995, 2003; Cheshire 1987; Eckert 1997; Foulkes & Docherty 2006; Hockett 1950; Kerswill & Williams 2000; Labov 1964, 1972a, 2001; Wagner 2012a; Woolard 2011). Although theorization about psychosocial development in linguistic behavior has circulated for some time, the study of life stages in language variation represents a relatively new and important development within the field of sociolinguistics; one that first developed with the recognition that adolescent culture does not exist as an imperfect imitation of adult systems, but rather, emerges within the social and developmental contexts of this life-stage (Eckert 1989).[1] These studies consider the social process of development and aging and its potential impact on linguistic behavior (Cameron 2005, 2010; Coupland 1991, 1997; Eckert 1996, 1997, 2000, 2011; Foulkes & Docherty 2006; Kerswill 1995; Kerswill & Williams 2000, 2005; Roberts 2002; Romaine 1984; Woolard 2011).

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[1]While Habick (1980) and later Eckert (1989) were the first to incorporate this approach to data collection and analysis, Hockett (1950) proposed the importance of recognizing adolescent culture as distinct from adult culture almost three decades before Habick's (1980) and Eckert's (1989) groundbreaking ethnographic work on teen culture.

An understanding of the interaction between age and linguistic behavior is intimately related to the cultural processes of development and aging in the broadest sense of these words, which is why panel studies emerge as a crucial test case for such theories. Panel studies consist of multiple interviews of the same individuals over a span of time, thus providing information on trajectories of change (Sankoff 2005). The majority of what is known about linguistic change across middle childhood and adolescence comes from apparent time or from case studies over a limited time period. While these studies provide information on the interaction between development, aging, and linguistic behavior across the lifespan, there is no substitute for the insight that can be gained by following groups of individuals through the developmental and social experiences of growing up (Sankoff 2004; Wagner 2012a). Only panel studies can empirically establish that individuals show linguistic stability or change across the lifespan and whether change correlates with progression through life stages.

How do individuals linguistically transition between life stages? Do real-time data provide evidence to indicate that the linguistic life stage of adolescence stands apart from other life stages? If so, are such behaviors restricted to certain linguistic structures? Are there limits to language change across the lifespan? Answering these questions is a necessary step in understanding ordered heterogeneity within the speech community.

This current study represents the largest longitudinal study of vocalic variation across childhood and adolescence, both in terms of number of participants and the number of temporal points sampled, providing critical insight into the questions outlined above. The research contributes to the conversation of life stages and language variation in three ways. First, I identify trajectories of development across childhood and adolescence for stable vocalic variation for twenty speakers from approximately age 9 to approximately age 20. This contributes to the growing body of knowledge on linguistic life stages by examining a dimension of potential variability in the system that has yet to be explored longitudinally for children and adolescents. Are trajectories of change for stable vocalic variation isomorphic to those observed for stable morphosyntactic variation within this community? If not, why would a difference emerge and what does this reveal about typical patterns of variation across the lifespan? Additionally, analyzing stable vocalic variation across adolescence provides context for apparent-time studies of sound change as it can serve as a crucial base model comparison of community variation in stable contexts. Finally, I investigate the relationship between institutional structures and lifetime change by exploring the relationship between school demographics and participation in regional sound changes.

The evidence reviewed below from apparent-time and adolescent panel studies (Section 2.1), ethnographic studies of child and adolescent linguistic behavior (Section 2.2), adult panel studies and dialect acquisition studies (Section 2.3) all contribute to the conversation of whether there are typical and predictable patterns of change across adolescence and whether there are constraints on late adolescent change. These studies illustrate that adolescent peaks frequently occur with linguistic changes in progress (Labov 2001; Tagliamonte & D'Arcy 2009). Stable morphosyntactic and consonantal variation above the level of consciousness can show adolescent peaks (Labov 2001; Van Hofwegen & Wolfram 2010; Wolfram & Van Hofwegen 2012), but these patterns are more variable and often subject to additional social constraints (Biondi 1975; Macauley

1977; Wolfram 1969). To date, no studies have examined stable vocalic variation from a life-stage perspective.

Evidence from ethnographic studies of adolescent speech suggests that teens may follow different linguistic trajectories for stable morphosyntactic variables depending on their engagement with adolescent social structures (Eisikovits 1998; Moore 2004). Speakers who vary on a morphosyntactic feature may easily alter speech through simple shifts in frequency even in adulthood (Nahkola & Saanilahti 2004). Yet, there may be limits on the extent to which older adolescents can modify vocalic variables due to a loss of linguistic plasticity (Evans & Iverson 2007). Although longitudinal case studies indicate that adults can modify vocalic systems in the direction of community change (Harrington et al. 2000), group change for variables below the level of consciousness is idiosyncratic (MacKenzie & Sankoff 2010). Because of a lack of research on stable vocalic variation, it remains to be seen how stable vocalic variation patterns across adolescence. Ultimately, there is no substitution for longitudinal studies covering multiple life stages that can show how transitions through the cultural constructs of age impact language use.

2.1. Evidence for life-stages

Currently, the majority of what is known about linguistic development through adolescence has emerged from apparent-time data investigating stable morphosyntactic and consonantal variation or sound changes in progress. Evidence comes from a handful of studies with participants from a wide age range, typically including children from about age 10 through the elderly (Cameron 2005; Labov 1966, 2001; Macauley 1977; Trudgill 1974; Wolfram 1969; Wolfram & Christian 1975), and ethnographic studies that home in on specific life-stages (see Section 2.2). Research from apparent-time studies indicates that individuals in different life stages use stable vernacular morphosyntactic features and incoming changes to different degrees. Starting with a developmental stage where the child acquires linguistic variants closely aligned with parental models (Foulkes & Docherty 2006; Roberts 1994, 1997, 2002; Smith, Durham & Fortune 2007), apparent-time evidence and short term real-time evidence suggests that children begin to diverge from parental models as they gain exposure to peer models in elementary school (Kerswill & Williams 2000, 2005). Several scholars suggest that this process of divergence continues incrementally across childhood, peaking in the adolescent years as teens seek to establish autonomous identities from both adults and children (Cheshire 1987, 2005; Eckert 1997, 2000, 2011; Labov 1964, 1972a, 2001).[2] As teens transition towards adulthood, they are described as attenuating their use of vernacular variables, moving towards adult norms (Labov 2001). Attenuation of variables undergoing a change in progress may occur, but to a lesser extent (Cedergren 1987). Often, young adults' orientations towards marketplace pressures are cited as instigating this shift, and sometimes a similar shift back to more vernacular behavior has been predicted for retirees who no longer experience the pressure of conforming to linguistic marketplace pressures (Chambers 1995, 2003; Eckert 1997).

[2] This vernacular spike has been described as a "preference in variants not favored by adults" (Chambers 1995: 172). So, for example, Wolfram and Christian (1976) did not observe adolescent peaking for many Appalachian English (AE) vernacular features such as *a*-prefixing likely because adults in this region favor these forms.

2.1.1. Age-grading: Evidence from generational and panel studies

Adolescent peaks in vernacularity for stable variants have been cited as evidence of the importance of life stages in linguistic development (Chambers 1995, 2003; Eckert 1997; Labov 2001). Such generational differences cannot be attributed to language change, and as such, represent an important insight into the influence of the cultural construct of age on language variation. Even as adolescent peaking for non-standard stable variables is sometimes touted as a truism in the field of sociolinguistics, evidence discussed below suggests that different communities and class backgrounds exhibit different patterns of age-grading in apparent time. This pattern is consistent with the hypothesis that age-grading reflects the culture context of aging in a community. If adolescent peaks for stable variants are based on identity work as suggested by Eckert (1997), then social indexing of the variable in question, as well as social expectations for adolescent identities, will play a role in the age distribution of the variant. Evidence from Van Hofwegen and Wolfram (2010) presented in this section provides the linguistic context for this study by illustrating that vernacular AAE morphosyntactic features for this population display an adolescent peak. With this in mind, I can ask whether peaking patterns extend to stable vocalic features as well.

Two predominant patterns of age-grading have been described for stable variation in generational studies: a curvilinear pattern in which children demonstrate the highest levels of non-standard features (Cheshire 1987, 2005; Romaine 1984) and a peaking pattern in which adolescents have the highest levels of vernacular features (Labov 1966, 2001). Labov found an adolescent peaking distribution for velar nasal fronting, *eth* stopping and *theta* stopping in his New York City study (e.g. Labov 2001:112). Based on this evidence, he claimed that the use of stable vernacular sociolinguistic variables is a function of class for adults, but that speakers may show elevated use of such features in late adolescence (2001: 119). Yet the age of an apparent-time peak for stable variation does not always appear in adolescence and frequently interacts with class. For example, Biondi (1975) identified a peak in *theta*-stopping, among other features, for 4th graders when compared to 1st graders and 8th graders among Italian-American bilingual and monolingual Bostonians. Macauley's (1977) analysis of Glaswegian English identified that the stigmatized use of glottal variants for /t/ was highest among children, but declined across adolescence to lower levels in adulthood among professional and white collar classes in his data. Variability in patterns of age-grading can be contrasted with more consistent patterns of adolescent peaking identified for changes in progress, suggesting that age-grading may be subject to more locally defined cultural practices related to age (Section 2.1.2)

Both apparent-time and longitudinal studies of AAE have demonstrated that vernacular AAE morphosyntactic and segmental features undergo age-grading between childhood and adulthood (Baugh 1996; Cukor-Avila 2002; Cukor-Avila & Bailey 2011; Rickford & McNair-Knox 1994; Van Hofwegen & Wolfram 2010; Wolfram 1969). These studies suggest that social factors such as school structure, interlocutor effects, and class background likely influence trajectories of life-stage change within each community.

Wolfram's (1969) study of AAE in Detroit examined several stable phonetic and morphosyntactic vernacular AAE variables comparing pre-adolescents (10-12 year olds) to adolescents (14-17 year olds) and adults (age 18 and older). In general, the youngest age group used higher rates of non-standard variants than teens or adults. However, an interaction between class and age was apparent for some of these variables in which working class teens patterned closer to the children's rate of usage and the middle class teens patterned closer to adult levels of usage. This pattern is apparent not only for phonological features such as labialization of interdental fricatives, but also for morphosyntactic variants such as invariant *be*.

Baugh (1996) confirmed this age-graded pattern in real time through a case study of four men interviewed as teens and again as adults. Although each of the participants had taken different career paths, every individual used fewer vernacular AAE morphosyntactic features, including copula absence and non-standard negation, in the adult interview. This is particularly striking considering that one of the adult participants was interviewed during his incarceration, during which linguistic marketplace forces likely differ from typical young adult settings.

Rickford and McNair-Knox (1994; Rickford & Price 2013) provided a longitudinal case study examining stylistic constraints on vernacular AAE for their participant Foxy Boston. Foxy's earliest interview, at age 13, had the highest rate of vernacular AAE forms such as copula absence and invariant *be*. Rickford and McNair-Knox attributed lower levels in later interviews to a combination of interlocutor differences (the fourth interview in the series was conducted by a European American graduate student), changes in life experience (Foxy transitioned from a primarily African American school to a school with a large European American population), and increased involvement with academic and career development programs. Rickford and Price (2013) contrasted Foxy's age-graded patterns for morphosyntax with her relative stability for vocalic variables. However, the earliest time point included in this study was age 13. Given evidence that suggests linguistic plasticity declines across adolescence, this time point may have been too late to capture peaking patterns for vocalic variation.

The importance of school as a locus for diffusion resulting in life-stage change is evident within Cukor-Avila and Bailey's (2011) panel study in rural Texas. Speakers born between World War II and 1970 adopted urban AAE morphosyntactic features only after attending a high school outside of the community as social networks extended beyond the community. In contrast, after the community gained a high school in the 1990s, the youngest generation appeared to have adopted innovative quotative forms through "infusion," primarily from European Americans who came from outside the community to attend the local school. In both cases school system structures provided the social contact necessary to trigger life-stage change.

Van Hofwegen & Wolfram (2020) began research at the FPG project with a linguistic analysis of 32 participants from 48 months through high school (Van Hofwegen & Wolfram 2010). This study has now been extended to include 67 participants and a post-high school time point for a subset of these participants (Wolfram & Van Hofwegen 2012). Participant speech was analyzed for morphosyntactic and consonantal variation in three complementary ways: a token and type base measure of total vernacularity (a Dialect Density Measure (DDM)), and traditional variationist analyses for velar nasal fronting, copula absence, third person singular *–s* absence, and invariant *be*. Because the current analysis focuses on a subsample of the speakers analyzed in Van Hofwegen and Wolfram (2010), this study provides important context.

The majority of participants demonstrated a "roller coaster" trajectory for the composite measure in which scores are high at 48 months, dip in 1st grade (approximately age 6) and 4th grade (approximately age 9), and rise in 6th (approximately age 11) and 8th grade (approximately age 13) (Van Hofwegen & Wolfram 2010). Inclusion of the post-high school time point indicated that DDM scores tended to drop for the majority of speakers between 10th grade (approximately age 15) and post-high school (approximately age 20) (Wolfram & Van Hofwegen 2012). This pattern aligns with the adolescent peak model of vernacularity in which teens use vernacular features more frequently than younger children or adults.

The variationist analysis of *–ing,* third person singular *–s* absence, habitual *be,* and copula deletion also demonstrated adolescent peaking patterns with lower frequencies of vernacular features in 1st and 4th grade and higher frequencies in the middle school and high school years (Van Hofwegen & Wolfram 2010). All morphosyntactic features analyzed using traditional variationist methods rose in frequency between 4th grade and subsequent middle school and high school grades and declined in frequency between 10th grade and post-high school, once again illustrating that these stable vernacular features have an adolescent peak for the community in question (Wolfram & Van Hofwegen 2012).

Findings from the FPG study for morphosyntactic and segmental variation contrast with Wolfram (1969), in which consonantal and morphosyntactic vernacular features were used at higher rates for 10-12 year olds than for teens and adults, further illustrating that adolescent peaking in stable vernacularity, while common, is probably dependent on the cultural context of the community in question. Because features such as copula absence, third person singular -*s*, and non-standard negation were observed in the earliest sociolinguistic studies of AAE (Labov 1966), we can assume that these features are generationally stable to some extent. With this in mind, having comparison data for morphosyntactic and consonantal variation for the participants in this study is particularly valuable as Van Hofwegen and Wolfram 2010 and Wolfram and Van Hofwegen 2012 illustrated that stable vernacular morphosyntactic and consonantal variants have adolescent peaks for this population.

To date, no longitudinal study tracks trajectories of change for vocalic features across childhood and adolescence outside of second dialect acquisition studies to be discussed in Section 2.3. Stable vocalic variation rarely receives attention from sociolinguists unless it is highly stigmatized. Yet, understanding life-stage trajectories of change for stable vocalic variation provides a necessary complement to similar studies of segmental variation by illustrating the extent to which individuals modify their speech as they age.

2.1.2. Linguistic change: Evidence from generational studies

While adolescent speech is frequently described as more vernacular, it is even more frequently described as innovative. Studies of rapid change indicate that "... preadolescents are consistently found to use incoming forms less frequently, not more frequently, than their immediate elders, while post-adolescents also use the same form less frequently..." resulting in an adolescent peak (Tagliamonte & D'Arcy 2009: 59). This pattern has been observed for sound changes in progress (Ash 1982; Cedergren 1973, 1987; and Labov 2001, among others), and morphosyntactic changes in progress (Tagliamonte & D'Arcy 2009).

In a large-scale study of sound change in North America, Labov (2001: 458) found a peak in apparent-time for nine incoming sound changes in Philadelphia. Trudgill's (1974) study of Norwich English also found incoming variants were more common among the youngest participants in his study.[3] Ash (1982) identified similar peaks for /l/ vocalization, a change in progress in Philadelphia. Tagliamonte and D'Arcy (2009) offered strong evidence that morphosyntactic changes also display adolescent peaks. The age range of the 152 Canadian English speakers in the sample population allowed for the comparison of teenagers to both children (between the age of 9 and 12) and adults (ranging from 29 to 32). Of the six variables explored (quotative *be like*, discourse marker *like*, stative possessive *have*, modal *have to,* future temporal *going to*, and intensifier *so*), teens had higher rates for the incoming form than pre-adolescents or adults for five of the variables. Peaks were largest for rapid changes, as seen in the case of *be like*. Incipient changes, such as intensifier *so*, and changes that were approaching completion and completed changes, such as future temporal *going to* or modal *have to,* showed little to no peak. The authors attributed these patterns to logistic incrementation. They hypothesized that pre-adolescents participate in vernacular reorganization, advancing linguistic change, until around age 17 when their grammars stabilize.

Cedergren's (1973) study of *ch* lenition in Panama also contained a peak,[4] which she interpreted as indicating a change in progress. In order to confirm this hypothesis, Cedergren resampled the population over a decade later between 1982 and 1984

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[3] Nevertheless, because Trudgill (1974) groups speakers by decade it is impossible to determine distinctions between preadolescent and adolescent speech.

[4] Cedergren included 22 individuals between the ages of 14 and 20, 23 between the ages of 21 and 35, and 34 over the age of 35.

(Cedergren 1987). The peak remained, even as the sound change had advanced by 10 to 15% per age group. She interpreted these finding as indicative of a pattern of both community change and individual change across the lifespan.

In a rare comparison of stable variation and language change across generations, Cameron (2005) contrasted a morphosyntactic change in progress (quotative strategies) with two stable phonological variables (final –*s* deletion and intervocalic spirantization of *d*) in Puerto Rican Spanish for speakers age 5 to 84. Only the first feature showed an adolescent peak, but it is unclear whether this difference reflects a morphosyntactic/phonetic split or a change in progress/stable variant split. However, given Cedergren's (1987) findings, it seems likely that the distinction relates to change rather than linguistic status.

Apparent-time generational studies provide suggestive evidence that features undergoing change demonstrate adolescent peaks consistent with logistic incrementation regardless of whether these features are morphosyntactic, consonantal, or vocalic. In contrast, adolescent peaking in apparent and real time for variation that is stable at the community level is inconsistent, suggesting that age-grading may be constrained by additional factors. Potential factors that may influence age-graded patterns include whether or not the feature is above or below the level of consciousness, as well as social indexing of variants. Without research into typical lifespan trajectories for vocalic variation researchers must rely on trend evidence to interpret whether adolescent peaks in apparent time correspond to language change, as observed for Philadelphian vowels, or age-graded behaviors, as observed for *theta* stopping and velar nasal fronting in New York City (see Section 1.2 for a discussion of the superficial similarity of age-graded and apparent-time peaks). As such, a lack of research into age-graded patterns poses a hurdle for apparent-time interpretations of research into vocalic change.

2.2. Sociolinguistic analysis of linguistic development across childhood and adolescence

Studies that focus on developmental or cultural aspects of variation across childhood and adolescence are typically limited to a narrow age range. Most studies that focus on younger speakers address the question of how and when children acquire variable forms (Foulkes & Docherty 2005; Roberts 1997, 2002; Smith et al. 2007). Accordingly, they tend to be limited to the early stages of development through the first six years. Interest in adolescent speech typically explores engagement in identity work that may correlate with more innovative or vernacular speech (Eckert 1996, 2000, 2011), or how adolescent linguistic behavior reflects and interacts with social structures specific to both the age group and the local context of the group in question (Bucholtz 1999; Fought 2003; Habick 1993; Mendoza-Denton 2008; Moore 2004), limiting studies to the secondary school years. Until recently the category of emerging adulthood following secondary school has been lumped in with either adolescence or adulthood, but recent research demonstrates that the transitional nature of this life-stage has important implications for language change across the lifespan (Bigham 2008, 2012; Prichard & Tamminga 2012; Wagner 2008). These studies provide a complementary assessment of the linguistic influence of life-stages when compared to the panel studies and large generational comparisons discussed in 2.1.

2.2.1. Sociolinguistic analyses of children

Interest in how and when children acquire variable speech patterns has led to the growth of early childhood research from a sociolinguistic perspective.[5] Data from Child-Directed Speech (CDS) indicate that children are exposed to socially meaningful variation at the earliest stages of acquisition, and analysis of child speech for these earliest time periods indicates close alignment with parental models for socially salient variables (Foulkes, Docherty & Watt 2005; Kerswill & Williams 2000; Roberts 2002; Smith et al. 2007). Longitudinal (Callahan-Price 2011) and apparent-time analyses of language acquisition indicate that developmental constraints on variation cede to linguistic constraints found in the larger adult population during the preschool years, (Foulkes et al. 1999; Guy & Boyd 1990; Roberts 1996, 1997).[6] Research into middle childhood illustrates a shift towards peer models, with schools serving as an important location for social contact (Kerswill & Williams 2000).

Some evidence suggests that local vocalic systems are acquired by about age 4 at which time variation closely aligns with adult models. Smith et al. (2007) studied a lexically conditioned stable phonological variant in Scots English, the *HOOSE* (for HOUSE) variable, among caregivers and children ages 2.6 and 4 years old. Although the youngest children frequently had only the standard variable, the oldest children in this

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[5]Some of the major theoretical questions driving sociolinguistic child acquisition studies include whether children acquire social variation alongside linguistic variation, or if children start with one representation and introduce social variation at a later stage, and how to model acquisition of sociolinguistic constraints in phonological theory (Foulkes & Docherty 2006). These issues fall outside the scope of this dissertation as the children under analysis are beyond the early acquisition stage of development.

[6]During early acquisition social and linguistic constraints may not be acquired simultaneously, frequently with linguistic constraints leading social constraints (Chevrot, Beaud & Varga 2000; Roberts 1994, 1997, 2002; Smith et al 2007). Social constraints can emerge early in child speech, however, due to levels of exposure from parental models. For example, adult class distinctions appear in the speech of 4 to 6 year old Venezuelan Spanish speakers even as style shifting is not apparent among the youngest participants (Díaz-Campos 2005).

study were found to match CDS frequencies and stylistic constraints for the local variable. Roberts and Labov (1995) analyzed the Philadelphia split –*a* system, a variable undergoing change at that time, for 3 and 4 year olds enrolled in preschool. Lexically-conditioned tensing for the children aligned with parental models. Phonetic constraints for the 4 year olds more closely matched adult norms than those of the three year olds, illustrating that the adult system was acquired around age 3-4. Additionally, 4 year olds showed evidence of increasing tensing in environments undergoing a change in progress. The acquisition of adult norms was occurring alongside the progression of sound changes.

Beyond the acquisition of variation in early childhood, analysis of middle childhood speech provides evidence that the transition between infancy at home to childhood and towards adolescence at school correlates with reorganization of variation based on peer models (Kerswill & Williams 2000). While middle childhood is clearly an important time in the linguistic lifecycle for moving away from parental models and learning sociolinguistically meaningful variation in the context of the peer group, the emphasis in sociolinguistic analysis has been placed on early acquisition, adolescent variation, or the presumably stable adult system. Because middle childhood language, between the years of 7 and 11, represents a relatively intact structural system with developing social components,[7] this particular time period deserves greater attention from linguists interested in how the linguistic individual progresses through the lifespan.

[7]While linguistic acquisition may be nearing completion around early elementary school, several studies indicate that children continue acquiring style sensitivity throughout the later stages of early childhood and into elementary school (Chevrot, Beaud & Varga 2000; Díaz-Campos 2005; Renn 2010). Díaz-Campos (2005) observed no evidence of style shifting for Spanish-speaking 3-4.5 year olds, but a significant task effect did emerge for 4.5-6 year olds. In a longitudinal analysis Renn (2010) found that first graders, for example, did not show style sensitivity related to task for FPG children, but style shifting of

Sociolinguistic studies of vowel variation for middle childhood are rare (Habib 2011; Kerswill & Williams 2000; Romaine 1984: 100-102),[8] and acoustic studies for this age group are almost non-existent (Eckert 2011; Jacewicz, Fox & Salmons 2011; Thomas 1996).[9] While there are few apparent-time studies addressing the transition from childhood to adolescence, Eckert notes that this stage is likely a crucial one in the development of the linguistic individual: ". . . it is in this early social order that kids' sociolinguistic competence expands to engage with the wider social world" (Eckert 2011: 86). Eckert's initial investigations of preadolescent speech suggests that innovative vowel variation, including advanced variants of Californian vowels undergoing a change in progress, is one tool that preadolescents draw upon to establish their social orders.

In their study of 4, 8, and 12 year olds at Milton Keynes, Kerswill and Williams (2000) focused on children as the promoters of koineization, a process of rapid dialect change that occurs in dialect contact environments, but their results speak to the importance of life-stage variation as well. Six of the 10 features analyzed in their study of a New Town koine were vowel variables. For all of the variables the children avoided salient regional markers and were more homogenous than the adults, who hailed from various dialect regions. Kerswill and Williams (2000) compared school-aged children to

morphosyntactic and segmental variants emerged as socially significant by the sixth grade. Again, because this current study focuses on a subsample of the data analyzed in Renn (2010), this finding is of particular interest. In a comparison of 6-7 year olds to 10-11 year olds for /R/ deletion in France, Chevrot, et al. (2000) found a similar pattern. These authors additionally note that the process of learning to read likely affects phonemic awareness.

[8]Acoustic studies of child vowel variation from a developmental perspective are discussed in Chapter 4. These studies do not consider social backgrounds of the participants but, rather, focus on acoustic correlates of the physical development of vocal tract morphology. See Vorperian and Kent (2007) for a review of the literature.

[9]Seeking to fill the gap, Jacewitz et al. (2011) compared child and adult speech from a Southern community, a Northern community, and a Midwestern community using word list data. They found that 8-12 year olds generally demonstrated similar regional systems when compared to adults.

children not yet enrolled in school for two vocalic variables: the BOAT and BOOT classes. For both vowel classes the youngest participants aligned more closely with parental models and the 12 year olds led in the use of innovative forms, consistent with Labov's (2001) model of sound change through incrementation. A case study of one male speaker demonstrated a shift away from parental models over an 18 month stretch from age 4 to age 6. The child's vowel system went from reflecting the Scots dialect of his parents to the Southern English variants of his peers during this time.

Linguistic and social saliency likely affects whether or not children adjust the use of a feature when entering school. In a study of Arabic variation Habib (2011) explored two variables among children and adolescents ages 6-18 in a rural Syrian village. Habib compared a rural raised and fronted [e] variant to the low back vowel [a] urban variant, and a more urban glottal stop variant was compared with its rural uvular stop variant. Urban variants are spreading to the rural community under analysis. Mothers in this community typically come from outside the rural town, bringing in urban variants. The uvular stop appears to be a socially salient feature, receiving metalinguistic commentary from participants in the study. Apparent-time age effects were much stronger for the consonantal variant than the vocalic variant, possibly because the saliency of the consonantal variant made this feature the subject of age-grading for boys.

While childhood has been identified as a crucial transitional stage for linguistic development there remains a lack of evidence regarding vocalic variants from children. Only a handful of studies have analyzed child vowels from a sociolinguistic perspective (Habib 2011; Kerswill 1996; Labov 2001;[10] Roberts & Labov 1995; Thomas 1996).

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[10]Labov (2010) includes a group that included speakers under the age of 13.

These studies indicate that vocalic systems have generally been acquired by about age 4 (Roberts & Labov 1995) but that such systems are likely to undergo modification as contact with peers becomes the primary source for linguistic input (Kerswill & Williams 2005). Labov (2001) has suggested that school-aged children continue to advance sound changes across middle childhood and into early adulthood, and initial evidence from generational studies appears to support this hypothesis. Yet little empirical evidence for the development of the vocalic system across childhood exists. As a result, the extent to which children differ from adolescents and adults for vocalic variation remains unexplored. Does child vocalic variation differ from adolescent vocalic variation? Do individuals alter their vowel spaces as they transition through the school system? This corpus allows for a direct analysis of the connection between adolescents and the use of ethnolectal variants from childhood to adolescence as it follows a group of twenty speakers from elementary school through high school.

2.2.2. Adolescents

Unlike child vowel variation, adolescent speech has been the subject of extensive ethnographic work within sociolinguistics. Studies of adolescent culture suggest that the importance of establishing an identity within the context of peer culture leads to extensive identity work performed through linguistic variation during this life stage (c.f. Bucholtz 1999; Eckert 1989, 2000; Eisikovits 1998; Fought 2003; Habick 1993; Mendoza-Denton 2008; Moore 2004). Because of this identity work many teens lead in vernacular and innovative forms, and ethnographically defined emic categories are shown to be better predictors of variation than adult social class categories at this stage in the lifecycle. These studies identify the cultural mechanisms behind patterns identified in generational studies. However, little is known about how children transition from childhood to adolescence (although see Eckert 1996, 2011 for emerging work on this issue), including how vocalic variation transitions as children mature into adolescents. How do children linguistically become adolescents?

By adolescence emergent social systems identified in pre-adolescence appear firmly integrated so that teen social orders have fully developed groups with corresponding linguistic divisions. So, for example, both Eckert (2000) and Habick (1993) found that teens who oriented away from institutional organizations, nicknamed "burnouts" in both studies, had more advanced instantiations of sound change compared to the more conservative teens in each community: burnout girls from Belten High led Northern Cities Shift (NCS) BAT raising and BUT backing (Eckert 2000), while burnouts in Farmer City led BOOT fronting (Habick 1993). From a dialect accommodation/resistance perspective, Fought (1999) identified gang affiliation as a better predictor of resistance to back vowel fronting than class background for a group of Latino students in California, a region where back-vowel fronting is rigorous and widespread for the Predominant Regional Variety (PRV).

Frequently the construction of these teen cultural practices involves the incorporation of new or more advanced linguistic variants, or non-standard variants into the linguistic repertoire. Yet, not all teens actively engage in these kinds of practices, as Bucholtz (1999) illustrates in her analysis of high school nerd girls who resist Californian back vowel fronting (a change in progress), along with other sociolinguistic and social markers of mainstream teens.

Socially conditioned patterns of age-grading have been observed for adolescents as illustrated in Eiskovits's (1998) analysis of adolescent speech in Australia and Moore's (2004) study of teens in the northwest of England. Eiskovits (1998) identified different trajectories of change for females and males during adolescence as female panel participants reduced their use of stable non-standard morphosyntactic and consonantal features, such as non-standard past tense realizations, over the course of the study while male participants either maintained or increased the use of these same features. Eisikovits suggested that the girls and boys in her study had different cultural expectations for maturation, leading to distinct patterns of language change across adolescence.

Parallel to these findings, Moore (2004) followed a group of girls in northwest England over the course of two years. She found that age-grading patterns corresponded to the development of group identities, with girls who developed into a social group known as "Townies," a group identified by engagement in risky behaviors, demonstrating an increase in *were* leveling, tag questions, and negative concord over the two-year span. This pattern contrasted with girls who associated with the "Popular" category, a group that refrained from the more rebellious behaviors of the "Townies." Overall, the "Populars" demonstrated less extreme increases in non-standard linguistic behavior over the course of the two-year study. Findings like these highlight how a group's orientation to the cultural context influences life-stage patterns. While large scale life-stage studies may identify dominant trajectories of linguistic change, there are likely to be sub-patterns related to such choices.

Ethnographic studies of teen speech illustrate that teens participate in complex cultural structures. Even as children grow up within the context of dominant discourses of what it means to be a teenager, it is unlikely that all children will progress in a uniform fashion through this period in life. While generational studies cited earlier offer evidence that teens strengthen innovative changes and frequently have higher rates of stable vernacular features, we may ask whether this pattern is pervasive among teens or restricted to those who engage in the kind of oppositional identity work found for Eckert's Belten High Burnouts.

2.2.3. Emerging adults

As noted by Deser, ". . . if Labov believes that the child is likely to undergo radical language change in her preadolescent (as well as adolescent) years, then isn't it also quite possible that a further series of changes might occur in the adult years where other goals such as career and employment come into play?" (Deser 1990:35). Interviews with post-high school subjects in the 18 and 25 year-old age range are not uncommon in the field of sociolinguistics, but they frequently are lumped into broader age categories. There is reason to believe that the transition from high school to post-high school merits further investigation, especially within the changing context of a post-industrial society where post-high school education, multiple career changes and moves, extended dependence on parental support, and delayed introduction into typical cultural markers of adulthood such as marriage and child-rearing is common (Arnett 2001). This is precisely the kind of observation that drives the most recent research into life stages as linked to lifespan change and language change in general (Bigham 2012). An emerging body of literature has begun to address the influence of this life stage on language variation.

Wagner's (2008) longitudinal analysis of Philadelphia women transitioning between high school and post-high school is particularly relevant for the current study because the analysis includes both stable consonantal variables for 22 participants and vocalic variables that are changes in progress for a subsample of 9 participants at two time points. In line with the generational studies discussed in Section 2.2, class differences in age-grading emerged for the stable phonological variables -*ing* and *dh*, with only the highest socioeconomic group showing a decline in non-standard variants between high school and college. In addition to two stable variables, Wagner (2008) looked at four vowel variables including BET, tensed BATH, BOUT, and BITE. Within the Philadelphia system, BET backing and lowering is a new and rapid change, tensed BATH raising is old and the subject of stereotype, BOUT fronting is a change that has come to completion or is reversing, and the centralization of the pre-voiceless BITE vowel is a new change similar to BET. Although most vowels remained stable on most dimensions, 6 of the 9 participants had a significant difference for at least one of the four vowels. BET and BITE, the newest changes, were the most likely to exhibit change, with three participants advancing BET and two participants advancing BITE. Change for BATH and BOUT was idiosyncratic, with one speaker advancing each and one speaker retracting each. Wagner noted that it is surprising that so few of the participants changed the pronunciation of the stereotyped BATH variable in the context of her study, but this may reflect the lexicalized nature of raising in the Philadelphia split.

Because modern instantiations of post-high school culture lend themselves to intense dialect contact situations found in institutions such as universities and the military, Bigham (2012) suggested that a focus on this life stage can provide insight into patterns of diffusion. He explored accommodation during emerging adulthood using word list data for southeastern Illinois students attending a university with both southeastern Illinois students and students from the Chicago area with the NCS (2008, 2010). He used apparent-time data from teens enrolled at a local high school as a comparison to the southern Illinois college students. The southern Illinois college students showed evidence of accommodation towards NCS norms, although patterns of accommodation varied among participants.

Individual orientation towards the community in question during emerging adulthood may also play a role in predicting participation in local sound changes, as demonstrated in Prichard and Tamminga's (2012) study of Philadelphia vowel systems. Speakers who did not pursue higher education or who attended locally-oriented institutions maintained diagnostic local features including the split short *a* system and a raised BOUGHT class. Speakers who attended nationally-oriented institutions did not maintain these local features, and speakers who attended regionally-oriented institutions had an intermediate distribution. The speakers who led retraction of the stigmatized features also had the most advanced variants of raised BAIT and fronted BOOT, both of which are changes from below the level of consciousness. The authors suggest that changes from below pattern differently from changes from above because ". . . local features are only sensitive to correction when they bear negative social evaluation" (Prichard & Tamminga 2012: 87). Without longitudinal data it is unclear whether these participants altered their linguistic behavior during emerging adulthood or entered this stage of life with the vowel system intact.

Several important themes emerge from this new body of work. First, cultural shifts experienced by emerging adults are likely to be as significant, if not more significant, than those experienced by preadolescents moving towards adolescence.

Second, heightened mobility during this life-stage produces a situation where dialect contact is highly likely for many individuals. Finally, identity work likely plays an important role in the outcomes of such contact such that individuals will show change if negative stigma makes such change socially desirable. However, the paths to achieve change may be variable. Given the radical social development and change that is likely to occur across childhood and adolescence, panel studies are an important tool for researching how these changes impact linguistic behavior.

2.3. Constraints on lifespan change

An individual's linguistic plasticity is one of the factors that determines whether, when, or how an individual changes through the lifespan. The majority of research on linguistic plasticity comes from Second Language Acquisition (SLA) studies with a primary focus on whether a critical period exists for language learning. Evidence from these studies indicates that the ability for speakers to acquire a second language structure correlates with the speaker's age, age of exposure in the second language, the linguistic level and complexity of the target structure, and the relationship of the incoming structure to structures already present within the L1 system, among other factors.

The study of linguistic plasticity is more recent within the field of sociolinguistics, but research into Second Dialect Acquisition (SDA) (2.3.1) and life-time change (2.3.2) directly engage issues of linguistic plasticity by asking what types of linguistic structures individuals modify across the lifespan, and when and how such modification occurs. Findings from these studies align with SLA studies in that younger individuals tend to show more change than older individuals, and the structure of the incoming variable at the linguistic level and in relationship to the first language system may predict ease of acquisition. Socio-cognitive factors such as the saliency of the feature in question (Trudgill 1986) and the speaker's orientation towards the sociolinguistic indexing of the variable are likely to influence levels of change as well (Giles & Coupland 1991).

The current study approaches the question of linguistic plasticity from the perspective of life-time change for continuous variables in a social setting where vowel systems show social variation (see 3.4). Unlike SLA or SDA studies, individuals in this community are likely to have access to both AAE and Piedmont Southern varieties throughout the lifespan, but similar to adult panel studies the level of access may vary by factors such as school and community demographics. Studies of linguistic plasticity suggest that such shifts in the lifespan are constrained by the same factors that lead to a loss of linguistic plasticity later in life for some individuals. To what extent are linguistic life-stage transitions constrained by factors limiting plasticity? At what age can children alter simple phonetic variants in a gradient fashion?

2.3.1. Second language and dialect acquisition studies

A strong inverse correlation between the ability to acquire a language with native-like competency and age led Lenneberg (1967) to propose that language is subject to a critical period constraint for which learning must occur within a developmental window, roughly before the age of 8-10. While the existence and/or nature of this critical period remains hotly debated, SLA research provides clues to general patterns of linguistic plasticity across the lifespan. Perhaps the strongest and most consistent finding in the field is that "earlier is better," as linguistic plasticity appears to decline with age (Flege

1999; Flege, Munro & McKay 1995; Johnson & Newport 1989).[11] Several findings from SDA research reviewed below suggest that the loss of linguistic plasticity is gradual across the lifespan, and may interact with the linguistic level and complexity of the target features. Late learners also show patterns of learning distinct from early acquisition (Flege 1999). These findings suggest that post-adolescent change can occur, but may be constrained.

While early SLA research suggested that linguistic plasticity rapidly drops around puberty (Johnson & Newport 1989), more recent research suggests loss of plasticity appears gradually across the lifespan, rather than sharply (Bialystok & Hakuta 1999; Hakuta, Bialystok & Wiley 2003). This pattern extends to childhood and adolescence so that children acquiring a second language in early childhood attain native-like categories more frequently than children acquiring the same language in late childhood (Flege et al. 1995).[12] These findings suggest that younger children have greater linguistic plasticity than older children and adolescents, but that adolescents do not have a complete loss of plasticity.[13] Greater changes should be possible early in the lifespan, but fossilization of

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[11]The reason for this decline is the source of much controversy in SLA research. Particularly, it remains unclear whether the decline is related to neurobiological changes related to maturation, amount of exposure to the second language, or other confounding factors such as level of education. This controversy is beyond the scope of the current study. Part of this controversy is whether declines in plasticity are sudden (Johnson & Newport 1989) or gradual (Flege 1999).

[12]A gradient decline across childhood in successful SDA is also apparent. Tagliamonte and Molfenter (2007) found that 3 Canadian children acquiring British English as a second dialect still did not match local constraints at 100% after six years of exposure. These findings are consistent with the hypothesis that attainment of native-like acquisition declines across early childhood, as well as later in life.

[13]In addition to general patterns of gradual loss for native-like acquisition across the lifespan, evidence suggests that some individuals may maintain plasticity later in life, even if exposure to a second language does not begin until after puberty. Bongaert (1999) studied advanced Dutch and French learners of English, all of whom began serious study during college. While not all participants were judged to have native-like accents, several did meet the criteria established for native-like pronunciation. He suggested that individual motivational factors may play a role such that if a native accent is of vital importance and if the speaker has sufficient exposure native-like achievement may be possible after the critical period. This suggestion

the linguistic system is not instantaneous, so that individuals may alter speech later in life.

A number of studies suggest that earlier is better in SDA research as well (Chambers 1992; Kerswill 1994; Payne 1976, 1980; Sibata 1958 quoted in Chambers 1992; Trudgill 1986), but the age range at which a variable may be acquired also depends on the linguistic level and structure of the feature (Chambers 1992). Linguistic complexity as a factor emerged as a central variable in Payne's (1976, 1980) study of SDA among children in Philadelphia. Children who arrived after the age of 10 did not acquire 4 of the 5 local vowel variables, while children who arrived before the age of 10 exhibited at least partial acquisition of all the phonetic variables analyzed.[14] Additionally, the complex phonological split of /æ/ was not acquired by any child whose parents were not native speakers of the local dialect. These findings suggest that age constraints on linguistic plasticity are greater for some linguistic variables than others.

Contrary to Payne's (1976, 1980) findings, several case studies provide evidence that adolescent and post-adolescent SDA of vocalic variables can occur. Carter (2007) recorded a Latina student, Maria, at age 10 when she attended a primarily European American elementary school, and at age 14 when she transitioned to a more diverse middle school. Several phonetic variables in Maria's speech shifted towards Latino English norms between these two time points, including pronunciation of BAN and BOOT, prosody, and lenition of intervocalic stops. De Decker (2006) followed four Canadian girls as they transitioned from high school in rural Canada where BAT

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echoes Klien (1995) who proposed that adolescents outperform adults in native acquisition due to increased motivation and increased access to L2 input.

[14]The one variable acquired by speakers over the age of ten, GOAT fronting, was acquired at greater rates than among the younger children.

retraction was less advanced to college in an urban hub where BAT retraction was more advanced. Three of the four girls had more retracted BAT classes in the second interview, indicating a shift towards the urban norm. These studies suggest that post-adolescent change for vocalic features can occur.

SLA evidence indicates that late learners do not acquire categories in the same way as early learners, and the structure of L1 forms in relation to L2 forms can determine the ease of acquisition. Flege (2009) suggested that L1 categories serve as “perceptual magnets” for similar, but not identical categories in the L2. He hypothesized that L1 categories develop slowly, at least into adolescence, as reflected by higher levels of linguistic plasticity for younger speakers. If the speaker fails to develop a new category for an L2 sound, L1 and L2 categories that are perceptually similar become “merged” in an intermediate distribution. For example, VOT for Spanish and English alveolar stops among Spanish late learners of English was found to be intermediate between the two languages (Flege 1991). Because much of SDA consists of subphonemic phonetic adjustments, this pattern may suggest that intermediate levels of accommodation will be common. It also suggests that SDA may be particularly tricky due to the number of similar categories present in each system.

Several studies of adult SDA identify intermediate targets of accommodation similar to the intermediate targets Flege described for late SLA. Notably, Trudgill (1986) coined the term “interdialectalism” for this pattern. Several of Bigham’s (2008, 2010) emerging adults discussed in Section 2.2.3 displayed patterns of accommodation consistent with an intermediate target. In a similar study Evans and Iverson (2007) followed BATH, FOOT and STRUT pronunciations across four time points for 20 native speakers of a Northern variety of British English attending a Southern British university. The students displayed patterns of accommodation, but the authors noted that these changes were far from perfect mimicry. Munro, Derwing, and Flege (1999) found similar intermediate results for Canadian raising for perceptions of Canadians relocated to the Southern US. Variable accommodation to D2 vocalic variables was also identified in Sankoff (2004)'s study of the changing speech of two boys in the *Seven Up!* documentary. Although socially and geographically stable until age 16, both participants moved out of the northern British English dialect region around that time. Sankoff found that accommodation to new dialect patterns was variably produced through partial acquisition of the Southern realizations of the BATH and STRUT classes.[15]

Adult studies of SDA illustrate that while adults can demonstrate change, post-adolescent attainment of local norms can be erratic across variables and across speakers. Both Nycz (2011) in a large study of Canadians acquiring New York City (NYC) English and Conn and Horesch (2002) in a case study of non-natives acquiring Philadelphian English found patterns of accommodation for adult SDA, but variability in terms of the vocalic features. Nycz identified an inverse correlation such that speakers with greater BOUGHT accommodation demonstrated less loss of Canadian raising. Bowie's (2000) study of Maryland exiles revealed idiosyncratic patterns of D2 acquisition with features undergoing a change in the D1 more likely to undergo accommodation than stable features in the D1. Prince's (1987) longitudinal study of dialect accommodation by vocalist Sarah Gorby indicated that the singer showed accommodation to D2 vowel pronunciations in closed class items, but was able to maintain her prestigious first dialect

[15]Surprisingly, there is evidence for acquisition of a new phonetic distinction, a process that Chambers (1992) considers difficult for late-acquirers.

in open class items. Cumulatively, these studies suggest that changes to vocalic systems may be more erratic and idiosyncratic with age, but there may not be a precise age at which this loss of plasticity becomes apparent. Additionally, individuals may vary with regards to the level of proficiency attained and the variables acquired.

Evidence from SLA and SDA suggests that change can occur across the lifespan, but that later change is often more sporadic than early change for both segmental and vocalic variants. SDA of vocalic variables among adults appears more limited and sporadic with idiosyncratic patterns of accommodation, and thus may constrain post-adolescent life-stage shifts in production.

2.3.2. Longitudinal studies

Change in adulthood can be facilitated by a number of factors. First, non-categorical users of consonantal and morphosyntactic variants appear more likely to change over a longitudinal span (Nahkola & Saanilahti 2004; Sankoff & Blondeau 2007). This finding is not surprising as such changes represent a shift in frequency, rather than the acquisition of a new form. Change for vocalic variation across the lifespan has received less attention, but the few studies that have tracked adult vocalic change suggest that individuals may be more likely to alter their speech for rapid sound changes in the community than incipient changes or changes near completion. Vocalic variation across the lifespan appears much more restricted than segmental or morphosyntactic changes (Wagner 2008).

Consonantal change that is analyzed as discrete and morphosyntactic change are distinct from vocalic change in that these features are not continuous. Sankoff and Blondeau (2007) investigated variation of (r) undergoing a change in progress in

Montreal French through a panel and a trend study. Change for panel members was restricted to midrange users of the two variables illustrating that variable speakers can shift rates of variation. With one exception all those who demonstrated change shifted in the direction of the community change in progress. These findings illustrate a consistent pattern of later-in-life change for a consonantal feature undergoing a change in progress when speakers show variable productions at the initial time point. In a panel study of 24 Finnish speakers interviewed twice during a span of 10 years Nahkola and Saanilahti (2004) identified similar patterns for both morphosyntactic and phonological features in their analysis. Categorical speakers tended to remain categorical, while variable speakers tended to change in the direction of community change. However, all coding was performed auditorally. Acoustic analysis may have revealed less discrete patterns for phonological variants.

These findings can be contrasted with results from Bowie (2010) who tracked lifetime change for the deletion of post-vocalic /r/ and /w/ aspiration among Mormon Church leaders over the course of several decades. Neither of these features was identified as a regional feature of Utah English, and it is unclear whether these variables were undergoing a change in progress, but they variably occurred within the dataset. Unlike previous studies discussed Bowie's findings do not present a neat pattern of either stability or change in the direction of a community change:

> [T]here is no consistent pattern of change across the entire group, nor does each change (or lack thereof) follow the same pattern from speaker to speaker. It is true, all the same, that all individual speakers do exhibit variation of some kind over time with respect to both variables examined. (Bowie 2010:64)

These findings raise several questions about linguistic stability and assumptions of change. When more than one time point is included, will patterns identified in two-time point studies continue upon expected trajectories, or will individuals exhibit non-monotonic change? Does group stability mask individual variation? Will stable variables that display salient regional or ethnic patterns display similar noisiness or will they be subject to age-grading?

In general, studies of vocalic variation continue a pattern where rapid changes above the level of consciousness are more likely to change at the individual level, while patterns of change for other kinds of vocalic features are highly idiosyncratic.[16] Harrington et al. (2000) illustrated that individuals can change vocalic features well after the critical period, but that earlier remains better. In their study of the Queen's Christmas speeches they identified significant change in the direction of incoming sound changes for RP English. These changes are largest between the 1950s and 1960s, with little change occurring between the 1960s and 1980s.

MacKenzie & Sankoff (2010) explored trajectories of change for a change from below, the diphthongization of long vowels in Montreal French. While all individuals changed on at least one dimension, the vowel class that underwent change and the direction of change were inconsistent among the speakers analyzed. Gregerson, Maegaard, and Pharaoh (2009) identified a similar pattern for short (æ) in Danish. The authors attributed idiosyncratic patterns of change to a combination of a reversal of a sound change interacting with class indexing, but with two time points it is difficult to distinguish this interpretation from the possibility that the idiosyncratic patterns simply

[16] An early longitudinal study of vowel variation using impressionistic coding by Brink & Lund (1979) concluded that vowel systems in Danish were largely stable for individuals across the lifespan. Recent studies reviewed below demonstrate that individual change is common, even for adults.

reflect individuals' tendencies to display noisy variation across the lifespan in the vowel system.

Adult studies hold several implications for life-stage change. Some variables may be more likely to experience change than others as loss of linguistic plasticity may limit the kinds of changes individuals make to their linguistic repertoire throughout the lifespan. Speakers who vary on a morphosyntactic feature may easily alter speech through simple shifts in frequency. Evidence suggests that changes to vowel production, while possible into adolescence and even adulthood, may be more idiosyncratic.

2.4. What we don't know about life-stage change

The body of sociolinguistic research reviewed in this chapter provides strong evidence to suggest that life stages influence language variation for at least some variables (c.f. Eckert 2000). I also reviewed evidence supporting the hypothesis that adolescents increment language change for morphosyntactic and vocalic variation (Labov 2001; Tagliamonte & D'Arcy 2009). Despite the importance placed on childhood and adolescence in sociolinguistic studies, no study to date has tracked trajectories of change for stable vocalic variation across childhood, adolescence, and early adulthood. Within a community where ethnolectal variation provides various vocalic models, and in which adolescent patterns of peaking emerge for consonantal and morphosyntactic ethnolectal variation, do adolescents show similar peaking patterns for vocalic variation? The answer to this question holds important implications for understanding change among different linguistic structural levels and how individuals transition between life stages. Interpretation of apparent-time analyses depend on an improved understanding of how individuals change linguistically across the lifespan.

CHAPTER 3

CONTEXTUALIZING AFRICAN AMERICAN ENGLISH VOWELS

The AAVS is a system that has been present in the Piedmont region of North Carolina for roughly a century. In this chapter I provide a general description of vowels that commonly occur in AAE, then I review the small body of literature on social correlates of AAE vowels as social saliency and vernacularity is likely to correlate with age-graded patterns of language change. While there is only a limited body of studies on social correlates of the AAE vowel system, there is a larger and growing body of literature related to questions of participation in regional vowel shifts and diffusion. These studies identify historical trajectories of change for the AAVS, as well as social conditions that encourage diffusion between the AAVS and PRVs. Because I track language change across childhood, a potentially crucial period for changing levels of exposure to the PRV, this study contributes to an understanding of the social structures that intersect with ethnolects and cohort-dominant varieties across the lifespan.

After presenting previous research on AAE vowels, I provide the necessary background for my study by presenting data from European American English (EAE) and AAE vowels in the Piedmont region of North Carolina. These descriptions will frame the longitudinal analyses in the chapters that follow by identifying what kinds of vowel variants are typical of African American and European American English in the North Carolina Piedmont, which kinds of variants are typical of AAE varieties in general, the social factors that have been found to predict participation in the AAVS, and factors that may predict participation in regional sound changes. The evidence presented in Section 3.4 illustrates the variable, but stable, nature of the AAVS in contrast to rapid change occurring in the PRV.

3.1. Description of the AAE vowel system

A supra-regional AAE vowel pattern described as a variety of Southern English characterized by both conservative and innovative features has been observed by a number of scholars including Bailey and Thomas (1998), Eberhardt (2010), Kohn and Farrington (2011, 2012b), Koops and Niedzielski (2009, 2011). Labov, Ash, and Boberg (2006), Purnell (2010), and Thomas (2001, 2007).[1] Although this pattern has been observed across a number of AAE communities, participation in aspects of the system is frequently selective. As noted by Yaeger-Dror and Thomas: "There seems to be a suite of variants that are widespread in AAE, but in a given community, African Americans keep some of those features, discard others, and adopt selected features from the local PVE [(Predominant Vernacular English)]" (2010:14). This suite of features shares many features with Southern European American English (SEAE) including the PIN/PEN merger, various mergers before liquids, a variably upgliding BOUGHT vowel that remains distinct from BOT, BIDE glide weakening in pre-voiced and open syllable contexts, and aspects of the Southern Vowel Shift (SVS) (See Figure 3.1). Although the characterization of AAE vowels as a Southern system appears apt to some extent, SEAE vowels and the AAVS are not identical, and probably never have been (Thomas & Bailey 1998).

[1]This list is not an exhaustive bibliography of AAE vowel studies, but, rather, a list of studies that identify the AAE vowel system as unique from ambient dialects. Many other studies focus on shared features between AAE vowels and regional varieties or similarities with the SVS, and these studies will be discussed in Section 3.3.2.

Table 3.1: Similarities and differences between SEAE and AAE[2]

Feature	*Southern EAE*	*AAE*
a. PIN/PEN	+	+
b. HEEL/HILL merger	+	+
c. BALE/BELL merger	+	+
d. upgliding BOUGHT distinct from BOT	undergoing a merger in some areas	+
e. BIDE/BYE glide weakening	+	+
f. Mid front vowel SVS	+	+
g. BAT raising/ fronting	variable	+
h. High front vowel SVS	variable	rare
i. BOUT nucleus fronting	+	-
j. diphthongization of front lax vowels	+	-
k. BITE glide weakening	+	-
l. Back vowel fronting, potentially with BOAT nuclei lowering	more advanced	less advanced
m. Raised BUT	variable	+
n. centralized, lowered BOT	-	+

3.1.1. Similarities and distinctions between the AAVS and the European American SVS

The European American SVS is characterized by glide weakening of /ai/, reversal of the tense and lax nuclei in the front vowels with subsequent diphthongization of the lax vowels, and fronting of the back vowel nuclei (see Figure 3.1).[3] Back vowel fronting appears to operate independently of the front vowel system and consists of the fronting of the BOOT and BOOK classes first following coronals, and later in all environments. BOAT follows this pattern at the last stage of the shift (Labov et al. 2006) with possible lowering of the nuclei as well (Bailey & Thomas 1998).

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[2]Table based on compiled descriptions from Bailey and Thomas (1998), Bernstein (1993), Thomas (2001, 2007), Labov et al. (2006), Koops and Niedzielski (2009, 2011), and selected papers from Yaeger-Dror and Thomas (2010).

[3]Labov (1991) posited that the front chain shift initiates with /ai/ monophthongization, which allows the BAIT class nucleus to move down and back in the vowel space as the BET nucleus moves up and forward. In a later stage, the BIT and BEET nuclei may show the reversal as well, although this change is less common.

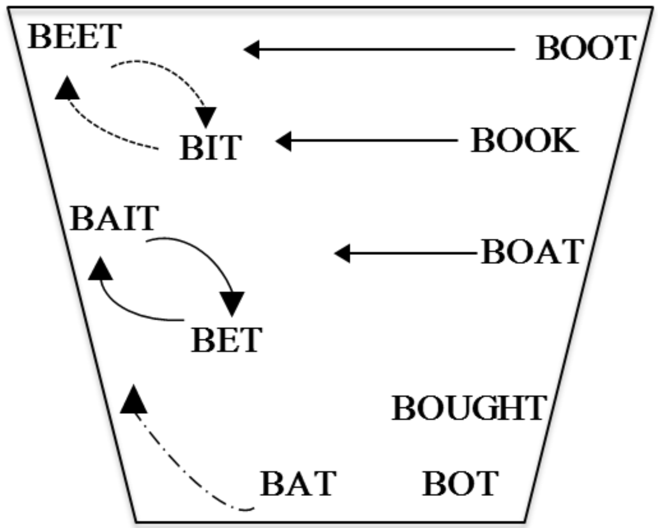

Figure 3.1: The Southern Vowel Shift (Labov 1991, 1994; Labov et al. 2006; Thomas 2001). Dotted lines for BEET and BIT indicate that shifting is not as prevalent as BAIT/BET reversals. The dashed line for BAT indicates the variable nature of raising in the South.

Speakers of AAE have been found to share some aspects of the SVS system; reversal of the mid front vowel nuclei has been identified among selected speakers of AAE in a variety of locations across the US (Andres & Votta 2006; Durian, Dodsworth & Schumacher 2010; Fridland 2003a; Purnell 2010; and Thomas 2001, 2007). BIDE/BUY glide weakening, the most commonly studied vocalic feature in the AAVS, is widespread (Anderson 2002, 2003; Andres & Votta 2010; Ash & Myhill 1986; Bailey & Thomas 1998; Childs, Mallinson & Carpenter 2010; Coggshall & Becker 2010; Deser 1990; Dorrill 1986; Durian et al. 2010; Eberhardt 2009, 2010; Edwards 1997; Fridland 2003b; Gordon 2000; Labov et al. 2006; Pederson, McDaniel, Bailey, Basset, Adams, Liao & Montgomery 1986; Nguyen 2006; Scanlon & Wassink 2010; Thomas 2001; Williamson 1968; Wroblewski, Strand & Dubois 2010). As with SEAE, reversal of the BET and BAIT classes is more common, while reversal of the BEET and BIT classes remains rare (see Fridland 2003a; Thomas 2001, 2007; and the collected studies in Yaeger-Dror & Thomas 2010).

While participants in the AAVS tend to raise BET, lower BAIT, and show glide weakening for BIDE/BUY, several other features differentiate this pattern from the SVS found among European Americans. Unlike the SVS, for which Labov et al. (2006) and Labov (1991) propose that BAIT shifts back and down early in the chain shift, BET raising and fronting sometimes occurs without BAIT lowering or backing in the AAVS (see plots in Thomas 2001, 2007). This observation supports Thomas's depiction of the AAVS as primarily occurring in the front lax vowels (Thomas 2007). Additionally, the BET/BAIT reversal is frequently less extreme than among European Americans (Bailey & Thomas 1998).

Studies that include vowel trajectory information suggest that the front lax vowels remain comparatively monophthongal in the AAVS[4] even as they undergo SVS reversal (Holt 2011; Koops 2010; Risdal & Kohn 2013), although further work is necessary to fully describe potential trajectory differences between SEAE and AAE. Figure 3.2 represents trajectory information for the 20 FPG participants included in this study and a sample of 8 SEAE speakers from Raleigh, North Carolina. The trajectory information is fitted using LOESS (Local Regression – in which simple models are fit to subsets of the data to create an estimate similar to a running average) smoothing splines. These figures are based on 21 measurements across vowels from onset to offset. Trajectories for the FPG participants hit a stable target and stay at the stable target for a portion of the vowel, corresponding to a more monophthongal production. In contrast, the European American

[4] See Koops (2010) for evidence from the BET class among AAE speakers in Texas.

vowels do not hit a steady-state, corresponding to a more diphthongal production. Data are from Risdal and Kohn (2013).

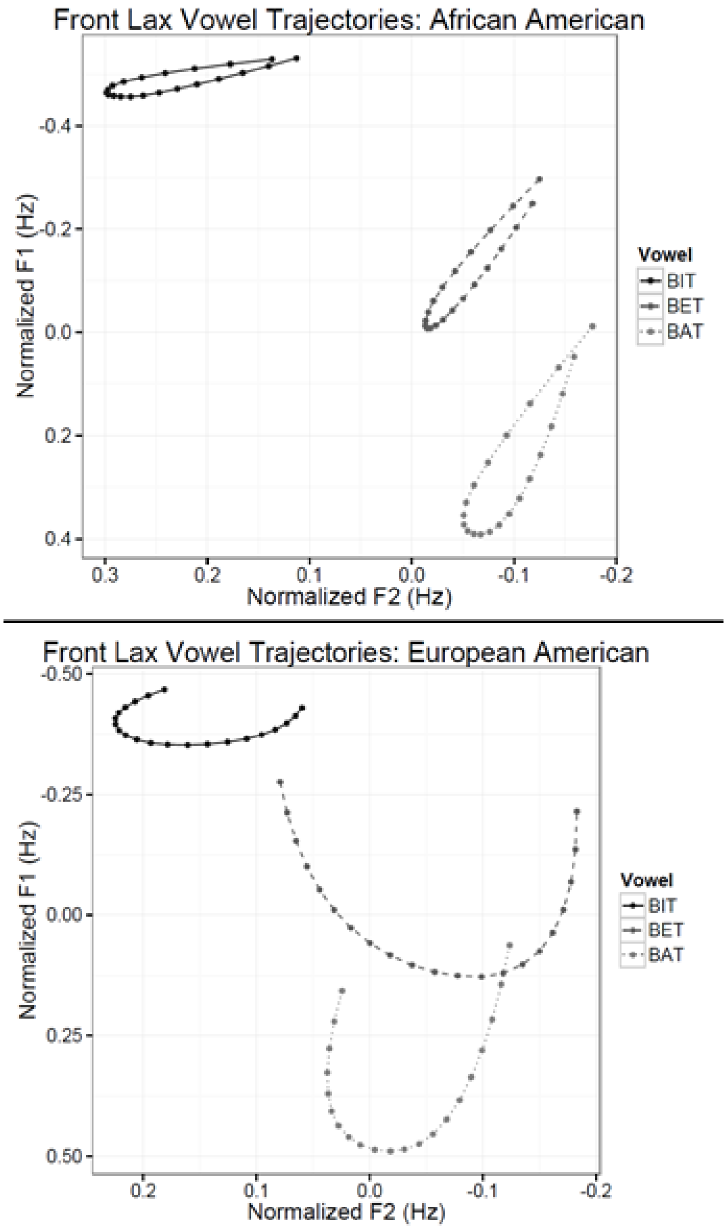

Figure 3.2: Trajectories for front lax vowels.

