Second-dialect Acquisition in Southwestern Pennsylvania

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SECOND-DIALECT ACQUISITION IN SOUTHWESTERN PENNSYLVANIA

By

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Thesis

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This thesis presents an analysis of second-dialect acquisition of Pittsburgh English phonological features. Pittsburgh English is the dialect spoken in southwestern Pennsylvania. There are two phonological features unique to the dialect: (i) the [ɔ] realization of the low-back vowel merger and (ii) monophthongal /aw/ (Johnstone et al. 2002). The current study is based on speech data collected from nine participants, native speakers of other dialects of English who now live in southwestern Pennsylvania. This analysis shows that these two phonological features can be acquired. This is the first study to examine Pittsburgh English as a second-dialect.

Participants read a word list and a short reading passage adapted from data collection methods developed by Johnstone & Kiesling (2011). I analyzed words containing the low-back vowels and /aw/ using the Praat suite (Boersma & Weenink 2013), an acoustic program that extracts vowel frequencies. These frequencies reveal if speakers produce these vowels as found in their first-dialect or as they are produced in Pittsburgh English, their second-dialect. This analysis revealed that three participants have acquired the merger; of these three, two have also acquired monophthongal /aw/. Furthermore, one participant who lacks the merger has acquired the monophthong.

This study also provides an analysis of two speaker variables – dialect awareness and gender – in the acquisition of phonological features. Participants’ awareness of the dialect, its features, and any opinions they have about the dialect area were determined through interviews conducted after they provided speech data. I propose that speakers who are aware of the use of monophthongal /aw/ in southwestern Pennsylvania do not produce the feature. I also propose that the presence of the feature correlates with gender, as it is only present in the speech of male participants. However, dialect awareness and gender do not account for the distribution of the merger. These second-dialect findings support previous first-dialect studies of Pittsburgh English (Johnstone & Kiesling 2008; Eberhardt 2009).

The analysis put forth in this thesis has implications for dialect studies, as it shows that adults can acquire features of a second-dialect. Furthermore, the same speaker variables that factor into the distribution of first-dialect features are also applicable to second-dialect features. This analysis not only adds to the documentation of Pittsburgh English, but also more generally contributes to the understudied field of second-dialect acquisition.
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1. Introduction

This thesis aims to contribute to the literature on second-dialect acquisition, focusing on the acquisition of phonological features of Pittsburgh English by adults. Pittsburgh English is a dialect of American English spoken in southwestern Pennsylvania. Two phonological features are unique to the dialect: (i) the [ɔ] realization of the low-back vowel merger and (ii) monophthongal /aw/ (Johnstone et al. 2002; Labov et al. 2006). Based on an acoustic analysis of tokens of these features elicited from nine participants, I propose that these features can be acquired by adults who are native speakers of other English dialects but now live in southwestern Pennsylvania. Furthermore, I argue that the distribution of monophthongal /aw/ is influenced by speakers’ dialect awareness and gender.

This thesis contributes to the documentation of Pittsburgh English. It is the first study to investigate Pittsburgh English as a second-dialect. This analysis shows that adult speakers can produce phonological features of a second-dialect, thus supporting Flege’s (1995) proposal that the production and perception of speech sounds is malleable over a speaker’s lifetime. Previous research on first-dialects indicates that dialect awareness (Szabo 2006; Johnstone & Kiesling 2008; Gluzsek et al. 2011) and gender (Trudgill 1972; Cheshire 2002) account for speakers’ (non-)use of dialect features. This thesis extends these claims, proposing that these speaker variables also factor into the (non-)use of second-dialect features.

This thesis is organized as follows. In Chapter 2, I discuss previous analyses of second-dialect acquisition and propose that this thesis adds to the literature by studying acquisition in adults and focusing on Pittsburgh English, a dialect that has not previously been examined in a second-dialect context. I also discuss previous research on the low-back vowel merger in American English dialects, showing how the merger’s quality is uniquely realized in Pittsburgh
English. Chapter 3 provides a brief history of southwestern Pennsylvania and describes the phonological features of Pittsburgh English. I discuss previous hypotheses on how the unique settlement and industrial history of the area influenced the development of the Pittsburgh English dialect. I then describe the phonological features that Pittsburgh English shares with other dialects and also the features that are unique to the area. In Chapter 4, I describe the methodology used in this study, outlining how the data for this thesis was collected and analyzed. Chapter 5 focuses on the low-back vowel merger in Pittsburgh English. I examine previous research on the feature, present my analysis of speakers’ merger data, and propose that three of nine participants have acquired the Pittsburgh English [ɔ]. I discuss monophthongal /aw/ in Chapter 6. I provide an overview of previous research on the feature, present my analysis of speakers’ production of /aw/, and propose that three of nine participants in this study have acquired the feature. In Chapter 7, I provide an analysis of the distribution of the two features across the participants in this study. I focus on how two speaker variables – dialect awareness and gender – account for the feature distribution. Previous first-dialect research indicates that these variables do not factor into the distribution of the merger, but do for the monophthong. I relate my findings to these previous studies, showing that my study replicates these findings in a second-dialect context. Finally, in Chapter 8, I conclude the findings and analyses of this thesis, discuss the implications of the research, and present issues for further research that this analysis raises.
2. Theoretical Background

This thesis draws upon two main fields of study: second-dialect acquisition and the low-back vowel merger.¹ In §2.1 I discuss previous second-dialect studies; §2.2 provides an overview of previous research on the low-back vowel merger in American English; and §2.3 shows how this thesis expands on these previous studies.

2.1 Previous studies in second-dialect acquisition

As mobility – whether geographic, occupational, or social – has greatly increased amongst American populations over the last century, people increasingly move between dialect areas. They go from the area of their first-dialect (D1) to an area where they come into contact with, and potentially acquire, a second-dialect (D2) of English. However, as Chambers (1992) points out, these mobile populations were “purposely excluded” from early dialectology studies; the preference was to study the dialects of NORMS – non-mobile, older, rural men. Early dialectology studies focused on dialect geography, an attempt to establish the geographic boundaries of American English dialects. D2 speakers were not studied, as researchers believed that studying NORMS yielded more stable and differentiated speech data reflective of each geographic area.