Further, back vowel fronting is neither as common nor as extreme as in European American communities (Thomas 1989, 2001, 2007), with fronting mainly occurring in phonetically favorable environments such as pre-coronal positions for BOOK and BOOT

(Anderson 2003; Nguyen 2006),[5] or post-coronal positions for BOOT (Fridland & Bartlett 2006). Other developments in SEAE that appear to be less common or less vigorous in AAE include the fronting of the BOUT vowel nucleus and BITE glide weakening (Bernstein 1993; Thomas 2001).[6]

While some SEAE developments occur less frequently in AAE, the AAVS also has some independent developments. BAT raising and fronting is vigorous in AAE (Bailey & Thomas 1998), although some SEAE varieties clearly raise and front BAT as well (Dodsworth & Kohn 2012; Thomas 2001). Other features commonly identified in the AAVS include BOT centralization so that BOT is low and central in the vowel space as compared to the backed BOT class found in Southern European American varieties (Koops & Niedzielski 2009, 2011; Thomas 2007), and raising of the BUT class, a feature that has also been found in the AAVS of Houston, Texas (Koops & Niedzielski 2009, 2011) and Columbus, Ohio (Durian et al. 2010; Thomas 2001), as well as among the FPG sample (Kohn & Farrington 2011, 2012). Visual inspection of vowel charts for the FPG participants indicates that BOT is low and central, often overlapping with the nucleus of BIDE, for the majority of the speakers in the sample, while lax vowel raising is highly variable across participants.

Based on these previous descriptions of AAE vowels, the AAVS differs from Labov's (1991, 1994) depiction of the SVS in that the lax vowels remain more monophthongal and back vowel fronting occurs only in phonetically favorable contexts,

[5] Anderson (2003) and Nguyen (2006) contrasted pre-velar and pre-alveolar tokens and found that pre-alveolar tokens tended to be fronted.

[6] Although see Anderson (2002, 2003) for an exception. Also Fridland (2003b) demonstrates that some African Americans have glide weakening on BITE, but to a lesser extent than occurs in the PRV. Regional studies discussed in Section 3.3.2 show accommodation to BITE glide weakening in endocentric Appalachian communities as well (Childs et al. 2010; Mallinson & Wolfram 2002).

if at all.[7] Similarly to the SVS, this shift may be triggered by phonologically conditioned /ai/ glide weakening.

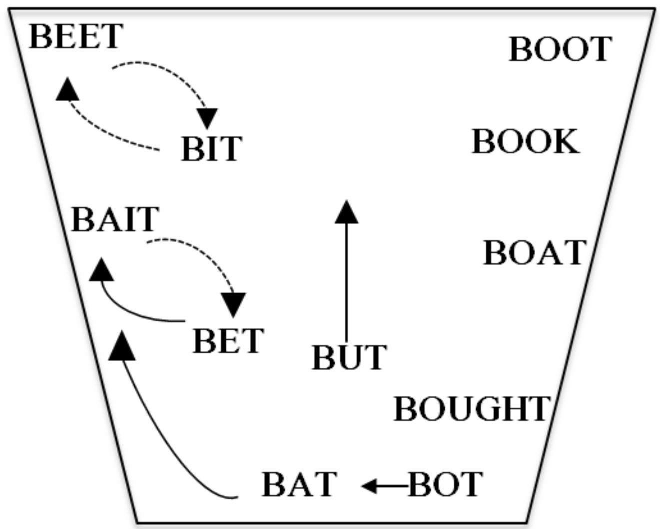

Figure 3.3: Features of the AAVS as identified in previous descriptions of AAE vowels. Interactions with PRV systems and regional innovations frequently lead to partial participation in this system. Dotted lines represent less common features

3.1.2. AAVS as part of AAE: Evidence from perception studies and regional distribution

Results from perception studies as well as distribution from descriptive studies suggest that the features described above are linked to AAE. Experiments that control for voice quality, intonation, and morphosyntactic features have indicated that vowels are an important component in identifying ethnicity in listening tasks (Graff, Labov & Harris 1986; Purnell, Isardi & Baugh 1999; Thomas, Lass & Carpenter 2010; Thomas & Reaser 2004). Specifically, Thomas et al. (2010) found that inclusion of raised BAT or backed BOAT in speech samples allowed listeners from North Carolina to identify whether or not speech samples were produced by European American speakers or by African

[7]The influence of alveolar codas is of interest as Labov et al. (2006) cite alveolar onsets as favoring fronting for back vowels for Southern English, while Anderson (2003) and Nguyen (2006) cite alveolar codas as correlating with fronting of BOOK in AAE.

American speakers.[8] Purnell et al. (1999) found that fronting of BET was an important cue in identifying a speaker as African American or Hispanic as opposed to European American. Retention of a backed BOUT class was found to be a salient cue for ethnic identity in Philadelphia (Graff et al. 1986). If AAE can be described as “any kind of English spoken by African Americans that could be identified by American listeners with a greater than chance frequency as African American” (Thomas forthcoming), then these perception studies indicate that vowel variables identified as part of the AAVS are a component of this system.

Similar to AAE morphosyntactic features, the AAVS is not restricted to a specific region. Individuals who participate in the AAVS have been found in field sites as distant as Columbus, Ohio (Durian et al. 20010), Brooklyn, New York (Thomas 2007), and Milwaukee, Wisconsin (Purnell 2010), as well as the South (Fridland 2003a; Koops & Niedzielski 2009, 2011). As with AAE morphosyntactic variation, participation in the system is selective both in terms of the features used within a community and in terms of individual participation within the community. Preliminary evidence suggests that factors such as class (Nguyen 2006) and interlocutor (Scanlon & Wassink 2010) may influence individual participation in some aspects of the AAVS, but much more work remains to identify social, regional, and discourse-pragmatic constraints on participation in the AAVS.

3.2. Social evaluation of African American English Vowels

As discussed in Chapter 2, age-graded behavior often occurs with vernacular linguistic forms, including morphosyntactic features of vernacular AAE (Baugh 1996;

[8] It is of interest that raised BAT serves as a cue for ethnicity as raising of BAT is found in AAE and EAE varieties in North Carolina. Participants in this study were primarily college students who may have post-dated BAT raising in the European American community.

Rickford & McNair-Knox 1994; Van Hofwegen & Wolfram 2010). With age-graded patterns individuals can show change across the lifespan, but the change is not permanent as speakers shed non-standard features as they age. This results in a "peaking" pattern, as identified in trajectories of change for AAE morphosyntactic patterns (Van Hofwegen & Wolfram 2010). Understanding social associations of the AAVS may provide insight into whether AAE vowel features are likely to align with AAE morphosyntactic features in demonstrating age-graded patterns across the lifespan. While regional comparisons of AAE and PRVs have blossomed over the last decades, very little information is available on the social and individual factors that determine who participates in the AAVS, to what extent, and with what features. Below I discuss class and style shifting with relationship to the AAVS.

3.2.1. Is the AAVS likely to undergo age-grading?

The question of what is "standard" in AAE is of particular interest to studies of adolescent AAE because stable vernacular variants are likely to undergo age-grading where vernacular variants decline after adolescence. If AAVS variants behave like vernacular AAE morphosyntactic variants, then participants may show a decline in such features between high school and emerging adulthood. Under this scenario, I would expect that AAE vowel variants would follow trajectories of change similar to those of morphosyntactic variables unless loss of plasticity restricts changes to the vowel system. It is also possible that vocalic features do not carry the same degree of social valuation as morphosyntactic variables, in which case sloping patterns related to language change through diffusion or internal innovation, or stable production values across the lifespan may be more prevalent. This topic will be discussed in Chapter 6 where I compare trajectories of change for vowels to those for morphosyntactic features. Below I review the little evidence that exists regarding the social evaluation of the AAVS.

Are vowels a part of Standard African American English?

Standard language and the non-use of vernacular features are frequently associated with the middle class and formal speech events. The tendency to ignore segments of a population in the quest for the most "authentic" or "core" group of speakers has shaped AAE research,[9] so that middle class participants rarely make it into corpora (Bucholtz 2003). Some notable exceptions include Henderson (1996), Jones (2003), Kendall and Wolfram (2009), Nguyen (2006), Purnell (2010), Rahman (2008), Scanlon and Wassink (2010), Spears (1999), Weldon (2004), and Wolfram (1969),[10] the majority of whom focus on morphosyntactic and a few iconic consonantal features of AAE. Still, it is frequently assumed that many middle class African Americans speak a variety of Standard African American English (SAAE) (Rahman 2008; Spears 2001; Taylor 1971). Some of the earliest descriptions of SAAE identify phonetic variation as a key component of the variety, along with the incorporation of specific lexical items. Taylor (1971) specifically cites prosody and vowel quality as markers of SAAE. These early descriptions of SAAE resurface in modern assumptions regarding the variety. Thomas, for example, states:

> Middle-class AAE most often lacks the more stigmatized morphosyntactic variants, although some middle-class speakers may employ them for stylistic

[9]The authenticization of AAE speakers is discussed in Bucholtz (2003: 409-410): "These include the emphasis on the working and unemployed classes, the concentration on male speakers, and the focus on taboo language."

[10]This relates to Bucholtz's (2003:404) discussion of the ideology of linguistic isolationism – that the most isolated speakers (speakers removed from and uninfluenced by contact with other groups) are the most authentic speakers.

> effect or to express solidarity. Most pronunciation variables are not as stigmatized, however, and, for many of them, there may be no meaningful distinction between vernacular AAE forms and AAE forms. (2007:451)

These assumptions follow Wolfram's (1969) observation that phonetic variables such as consonant cluster reduction appear to have a gradient pattern of class stratification, as opposed to morphosyntactic variables which are sharply class stratified. Others assert that only intonational contours unite SAAE and vernacular AAE (e.g. Green 2002). Lacking a significant body of research on middle class African Americans and SAAE in general, it remains to be seen whether vowel variants play a role in the construction of SAAE. If the AAVS is part of SAAE, then FPG children may be less likely to display age-graded patterns of production for these features.

Is the AAVS class-stratified?

Studies that focus on class stratification leave questions as to whether the AAVS may be considered part of SAAE (Deser 1990; Henderson 1996; Jones 2003; and Nguyen 2006). Henderson (1996) and Jones (2003) focused on regional accommodation patterns, while Nguyen (2006) explored intra-ethnic language change and Deser (1990) examined familial participation in Southern and Northern features for class stratified samples of African American participants. Because the majority of these studies focused on whether middle class speakers accommodate to PRVs, it is difficult to deduce whether these participants used AAVS features. Henderson's exploration of middle class African American participation in the Philadelphia short *a* pattern indicates that middle class African Americans may not consistently participate in local sound changes, but it does not speak to whether the AAVS is available to middle class speakers. Within this study only a third of the participants came close to the PRV realization of the short *a* constraint.[11] Even though Henderson restricted participant selection to middle class African Americans in well-integrated neighborhoods, the majority of these speakers were not following local PRV patterns.

Jones' (2003) study of BAT raising for a class stratified sample in Lansing, Michigan, also raises more questions than answers. The EAE variety in the region vigorously participates in the NCS. While Gordon (2000) found that AAE participants in his study mostly resisted the NCS, Jones (2003)[12] identified partial participation, with 20 of 31 speakers demonstrating BAT raising in both prenasal and non-prenasal positions as measured in relation to the BET vowel. While not statistically significant, middle class women led participation in BAT raising in the sample. Because BAT raising is a feature of both the AAVS and the NCS[13] it is difficult to conclude whether middle class African American women were participating in the NCS, the AAVS, or a mixed system with features of both.

Both Deser (1990) and Nguyen (2006) studied class variation in Detroit using Wofram's (1969) corpus. Notably, among the six families included in Deser's (1990) study, school integration levels were better predictors of BET and BAT fronting than class background.

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[11]However, this feature is phonologically complex, which could restrict the ability of speakers to acquire this variant through contact instead of through first language acquisition, as demonstrated by Payne (1980).

[12]Jones (2003) was able to distinguish NCS BAT raising from participation in AAE BAT raising by comparing BAT positions to BET positions. In the AAE shift BET raises, so that BET remains above BAT. In the NCS BET backs or lowers so that BAT raises above BET. Jones judged raising by comparing the height of BAT to BET. A BAT vowel which was as raised as BET or higher than BET was considered to be indicative of participation in the NCS.

[13]The manner of tensing, including contour quality, is probably different across the two dialects.

Nguyen's (2006) trend study of Detroit demonstrates class stratified trajectories of change among African Americans for BOOK fronting, as well as stable class distinctions for BIDE glide weakening. Nguyen performed a longitudinal analysis of several phonetic variables including *r*-lessness, final alveolar stop glottalization, BIDE glide weakening, and back vowel fronting for a class stratified panel study in Detroit. Nguyen compared Wolfram's (1969) Detroit study to a modern sample. BIDE glide weakening correlated with class at both time points, with working class African Americans exhibiting shorter glides. This variable appeared stable as rates of glide reduction are similar in both samples. Nguyen also explored BOOK vowel fronting, specifically examining an allophonic split first identified by Anderson (2002, 2003) in which African Americans in Detroit front pre-alveolar tokens, while retaining backed tokens before velars. The 1966 sample demonstrated that middle class African Americans led in this change at that time, but the modern day sample showed no significant effect for class, with working class individuals having caught up to the middle class in rates of fronting. This represents a change in progress led by the middle class, as well as a class-stratified AAE vocalic feature. Nguyen (2006) identified middle class speakers who do not participate in BIDE glide weakening, an AAVS feature, but do participate in BOOK fronting before alveolars, a development not identified within the PRV.

Acoustic studies of AAE that incorporate a class variable suggest that middle class participants may have more access to non-AAVS forms, but such access will not guarantee uniform participation in regional vowel shifts. What does this mean for the status of AAVS features in SAAE? It appears that certain salient variables, such as iconic BIDE glide weakening, may attract some stigma, resulting in class-stratified patterns of use (Nguyen 2006). On the other hand, vowel variables could be another resource with which middle class speakers can construct an African American identity, much like the use of vernacular AAE in formal speech events documented by Weldon (2004). It remains unclear whether all AAVS features are indexed for vernacularity, or whether only a selection of iconic vowel classes pattern with stigmatized variants by exhibiting class stratified distributions.

Evidence from Style Shifting

Both Kendall and Wolfram (2009) and Scanlon and Wassink (2010) provide rare analyses of middle class AAE vowel variables through the lens of style shifting, with results suggesting that AAVS variables are available to middle class African Americans. As discussed below, evidence regarding vernacularity is less clear-cut.

Kendall & Wolfram (2009) explored vocalic variation and morphosyntax for African American leaders from an African American town in North Carolina. Figure 3.4 shows the vowel space of an African American mayor with advanced education in both a formal speech setting and a sociolinguistic interview. The vowel spaces are remarkably similar and show typical AAVS patterns such as a raised BAT vowel and BET and BAIT nuclei in close proximity. Because the mayor did not show much change between contexts, we may hypothesize that the AAVS variables are not vernacular and compose part of SAAE. Moreover, this participant also frequently used vernacular AAE morphosyntactic features in both formal and informal settings. The endocentric nature of the community may promote participation in vernacular AAE, including AAVS variables.

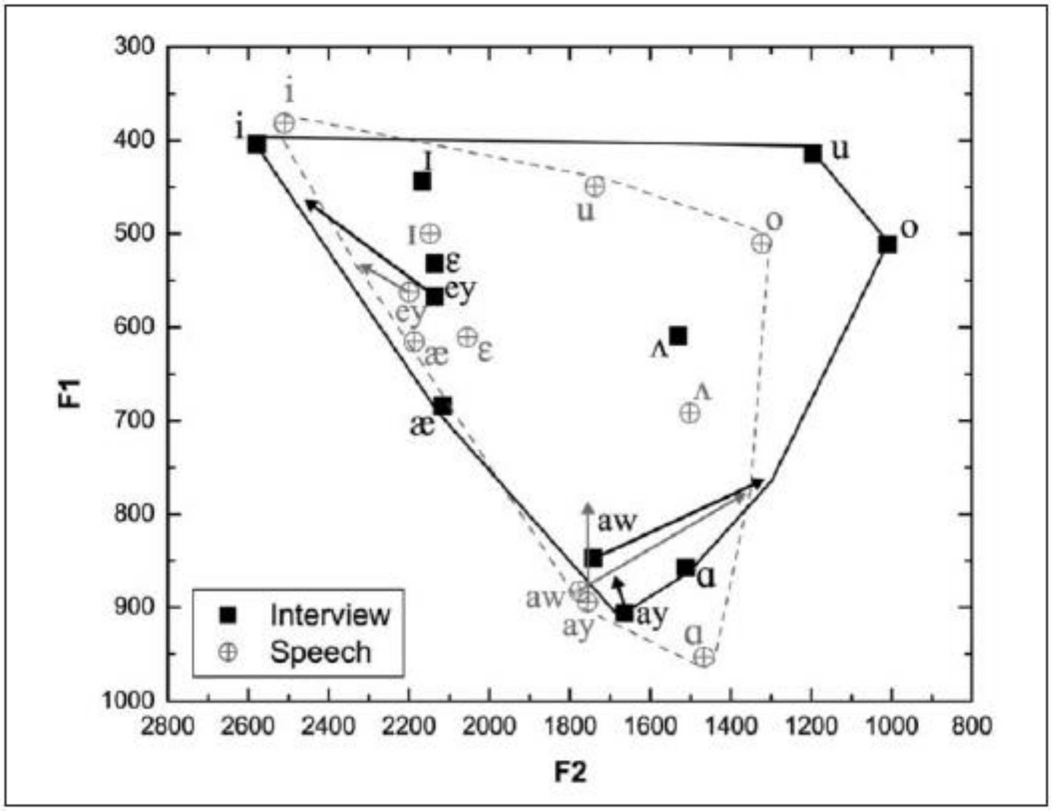

Figure 3.4: Vowel space from African American mayor (Kendall & Wolfram 2009:312)

Scanlon & Wassink (2010) investigated style shifting for a middle class African American female in Seattle, Washington, and found that factors such as familiarity with the interlocutor and interlocutor ethnicity may predict BIDE glide weakening. They cited similar suggestive evidence for stylistic variation in the PIN/PEN merger. These findings indicate that features of the AAVS are available to middle class speakers and are subject to style shifting, but caution must be exercised when one extends these conclusions to the AAVS system as a whole. Features such as BIDE glide weakening have clearly reached the status of a stereotype and therefore are likely to behave differently from features that do not receive overt social commentary.

Previous research indicates that some AAVS features may be available to middle class speakers, but certain iconic features of the AAVS, such as BIDE glide weakening, may be subject to style shifting related to interlocutor identity. As Weldon (2004) and Kendall and Wolfram (2009) point out, AAE may not be class stratified in a straightforward manner. While SAAE may exist at the end of a continuum opposite vernacular AAE, middle class speakers may style shift between the various codes depending on the social circumstances or community structures in which they find themselves.[14] No clear-cut evidence exists as to whether or not AAVS features beyond the BIDE vowel class are likely to undergo age-grading due to stigmatization.

Because of the lack of research on SAAE and the lack of clear patterns emerging from acoustic analysis of middle class AAE, it is difficult to make predictions regarding life-stage variation and participation in the AAVS. If AAVS variables are stigmatized, they may be subject to age-grading, leading to peaking patterns in real-time. If AAVS variables are not stigmatized, I would predict erratic, little, or no change or a sloping pattern with continued change after 10th grade, when other factors are held constant. These two possibilities will be explored when I compare vocalic patterns of change to morphosyntactic patterns of change, as I consider potential input varieties from the local linguistic ecology (see Section 3.4).

3.3. AAE vowels and sound change

In addition to age-grading, change across the lifespan may occur due to participation in community change or diffusion. As will be described in Section 3.4, FPG participants face a diverse linguistic ecology presenting the opportunity for diffusion and/or participation in regional sound change, both of which would result in change across the lifespan. Unlike research into the social correlates of the AAVS, numerous

[14]Weldon (2004), for example, identifies the use of vernacular AAE by middle class African American leaders speaking before a racially heterogeneous audience.

studies provide insight into the diachronic development of the AAVS (Bailey & Thomas 1998; Dorrill 1986; Nguyen 2006; Thomas & Bailey 1998) and AAE participation in regional sound changes (Andres & Votta 2010; Coggshall & Becker 2010; Bernstein 1993; Childs et al. 2010; Childs & Mallinson 2004; Denning 1989; Durian et al. 2010; Eberhardt 2009, 2010; Fridland 2003a, 2003b; Fridland & Bartlett 2006; Gordon 2000; Henderson 1996; Purnell 2010; Thomas 1989; Wolfram & Thomas 2002; Wroblewski et al. 2010).[15]

These studies point to two important conclusions regarding the development of the current AAVS vowel system and the relationship with PRVs: first, there is evidence that AAVS and SEAE have mutually influenced each other as they developed over the last century and a half, frequently resulting in patterns of mixed alignment for which features of the local PRV and AAVS exist within the same vowel system; and, second, social factors ranging from personal orientation toward local and/or ethnic identity (Anderson 2003; Childs et al. 2010; Eberhardt 2008, 2009), the sociohistorical context of the community in question (Holt 2011; Wolfram & Thomas 2002), and levels of integration (Deser 1990; Purnell 2010), may influence the extent to which AAE vowels participate in local sound change.

These findings influence the current study in several ways. First, if FPG participants change across the lifespan due to participation in PRV sound changes, it is not necessarily the case that they will show wholesale shifts in the direction of PRV sound changes. Second, the sociohistorical context and levels of segregation of the field sites may influence patterns of alignment with local sound systems. Finally, changing

[15] While the studies listed above speak to sound change, even stronger evidence of mutual influence and mixed alignment are found in morphosyntax (Bailey & Maynor 1985; Wolfram 1974).

orientation towards or away from the communities in question may cause some individuals to show idiosyncratic trajectories of change.

3.3.1. A brief history on the study of AAE participation in regional sound changes

The relationship between AAE and local PRVs has been an important focus of inquiry since early American dialectology. Most research on AAE vowel systems has been conducted in an attempt to better understand how local varieties of AAE and PRVs interact, and over sixty years of study now provide evidence for factors that influence relationships between local ethnolinguistic varieties. This current analysis contributes to the ongoing conversation by exploring processes of diffusion and change (or lack thereof) over the lifespan as children transition between schools and into the workforce, potentially experiencing changing levels of contact with the PRV.

The relationship between local varieties of AAE and PRVs was first explored by dialectologists in the South, many of whom depicted the varieties as identical when class and education are controlled. For example, Kurath (1949:6) stated that "by and large the Southern Negro speaks the language of the European American man of his locality or area and of his education" and Williamson (1968:1) summarized the vowel variation of a sample of African American teens in Memphis, Tennessee, as, "… the same as those which are found in standard Southern speech …".

As sociolinguists shifted the focus of analysis from the older rural speakers typical of early dialectology research to urban youth outside of the South, depictions of AAE shifted as well (Fasold 1972; Labov 1972a; Labov, Cohen, Robins & Lewis 1968; Legum, Pfaff, Tinnie & Nichols 1971; Wolfram 1969). Along with this shift, both methods and the variables analyzed shifted as well. These urban studies identified a core set of morphosyntactic structures among inner city youth in metropolitan areas as far-flung as Los Angeles, New York City, and Detroit.[16] Variation in the results of these early studies was frequently attributed to methodological differences, rather than to regional differences in AAE (Thomas & Wassink 2010). Speakers who had extensive contacts outside of urban African American communities, or who did not use the most vernacular varieties of vernacular AAE, were frequently excluded from analysis (see, for example, Labov's 1972a discussion of *lames*).[17] The focus on morphosyntactic variation, cautious interpretation of results, and speaker selection criteria reinforced the depiction of AAE as distinctive from PRVs and as relatively homogenous across the nation.

The DIVERGENCE/CONVERGENCE debate emerged out of these early studies, and acoustic analysis of AAE began as an attempt to find evidence to speak to this debate. One of the most heated debates in sociolinguistics, this debate surrounded whether or not AAE is becoming more or less similar to local EAE. The debate culminated in a special publication of *American Speech* in 1987 (Fasold, Labov, Vaughn-Cooke, Bailey, Wolfram, Spears & Rickford 1987). Several scholars cited the failure of AAE to participate in PRV sound changes in the urban North as evidence of PRV divergence

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[16]It is notable that African American communities in these regions were rather new, with most families having relocated from the South during the African American Diaspora between World War I and World War II. Additionally, these communities were and continue to be some of the most segregated in the US (Massey 2001).

[17]Bucholtz (2003) characterizes the early state of investigation into AAE as strategic essentialism, or a necessary obscuring of intra-group variation for a political goal. In the case of AAE, establishing the variety as structurally sound was necessary to combat stereotypes and folk ideologies of linguistic deficiency. With these goals in mind it made sense to focus on commonalities and speakers who were considered 'core' to the community. As noted by Wolfram (2007), the resulting biased sample and researcher specific agendas led to the creation of the SUPRAREGIONAL MYTH where regional and social variation in AAE is frequently glossed over in favor of emphasizing internal consistency (Wolfram 2007, forthcoming). An additional motivation for focusing on the most vernacular speakers was to identify the linguistic structure of this variety.

from AAE norms (Gordon 2000;[18] Henderson 1996; Labov & Harris 1986). Labov and Harris summarized this position: "As the sound pattern of the Philadelphia white community becomes more and more different from the speech of Boston, Chicago and Fort Worth, it is also becoming more and more different from the sound pattern used by Black Philadelphians. We also find the same situation in all the large Northern Cities: Boston, New York, Detroit, and Chicago as well as Philadelphia" (1986: 18). Other studies documenting divergence between PRVs and AAE for vowel variables during this time include Bernstein (1993) in an analysis of Texas Poll data and Thomas's (1989) analysis of BOAT fronting in Wilmington.

While these early studies prove informative, there are several criticisms that can be levied against them. It is not surprising that highly segregated, relatively new communities in the urban North do not participate in local sound changes. Scholars argue that regional studies in non-Southern urban areas are not indicative of the general state of AAE across the nation; in fact, local factors, including but not limited to level of segregation likely influence levels of participation in PRV sound changes on a community-by-community basis (Mufwene 2001; Wolfram 2007). Further, the tendency to focus on a small selection of incipient sound changes in the PRV, rather than the full vowel system with older as well as newer sound changes, might have led to overestimations regarding the amount of divergence between AAE and PRVs.

A more recent wave of AAE studies sampling a wider range of communities and vowel variants emerged to directly test characterizations of AAE as resistant to local sound changes. Many of these studies focused on full vowel spaces instead of a small

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[18]While Calumet, Indiana, is not a large city, the NCS sound change analyzed in this study is associated with the urban North.

sample of vowel variants, offering a more complete picture of regional variation. Results from this research indicate that African American speech communities often show mixed alignment, with some individuals, and even whole communities, showing close alignment with regional varieties, while others remain distinct on all but a few features. Mixed alignment patterns have been attributed to a conscious or subconscious alignment with multiplex regional and/or ethnic identities (Anderson 2003; Childs & Mallinson 2004; Eberhardt 2008, 2009; Jones 2003) or the existence of vestigial patterns related to migration and settlement patterns (Mufwene 2001; Thomas 2007). In the context of this new line of research, this study acknowledges that FPG participants may selectively participate in aspects of PRV sound changes depending on several social and individual factors.

3.3.2. Evidence for mutual influence between AAE and PRV vowel systems

Historical development of AAE vowels

Historical evidence suggests parallel patterns of development where EAE and AAE remain distinct but mutually influence each other through simultaneous processes of convergence and divergence. Because African American populations have resided in greater numbers and for a longer period time in the South than elsewhere, data are available to explore historical trajectories of development within AAE in the context of local Southern PRVs. The first evidence for AAE vowels in the South is found in the data left by dialectologists, some of whom viewed AAE as phonetically identical to local PRVs (Kurath 1949). Reanalysis of the data neither fully supports this position nor Labov's description of AAE vowels as resistant to local sound change. Dorrill's (1986a) reanalysis of LAMSAS data indicates that mid-19th century African Americans shared many features with their regional counterparts, including local variants of BIDE and BOUT. However, even these early data indicate differences between AAE, where BAIT, BOUGHT, and BOAT are variably monophthongal, and EAE, where the mid tense vowels are more diphthongal. Other differences for these speakers include resistance to BOOT and BOUT fronting among African Americans, while these nuclei showed evidence of fronting in the European American community (see also Bernstein 1993 and Pederson, McDaniel, Bailey, Basset, Adams, Liao & Montgomery 1986-1992). Vowel plots in Thomas (2001) provide some evidence that AAE speakers variably raised BAT in the latter half of the 19th century.

When Bailey and Thomas (1998) compared these early speakers to speakers born toward the end of the 19th century, some features showed convergence, while others appeared to diverge. The mid tense vowels underwent diphthongization for AAE, matching local EAE varieties. EAE appeared to follow AAE as both developed glide weakening for BIDE, a pattern not apparent in data from the earliest speakers. EAE and AAE remained distinct as BAT underwent more extreme raising than the variable BAT raising among EAE. Back vowels underwent fronting in EAE, but not AAE. Evidence for the SVS emerged for European Americans around this time period. Bailey and Thomas (1998) reported that 19th century African American speakers were not as advanced in the SVS as their European American cohorts.

These historical overviews of language change indicate that a) AAE can show independent innovations[19] which may or may not be adopted by local EAE and b) even as some features show convergence, others may simultaneously show divergence.

[19] See Blake & Shousterman (2010) for a more recent example of independent regional AAE sound change.

Significantly, historical records of AAE and EAE in the South indicate interacting patterns of development where some features almost always appear as distinct, while considerable overlap is maintained. This research indicates that AAE is not impermeable to regional changes, and that lack of participation in certain regional variants may not indicate diverging paths, but, rather, parallel paths of development, as varieties in contact borrow from each other and maintain some similarities while also maintaining some distinctions (Bailey & Thomas 1998; Thomas 2007).

Regional features in AAE

Studies that focus on older sound changes or full vowel spaces frequently identify mixed alignment patterns where both PRV and AAVS variants can be found in the same vowel system. At least some of these mixed alignment patterns appear to be the result of speakers participating in sound changes at different times, frequently with a lead among European Americans. Within this section I focus on mixed alignment patterns in the urban South as these patterns are most informative for the current study. However, mixed alignment patterns have been widely documented throughout the US (See Table 3.2 for a handful of examples of mixed alignment beyond the South).

Table 3.2: Mixed alignment patterns beyond the South

Mixed alignment patterns outside of the South		
	AAVS/ Southern feature	Regional feature
Columbus, OH	BET/ BAIT reversal for some speakers, BUT raising (Durian et al. 2010)	BOAT fronting (Durian et al 2010,[20] Thomas 1989/1993)
NYC	BIDE glide weakening (Coggshall & Becker 2010) BET/BAIT reversal for some speakers (Thomas 2007)	Downgliding BOUGHT variant (Coggshall & Becker 2010)
Pittsburgh, PA	PIN/PEN, BIDE glide weakening (Eberhardt 2009)	COT/CAUGHT merger, BOAT, BOOT fronting, BUT lowering (Eberhardt 2009)
Palo Alto, CA	BIDE glide weakening (Denning 1989)	Participation in *Happy* tensing (Denning 1989)

Mixed alignment patterns with retention of older features in AAE are found throughout the urban South where the front half of the SVS appears to be on the decline among European Americans (Dodsworth & Kohn 2012; Fridland 2001; Labov et al. 2006; Thomas 1997, 2001), even as younger African Americans continue to reverse the mid front vowels (Andres & Votta 2010; Fridland 2003a). The reversal of the front SVS system among European Americans has been particularly well-documented in Raleigh, North Carolina (Dodsworth & Kohn 2012), and Memphis, TN (Fridland 2001), but younger European American speakers in studies from Roswell, GA (Andres & Votta 2010), are also less likely to show front vowel reversals than their older counterparts, and evidence from the ANAE (Atlas of North American English) confirms that retraction of the SVS is common in the urban South.[21] In contrast, Southern shifting occurred more frequently in the speech of younger AA participants in Roswell, GA, and Memphis, TN,

[20]It should be noted that Durian et al. (2010) restricted their study to working class individuals.

[21]It is important to note that neither the Memphis, TN, study nor the Roswell, GA, study provided evidence for the reversal of BEET and BIT among African Americans or European Americans.

than among their older cohorts, and no change in progress could be identified among African Americans in Raleigh for vowel height and frontness (Dodsworth & Kohn 2008, 2009).[22] Additionally, while Fridland and Barlett (2006) found evidence of back vowel fronting among African Americans, it does not appear to be as well-developed as among local European Americans (See also Thomas 1989[1993], 2001). These Southern urban studies indicate a split pattern in which African Americans are retaining or advancing the front vowel reversal aspect of the SVS, even as European Americans are moving away from this system. While European Americans are more advanced for back vowel fronting, African Americans do participate in this change as well. The predominant pattern in these studies is that African Americans may participate in all aspects of the SVS, but at different generational rates from European Americans.

Combined, this evidence suggests that while AAE vowels remain distinct from regional varieties for some features, regional variants do become incorporated into the system for others. Mixed alignment patterns, where some local features are found in AAE alongside some supra-regional patterns, are common throughout the US. Frequently, AAE and EAE communities appear to differ in the timing of adoption of a change.

3.3.3. Factors that potentially influence AAE and PRV interaction

Regional studies of AAE vowel variation suggest that several social and linguistic factors potentially creates a complex relationship between regional AAE and EAE, as well as across regional varieties of AAE (e.g. Yaeger-Dror & Thomas 2010). These studies indicate that the relationship between EAE and AAE vowels is mitigated by social factors, including levels of integration (Deser 1990; Purnell 2010), sociohistorical

[22] There was a significant age difference for diphthongization with older African Americans showing greater degrees of diphthongization for the front lax vowels.

contexts (Eberhardt 2008, 2009; Holt 2011; Wolfram & Thomas 2002), and the importance of regional identity for the individual (Anderson 2003; Childs et al. 2010).[23] I discuss each of these factors below.

Personal orientation

An individuals' orientation towards the social meaning attached to an enregistered form may affect accommodation, as demonstrated by the avoidance of the Pittsburgh monopthongal BOUT (Eberhardt 2003), or participation the stereotyped New York BOUGHT vowel (Coggshall & Becker 2010), but it is difficult to determine whether a similar claim can be made for local features that receive less attention. Still, several authors suggest that orientation towards a local or regional identity may play a role in PRV participation (Anderson 2002, 2003; Childs et al. 2010; Childs & Mallinson 2003; Jones 2003; Fridland 2003a). Fridland (2003a) suggested that the SVS has come to be associated with regional identity, and that AAE participation in the shift indexes this identity. Similarly, Childs and Mallinson (2003) and Childs et al. (2010) attributed heterogenic patterns of regional alignment in their studies to idiosyncratic orientation towards the social meaning of various vowel variants.

Relying on ethnographic research techniques, Anderson (2002, 2003) provided another example of the importance of orientation towards local identity in a study comparing AAE to Appalachian varieties in Detroit, Michigan. Significant levels of accommodation to AE emerged as the African American participants, as well as the Appalachian participants, showed BITE glide weakening and back vowel fronting, features typical of AE (Anderson 2002, 2003). Anderson hypothesized that this pattern of

[23]Additionally, linguistic factors such as the complexity of the feature in question may be expected to play a role in how easily features will diffuse between PRVs and AAE, and independent regional AAE vowel innovations distinct from the PRV may also emerge (Blake & Shousterman 2010).

accommodation may be related to the features' association with the South as the African Americans in the sample expressed a strong affinity with Southern identity.

Sociocultural history of the community in question

Several studies illustrate the importance of considering the sociocultural history of a community when examining interactions between AAE and PRVs. Specifically, sustained isolation and endocentric regional values appear to promote assimilation, particularly in the rural South (Childs et al. 2010); yet, changing relationships with the broader region may change levels of accommodation (Wolfram & Thomas 2002; Wroblewski et al. 2010).

A classic example of the influence of a changing sociogeographic environment on language variation is found in Wolfram and Thomas's (2002) analysis of Hyde County. In Hyde County, located in Eastern North Carolina, older generations shared local patterns for BIDE and BOUT, regardless of ethnicity. However, younger African Americans showed mixed regional alignment, retaining back vowel fronting while eschewing the salient regional diphthong variants.[24] Wolfram and Thomas (2002) proposed that increased contact with outside communities through the building of roads has allowed younger speakers to orient away from regional patterns.

Yet increased access to external norms does not always promote divergence. In a study of rural Louisiana speakers across ethnicities and generations shared many regional vowel variants, such as the monophthongal production of tense vowels, and considerable overlap for the production of BEET, BIT, and BAIT vowels. As the community gained more contact with the broader region, local EAE and AAE vowels converged as relic

[24] Young European Americans also lost many regional features, but the features lost, as well as the newly adopted features, were different from those in the African American community.

features preserved in the older African American male speech disappeared among younger generations (Wroblewski et al 2010).[25] Sustained local contact in endocentric communities promotes shared vocalic features, but differences may emerge if other speech models become available.

Levels of integration

As noted by Yaeger-Dror and Thomas:

> The degree to which a given AAE [speaker] accommodates to the local PVE norms is theoretically also influenced by the degree of actual face-to-face contact that occurs between members of each group in any given locale. Presumably, the greater the degree of segregation that exists in a given locale, the smaller the opportunity for assimilation or accommodation in either direction (2010:8).

Several studies examine the role of integration in predicting phonetic variation, including Deser (1990), who explored both class, family background, and school integration as potential contributing factors to regional accommodation; Fridland (2003a) and Jones (2003), both of whom analyzed network strength and participation in local sound changes; and Purnell (2010), who discussed the influence of contact between African Americans and European Americans on language variation in Milwaukee, Wisconsin.

Deser (1990) resampled Wolfram's (1969) Detroit study in Detroit, MI, primarily to identify the role of parental influence in dialect transmission. In addition, Deser (1990) explored the potential role of class and school integration levels. She found that children who were in schools with higher percentage of African American enrollment tended to

[25] Older African American males frequently use a relic form of BIRD where *schwar* is realized as [ʌi], while this variant has all but disappeared from regional European American and younger African American speech.

have fronted pronunciations of both BET and BAT, both of which are features of the AAVS.

Fridland (2003a) explored network strength analysis as a possible predicting factor for participation in the SVS. Although she hypothesized that increased network contacts with European Americans would result in increased participation in the SVS, her results indicated the reverse. However, because the SVS is receding among European American speakers in the urban South, this result is not surprising. African Americans who have increased contact with European Americans may simply keep pace with the rejection of SVS variants. In contrast, the relationship between network scores for EAE contact and participation in the NCS were less clear-cut (Jones 2003).

Purnell (2010) discussed the role of interactional accommodation alongside integration by exploring both the influence of interlocutor and community of residence for nine African American college students from Milwaukee, WI. SVS aspects of the AAVS were found in the speech of various speakers from a traditionally African American neighborhood regardless of whether their interlocutor was European American or African American. In contrast, speakers who grew up outside of traditionally African American neighborhoods had longer glides on BIDE and a lowered and backed BET. This last feature is particularly interesting as it is one of the variants that distinguish the NCS from the AAVS. The minimal influence of interlocutor effects suggests that childhood community integration levels may be a more important predictor of AAVS participation than interactional accommodation.

Although more work needs to be completed on the role of integration and the AAVS, these initial studies indicate a correlation between African American community density, levels of integration, and participation in the AAVS. Because integration levels appear to be an important predictor of phonetic variation, I will explore whether or not FPG children change vowel pronunciations as they change between schools that have varying degrees of integration.

Previous analyses of regional AAE vowels indicate that interactions with PRVs are complex and potentially hinge on numerous factors. This longitudinal study contributes to the conversation on the interaction between AAE and PRVs by following the linguistic development of African American children in the context of a rapidly changing PRV matrix variety. While this study cannot sort out all the potential motivations for accommodation (or lack thereof) to local PRVs, it can identify whether children shift towards or away from this rapidly changing PRV over the course of adolescence, potentially indicating diffusion for late-in-life accommodation, or participation in the changing system for earlier adoption of PRV features. Because school and field site demographic data are available I will explicitly analyze the influence of integration on participation in the PRV.

3.4. The linguistic ecology of FPG

As indicated in the studies above, it is important to consider the linguistic ecology for the study of AAE vowels. This section reviews research on vowels previously conducted in the Coastal Plain and Piedmont areas of North Carolina (excluding the Pamlico Sound region) as the FPG participants grew up in and around these regions. Included below are data from rural African American speakers, rural European American speakers, and urban middle class African American and European American speakers. The social, historical, and political context will be discussed in greater detail in Chapter

3, but it is important to note that the FPG sample selected for analysis includes individuals mainly born and raised in Durham and Orange Counties in North Carolina. While these counties have urban hubs, some of their communities are more affiliated with rural lifestyles. As such, I will provide both urban and rural comparisons.

3.4.1. Rural Eastern and Piedmont North Carolina

The rural comparison data come from Warren County and Robeson County, North Carolina, and were analyzed by Thomas (2001). Figure 3.5-Figure 3.8 present speaker means of vowel measures provided by Erik Thomas. Figures were plotted in ggplot2 with the geom_point and geom_segment functions. Below I provide a vowel chart for an older African American female, a younger African American female, an older European American male and a younger European American female from Robeson County, North Carolina. Robeson County is located in the Coastal Plain of North Carolina on the I-95 corridor along the South Carolina border. Although the mid front vowel nuclei for the two African Americans are in close proximity, their positions do not reverse.

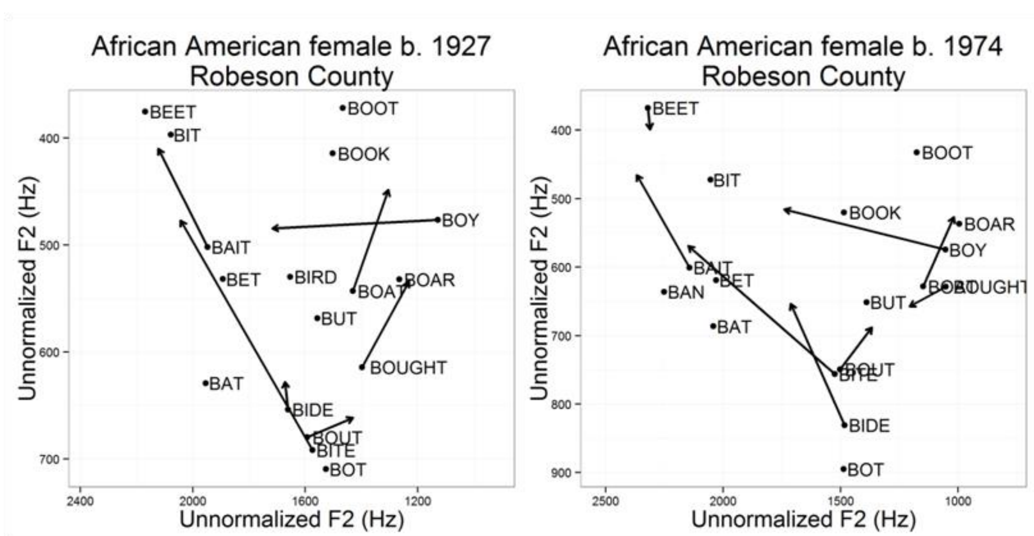

Figure 3.5: African American speakers from Robeson County

In contrast, both European Americans fully participate in the reversal of the front mid vowels. As with Bernstein (1993) and documented in *The Linguistic Atlas of the Gulf States* (Pederson et al. 1986-1992), BOUT appears fronted for the European participants, but not among the African American participants. Back vowel fronting is much more advanced for the European participants, but all the participants appear to raise BAT and BUT. The BOUGHT nucleus appears more raised and backed for the African American participants.

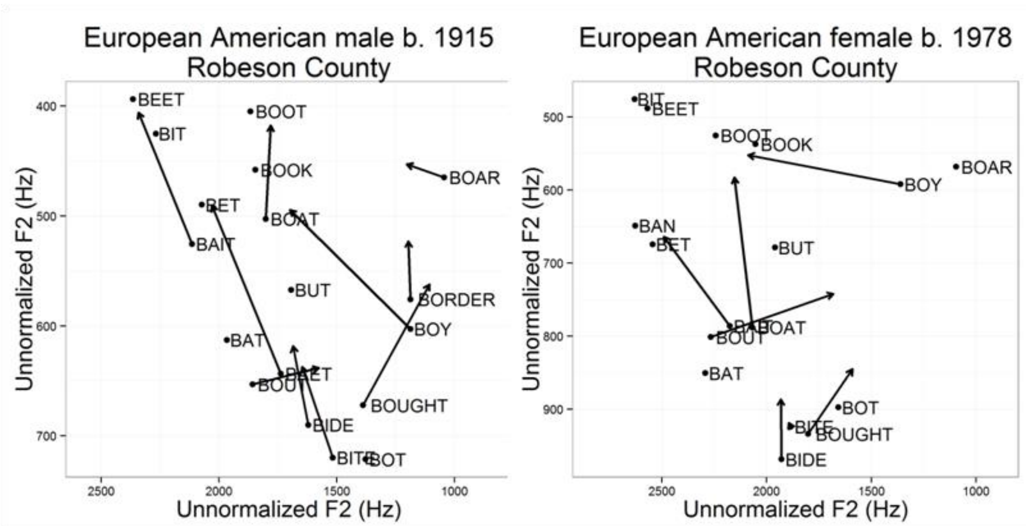

Figure 3.6: Robeson County European American speakers

Warren County is a Piedmont community located on the border of North Carolina and Virginia directly north of the Research Triangle. Again, back vowel fronting is more rigorous for the European American participant. While she retains a backed and raised BOUGHT vowel and has a fronted BOUT nucleus, she does not participate in Southern shifting. The young African American has the most raised variant of BAT and BUT for the group. This participant also has a raised BET class with no lowering of the BAIT class.

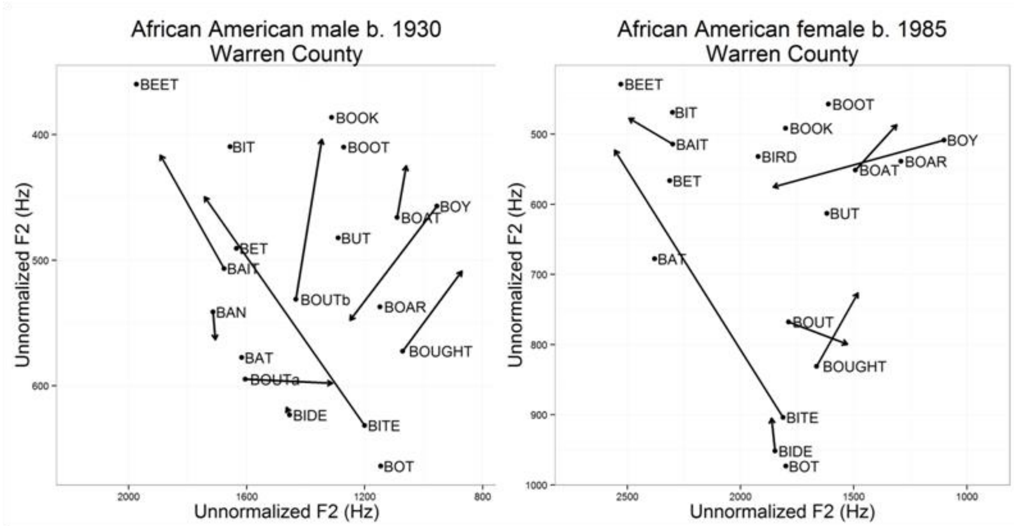

Figure 3.7: Warren County African American speakers

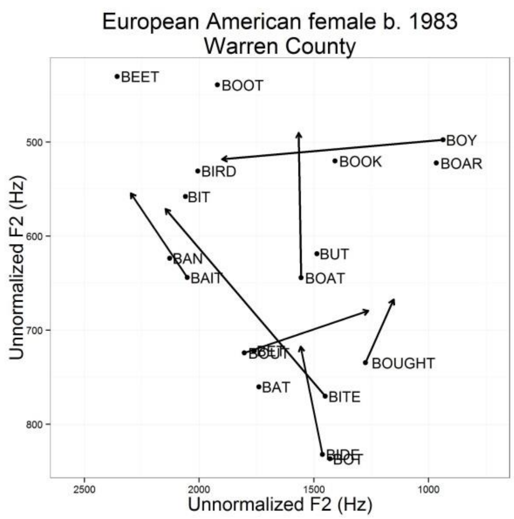

Figure 3.8: Warren County European American speaker

3.4.2. Urban Piedmont North Carolina

Evidence from Raleigh, North Carolina, shows a rapid reversal of the Southern Shift among middle class European Americans, but interviews from middle class African Americans indicate that the shift was never robust in the African American community in Raleigh (Dodsworth & Kohn 2008, 2009). Even so, the AAVS has been evident within Raleigh for at least the last ninety years. First, I summarize information regarding urban EAE vernaculars in the region as exemplified through research completed in Raleigh, North Carolina. Next, I present an apparent-time analysis using data from African Americans in Raleigh. These data provide historical context for the FPG data.

Below are two figures from Dodsworth and Kohn (2012) displaying cumulative data from a study of 59 middle class European Americans in Raleigh, North Carolina. These figures show apparent-time change to the front half of the vowel space, with Figure 3.9 displaying speaker means for normalized F_1 values for BAT, BET, BAIT, BIT, and BEET, and with Figure 3.10 displaying normalized F_2 values for the same vowels. Measurements were taken at the nucleus, 25% in from the onset of the vowel. The graphs were created in R with the geom_point and geom_smooth function in the ggplot2 package (R Development Core Team 2010). Each plotting symbol represents a speaker mean. In addition to speaker means, the figures depict Generalized Additive Models (GAMs), which are conceptually similar to a running average of the data, with 95% confidence intervals. These figures show that while BEET and BIT never reverse in Raleigh, with BIT's F_1 consistently larger than that of BEET, BAIT and BET show an SVS pattern where the nuclei for these vowels are not reliably distinct for middle class

European Americans born before 1960. After 1960, the F_1 of BAIT raises toward the F_1 of BEET and BET also shows a moderate drop toward BAT.

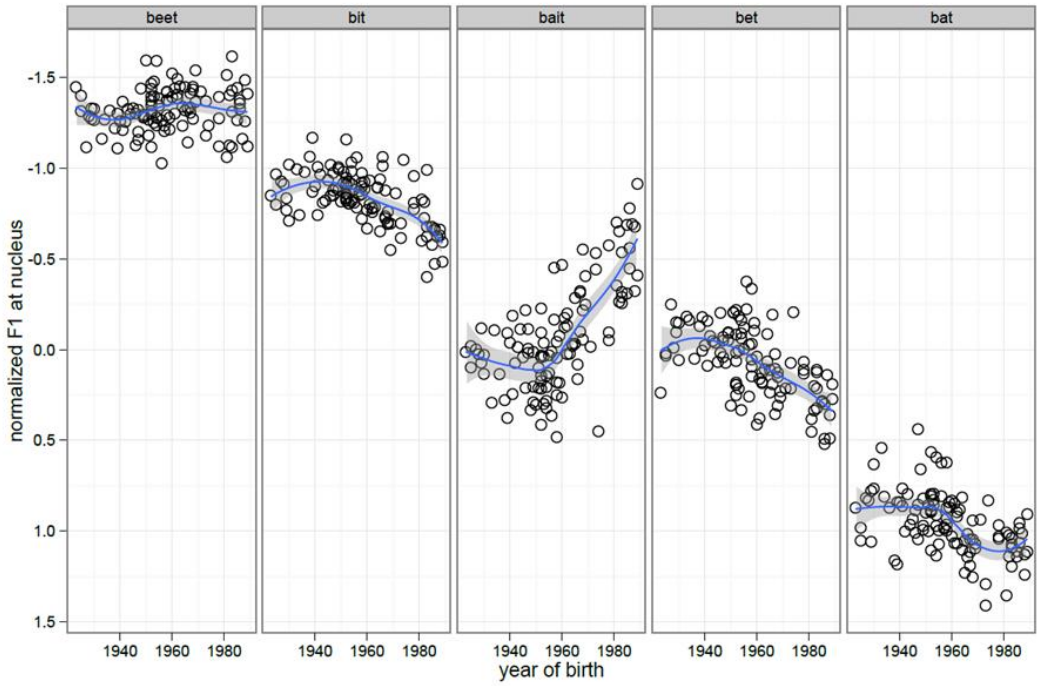

Figure 3.9: Normalized F_1 values for European Americans in Raleigh, NC, in apparent time

Figure 3.10 illustrates that BAIT fronts and BIT backs over apparent time. BAT and BET also appear to back in tandem with BIT. These two figures indicate that the SVS is not the primary system for European American youth in Raleigh, NC. A rapid change in progress is reversing the primary patterns for the front half of the vowel system. Preliminary examination indicates that back vowels continue to front among European Americans in the region (Dodsworth and Kohn 2008).

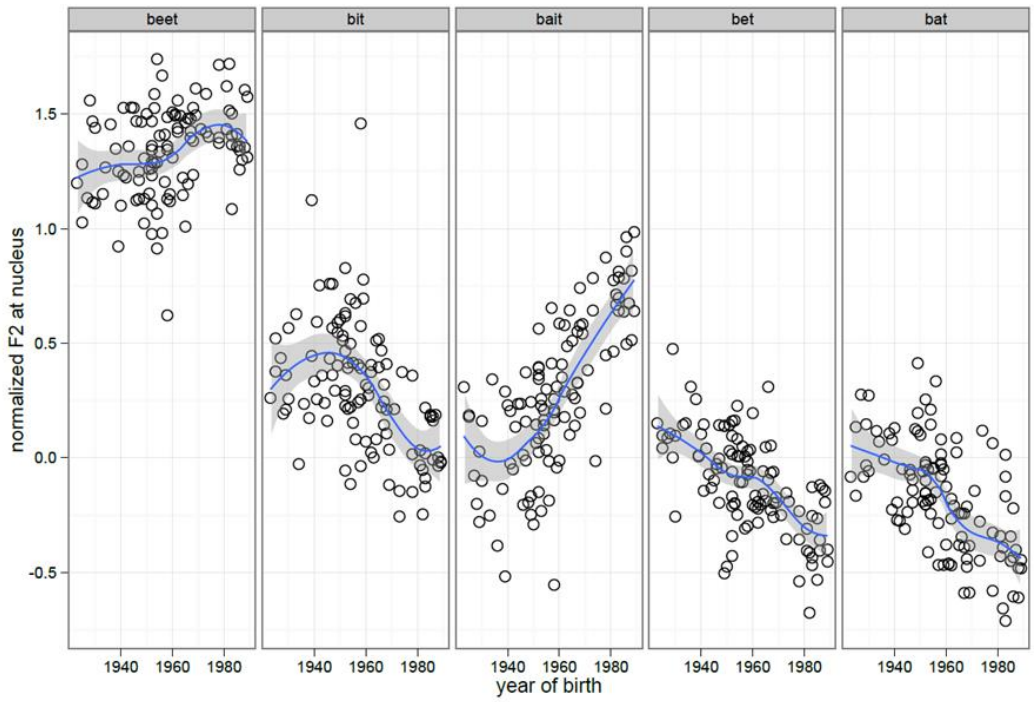

Figure 3.10: Normalized F_2 values for European Americans in Raleigh, NC, in apparent time

In contrast, African Americans in Raleigh, North Carolina, have not been undergoing a rapid change in progress since the 1960's. In the section below I present data from 20 African Americans born between 1917 and 1987. Interviews with these speakers were collected as part of the Raleigh Project (Dodsworth & Kohn 2012). Nineteen of these speakers come from Raleigh, North Carolina, and one comes from Cary, North Carolina. As of 2010 Raleigh was 58% European American and 29% African American. Cary had a population that was 73% European American and 8% African American (US Census 2010). One Raleigh speaker born in 1987 does not have vernacular AAE features in her speech. The speakers born before 1960 all resided in a historically middle-class African American neighborhood, South Park. Raleigh speakers born after 1960 hailed from various parts of the city, but were generally middle class. For comparison I have overlaid data for the 20 participants analyzed in this dissertation. The data come from the post-high school time point as these interviews were collected contemporaneously with Raleigh Project data collection. The FPG speakers were all born between 1990 and 1992 and they have been categorized as raised in Chapel Hill, Durham, or in an "other" category comprised of movers and those students who reside in outlying rural areas (additional details provided in Section 4.1.1).

Below I present scatter plots of normalized vowel data for these individuals. Each plot was created in the ggplot2 package in R with the geom_point function (R Development Core Team 2010). Each plotting symbol represents one vowel token. Symbols have been offset through the addition of noise using position_jitter in the geom_point function, a technique used to avoid overplotting. A LOESS[26] curve with 95% confidence intervals was fitted over the Raleigh data[27] using the geom_smooth function for aid in visual analysis. Additionally, I include box plots for each of the Raleigh speakers arranged by birth year. These plots were created using the geom_boxplot function in ggplot2.

BAT

Among European Americans in Raleigh, North Carolina, BAT has been retracting in apparent time. In particular, raised variants are uncommon for generations born after the 1950s (Dodsworth & Kohn 2012). Below are scatter plots for normalized BAT F_1 and F_2 for individual tokens of BAT from African American speakers from both the Raleigh

[26]LOESS is short for local regression. This function is conceptually similar to a running average in that it fits models to localized subsets of the data. It is similar to GAM curves, but is better suited to smaller datasets.

[27]The non-vernacular speaker was excluded from this smoothing curve as she does not pattern with the other Raleigh participants.

Project and the FPG project. Negative values for F_1 correspond to high vowels, so the y-axis has been flipped to aid in interpretation.

While a bump of raised and fronted variants is apparent for speakers born in the 1940s, speakers born after the 1940s do not appear to be participating in the rapid change in progress identified for the European American speakers discussed earlier. The speaker from Cary, North Carolina, appears as an outlier with low and back tokens well outside of the range of the older African American speakers. The FPG speakers generally fall in the range of the Raleigh speakers, with perhaps slight evidence of backer BAT classes when compared to the oldest generation.

This pattern of variability without change for those born post-50s is apparent in the box plot data as well. Examination of the box plots illustrates that the non-vernacular AAE speaker born in 1987 has a lower and backer BAT class when compared to her cohorts, similar to what is observed for her European American cohorts.

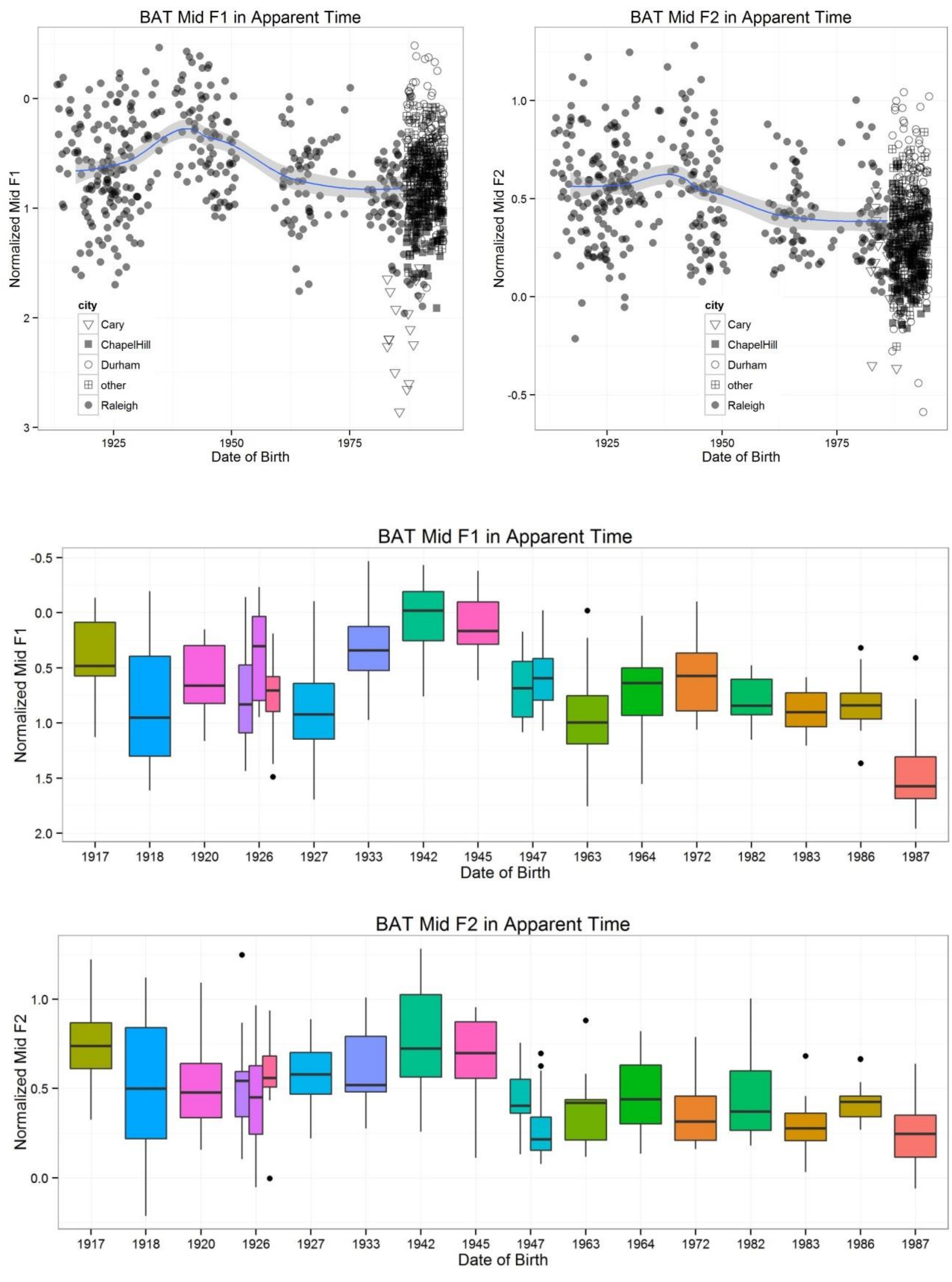

Figure 3.11: BAT scatter plots and box plots for Raleigh African Americans.

BET

Data for the BET vowel class are presented in the same way and show striking parallels. Again, a 1940s peak comprised of a few individuals is followed by intense variability that would be difficult to interpret as a change in progress, particularly for F_1. The Cary participant remains a strong outlier with a low BET class, and the FPG speakers generally fall into the range of production found in previous generations. Box plots illustrate that the 1987 non-vernacular AAE speaker once again has a lower lax vowel than the rest of her cohort, similar to the European American population. No recent trends for apparent-time change can be identified, although inter-speaker variation is high.

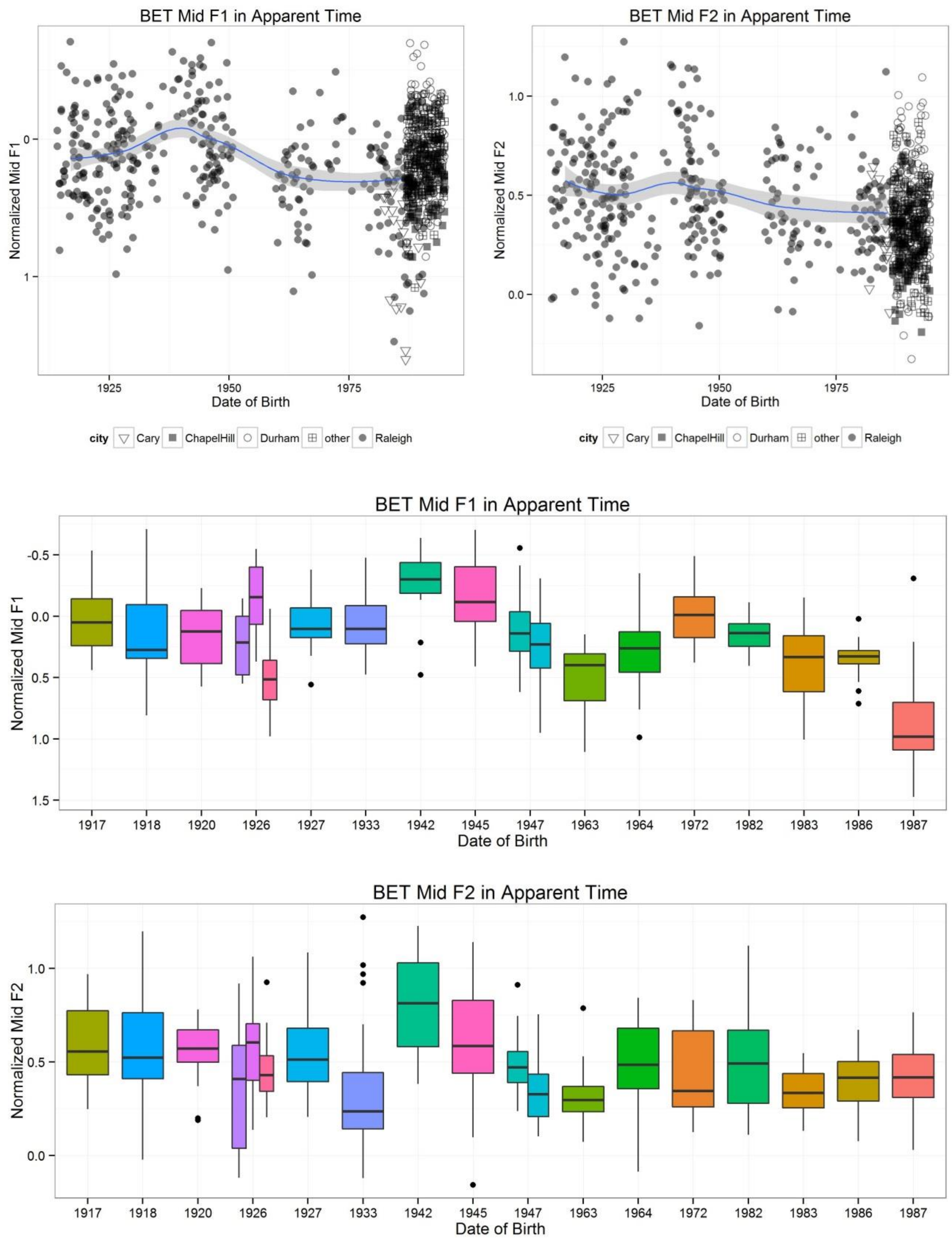

Figure 3.12: BET scatter plots and box plots for Raleigh African Americans.

BAIT

Measurements for BAIT were taken 25% into the vowel. BAIT has been raising and fronting in apparent time for Raleigh, NC, primarily through a loss of more Southern-shifted variants among European Americans (Dodsworth & Kohn 2012). Vowel tokens for the FPG participants still encompass the range of productions found in earlier generations, although there appears to be a lowering trend for BAIT when the six youngest speakers are compared to the older speakers. Patterns of backing are not as prominent. Again, the non-vernacular AAE speaker born in 1987 has a less Southern Shifted BAIT class than her peers. Except for this speaker, there is no evidence for apparent-time change post-1950.

BIT

The FPG distribution of BIT once again encompasses the variation found in previous generations. No apparent-time change is evident within the data for the youngest generation, although a lowering trend between the oldest and youngest generation is apparent. The box plots for BIT confirm the impression of variability without apparent-time change, particularly for speakers born post-1950s.

BUT

F_1 for BUT is highly variable across speakers. Data from F_2 of the BUT class suggest stability, although the non-vernacular AAE speaker remains an outlier with a lower BUT class than her cohorts.

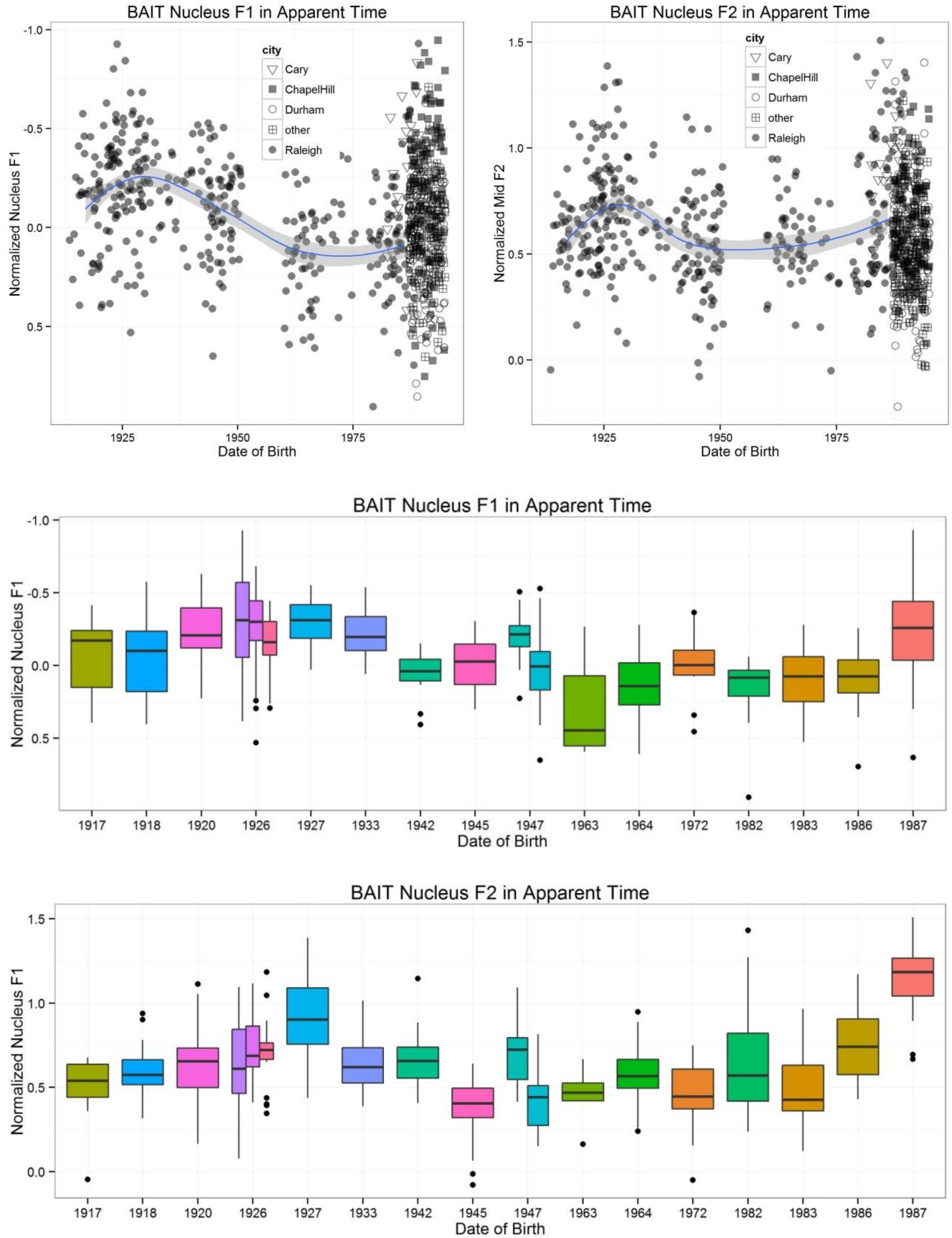

Figure 3.13: BAIT scatter plots and box plots for Raleigh African Americans.

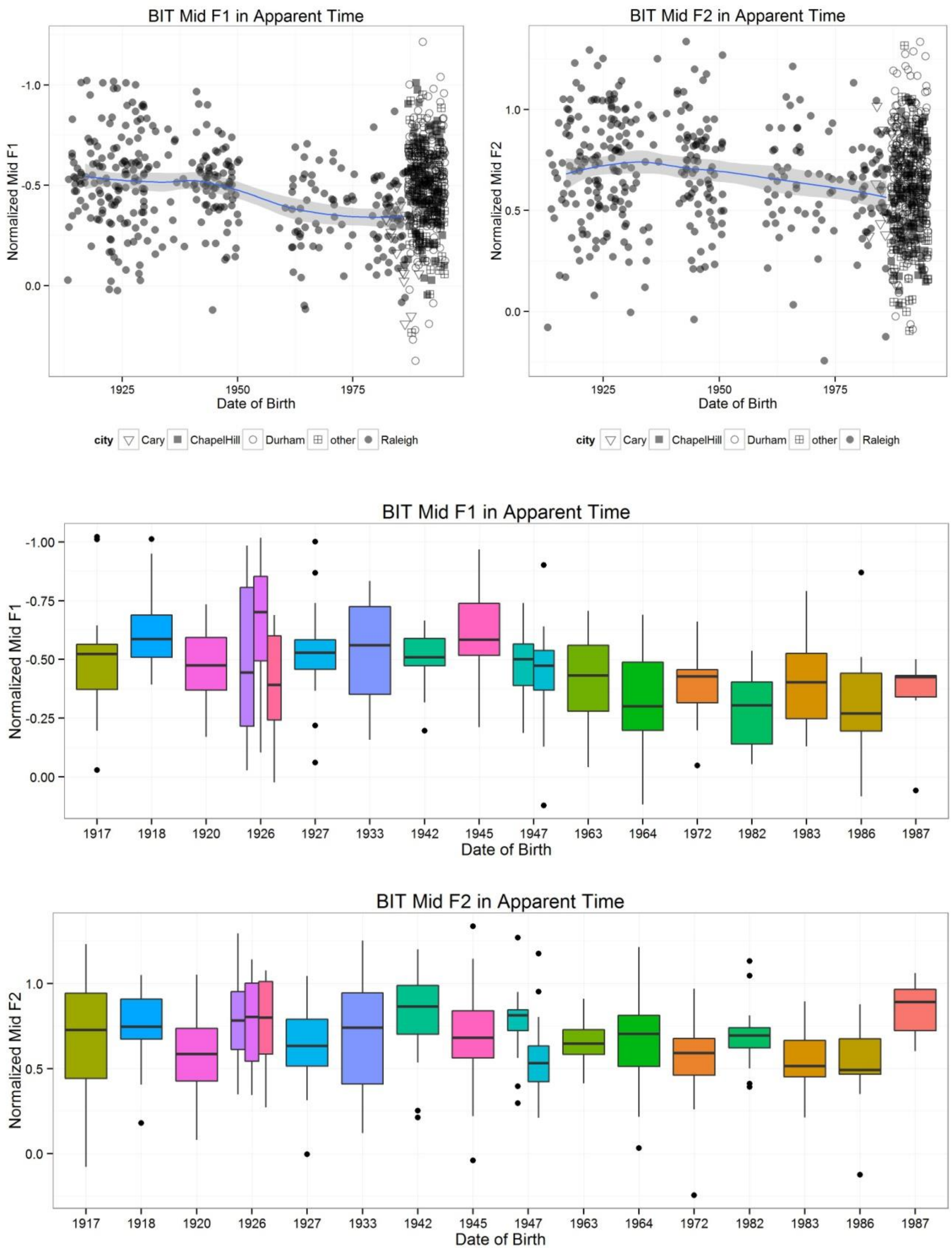

Figure 3.14: BIT scatter plots and box plots for Raleigh African Americans.

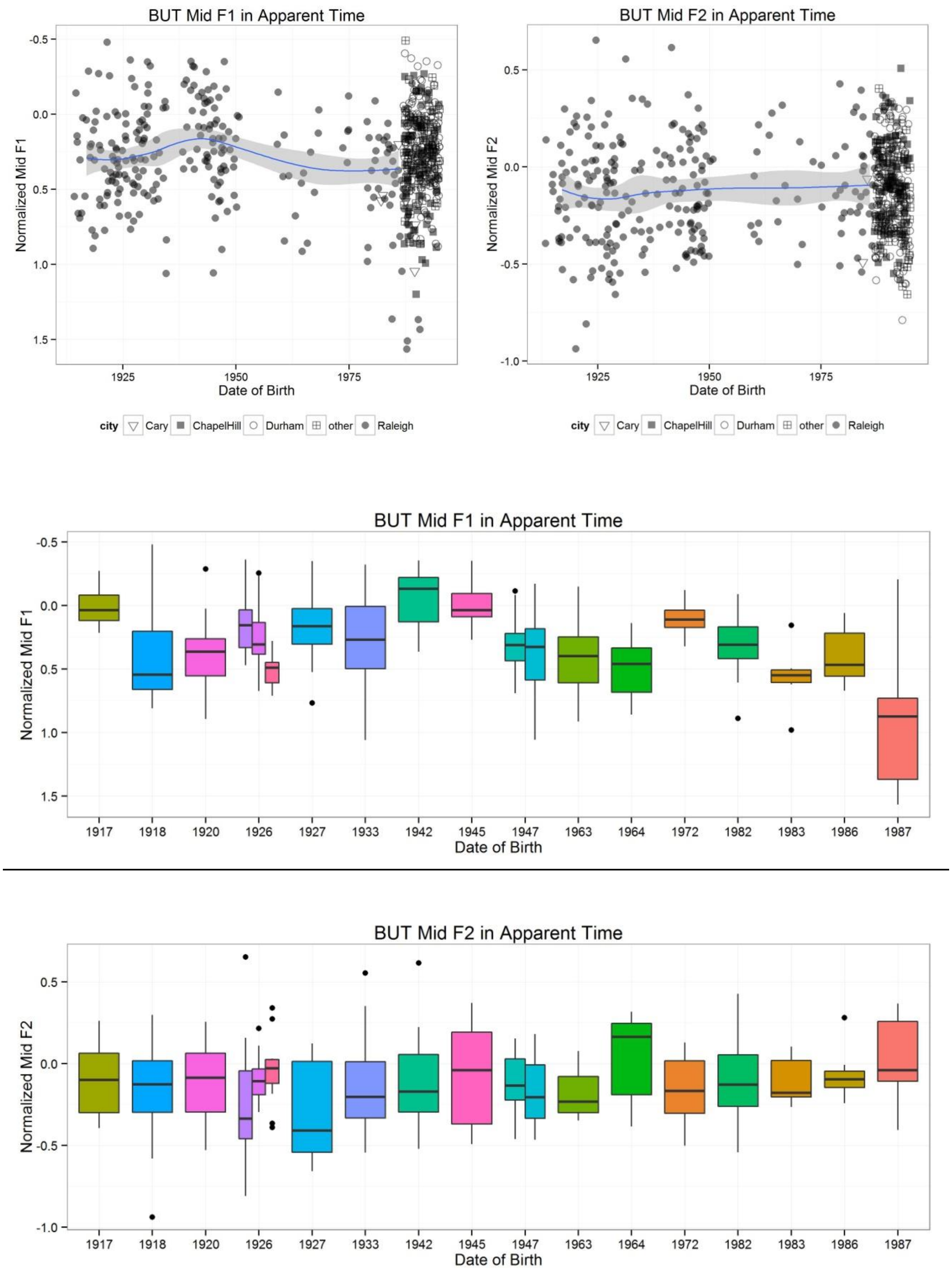

Figure 3.15: BUT scatter plots and box plots for Raleigh African Americans.

BOAT

While there is some evidence for lowering and fronting of the BOAT class between 1940 and 1960, no recent apparent-time trends for change emerge for this class either. Once again, the FPG speaker range is wider than the younger speakers in Raleigh, but occurs in roughly the same position, suggesting that no recent change in progress is apparent in the data.

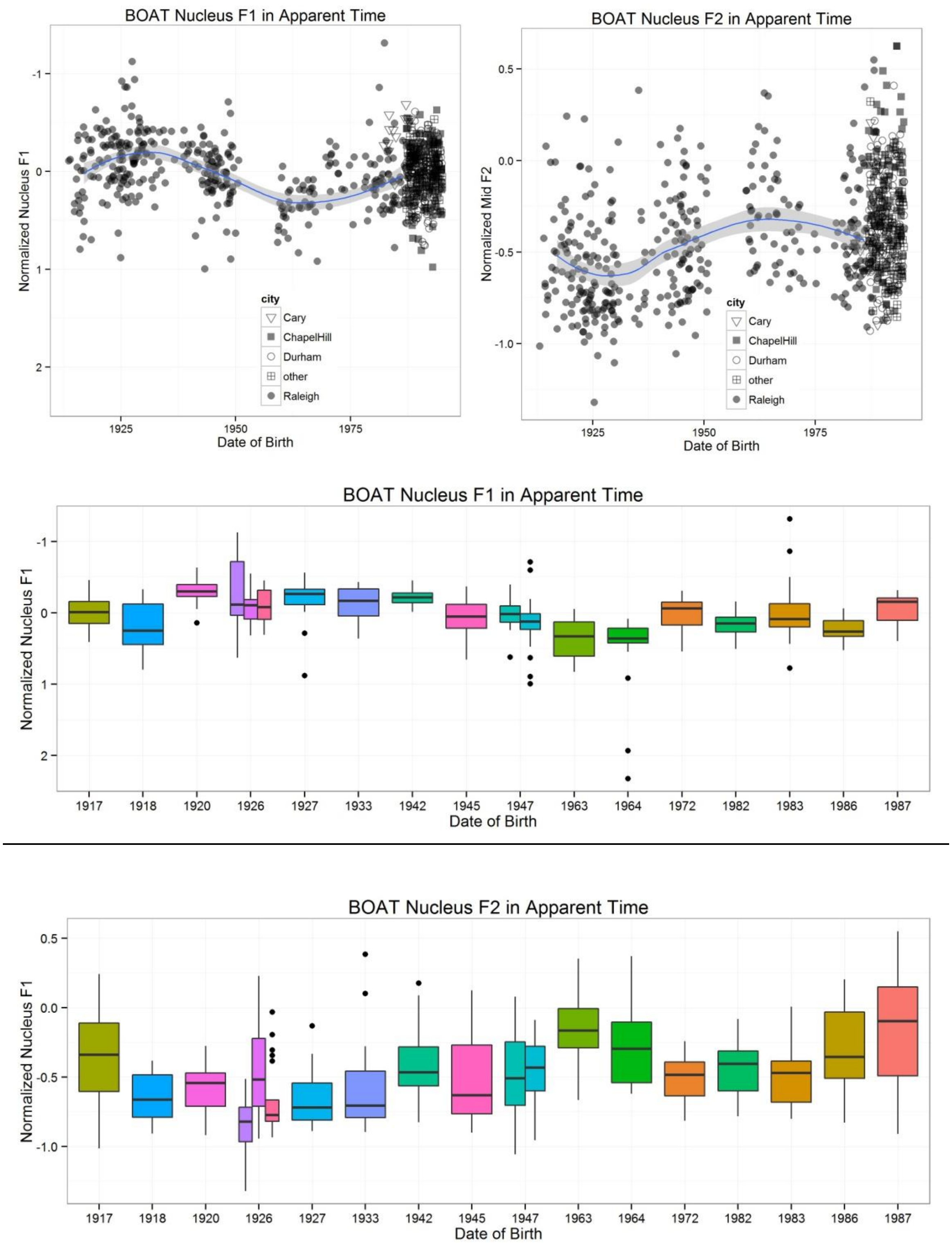

Figure 3.16: BOAT scatter plots and box plots for Raleigh African Americans.

BOOK and BOOT

Natural speech data for the BOOK and BOOT class are not currently available from the Raleigh Project, but I was able to obtain wordlist data for six speakers for comparison. The data points plotted below represent the lexical items BOOT and FOOT. FPG tokens plotted alongside these wordlist items were restricted to post-labial tokens for comparability. Although the data are only suggestive in nature, there does not appear to be a change in progress when the word list data are compared to the FPG data. Post-labial tokens remain back of the center of the vowel space for most of the speakers.

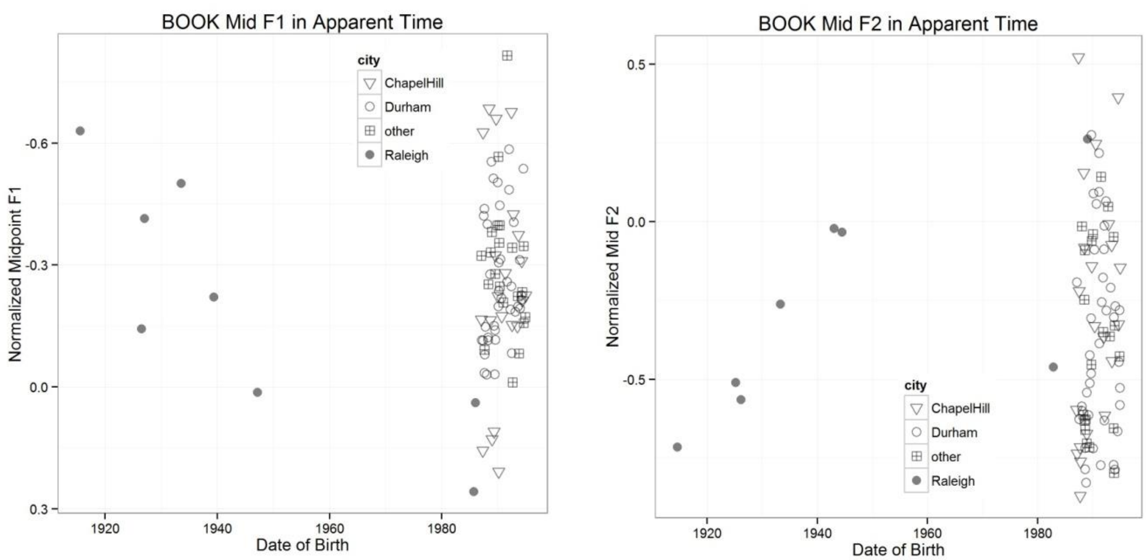

Figure 3.17: BOOK scatter plots for Raleigh African Americans.

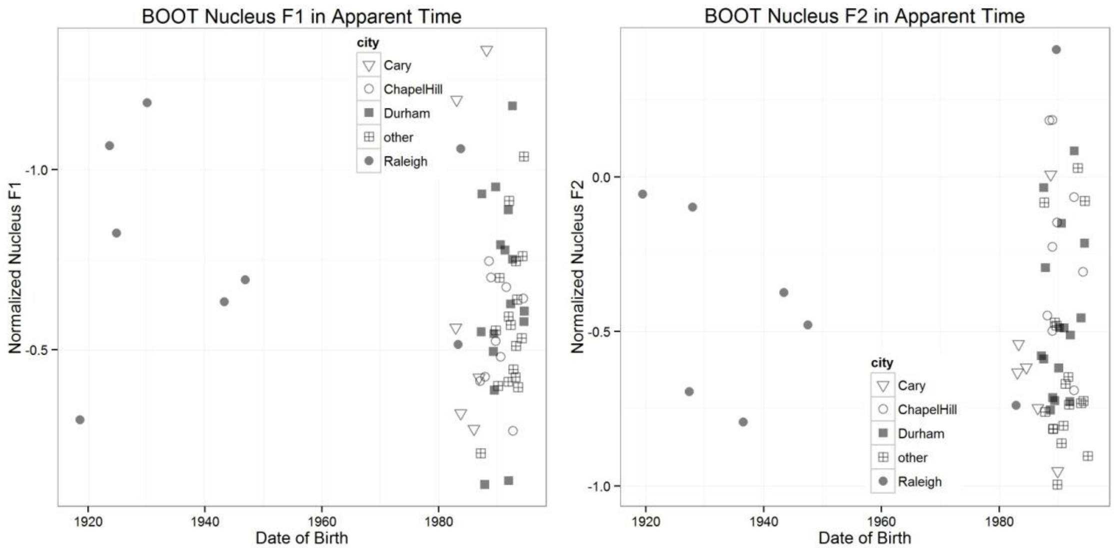

Figure 3.18: BOOT scatter plots for Raleigh African Americans.

Apparent-time data from Raleigh and FPG do not provide evidence for a recent change in progress, even as there is evidence for a rapid change in progress among European Americans. However, idiosyncratic variation is present within the data. Two striking examples include the non-vernacular AAE speaker born in 1987 and the speaker born in Cary, who appear similar to younger European Americans because of their retracted BAT and BET vowels, tensed BAIT vowels, and lack of BUT raising. The AAVS system in Raleigh appears stable, but exists in variation with the local PRV.

Sample of FPG vowel charts

Idiosyncratic variability potentially tied to community demographic makeup is also apparent in the FPG data. I've provided four representative vowel charts from the post high school time point in this section, and the remaining sixteen charts are available in Appendix 2. Vowel charts are based on speaker means with measures at 50% for monophthongs and 25% and 75% for diphthongs. Vowel means were plotted in ggplot2 with the geom_point and geom_segment functions. The nucleus of BOAR is included as an indication of the back of the vowel space. Two of the plots display vowel spaces for speakers from Chapel Hill, while the other two display vowel spaces for speakers from Durham. The vowel charts chosen for each city represent maximally different charts in order to illustrate the amount of variation in the sample. The first two charts represent males who show evidence for back vowel fronting and resistance to the Southern Shift, like young Raleigh European Americans. The BAT tokens for these two males are quite low.

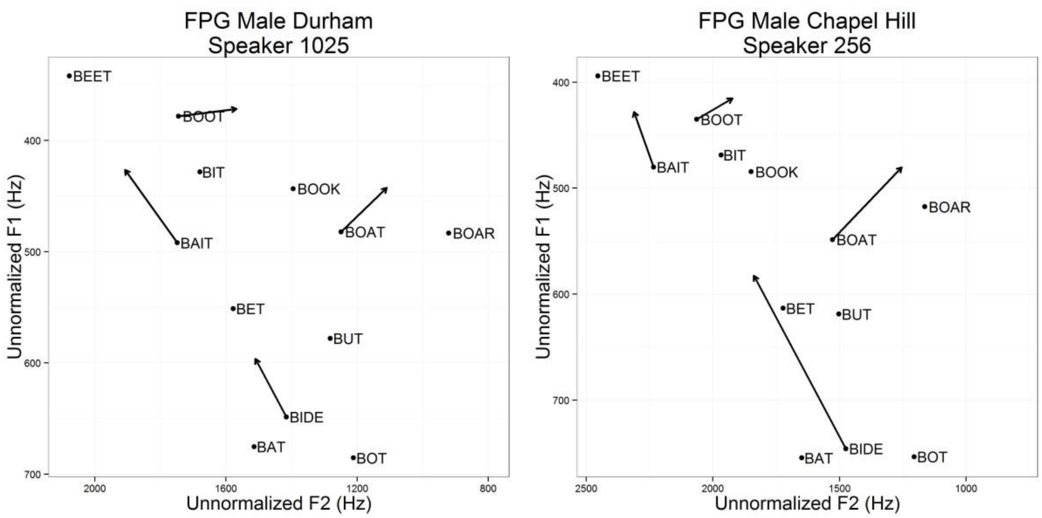

Figure 3.19: FPG speakers with PRV systems.

The next two charts represent individuals who are more representative of the AAVS. In particular, the speaker from Durham, North Carolina, reverses the nuclei of BAIT and BET. The speaker from Chapel Hill has a more intermediate system with a lower BAT token but with BAIT and BET nuclei in close proximity. BOOT fronting is apparent, as is some measure of BOAT nuclei centralization. The sample contains a range of speakers with both the emerging PRV system and features of the AAVS system.

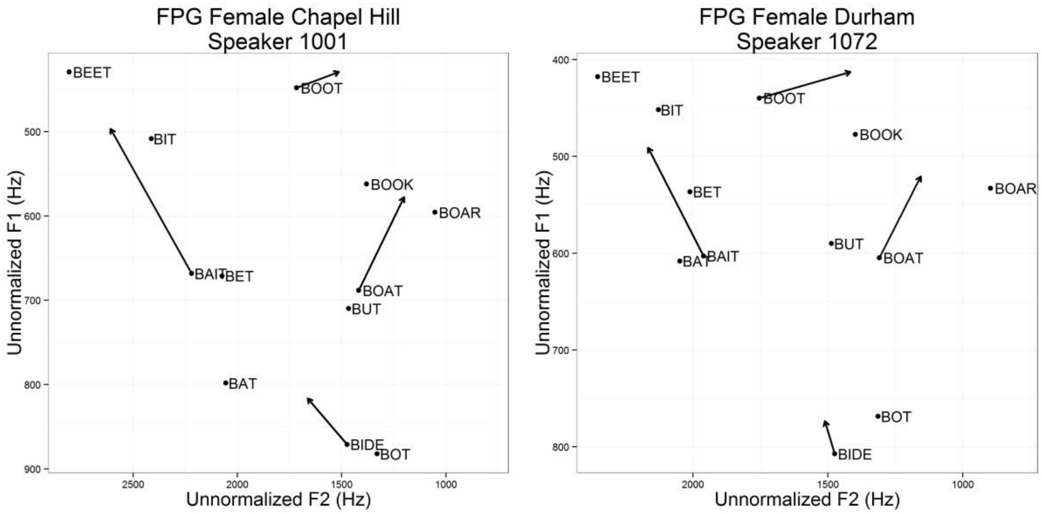

Figure 3.20: FPG Speakers with AAVS features.

3.5. Chapter summary

Within the Piedmont region of North Carolina the AAVS has been present, although highly variable, for almost a century. This system exists alongside a rapidly emerging urban variety of EAE characterized by a reversal of the front SVS. Even so, rural areas nearby still show evidence of the SVS in the PRV. As such, there are two potential EAE contact varieties alongside the AAVS in the community. Vowel charts presented from representative FPG speakers indicate that variables from both the urban EAE front vowel system and the AAVS system appear within the sample. The next chapter will present detailed information on the participants, community, and methods that will be used to identify how FPG children modify their vowel systems over time.

CHAPTER 4

THE DATABASE AND THE ANALYSIS

The data analyzed for this study come from a project conducted at the Frank Porter Graham Child Development Institute (FPG) located at the University of North Carolina at Chapel Hill. This study has yielded the most extensive longitudinal database of AAE in the sociolinguistic history of this variety to date. Longitudinal studies, while providing a rich source of information about change across the lifespan, present unique methodological issues for data collection and analysis (Tillery & Bailey 2003; Wolfram, Sankoff, Rickford, Van Hofwegen, Kohn & Farrington 2012). Beyond the obvious issues related to remaining in contact with participants over the course of many years, the researcher must also consider the physical development of the individual and its subsequent impact on acoustic correlates. Below I describe the database, selected participants, and data collection protocols. I also address speaker normalization, though for a more thorough discussion of this topic see Kohn and Farrington (2012).

4.1. Frank Porter Graham Project

The FPG Project provides a unique opportunity to explore the longitudinal development of speech across childhood to adolescence and adulthood (Van Hofwegen & Wolfram 2010). Beginning with 88 African American children in 1990, this project was able to track participants from infancy over the course of 20 years, collecting a battery of academic, social, and demographic data across distinct time points. The success of this project is largely due to the Primary Investigators Susan Zeisel and Joanne Roberts, whose diligence and hard work are apparent in the extensive amount of data collected as well as the exceptional retention rate. Participants were recruited from nine local daycares and were between six and twelve months old at the time of recruitment. Seventy-one percent were below federal poverty guidelines at the time of enrollment. Thanks to the efforts of Susan Zeisel, 67 participants currently remain in the study at 21 and 22 years old.

The goals of the project have shifted since its original inception as a study of the impact of otitis media on language development (Roberts, Burchinal & Zeisel 2002), with the primary focus changing to cognitive, language, and literacy development across the lifespan (Burchinal, Roberts, Hooper & Zeisel 2000; Burchinal, Roberts, Riggins, Zeisel, Neebe & Bryant 2000; Burchinal, Roberts, Zeisel, Hennon & Hooper 2006; Burchinal, Roberts, Zeisel & Rowley 2008; Renn 2007, 2010; Renn & Terry 2009; Van Hofwegen & Wolfram 2010). With these changing goals, participant assessments have evolved over the years. However, because language always formed an important component of the investigation, language samples were taken minimally at biannual intervals. In addition to language samples, demographic data, school and home assessments, self-esteem scales, racial centrality measures, literacy and language assessments, and a host of other measures were collected at various time points throughout the study. Together these data chronicle not only the language development of each child, but also their social context at each time point. Below I describe the subsample of participants and field sites included in this study.

4.1.1. Participants

A subsample of twenty participants was selected for analysis in this project. A number of factors were taken into consideration when selecting the subsample. First, the population was narrowed down to participants who had language samples at all longitudinal time points included in this study. I focus on four time points selected to capture trajectories of change across adolescence and ending with incipient introduction into adulthood. These include grades 4, 8, 10, and a post-high school time point, representing approximately ages 9, 12, 15, and 20. All participants selected have speech samples at each of these time points. Additionally, I attempted to select a sample that was evenly balanced between males and females.

The most important criterion for selection was that each speaker must have recordings of sufficient quality for acoustic analysis across all time points. Based on Van Hofwegen and Wolfram's (2010) and Renn's (2010, 2007) analyses, I also attempted to select a sample that represented a full range of vernacularity (see Table 4.1). This was assessed through reference to a Dialect Density Measure (DDM) calculated for each participant by a team of research assistants supervised by Renn. Based on Craig and Washington (2006) and expanded by Renn (2007, 2010), the DDM used in this study is a token-based measure of vernacularity which references the number of non-standard dialect features per communication unit or per word (Craig & Washington 2006; Oetting & McDonald 2002; Renn 2007, 2010). Higher scores indicate the use of more vernacular dialect features per communication unit. The DDM utilized in participant selection consists of 41 morphosyntactic features and 3 phonological features and was calculated for 50 utterances per child at each time point. This DDM highly correlates with more extensive feature inventories, as well as type-based inventories (Van Hofwegen & Wolfram 2010). Averaging this score across all time points that had been previously analyzed for vernacularity, including the 48 month, 1st grade, 4th grade, 6th grade, 8th grade, and 10th grade language samples, I selected participants who represented a range of AAE, from mostly standard to vernacular. Because the post-high school sample had not been collected at the time of participant selection, the post-high school DDM score was not included in this average.

Table 4.1: Average DDM across 6 time points by speaker

Male Speaker ID	*Birthday*	*Average DDM*	*Female Speaker ID*	*Birthday*	*Average DDM*
K256	05/1990	0.215	K268	06/1991	0.112
1025	05/1991	0.223	K274	06/1991	0.163
1003	08/1990	0.233	1001	07/1990	0.192
K269	06/1991	0.243	1061	01/1992	0.195
1085	05/1992	0.317	1078	10/1991	0.260
K275	10/1991	0.340	1058	07/1991	0.260
1015	01/1991	0.3460	1062	10/1991	0.284
K280	05/1992	0.3550	1035	02/1991	0.334
1075	12/1991	0.3560	1070	10/1991	0.384
1057	12/1991	0.375	1072	12/1991	0.431
Mean (SD) Range:		.30 (.06) .16	Mean (SD) Range:		.26 (.10) .32

Within the sample the average DDM score for males is slightly higher than that for females and the range and standard deviation is smaller. This is reflective of differences between males and females in the full 67 person corpus.

Speaker selection occurred before the participants graduated high school. During the post-high school interviews information regarding their current occupation and education status was collected. Several of the participants were attending Historically Black Colleges and Universities (HBCU) at the time of the last data collection, some of them in their hometown. Several others were attending local community colleges, while a portion of the participants directly entered the work force after receiving a technical degree, earning a high school diploma, or dropping out of high school. More females went to four-year institutions, while more males attended community colleges. While the majority of the sample remained in their home community after high school, three moved out of state for work or school, and four worked or were attending school in nearby counties in-state.

Table 4.2: Post-high school occupations. Individuals who have moved out of county are noted.

Male Speaker ID	*Post-high school*	*Female Speaker ID*	*Post-high school*
K256	Military (Out of state)	K268	Community College
1025	HBCU	K274	HBCU (Out of state)
1003	Finished community College, working	1001	Working (Out of state)
K269	1 year college, working	1061	4 year university (Out of county)
1085	Community college (Out of county)	1078	HBCU
		1058	HBCU
K275	Working (Out of state)	1062	HBCU (Out of state)
1015	Community college	1035	Working
K280	Community college	1070	Finished technical school, working
1075	Looking for work		
1057	Working	1072	Working

4.1.2. Field sites

Many of the participants continue to live within and around the North Carolina Research Triangle area, encompassing Chapel Hill, Durham, and Raleigh (see map 1). Durham is a mid-sized city of 233,252 individuals, 41% of whom are African American, 37.9% of whom are European American, and 14.2% of whom are Hispanic. Chapel Hill is a town of 58,011 individuals, 9.7% of whom are African American, 69.5% of whom are European American, and 6.4% of whom are Hispanic (2011 US Census Bureau).

These communities are located 11 miles apart and form two of the three cornerstone communities of the Research Triangle in North Carolina (map 1).

In addition to size and demographics related to ethnicity, the cities differ in economic indicators including median household income and the percentage of individuals below the poverty line. The city of Durham, NC, had a median household income of $47,394, with 18.6% of the population below the poverty line based on figures calculated between 2007 and 2011. This can be contrasted with Chapel Hill, NC, where the median household income was $58,415, with 22.1% of the population below the poverty line during the same time period. Chapel Hill is smaller and more affluent, but has greater income inequality (2011 US Census Bureau).

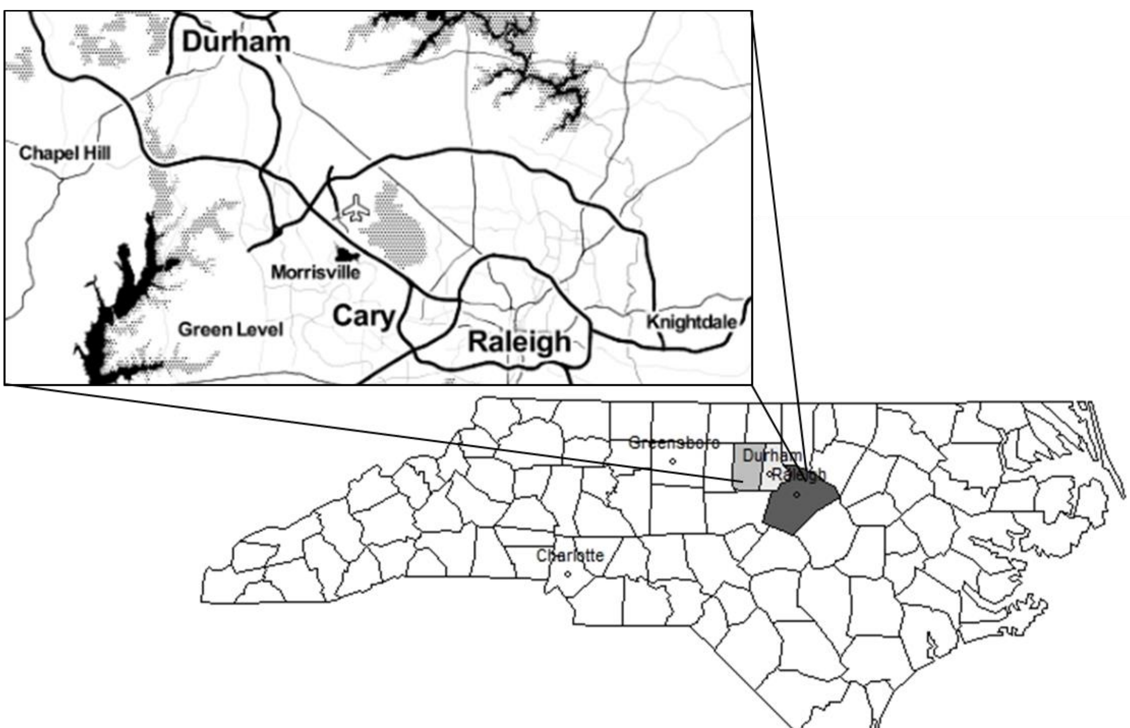

Figure 4.1: Field site locations

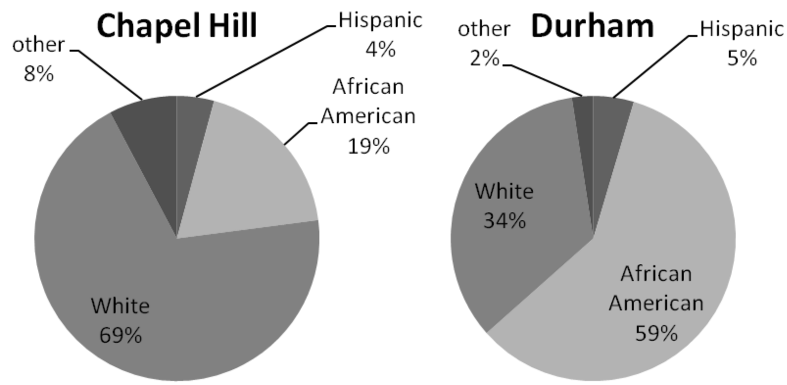

Figure 4.2: School demographics 1999-2000 4th grade

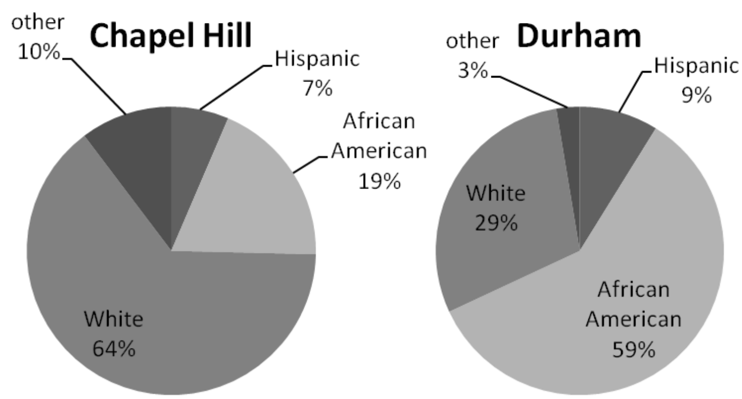

Figure 4.3: School demographics 2003-2004 8th grade

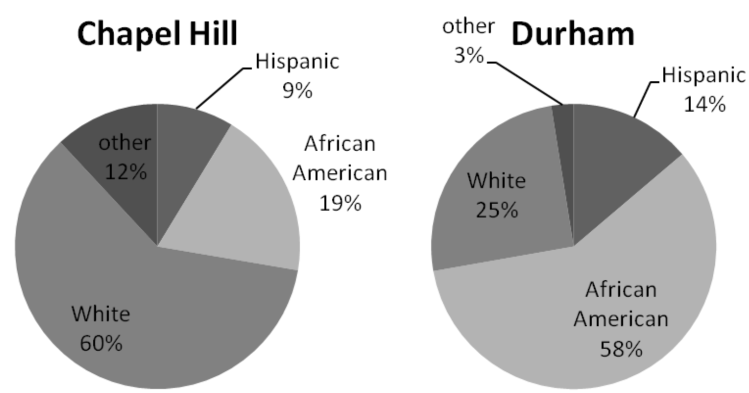

Figure 4.4: School demographics 2006-2007 10th grade

As discussed in Chapter 3, both communities are located in the Southern Piedmont dialect region, although some characteristics associated with these dialects are eroding among European Americans due to high levels of immigration from throughout the nation (Dodsworth & Kohn 2012).

In the 1996-1997 school year, approximately when the FPG participants began school, the Chapel Hill-Carrboro school district had an enrollment of 8,243 students, and by the 10th grade time point in 2006 enrollment reached 10,360. Durham Public Schools had a population of 28,100 in 1996 and reached 31,462 in 2006 (North Carolina Public Schools Statistical Profile 1999, 2006). Figure 4.2-Figure 4.4 display demographic profiles for each school system for the school years that approximately correspond to the 4th grade, 8th grade, and 10th grade data collection points (data retrieved from North Carolina Public Schools Statistical Profile 1999, 2003, 2006). While both school districts grew in size during the study, the demographic distribution for African American students remains largely stable. African American students comprised 19% of the Chapel Hill-Carrboro school district and about 59% of the Durham County school district.

These communities are closely connected, but their distinct histories create differing contexts for the local African American communities. The town of Chapel Hill was chartered simultaneously with the construction of the University of North Carolina at Chapel Hill (UNC-CH) in 1795, whereas Durham city remained unincorporated until just after the Civil War in 1869. While Chapel Hill's incorporation is tied to the founding of UNC-CH, Durham grew out of post-civil war industrialism in which rural African Americans and European Americans came to work in the newly constructed tobacco and textile factories (Anderson 2011). As late as 1881, the two cities were part of the same county, with prominent African American families holding longstanding connections to Chapel Hill, even as some began to establish new businesses near Durham's Station, a railroad stop in a rural section of the county. From the beginning, the burgeoning African American community in Durham supported some of the largest African American owned businesses in the United States, with its financial district earning the name "Black Wall Street." The establishment of local African American educational institutions soon followed, with North Carolina Central University opening in Durham in 1910 under the name "National Religious Training School and Chautauqua." In fact, some of the participants in this study attended one of the oldest historic African American high schools still in operation in the state of North Carolina. Hillside High School has been in operation since 1887, predating integration by far (Brown 2008). Durham remains an African American cultural hub to this day (Brown 2008).

Chapel Hill attained other landmark achievements, including the election of the first African American mayor of a predominantly European American Southern town in 1969 (docsouth.unc.edu). However, the population of African Americans in the town remains small compared to Durham. Additionally, the towns differ in formal measures of segregation, as the African American community in Durham is more densely populated in selected census tracts (see Appendix 1 for details).

Although city of residence was not considered in the original participant selection, it emerged as a significant variable in later analysis. City of residence was not formally coded in the initial data collection, but was coded based upon school attendance from elementary school through high school. Following this metric, most participants grew up in Chapel Hill or Durham.

Table 4.3: Participants

	Durham	*Chapel Hill*	*Other*	*total*
Males	4	1	5	10
Females	5	4	1	10
Total	9	5	6	20

Table 4.4: School demographics by gender

		Grade		
	speaker	4	8	10
Females	1061	0.146	0.196	0.227
	1062	0.257	0.254	0.143
	1001	.197	0.181	0.159
	1035	0.88	0.762	0.891
	274	0.247	0.212	0.142
	268	0.183	0.189	0.142
	1072	0.993	0.611	0.763
	1078	0.335	0.556	0.889
	1070	0.736	0.762	0.781
	1058	0.541	0.546	0.781
Average		0.4515	0.4269	0.4918
Standard Deviation		0.314	0.2439	0.3504
Males	1003	0.87	0.765	0.843
	1015	0.975	0.604	0.388
	1085	0.425	0.611	0.534
	256	0.198	0.181	0.158
	269	0.214	0.262	0.167
	275	0.218	0.254	0.578
	280	0.42	0.73	0.29
	1075	0.803	0.216	0.149
	1057	0.555	0.556	0.96
	1025	0.686	0.478	0.781
Average		0.5364	0.4657	0.4848
Standard Deviation		0.2874	.2205	0.3020

Participants who changed school districts were placed in the Other category, as were participants raised outside of Durham and Chapel Hill. Two outliers grew up in rural regions near Durham and Chapel Hill, one outlier moved almost yearly throughout the state of North Carolina during high school, two outliers moved between the Durham and Chapel Hill school districts and one outlier moved from the Durham school district to an outlying rural school district. While gender is not balanced across field site, gender is balanced across school demographics, as shown in Table 4.4.

4.2. Sound file selection

In order to extract a sufficient number of vowel tokens for statistical analysis, I utilized a wide range of recordings available in the FPG database. My colleagues and I[1] first analyzed the language samples at each time point. The nature of these samples varied, and the data collection protocol for each time point is outlined below. During the 1st and 4th grade time points a mother-child interaction was collected. This interaction consisted of a guessing game, several reading activities with story recall components, a letter writing component, and a discussion of life goals. Language samples in the 6th and 8th grade consisted of peer interactions in which participants had free time to interact, give a speech, plan a vacation, and discuss issues or problems chosen by the peer. In the 10th grade participants were paired with another peer in the study to design a Myspace or Facebook page. This task was supplemented by free time to talk if the activity did not provide a large enough sample. In addition to the peer interactions, a formal and an informal interview were collected in the 8th and 10th grade. The formal interview consisted of a mock job interview, while the informal interview consisted of a chat with one of the staff members about television, music, sports, and movies. These interviews supplemented the other language samples when token counts from language samples and

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[1] Special thanks to Charlie Farrington, who extracted a sizeable portion of the vowels analyzed in this study. Thanks are also due to David Ethier, who extracted vowels during the pilot study component of this analysis. Additionally, I would like to recognize Anna Powers, as she created six text grids for the tenth grade time point to aid in vowel extraction.

testing were insufficient. All told, each individual language sample provided between 50 and 100 vowel tokens per participant per time point. The language sample at the post-high school time point is different from those at earlier time points as it is longer, lasting over an hour, and consists of a sociolinguistic interview, a mock job interview, and a metalinguistic awareness interview. These interviews generally yielded over 200 tokens per speaker.

Because token counts from the language samples for the school time points were too low, I also chose to analyze the expressive portion of the Clinical Evaluation of Language Fundamentals-3 (CELF) test at each time point (Semel, Wiig & Secord 1995, 2004). These tests consisted of sentence assembly tasks, formulated sentences tasks, sentence recall tasks, and semantic relations tasks. The sentence assembly task provides participants with a list of words. The participants are then asked to create two different sentences with the given words. The formulated sentences task requires participants to construct sentences with a single word prompt and a picture for context. The sentence recall task requires participants to repeat a sentence back to the administrator. Finally, the semantic relations task requires participants to identify two words which have a semantic relationship out of a list of four words. While the formal nature of these tasks is a limitation of the data, it also allows for consistency across time points and individuals. We are able to select identical words in identical phonetic environments for all participants at each time point.

In general, all time points consisted of interactions that are more formal than a typical sociolinguistic interview. However, as life-long participants in the study, participants typically were more relaxed in these formal settings than would normally be expected. For example, speaker 1057 explains his relaxed attitude during the post-high school interview as a symbol of his affection for the PI: “I’m just so comfortable around y’all, you know. She [Susan Zeisel] been here all my life. I love her.” With these additional recordings we were able to extract around 200 vowel tokens per speaker per time point.

Interviews were conducted at FPG facilities except at the post-high school time point, when interviews were either conducted on-site at FPG or in the participant’s home. Interviews were conducted mostly by African American female graduate students working for FPG. However, on occasion the PI, who is a European American female, would facilitate activities. At the post-high school time point recordings were conducted by either two African American female graduate students or one African American female graduate student and one European American female (a research assistant or the PI). External microphones were placed on tables in a central location between speakers for all recordings except post-high school for which lapel microphones were used. Recordings were made on cassette tapes until the 6^{th} grade (8^{th} grade for cohort 1), and on a digital recorder for grades 8 and above. All cassette tapes were later digitized. Because the data are archival in nature, and because the original goal for the recordings did not include acoustic analysis, recording quality varies. Rooms were not soundproof and ambient noise such as that caused by fluorescent lights and heating/cooling systems is present in some of the recordings. The speakers selected for the current analysis were chosen because their recordings were of a high enough quality to extract formant values across all age points.

4.2.1. Data extraction

For each participant at each time point a range of vowels was extracted from the classes BEET, BIT, BAIT, BET, BAT, BAN, BUR, BUT, BOOT, BOOK, BOAT, BOUGHT, BOT, BITE/BIDE, BIN/BEN, and BOWL/BOAR.[2] Only stressed vowels surrounded by obstruents were selected for the analysis, with the exception of pre-rhotic /o/, /o/ before /l/, and pre-nasal /æ/, /ɪ/, and /ɛ/. These tokens are plotted separately by environment and are not included in statistical analysis. Only vowels with a duration of at least .06 seconds were selected for analysis. No more than two to three tokens of a single lexical item were selected in an attempt to sample a wide range of phonetic environments, and we attempted to collect at least 10 tokens of each vowel per participant at each time point. In total 17,726 vowels were selected for analysis. All vowels were analyzed in Praat using LPC analysis (Boersma & Weenink 2010). For vowels in the environment of obstruents the beginning of the vowel was determined to be the point at which the amplitude increased and at which F_2 began to be visible. The end of the vowel was determined to be the point where amplitude fell and F_2 values were obscured. The researcher selected these points through visual and auditory analysis (Figure 4.5a).

[2] Following Yaeger-Dror and Thomas (2010), this text will reference vowels using a combined paradigm of Wells (1982) style key words within a paradigmatic frame similar to Ladefoged's (2005) convention. This author will follow Yaeger-Dror and Thomas (2010) in using a B_T frame.

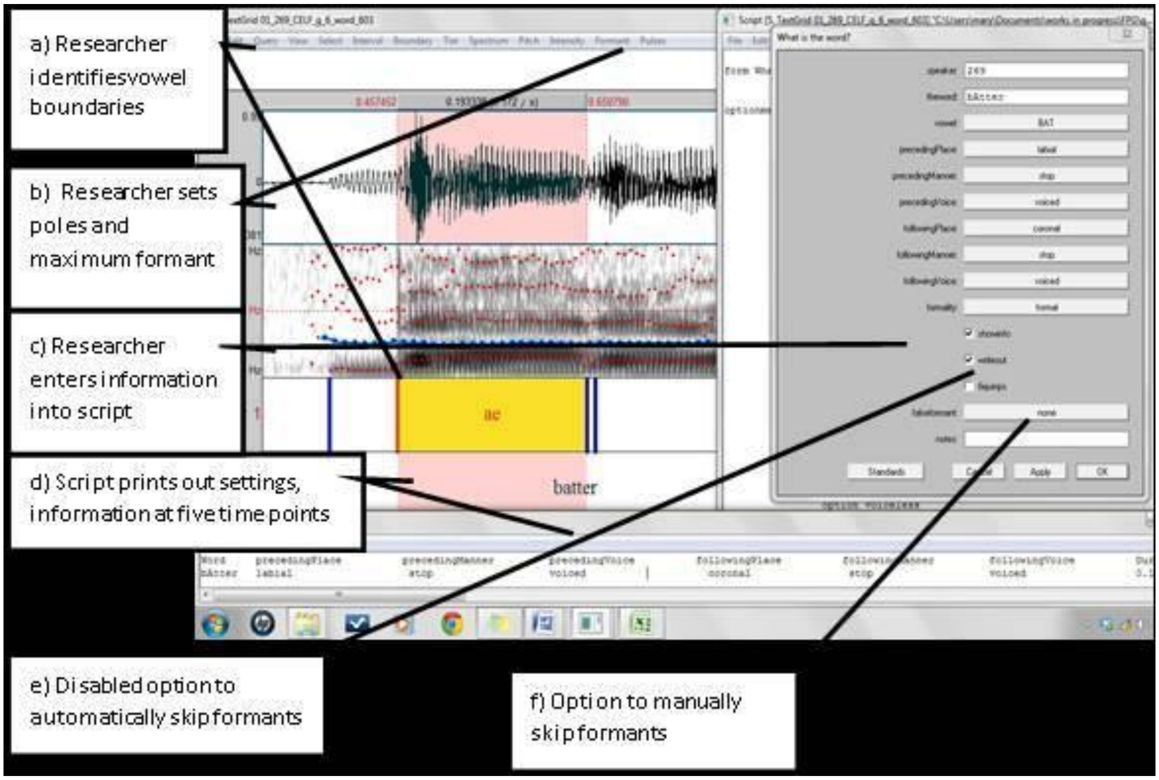

Figure 4.5: Vowel extraction

Because of the varying ages and sound qualities of the participants and recordings, settings for the maximum formant values and poles used in the LPC analysis were manually selected by the analyst for each vowel (Figure 4.5b). These settings were recorded by a Praat script to be exported with formant information. The pitch, first formant, second formant, and third formant for the vowel onset, 25% duration mark, midpoint, 75% duration mark, and vowel offset were extracted to a tab-delimited file using an interactive Praat script, which was co-written by the author and Jeff Mielke (Figure 4.5). The script also exported information specified by the analyst regarding the preceding and following place of articulation, manner of articulation, and voicing so that the author may statistically control for preceding and following phonetic environment (Figure 4.5c).

Due to the inconsistent recording quality, several features were built into the interactive Praat script in order to assist with data collection. An option designed by Jeff Mielke (personal communication) allowed the interactive script to automatically identify spurious formants and skip them (Figure 4.5e), but this feature was disabled for the majority of vowel analysis. A second option manually "skipped" spurious formants, so that if the LPC analysis tracked extraneous noise as a formant or if actual visually-identified formants could only be tracked if a spurious formant was present, the analyst could choose not to export the values for the false formant (Figure 4.5f). When the analyst used this option, a note indicating that a formant was skipped was included with the measurements in the tab-delimited file created by the Praat script. Analysts were instructed to carefully examine whether such readings distorted the formant trackers, and to use this option as sparingly as possible. The analysts used this option if one stray formant was present in a vowel with otherwise clear formant readings.

Data were analyzed by the author as well as by two master's student from North Carolina State University. For the first speakers analyzed by each of the master's students every token collected was double-checked by the author, resulting in direct supervision of the first thousand tokens collected. For the remaining tokens the students were asked to make comments on tokens which they found difficult to measure or problematic. Additionally, I plotted all data and identified outliers. I then visually checked all problematic tokens as well as outliers against the original spectrograms.

4.2.2. Selection of normalization procedure

Speaker normalization, a technique used to control for variation introduced by physical differences between speakers, is a necessary component in studies that attempt to compare speakers of diverse sizes, genders, and physiological makeup. It allows researchers to understand how non-physiological variation patterns within populations and what role such variation may play in sound change. Normalization is crucial to the current study as the impact of maturational acoustic correlates in unnormalized data prevents direct comparisons across age points. Neither vocal tract morphology nor acoustic correlates of vowel production change uniformly across childhood, with distinct trends for males and females.[3]

Knowledge of vocal tract growth may assist in understanding some of the potential pitfalls researchers face when working with child language. While few longitudinal acoustic studies of vocal tract morphology and language acquisition exist (e.g. Bennett 1983; Whiteside, Hodgson & Tapster 2002), some trends emerge from the body of cross-sectional studies (Vorperian & Kent 2007). Formant frequencies depend on vocal tract length, a factor which is obviously influenced by maturation. A longer vocal tract results in lower formant frequencies; a shorter vocal tract results in higher formant frequencies. MRI evidence suggests that while the oral tract grows at proportional rates between childhood and puberty for both sexes, the pharynx does not grow proportionally to the oral tract (Fitch & Giedd 1999). Large sex differences in the proportion of oral tract to the pharynx emerge during puberty, between 10 and 14 years of age. These maturational differences create gender distinctions in F_2 values around this time. Early studies indicate that these F_2 gender distinctions are largest in the front vowels (Fant 1975; Bennett 1981). These results suggest that sex differences do not emerge uniformly across vowels. Gender differences in F_2 values become significant by age 15, with males

[3]Because this study focuses on children aged 5 through 16, I will not focus on the early development of the vocal tract. For a literature review of acoustic analyses of child vowels, see Vorperian and Kent (2007).

showing a disproportionally longer pharynx. Repeated studies suggest that low vowels have disproportionally higher formant frequencies for women, so that F_1 shows greater sex differences for low vowels than for high vowels (e.g. Fant 1975; Vorperian & Kent 2007). These differences emerge by age 4, while other gender differences are not apparent until the onset of puberty (Eguchi & Hirsh 1969; Whiteside 2001; Lee & Iverson 2009). Sex differences appear smallest for F_3 when compared to the other formant values. F_3 has the steepest chronological decline of all formants, reaching adult-like levels before F_1 and F_2 (Vorperian & Kent 2007).

Several important themes emerge from these studies of child vowel development. First, chronological changes are not uniform across formants or across vowels because the oral tract does not develop uniformly with the pharynx. Additionally, F_3 descends towards adult-like values more rapidly than the other formants. This suggests that formant intrinsic normalization procedures that do not rely on formant ratios, such as LOBANOV (Lobanov 1971) or NEAREY 1 (Nearey 1977), may be more appropriate for child data. Normalization algorithms that rely on F_3 values may underestimate maturational differences for F_1 and F_2. Maturation appears to affect vowels differently. In particular, the overall shape of the vowel space changes over time (Vorperian & Kent 2007). Gender differences in the low range of the vowel space that emerge around age 5 or 6 may present difficulties in normalizing the lower range of the vowel space when one uses range normalization techniques such as GERSTMAN (Gerstman 1968) .

Even though variation introduced by maturational differences appears more dramatic and complicated than variation introduced by gender differences, comparison of the speech of a young male speaker to his adult counterpart runs into many of the same issues that arise when one compares speech across sexes. Both types of comparisons must account for proportional differences, as well as total size differences, in vocal tract morphology. Normalization procedures that are more effective in reducing gender differences for adult populations should also perform better at normalizing speaker data across adolescence. Because LOBANOV has been found to perform especially well at reducing scatter attributed to sex in adult populations (Adank, Smits & van Hout; 2004; Clopper 2009; Fabricius, Watt & Johnson 2009; Flynn 2011), and because it is a formant-intrinsic normalization technique that does not rely on F_3 values it should effectively reduce scatter attributed to physiological changes while preserving sociolinguistically meaningful variation.