As second-language acquisition and child-language studies gained popularity in the 1970s and 80s, researchers saw the opportunity to apply the methodologies employed in these studies to the examination of D2 acquisition in children. These D2 studies largely focused on the inherent variability present in children’s D2 systems. The first notable D2 study was Payne’s (1980) analysis of children who had moved to Philadelphia from other American English dialect

¹ While monophthongal /aw/ is also discussed in this thesis, this feature is limited to southwestern Pennsylvania, and as a result, there is a dearth of literature focusing on this feature. The limited literature on monophthongal /aw/ is presented in Chapter 6.
areas. Focusing on glide fronting of /uw/ and /ow/, Payne shows that there was no consistent acquisition pattern of these features across speakers in her study, even amongst those of the same age range and those who had been in Philadelphia for similar lengths of time. Thus, while participants had acquired the dialect, they exhibited variation. Trudgill’s (1986) longitudinal study of seven year old British twins living in Australia also indicates that children have a variable language system when in contact with a D2. His study focuses on allophones of /t/, with the important distinction being that the British dialect uses [ʔ], while the Australian dialect uses word-medial [r] and word-final [t]. One twin acquired [r] one month after the move to Australia, but did not switch from word-final [ʔ] to [t] until five months later. The other twin, however, had not acquired either Australian variant of /t/ by the end of the study. The variability of D2 acquisition in children is particularly evident here, as the twins are the same age and had the same length of exposure with drastically different results. Chambers (1988) also found this variability in a study of Canadian children transplanted to England. Drawing upon his results, and also those of previous studies, Chambers (1992) presents a set of principles to account for D2 acquisition and the accompanying variability. He argues that (i) lexical features are acquired before phonological ones; (ii) simple phonological rules are acquired before complex ones; and (iii) D1 transfer and interference causes variability in the early stages of D2 acquisition.

Tagliamonte & Molfenter (2007) explore t-voicing in a six-year longitudinal study of Canadian children living in a D2 area in York, England. Like previous studies from the 1980s, the researchers conclude that the children’s D2 system is highly variable. They note that, while this variation is very common, it is difficult to discern whether the variation is socially or developmentally motivated. Social variation is dependent on the children’s interaction with the local speech community, while developmental variation is dependent on the children’s age and
their language faculty. Despite this admitted difficulty in studying D2 acquisition in children, Tagliamonte & Molfenter claim that children are the only group that can successfully acquire a D2 of their native language.\(^2\) This claim is likely the contributing factor to the focus on children rather than adults in the majority of D2 studies.

Despite the claim that only children can successfully acquire a D2, recent studies have examined D2 acquisition in adults. While very few such studies exist, they are noteworthy as their results indicate that adults can acquire features of a D2. Munro et al. (1999) provide a perceptual study of Canadian adults living in Alabama. They focus on the difference in pronunciation of /aj/ in the two dialect areas; the glide of this diphthong in Alabama English is weakened. In contrast to Tagliamonte & Molfenter’s (2007) claim that only children can acquire native-like D2 features, Munro et al. adopt Flege’s (1995) speech learning model; this theory argues that the production of speech sounds is malleable across a speaker’s life span. This would mean that successful D2 acquisition should not be limited only to children. Indeed, Munro et al.’s results show that some of the Canadian speakers were consistently rated as producing an Alabama /aj/ variant; consequently, their study demonstrates that adults can acquire native-like D2 features.

Nycz (2013a, b) also focuses on Canadian adults transplanted to an American English D2 area. In addition to investigating perception, Nycz also provides a phonetic analysis of her data. Nycz focuses on low-back vowels; the speakers in her study are from a D1 area where /a/ and /ɔ/ are both realized as [ɑ] (merger), while their D2 (New York City) retains the distinction between

\(^2\) It is not clear how exactly Tagliamonte & Molfenter define ‘successfully’. However, they suggest that age of arrival in a D2 area is the best predictor of success, citing previous studies that claim that children who arrive in a D2 area before the age of eight are able to achieve near native-like command of the D2 (Payne 1980; Trudgill 1986). Based on this information, I assume that they equate success with native-like competence of the D2. This claim is complicated, though, as Tagliamonte & Molfenter note that their subjects all arrived in the D2 area before the age of five, yet did not reach native-like competence.
the phonemes (split). Nycz’s (2013b) results show that speakers retain the merger in their perception of the low-back vowels, but that the majority of speakers produce them slightly split, as evident from an acoustic analysis of the vowels. As the merger is considered complete in all environments in their D1, Nycz attributes the production split to exposure to/contact with the D2 (2013a). Dufour et al. (2013) show that a similar contrast between perception and production occurs with the distinction between /o/ and /ɔ/ for speakers of French dialects. If the phonemes are merged in their D1 but split in their D2, speakers tend to discriminate between the sounds more in production (if at all) than in perception.³

2.2 Previous research on the low-back vowel merger

A merger is a phonological process that results when two phonemes, distinct in some dialects, are pronounced the same. The effect of a merger is a reduction in the number of sound distinctions in a phonemic inventory. For speakers whose low-back vowels are merged, /ɑ/ and /ɔ/ are pronounced as the same vowel. In §2.2.1, I provide an overview of the merger in American English dialects; in §2.2.2, I discuss the production and perception of the merger; and in §2.2.3, I explain the relevance of mergers-in-progress.

2.2.1 The merger in American English dialects

Labov et al. (2006) provide a comprehensive treatment of American English vowel mergers. Their analysis proposes the following key features of mergers: (i) mergers expand at the expense of phonemic distinctions (Herzog’s Corollary); (ii) mergers cannot be reversed by

³ I focus here on Nycz (2013), Munro et al (1999), and Dufour et al. (2013). These studies are most closely related to the present study, as they deal with specific phonological features of the D2. Beyond these studies, research into D2 acquisition in adults is, to the best of my knowledge, limited.
linguistic means (Garde’s Principle); and (iii) mergers can trigger a chain shift, a process by which phonemes shift in the phonetic space so that they occupy a position previously held by a separate phoneme. Labov et al. further note that the low-back vowel merger is the most common merger in American English dialects. As shown in Figure 2.1 below, the low-back vowel merger is found in the dialects of a considerable portion of American English speakers.