Results from a pilot study including ten FPG speakers across five time points support this hypothesis (Kohn & Farrington 2012). For the initial pilot study over 4000 tokens of BEET, BAT, BAN, BITE/BIDE, BUT, BOT, BOUGHT, BOAT, BOWL, and BOAR were collected, yielding about 80-100 tokens per speaker per interview. Interviews included in the study came from the 4th, 8th, and 10th grade time points described above. In addition, we analyzed data from the 1st and 6th grade time points. The age of the participants ranged from approximately 6 years old to approximately 15 years old, thus spanning puberty. A range of normalization techniques was compared for their effectiveness in reducing differences attributable to age. Results indicated that the LOBANOV technique was the most effective technique, even as other formant intrinsic normalization techniques performed well. Given these considerations I chose to normalize formant values using a modified LOBANOV technique (see Table 4.5). Effectiveness of normalization is illustrated in Figure 4.6 in which a speaker's normalized and unnormalized vowel spaces are compared. While the unnormalized data does not share a consistent range across time points, with large differences between 4th and 8th grade, the normalized data places the vowel classes into a similar range. Differences in relative vowel class positions across time points apparent in the unnormalized data, such as the relative position of the BIDE nucleus to the BOT midpoint, are preserved in the normalized data.

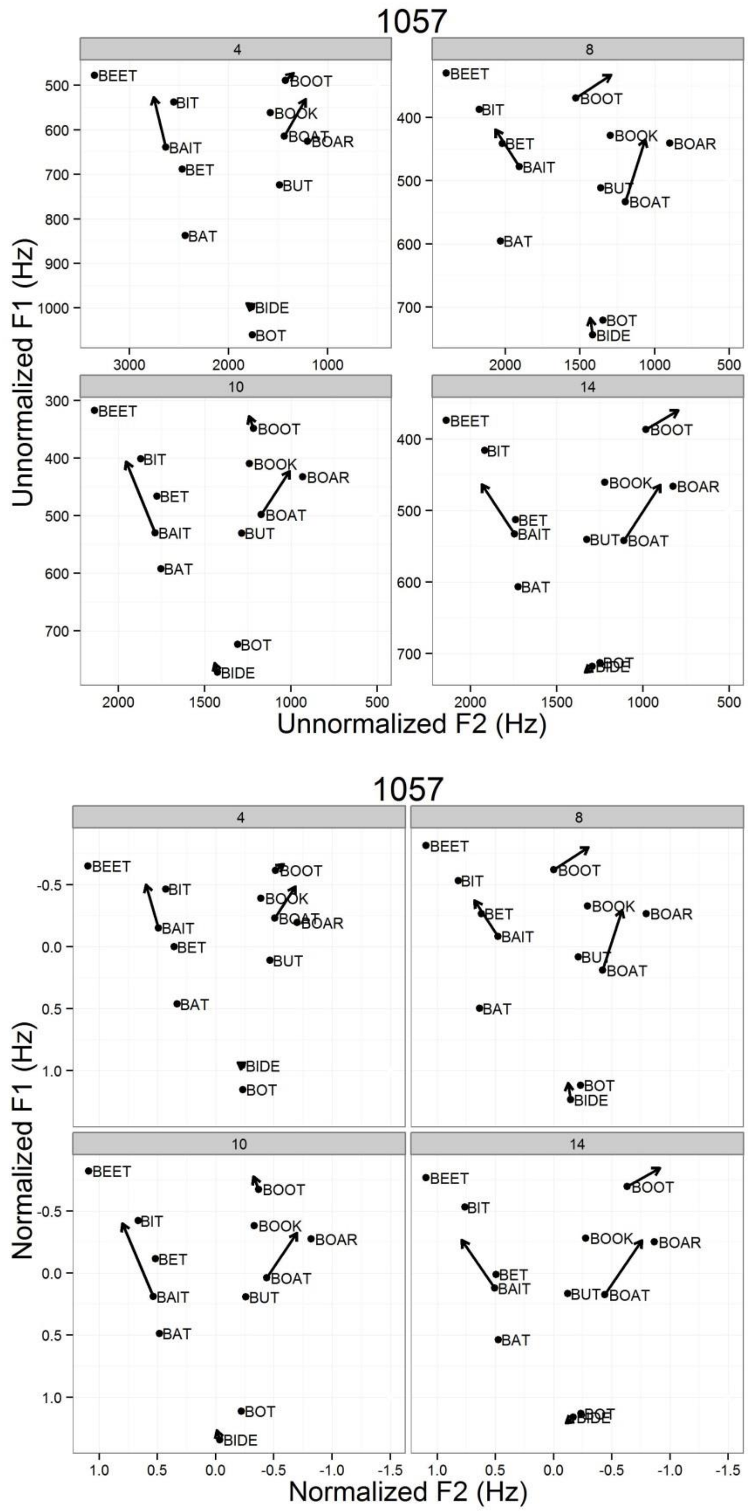

Figure 4.6: Comparisons of unnormalized (above) and Lobanov normalized (below) vowel spaces for the same participant (speaker 1057) at four ages. Plotting symbols represent means for vowel classes.

4.2.3. Details of normalization procedure chosen for the current analysis

Table 4.5: LOBANOV normalization algorithm

Lobanov (1971)	$F_{norm}=(F_{ni}- \mu(F_n))/(\sigma (F_n))$	F_{ni} is formant ***n*** of token *i*. μ and σ are the grand mean and the standard deviation for formant *n*.

LOBANOV normalization consists of converting individual F_1 and F_2 values to z-scores based on a grand mean and standard deviation for the vowel space. A traditional LOBANOV technique uses values from all vowels in the vowel system to arrive at a grand mean and standard deviation value. I modified this technique to arrive at these values using point vowels which were then excluded from further statistical analysis. I selected the midpoint measures of the vowels BEET, and BOT, and the nucleus of BOAR (as this environment resists fronting), to represent extreme high front, low, and back corners of the vowel space. Although there are differences between the European American community and African American community for BOT pronunciation, the speakers in this study generally all have a low, central BOT class that appears stable over time, making this vowel a good choice for a normalization anchor. Using these vowel classes I established a grand mean and standard deviation individually for F_1 and F_2 for each participant/grade category. Each vowel token within a participant/grade category was converted to a z-score with this grand mean and standard deviation. These normalized values will be used as the dependent variable in subsequent statistical analysis, but in order to ensure that any change identified is not a relic of normalization, I also performed visual comparisons of unnormalized data across time points by identifying relationships between vowels in the vowel space using vowel plots available in APPENDIX 2. Illustrative examples are included in subsequent chapters.

4.3. Independent variables considered in the analysis

Each normalized token was coded for the following independent variables:

Grade

The grades 4, 8, 10, and a post-high school time point, representing approximately ages 9, 12, 15, and 20, are included as an independent variable for each token and reflect the target grade for the data collection protocol at the time of the utterance. Grade refers to the testing protocol for the target grade/age of the cohort. The actual grade in which the participant was enrolled at the time of testing was occasionally one year behind due to retention in school. Grade was chosen as the primary correlate for time in order to maintain consistency with protocol tasks across participants.

Sex

Because sex differences in processes of language variation and change are common (Labov 2001), I include this variable in subsequent analyses.[4]

Interview Context

To control for the different contexts in which data were collected, I have labeled tokens as either formal or informal. Testing contexts for grades 4, 8, and 10 were labeled as formal. The metalinguistic analysis and job interview for the post-high school time point were also labeled as formal. All other contexts were labeled as informal. This division represents only a rough divide for context as participants frequently showed different orientations towards formality during the same task. Additionally, it should be noted that these categories are not isomorphic to categories labeled as formal and

[4]There are many more sophisticated ways to analyze gender, and I plan to pursue these in future case studies.

informal in Renn (2010; Van Hofwegen & Wolfram 2010; Wolfram & Van Hofwegen 2012) as testing contexts were not included in their analyses.

<u>Field site</u>

As discussed in Chapter 3, it is often assumed, and there is some preliminary evidence to indicate, that level of segregation influences the interactions between AAE and PRVs, with high levels of segregation promoting the retention of AAVS features and low levels of segregation promoting accommodation to regional PRV forms. Because participants raised in Chapel Hill, NC, experienced less spatial segregation than participations who grew up in Durham, NC, I include field site as an independent variable in subsequent analyses. This variable is divided into three factors: Durham, Chapel Hill, and Other. As discussed earlier in the chapter, speakers categorized as Other either lived in rural areas or moved between school districts during childhood. Each speaker is categorized as growing up in one of these three categories and so this variable represents a stable variable across the lifespan.

<u>School segregation</u>

In order to perform a more fine-grained analysis of the influence of inter-ethnic contact on language change, I also include school demographic data in subsequent analyses. The school demographic variable is a continuous variable ranging from 0 to 1 and represents the percentage of African Americans in the participants' school for each time point in which the participant was enrolled in North Carolina public schools. The measure is a grade-specific variable and is not stable across the lifespan. This figure is based upon nationally available data (nces.ed.gov). Comparable measures are not available for the post-high school time point because not all participants enrolled in higher education institutions after high school. As such, the post-high school time point will not be included in statistical runs that consider school segregation levels.

Vernacularity

As discussed in Chapter 2, concurrent with my acoustic analysis a team of researchers are utilizing this corpus to study other aspects of linguistic change across the lifespan, including change in the use of non-standard morphosyntactic and segmental features (Van Hofwegen & Wolfram 2010), and style shifting (Renn & Terry 2009). Van Hofwegen and Wolfram (2010; Wolfram & Van Hofwegen 2012) have made their longitudinal frequency-based analyses available to me. These analyses include copula absence (*she nice*), and velar nasal fronting (*swimmin'* for *swimming*). The coding protocol for copula absence and velar nasal fronting follows the traditional variationist paradigm of identifying the relative frequency of each variant. I include these data in statistical runs in Chapter 6 where I compare changes in vowel features to changes in morphosyntactic and consonantal features across childhood for each participant.

Linguistic factors

I include several linguistic factors for statistical control as fixed factors in all initial models considered. These fixed effects include duration of the vowel, to control for correlates of undershoot, and place of articulation, in order to statistically control for the influence of place of articulation on F_2 values. Duration is a continuous variable listed in seconds, and place of articulation is a categorical variable divided into labial, coronal, velar, glottal, and none.

Preceding place of articulation was included in models for all diphthongs as the nucleus measure is the dependent variable. To determine whether to include preceding place of articulation or following place of articulation in the statistical analysis for monophthongs I compared goodness of fit for two base models for each monophthongal vowel class. Each base model included speaker as a random factor and grade as a random slope (see 5.1 for details). Fixed effects in the models included duration and interview context, as well as either preceding place of articulation or following place of articulation. I compared models using goodness of fit measures including the Aikake Information Criterion (AIC) and the Bayesian Information Criterion (BIC), indices typically used to compare models that are not nested. Both the AIC and the BIC are based on the Log Likelihood, but include penalties for model complexity. Lower scores indicate better goodness of fit. The AIC score penalizes model complexity to a greater degree than the BIC score (Cohen, Cohen, West & Aiken 2003). Because the two models compared in this analysis are equally complex, the AIC and BIC scores consistently selected the same model as superior. The place of articulation variable included in the model with superior goodness of fit measures was included in subsequent models for the monophthongal vowel class in question.

All statistical models and graphs were produced in R using the nlme and ggplot 2 packages respectively (R Development Core Team 2010). Ggplot 2 is a plotting and graphing system designed for R. Nlme is a statistical package designed for fitting and comparing linear and non-linear fixed effects models (Pinheiro, Bates, DebRoy, Sarkar & R Core Team 2013). Specific details of model building are discussed in subsequent chapters.

CHAPTER 5

HOW DO CHILDREN CHANGE THEIR VOWEL PRONUNCIATIONS AS THEY AGE?

Do individuals change their linguistic behavior over the course of childhood, adolescence, and emerging adulthood? And, do trajectories of change show predictable patterns consistent with life-stage variation at the aggregate level? The primary focus of this analysis is to provide a description of real-time change for stable vocalic variation in order to identify the extent to which the social process of development and aging impacts linguistic behavior in predictable ways. These results not only provide insight into typical patterns of linguistic change across adolescence, but also hold important implications for the interpretation of apparent-time data. Because the AAVS is a stable vowel system that exists in variation with a PRV, this system provides a testing ground for the influence of life-stage variation on vowels that are not undergoing a change in progress. In addition, this analysis provides evidence for the sociogeographic distribution of the AAVS in the region. How do changes in African American English (AAE) across adolescence correlate with and reflect societal structures? What is the relationship between community demographics and participation in the AAVS? Is there evidence to support the central role attributed to school systems in the construction of life-stage change?

Evidence presented below reveals a significant correlation between participation in the AAVS and the demographic profile of the schools attended by participants, with a positive correlation between BAT, BET, and BIT height and the percentage of African

American students in the school (Section 5.1). As students change schools due to matriculation or relocation, several participants experience changes in the demographic profiles of their schools. To explore the influence of institutional changes in life-stage change, I compare adolescent trajectories for individuals who experience demographic changes to those whose school environments have stable demographics (Section 5.1). While there is a strong correlation between features of the AAVS and school demographics, speakers who experience demographic shifts do not always show subsequent change to their vowel space.

In the remainder of the chapter I identify whether the participants in this study change their pronunciation as they transition from childhood to adulthood, the temporal points at which these changes occur, and how pervasive this change is across the vowel system. I also examine the extent and limit to which individuals participate in change consistent with life-stage variation. This analysis speaks directly to pervasive questions surrounding the direction and magnitude of life-stage change reviewed in Chapter 2 by providing a description of change across adolescence for stable vocalic variables. I explore change over time for the participants as a group in Section 5.3 followed by change at the individual level in Section 5.4.

Results indicate that stability is the predominant group pattern, with little evidence for life-stage patterns of change at the group level. Changes that do occur at the group level generally emerge as significant only at the post-high school time point, and mostly occur on the F_1 dimension (Section 5.3.6). This pattern is inconsistent with the hypothesis that adolescent peaks occur for stable vocalic variables. Individual level results indicate that participants do change across the lifespan in patterns that suggest adolescent peaking, but that individuals vary in terms of vowel subset stability (Section 5.4). Despite idiosyncratic patterns for change, strong community differences are present throughout the vowel system. Implications for individual variability in the context of stable variation are discussed in Section 5.4.

5.1. Statistical analysis for group change across time

This analysis focuses on individual and group change through a repeated measures design, the hallmark method of a longitudinal panel study. While longitudinal studies remain rare in sociolinguistics (Sankoff 2005, 2006) they are more common in closely allied fields such as first language acquisition, psychology, and sociology. This has led to the development of statistical techniques appropriate for the unique properties of longitudinal data. Specifically, practices commonly used for cross-sectional data are inappropriate for longitudinal data as within-speaker measures across time points are not independent. As such, time variables in a longitudinal study require special treatment in order to model nested speaker-level effects across time. This is accomplished by modeling individual trajectories of change for each speaker. Following Singer and Willet (2003), I constructed growth models using mixed model hierarchical regressions with a speaker by time random effect where grade serves as a proxy for progressive age. Traditionally, this structure models speaker-specific growth curves. Grade is also included as a fixed effect. Any variation attributable to the fixed effect for grade will reflect group patterns of change because individual differences are captured in the random effects.

A separate series of analyses was performed for the normalized F_1 in Section 5.1 and normalized F_1 and F_2 values in Section 5.3 for each vowel class. The dependent variable is the z-score outputted from normalization (ranging from -1.51 (high) to 2.19 (low) for F_1 and 1.74 (front) to -1.09 (back) for F_2 for vowels under statistical analysis). I did not assume that vowel classes behave in tandem, although clustering of results may offer evidence of chain shifts. I included several linguistic variables as fixed factors for statistical control in all models considered. These variables included duration of the vowel measured in seconds and place of articulation, as described in Section 4.3. Finally, context was included as a control variable, with formal speech contexts such as testing environments and metalinguistic interviews coded as distinct from more informal contexts. The fixed effects of central interest include grade, percentage of African American students in the school (on a scale of 0-1, Section 5.1), sex, and field site (Section 5.3) (See Table 5.1).

Table 5.1: Variables considered in the analysis.

Variables considered in the analysis **_Additional information for coding is presented in Section 4.3._**	
Dependent variable *Normalized Hz value (z-score)* (continuous)	Normalized F_1 and F_2 of BAT, BET, BIT, BAIT, BUT, BOOT, BOOK, and BOAT, each considered separately. Values for normalized F_1 range from -1.51 (high) to 2.19 (low). Values for normalized F_2 range from 1.74 (front) to -1.09 (back).
Random factor	Speaker (categorical) by grade (categorical)
Fixed factors in the base model	
Place of articulation (categorical)	Coronal, Labial, Velar, Glottal, None
Duration *seconds* (continuous)	Duration of vowel segment in seconds. Values range from .06 seconds to .82 seconds
Context (categorical)	Formal/Informal
Grade (categorical)	4th, 8th, 10th, post-high school
Fixed factors considered in model building	
Percentage of African American students in the school (continuous)	A continuous variable ranging from 0-1 corresponding to the percentage of African Americans in the school system attended by the participant during the grade/year under consideration as reported by nces.ed.gov.
Sex (categorical)	Female/Male
Field site (categorical)	Chapel Hill, Durham, Other

Inspection of speaker trajectories in Appendix 3 indicates that change across time is non-monotonic for this population. Because I have multiple measures per speaker per time point I was able to treat grade as a nominal (categorical) factor in order to allow for effects coding. With this structure I did not make assumptions *a priori* about trajectories of change, but instead compared 4th grade pronunciations to pronunciations in subsequent grades. This allowed me to test directly for peaking patterns across time.

To evaluate the influence of fixed effects I used a model comparison approach using ANOVA in the nlme package in R (Pinheiro et al. 2013). To facilitate model comparisons using ANOVA tests, models were fitted using Maximum Likelihood estimation. I selected more complex models over less complex models if the likelihood ratio statistic indicated that the goodness of fit of the more complex model was a significant improvement over that of the more parsimonious model.

In Section 5.1 the base model was compared to a model with an interaction between grade and the percentage of African Americans in the school, as well as a model with main effects alone.[1] For section 5.3 the base model was compared to more complex models that included either field site or sex. Before adding sex or field site as a fixed factor I visually inspected trajectories of change for males and females and for the three field site categories. If paths of change were not parallel, I included an interaction effect between grade and the variable of interest. I compared the interaction model to a model with only main effects and the base model using an ANOVA test, choosing the preferred model. If paths of change were parallel, I included the variable of interest as a main effect and compared this model to the base model using an ANOVA test.

Because of the uneven distribution of sex across field site, I built separate models for sex and field site. I compared the AIC values for the best model assessing sex to the best model assessing field site. The model with a superior AIC value was selected as the best model. Significance for fixed effects was evaluated only after arriving at the best model.

[1]Because sex is relatively balanced for school demographics, I also compared models that included sex as a fixed effect, but inclusion of this factor did not improve the goodness of fit for any of the models assessed. As such, it was not included in the best model selected.

5.2. Analysis of school demographic data

As reviewed in Chapter 2, there is evidence that schools play an important role in vernacular reorganization. Entrance into school is considered an important stage in the linguistic development of the individual, as peer models supersede parental models at this time (Kerswill & Williams 2000). Changes to school structures affect processes of diffusion between ethnolects (Cukor-Avila & Bailey 2011) and changing between schools or school systems in the same dialect region can lead to changes in vowel pronunciations (Carter 2007; Rickford & McNair-Knox 1994). There is also suggestive evidence that school segregation levels correlate with BAT and BET fronting, two features of the AAVS (Deser 1990). I explore two questions within this section: First, to what extent does participation in the AAVS correlate with school demographics? And, second, do children who experience demographic shifts across adolescence in the school system change their participation in the AAVS in ways that reflect these demographic changes? To investigate these questions I focus on F_1 distributions for the front lax vowels for the 4th grade, 8th grade, and 10th grade time point. A more detailed review of change across time for all four time points will be presented in Section 5.3.

Figure 5.1 displays individual tokens for the 4th grade, 8th grade, and 10th grade time point. Each plotted symbol represents one token and has been jittered for visibility. The y-axis represents vowel height and the x-axis represents the percentage of African American students in the school.[2] LOESS curves were overlaid using the geom_smooth function in ggplot2 (R Development Core Team 2010) and follow correlations between vowel height and school demographics for each grade. Shaded areas represent 95%

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[2]Tokens were plotted using the geom_point function in ggplot2 (R Development Core Team 2010).

confidence intervals. This figure reveals a strong correlation between participation in BAT raising and school demographics. Students in mostly African American schools produce more raised variants than students who attended schools with low proportions of African American students. This pattern is also apparent for BET, although the correlation is weaker. Patterns for BIT are suggestive, but weaker than those found for BAT and BET.

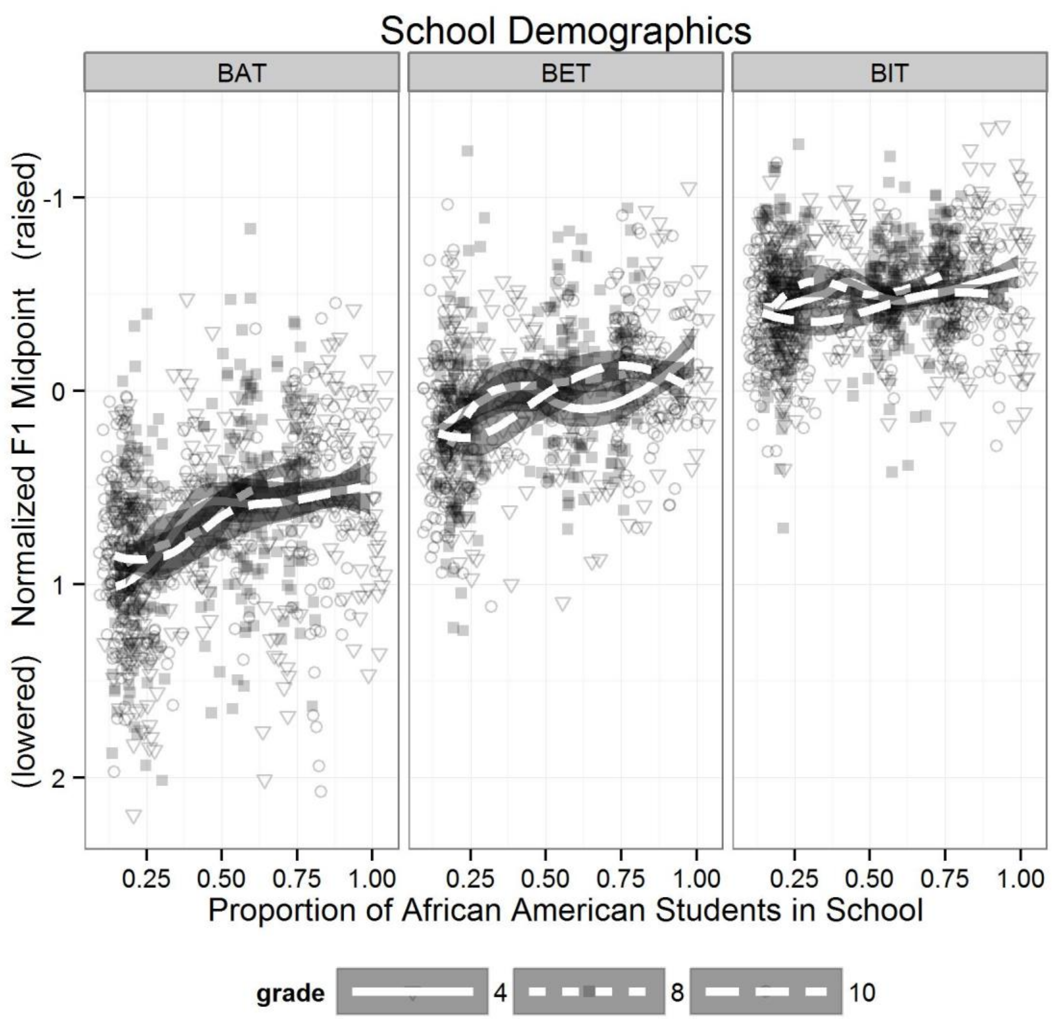

Figure 5.1: Correlation between school demographics and participation in front lax vowel raising.

The LOESS curves in Figure 5.1 also illustrate that the correlation between BAT and BET raising and the percentage of African American students in the school system is similar at each grade level. The elementary school demographics do not show a stronger correlation with BAT and BET raising than middle school and high school demographics. Regression results confirm this interpretation. Best models selected for each vowel included a main effect for the percentage of African Americans in the school system, but not an interaction with grade. The correlation between the percentage of African American students in the school system and lax vowel raising was highly significant for each of the best models for BAT and BET (BAT: -.59, t = -5.6***, BET: -.39, t = -5.22***).[3]

The lack of an interaction between grade and school demographics is at least partially explained by the fact that half of the participants in this study attended elementary schools, middle schools, and high schools with similar demographic profiles. Ten of the 20 participants experienced less than a 25% shift in school demographics over the course of their childhood. However, ten of the speakers experienced large shifts in the demographic makeup of their schools when they transitioned among elementary school, middle school, and high school. Five of these students changed school districts over the course of the study. Figure 5.2 displays changes in school demographics for each speaker. Speakers have been arranged into five categories: those who experienced a repeated decline in the percentage of African American students in their schools across grades, those who experienced a dip or a peak, those who experienced a rise in the percentage of

[3]The model for BIT F_1 failed to converge.

African American students in the school, and those who experienced a demographically stable school environment.

Do individuals who experience changes in school demographics also demonstrate subsequent changes in front lax vowel raising? Figure 5.3 presents LOESS curves[4] for each speaker for front lax vowel height with 95% confidence intervals faceted according to the trajectories of change in demographics experienced in the school system. This figure lines up with Figure 5.2 such that comparisons between changing school demographics and changing vowel height can be made. More negative normalized F1 values correspond to more raised lax vowels. Vowels are arranged from most dynamic (BAT) to least dynamic (BIT).

[4]LOESS curves were created using the geom_smooth function in ggplot2 (R Development Core Team 2010).

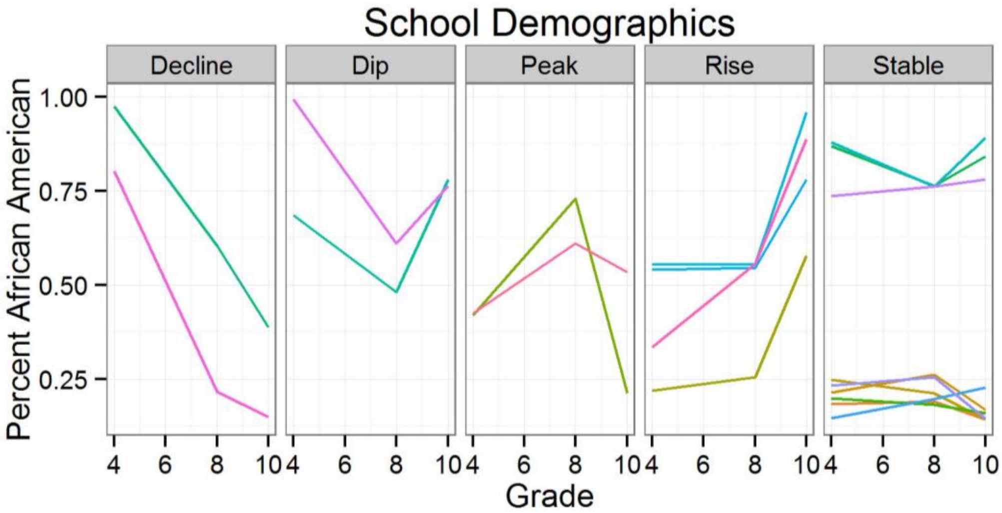

Figure 5.2: Changes in school demographics by speaker

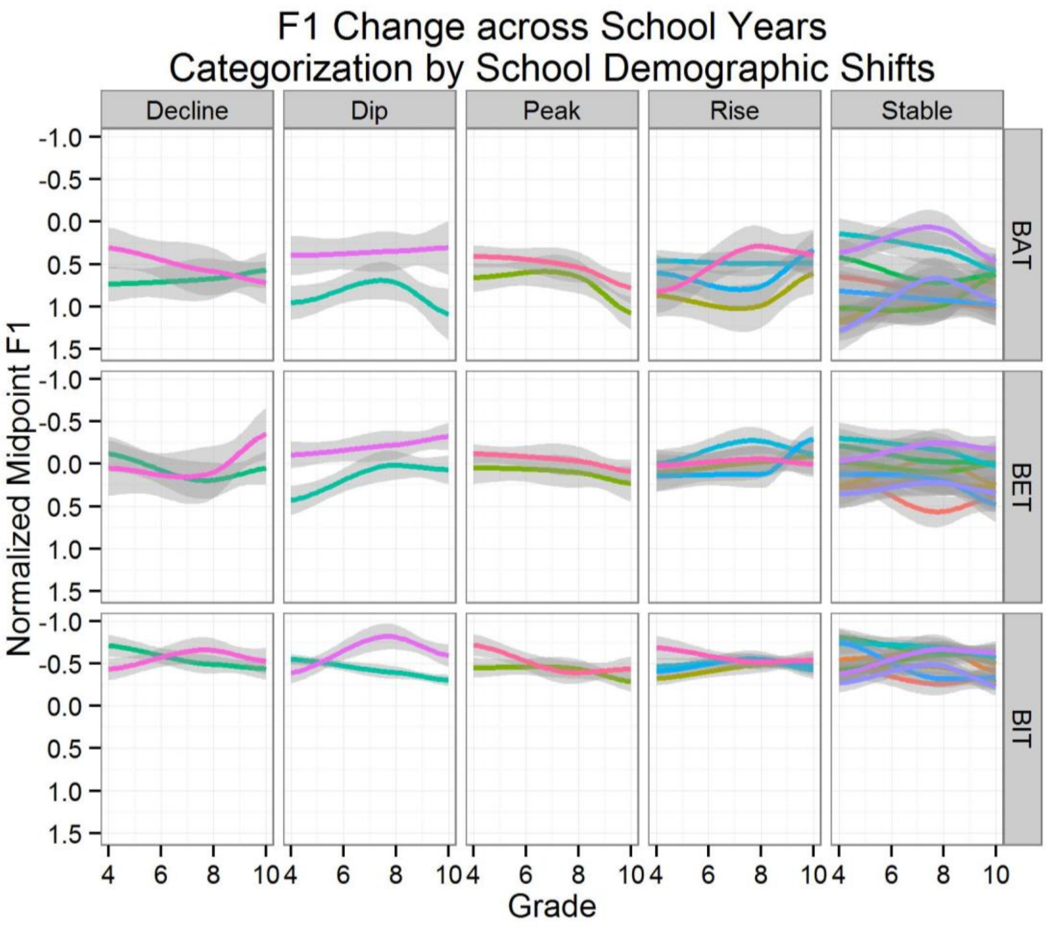

Figure 5.3: Changes for vowel height faceted by changes in demographics during childhood and adolescence.

Several aspects of these results are striking. First, individuals with stable school demographics do not always follow stable trajectories for participation in the AAVS. Even in the context of a stable school environment, many speakers have dynamic non-monotonic trajectories of change for the F_1 dimension for the front lax vowels. This result indicates that speakers do not remain stable in their production of front lax vowels across the lifespan, even when dramatic changes to school environments are not present. Second, individuals who experienced a change in demographics did not always display trajectories for vowel height predicted by demographic changes. Some participants who experienced changing school demographics were quite stable in their AAVS participation across grades. Trajectories across vowel classes are also inconsistent. There is a clear correlation between participation in the AAVS and school demographics. Yet, although some participants in this study change in directions predicted by their new social contexts, not all individuals who experience changing demographics in the school system change their speech accordingly.

SDA research on vocalic variation reviewed in Section 2.3.1 indicates that children can accommodate to new speech communities when transitioning between elementary school and middle school (Carter 2007), and that at least partial accommodation is possible at even later ages (Bigham 2012; De Decker 2006; Evans & Iverson 2007; Sankoff 2004). Why are findings not replicated for this group?

First, the notable dynamicity of speakers in the stable school demographic category indicates that factors beyond demographics must influence change between time points. Some of the discrepancies are likely attributed to uncontrolled factors such as short-term accommodation to interlocutors or potentially changing orientations toward the indexicality of the feature in question (Giles & Coupland 1991). Because longitudinal dialect accommodation studies do not include longitudinal stable cohorts and frequently only assess two time points, these kinds of fluctuations for individuals in stable communities are not typically available as a comparison to D2 cohorts.

Second, moving between schools with different demographics is not the same as moving between dialect regions as observed in Chambers (1992), Sankoff (2004), and Tagliamonte and Molfenter (2007), among others. Participants may stay within the same neighborhood and are likely to transition with a cohort of classmates as they matriculate to schools with different demographic make-ups. Even individuals who transition between adjacent school systems may maintain close contact with previous social circles, as speaker K280 reported. Familial ties, including siblings and cousins, also likely confound direct accommodation patterns.

Dialect change is at least partially motivated by social costs associated with retaining first dialect features (Kerswill 1994; Prichard & Tamminga 2011; Trudgill 1986), so that accommodation and change may hinge on interspeaker relationships (Giles & Coupland 1991).[5] If groups move between schools as a cohort with a pre-established social network, or if speakers maintain contact with previous social networks, the social costs for maintaining a D1 are likely minimal. If social networks shift, as was observed in Carter's (2007) longitudinal study of Maria, then the social cost of maintaining a D1 may rise, thus promoting dialect shift. These observations illustrate the need for case-studies employing ethnographic approaches in order to illuminate the variable patterns observed in Figure 5.3.

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[5]Resistance to change may also correlate with social capital. If a dialect holds prestige, a speaker in a D2 setting may not accommodate to D2 variants to maintain prestige (Trudgill 1986).

Other factors that must be considered are individual linguistic plasticity and/or predisposition to change. SLA studies provide evidence that levels of attainment in a second language are variable across speakers such that a small minority of speakers are capable of achieving native-like attainment of a second language even as adults (Bongaert 1999). Similar differences are likely to exist for accent modification across the lifespan. Differences in motivation, desire to change, levels of metalinguistic awareness, and performance skills all likely contribute to the distribution observed in Figure 5.3. While individuals who experience demographic shifts across adolescence are likely to have greater exposure to a wider array of vocalic variants, these additional factors may all play a role in creating variable levels of accommodation and change.

5.3. Group results for four time points

The initial analysis presented in Section 5.1 illustrates that demographic differences correlate with individual production values for the front lax vowels. It is also apparent that group level effects will necessarily aggregate over a range of individual trajectories. In this section I explore whether group level effects emerge in spite of the range of individual trajectories apparent in Section 5.1. Aggregate results provide important context for both apparent-time and longitudinal studies by showing whether, as a group, adolescents tend to modify stable variation in predictable ways. Are there group patterns of change across adolescence consistent with life-stage change, as observed for morphosyntactic variables assessed by Van Hofwegen and Wolfram (2010)? Within this section I present an analysis of group change from the 4th grade through post-high school. Group regression results are presented in Table 5.2 through Table 5.6, followed by an exploration of range for each variable.

Factors selected during model selection are listed in Table 5.2 (see Section 5.1 for details). Field site is included in the best model for the majority of vowels on the majority of dimensions, whereas sex is included in the best model only for the F_1 dimension of BOAT. The only interaction present for grade is in the best model for BOOT F_2. The general lack of interactions between grade and the other fixed effects indicates that the males and females in this study have similar trajectories across time points, as do participants from different field sites. Results reviewed in Section 5.3.4 suggest that group production values are mostly stable over time, so a lack of interaction effects is unsurprising.

Table 5.2: Model selection

	F_1				*F_2*			
	Sex	Sex* grade	Field site	Field site* grade	Sex	Sex* grade	Field site	Field site *grade
BAT	no	no	**YES**	no	no	no	**YES**	no
BET	no	no	**YES**	no	no	no	**YES**	no
BAIT	no	no	no	no	no	no	no	no
BIT	no	no	**YES**	no	no	no	**YES**	no
BUT[6]	no	no	**YES**	no	n/a	n/a	n/a	n/a
BOOT	no	no	no	no	no	no	**YES**	**YES**
BOOK	no	no	**YES**	no	no	no	no	no
BOAT	**YES**	no	no	no	no	no	no	no

5.3.1. Phonetic environment

Phonetic factors are highly significant for all vowels for both the F_1 and F_2 dimensions. Table 5.3 lists coefficients for duration in Lobanov z-score units.[7] Negative values correspond to a positive relationship between raising and duration for the F_1

[6]The base model for BUT F_2 failed to converge. This vowel dimension will not be considered in subsequent analyses.

[7]These z-score units are estimated using point vowels as described in Section 4.2.3 so that the z-score distribution represents the entire vowel space.

dimension. Positive values indicate a positive relationship between fronting and duration for F_2 coefficients. So, for example, a one second difference in duration is predicted to correspond to a -.36 change in vowel height for BAT (all other factors held constant), which indicates that longer BAT tokens tend to be realized higher in the vowel space. This same difference corresponds to a .53 change in on the front/back dimension (all other factors held constant), which indicates that longer BAT tokens tend to be realized in a more fronted position in the vowel space. Subsequent results for continuous variables are to be interpreted in the same manner.

Table 5.3: Coefficients for duration

	BAT	*BET*	*BAIT*	*BIT*	*BUT*	*BOOT*	*BOOK*	*BOAT*
F_1	-.36**	-.19	.48***	.18	.08	-.09	.38***	.73***
t	*-2.71*	*-1.30*	*4.85*	*1.62*	*.53*	*-.91*	*3.44*	*5.04*
F_2	.53***	.89***	.46***	.84***	n/a	.11	-.08	.39***
t	*7.57*	*9.58*	*6.33*	*7.59*		*.84*	*-.50*	*3.67*

Table 5.4 lists coefficients for phonetic environment. Coronal environments were selected as the default treatment category, so that negative values on the F_1 dimension indicate that the comparison category is raised when compared to coronal tokens, whereas a positive coefficient value on the F_2 dimension indicates that the comparison category is fronted compared to coronal tokens. So, for example, labial tokens of BAT are predicted to be .14 lower in the vowel space compared to coronal tokens when all other factors are held constant. Labial tokens are also predicted to be backer in the vowel space (by -.10 Lobanov z-score units), when all other factors are held constant. Subsequent coefficients for categorical variables should be interpreted in this same manner.

Table 5.4: Coefficients for phonetic environment (coronal as comparison)[8]

		BAT	*BET*	*BAIT*	*BIT*	*BUT*	*BOOT*	*BOOK*	*BOAT*
F_1	labial	.14***	.16***	.01	.10***	.06**	.04	.10***	.04
	t	*5.44*	*6.94*	*.40*	*5.10*	*2.82*	*1.96*	*4.15*	*1.22*
	velar	.10**	.08***	-.15***	.01	.07	.07	-.02	-.08**
	t	*2.85*	*3.46*	*-6.53*	*.62*	*1.60*	*1.17*	*-.76*	*-3.19*
	glottal	.32***	-.06	-.09***	.06**	.00	-.07	-.07	.08**
	t	*11.06*	*-1.60*	*-3.87*	*2.76*	*.11*	*-1.55*	*-1.23*	*2.84*
	none	.29**	n/a	n/a	n/a	n/a	n/a	n/a	-.09
	t	*3.06*							*-.64*
F_2	labial	-.10***	-.02	-.04**	-.17***	n/a	-.62***	-.50***	-.29***
	t	*-7.35*	*-1.73*	*-3.02*	*-8.69*		*-21.71*	*-3.37*	*-13.39*
	velar	.0	.07**	.21***	.02	n/a	-.42***	-.42***	-.10***
	t	*.22*	*3.25*	*12.59*	*1.25*		*-5.3*	*-15.73*	*-5.18*
	glottal	.08***	.18***	-.27***	.13***	n/a	-.57***	-.18***	-.24***
	t	*4.74*	*9.96*	*16.17*	*5.98*		*-9.60*	*-6.01*	*-11.84*
	none	.03	n/a	n/a	n/a	n/a	n/a	n/a	-.40***
	t	*.27*							*-3.95*

Effect sizes for place of articulation are largest for the back vowels. Both BOAT and BOOT are more fronted in post-coronal environments than in all other environments. Following place of articulation was selected for the best model of BOOK, with tokens preceding coronal consonants more fronted than any other tokens. This pattern corroborates findings from Anderson (2003) and Nguyen (2006) for AAE in Detroit, Michigan.

5.3.2. Formality

Results for formality, which was originally included as a control variable, suggest that style-shifting may occur for the front vowels of the AAVS. Coefficients for context are listed in Table 5.5. The informal category was set as the default treatment, so that coefficients represent deviation of the formal from the informal category. Negative

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[8]Choice of conditioning environments for monophthongs as determined through model selection (see Section 4.3 for details): BAT F_1: Preceding place, BAT F_2: Following place, BET F_1: Following place, BET F_2: Preceding place, BIT F_1: Following place, BIT F_2: Following place, BUT F_1: Following place, BOOK F_1: Preceding Place, BOOK F2: Following Place

coefficients for F_1 indicate that vowels in the formal category are higher in the formal setting.

Table 5.5: Coefficients for formality (Informal as treatment code)

	BAT	*BET*	*BAIT*	*BIT*	*BUT*	*BOOT*	*BOOK*	*BOAT*
F_1 (formal)	.10***	.06**	-.04*	.06***	0	0.07***	0	0
t	*4.5*	*2.99*	*-2.13*	*3.98*	*-.11*	*4.12*	*.09*	*.15*
F_2 (formal)	0	-.02	.01	-.03	n/a	-.05*	-.02	0
t	*-.39*	*-1.39*	*.47*	*-1.75*		*-2.23*	*-.62*	*-.23*

The front lax vowels are all significantly lower as indicated by positive coefficients, while BAIT is significantly higher in the formal setting. Hence, vowels produced in an informal setting are more likely to conform to the AAVS pattern than those produced in a formal setting. However, effect sizes are smaller than phonetic factors. Notably, context is not significant for any vowel except BOOT on the F_2 dimension or for BOOK, BOAT, or BUT on the F_1 dimension.

5.3.3. Sex differences

Female leads are common for variables undergoing change (Labov 2001; Tagliamonte & D'Arcy 2007), although there are some exceptions (Conn 2005; Dodsworth & Kohn 2012). Sex distinctions for stable segmental and morphosyntactic variables are also wide-spread and apparent-time studies indicate that males and females may display divergent trajectories across adolescence for such features (Cameron 2005, 1010). However, Van Hofwegen and Wolfram (2010) did not identify separate trajectories for males and females in their morphosyntactic analysis of the FPG study. While community differences emerge as robust in the dataset for vocalic variation, sex differences are only included in one best model selected in the analysis: BOAT F_1.

Results indicate that males have more raised tokens of BOAT, although the effect size is small (Table 5.6).

Table 5.6: Coefficients for sex differences (women as default treatment code)

	BAT	*BET*	*BAIT*	*BIT*	*BUT*	*BOOT*	*BOOK*	*BOAT*
F_1 (men)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-.08* -2.51
F_2 (men)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

5.3.4. Group change across time

Table 5.7 presents coefficients for grade for the best models for the normalized F_1 and F_2 values for eight vowel classes. Fourth grade was set as the default treatment so comparisons represent change from the 4th grade time point. On the F_2 dimension only two of the seven vowels differ significantly from their distribution at the 4th grade time point. BAT is significantly backer at the post-high school time point (Figure 5.5) and BOOK is significantly fronted at the 8th grade time point (Figure 5.16).

On the F_1 dimension group change is more robust. Results for BAIT F_1 reveal a sustained lowering at each time point (Figure 5.11). BET, BOAT, and BOOK also are significantly lower at the post-high school time point than at the 4th grade time point (Figure 5.7, Figure 5.13, Figure 5.15, and Figure 5.17). Results for all other vowel dimensions exhibit no group change across adolescence. The distribution presented in Figure 5.6 suggests that significant differences for BET corresponds to smaller ranges produced at the post-high school time point. Variance components at post-high school for this vowel dimension are also smaller than for the other time points (4th grade: .02, 8th grade: .03, 10th grade: .04, PHS: .01).

Table 5.7: Coefficients for grade

		BAT	*BET*	*BAIT*	*BIT*	*BUT*	*BOOT*	*BOOK*	*BOAT*
F_1	8^{th}	-.05	.01	.11**	-.02	-.01	.03	.03	.08
	t	-.92	.29	3.10	-.45	-.23	.66	.08	1.75
	10^{th}	-.06	.01	.14**	.04	-.02	.04	.07	.05
	t	-.83	.24	3.31	1.10	-.32	.82	1.83	.88
	PHS	.04	.09**	.15***	.05	.10	-.01	.12**	.10*
	t	.86	2.78	3.58	1.12	1.67	-.91	2.88	2.11
F_2	8^{th}	.03	.06	-.02	.05	n/a	-.02	.10*	.05
	t	1.04	1.57	-.54	1.47		-.19	2.27	1.55
	10^{th}	-.01	.02	-.04	.00	n/a	.11	.04	.03
	t	-.36	.44	-1.43	.18		1.32	1.12	.72
	PHS	-.09**	-.01	-.04	-.04	n/a	.03	.01	.03
	t	-2.69	-.34	-1.42	-1.08		.27	-.15	1.01

A few initial observations can be made based on these results. First, unlike vernacular AAE morphosyntactic and consonantal features analyzed by Van Hofwegen & Wolfram (2010) for this group, there is no general peaking pattern for the AAVS. Only BOOK F_1 follows such a pattern. Instead, the majority of significant results for grade occur at the post-high school time point. Finally, significant patterns of change across vowel classes appear erratic. Lowering of BAIT across each time point might suggest increasing participation in the AAVS across the lifespan, but lowering of BET and retraction of BAT at the post-high school time point contradict this assessment and suggest participation in or accommodation to PRV sound changes.

5.3.5. Participation in the AAVS by field site

As discussed in 3.3.3 level of integration potentially influences participation in the AAVS. Durham and Chapel Hill differ considerably on all integration metrics with Durham categorized as a moderately segregated city with a large African American population and with Chapel Hill categorized as an integrated city with a small African American population (see Section 4.1.2 and Appendix 1). Table 5.8 displays coefficients for field site. Chapel Hill was the default treatment for comparison. Negative values for F_1 indicate that the vowel class is raised in the vowel space for the group in question in comparison to Chapel Hill. Positive values for the F_2 dimension indicate that the vowel class is more fronted in the vowel space for the group in question than for Chapel Hill.

The results presented in Table 5.8 indicate that Durham participants have lax vowels that are significantly more raised than those of the Chapel Hill participants. The front lax vowels are significantly more fronted as well. This indicates that Durham participants show generally greater participation in the AAVS (see 3.1). In addition, the BOOT class is significantly backer for Durham than for Chapel Hill, a variable which differentiates the AAVS from both the SVS and the urban PRV pattern in the region. No significant differences for field site were identified for the mid tense vowel.

Table 5.8: Coefficients for field site (Durham and Other relative to Chapel Hill)[9]

		BAT	*BET*	*BAIT*	*BIT*	*BUT*	*BOOT*	*BOOK*	*BOAT*
F_1	Durham	-.35***	-.24**	n.s.	-.10**	-.21***	n/a	-.10**	n.s.
	t	-4.22	-3.94		-3.00	-4.02		-3.22	
	Other	-.15	-.14*	n.s.	-.03	-.17**	n/a	-.04	n.s.
	t	-1.68	-2.20		-.74	-2.98		-1.21	
F_2	Durham	.20***	.16***	n.s.	.17***	n/a	-.36**	n.s.	n.s.
	t	7.55	5.49		5.04		-2.94		
	Other	.08*	.09*	n.s.	.02	n/a	-.18	n.s.	n.s.
	t	2.75	2.65		.64		-1.40		

These findings indicate that speakers in communities separated by less than 12 miles but with distinct demographic profiles differ significantly for vocalic ethnolectal variation. Level of segregation correlates with participation in the AAVS, supporting observations made by Deser (1990) and Purnell (2010), discussed in Section 3.3.3, and corroborating findings from Section 5.1.

[9]n.s. indicates vowels for which field site was not included in the best model selected

5.3.6. Exploration of vowel change by field site

Limited significant patterns of group change may belie changes in range across time points. Because a life-stage approach to language variation suggests that adolescents engage in sociolinguistic identity work, speakers may exhibit larger ranges in production during the 8th and 10th grade time points with respect to an expanding repertoire of stylistic variants at either the community or the individual level. In Figure 5.4-Figure 5.18 I display individual tokens by grade and field site to identify variation in range across time points. LOESS curves with 95% confidence intervals have been added to each plot for each field site to illustrate differences in both production and trajectory for each community.[10] These plots show that adolescent ranges of production at the group level are not larger than those for the childhood time point. However, there is some indication that the range of F_1 values is smaller at the post-high school time point for at least BET F_1.

Front and Central Lax Vowels: Front lax vowels are typically raised and fronted and the central lax vowel is typically raised in the AAVS (Section 3.1.1). Increases in the upper bounds of the range for front lax vowels at the 8th and 10th grade time points may reflect adolescent peaking. However, as shown in Figure 5.4-Figure 5.10, the ranges for BAT F_1, BAT F_2, BIT F_1, and BIT F_2 for adolescents do not stand out from those of childhood or adult production.

In contrast, the range for BET F_1 appears smaller at the post-high school time point than at the other time points. Ranges for BET F_1 in the middle school and high school years resemble those of the 4th grade time point, but LOESS curves show that

[10]Tokens were plotted using the geom_point function in ggplot2. LOESS curves were added using the geom_smooth function in ggplot2 (R Development Core Team 2010).

means for Durham and Chapel Hill shift away from each other, suggesting divergence between these communities. A model that included an interaction between city and grade approached, but did not reach significance, over a model that included only main effects (ANOVA comparison p = .069). Differences between communities for this vowel dimension are not as apparent in the post-high school time point when the range shrinks and the most raised variants disappear. A similar pattern emerges for BET F_2, for which community differences are largest at the 8^{th} grade time point. As with BET F_1, ANOVA results comparing an interaction model to a model with only fixed effects approached significance but did not meet the $p<.05$ criteria ($p = .06$), and so the main effects model was selected as the best model.

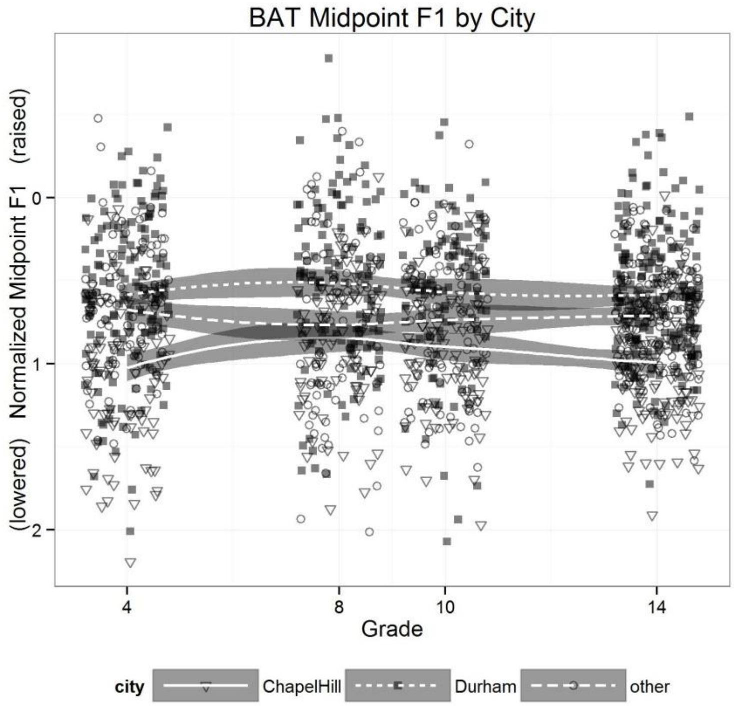

Figure 5.4: BAT F_1 by field site.

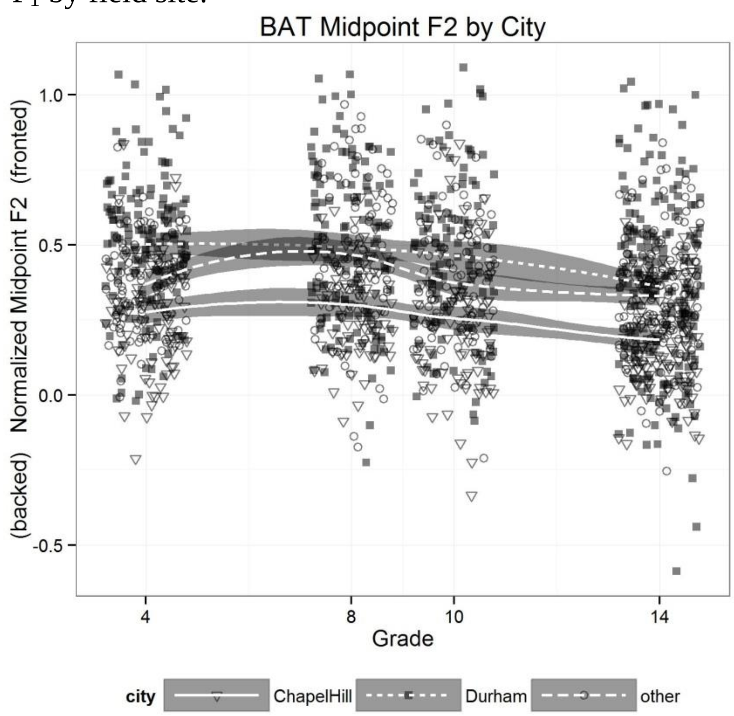

Figure 5.5: BAT F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

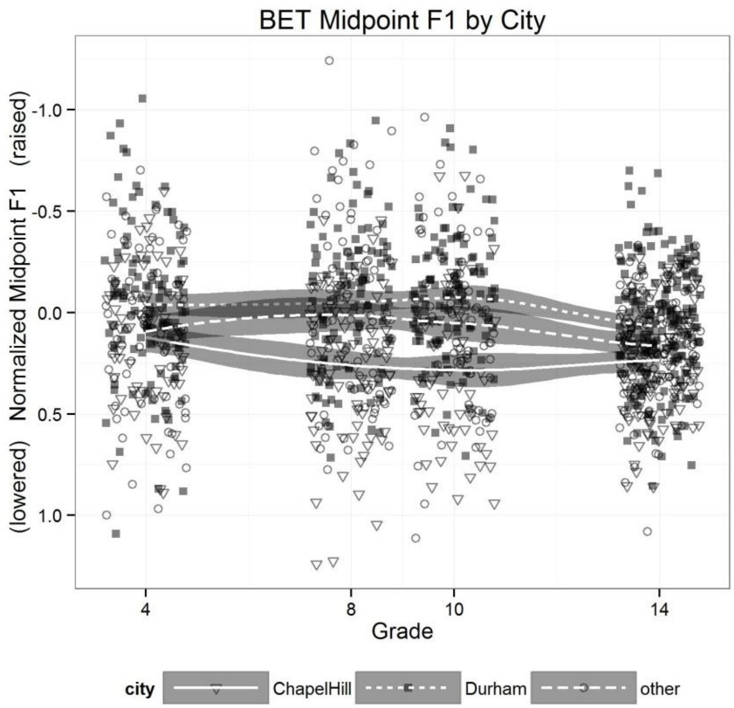

Figure 5.6: BET F_1 by field site.

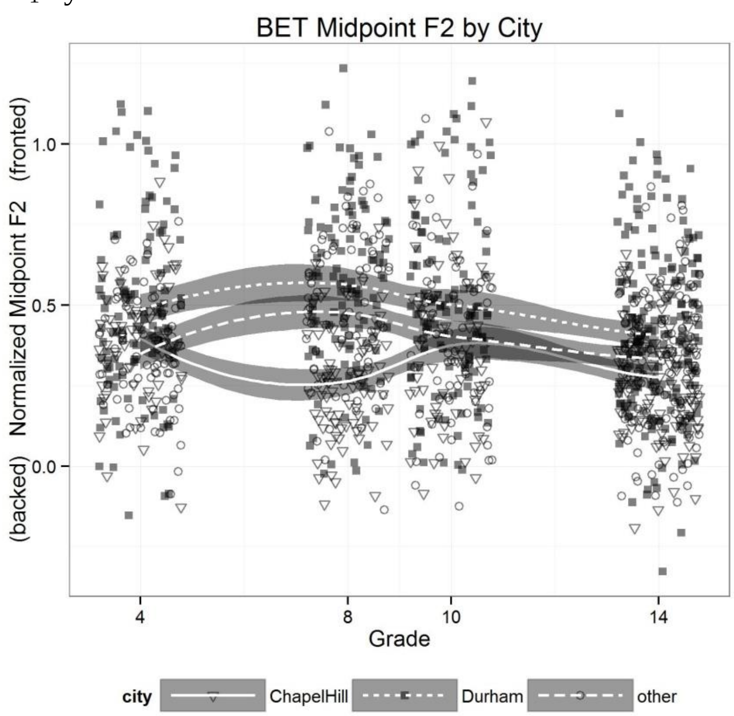

Figure 5.7: BET F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

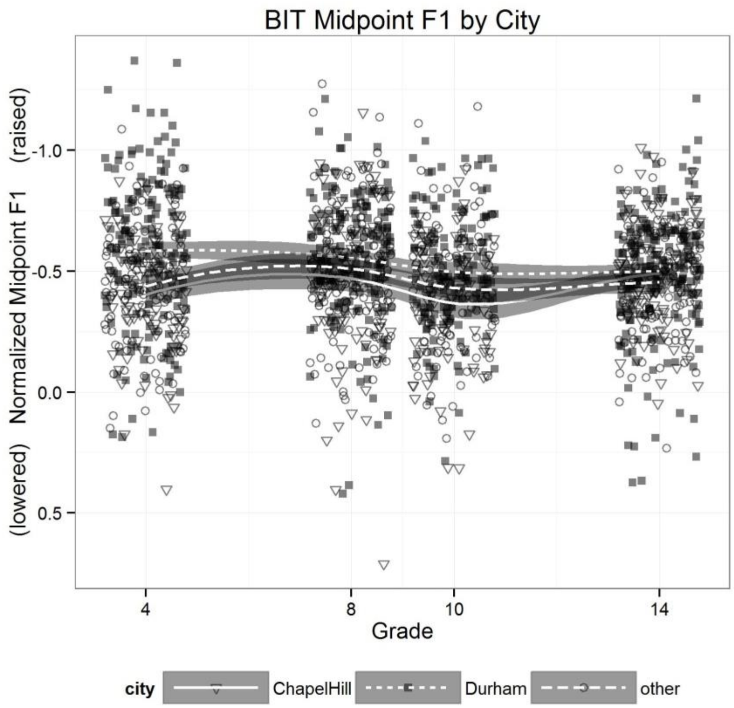

Figure 5.8: BIT F_1 by field site.

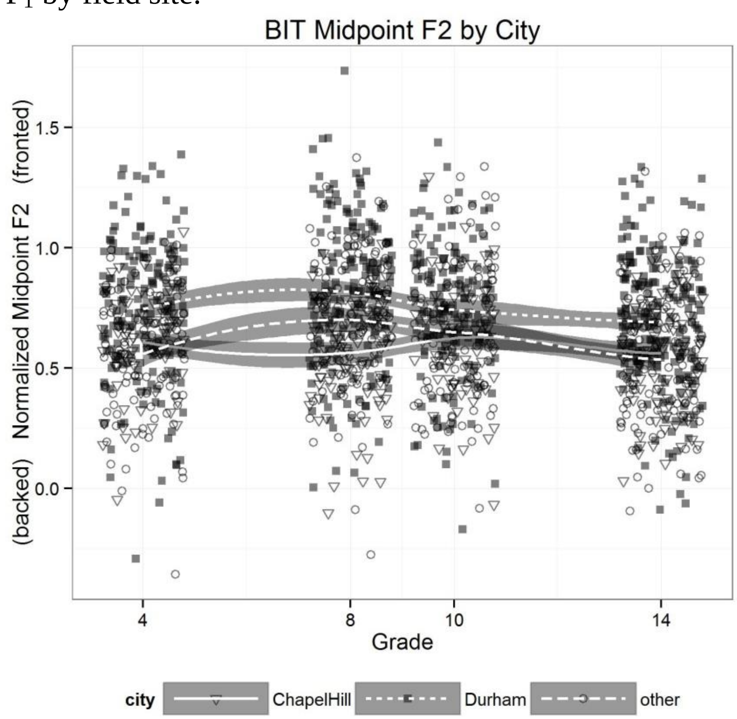

Figure 5.9: BIT F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

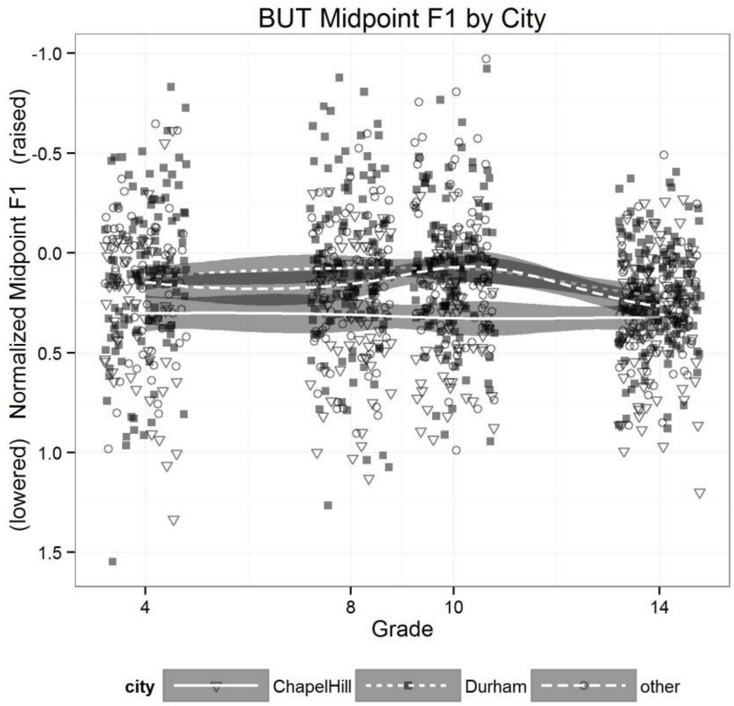

Figure 5.10: BUT F_1 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

<u>Front Tense Vowel:</u> BAIT is typically produced lower and backer in the AAVS. An increase in the lower range of production for this vowel class during the 8th and 10th grade may reflect adolescent peaking. However, the distributions in Figure 5.11 and Figure 5.12 do not show larger ranges during these time points for either the F_1 or F_2 dimensions. Although Chapel Hill and Durham participants appear to diverge in the 10th grade, an interaction between field site and grade does not improve the goodness of fit over the base model.