Figure 2.1: The low-back vowel merger [from Hartman (1985), reprinted in Irons (2007)]

Wetmore (1959) and Kurath & McDavid (1961) are the first studies to provide an analysis of the various realizations of the low-back vowel merger. When this merger is present in American English, the low-back vowels /ɑ/ and /ɔ/ are both realized as [ɑ]. However, they note that the merger is realized as [ɔ] in a single American English dialect area: southwestern Pennsylvania.

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4 While Labov et al. (2006) provide the most comprehensive discussion on the low-back vowel merger, their maps focus on individual regions and isoglosses, and thus do not show the country-wide distribution of the merger as clearly as Hartman (1985).
While Figure 2.1 shows that the geographic boundaries of the low-back vowel merger can be approximated, Labov (1994) claims that this boundary alone is not sufficient to distinguish between regional dialects of American English. Thus, the low-back vowel merger cannot independently identify dialects, as it occurs in several different dialect areas. However, within any defined dialect of American English, the low-back vowels are either merged or split; the merger and the split are not both found in the same dialect area. Eberhardt (2008, 2009) affirms Labov’s claim that a dialect area should be unified with respect to whether the low-back vowels are merged or split. Eberhardt shows that both Caucasian and African American speakers (of both genders and of various socioeconomic backgrounds and ages) of Pittsburgh English use the low-back vowel merger. Thus, she concludes that the merger’s presence or absence is not influenced by sociolinguistic factors. Labov (1994), Irons (2007), and Nycz (2013b), amongst others, explain that the merger is steady across a dialect area because mergers occur below the level of conscious awareness, and thus do not have a sociolinguistic value attached to them. The relationship between language awareness and the use of dialect features is discussed in further detail in Chapter 7.

2.2.2 Production and perception of the merger

Speakers’ production and perception of /ɑ/ and /ɔ/ can be used to determine the status of their low-back vowels. In the first major acoustic analysis of American English vowels, Peterson & Barney (1952) indirectly refer to this merger, noting that participants who did not produce /ɑ/ and /ɔ/ as distinct phonemes were largely unsuccessful in identifying the phonemes in the speech of others. Gordon (2002) finds a similar result, noting that a minimal pair task is particularly useful in determining if speakers use the low-back vowel merger. If speakers do not perceive or
produce a contrast between /a/ and /o/ in a minimal pair environment, this indicates that the low-back vowel merger is complete in the speakers’ phonological inventory. If there is a disparity between a speaker’s perception and production of the low-back vowels in a minimal pair environment, the merger is not complete (Nycz 2013b). Rather, this disparity is good indication that the merger is in progress.

2.2.3 The low-back vowel merger-in-progress

A merger-in-progress describes a speaker’s speech system that is transitioning from one where two phonemes (here /a/ and /o/) are distinct to one where they are produced as a single phoneme ([a]). A merger-in-progress is characterized by what Labov (1994) and Hall-Lew (2013) call ‘flip-flop’: while a speaker will for the most part retain a split between two phonemes, tokens begin to be produced in the contrasting vowel space. For example, /a/ is sometimes produced as [ɔ] and /ɔ/ is sometimes produced as [a]. If a merger-in-progress becomes a completed merger, other sound changes are often triggered. In his study of speech data from southern Illinois, Bigham (2010) suggests that the completion of the low-back vowel merger triggers a chain shift where /æ/ retracts and shifts towards an [a] pronunciation. This shift can currently be found in Midwest and West dialect areas where the low-back vowel merger is present. Gordon (2005) claims that /æ/-retraction is shifting east of the Mississippi River and will eventually be found anywhere the merger is found. Thus, the low-back vowel merger can alter not only the pronunciation of /a/ and /ɔ/, but also other vowels that it pulls into a chain shift.

Researchers have also investigated the source of mergers-in-progress. Both Herold (1997) and Irons (2007) suggest that the presence of a merger-in-progress in a dialect area is not due to spread from the completed low-back vowel merger areas highlighted in Figure 2.1 above.
Rather, other linguistic features are at play. In an analysis of an emerging low-back vowel merger in eastern Pennsylvania, Herold (1997) argues that its presence is not due to spread from the western Pennsylvania merger area, but rather the quick settlement of the area by non-native speakers of English in the early twentieth century. She suggests that the native English speakers stopped making the distinction between /ə/ and /ɔ/ because the non-native speakers they were in contact with did not distinguish between them. This yielded the split unnecessary for communicative purposes. Irons (2007) also rejects a spread-theory, arguing that the emerging merger in Kentucky English is not from the adjacent Midland dialect or Upper Ohio Valley area. He suggests a phonological rather than social cause behind the low-back vowel merger’s emergence. Irons presents an analysis in which the merger is a result of a loss of the back-upglide typically produced with [ɔ] in Southern American English dialects. When this glide is lost, the distinction between /ə/ and /ɔ/ weakens and the two vowels are potentially merged into a single production space.

2.3 Theoretical issues addressed in this thesis

In examining the acquisition of Pittsburgh English as a second-dialect (D2) in adults, I address several issues raised in the literature on D2 acquisition and the low-back vowel merger. The first is Tagliamonte & Molfenter’s (2007) claim that children are the only sector of a population that can successfully acquire a D2. Perhaps due to this claim, there is very little research on D2 acquisition in adults. This thesis contributes to the field on D2 studies and the results of this study support the claim that adults can also acquire the features of a D2; furthermore, the contributions of this study are made based on data from southwestern Pennsylvania, an area never before examined as a D2 area. Tagliamonte & Molfenter propose
that, while D2 studies focus primarily on children, it is difficult to differentiate between developmentally and socially motivated variability in children’s use of D2 features. Studying adults, who are long past the early developmental stage of their language faculty, eliminates this difficulty. As such, social motivations for D2 acquisition in adults are discussed in this thesis (see Chapter 7).

As shown in §2.2, substantial research has been conducted on the low-back vowel merger in American English dialects. While the low-back vowel split has been examined as a D2 feature (Nycz 2013a, b), the merger has not, to my knowledge, been examined as an acquired feature. This study analyzes the merger in a D2 context. Additionally, as this study focuses on southwestern Pennsylvania, where the merger is uniquely realized as [ɔ] rather than [a], this study contributes to the documentation of the variants of the low-back vowel merger.

Finally, this thesis extends Herold’s (1997) theory on merger spread via speaker contact to D2 studies. Herold’s theory addresses the emergence of the low-back vowel merger in D1s only; the native English speakers in Herold’s study did not move to a new area, but rather non-native speakers without the distinction between /ɔ/ and /a/ entered the dialect area. In a D2 context, specifically as it relates to the participants of the current study, speakers with the split have relocated to a dialect area (southwestern Pennsylvania) with a merger. As discussed in Chapter 5, three participants of this study have acquired the [ɔ] realization of the merger. In §7.2, I argue that Herold’s theory is applicable to a D2 context: when speakers come into contact with the merger, retaining the split is no longer necessary to retain semantic clarity in communication.
3. Southwestern Pennsylvania and Pittsburgh English

The Pittsburgh area is the cultural, political, and economic center of southwestern Pennsylvania (here on referred to as SW PA). It is also the largest and most populated area of Appalachia, with which it shares some cultural, lexical, and grammatical features (O’Neill 2011). Overall though, SW PA has developed, both economically and culturally, largely independently of the surrounding geographic areas; this isolation has uniquely impacted the history and language of the area. In §3.1 I provide a brief history of SW PA, including theories of how the area’s unique immigration patterns and industrial background may have influenced the development of the Pittsburgh English dialect. Then, in §3.2, I discuss the main phonological features of the Pittsburgh English dialect.

3.1 Background on southwestern Pennsylvania

Figure 3.1 below shows the area of the state referred to as SW PA, which coincides with the Pittsburgh combined statistical area (Office of Management and Budget 2013). A combined statistical area (CSA) is a census area determined by social and economic ties and also commuting patterns. Pittsburgh, the largest city in the CSA, is the economic center of SW PA; numerous workers from the adjacent counties in the CSA commute into the city for employment. Hence, SW PA is just as often referred to as ‘the Pittsburgh area’, or simply ‘Pittsburgh’.
In §3.1.1, I provide a brief history of SW PA and the communities included in this study. In §3.1.2, I present some theories about the effect that the unique history of the area had on language development.

3.1.1 A brief history of the area

Through the mid-1800s, SW PA was a thinly populated rural area. Its economy was based on farming and water-based commerce (Dietrich 2008). As Figure 3.1 above shows, the area was well-equipped for such an economy, as Pittsburgh lies at the confluence of three major rivers, facilitating trade with other metropolitan areas. At this time, the area was settled largely by agrarian immigrants from Ireland and Germany (Johnstone et al. 2002). Dietrich (2008) notes

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Figure 3.1: Southwestern Pennsylvania [National Research Council (2005)]

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5 Generally, the SW PA geographic area shown in Figure 3.1 coincides with the Pittsburgh English dialect area. Wetmore (1959), who published the first major work on the low-back vowel merger in the area, excluded the southern counties in Figure 3.1 (Washington, Greene, Fayette, and Somerset) from his evaluation. Whether this was purposeful or not is unclear. Labov et al. (2006) seem to include these counties, as the area encompassed in their approximation of the dialect area is quite large. Despite the vagueness on the inclusion of the peripheral areas, Allegheny County (the site of this study) is the center of the dialect area and thus its status is uncontested. Overall, this slight mismatch is to be expected, as linguistic boundaries tend not to align exactly with geographic ones.
that the switch from commerce to industry happened quickly due to the simultaneous occurrence
of two key events in the early 1860s: the outbreak of the Civil War and the discovery of large
veins of iron ore throughout SW PA. The American war-time government was in need of metal
weapons, and the ore deposits in the area largely filled the need. A surge of immigration from
Eastern Europe and other areas of the United States occurred, as there were numerous jobs in the
new iron and (soon after) steel and railroad foundries. This led to the area’s ‘Golden Age’ – an
era of economic prosperity and industrial dominance that lasted throughout the early to mid-
twentieth century. However, as the steel industry declined, unemployment and poverty spiked.
The city of Pittsburgh lost over 35% of its population between 1970 and 1990 (U.S. Census
Bureau 2002). This abrupt rise and fall has left its impact on the region, largely in the economic
sector and, as we will see, on the area’s language as well.

Before the decline of the steel industry, the prosperity of the city of Pittsburgh proper led
to the development of suburb communities throughout SW PA. Muller (2001) explains that, as
the steel industry grew, the need for new foundry and rail sites surpassed the availability of space
within the city. Combined with intense overcrowding, new foundries and mines were built
throughout SW PA, leading to the development of residential communities, mill towns, and
mining towns. Andrew Carnegie, who led the development of the steel industry in the area, and
George Westinghouse, who established the area’s railroad and electric industries, were key in the
expansion of Pittsburgh’s economy, often bringing in new workers and buying land to create
their own working suburbs (Dietrich 2008). Trafford and Monroeville, the two communities in
which the participants of this study live, were developed largely to support this industrial
expansion. Figure 3.2 below shows the location of these communities within Allegheny County.
The city of Pittsburgh has a central location in Allegheny County. Trafford is represented with a red star on the map. Monroeville, a significantly larger community, is directly adjacent to Trafford to the north and is represented with a blue triangle on the map. The two communities, each lying approximately fifteen miles outside of Pittsburgh, were developed largely to support Pittsburgh’s industry.