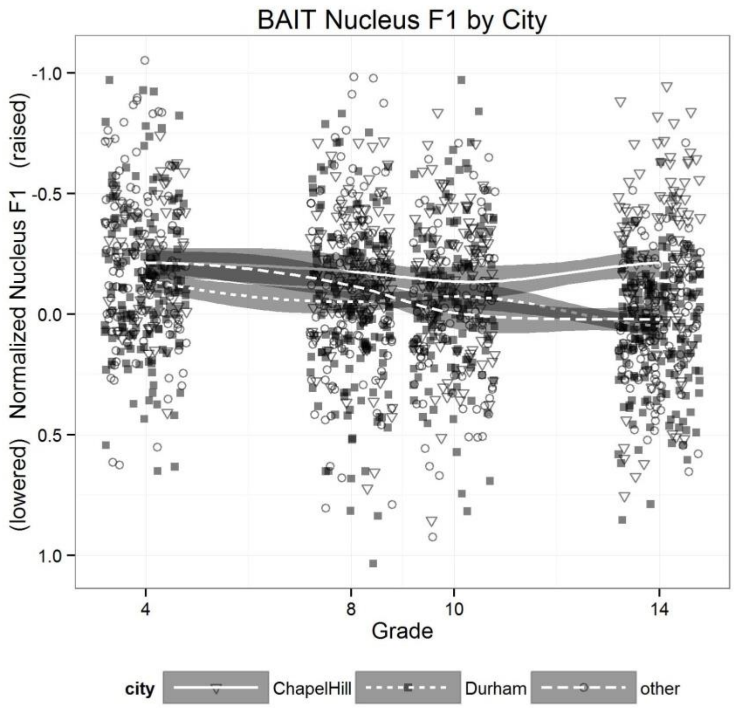

Figure 5.11: BAIT F_1 by field site.

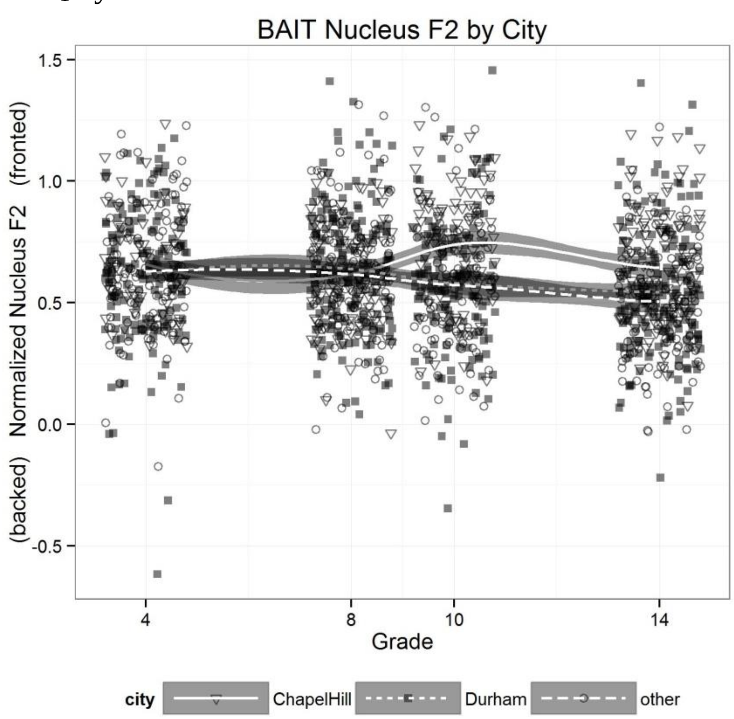

Figure 5.12: BAIT F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

Back Vowels: Back vowels are characterized as resisting fronting in AAE (Thomas 2001, 2007). An increase in backed tokens at the 8th or 10th grade time point may reflect a peaking pattern. However, ranges for the back vowels displayed in Figure 5.13-Figure 5.18 provide no evidence for adolescent peaking. Instead, a broadening of the range across time points can be seen for BOAT F_2 and BOOT F_2. LOESS curves in Figure 5.14 illustrate diverging paths of change for Chapel Hill participants and the rural/movers participants. Between 8th and 10th grade Chapel Hill students front BOOT tokens, while the rural/mover students back these tokens. Durham participants have a consistently backed production of BOOT across all grades. Possible divergence also emerges in Figure 5.18, in which LOESS curves for BOAT F_2 appear to diverge by field site, with Chapel Hill fronting across time and the other field sites backing over time. The interaction between community and grade did not provide a better model fit than the base model.

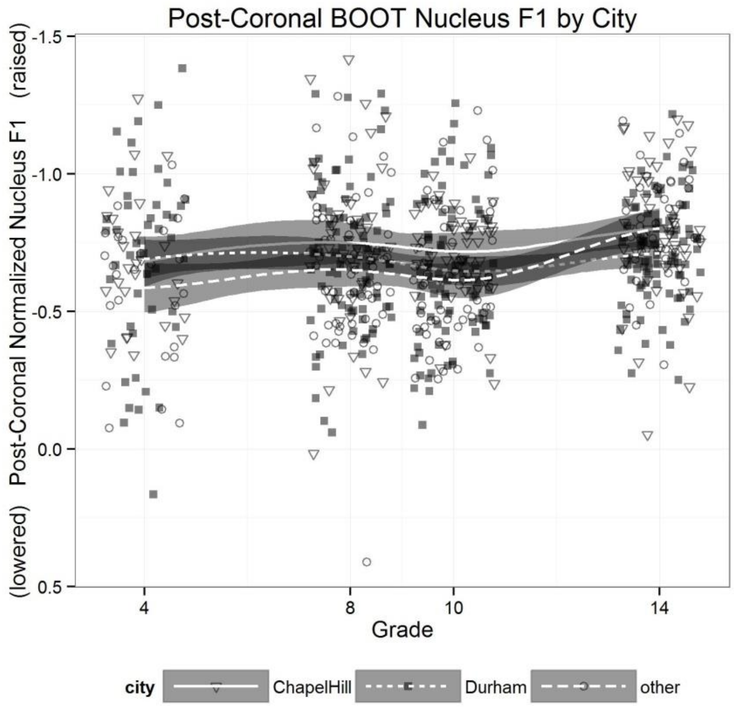

Figure 5.13: Post-Coronal BOOT F_1 by field site.

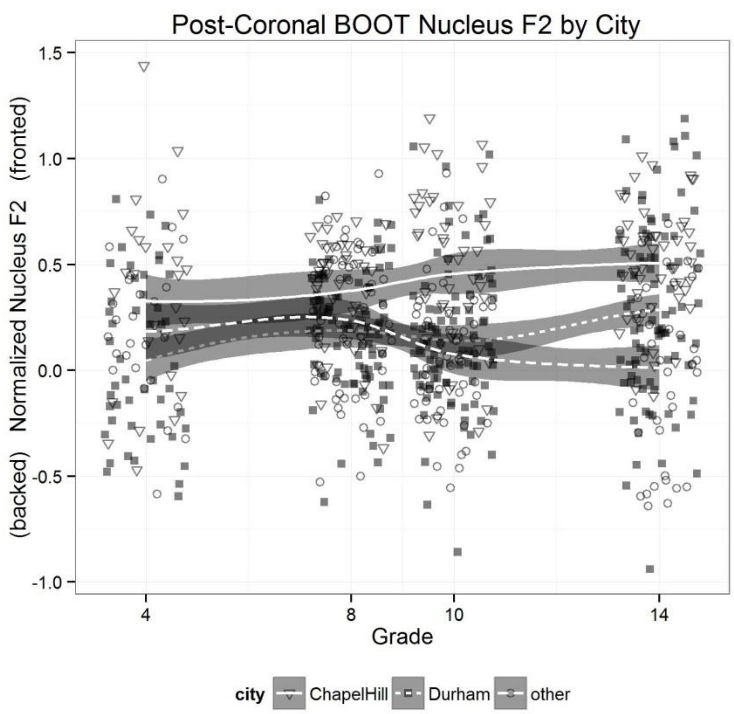

Figure 5.14: Post-Coronal BOOT F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

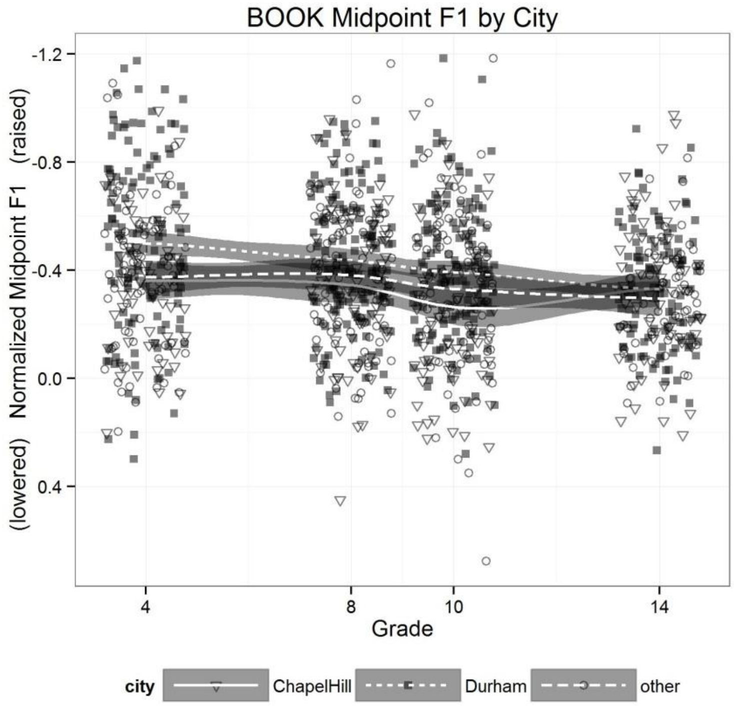

Figure 5.15: BOOK F_1 by field site.

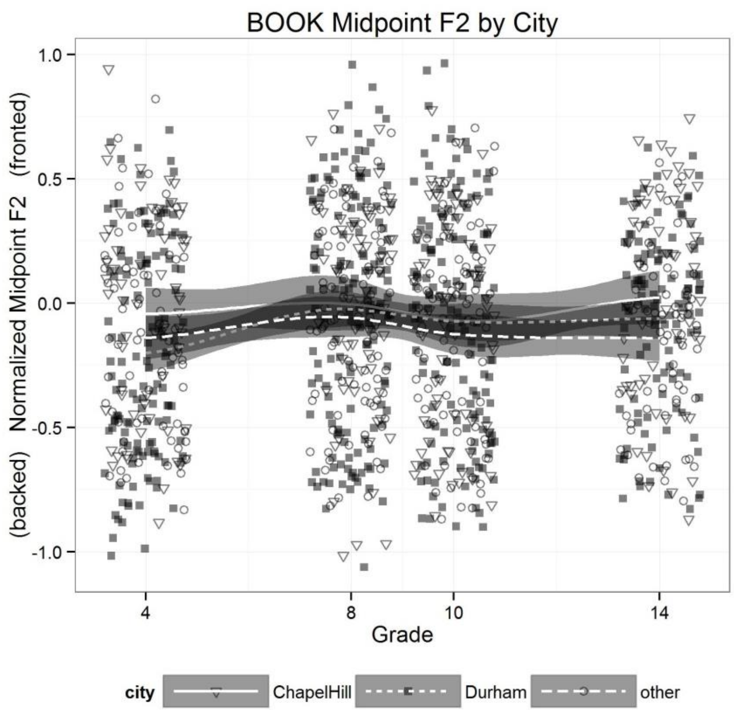

Figure 5.16: BOOK F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

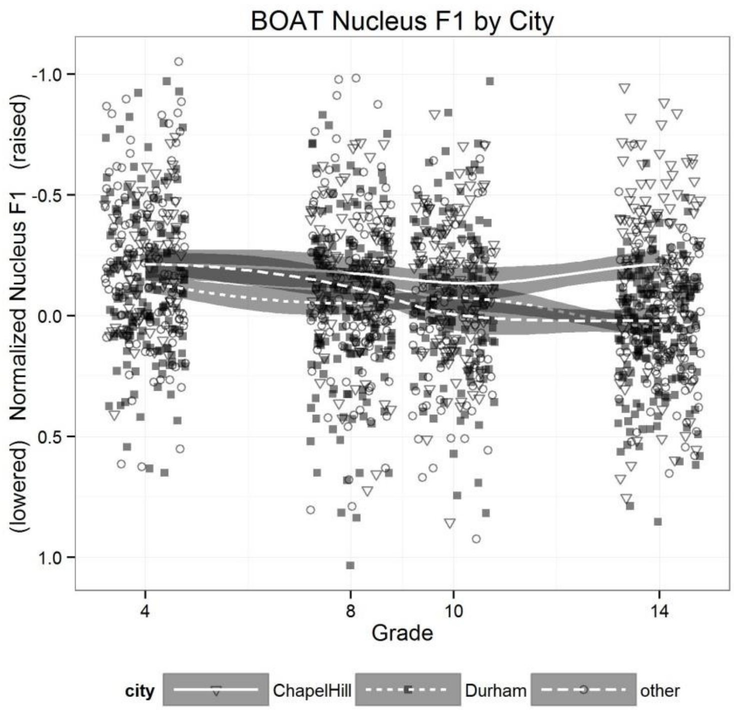

Figure 5.17: BOAT F_1 by field site.

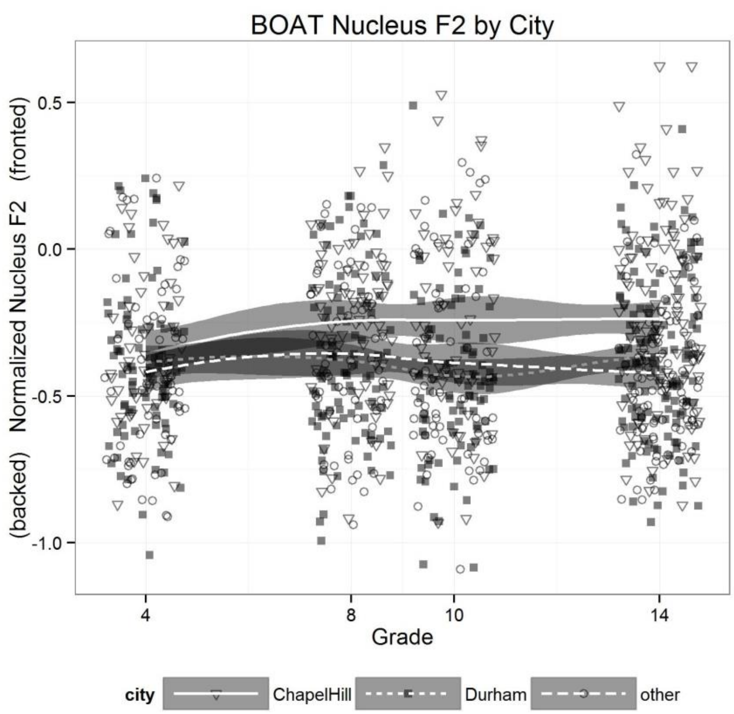

Figure 5.18: BOAT F_2 by field site.

Each plotted symbol represents one token and has been jittered for visibility.

LOESS curves follow community trajectories.

The distribution of data presented in these figures brings to light several possible trends: first, Durham and Chapel Hill exhibit different patterns, suggesting that these two communities function as different speech communities despite their proximity. Second, the majority of vowel dimensions do not demonstrate group patterns of change across the four time points. Finally, the majority of vowels do not show wider ranges of tokens at the middle school and high school time points. However, range reduction in the post-high school time point is apparent at least for BET F_1.

5.3.7. Discussion of group results

There are three primary issues at stake in the group-level analysis: In the aggregate, is there evidence for predictable patterns of life-stage change for stable vocalic variables? What is the role of minority youth with respect to ongoing sound changes relating to their ethnolect and with dominant cohort groups? Moreover, do community structures affect trajectories of participation in the AAVS? First, I will address evidence for life-stage patterns in the data.

<u>In the aggregate, does adolescent speech stand out from childhood and emerging adulthood speech?</u>

Although age-grading can occur in the form of adolescent peaking patterns, a general sloping pattern may also be consistent with age-grading of stable variation (see 2.1.1). While some sloping patterns emerge in the data, neither peaking patterns nor sloping patterns predominate. Only six of the fifteen vowel dimensions analyzed showed significant change at the group level over time. Effect sizes for significant changes are small compared to phonetic or field site factors, and most significant effects emerge only at the post-high school time point. The most consistent pattern observed in Figure 5.4-Figure 5.18 is a pattern of community difference and group stability.

At the aggregate level, regression analysis and inspection of range through plots of individual tokens are inconsistent with respect to peaking. Aggregate adolescent production values do not differ from childhood production values. This result is surprising for two reasons. First, consistent community patterns indicate that the front lax and central vowels, as well as BOOT F_2, pattern in sociolinguistically meaningful ways such that Durham, as a more densely African American community, participates to a greater extent in the AAVS. Such meaningful variation has the potential to serve as an ideal variable for adolescent identity work. Second, vernacular AAE segmental and morphosyntactic patterns for this group do display adolescent peaking patterns (see Chapter 6). Yet the evidence for vocalic adolescent peaking is sparse at best.

In contrast to adolescent peaking, the majority of change occurs at the post-high school time point, as BET F_1, BAT F_2, BOAT F_1, and BOOK F_1 post-high school time points are significantly different from the 4th grade time point.[11] A review of the unnormalized vowel charts in Appendix 2 suggests that these changes are not the result of normalization issues, but, rather, are the result of differences in production across time points.

Considering the recent emphasis on the importance of emerging adulthood on linguistic variation (Section 2.2.3), post-adolescent change may suggest that transitions from high school to college or the workforce impact linguistic production at a group

[11] Consistent patterns of lowering could indicate issues with normalization. However, normalization issues are most likely to emerge between the 4th grade and 8th grade time point due to the greater physical changes that occur during this developmental stage. Additionally, not all vowels exhibit significant changes in height. Speakers 1001, 1003, 1025, 1061, 1070, 1075, and 1085 illustrate lowering patterns, particularly for BAIT, in unnormalized data.

level. For at least BET F_1, change at the post-high school time point corresponded to a reduction of range through the loss of raised tokens. This finding may correspond to an age-graded pattern in which individuals in the post-high school interview refrained from using more AAVS features.

In contrast, BAIT F_1 and BAT F_2 do not show range restrictions consistent with age-grading. Instead, these vowel classes maintain a wide range, even as the mean production values shift across time points. As discussed in Section 3.3.2, patterns of simultaneous divergence and convergence between AAE and local PRVs in apparent time are common. BAIT lowering across all time points is the strongest group pattern of change identified in the data, and is clearly evident in many of the vowel spaces in Appendix 2. This lowering trend is inconsistent with PRV sound changes in the region where BAIT is raising and fronting in apparent time (Dodsworth & Kohn 2012). In contrast, BAT backing and BET lowering emerge as significant only at the post-high school time point, and would be consistent with alignment towards PRV systems. These changes are not occurring simultaneously. The pattern observed for BAIT, BET, and BAT may suggest variable change toward and away from the PRV at different points in the lifespan.

Significant change at the post high school time point is also possibly related to task effect and the changing orientation of the participant towards the task at hand. While recordings from grades 4 through 10 include testing sessions alongside informal interactions with mothers in the 4^{th} grade and peers in the 8^{th} grade and 10^{th} grade sessions, the post-high school time point was composed of a sociolinguistic interview, a metalinguistic interview, and a job interview. It is doubtful that the stylistic range for the post-high school time point matches the range elicited at other time points. In addition, as adults, speakers may have been more conscious of the recording process, leading to careful speech and an expanded vowel range. This could produce lowering effects for BOAT and BOOK through an increase in diphthongization, as well as lowering effects for the mid vowels.

The predominance of change on the F_1 dimension may illustrate a constraint on life-stage change for which adjustments to F_1 are more pervasive than adjustments to F_2. Change on the F_1 dimension was documented as more frequent than modifications in F_2 in Harrington et al.'s (2000) longitudinal analysis of Queen Elizabeth's Christmas speeches, as well as in Babel's (2009) work on short-term accommodation. Differences between formal and informal contexts in this analysis were also significant predominantly for F_1 dimensions. This could be attributable to the perceptual prominence of the first formant (Parikh & Loizou 2005), or to finer motor control over jaw height. Both of these possibilities should be explored further.

The predominant finding for group change over adolescence is that there is no evidence for group patterns of adolescent peaking for vocalic variables, even though mixed accommodation to PRV norms may occur. The stable vocalic variables analyzed in this study do not display patterns of adolescent peaking.

Do community structures affect participation in the AAVS?

Group results for change are far from straight-forward. In contrast, group results for field site are robust. As discussed in Section 5.3.1 significant differences between Durham and Chapel Hill indicate that participants from Durham participate more robustly in the AAVS. Effect sizes for field site are larger than effect sizes for grade, nearing effect sizes for some phonetic factors. While many scholars have suggested that community demographics influence participation in the AAVS (see Section 3.3.3), a focus on high-density African American communities has prevented confirmation of this assessment. The evidence provided here and in Section 5.1 illustrates that participants who come from more densely populated African American communities are more likely to show features of the AAVS.

5.4. Individual change

Limited aggregate change across time points may mask individual differences. To explore whether individual participants significantly change the vowel space across each time point, I conducted linear regressions on the normalized formant values for the midpoint F_1 of the monophthongs for each speaker using the lm[12] function in the lme package in R (Pinheiro et al. 2013). I chose to focus on these vowels because Durham and Chapel Hill consistently differed from each other in that Durham speakers have raised lax vowels when compared to those of Chapel Hill. Also, as noted in Chapter 3, front lax-vowel raising has been identified as a widespread feature of the AAVS. Each model included the relevant normalized Hertz values (Lobanov z-scores) as the dependent variable and the preceding place of articulation and duration as fixed variables. In addition, vowel class and grade, as well as an interaction between vowel class and grade, were included in the models. Fourth grade was set as the default treatment so that significant results for grade indicate significant change from the 4th grade time point. BAT was chosen as the default treatment for the interaction so that significant

[12]Lm is a function in the lme package that is used to fit linear models in R.

interactions represent time points at which the comparison vowel class did not pattern with the BAT vowel class.

Table 5.9: Individual regression results for lax vowel midpoints

	Main Effects			Significant interactions					
	8th	10th	PHS	BET	BIT	BOOK	BUT	(+/-) AAVS	
1062	*-.60****	*-.37***	*-0.12*	*8**,10**	*8*,10**	*8**,10***		-	*peak*
1078	-.54***	-.41**	-0.01	8**,10*	8***, 10***	8***,10***, 14*	8*,10**	+	peak
269	**-0.08**	**-.47*****	**-.32****	**10***	**10*, 14***	**10*, 14***		+	**peak**
274	*-.45****	*-.42****	*-.25***	*8***,10***, 14**	*8**,10****	*8***,10***,14****	*10**	+	*peak*
1001	*-0.04*	*-.44****	*-.26***	*10**, 14****		*10**	*10*,14***	-	*peak*
1035	.24*	.44***	0.13					+	peak
280	**0.01**	**.40*****	**.23***		**14****	**10*, 14***		+	**peak**
256	*.2**	*.33****	*.38****		*14**	*10*,14**		-	*slope*
1085	0.15	.37***	.24***			10**		-	peak
1075	**0.21**	**.34****	**.37****	**10*****	**8**,10**,14****	**10***		-	**slope**
1003	.27*	0.18	.29**					-	erratic
1070	-.27*	0.1	.19*		10**, 14*		10*	+	peak
275	**0.06**	**-.26***	**-0.05**				**14****	+	**peak**
1015	-0.11	-.26*	0.11	8**,10**	8*,10***,14*	10***,14*	8*,10***,14*	+	peak
1058	0.17	-.25*	-.24*		8*	10*,14*		-	peak
268	*-.23**	*-0.17*	*-.23**		*14**		*10*, 14**	+	*erratic*
1061	**0.17**	**.22***	**-0.02**				**10****	+	**peak**
1025	-0.19*	0.15	0.1	10**	8**		10*	+	peak
1057	**0.09**	**0.12**	**.16***	**8****	**14***			-	**slope**
1072	-0.04	-0.09	-0.13	8**		8**		+	stable

Table 5.9 lists speakers in descending order of effect size for grade. Main effects and interactions between vowel and grade are listed for each speaker. Speakers from Chapel Hill are italicized, and speakers in the Other category are boldfaced. In contrast to the group analysis, most speakers do not have stable vowel spaces across the four time points. Only one speaker, 1072, exhibits no significant change across the four time points. Significant main effects for grade are most common and largest at the 10th grade time point. Fourteen speakers have significant differences between their 10th grade vowel space and their 4th grade vowel space, compared to 12 at post-high school and 9 at the 8th grade time point. Twelve of the 14 speakers who have significant differences at the 10th grade time point have smaller coefficients for the post-high school time point. Unlike evidence from group results, this pattern is consistent with an adolescent-peaking model in which individuals change at high school only to revert to earlier variants upon entering college or the workforce.

Stability at the group level with a correspondence to individual change

While the majority of individuals' vowel spaces show significant change across time points, patterns of change are erratic. Coefficients for main effects indicate that individuals are not shifting in the same direction, which corroborates the lack of group effects. Interactions between vowel classes are also variable, indicating that not all speakers are changing the same vowels in the same way.

Additionally, community membership does not appear to predict change over time. The top three speakers with the highest coefficients for grade are each members of different communities. One of the most stable speakers, 1057, is also the speaker who moved the most throughout the study, attending various high schools across the state.

Minimal group patterns for change combined with extensive evidence for individual change is a common finding among longitudinal studies for adult vowel systems, and it appears that similar patterns emerge for children and adolescents. For example, MacKenzie and Sankoff's (2010) analysis of adult participation in a community sound change below the level of consciousness demonstrated that individual change on at least one formant dimension occurred, but patterns of change across the group of individuals was highly variable both in direction and in the vowel class that underwent change. Similar patterns emerged for many of the vocalic variables analyzed in Wagner (2008), as well as the consonantal variants analyzed in Bowie (2010). Bowie's study of variable *r*-lessness and aspirated /hw/ revealed non-monotonic trajectories of change across time points for the majority of participants in his study. Such variation does not have to be inherently social, but, rather, could be attributed to any number of factors such as short-term accommodation or chance sampling error. These studies reveal the non-monotonic variability beneath the façade of aggregate patterns, and may indicate the need for more dense longitudinal studies of post-acquisition variation. When the lack of consistent group trajectories is taken into consideration, the variation across time points observed for the individuals in this study aligns with adult patterns of variability observed for variables that are below the level of consciousness.

<u>Individual change as reflecting social variation</u>

Another possibility is that adolescents are engaging in identity work bound by the local social environment in which they find themselves. Short-term longitudinal studies of adolescents suggest that patterns of change may depend on group membership and may be variable-specific (Eisikovits 1998; Moore 2004). Because this study began when the participants were infants, the selection of speakers could not possibly be controlled to represent local teen social orders. The increased number of significant differences between the 4th grade and 10th grade time point may reflect disparate identity work as each individual displays linguistic creativity in different dimensions and in different ways.

The metalinguistic commentary elicited from participants in the post-high school interviews yields little information on vocalic variation, but there is some evidence for the local construction of meaning for at least one AAVS variable analyzed in this study. Pronunciation of the BUT class sparked a conversation among two male participants at the 10th grade time point:

1 Like to study. [produces stressed syllable of *study* with raising]
2 Yeah.
2 You from Durham, right?
2 Yeah, I could tell 'cause of the way you talk, boy.
2 You like "she like to study." [produces *study* with raising]
1 What else, what else?
1 So we put she like to study. [performs more extreme raising on *study*]

Locally constructed indexical meanings such as the one referenced in the conversation above may be co-opted into adolescent identity work to varying degrees depending on the individual's orientation to the meaning of the variant. Adolescents in Durham may choose to incorporate more local forms such as raised BUT or avoid such forms based on identity construction or future goals. Chapel Hill adolescents could perform similar identity work, but the pool of vocalic resources differs.

The ability to discriminate between inherent variability and fluctuations conditioned by local adolescent identity work is a challenge for large-scale studies. However, as more longitudinal studies emerge in sociolinguistics this issue is an important challenge for future research. Dense longitudinal studies may provide some insight into the fluctuating patterns observed in many post-acquisition longitudinal studies. Regardless, individual level results indicate that linguistic plasticity on the F_1 dimension is common even into adolescence for stable vocalic variables.

5.5. Conclusions

Social patterns corresponding to community and school demographics emerge as strong predictors of variation in the vowel systems for the participants analyzed in this study. These findings strongly support the hypothesis that participation in the AAVS is correlated with community density. While previous studies of AAE suggest that segregation contributes to variable levels of participation in AAE, this study provides empirical evidence for this observation. However, changes to school environments do not always correspond to predicted changes in the vowel system. Furthermore, individuals in stable school environments display dynamic trajectories of lax vowel raising across adolescence. These observations suggest that additional factors contribute to the nature of trajectories for stable variation across the lifespan.

Even as individuals have dynamic trajectories across adolescence, group results provided minimal evidence for aggregate-level change, in which the most robust effect was the lowering of BAIT across grades. Significant changes did not align consistently in the direction of the AAVS or PRV changes. Given these patterns, results from the aggregate-level analysis do not suggest that adolescents, as a group, shift vowel production in a consistent manner towards stable ethnolinguistic variables.

While aggregate-level analyses exhibited remarkable stability, idiosyncratic variability emerged as a predominant pattern for individual-level analysis. Because there is little empirical analysis of stable variation, the source of individual variability across time points is unclear. Some evidence suggests that individual variability may reflect adolescent identity work, but the possibility that random variation across time is a feature of stable vocalic variables should be explored further. These results challenge current understanding of the relationship between individual trajectories across real-time and synchronic community patterns for stable variation.

CHAPTER 6

STABLE SYSTEMS AND LIFE TIME CHANGE: A COMPARISON ACROSS LINGUISTIC SUBSYSTEMS

"Really, if you're a freshman in college and you're still talking like you're in middle school. . . it's a problem." (Speaker 1058, Durham, NC)

While longitudinal studies have provided insight into the linguistic flexibility of children and adults, the longitudinal relationships between linguistic subsystems have not often been explored (Rickford & Price 2013). Just as longitudinal studies must include multiple time points so that trajectories of change can be distinguished from non-monotonic fluctuations, longitudinal studies should also investigate multiple types of variables. Life-stage change may affect different linguistic variables in distinct ways. Without comprehensive pictures of change across the lifespan we are left with an incomplete understanding of how life-stage change affects linguistic variation across linguistic subsystems (Sankoff 2005). To meet this challenge, this chapter compares features from different linguistic subsystems for four time points.

Idiosyncratic adolescent trajectories for vowel variation emerge as the predominant pattern for the twenty speakers analyzed in Chapter 5. These findings contrast with group patterns for morphosyntactic and consonantal variation identified in Van Hofwegen and Wolfram (2010; Wolfram & Van Hofwegen 2012) in which group trajectories are consistent with a pattern of age-grading. This contrast raises questions about the relationship between trajectories of change for stable morphosyntactic, consonantal, and vocalic variation across the lifespan. Do trajectories of change for vowels, consonants, and morphosyntax align for some groups of speakers and some variables? Do individuals show differential patterns of morphosyntactic, consonantal, and vocalic alignment? What might differential patterns of alignment for stable morphosyntactic, consonantal, and vocalic variation reveal about the nature of stable vocalic variation and constraints on life-stage change? Furthermore, can distinct kinds of trajectories be identified (and even formalized) for phonetic vs. morphosyntactic variation over the lifespan (i.e. in terms of saliency and/or metalinguistic awareness as well as plasticity)?

To explore these questions I first provide a group analysis of the relationship between two morphosyntactic variables and front lax vowel raising for four time points. I then present case studies for ten individuals to compare vowel production to morphosyntactic and consonantal variation at the individual level. I focus on one morphosyntactic feature, copula absence, a morphosyntactic feature of vernacular AAE, and one consonantal feature, velar nasal fronting of (ING),[1] a stable variable found in many vernacular English varieties. The group level analysis presented in Section 6.1 illustrates that variation in (ING) does not significantly correlate with front lax vowel raising, while copula absence has a marginally significant effect that varies across field site. These findings confirm differential patterns of change observed for morphosyntax, consonantal, and vowel variation across adolescence observed in case studies (c.f. Rickford & Price 2013).

While copula absence shows age-graded patterns, changes for vowels are highly individualized across time points. Case studies presented in Section 6.2 indicate that

[1] The status of (ING) as a phonological or morphosyntactic feature is debated. For example, Fischer (1958) treats the variable as morphosyntactic as its restricted distribution in the present participle and gerundial morphemes may suggest that it is a morphosyntactic feature.

vocalic variation, particularly BAT raising, appears to be a component of age-grading for some speakers in the study, mostly female participants from Chapel Hill. A focus on individual alignment patterns for vocalic, consonantal, and morphosyntactic change indicates that age-grading for vocalic change in tandem with other linguistic structures is a minority pattern.

6.1. Group level comparisons for trajectories of morphosyntactic, consonantal, and vocalic change

How do AAE vowel variables such as lax vowel raising correspond to changes in morphosyntactic and consonantal variation across the lifespan? To answer this question I focus on the most frequent morphosyntactic and consonantal features in the corpus: copula absence and velar nasal fronting, the latter henceforth referred to as *–in'*. Because *–in'* is a widespread vernacular English feature, while copula absence is often cited as a canonical feature of AAE, comparison of these features may provide additional insight into the intersection of life-stage change and ethnolectal variation.

6.1.1. The morphosyntactic and consonantal variables

Data for the morphosyntactic and consonantal analysis come from Van Hofwegen and Wolfram (2010; Wolfram & Van Hofwegen 2012). Although the transcripts were coded for all 29 features of the DDM refined by Renn (2007) (see Section 4.1), I restrict my analysis to the two most common features in the dataset. These features were coded as a ratio of occurrences over total possible occurrences according to traditional variationist methodology. Additional details of coding and transcription are presented in Wolfram and Van Hofwegen (2012).

Copula absence has been described as "one of the oldest and most frequently examined variables in the paradigm of quantitative sociolinguistics" (Rickford, Ball, Blake, Jackson & Martin 1991: 103). Absence of inflected copula or auxiliary *be,* as in "She Ø nice" or "They Ø working" is considered a showcase variable of vernacular AAE because it shows both quantitative and qualitative differences from copula absence in vernacular EAE (Wolfram 1974). Documentation of copula absence from ex-slave narratives and early sociolinguistic studies indicates that it has been present in AAE for some time (c.f. Bailey 1987; Fasold 1972; Labov 1972; Poplack & Tagliamonte 1991; Wolfram 1969), and more recent studies indicate that it continues to be a defining feature of vernacular AAE (Alim 2004; Wolfram & Thomas 2002). Copula absence remains one of the few sociolinguistic variables analyzed from a longitudinal perspective. As reviewed in Section 2.1.1, these studies found that adults omit the copula less frequently than adolescents (Baugh 1996; Rickford & Price 2013; Wolfram & Van Hofwegen 2012). Given the long-standing documentation of copula absence in AAE, this pattern is consistent with age-grading where cyclical individual level variation corresponds to community stability.

Velar nasal fronting, or *–in'* for (ING), represents a different kind of showcase variable as a widespread vernacular variable found in an array of English dialects. It has achieved iconic status as a stable variant, as social variation of *–in'* and -*ing* dates back to its diachronic development out of gerundial and progressive forms in an earlier stage of English (Houston 1985). Similar to copula absence, (ING) has a long history of analysis (Fischer 1958). The two main variants of (ING), -*in'* and *–ing*, are well-known for their perceptual prominence as *–in'* is associated with informality, while *–ing* is associated with articulateness and intelligence (Campbell-Kibler 2007, 2011). Given these social indices, it comes as no surprise that (ING) is a socially-differentiated variable (Hazen

2008), an attribute that makes (ING) a prime candidate for age-grading. Apparent-time evidence suggests that (ING) is subject to age-grading, as adolescents in some communities show higher rates of the informal variant than adults (Labov 2001).

Rates of copula absence vary across field site and time points for the subsample considered in this analysis. Trajectories of change for copula absence in the subsample reflect general findings from Van Hofwegen and Wolfram (2010; Wolfram & Van Hofwegen 2012) as copula absence peaks in middle school or high school years for the majority of participants (see Figure 6.1). Rates of copula absence are lowest for Chapel Hill participants across all time points (Table 6.1).

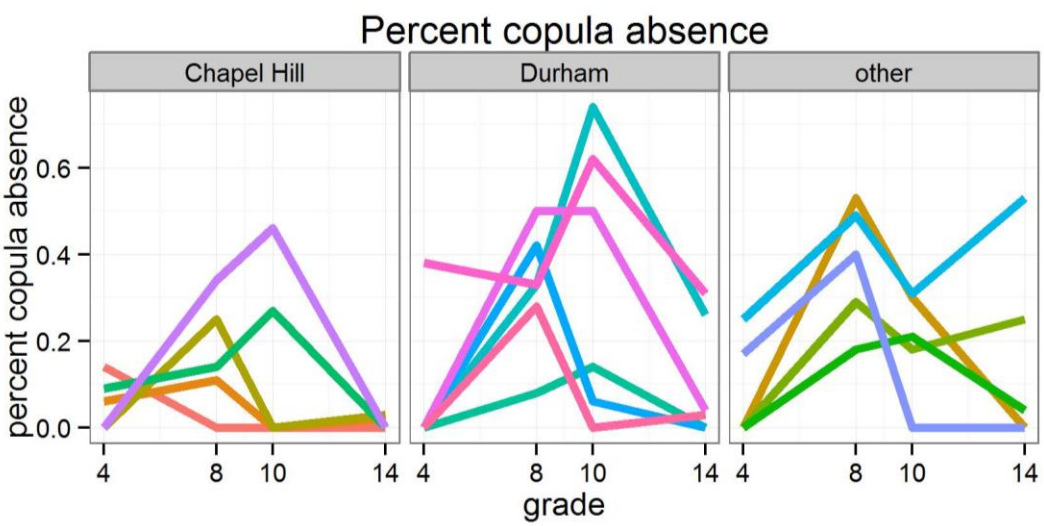

Figure 6.1: Trajectories of copula absence by field site. Each line represents a trajectory of change for one individual

Table 6.1: Frequency of copula absence by time point and field site

	Chapel Hill	Durham	Other
4th grade	.06	.07	.08
8th grade	.17	.31	.37
10th grade	.15	.34	.20
Post-high school	.01	.10	.17

In their variationist analysis of (ING), Van Hofwegen and Wolfram (2010; Wolfram & Van Hofwegen) found that alveolar variants were favored at the 6th and 8th grade, but disfavored at the 4th grade and post-high school time points. Patterns of change across time points for the subsample analyzed here are not as consistent as those observed for copula absence (Figure 6.2 and Table 6.2), but average rates of velar nasal fronting are higher at the middle school and high school time points when compared to 4th grade and post-high school (Table 6.2). Large differences between field sites are evident. The sample of rural/mover participants has high levels of velar nasal fronting across each grade, while Chapel Hill participants are highly variable.

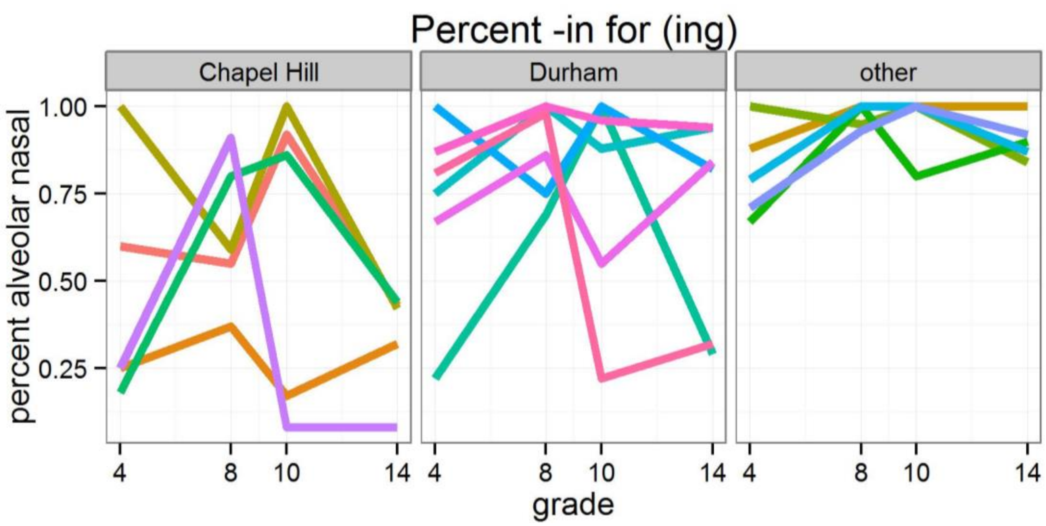

Figure 6.2: Trajectories of (ING) by field site. Each line represents a trajectory of change for one individual

Table 6.2: Frequency of *–in'* for (ING) by time point and field site

	Chapel Hill	Durham	Other
4th grade	.48	.71	.81
8th grade	.64	.89	.98
10th grade	.60	.76	.96
Post-high school	.34	.70	.90

6.1.2. Relationships among vocalic, consonantal, and morphosyntactic variables

In order to compare trajectories of change for morphosyntactic and consonantal variables with vowels I restrict my analysis to vowel data from less formal contexts. I exclude tokens taken from testing environments at grades 4, 8, and 10, and tokens from the metalinguistic interview and job interview portions of the post-high school interview. Two speakers, 1075 and 1085, were excluded from subsequent analysis because morphosyntactic and consonantal analyses were not available at all four time points. An additional two speakers, 1003 and 1015, were excluded because of low token counts.

2176 of the original 4096 tokens of BAT, BET, and BIT, and 16 of the original 20 speakers were ultimately selected for the analysis presented in this section. Figure 6.3 presents normalized F_1 token values of the front lax vowels in informal contexts across time points with LOESS curves and 95% confidence intervals for each field site. Each plotting symbol represents one vowel measurement and tokens have been jittered to avoid overplotting. Plots were constructed in ggplot2 (R Development Core Team 2010). Linear regressions constructed individually for BIT and BET normalized F_1 do not have significant main effects for grade, indicating group stability over time.[2] While the distribution of tokens for BET and BIT resemble patterns reported for the full dataset, a significant main effect for grade is present for informal BAT tokens at the 8th (-.23***) and 10th (-.26**) grade time points, with a significant interaction between grade and field site for Chapel Hill and the Other category (8th grade: .39***, 10th grade: .19, post-high

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[2]To assess the distribution of informal vowel variants across time I constructed linear mixed models for BAT, BET, and BIT F_1 using the lme function in the nlme package in R. The normalized F_1 value of interest was the dependent variable. Speaker was included as a random factor, but I could not include grade as a random slope due to insufficient tokens. Because LOESS curves illustrate that field sites show different trajectories of change across time, I included an interaction between grade and field site. I also included duration and preceding place of articulation as statistical controls. See Chapter 4 for coding details.

school: .16). The lack of a simple main effect for grade echoes findings in Chapter 5 that, in the aggregate, there is no consistent pattern of group change across field sites and time points.

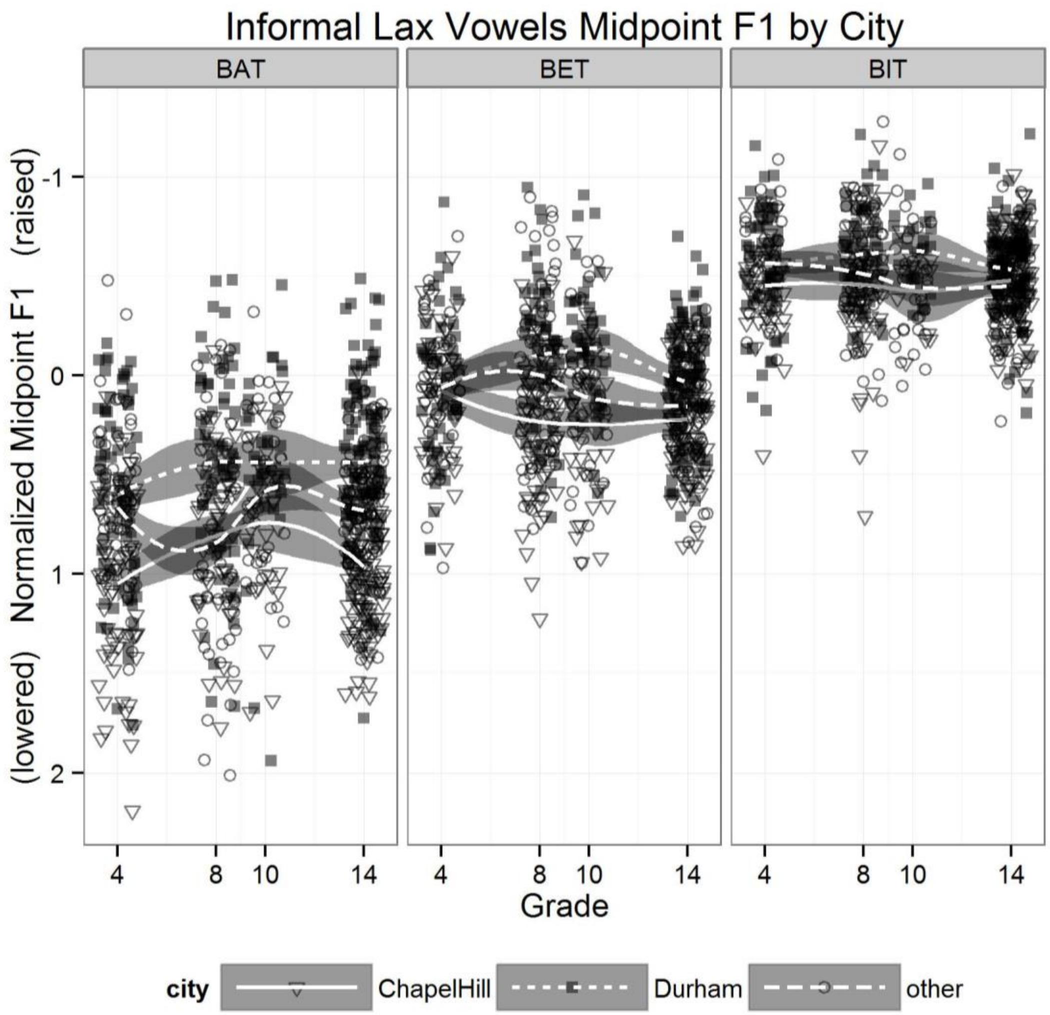

Figure 6.3: Front lax vowels in informal contexts across time.[3]

To consider the relationship between the morphosyntactic and consonantal variables and front lax vowel raising, I constructed a mixed model regression using the lme function in the nlme package in R (Pinheiro et al. 2013) for each morphosyntactic

[3]Each plotted symbol represents one token and has been jittered for visibility. LOESS curves with 95% confidence intervals follow community trajectories.

and consonantal variable with the normalized midpoint of the front lax vowels as the dependent variable, and vowel class, preceding place of articulation, duration, and the morphosyntactic or consonantal variable as main effects. An interaction between the linguistic variable of interest and field site was included to control for differences in vernacularity across field sites. Additionally, an interaction between grade and the linguistic variable of interest was included to allow vernacularity to vary across grades. Speaker was included as a random factor, but grade could not be included as a random slope because of the limited number of tokens available in less formal contexts. Any effect for grade reported from these models represents differences between grades at the aggregate level without consideration of individual trajectories of change across time points. Trajectories of change for morphosyntax, consonants, and vowels are addressed in the case studies presented in Section 6.2.

A main effect for a morphosyntactic or consonantal variable in these models would indicate that front lax vowel height co-varies with the morphosyntactic or consonantal variable while controlling for differences in vernacularity across city and grade. A significant interaction between the morphosyntactic or consonantal variable and grade or field site would indicate that this relationship differs across grade points or field sites.

Regression results show a near-significant main effect for copula absence (-.36, t=-1.82, p = .068). The model shows a significant main effect for city (Durham: -.29, t=-4.33***, Other: -.18, t= -2.51*). Interactions between field site and copula absence show that the relationship between copula absence and lax vowel raising varies across field site. The slope is more positive for Durham (.50, t-value=3.39***) and the Other category (.7, t-value = 4.42***), than for Chapel Hill. This indicates that front lax vowel raising and copula absence are more strongly correlated in Chapel Hill.

Figure 6.4 displays correlations between front lax vowel raising and copula absence for each of the field sites, with linear models and 95% confidence intervals overlaid for each grade. This figure illustrate that the near-significant relationship between copula absence and front lax vowel raising largely may be attributed to a correlation between BAT raising and copula absence in Chapel Hill. This is consistent with regression results. In contrast, regression results for front lax vowel raising from the model including (ING) show no significant main effect for (ING) (-.08, t = -1.10, p=.28), even as linguistic factors remain significant (e.g. duration: -.28, t = -2.85**, vowel class BET: -.60, t = -32.12***, vowel class BIT: -1.18, t- = -61.99***). Thus, front lax vowel raising and *–in'* do not co-vary. This is evident in Figure 6.5.

A lack of significant main effects for morphosyntactic and consonantal variables for lax vowel raising suggests that these features do not co-vary at the group level even when the analysis is restricted to less formal contexts. When findings from Chapter 5 are taken into consideration, these results confirm the observation that stable vowels vary in different ways than morphosyntactic and consonantal variables across adolescence. Consistent patterns of age-grading observed for copula absence, and to a lesser extent, *in'*, are not apparent across field sites for vowels. Instead, idiosyncratic variation across time points for vowels predominates.

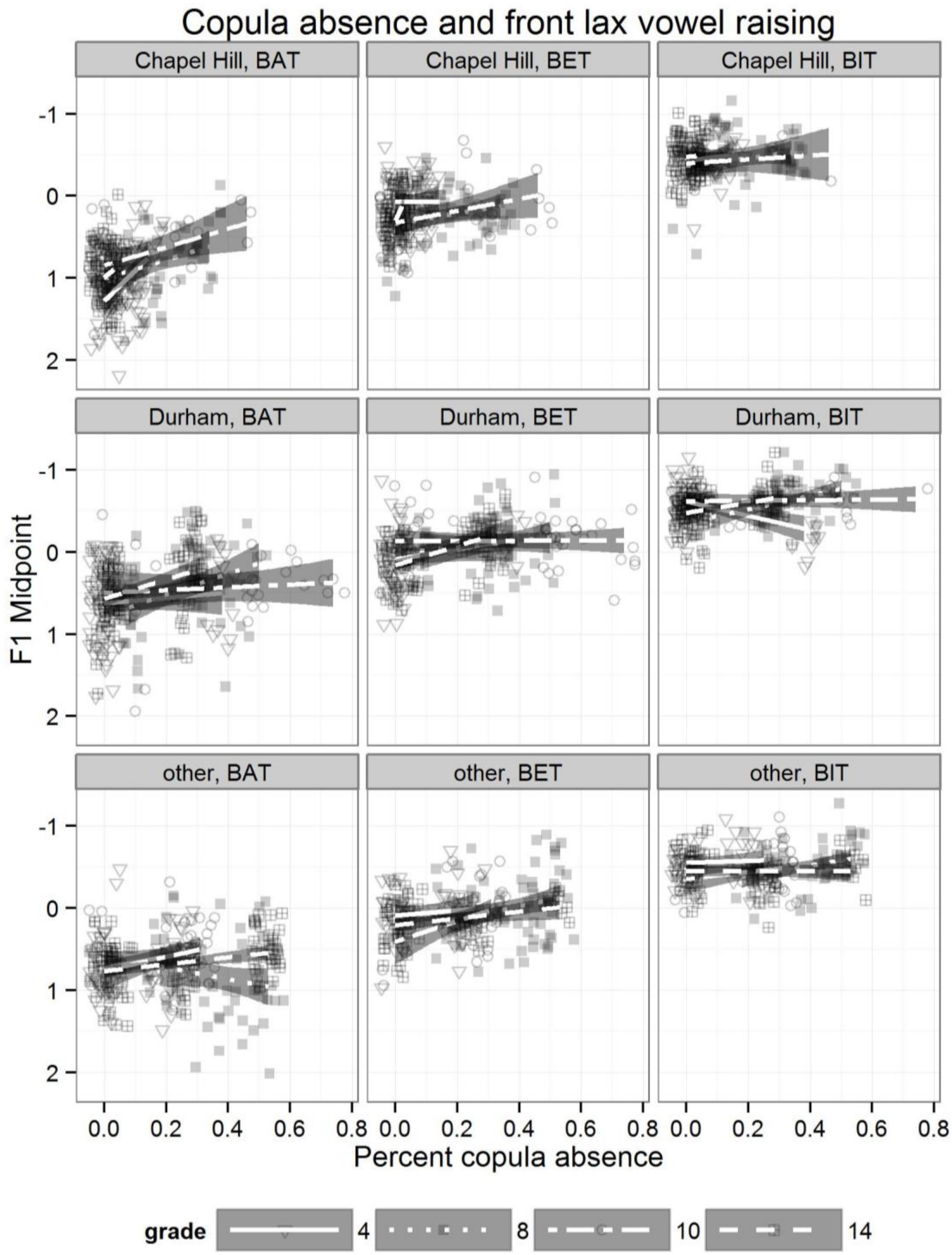

Figure 6.4: Correlations between copula absence and front lax vowel raising.[4]

[4]Each plotted symbol represents one token and has been jittered for visibility. Linear models with 95% confidence intervals for each grade overlay the data. More negative F1 normalized values correspond to more raised vowels.

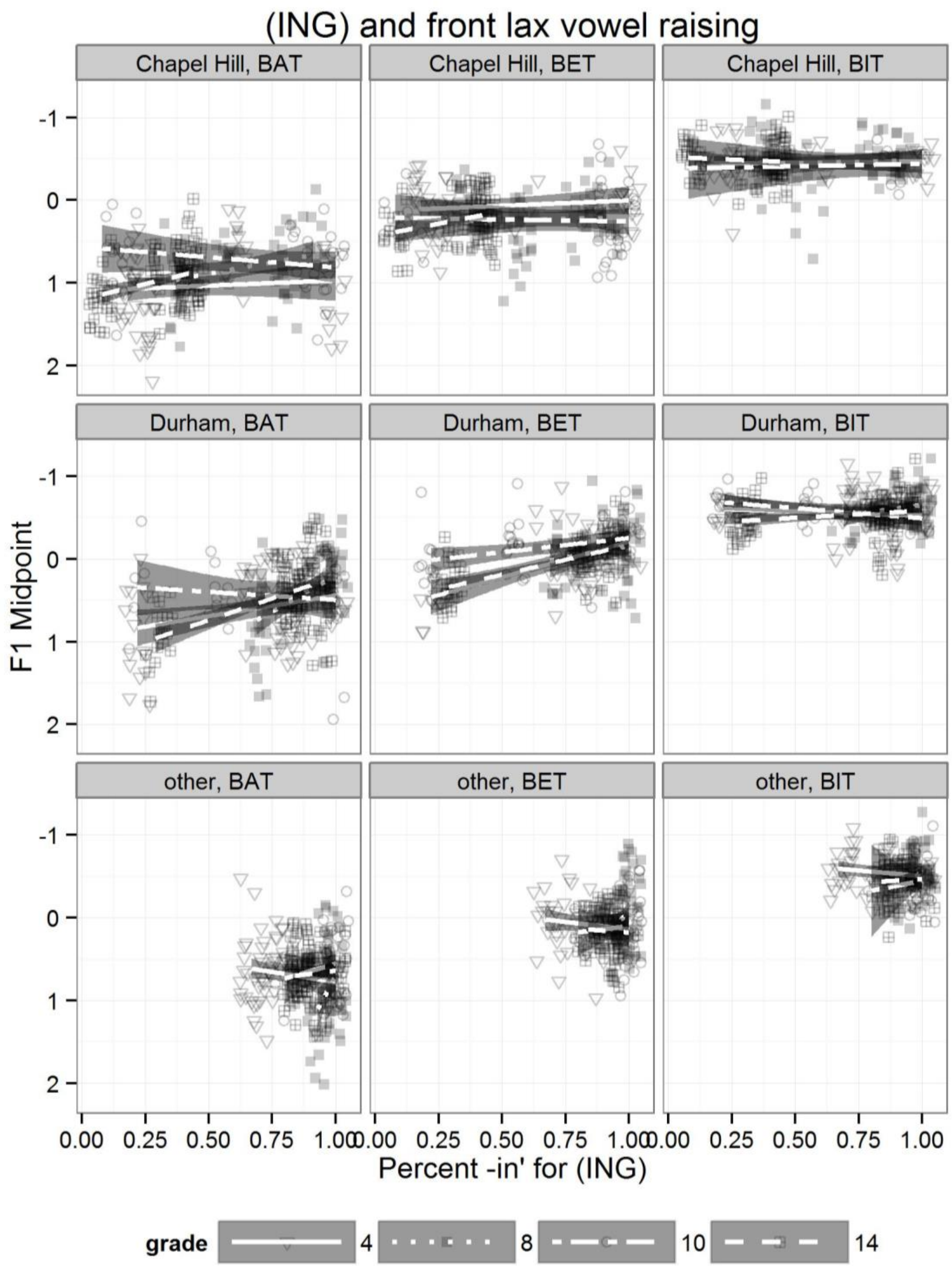

Figure 6.5: Correlations between (ING) and front lax vowel raising.[5]

[5] Each plotted symbol represents one token and has been jittered for visibility. Linear models with 95% confidence intervals for each grade overlay the data. More negative F1 normalized values correspond to more raised vowels.

6.2. Case studies

The limited sample size available in informal contexts discussed in Section 6.1 prevented discussion of covariance for trajectories of change. However, a closer investigation into how individuals vary across linguistic subsystems in real time provides insight into the differential behavior of stable vocalic, consonantal, and morphosyntactic variation at the group level. In this section I present ten case studies that illustrate several different patterns. For some speakers, primarily from Chapel Hill, trajectories for BAT raising align with copula absence as raising occurs predominantly during the same time points where copula absence peaks. Other speakers follow trajectories of change for the front lax vowels indicative of participation in or accommodation to regional sound changes for BAT across time points, with little or no correspondence between patterns of raising and non-standard morphosyntactic or consonantal variables. Additional patterns include stability for vowels with age-graded behavior for morphosyntax and/or consonants, and non-monotonic patterns of variability for vowels with peaks that do not align with morphosyntax or consonants. While age-graded patterns identified for a subset of Chapel Hill participants suggest that differences across speakers reflect local orientation towards the indexicality of vocalic variables, idiosyncratic variation among the majority of the participants supports the position that additional sources of variability beyond the influence of life-stages contribute to individualistic and non-monotonic trajectories of change for some stable variants.

6.2.1. Adolescent peaking patterns for BAT and copula absence

Although group analysis did not reveal a significant correlation between front lax vowel raising and non-standard morphosyntactic and consonantal variation, individual trajectories of change for a few speakers suggest a possible relationship between increased copula absence and BAT raising in informal contexts. A comparison between vowels and morphosyntactic variation from informal contexts shows that four speakers have peaks in BAT raising that correspond to peaks in copula absence (see Figure 6.6). Three of these speakers, 1062, 274, and 1001, are women who grew up in Chapel Hill. 1078 is a woman from Durham. Speaker 1062 was majoring in business at an HBCU in Florida, speakers 274 and 1078 were attending a regional HBCU, and speaker 1001 was working as a cocktail server in a nearby city at the time of the post-high school interview. Their alignment pattern is most likely the source of the near-significant effect for copula absence and front vowel raising identified in Section 6.1. Patterns of alignment between copula absence and BAT raising are most obvious for speakers 1062 and 1078, with comparatively smaller peaks for 274 and 1001. While peaks for BAT correspond to peaks for copula absence for each of these speakers, BET and BIT do not show similar patterns.

Notably, community differences observed in Chapter 5 are largest for BAT. For some Chapel Hill women this salient regional distinction may be incorporated into adolescent identity work in the same way as copula absence. The close correlation between copula absence change and BAT raising contrasts with (ING) which does not appear to co-vary consistently with BAT raising for these women. This contrast may indicate that BAT has become incorporated into ethnolectal identity work for these three women possibly due to its regional association with a prominent African American community. The incidence of lax vowel raising (F_1) and morphosyntactic and consonantal variables are given in Figure 6.6.