George Westinghouse founded Trafford in 1904, building the Westinghouse Foundry and a surrounding housing community for workers on former farmland adjacent to a railway. Workers and their families came from other SW PA communities (including Pittsburgh) and even other countries to work at the foundry and Westinghouse Airbrake, a factory in the
neighboring town of Wilmerding (Lloyd 1979). As Westinghouse created the town to deal with industrial overflow within Pittsburgh, Trafford shared the same economic and cultural makeup as the city. Like the areas of Pittsburgh where foundries were located, the citizens of Trafford are still largely of Irish and Eastern European heritage. The town went through the same decline that the city did, leading to a population and employment decrease that it is still struggling with today.6

While Trafford was founded to expand Pittsburgh’s industry, Monroeville was designed as a ‘bedroom community’ – a residential and commercial center to support workers traveling in and out of Pittsburgh. Until the early 1950s, Monroeville was known as Patton Township, an area largely dependent on farming and the employment opportunities in Westinghouse’s nearby Trafford-Pitcairn-Wilmerding corridor. The character of the area changed around 1924 with the opening of the William Penn Highway; running from Monroeville to Pittsburgh, it was the only paved road in and out of the city. The highway was expanded in the 1940s as cars gained popularity, causing an increase in population (Chandler 2007). Monroeville remains a residential and commercial center for people who work in Pittsburgh, and also links more distant SW PA communities to the city via its highway network. Although they have varying histories, both Trafford and Monroeville are closely tied to the history of Pittsburgh and SW PA. This shared history is partly revealed through a shared language variant.

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6 This observation is based on my own personal experience living and working in the town and conversations with Trafford residents who lived there during the industrial boom.
3.1.2 The intersection of historical and linguistic development

Multiple dialects of a single language can develop for many different reasons. Wolfram & Fasold (1974) propose that the three main motivations for the development of a dialect are: (i) the pattern of settlement in an area, (ii) population movement, and (iii) the geographic and social status of the area, chiefly whether it is in contact with other populations or remains more isolated. Johnstone (2011, 2013) theorizes that the industrial background, immigration patterns, and geography of the area led to the development of the Pittsburgh English dialect in SW PA.

Labov (2001, 2012) and Johnstone (2011) both argue that the initial development of Pittsburgh English in SW PA can be traced back over two hundred years. They base this claim on Zelinsky’s (1973) proposal that the first successful settlers of an area establish the basic cultural pattern of the area. Extending the theory of the development of cultural patterns to language variation, it has been claimed in the dialectology literature that the early settlers of an area leave a lasting impression on its linguistic features (Wolfram & Fasold 1974; Labov 2012). Labov and Johnstone both argue that the Scots-Irish were the first ethnic group to permanently settle SW PA, and that many aspects of Pittsburgh English are derived from their English dialects. O’Neill (2011) furthermore notes that Scots-Irish linguistic influence is common throughout all of Appalachia, seen in the presence of shared lexical items like *slippy* (~ ‘slippery’) and syntactic constructions like *need* + past participle. Thus, this suggests that we must look beyond just settlement patterns to better understand what caused Pittsburgh English to become so distinct from general Appalachian and Midland English varieties.

In addition to early immigration, isolation (both geographic and cultural) and the effects of industrialization are likely contributing factors to the unique development of Pittsburgh English. Geographically, SW PA is encompassed by the Allegheny range of the Appalachian
Mountains. As the advent of transportation that allowed people to move easily in and out of the area (automobiles, mainly) is relatively recent, SW PA was for a very long time geographically isolated from surrounding settlements. Geographic isolation leads to the isolation of an area’s population, meaning cultural development is often distinct from surrounding areas. Johnstone et al. (2002) argue that this isolation led to the population identifying with Pittsburgh and SW PA more than with the rest of the state or larger region of Appalachia. As language is intertwined with identity (Labov 1963; Wolfram & Schilling-Estes 1998; Hazen 2002), it is unsurprising that Pittsburgh English, a dialect that now identifies its speakers as being from SW PA, developed in this isolated population.

While the industrialization of SW PA led to a population increase, it likely also led to further social isolation of its inhabitants. As the iron and steel products being produced in the area were shipped to other locales, more outsiders become aware of, and sometimes visited or moved to, SW PA, particularly Pittsburgh. Generally, their evaluation of the area and its industry was overwhelmingly negative. MacDonald (1938) claimed that “no American city has a more pungent personality” than Pittsburgh (p. 51). Such rejection by outsiders can lead to the social isolation of a community (Wolfram & Fasold 1974); as seen above with geography, isolation often leads to the strengthening of local identity and language. As previously discussed, the steel industry in SW PA went through a rapid decline by 1970. Johnstone (2011, 2013) argues that, because industry had been such a vital part of the SW PA identity, the loss of industry caused inhabitants to look for new ways to identify themselves. She proposes that the strengthening of the local dialect filled this void.7 Here, it is again evident that the unique

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7 In a study of /aw/ in Pittsburgh, Johnstone & Kiesling (2008) found that those born between 1920 and 1970 consistently produced a more monophthongal pronunciation, a feature unique to SW PA. They argue that the rise of this feature coincides with the negative evaluation and decline of the area’s steel industry, a further indication that the dialect features developed in response to the culture and isolation of the area.
history of SW PA influenced the development of Pittsburgh English.

Overall, these factors have led to SW PA’s development into what Anderson (2001) calls an “imagined community” – a relatively large area where, despite the fact that the diverse inhabitants do not all come into contact with each other or share many aspects of their everyday lives, the population feels a sense of community and shared identity. In SW PA, this sense of community and identity is largely reflected in the use of Pittsburgh English. This shared dialect sets the SW PA community apart from others, both locally and nationally.

3.2 Phonological features of Pittsburgh English

While SW PA is entirely located within the larger Midland dialect area, Pittsburgh English is considered its own dialect area. While SW PA shares many Midland features, it also has other phonological features not found in the rest of the Midland. In §3.2.1, I describe the phonological features used in SW PA that are also characteristic of the larger Midland dialect area. In §3.2.2, I discuss the unique phonological features that set SW PA apart from not only the Midland, but also other American English dialect areas.

3.2.1 Midland dialect features found in Pittsburgh English

Labov (1991) defines three large dialect areas in the United States, based on the phonological quality of vowels in those regions. The Inland North is characterized by the Northern Cities Chain Shift, while the South is characterized by the Southern Cities Chain Shift. Labov tentatively labels the geographic area between the Inland North and South as the Third Dialect, and notes that this area is chiefly identifiable by the high prevalence of the low-back vowel merger found amongst its population. The Third Dialect area corresponds with the
Midland dialect area in most other sources (Labov et al. 2006; Wetmore 1959; Kurath & McDavid 1961; Labov 2012; amongst others). Labov (1991) and McElhinny (1999) furthermore note that many different features are found throughout the Midland area and that the dialect in this area shows more phonological variation across speakers than other areas of the United States.

The most widely distributed feature in the Midland dialect area is the low-back vowel merger of /ɑ/ and /ɔ/ (Labov 1991; Labov et al. 2006). Wetmore (1959) and Kurath & McDavid (1961) note that the exact quality of the merged vowel can vary, but that, regardless of the variation of the vowel quality, the phonemes are not distinct for the vast majority of the Midland population. SW PA is an area where the low-back merger is predominant, and it also shares other common features with the Midland. Labov et al. (2006) propose that two other mergers are found throughout the Midland area: (i) the tense-lax merger of /i/ and /ɪ/, which causes pairs such as steel and still to be pronounced the same; and (ii) the tense-lax merger of /ʊl/ and /ʊl/, in which pairs like pool and pull have the same pronunciation. Labov et al. argue that these mergers are more common across speakers in SW PA than in other areas of the Midland. Thomas (2001) proposes that a back chain shift before /ɹ/ has caused the Midland merger of /ɔɹ/ and /uɹ/: as /ɑɹ/ moved towards /ɔɹ/, /ɔɹ/ moved towards – and eventually merged with – /uɹ/.

This shift and resulting merger has caused a single pronunciation for groups like boar=bore=boor (Thomas 2001; Labov et al. 2006). The presence of these mergers is one set of features that SW PA shares with the Midland area.

SW PA shares other vowel qualities with the larger Midland dialect area. The fronting of /ow/ (e.g. boat) and /u/ (e.g. boot) is widespread throughout the entire Midland area, as is /æ/-raising (e.g. ban) (Labov et al. 2006; Eberhardt 2009). Another shared feature is the
monophthongization of /aj/, particularly before liquids; this, for example, results in the pronunciation of *tile* as [taːl] rather than the more-common [tajl]. Labov et al. (2006) explain that this feature is often (incorrectly) viewed as unique to SW PA. While the /aj/ monophthong is not found in areas adjacent to SW PA, it is commonly found in the southern areas of the Midland.

### 3.2.2 Phonological features unique to Pittsburgh English

Although SW PA is located within the Midland geographic area and shares many of its dialect features, there are phonological features that distinguish Pittsburgh English from both the Midland dialect and other American English dialects. Due to these unique features, SW PA is recognized as distinct from the rest of the Midland dialect area. Kurath & McDavid (1961) call the Pittsburgh area the ‘Upper Ohio Valley dialect area’ to distinguish it from the Midland, while Labov et al. (2006) refer to it simply as ‘western Pennsylvania’; Johnstone et al. (2002) and Eberhardt (2008, 2009) call it ‘Pittsburgh English’ and ‘Pittsburgh speech’. While the names given to the area may vary, there seems to be consensus in the dialectology literature that SW PA has many features that are absent from the surrounding dialect areas.

/ɪ/-vocalization, particularly word-finally, is common in Pittsburgh English but generally absent from the rest of the Midland dialect (Hankey 1972). McElhinny (1999) argues that this vocalization causes the laxing of /i/ and /u/ before /l/, and claims that these features are also restricted to Pittsburgh English within the Midland dialect area. The quality of /ʌ/ is also different. While /ʌ/ tends to be fronted throughout the rest of the Midland, it is instead lowered towards [a] in SW PA (Labov et al. 2006). Furthermore, while the low-back vowel merger is not unique to the SW PA area, the quality of the merger is; it is produced as [a] in all other areas.
using the low-back vowel merger, but as [ɔ] in SW PA (Wetmore 1959; Kurath & McDavid 1961). Labov et al. (2006) indicate that the lowering of /ʌ/ and the unique realization of the low-back vowel merger are related. Together, these features comprise the Pittsburgh Chain Shift, shown in Figure 3.3 below.

![Figure 3.3: the Pittsburgh Chain Shift](adapted from Labov et al. (2006))

As shown in Figure 3.3, because the low-back vowel merger is realized as [ɔ], /ɔ/ raises and shifts back, leaving the phonetic space it originally occupied open (1). This allows /ʌ/ to lower into the open [a] space (2). The Pittsburgh English realization of the low-back vowel merger is discussed in detail in Chapter 5.

Perhaps the most distinct phonological feature of Pittsburgh English is the monophthongization of /aw/, a variant not found in any other dialects of American English (Labov et al. 2006). The monophthongization of /aw/ is often discussed in relation to the Pittsburgh Chain Shift. Johnstone et al. (2002) explain that monophthongal /aw/ is likely caused by the merger of /a/ with /ɔ/. This merger leaves the [a] space open, available as the monophthongal pronunciation of /aw/. Labov & Baranowski (2006) note that the monophthong
is often lengthened ([ɑː]) to distinguish it from the [ɑ] realization of lowered /ʌ/.\(^8\) See Chapter 6 for a detailed discussion of this feature in Pittsburgh English.

### 3.3 Summary

In this chapter, I provided an overview of the SW PA geographic area and the phonological features of the accompanying Pittsburgh English dialect. The center of the SW PA area is the city of Pittsburgh, and the city’s history has largely driven the development of the whole area. The employment opportunities offered by the region’s steel industry led to an influx of immigrants whose native languages have left a lasting influence on the variety of English currently spoken in the area. When the steel industry, the former defining feature of SW PA, declined, local residents looked for new ways to assert their identity; researchers hypothesize that the development of the unique Pittsburgh English dialect was one such mechanism used in forging an overt identity.