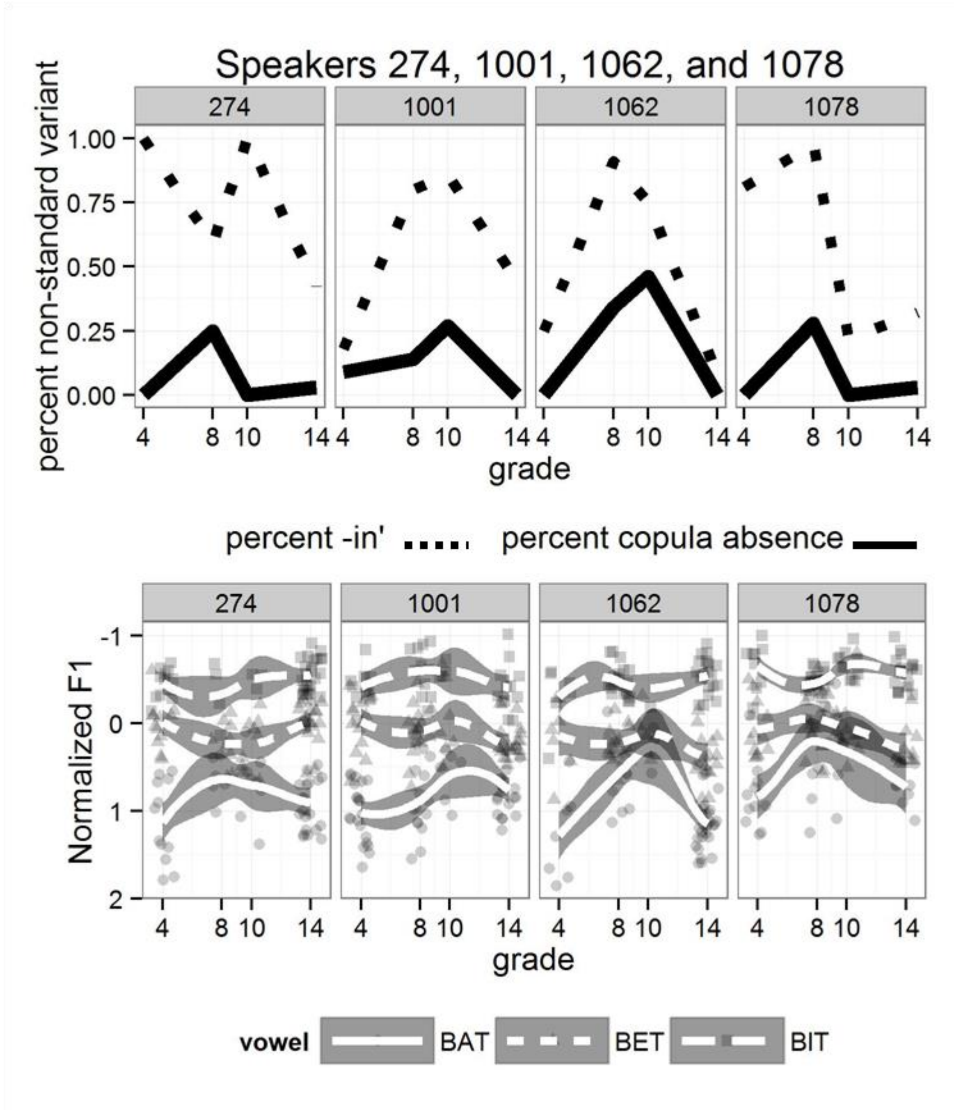

Figure 6.6: Comparison of morphosyntactic and consonantal change to vowel change in informal environments for speakers who display patterns consistent with age-grading.[6]

Although the majority of the women who participate in this pattern are from Chapel Hill, 1078 stands out as an exception. Commentary from the metalinguistic portion of the post-high school interview illustrates that 1078 is exceptionally aware

[6] More negative values for normalized F_1 correspond to more raised variants. Each plotted symbol in 6.6b corresponds to one vowel token and has been jittered to prevent overplotting. LOESS curves with 95% confidence intervals have been overlaid for each vowel class. Graphs were created using the geom_line, geom_point, and geom_smooth functions in the ggplot package of R (R development core team 2010)

metalinguistically. During the post-high school interview 1078 pinpointed a time in her life when she decided to change the way she spoke. In high school she took a position with a local non-profit organization that required her to speak in public. She recalled how this position influenced her:

> ". . . when I got to high school and I started working with [non-profit organization] and [there] were opportunities to speak out in public and stuff like that – that's when I started saying, 'Ok, let me speak a little bit more properly'"

These recollections align with the longitudinal data. At the 10th grade time point 1078's rates of *–in'* and copula absence declined to low levels. BAT lowered as well.

By her own account, 1078 fits Rickford and Price's description of a "linguistic chameleon," an individual who is capable of large changes in speech attributed to style shifting or accommodation (2013:131):

> "Well I remember when I was (uh) in eleventh grade my teacher was like (how do you) how can you go from speaking this way and then go to speaking extreme proper."

1078's exceptional pattern of aligning trajectories for vocalic, consonantal, and morphosyntactic variation may reflect an unusual level of metalinguistic awareness combined with motivating factors to modify her speech across time. As a public speaker, 1078 is conscious of how she presents herself linguistically. Heightened metalinguistic awareness and increased motivation have been cited as improving late L2 acquisition outcomes (Bongaert 1999). With motivation and input, similar factors could lead to greater levels of linguistic flexibility across the lifespan as well.

All of the speakers presented in this section display patterns of alignment between BAT raising and copula absence that are consistent with age-grading. Yet, the extent to which these speakers modify their front lax vowels is still limited to a single vowel class.

Further, as subsequent case studies will illustrate, alignment patterns between BAT raising and morphosyntax are an exception, rather than a rule.

6.2.2. Participation in or accommodation to PRV sound changes

Another minority pattern identified in the data is participation in or accommodation to PRV sound changes. Speaker 256, a man from Chapel Hill, and speaker 280, a man who moved from Durham County to a predominantly European American community during high school, display a pattern where BAT lowers across adolescence. For speaker 256 this pattern aligns with trajectories of change for copula absence as his 4th grade time point is the only time point where he uses copula absence. Correlations between copula absence and BAT lowering for 280 are less straight forward. While his rates of copula absence peak in middle school and high school, his BAT class lowers incrementally from 8th grade to post-high school.

Consideration of their community backgrounds provides insight into these patterns. 256, growing up in Chapel Hill, attended predominantly European American schools (see Figure 4.2-Figure 4.4). Given that his adolescence was spent in majority European American schools, lowering of BAT across time points potentially reflects participation in regional sound changes through incrementation. Notably, BAT lowering reaches stability at 10th grade for this speaker as it remains at a similar level at the post-high school time point. The timing of this pattern corresponds to hypothesized models of adolescent incrementation of sound change in which adolescents increment sound changes until about age 17 (Labov 2001).

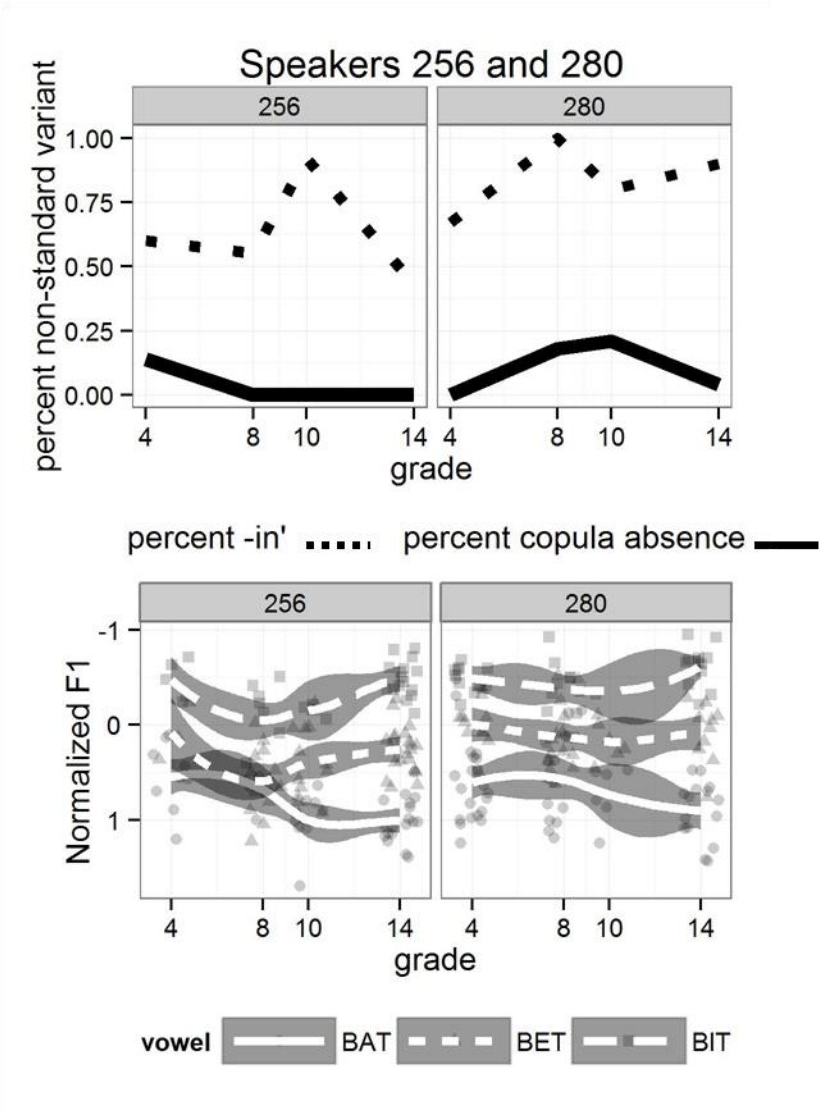

Figure 6.7: Comparison of morphosyntactic and consonantal change to vowel change in informal environments for speakers who show accommodation to or participation in PRV sound changes.[7]

Although speaker 280 attended elementary school and middle school in Durham County (percentage of African American students: 42% and 73%), he lived in an exurb of Raleigh, North Carolina, with a smaller African American population. Until 10th grade

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[7] More negative values for normalized F_1 correspond to more raised variants. Each plotted symbol in 6.7b corresponds to one vowel token. LOESS curves with 95% confidence intervals have been overlaid for each vowel class. Graphs were created using the geom_line, geom_point, and geom_smooth functions in the ggplot package of R (R development core team 2010).

his mother drove him to school in Durham daily. After his freshman year he transferred from Durham to the local high school (percentage of African American students: 29%). At the time of the post-high school interview 280 was working on UNC-CH's campus in Chapel Hill. During 280's metalinguistic interview he commented, "Like I hear a lot, 'you talk like a white person.'" He does not expand upon his comment when asked for further detail. A lowered BAT and BET class may contribute to the perception that 280 is 'talking white.' While 280 considers himself a Durham native, given his changing school and work environment, lowering of the BAT class likely represents accommodation to his changing social environment.

6.2.3. Stability or erratic patterns in vowels with no correspondence in morphosyntax

While the trajectories of change for copula absence and BAT raising in sections 6.2.1 and 6.2.2 appear to correspond to age-grading, participation in sound change, or accommodation to new speech communities, trajectories of change for the remaining speakers do not have such ready explanations. In this section I focus on four illustrative examples, although all of the remaining ten speakers analyzed in this chapter fit within this category. The remaining case studies illustrate the idiosyncratic patterns observed for vowel variation in Chapter 5 and the relative lack of alignment with morphosyntactic and consonantal change. These case studies show the distinctive behavior of stable vocalic, consonantal, and morphosyntactic variation across adolescence.

While most speakers show some change for the lax vowels across adolescence (Section 5.4), some speakers are relatively stable. Speaker 1035, a woman from Durham, and speaker 1057, a man from Durham who moved to several different schools in North Carolina during high school, have some fluctuation in BET, but both BAT and BIT remain relatively stable in informal contexts. Even as 1035 has relatively stable vowels across adolescence, she follows an age-graded pattern for copula absence in which copula absence peaks in the 10th grade. 1057 has a raised BET class in 10th grade, when he has a peak in copula absence, but a subsequent peak in post-high school for copula absence does not correspond to a rise in BET from the 10th grade.

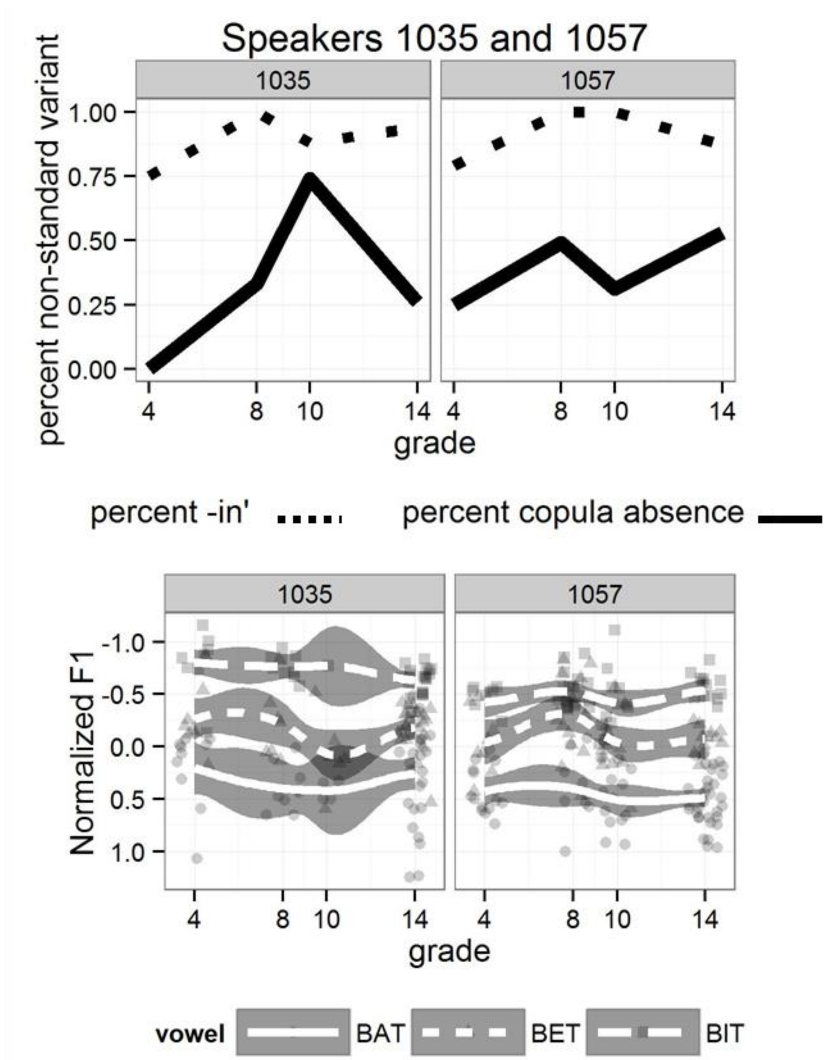


Figure 6.8: Comparison of morphosyntactic and consonantal change to vowel change in informal environments for speakers who have stable vowels.[8]

[8]More negative values for normalized F_1 correspond to more raised variants. Each plotted symbol in 6.8b corresponds to one vowel token. LOESS curves with 95% confidence intervals have been overlaid for each vowel class. Graphs were created using the geom_line, geom_point, and geom_smooth functions in the ggplot package of R (R development core team 2010).

Changes to school demographics do not provide an explanation for corresponding shifts in vowel systems as speaker 1057 did not experience a large change in school demographics until high school and as speaker 1035 never experienced large shifts in demographics. She attended predominantly African American schools throughout her adolescence. At the post-high school time point both participants were living and working in Durham, North Carolina. These speakers have trajectories of variation for their front lax vowels that do not correspond to changes in copula absence or changes to community environment.

While speakers 1035 and 1057 have relatively stable vowels corresponding to changing use of copula absence, 1058 and 1070 have variable patterns for vowels that do not align with their peaking patterns for copula absence. 1058 and 1070 are both women who grew up and were living in Durham, North Carolina, at the time of the post-high school interview. 1058 was attending a local HBCU and 1070 was a hair dresser pursuing a career as a vocalist.

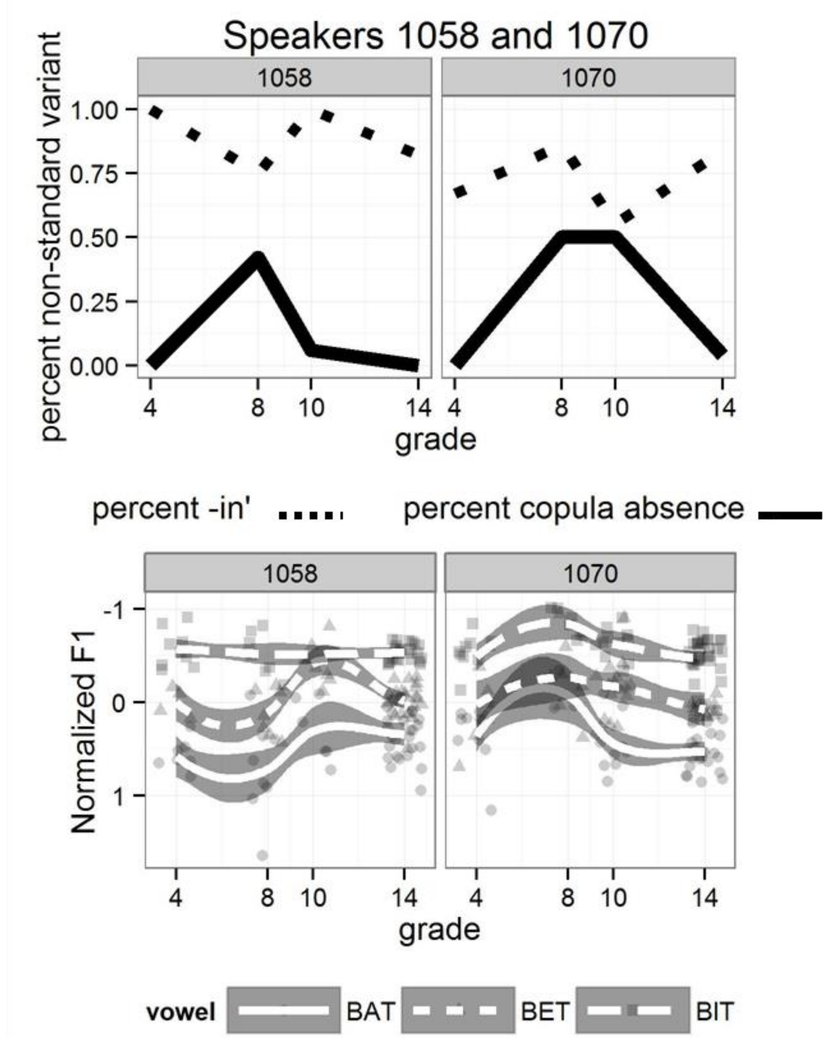


Figure 6.9: Comparison of morphosyntactic and consonantal change to vowel change in informal environments for dynamic speakers.[9]

Speaker 1058 has an 8th grade peak for copula absence, but her lax vowels rise between 8th and 10th grade, and remain raised at the post-high school time point. 1070, on the other hand, has a raised lax vowel system in the 8th grade that falls between the 8th and 10th grade. However, her use of copula absence is still raised at the 10th grade time

[9]More negative values for normalized F_1 correspond to more raised variants. Each plotted symbol in 6.9b corresponds to one vowel token. LOESS curves with 95% confidence intervals have been overlaid for each vowel class. Graphs were created using the geom_line, geom_point, and geom_smooth functions in the ggplot package of R (R development core team 2010).

point. Both 1070 and 1058 attended majority African American schools in Durham County throughout their adolescence, so demographic shifts are not a likely explanation for these patterns of change.

Changes to vowels do not align with changes to copula absence or (ING) for the majority of speakers, which is why group level regression results do not have significant main effects for these variables. There is a wide range of vowel variants within vowel classes in the Durham community, and some of the speakers from Durham have large fluctuations within this envelope of variability across the lifespan. However, these fluctuations do not appear to align with specific life-stages, as shown in Chapter 5, or with the use of age-graded morphosyntactic features. Shifts in school demographics also fail to explain many of the trajectories discussed in this section.

6.3. Factors that contribute to differential patterns of linguistic change across the lifespan

Why are longitudinal changes to morphosyntax more consistent across individuals than those observed for vowel variation? Trudgill (1986) suggested that social saliency may influence a speaker's ability to modify a linguistic variable over the course of one's life. While the concept of salience is debated, variants undergoing a rapid change, variants with correspondence to written forms, dichotomous variants (or variants without intermediate forms), and stereotyped or stigmatized variants are often considered salient (Auer, Barden & Grosskopf 1998; Trudgill 1986). The features discussed in this dissertation were selected because of their status as stable variants, but both (ING) and copula absence correspond to written forms, are frequently treated as dichotomous, are stereotyped, and are stigmatized. Vowel variation, on the other hand, is less commonly portrayed in writing and is continuous, and the indexical nature of the AAVS is unclear.

In this section I suggest that saliency and indexicality intersect to predict patterns of age-grading. Copula absence and (ING) are highly socially salient and have consistent indexical meanings, and as such are more likely to undergo age-grading in relatively predictable patterns. The vowels analyzed in this study are less salient according to the criteria discussed above, and their indexical nature is more opaque, leading to less predictable patterns of change across the lifespan.

Copula absence and (ING) are well-established and widespread, reaching the status of a stereotype (Labov 1971). The consistent patterns of age-graded behavior for features like copula absence may correspond to consistent interpretation of the indexical meaning of the feature in question. Ties to written forms likely help to reinforce interpretation of *–in'* as informal, or of copula absence as non-standard. Moore (2004), in her study of age-grading and adolescence, attributed adolescent identity work with morphosyntax to their salient ties to formal written language:

> The emphasis upon literacy at school may mean that nonstandard morphosyntactic features are the linguistic features that are most subject to overt comment and monitoring (Cheshire and Milroy 1993:11), and the use of these variables is most likely to be affected as a result of engagement with institutional ideologies (390).

Because forms with written correspondences are highly salient and monitored in the educational system, these variants become a prime resource for age-grading. Changing orientations towards institutions that reinforce standard language ideologies may lead to changing use of variants corresponding to these written forms.

When asked about informal language, the participants in this study tended to focus on forms that they perceived as not matching standard written language. During speaker 1078's metalinguistic interview she performed several examples of code switching in which she contrasted formal and informal speech, including *–in'* for *-ing*:

> ". . . you can't really speak . . . really proper with children. You gotta be like "hey, chill, don't do that." You know, "stop jumpin'" instead of "jumping."

1075 also identified *–in*' as an informal form: "Cause sometimes you talkin' slang, you might write, (you know what I'm say-), like jumpin' instead of jumping." When asked about style shifting, 1015 provided details about the kinds of features he attempts to change in formal contexts, explicitly referencing spelling in his description of speaking 'proper':

> 1015: "It's just something in my mind just tells me, you know, you need to speak proper. You know, pronounce your t's and r's and all that."

In contrast, only one speaker, 1078 from Durham, explicitly referenced vowel variation when discussing informal English:

> E: And what do you think might be the worst situation to use a non-standard dialect?
> 1078: Ooh. In court. . . . Just getting' up there and just: "Well, judge, she uh" [produces stressed vowel in *judge* with raising]
> E: Mhmh, no.
> 1078: So, court. Anything where you have to present yourself . . . .

Because morphosyntactic and consonantal features are tied to written forms, an individual's changing orientation towards institutions that promote standard writing can lead to age-graded patterns. During her metalinguistic interview 1058 discussed the importance of using "correct grammar" as an adult. When asked if she changes the way she speaks around her professors, she offered the following reply:

> 1058: I try to be more professional I guess.
> E: More professional mhm.
> 1058: Because like teachers at [HBCU], they really take how you talk to them into consideration as like how they treat you and your grades.

> E: Yeah.
> 1058: So if you're (like) really (like I guess) usin' urban language (like) being I guess, what's the word? I dunno, just . . . like talkin' to them like you're talkin' to your friends it won't quite work.
> E: Yeah right.
> 1058: Like slang and stuff. They'll get mad. Like, you have to like use like correct grammar.

1058's references to grammar and slang suggest that she focused on morphosyntactic and lexical choices when making this transition.

The indexicality of the vowel variables analyzed in this study is less clear (it is not mentioned explicitly in metalinguistic accounts), is not tied to written language (via one-to-one relationships of distinct sounds and spellings), and may be more localized (as illustrated in Chapter 5 in which one speaker, when hearing his friend's pronunciation of BUT, comments "you from Durham, right?"). Differential patterns observed in the case studies presented above support this interpretation.

Finally, a focus on patterns displayed by the four women who attended HBCUs provides a particularly vivid example of inconsistent evidence for age-grading of BAT. Participants 1058, 1078, 1062, and 274 were all enrolled in HBCUs across the Southeast at the time of their post-high school interviews. Three participants lowered BAT between 10^{th} grade and their entrance into the HBCU. This evidence, along with differences between formal and informal contexts discussed in Chapter 5 may suggest that the AAVS is stigmatized, particularly for women from Chapel Hill, indicating the proposed localized dimension for vocalic variation. Yet, 1058, who stressed the importance of speaking in a professional manner at the HBCU, continued to use raised variants of the front lax vowels at the post-high school time point, unlike the other three speakers.

Trajectories of variation for vowels, even for BAT, are far less consistent than the age-graded patterns observed for morphosyntax across the lifespan.

6.4. Conclusions

Patterns of age-grading for morphosyntactic and consonantal variation do not correspond to group level trajectories of change for the stable vowels analyzed in this chapter. Even as stable vowels are highly variable in the region, only a handful of speakers have trajectories of change for vocalic variation that correspond to the age-graded patterns observed for copula absence. Although apparent-time research suggests that adolescents incorporate vocalic variants into life-stage identity work (Section 2.2.2), this does not appear to be the case for stable vocalic variants. This may reflect a lower level of saliency or indexicality for the vowels when contrasted with morphosyntactic features. As will be discussed in Chapter 7, these findings have important implications for interpretation of apparent-time models for vocalic variables, and illuminate the nature of variability across adolescence for stable vocalic variants.

CHAPTER 7

THE NATURE OF VARIATION AND LIFE-STAGE CHANGE

The connection between the cultural process of growing up and community patterns of age-grading and change has been a primary focus of sociolinguistics for decades (Labov 1972a). This effort has led to a myriad of apparent-time and ethnographic studies that suggest adolescents push sound change forward and engage in linguistic acts of identity as they establish social orders distinct from childhood and adult cultural norms (Eckert 2000; Labov 2001). Yet, the only way to confirm hypotheses based on these studies is through the exploration of trajectories of individual linguistic behavior across multiple time points. Children growing up in the midst of ethnolinguistic and regional diversity have access to linguistic variation that could potentially serve as an ideal resource for adolescent identity work. Longitudinal analysis of morphosyntactic variation suggests that use of vernacular AAE variants correlates with life-stage variation in that individuals use more vernacular features as adolescents than as children or adults (Baugh 1996; Rickford & McNair-Knox 1994; Rickford & Price 2013; Van Hofwegen & Wolfram 2010; Wolfram & Van Hofwegen 2012). Yet, this current analysis illustrates that not all socially correlated variables follow trajectories across adolescence consistent with age-grading and that age-grading does not follow a unilateral model.

A tendency to focus on changing and highly salient linguistic features has left the full range of linguistic change and stability poorly understood (Wagner 2012b). An analysis of stability in variation provides key insight into the importance of life stages as differential distributions across age groups cannot be attributed to processes of language change. Analysis of a few stereotyped stable variables suggests that adolescents incorporate vernacular stable variants into adolescent identity work, setting teens apart from adult and child cohorts (Labov 2001). This pattern, however, creates ambiguity since peaks may reflect age-grading or language change (Sankoff 2005). The stable vocalic variants analyzed in this study are correlated with social categories, but do not display patterns of age-grading or language change at the aggregate level. Instead, the majority of stable vocalic variables analyzed in this study show idiosyncratic patterns of non-monotonic change. Strong correlations were identified between vocalic variation and community structures such as school demographics. These findings have implications for the interpretation of adolescent peaks in apparent-time data, an understanding of the interaction between ethnolectal vowel variation and predominant regional varieties, and a picture of how individuals pattern for stable variation.

7.1. The many paths through adolescence: Implications for apparent-time analyses of sound change

Age as a variable in sociolinguistics has been analyzed primarily for the purpose of identifying community change. In the apparent-time construct differences between younger generations and older generations are interpreted as indicative of language change. Without consideration of the intersection between social aspects of aging and linguistic practices, apparent-time interpretations run the risk of underestimating or overestimating community change. Longitudinal studies provide necessary context for apparent-time studies by illustrating how the cultural process of aging affects linguistic behavior across the lifespan. Adolescence, in particular, deserves attention from a longitudinal perspective as it is hypothesized that children modify their speech in the direction of sound change up to late adolescence (Labov 2001). This hypothesis has been established through the observation of an apparent-time peak in which adolescents use more innovative forms than either children or adults (Labov 2001; Tagliamonte & D'Arcy 2009). However, adolescent peaks could represent age-grading, in which cyclical patterns of life-stage change at the individual level occur within the context of stable community patterns, rather than language change. A study of stable vocalic variation can illustrate if age-grading is a typical, expected part of adolescent speech, providing context for the interpretation of adolescent peaks in apparent-time data. How do children maintain or shift the way they speak as they transition through adolescence and into adulthood? Do adolescents stand out from their childhood selves? If adolescents do incorporate linguistic variation into adolescent identity work, are there restrictions on which forms undergo change?

To answer these questions I analyzed four time points from childhood to early adulthood to identify trajectories of change across adolescence. In addition, I employed statistical techniques that capture the non-independent nature of longitudinal measures across speakers to account for individual paths of change. The inclusion of multiple time points improves upon studies that include two time points in that peaking or sloping patterns, which may be related to age-grading or change, can be distinguished from patterns that fluctuate across the lifespan.

The primary finding of this dissertation is that not all variables show predictable patterns associated with life-stage change. Although the vocalic variables considered in this dissertation are correlated with social structures, as a group, the participants in this study did not incorporate these variables into life-stage change in patterns consistent with age-grading. A review of findings in Van Hofwegen and Wolfram (2010; Wolfram & Van Hofegen 2012) illustrated that the adolescents in this study used more copula absence, a vernacular AAE form, during middle school and high school than at the elementary school or post-high school time points. In contrast, adolescent peaks at the aggregate level either towards the AAVS or PRV forms were not apparent, nor were changes in morphosyntactic or consonantal variation significantly correlated with changes to the front lax vowels at the group level. Instead, change across the vowel space at the group level was minimal, with effect sizes smaller than phonetic or field site factors. Change occurred in incremental, rather than peaking, patterns, and group ranges did not expand at the middle school or high school time points. These findings do not support the hypothesis that stable vowel variation shows adolescent peaks. Aggregate level changes emerged as significant mostly at the post-high school time point and were not consistent in directions towards or away from AAVS or PRV variants. While a group pattern of lowering for the BAIT class across time points was significant (a shift in the opposite direction from PRV sound changes), there were also significant changes towards PRV sound changes at the post high school time point, including lowering of BET and backing of BAT.

These results suggest that the cultural influence of life-stages on linguistic variability does not encompass all variables at the group level. Rather, select features become the focus of adolescent identity work. Although age-grading as a concept has received much attention in sociolinguistics (Chambers 2003; Eckert 1997), a review of apparent-time and longitudinal evidence for age-graded phenomena in Chapter 2 suggests that adolescent peaks for stable variation often are restricted to subsamples of a population (upwardly-mobile individuals may be more likely to engage in age-graded behavior (Wagner 2012a)), and differ across communities (adolescent peaks are apparent for vernacular AAE features in Wolfram and Van Hofwegen (2012), but not in Wolfram (1969)). This suggests that age-grading is not a widespread pattern and may be highly localized, and even idiosyncratic. Adolescents as a cohort do not follow consistent patterns of age-grading for all stable linguistic variables.

Why might morphosyntactic and consonantal trajectories differ from vocalic variable trajectories across adolescence? As discussed in Chapter 6, one possible explanation for the lack of consistent age-graded patterns for the vowels analyzed in this study is a lack of saliency or stereotyping with correspondingly less clear indexical meanings than for cornerstone features such as (ING) and copula absence. This observation has important implications for the interpretation of apparent-time studies of sound change. If there are socially indexed vowels, given models of adolescent identity work (Eckert 2000), one would assume that these vowels would peak in adolescence. But this is not the case. In the context of apparent-time studies of vowels where year of birth is the primary variable of interest, adolescent peaks should not be taken for granted as a natural component of adolescence. Adolescents do not appear to pull from all linguistic resources as they develop their speech away from childhood norms. If age-grading is constrained to stereotyped features for stable variation, it is unlikely that apparent-time peaks in non-stereotyped vocalic variables are the result of age-graded practices. This provides a strong base model of group stability for stable vocalic variables that provides context for apparent-time studies that explore variables undergoing change.

This observation presents a conundrum, however. While sounds undergoing change are often considered salient (Trudgill 1986), changes from below the level of awareness are by definition not salient. Yet, adolescent peaks have been found for changes from below the level of consciousness (Labov 2001). If non-salient stable features do not undergo age-grading, then what is the relationship between life-stage change and changes from below the level of awareness? Could this process be distinct from adolescent identity work? What would set it apart? And what might be the mechanisms that push sound changes forward if this process is not a reflection of adolescent identity work?

7.2. Ethnolectal vowel variation in context

Despite recent research into AAE vocalic variation, the social correlates of participation in the AAVS and its relationship to community demographics has been underexplored. As discussed in Chapter 3, the distribution of this system is geographically widespread, but participation in the system is selective both within and across communities (Andres & Votta 2006; Durian et al. 2010; Koops & Niedzielski 2009, 2011; Purnell 2010; Thomas 2001, 2007). The Piedmont region of North Carolina is host to a rapidly changing PRV and an AAVS system that has shown remarkable stability in the face of such change. Consistent with previous studies, vowel systems for African Americans presented in Chapter 3, as well as FPG participants, show variable levels of AAVS features. Previous research suggests that participation in the AAVS may correlate with levels of integration (Deser 1990; Purnell 2010), but this hypothesis has not been directly tested through the comparison of communities in similar dialect regions that differ on segregation indices.

Evidence presented in Chapter 5 shows strong correlations between school demographics, city demographics, and participation in the AAVS. Participants who attend predominantly African American schools are more likely to have raised front lax vowels. This correlation subsequently emerges as significant in community differences between Chapel Hill and Durham, North Carolina. Participants from Chapel Hill, North Carolina, a predominantly European American town, have front lax vowels that are lower than participants from Durham, North Carolina, a city with a large, long-standing African American community. This finding supports Yaeger-Dror and Thomas's (2010: 8) hypothesis that a lack of integration inhibits accommodation in either direction across ethnolects. Such social conditions can lead to the preservation of AAVS features in predominantly African American communities.

These results illustrate the utility of comparing adjacent communities with different demographic profiles to consider the influence of sociogeographic structures in the distribution of sound changes and dialect variation. A consideration of social geography metrics such as community segregation levels and school demographics illustrates the role such structures have on promoting or inhibiting accommodation between PRV and ethnolect vowel systems. Larger sociogeographic structures often constrain the kinds of social networks to which an individual has access. An individual in an ethnically homogenous school will not be as likely to have integrated friendship circles as an individual in an ethnically-diverse school, which will constrain potential participation in PRV sound changes. Fine-grained individual analyses of social network structures complement this broad perspective by providing insight into intra-community variation, but much can be learned about preservation or development of ethnolectal vowel systems through the comparison of communities that have contrastive sociodemographic attributes.

7.3. The complexity of stability

Lack of consistent age-graded patterns does not necessarily reflect a lack of linguistic plasticity. Individuals in this study are highly dynamic. Speakers displayed varied non-monotonic trajectories for vowel variation across each time point, including between 10th grade and post-high school. This raises the question: How do individuals relate to the group in terms of vowel variation over late adolescence and early adulthood? The majority pattern of idiosyncratic variation for vocalic variables across adolescence should motivate future research to reexamine the relationship between individual trajectories of change and community patterns for linguistic variation (Table 1.1). While the AAVS represents a stable vowel system, individual participation in this system is neither cyclical nor stable. This pattern has been observed in longitudinal studies of adult variation as well. Bowie's (2010) analysis of *r*-lessness and /hw/ aspiration illustrated a pattern in which individual change across time was non-monotonic. In addition to age-grading and individual stability, this pattern represents a third model. Flat distributions across apparent time may actually camouflage age-grading, individual stability, or non-cyclical variability.

Patterns of non-monotonic, non-peaking variability can now be added to our understanding of variation across the lifespan. But these patterns raise many questions. How many variables that are stable at the community level show this kind of variation? What is the source of this variability and how do systems that are variable at the individual level maintain community stability? Do fluctuating patterns correspond to sociolinguistic factors such as variation in style? Are these patterns reflective of short-term accommodation? What factors lead to patterns where some individuals show more dramatic fluctuations across time points than others? These questions require further investigation both through experimental design and dense longitudinal analyses, and again illustrate the importance of considering non-stereotyped stable variation from a sociolinguistic perspective. Dense longitudinal studies where individuals are recorded in several sessions over the course of a few days could illuminate the extent to which non-monotonic variation is a component of stable variation.

7.4. Conclusions and further directions

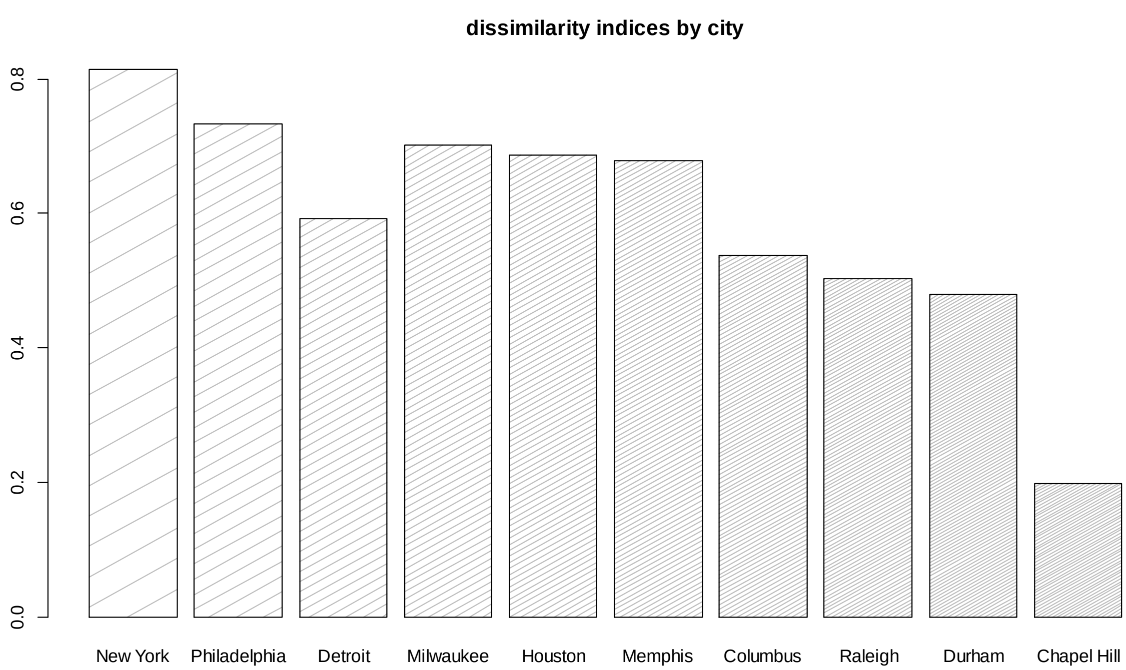
While participation in the AAVS correlates with community demographics, age-grading does not emerge as a significant aggregate pattern. Yet, the idiosyncratic nature of individual trajectories of change deserves further attention. Chapter 5 illustrated a pattern in which individuals in this study who experienced changing school environments corresponding to shifts in demographics did not always display predictable patterns of accommodation to their new environments (5.1). This finding calls for case studies. Do differential patterns in accommodating to new linguistic environments reflect differences in ability to acquire a D2, or is this a reflection of maintenance of a social identity? Individuals in stable demographic environments sometimes displayed large changes in their vowel systems. 1078, who provided metalinguistic commentary on vowel variation and who showed large changes to both vowels and morphosyntactic variables (discussed in Chapter 6) is a prime example. What social or linguistic factors make some individuals more dynamic than others? Interviewer speech may provide clues into whether short-term accommodation is a factor in fluctuating patterns of variation across the lifespan and should be considered as well.

While apparent-time analysis of sociolinguistic variation has proved a valuable tool with which to investigate language variation and change, the growing number of longitudinal studies serves as an important complement and challenge to these endeavors. As linguists learn more about how individuals confront rich linguistic diversity at each age, they can interpret results with appropriate caution and make predictions about how social institutions associated with each age group will promote or inhibit accommodation and change.

APPENDIX 1:

Segregation Indices for Durham and Chapel Hill

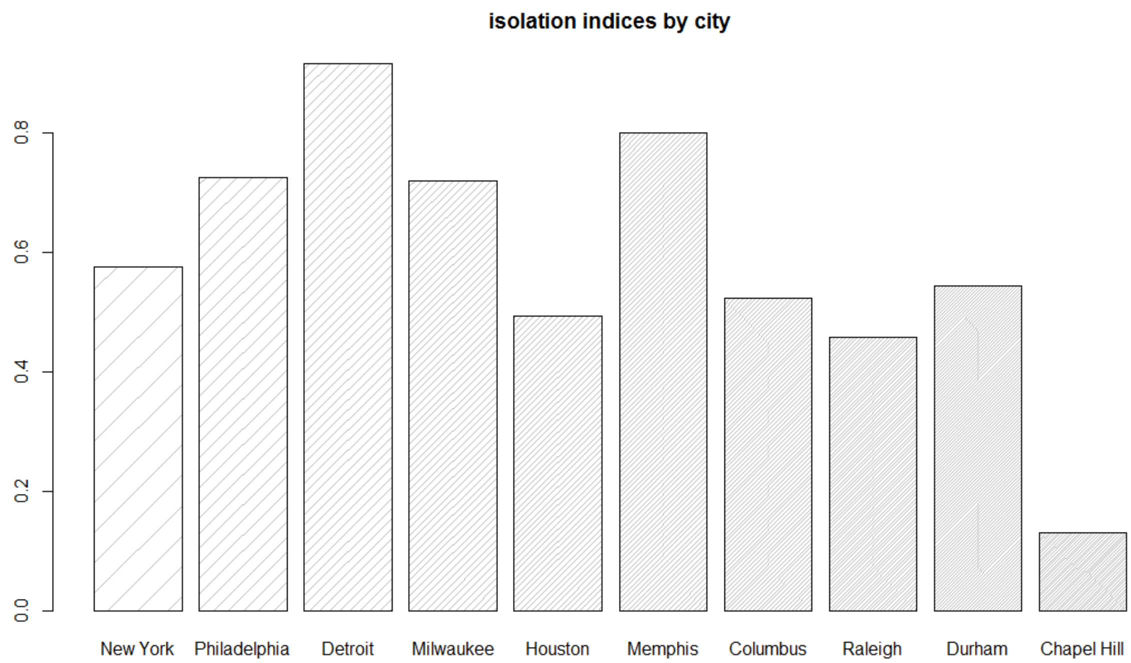
Durham is considered more segregated than Chapel Hill on three indexes of segregation commonly used by geographers (Massey & Denton 1989). These include the dissimilarity index, the isolation index, and the exposure index. The dissimilarity index is a measure of evenness which identifies the proportion of individuals who would need to move to make a population evenly distributed across census tracts. The concept behind this measure is that if every census tract has the same percentages of ethnic groups, segregation is at a minimum. A measure over .60 indicates high levels of segregation, measures between .40 and .60 indicate moderate levels of segregation, and measures below .40 indicate low measures of segregation. Figure 1 compares dissimilarity indices across cities where AAE vowel studies have been conducted.



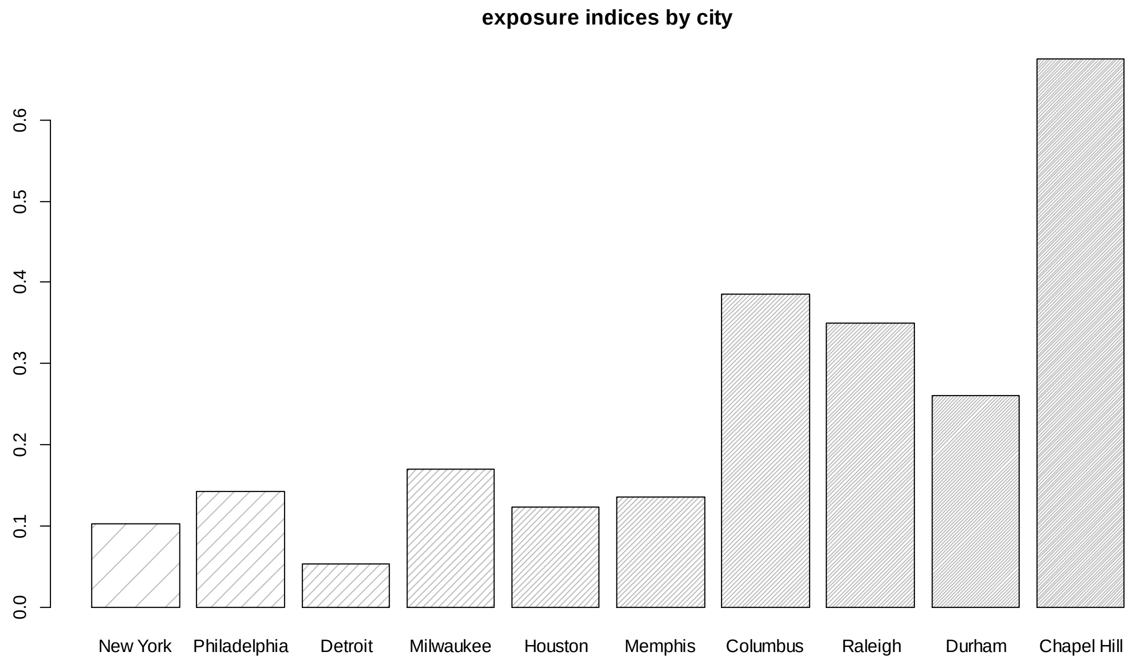
Appendix 1.1: dissimilarity indices for cities where AAE vowels have been studied

In Durham 47.9% of the European American population would need to move to evenly distribute African American and European American populations across census tracts. In Chapel Hill only 19.9% of the European American population would need to move, indicating that the population is more evenly distributed in this town.

Another measure of segregation, the isolation index, is a way to identify "the extent to which minority members are exposed only to one another" (Massey and Denton 1988: 288). Again, higher numbers indicate higher levels of segregation. This measure is .543 for Durham and .131 in Chapel Hill. These scores indicate that African Americans in Durham live in more clustered and concentrated communities when compared to Chapel Hill. The US average for the isolation index is .45. Figure 2 compares isolation indices across cities where AAE vowel studies have been conducted.



Appendix 1.2: Isolation indices for cities where AAE vowels have been studied



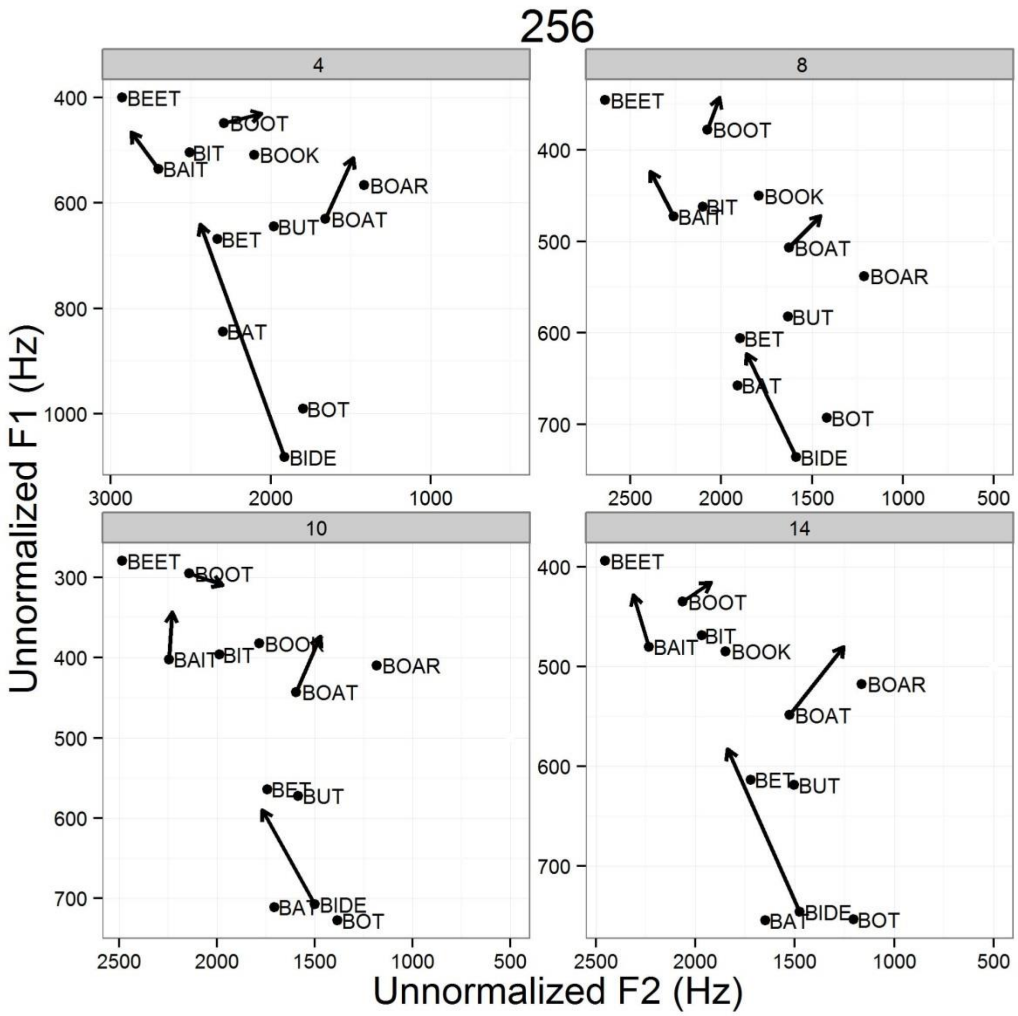
Appendix 1.3: Exposure indices for cities where AAE vowels have been studied

Finally, the exposure index indicates the amount of contact an average individual is likely to experience with other groups in an average tract given the person's ethnicity. Unlike the dissimilarity and isolation index, higher numbers indicate lower levels of segregation. In Durham, the exposure to other groups measure was .26 for black/white exposure. In Chapel Hill the exposure to others was .675 for black/white exposure. The national average for black/white exposure is. 35 (see figure 3 for a comparison of exposure indices for cities where vernacular AAE vowels have been analyzed). Together, these indices indicate that Chapel Hill is a well-integrated community, while Durham has moderate levels of segregation which are less severe than many urban hubs where previous analyses of African American vowels have been conducted.

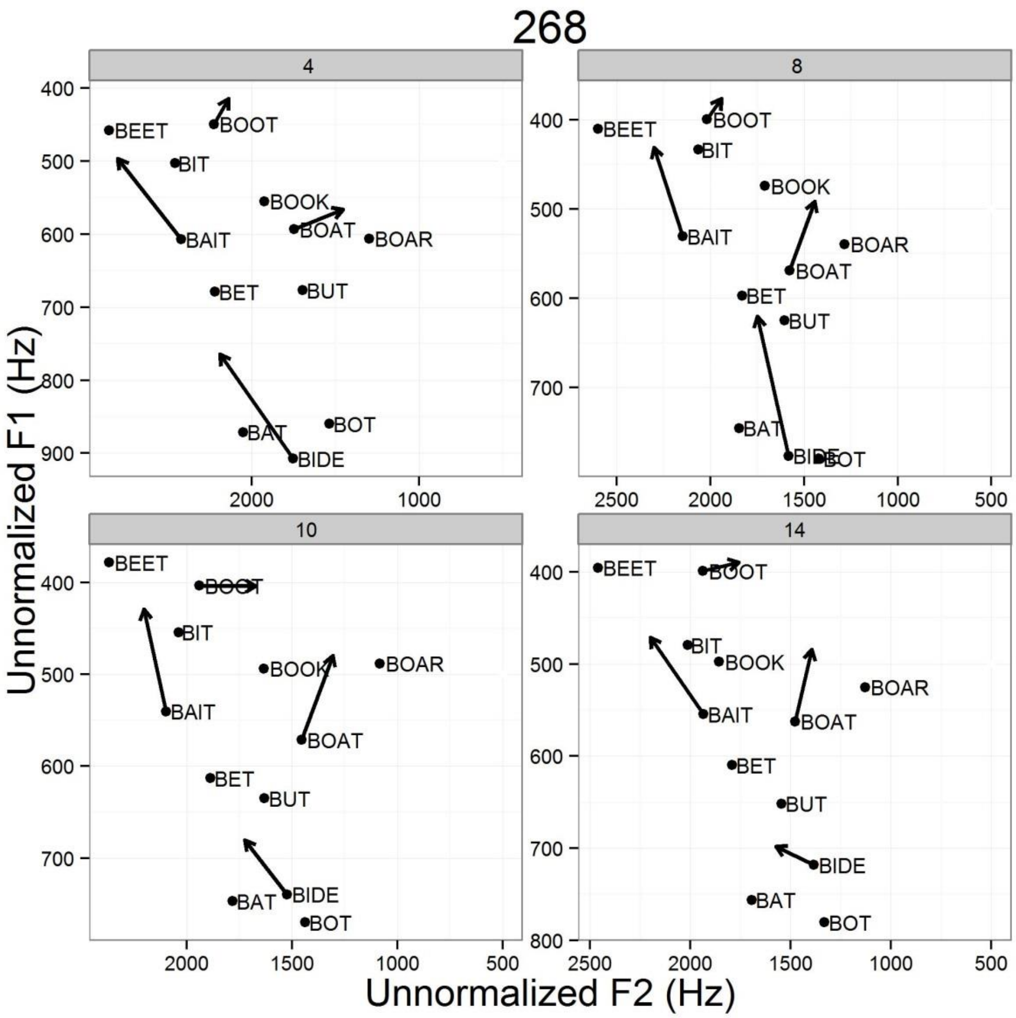
APPENDIX 2:

Individual Vowel Charts

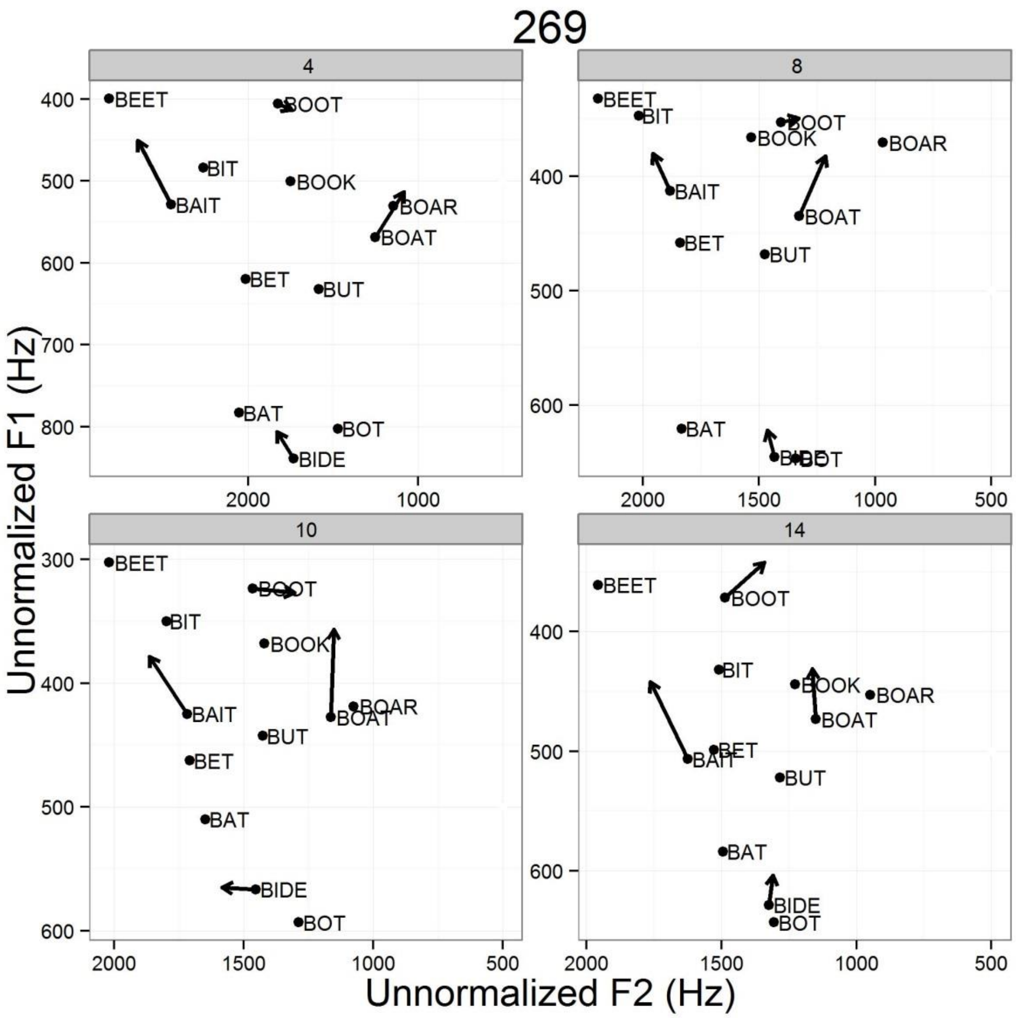
The following vowel charts represent mean unnormalized formant values for four ages.