As SW PA is located within the Midland area, Pittsburgh English does share many phonological features with the larger Midland dialect. While the vowel quality of the low-back vowel merger differs in SW PA and the rest of the Midland, the Midland dialect area is unified by the overall presence of the merger. Several other mergers and the fronting of /ow/ and /u/ are also found in the Midland dialect area. However, there are certain features that are found only in Pittsburgh English, such as the Pittsburgh Chain Shift and monophthongal /aw/. It is these unique features that set SW PA apart as a distinct dialect area.

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\(^8\) The representation of monophthongal /aw/ is inconsistent in the literature. Eberhardt (2008, 2009) and Johnstone & Kiesling (2008) refer to it as [aː]; Johnstone et al. (2002) represent it as [a]; and Labov & Baranowski (2006) represent it as [ɑː]. Despite the different notations, the sound is the same in all variants: it occupies the [a] space left open by the [ɔ] realization of the low-back vowel merger. Throughout this thesis, I refer to this production as ‘monophthongal /aw/’ and I use [a] as its phonetic representation so as to avoid confusion with the [ɔ] merger.
4. Methodology

This chapter provides an overview of methodologies employed in dialectology research and the methodology used in this study. §4.1 explains the types of study designs commonly found in dialect research and §4.2 describes the participants, data, and methods of analysis used for this study.

4.1. Overview of dialect study methodologies

The study of dialects generally relies on the sociolinguistic interview, a methodology pioneered by William Labov in the 1960s and 70s. Standard components often included in a sociolinguistic interview range from those that aim to elicit careful speech – mainly word-lists and reading passages – to those focused on more casual (or naturally occurring) speech (Labov 1984). Casual speech is most commonly elicited via recorded conversations between participant and researcher. §4.1.1 gives a brief overview of the types of data used in previous D1 and D2 studies, and §4.1.2 provides a discussion of the potential benefits of using either careful or casual speech data.

4.1.1 Data in previous D1 and D2 studies

Studies focused on D1 variation, the precursor to D2 studies, rely on many different sociolinguistic interview variants. Trudgill’s (1972) study on –ing variation in urban British English notably included data from, and separate analyses for, word-lists, reading passages, casual speech, and formal speech, which Trudgill defines as rehearsed casual speech (such as an academic presentation).9 The inclusion of both careful and casual styles has since become a popular sampling method; it is commonly used in D1 studies of the low back-vowel merger

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9 See §4.1.2 for a discussion of why careful and casual speech are often analyzed separately.
A focus on strictly casual speech styles is also popular, particularly in longitudinal studies and in child language-acquisition studies. Hazen (2002) and Irons (2007), for example, both use only data from casual speech in their analyses of phonological variation in rural American English dialects.

Though there are fewer D2 studies than D1 studies, both types of studies use a variety of data collection methodologies. Nycz’s (2013) study of Canadians in New York City included both careful (word-list and minimal pairs) and casual (conversation) data. A focus on more careful speech (word-list and targeted picture description) is used by Munro et al. (1999) in their study of Canadians in Alabama. Tagliamonte & Molfenter (2007), however, relied solely on casual speech data in their longitudinal study of Canadian children in England. While most casual speech data is elicited via a conversation between participant and researcher, Tagliamonte & Molfenter’s study is notable in that the children were outfitted with lapel microphones and then recorded while they went on with their daily lives, never having explicit conversations with the researchers.

While data collection methodologies are highly variable, the vast majority of dialect studies provide an in-depth acoustic analysis of their data. Peterson & Barney’s (1952) word-list study of 76 Mid-Atlantic area American English speakers popularized the acoustic analysis of vowels; their method of plotting formants to construct a vowel chart is still used today, and their vowel formant averages are often used as comparison points for contemporary American vowel studies (Watt et al. 2011). As dialects often differ concerning the quality of certain vowels, acoustic analysis is beneficial in that these differences can be visually plotted and vowel movement can be observed. It is particularly useful in D2 studies, as acoustic
data from D2 speakers can be compared to native speakers of that dialect to determine whether acquisition is occurring. Nycz (2013) uses an acoustic analysis to judge if participants have acquired the low-back vowel split as a D2 feature; my study provides a similar acoustic analysis of the low-back vowel merger as a D2 feature. The Pittsburgh English variations of /aw/ can also be studied in such a way. Eberhardt (2008, 2009) shows that an acoustic analysis of /aw/ is beneficial, as it allows the researcher to plot the glide movement as a vector, showing how strong or weak the diphthong is. I provide a similar analysis of /aw/, but as a D2 rather than a D1 feature.

Though used less often than acoustic analysis, perceptual studies are worth noting as they are prevalent in analyses of the /aw/ diphthong in SW PA. While monophthongs are considered to be of a more static quality, diphthongs are characterized by a noticeable change in quality throughout their duration. Dialectal differences in diphthong pronunciations are thus considered to be more salient and easily perceived, even to those listeners without linguistic training (Munro et al. 1999). Johnstone et al. (2002) analyzed tokens of /aw/ using a numerical perception scale, where a rating of 1 indicates a diphthongal [aw] pronunciation; 2 indicates a perceived pronunciation somewhere between [aw] and [a]; and a rating of 3 indicates a monophthongal [a] pronunciation. A related study (Johnstone & Kiesling 2008) evaluated diphthong perception via a matched-guise test of [aw] and [a:]; for example, participants would listen to a recording of both we bought a [haws] and we bought a [ha:s] and would choose which more accurately represented a Pittsburgh pronunciation (p.16). However, a perceptual analysis relies on listeners being able to detect a contrast between two sounds. As I am native to the Pittsburgh area, I cannot easily perceive the difference in /aw/ pronunciations. I leave a perceptual analysis of D2 acquisition in SW PA as an issue for further research. The present study focuses on production,
and consequently, I have chosen to present an acoustic analysis of data. This acoustic analysis is further discussed in §4.2.3 and in Chapters 5 (low-back vowel merger) and 6 (diphthong).