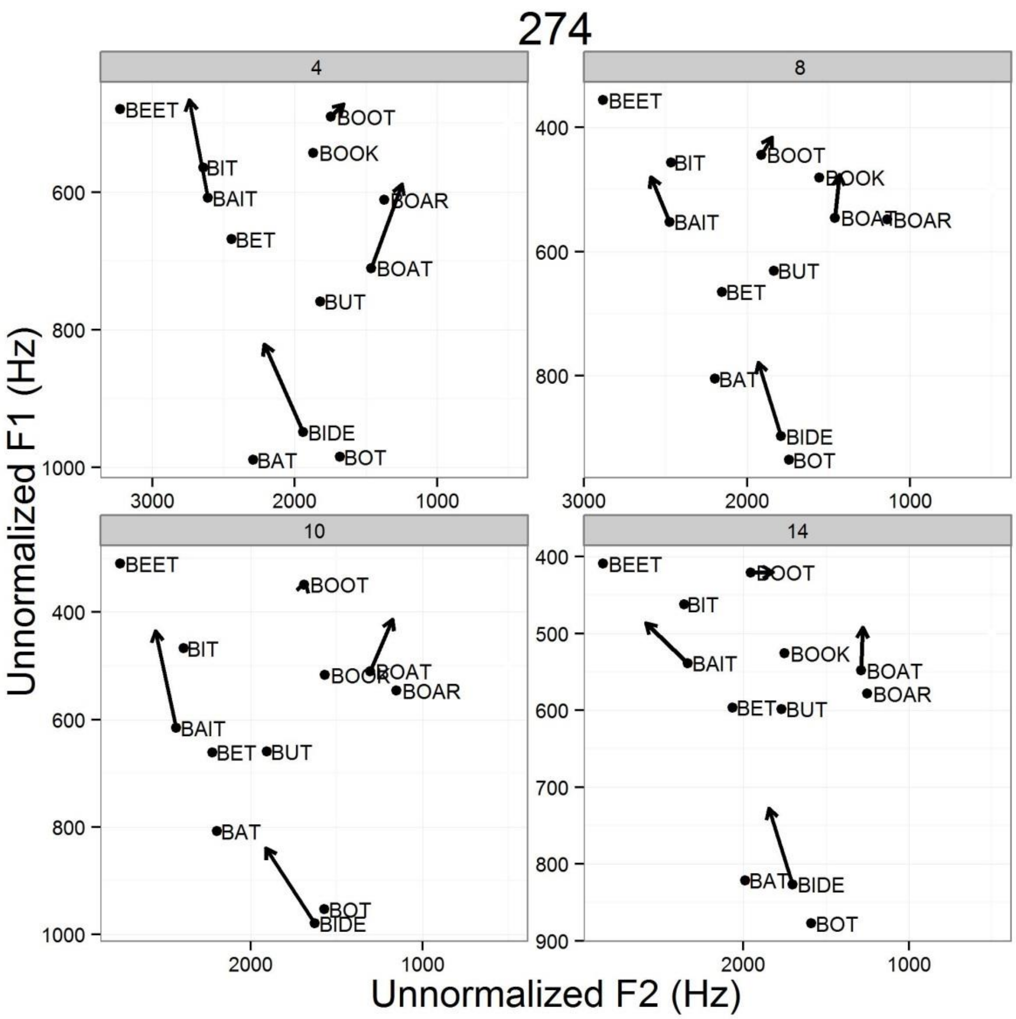
Appendix 2.1: Speaker 256



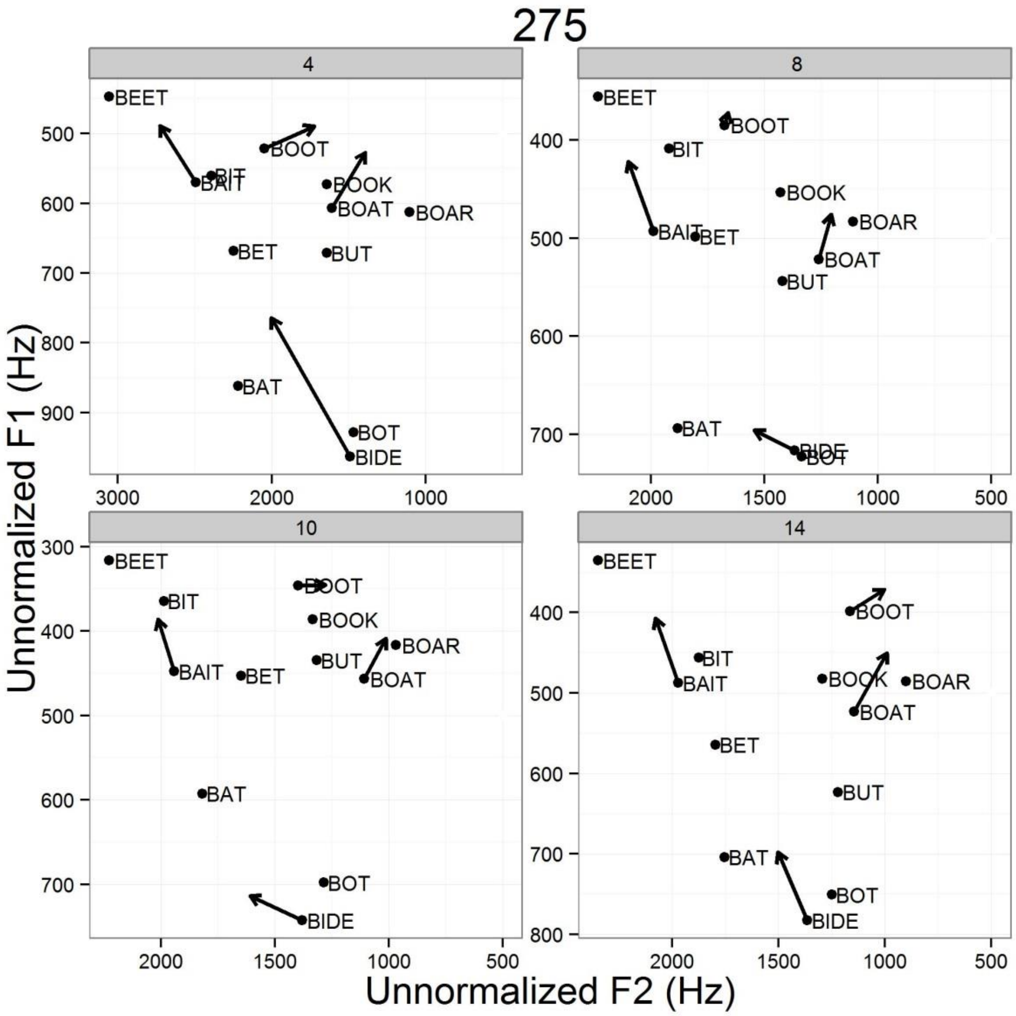
Appendix 2.2: Speaker 268



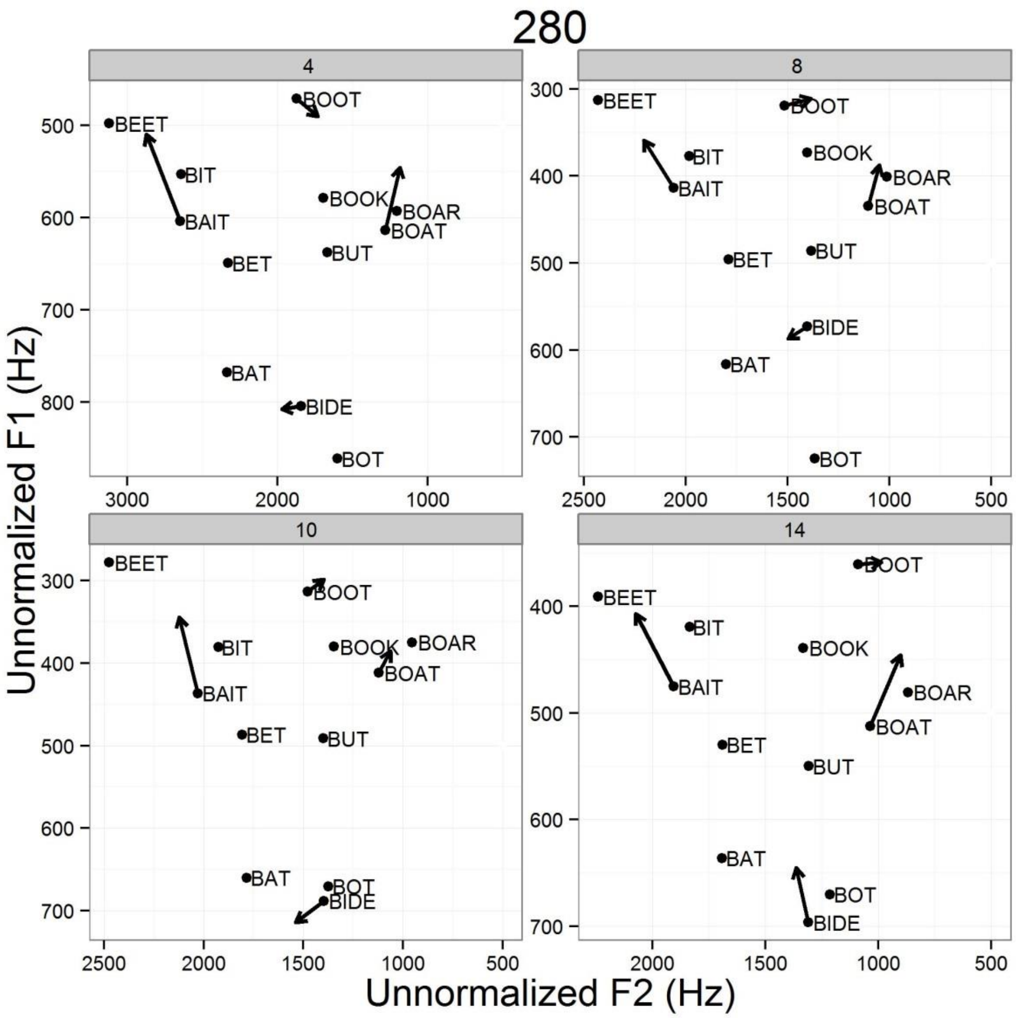
Appendix 2.3: Speaker 269



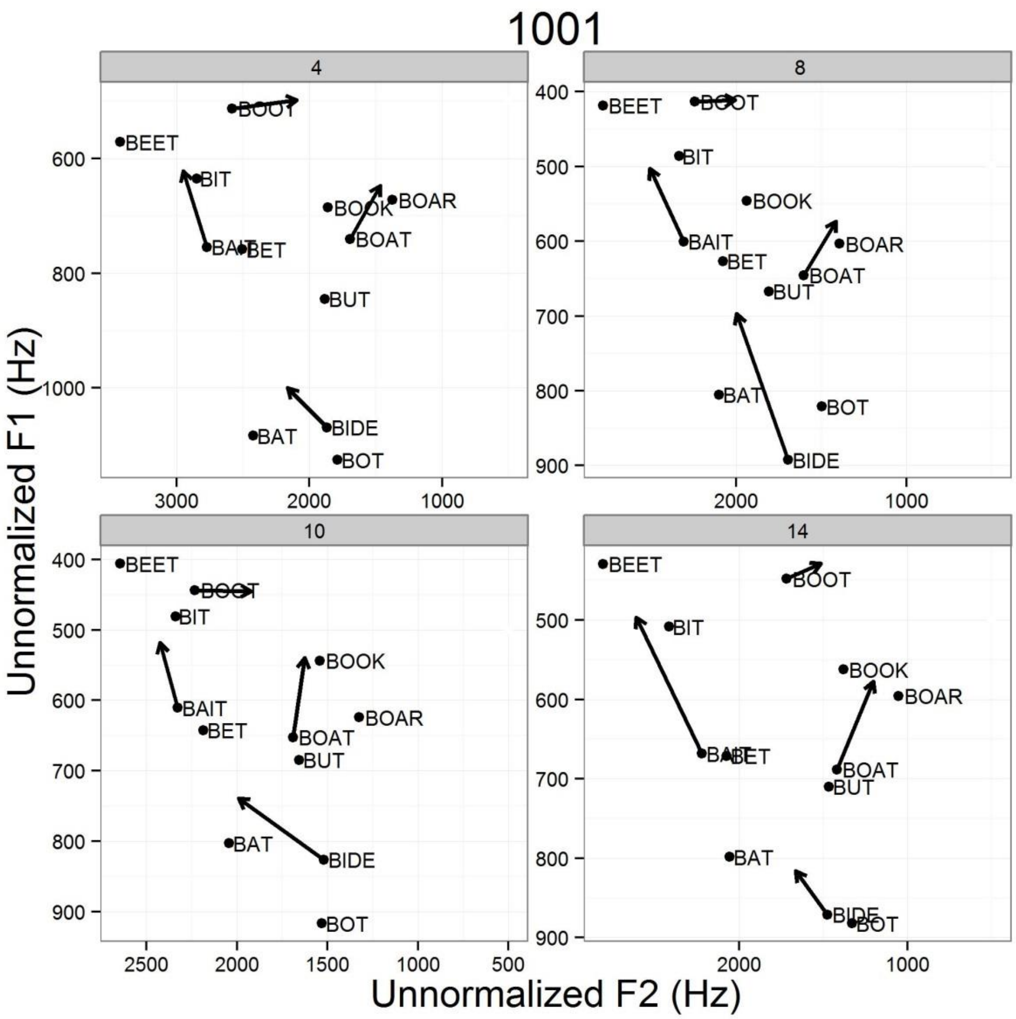
Appendix 2.4: Speaker 274



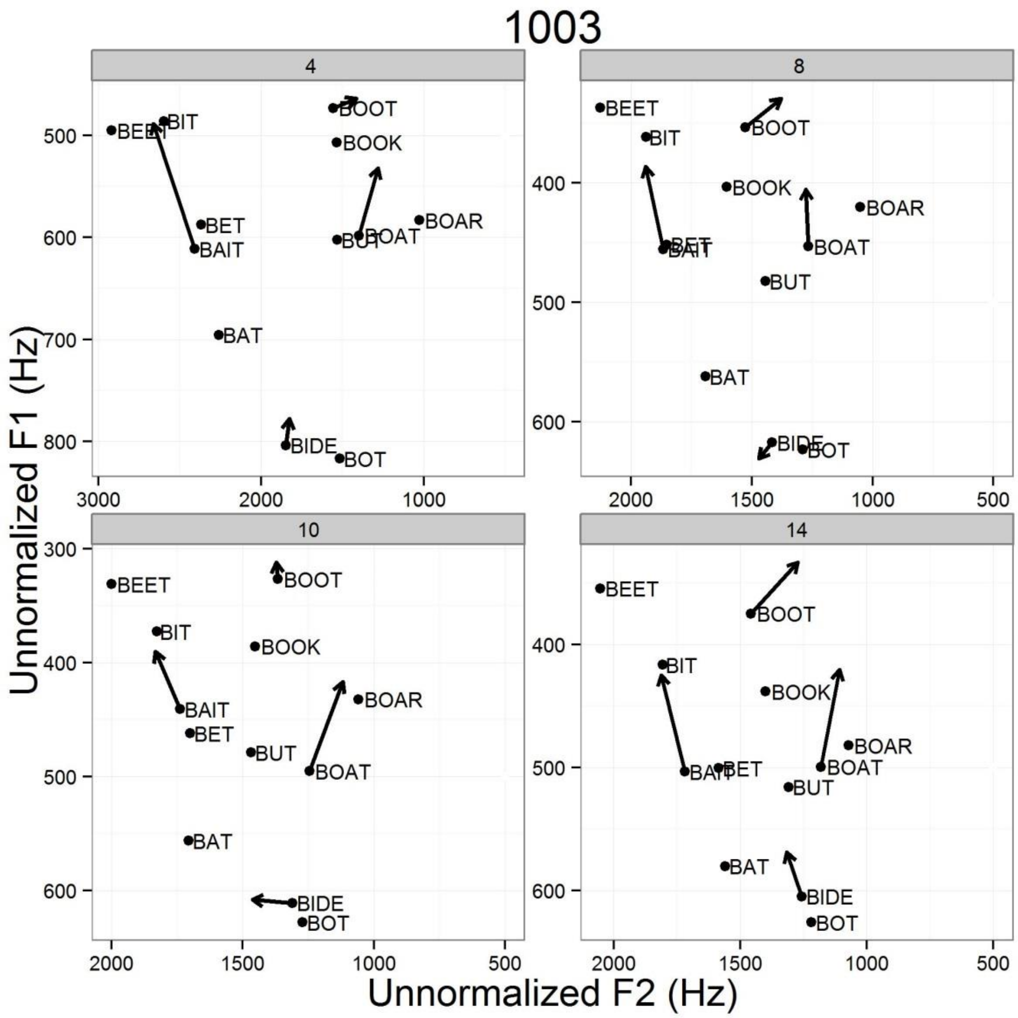
Appendix 2.5: Speaker 275



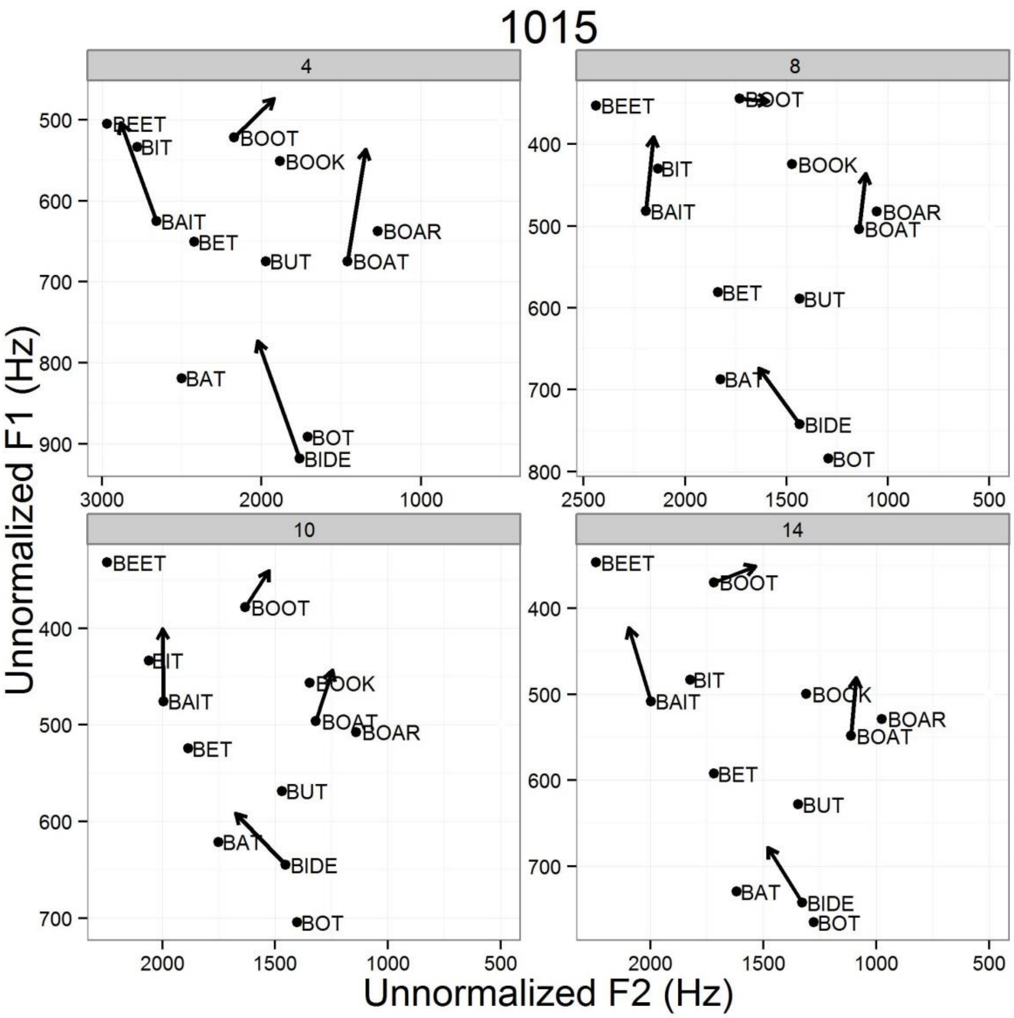
Appendix 2.6: Speaker 280



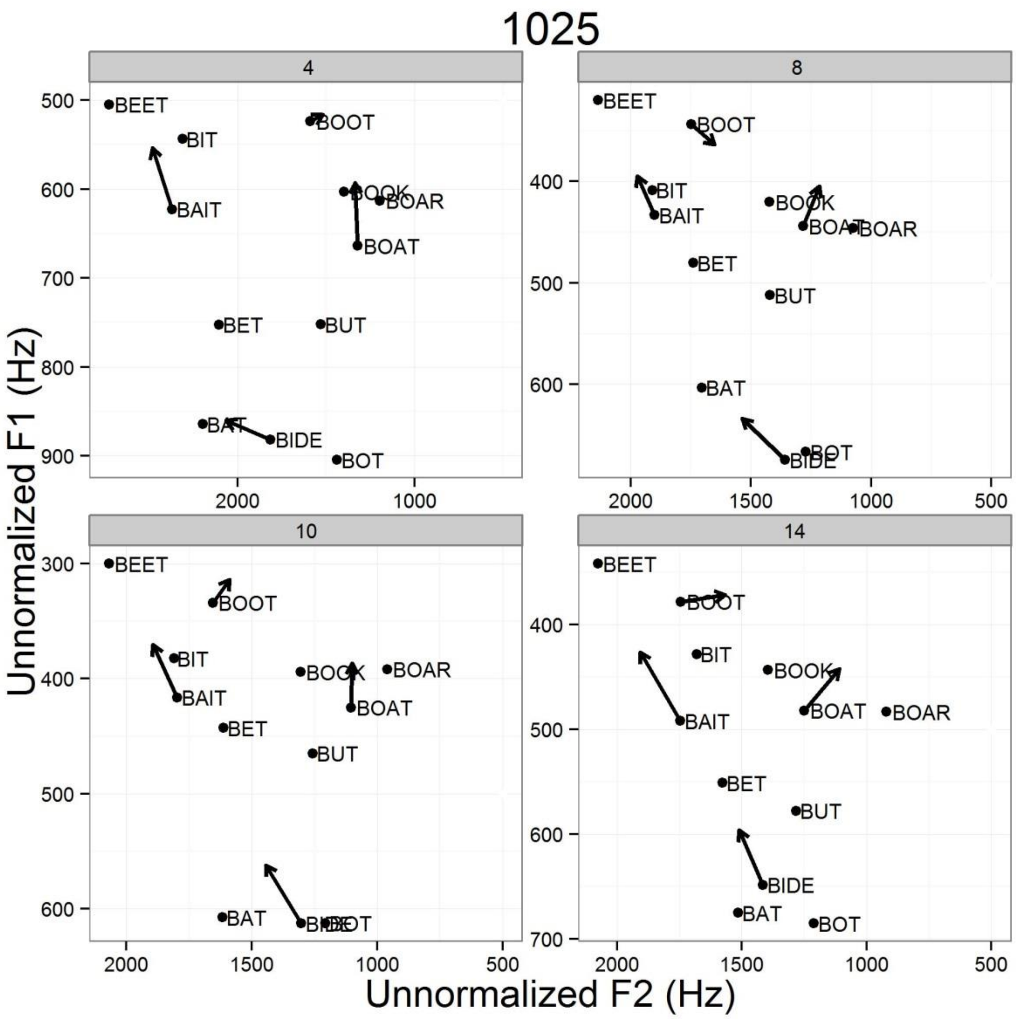
Appendix 2.7: Speaker 1001



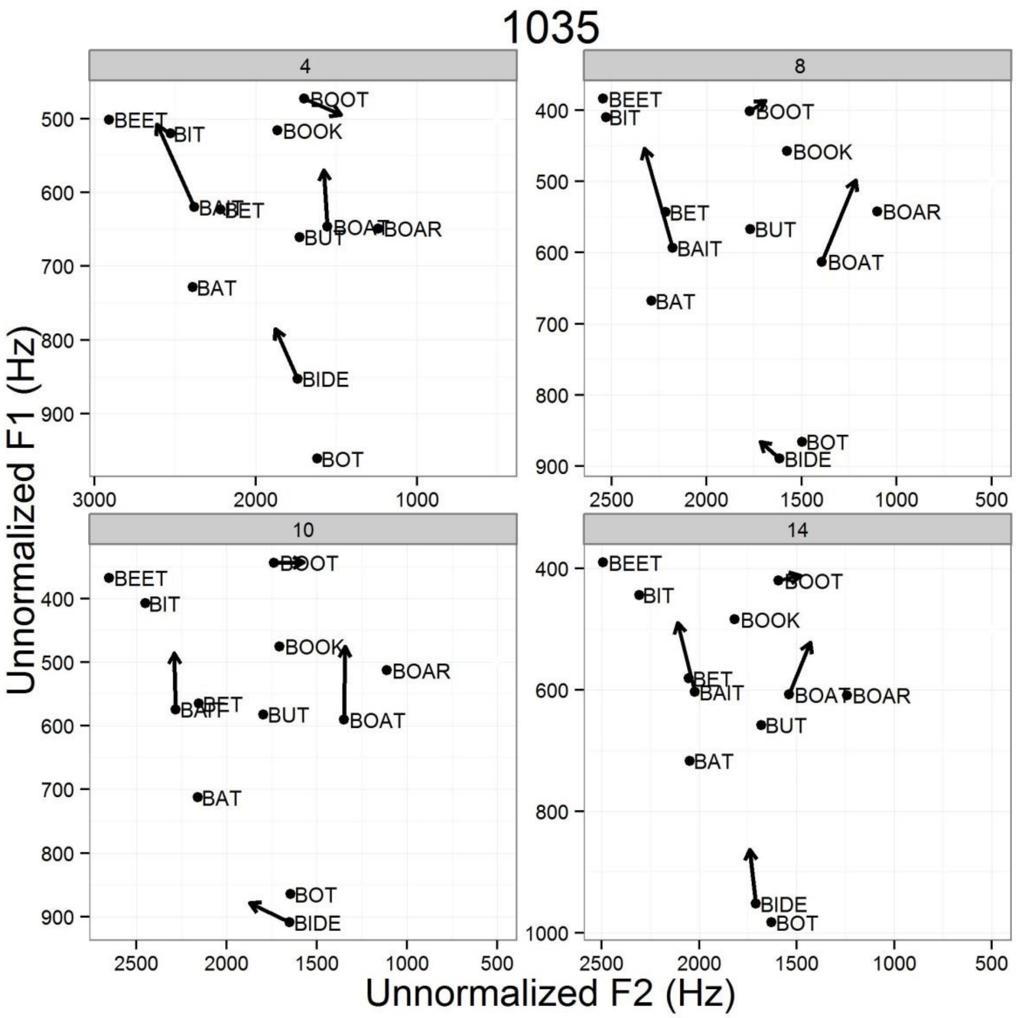
Appendix 2.8: Speaker 1003



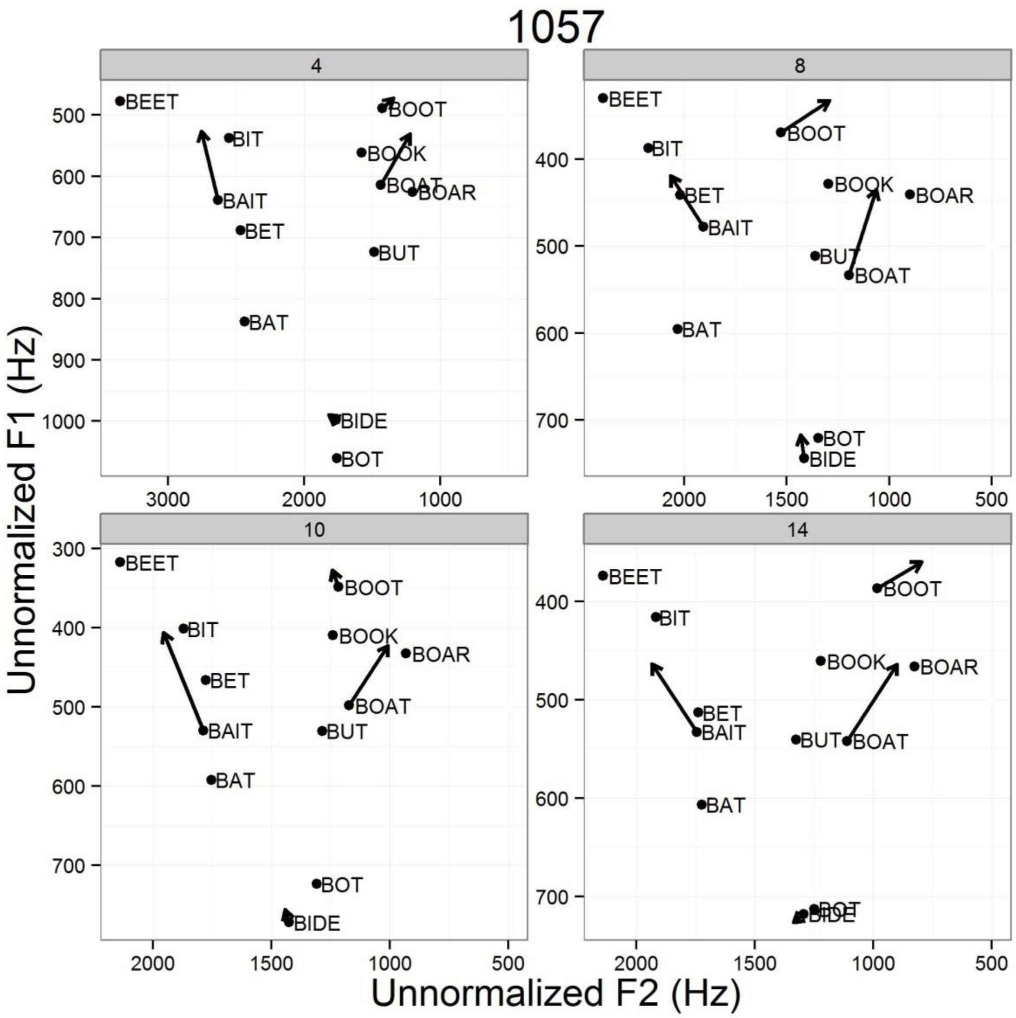
Appendix 2.9: Speaker 1015



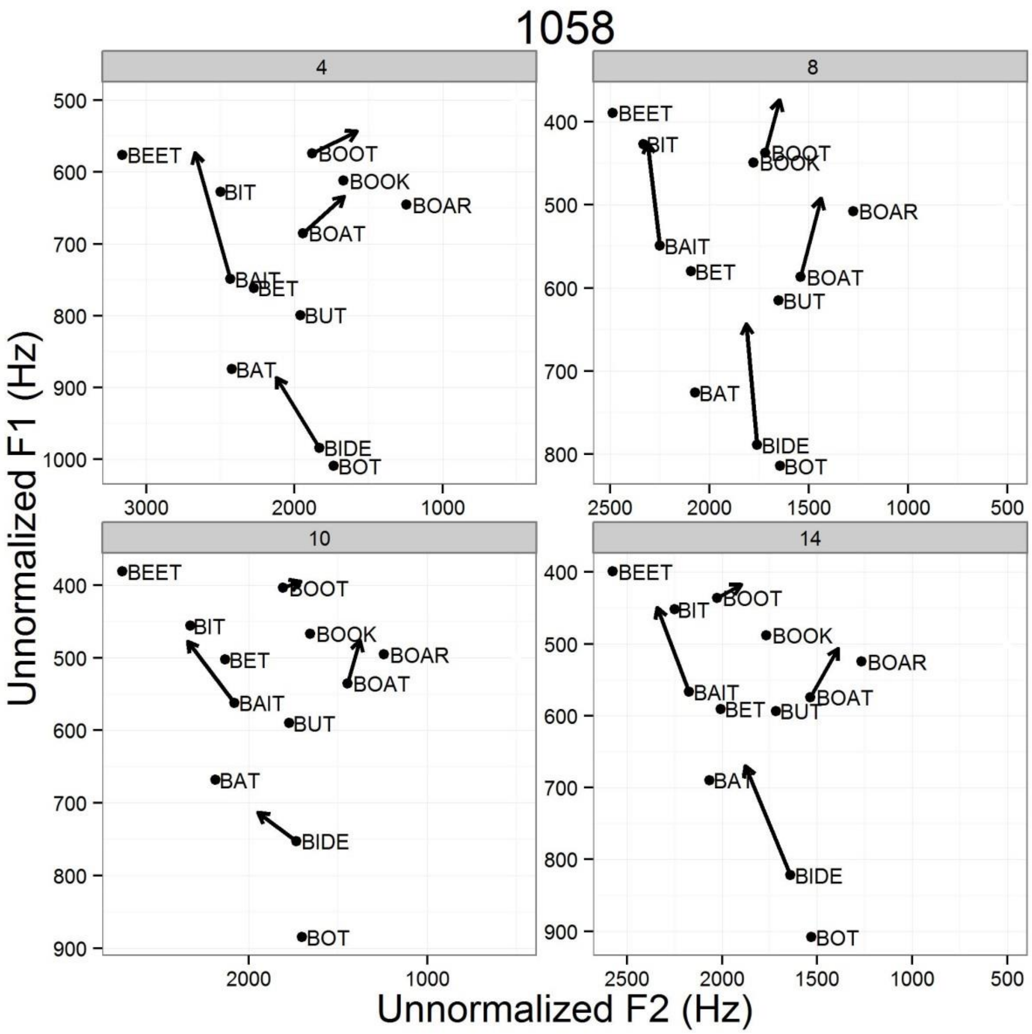
Appendix 2.10: Speaker 1025



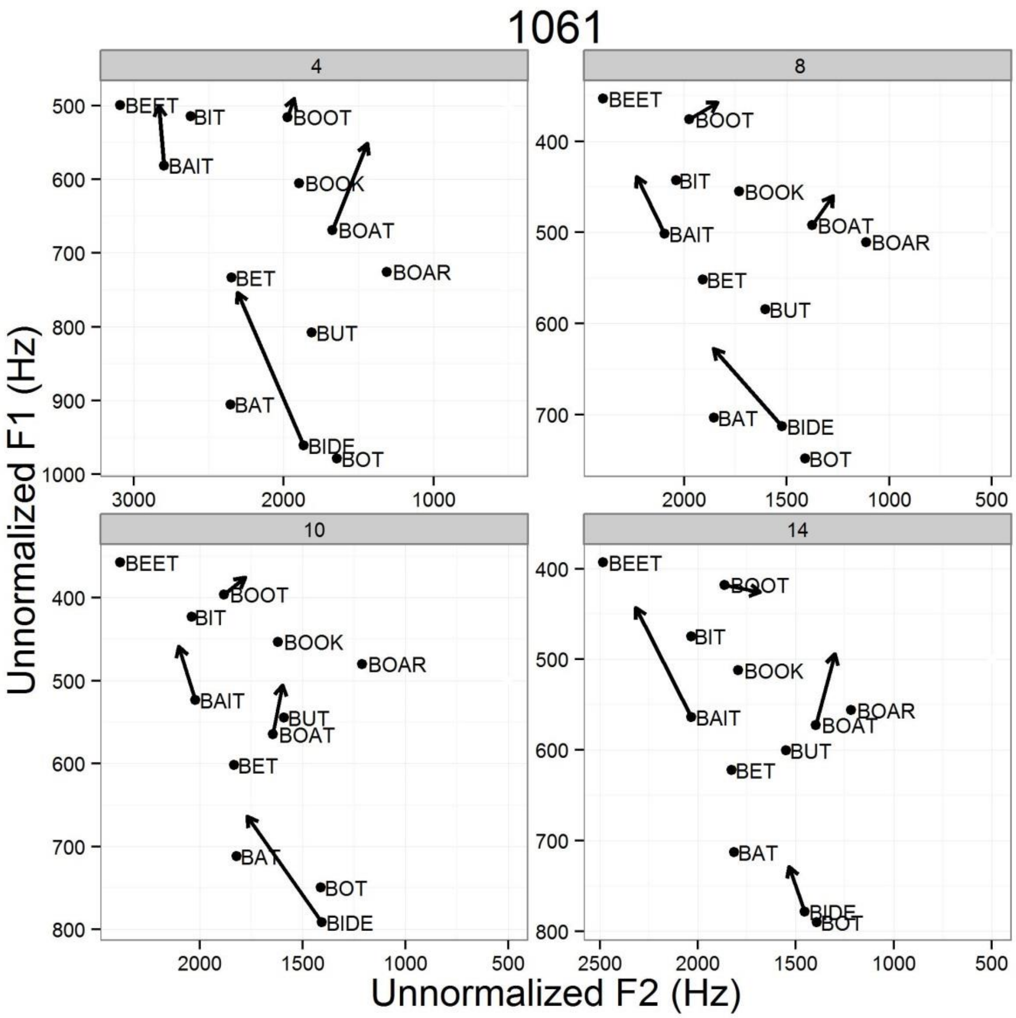
Appendix 2.11: Speaker 1035



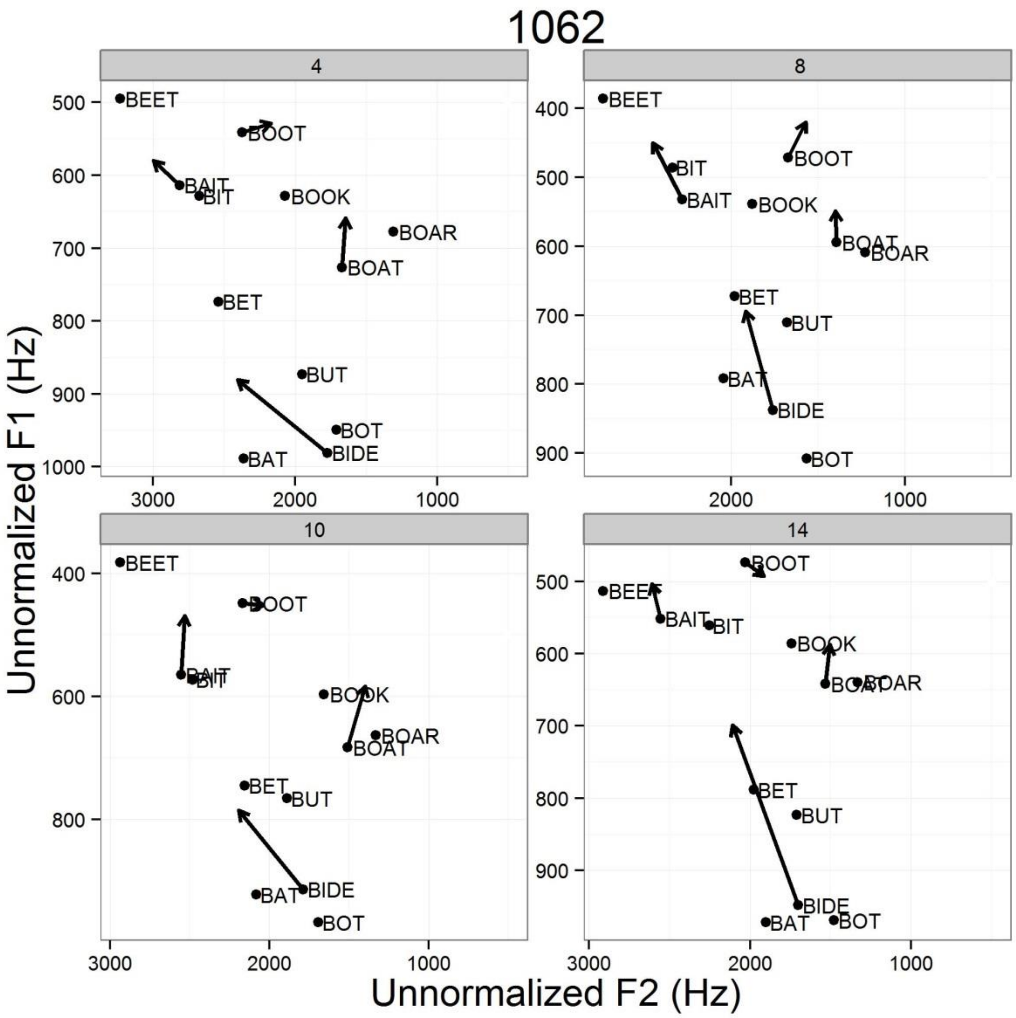
Appendix 2.12: Speaker 1057



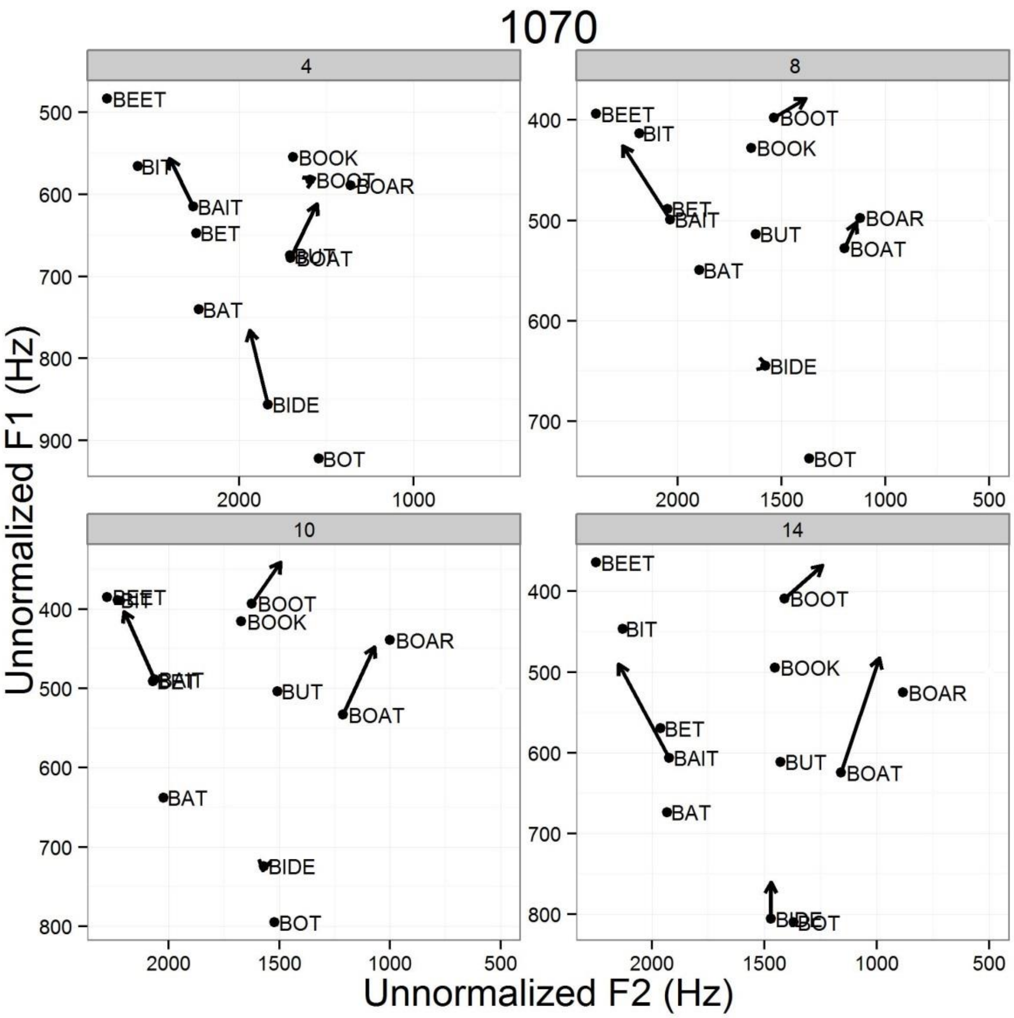
Appendix 2.13: Speaker 1058



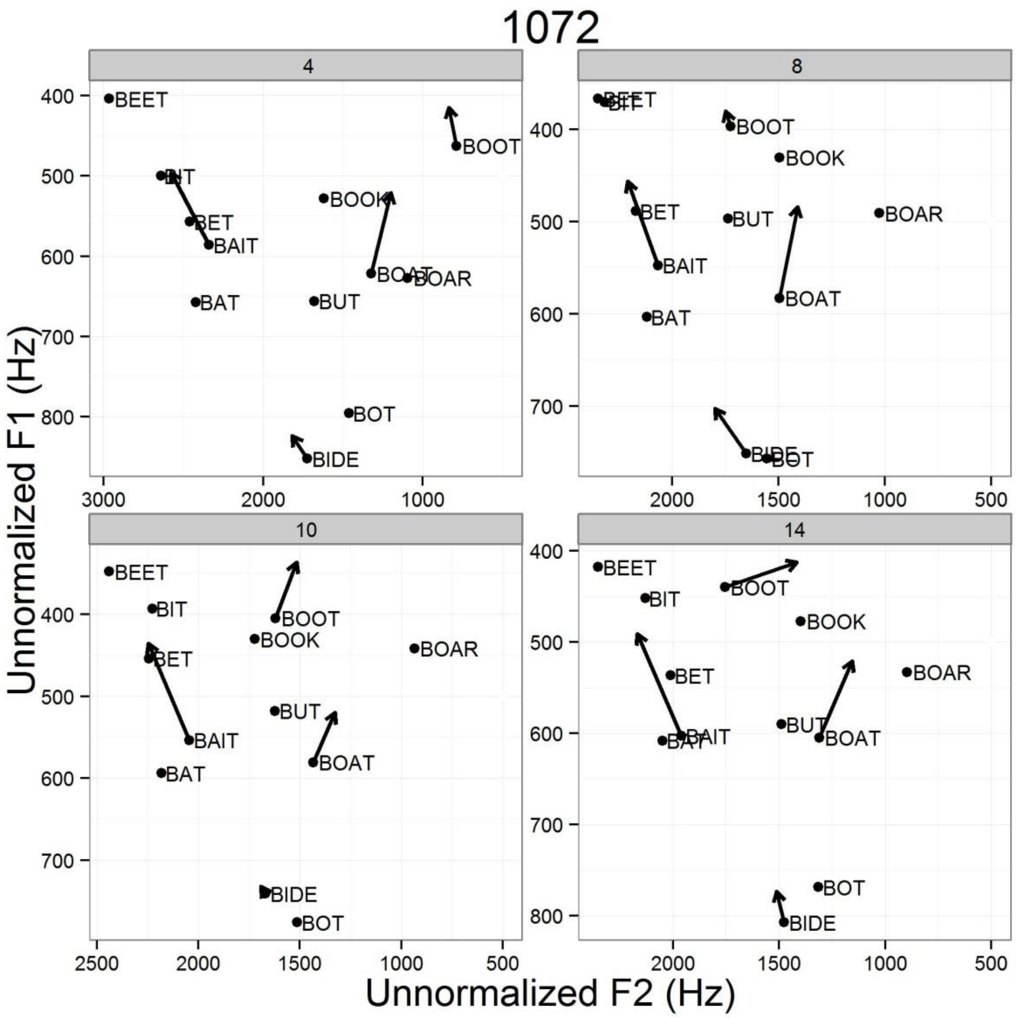
Appendix 2.14: Speaker 1061



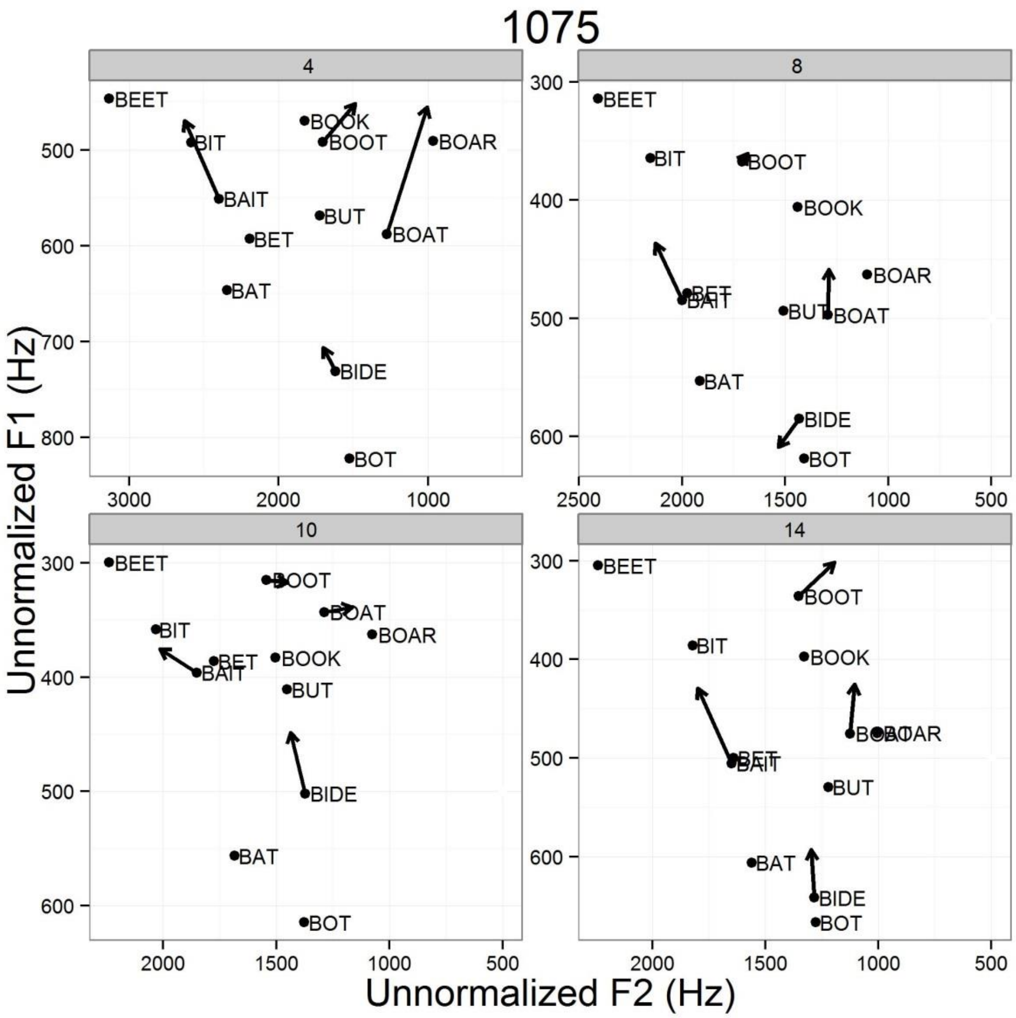
Appendix 2.15: Speaker 1062



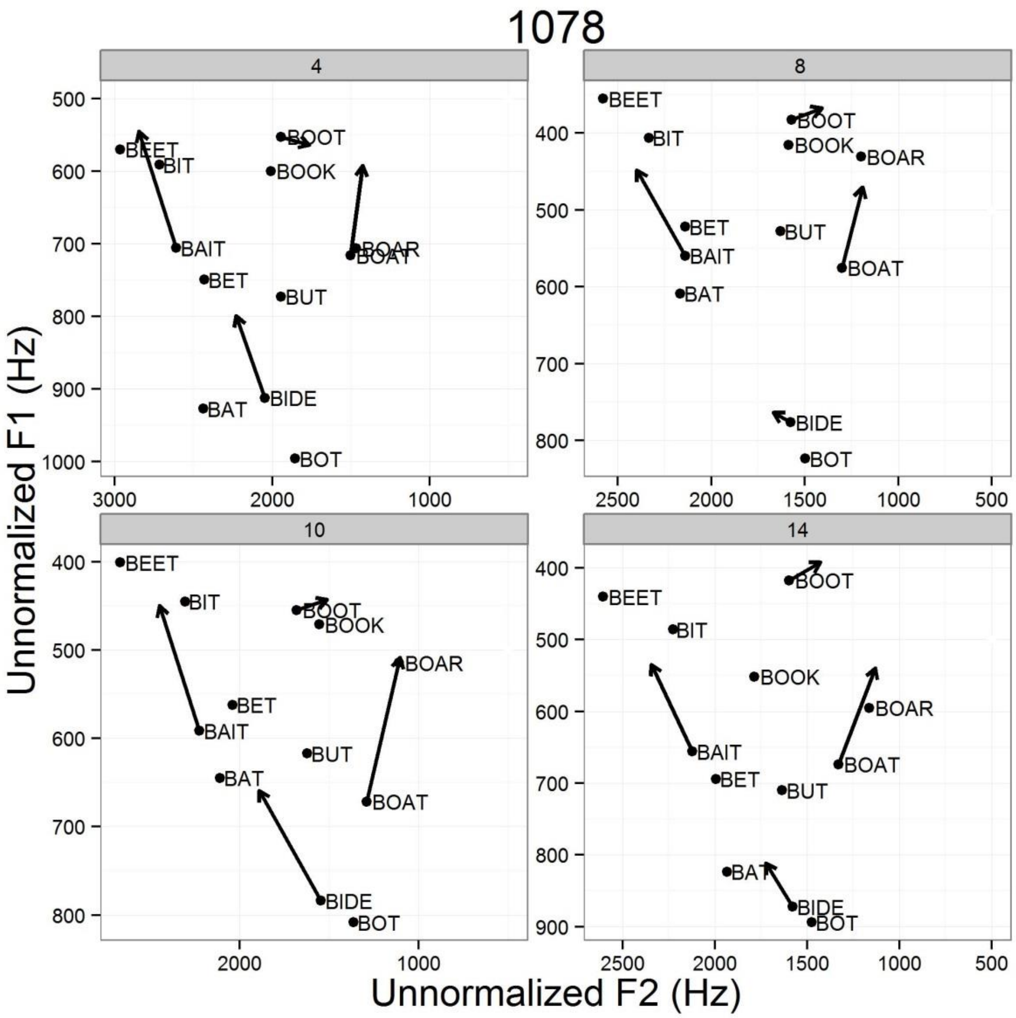
Appendix 2.16: Speaker 1070



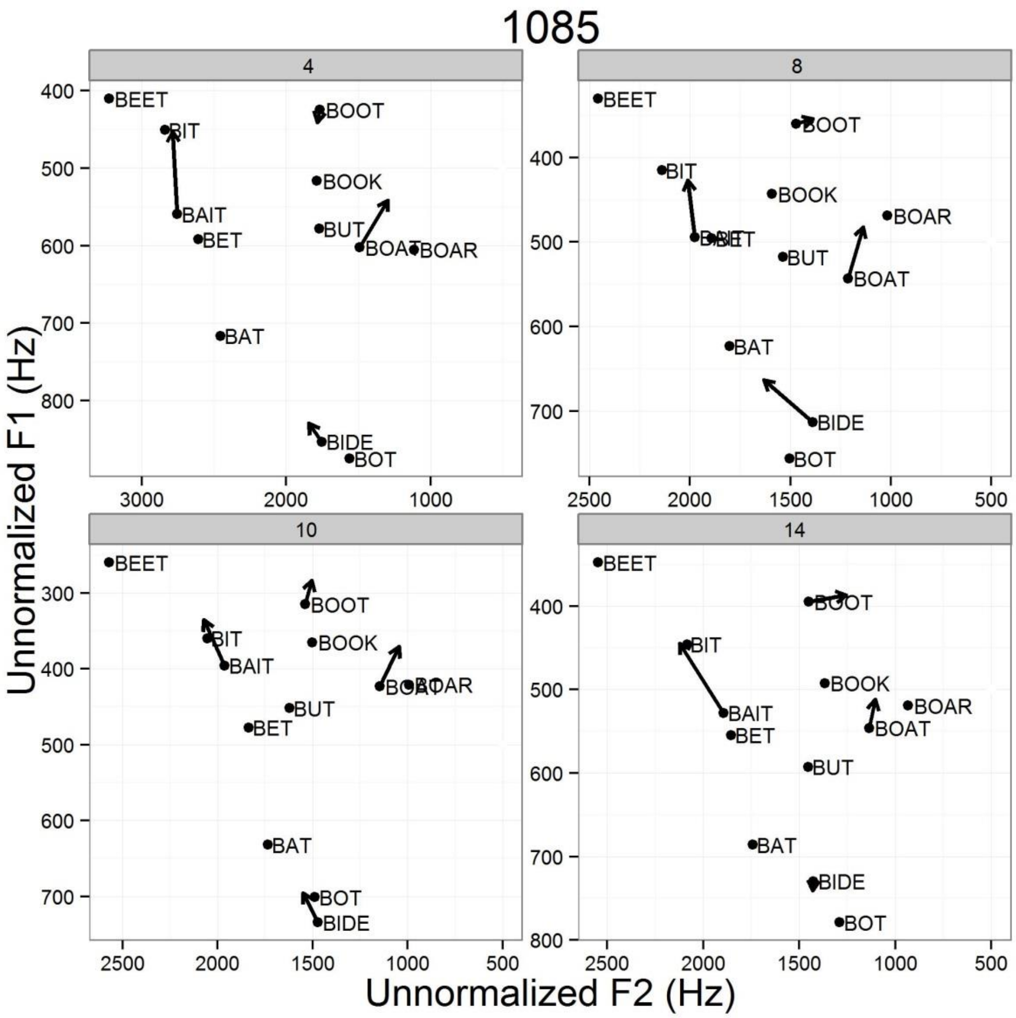
Appendix 2.17: Speaker 1072



Appendix 2.18: Speaker 1075



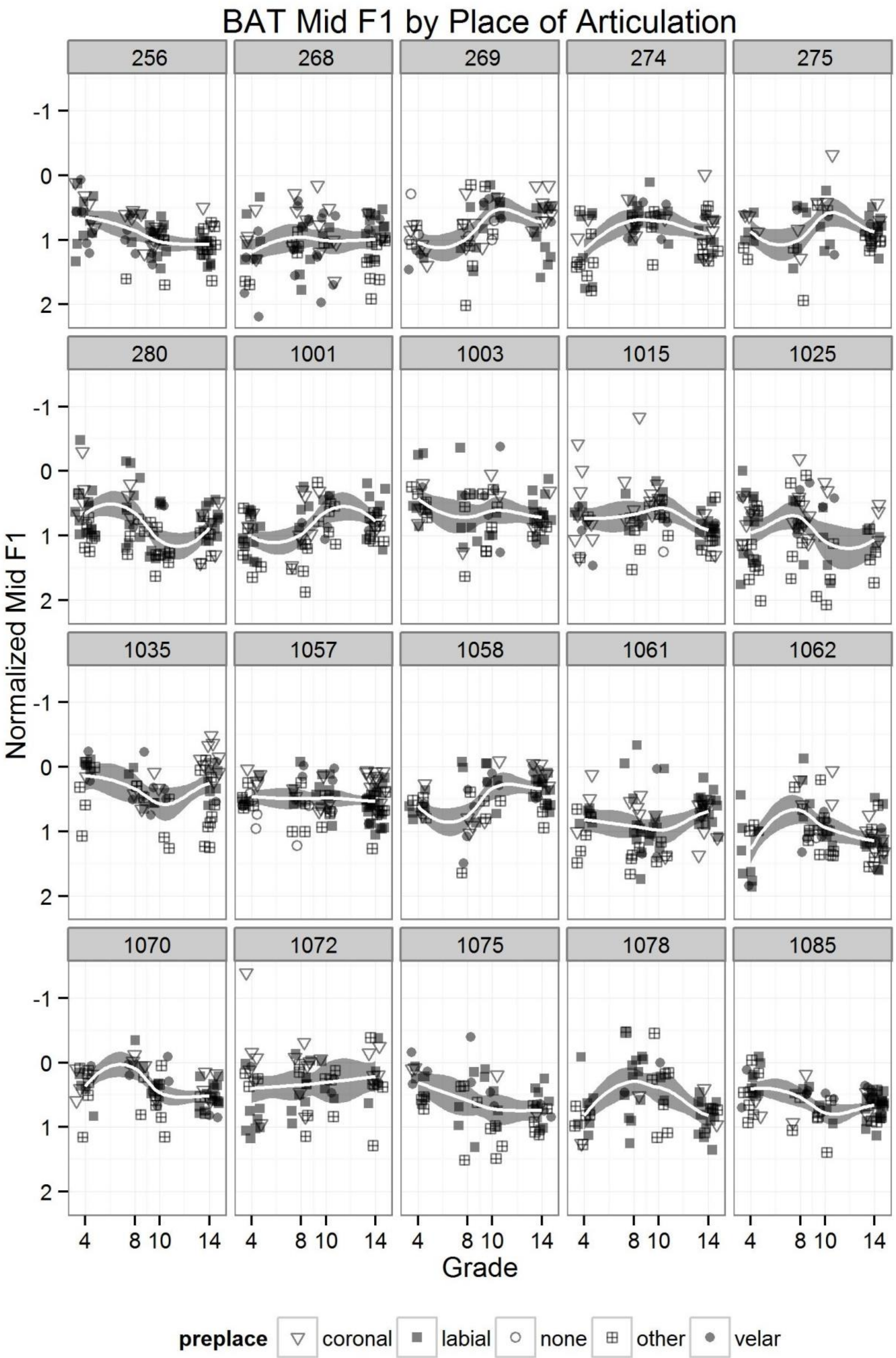
Appendix 2.19: Speaker 1078



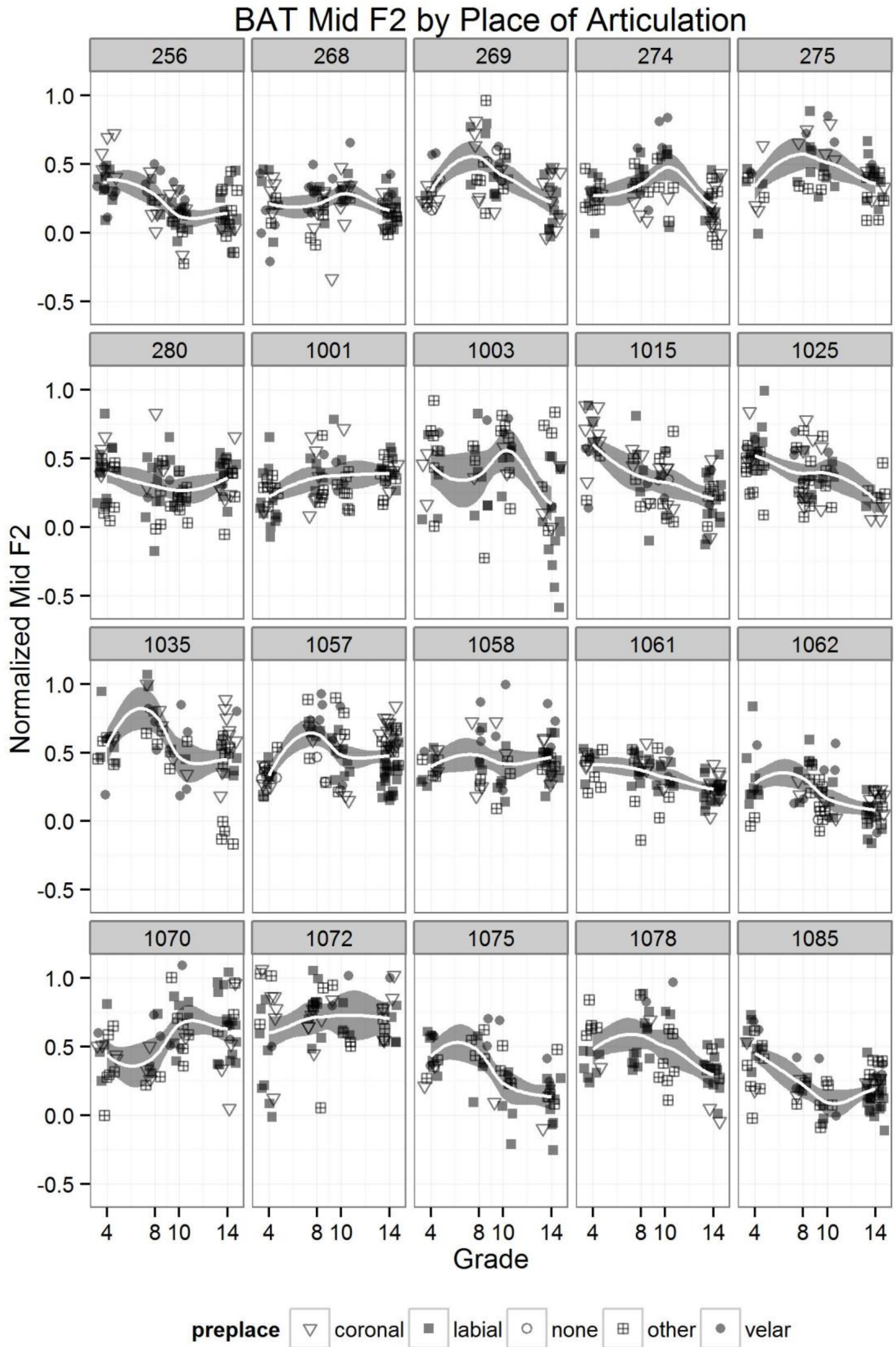
Appendix 2.20: Speaker 1085

APPENDIX 3

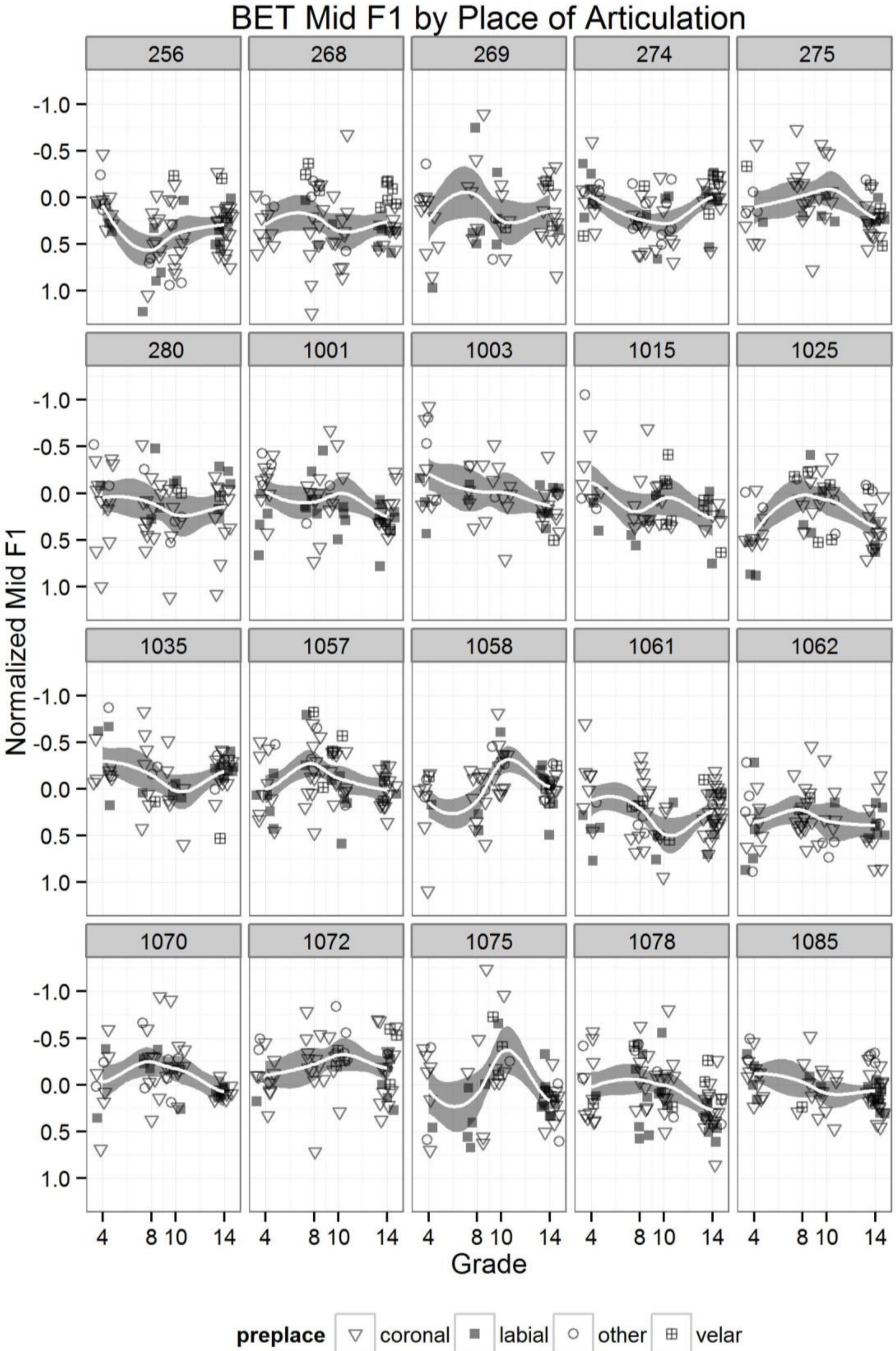
Normalized Vowel Trajectories



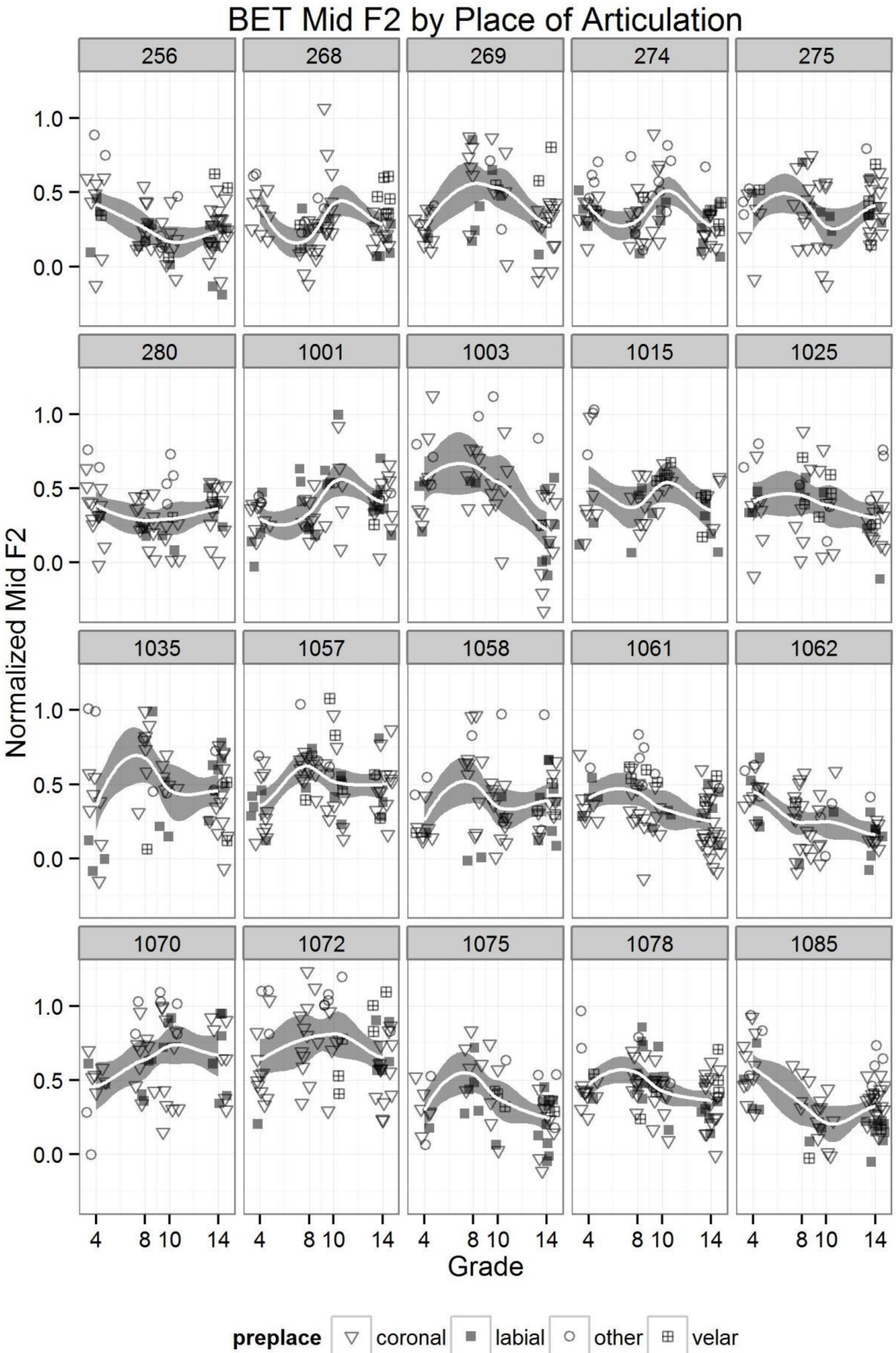
Appendix 3.1: Normalized BAT F_1 trajectories



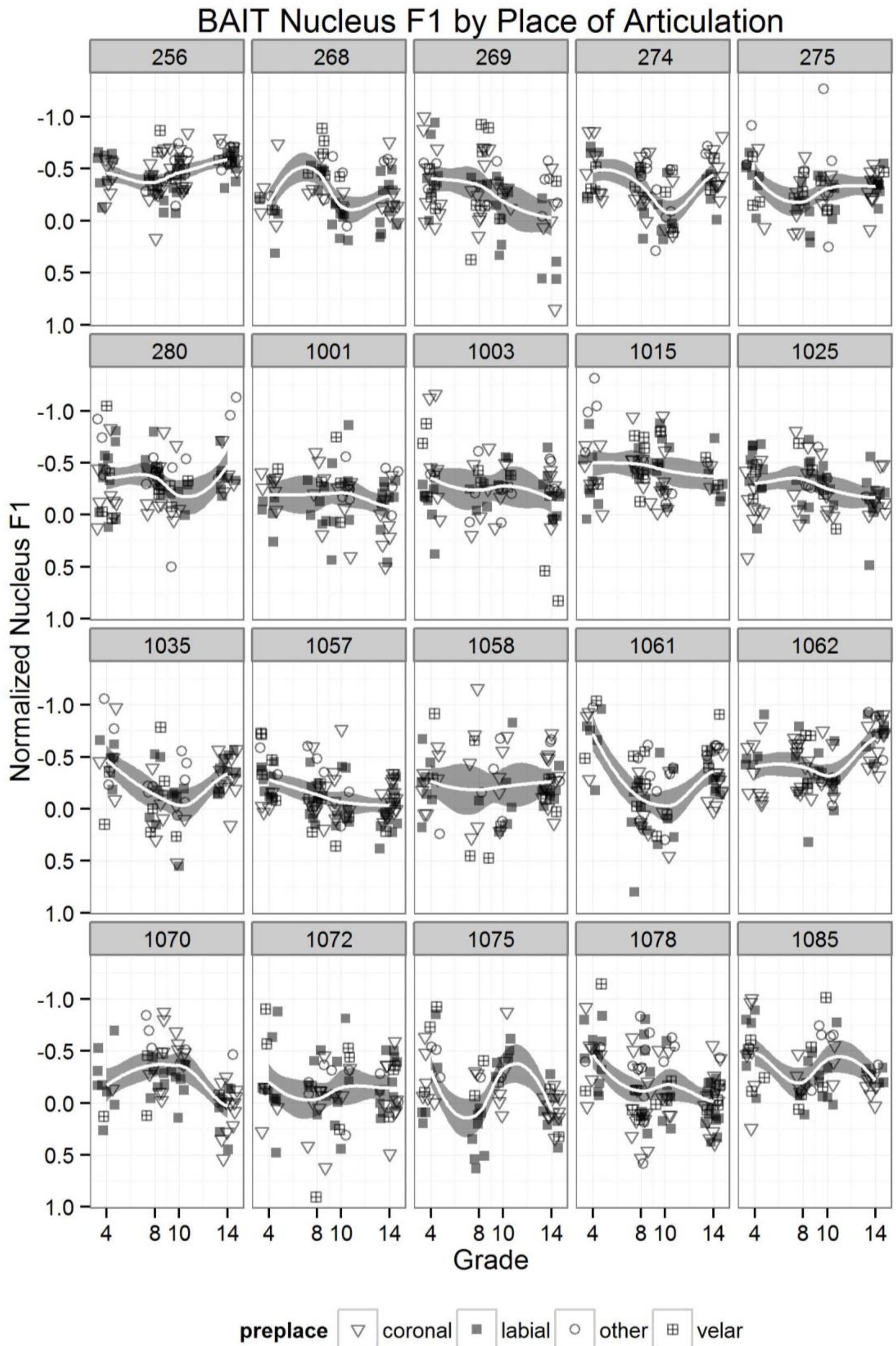
Appendix 3.2: Normalized BAT F_2 trajectories



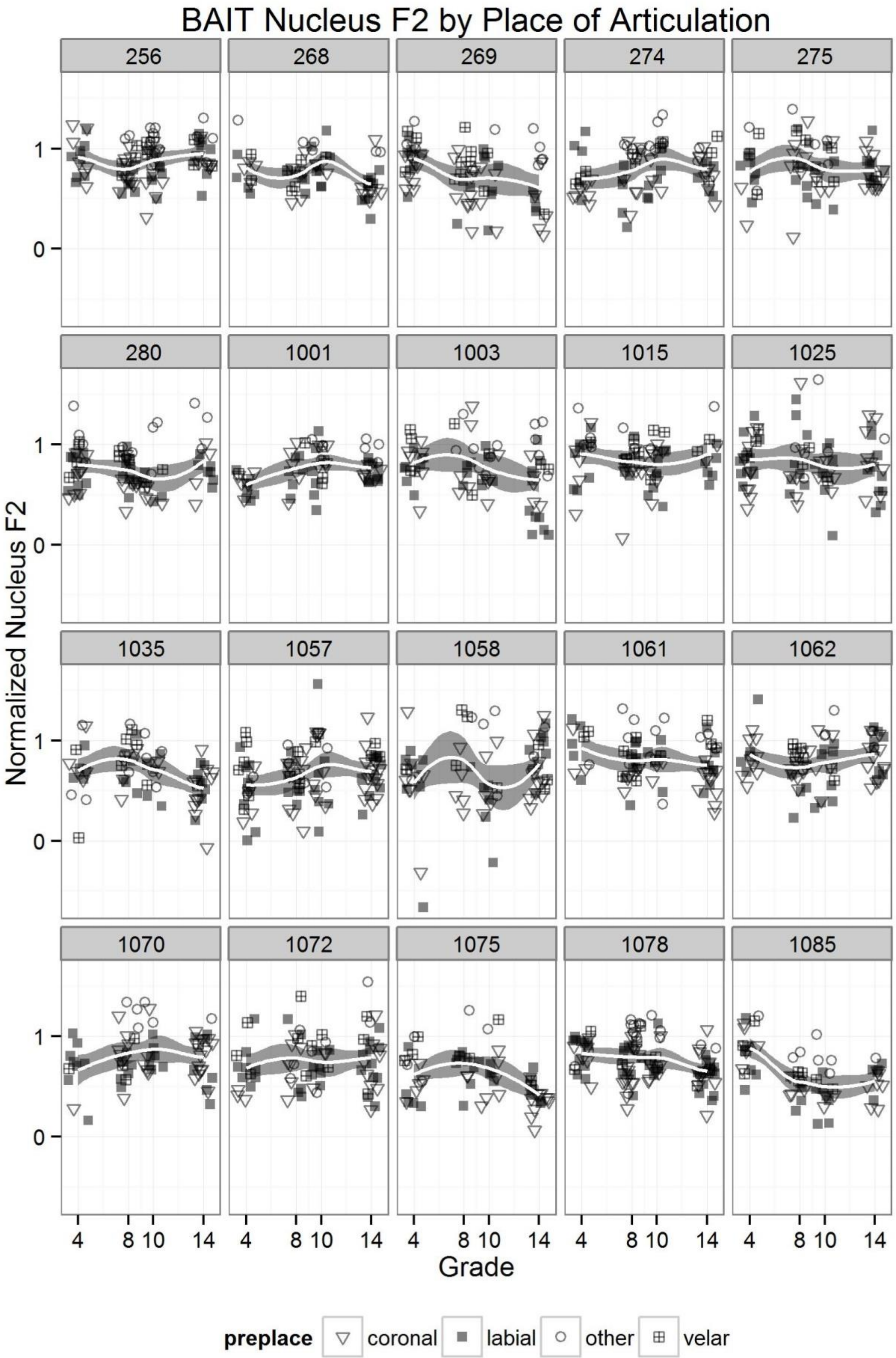
Appendix 3.3: Normalized BET F_1 trajectories



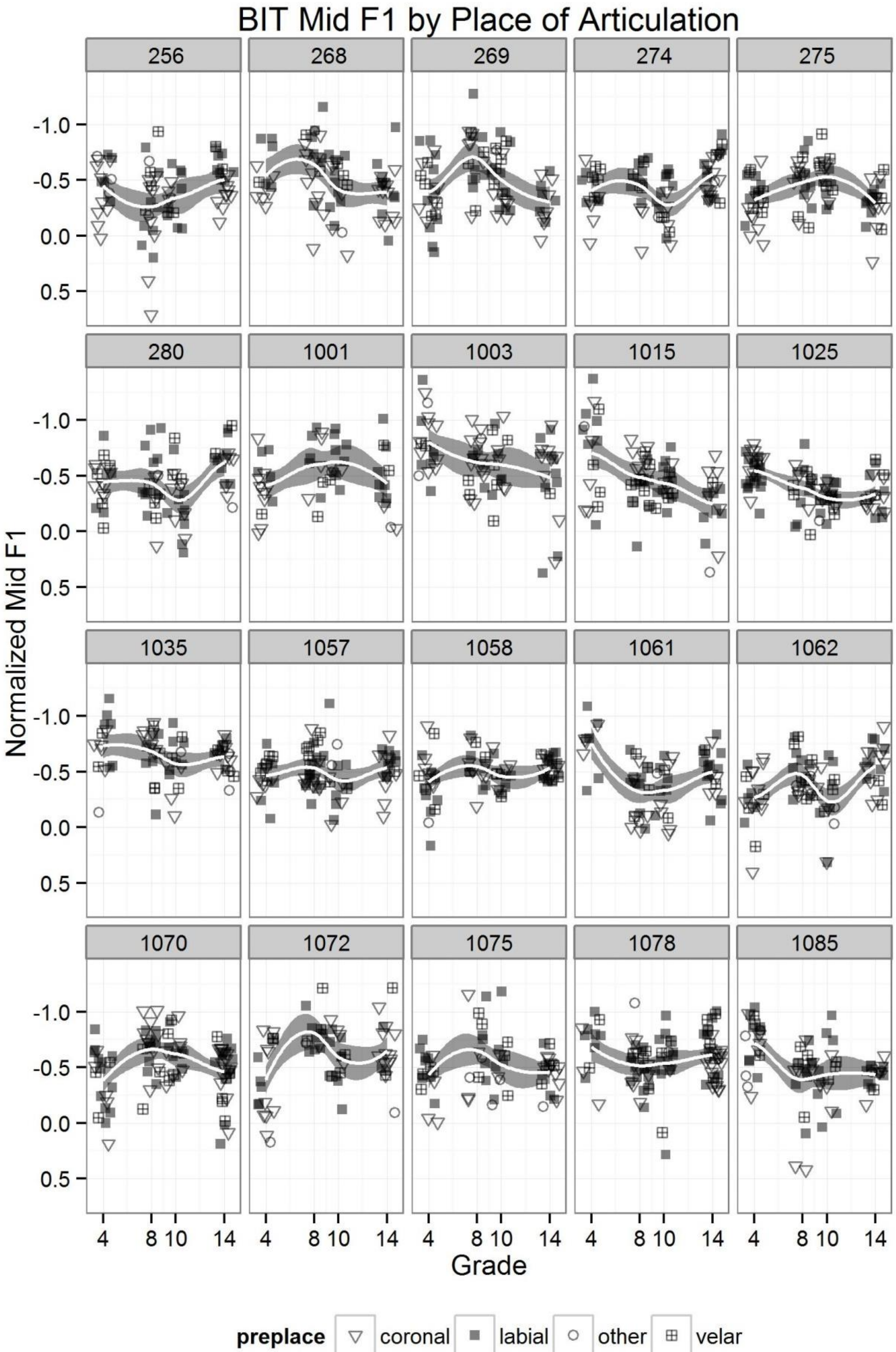
Appendix 3.4: Normalized BET F_2 trajectories



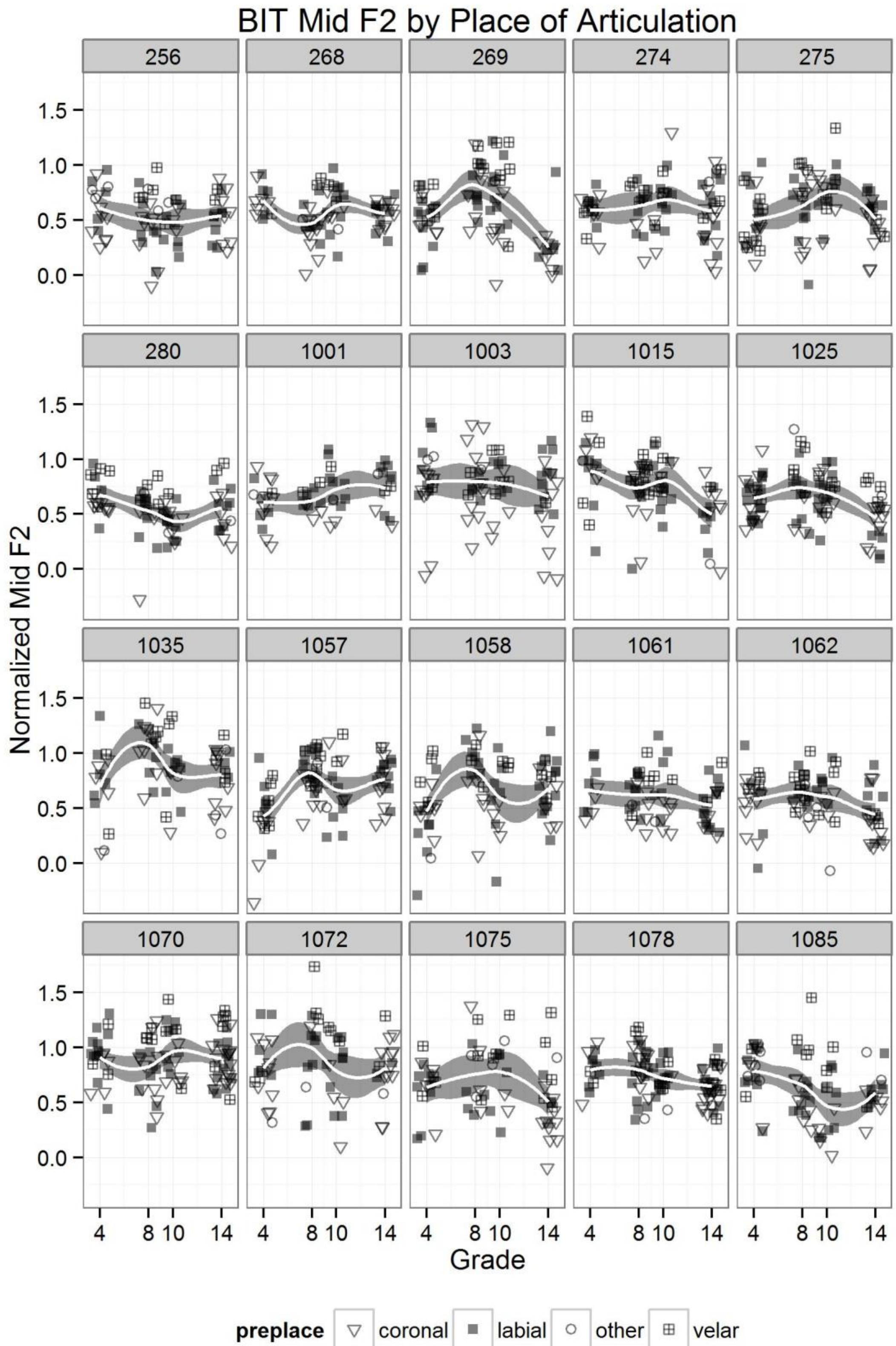
Appendix 3.5: Normalized BAIT F_1 trajectories



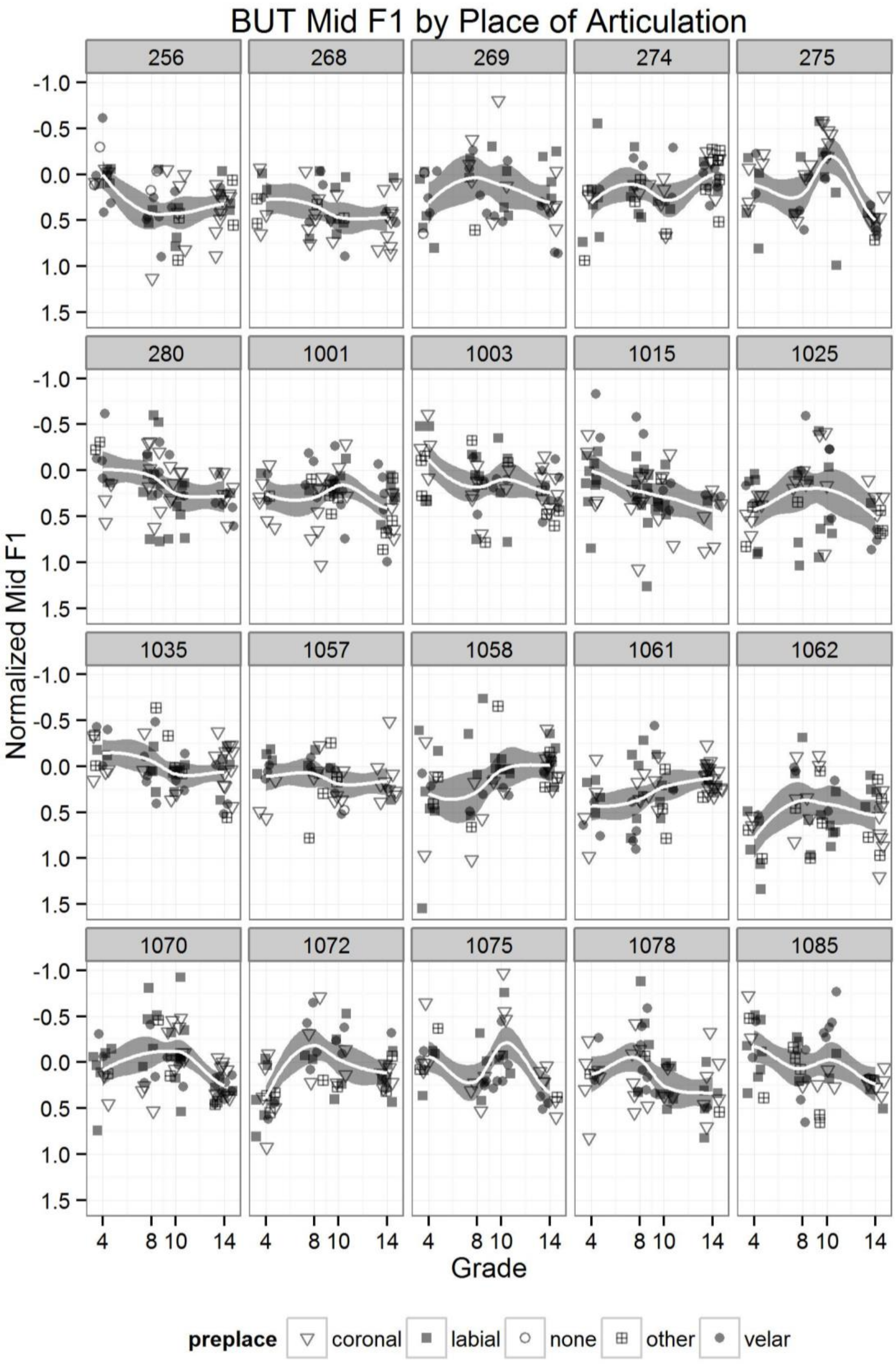
Appendix 3.6: Normalized BAIT F_2 trajectories



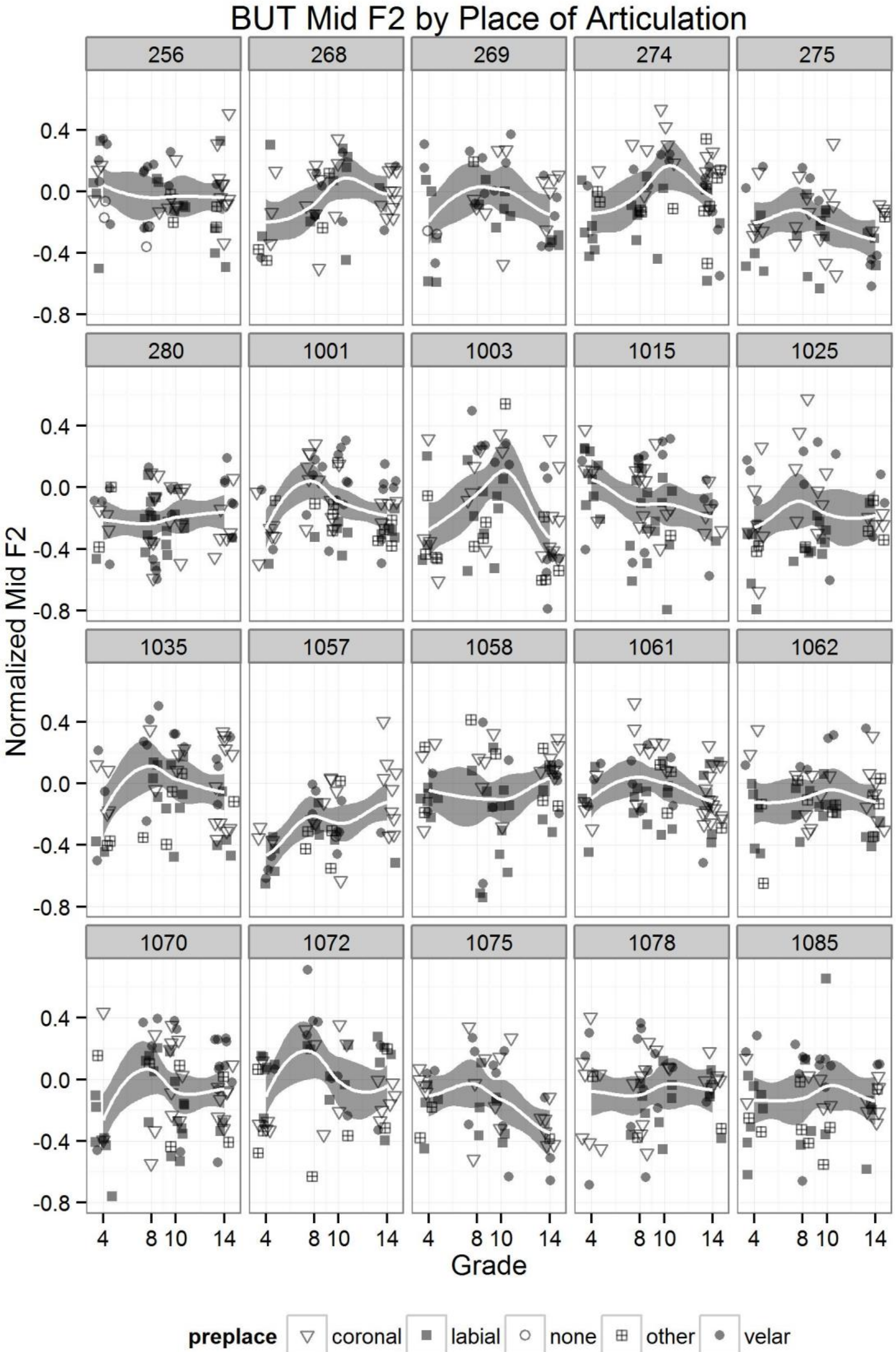
Appendix 3.7: Normalized BIT F_1 trajectories



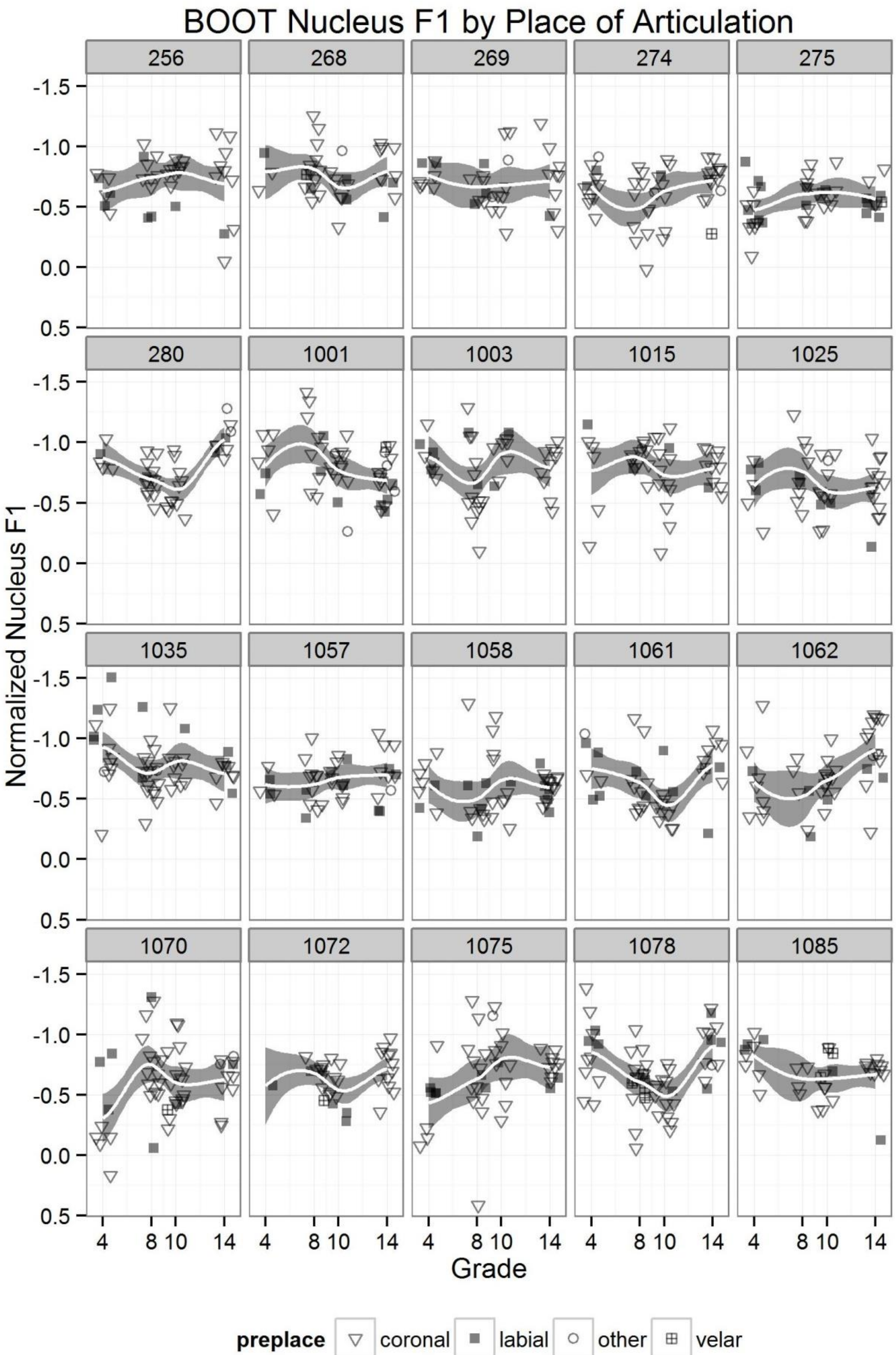
Appendix 3.8: Normalized BIT F_2 trajectories



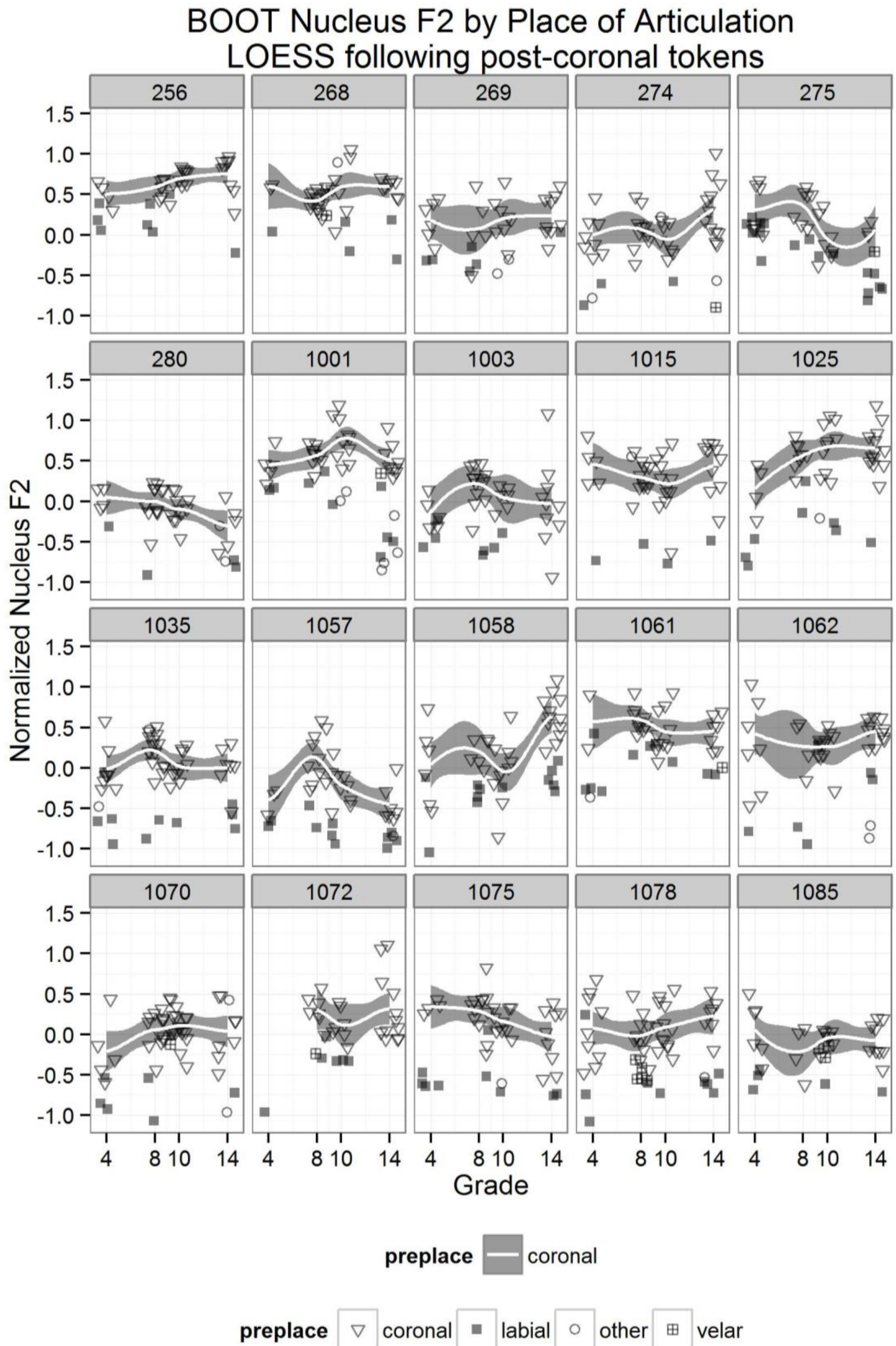
Appendix 3.9: Normalized BUT F_1 trajectories



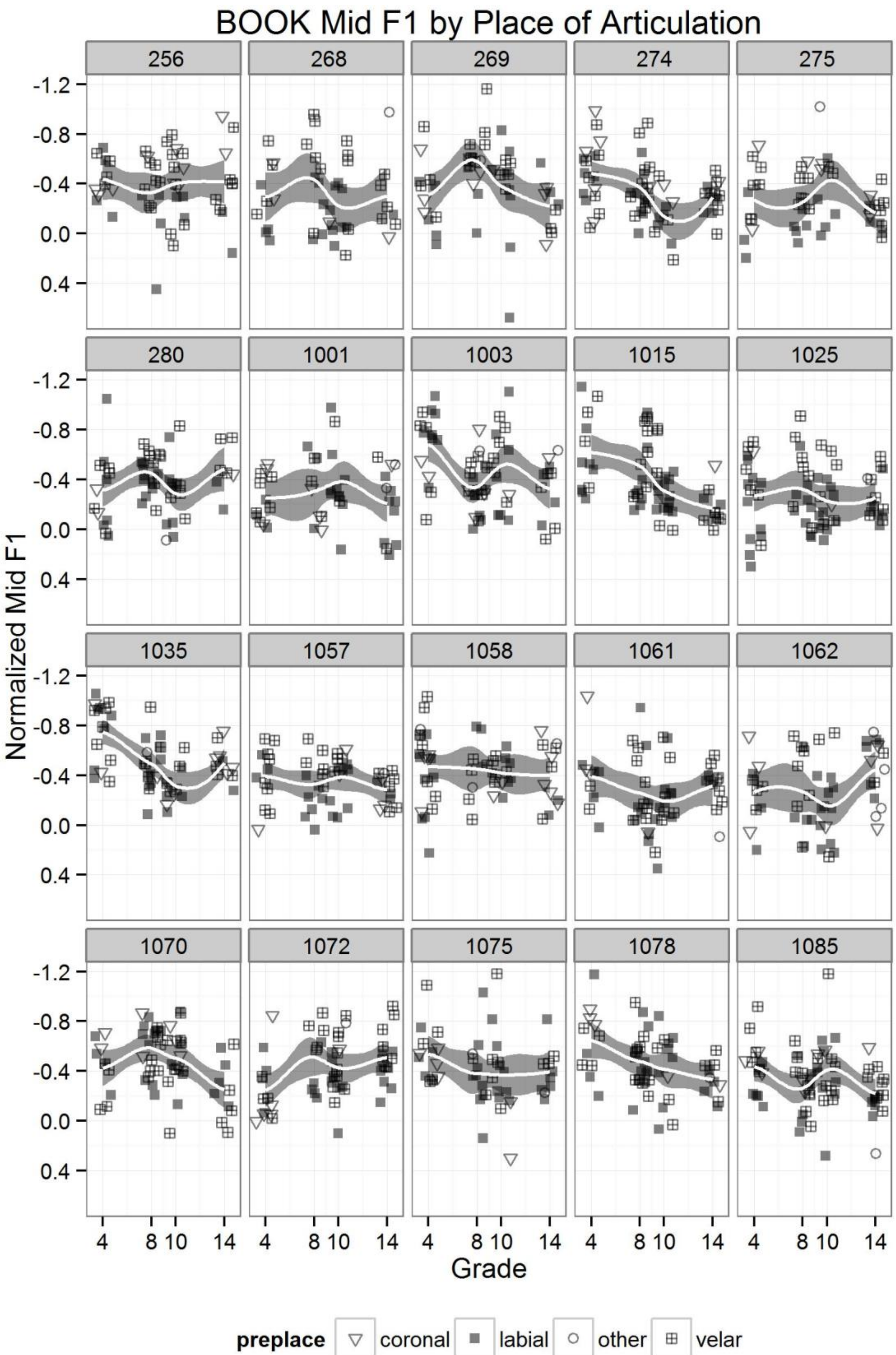
Appendix 3.10: Normalized BUT F_2 trajectories



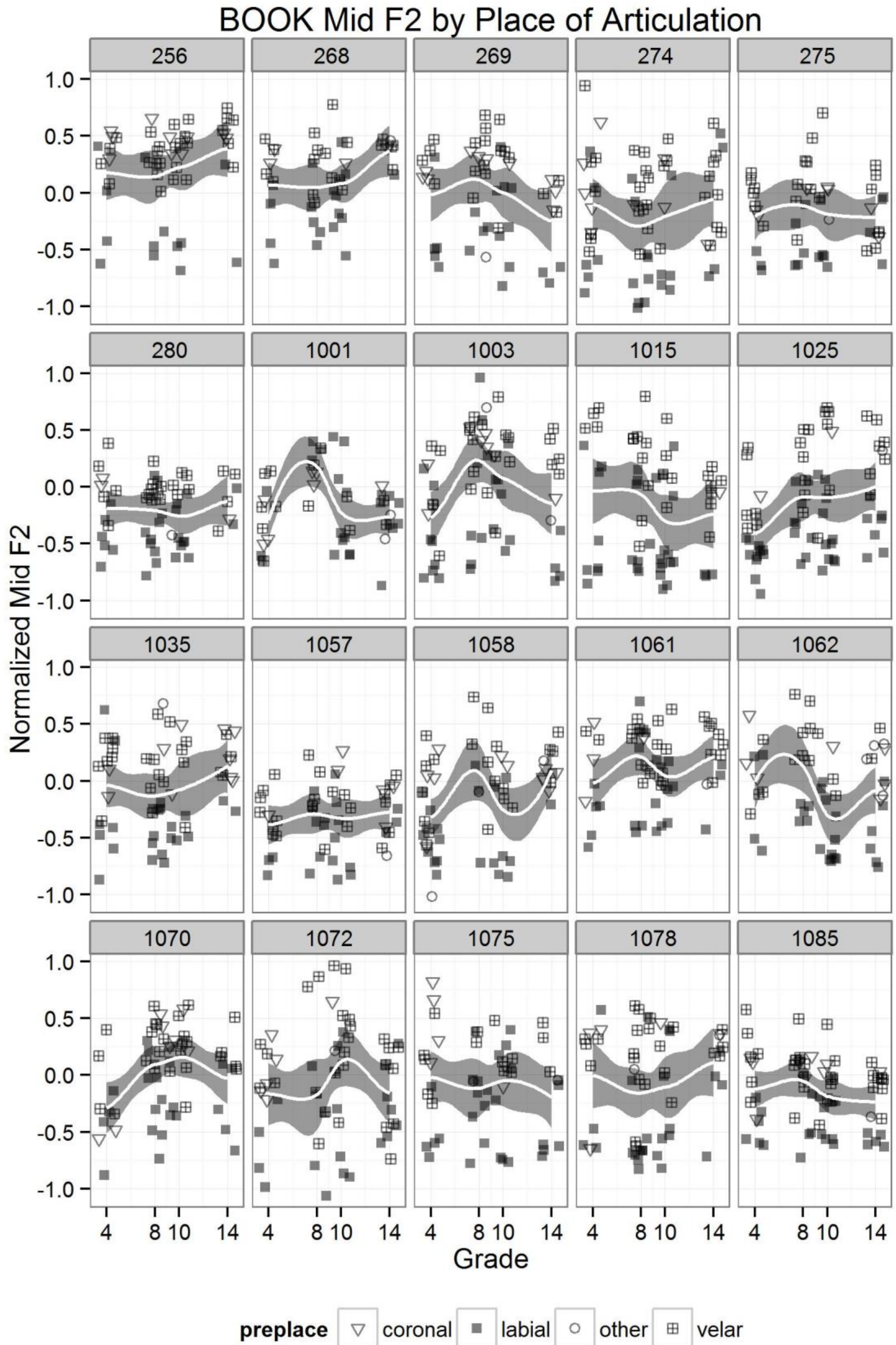
Appendix 3.11: Normalized BOOT F_1 trajectories



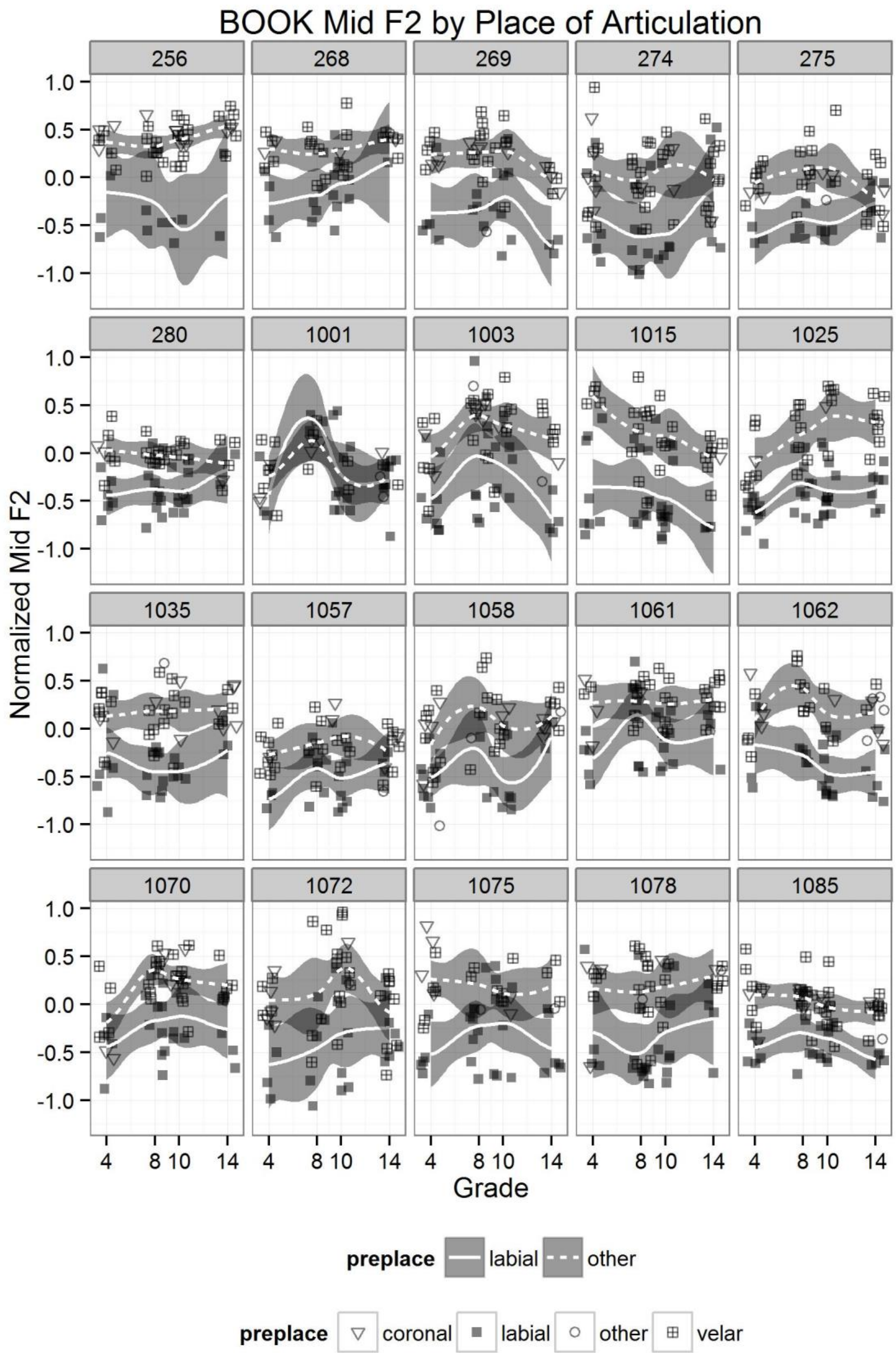
Appendix 3.12: Normalized BOOT F_2 trajectories



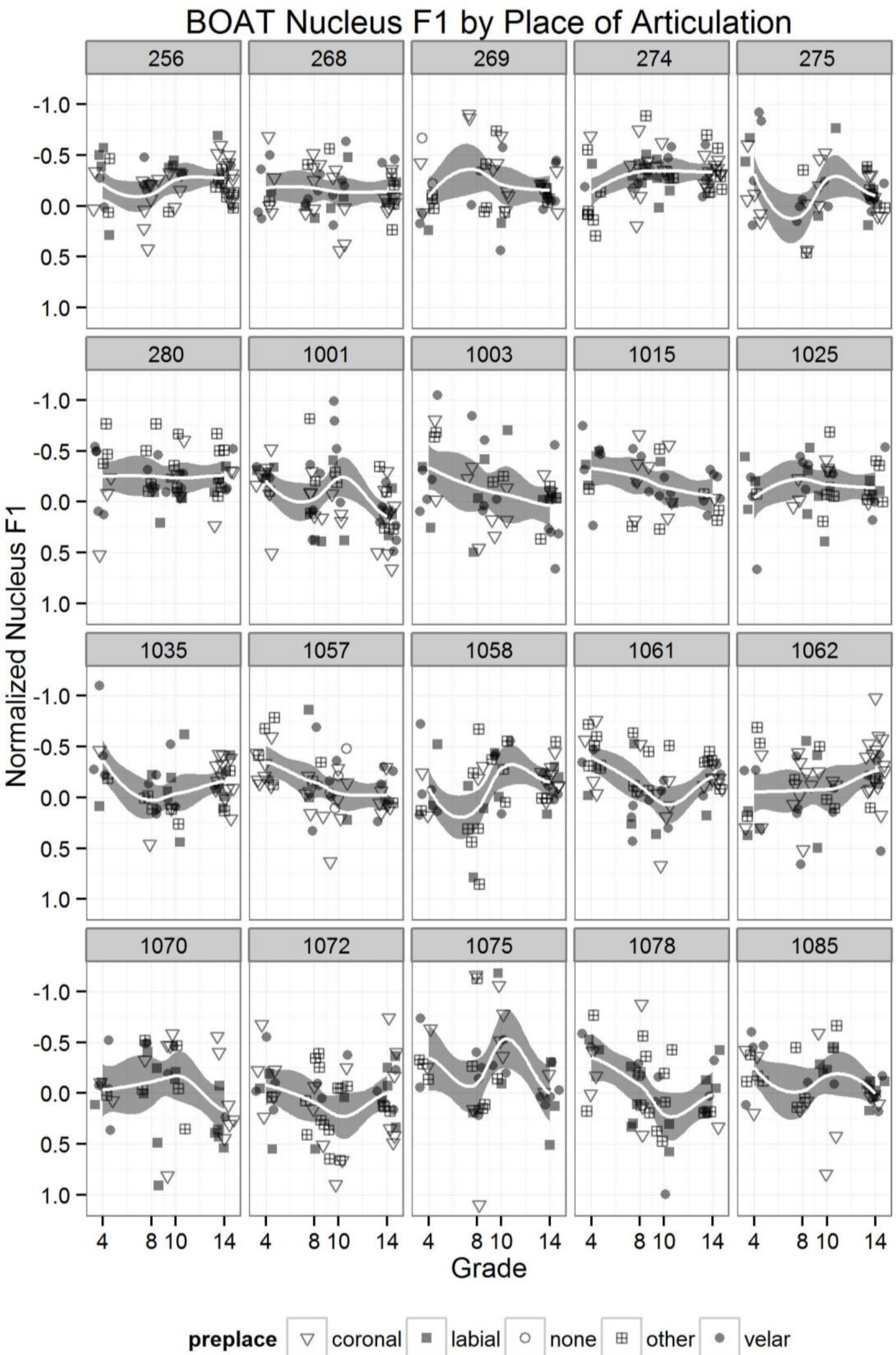
Appendix 3.13: Normalized BOOK F_1 trajectories



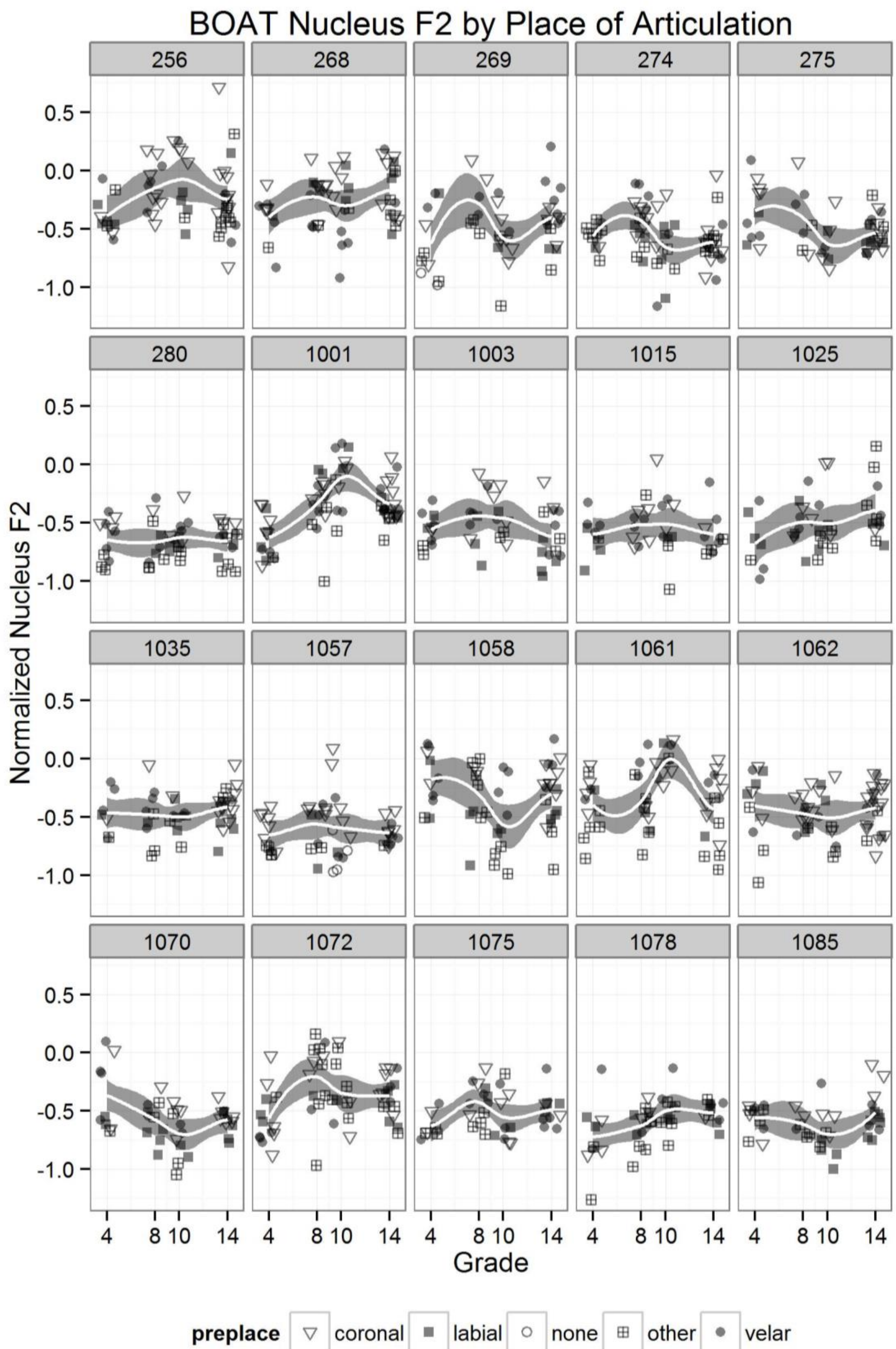
Appendix 3.14: Normalized BOOK F_2 trajectories



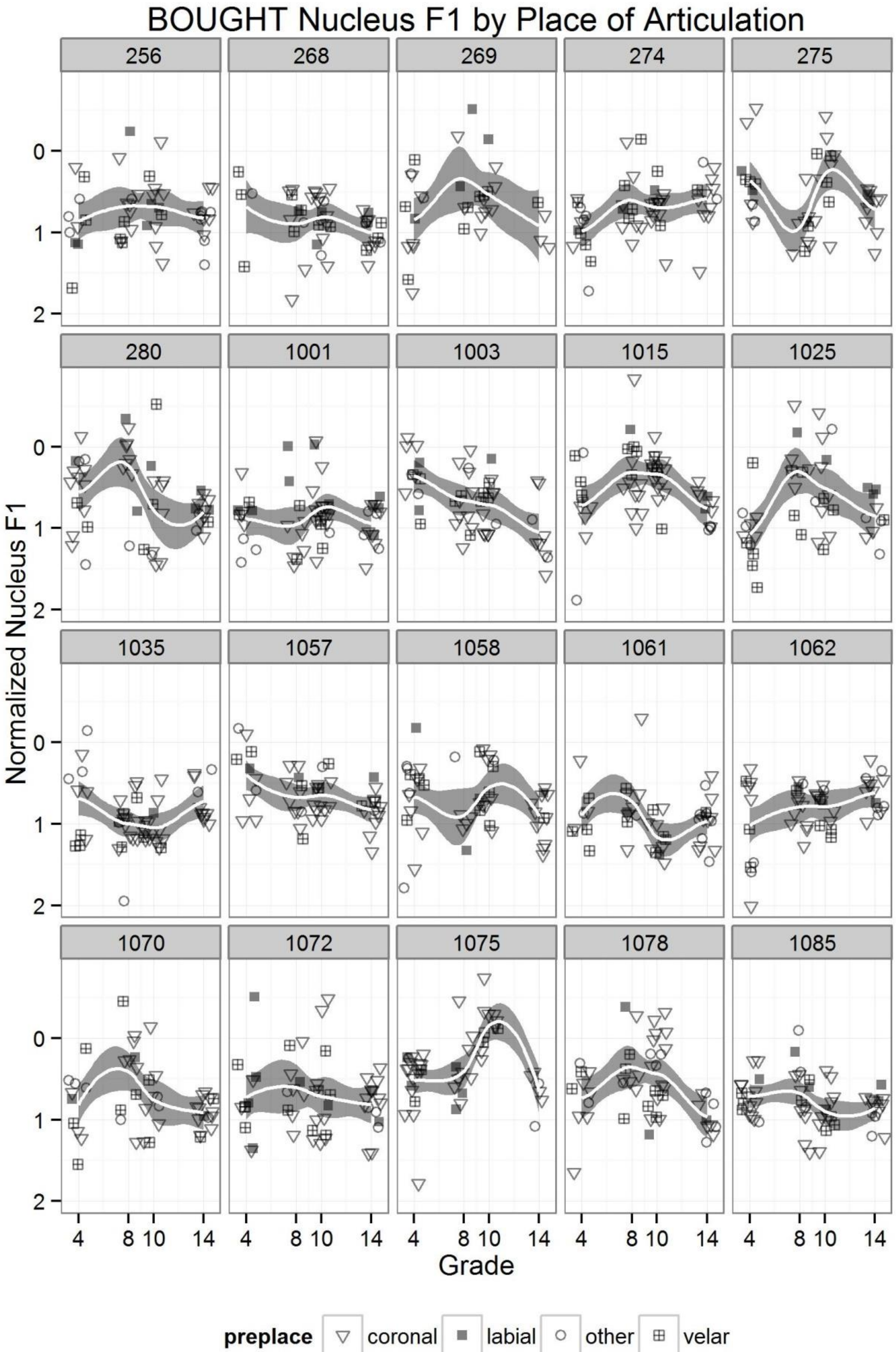
Appendix 3.15: Normalized BOOK F_2 trajectories



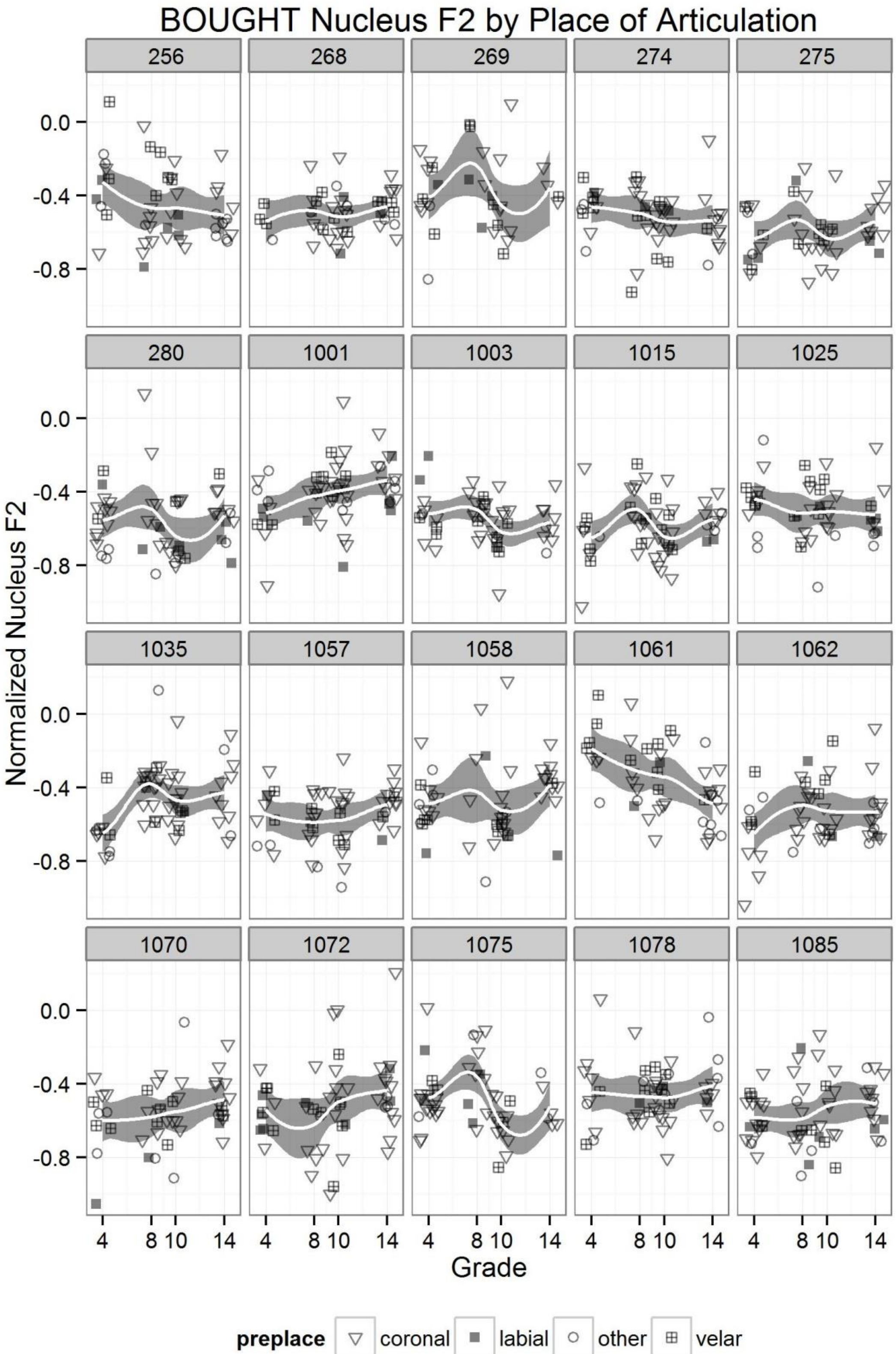
Appendix 3.16: Normalized BOAT F_1 trajectories



Appendix 3.17: Normalized BOAT F_2 trajectories



Appendix 3.18: Normalized BOUGHT F_1 trajectories



Appendix 3.19: Normalized BOUGHT F_2 trajectories

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