4.1.2 Careful versus casual speech data

Many dialect studies include both careful and casual speech data, as both styles yield data that is conducive to phonetic analysis. Guided conversations, typically open-ended questions about participants’ lives and backgrounds, are an effective way to collect large quantities of casual speech data. It is furthermore often less intrusive for research participants, because (i) engaging in conversation is natural and (ii) casual speech does not require reading aloud, so potential anxiety and literacy issues can be avoided. A main benefit of using word-lists and reading passages to elicit careful speech data is that the researcher can design the tasks to focus on particular sounds (Labov 1984). While careful styles usually yield a smaller corpus of data than casual speech styles do, the researcher has no guarantee that the unscripted casual data will contain as many desired tokens of the targeted sounds. In this sense, careful speech data can be more beneficial when one is focusing on a specific phonological feature.

Previous research indicates that careful speech data can be particularly beneficial in the study of the low back-vowel merger. As word-lists and reading passages repeat targeted sounds, participants often become conscious of their speaking “and therefore will produce the most conservative pronunciations in their linguistic system” (Eberhardt 2009:81). This is beneficial when studying mergers, because the lack of a contrast between the paired sounds (/a/ and /ɔ/, for example), especially when the participant is aware of the researcher’s interest in the pair, indicates that the merger is complete in the participant’s vowel system (Gordon 2002).
Similarly, if careful speech data yields a distinct split between the vowels, this indicates that it should also be present, perhaps to a greater degree, in a participant’s casual speech.

Because careful speech pronunciations tend to be more conservative than those found in casual speech, researchers consider it vital to either limit a study to only one speech style (Labov 1972), or to analyze each style separately (Di Paolo et al. 2011). If both careful and casual data is used, tokens from both speech styles are analyzed phonetically, but treated as two distinct data sets; one must separately account for the results obtained from the two styles. While pronunciations can noticeably differ between the two styles, results are highly consistent within a single style – in careful speech, word-list and reading passage data is usually analyzed together as a single data set (Trudgill 1972; Labov 1994). Due to the consistency of the careful speech style and because it gives a clear indication of whether a participant’s low back-vowels are merged or split, I have chosen to limit this study to careful speech data.

4.2. Methodology used in this study

This section details the methodology used in this study. §4.2.1 describes the participants of the study, how they were chosen, and variables that may influence D2 production; §4.2.2 addresses the type of data used in this study and how it was collected; and §4.2.3 describes how the data was analyzed.

4.2.1 Study participants

As the two features I analyze in this study – the [ɔ] realization of the low-back vowel merger and the monophthongal [a] realization of /aw/ – are considered unique to the SW PA dialect area and are being considered as D2 features, it was vital to choose participants who were
not D1 speakers of Pittsburgh English or native to the area. Furthermore, as this is strictly a D2 study and not a foray into second-language acquisition, all participants included in this study are native English speakers.

I furthermore limited my study to adults, as acquisition in children (both of languages and dialects) can be more complex and must be analyzed differently. As discussed in §2.1, the acquisition of feature variation in children can be developmentally or socially motivated, and it is often difficult to discern which motivation is at play (Chambers 1992; Tagliamonte & Molfenter 2007). By excluding children (and adults who moved to the area as children) from the study sample, I am able to rule out early-stage developmental acquisition; I instead focus on a sociolinguistic analysis of the data.\(^{10}\) Furthermore, I focus on adults, as they are addressed much less frequently than children in both L1 and D2 acquisition studies. By focusing on adults, this study aims to fill an age-gap in the literature, and also address Tagliamonte & Molfenter’s proposal that adults cannot successfully acquire phonological features of a D2. All participants of this study moved to the Pittsburgh area after the age of eighteen and have been in the area for at least ten years. They range in age from mid-thirties to late sixties, with six of the nine participants in their fifties.\(^{11}\)

Ethnicity and socioeconomic class are also important variables in dialect studies, and previous research indicates they are particularly important in relation to Pittsburgh English. Use of the dialect is generally equated with specific ethnic groups; previous research indicates that native Pittsburgh speakers of African American English (AAE) avoid using the monophthongal

\(^{10}\) Developmental acquisition cannot be ruled out for adults. I adopt Flege’s (1995) theory that speech sounds remain malleable across a speaker’s lifespan, which requires the presence of developmental acquisition. However, I follow Lightbown & Spada (2006) in assuming that adults are past the critical-period, the formative child-age years where acquisition is most heavily influenced by developmental and cognitive factors.

\(^{11}\) I did not seek out these specific ages, but this is how my data set ended up given my restrictions (native English speaker, non-native to SW PA, has been in the area for at least ten years) and the University of Montana IRB’s regulations on working with participants under 18 years of age.
version of /aw/ and associate its usage with ‘white Pittsburgh’ (Eberhardt 2008, 2009). As such, I have limited my participant pool to those of (self-identified) non-African American or AAE backgrounds; I do not expect features avoided in the D1 to be acquired in the D2. Furthermore, with a small sample size, I would not have been able to control for another variable (ethnicity).

Though perhaps not as closely as it relates to ethnicity, socioeconomic class is also associated with the use of Pittsburgh English. Before the 1960s, the dialect was strongly associated with white working-class Pittsburghers (Gleason 1967). However, as the economic identity of the area changed with the shift away from manufacturing and steel – the pinnacle of the Pittsburgh working-class – the dialect has become more generally associated with the locality of the city and its suburbs (Johnstone et al. 2006). Nonetheless, I attempted to choose participants of similar socioeconomic backgrounds; most are working-class while few are (low to mid) middle-class. I determined their socioeconomic status based on their similar educational backgrounds, that their occupations fall into the same general service industry classification, and how they (if at all) self-identify. As all participants are from two adjacent communities and largely belong to the same social circle, I assume that there are no major anomalies in their socioeconomic standing.

While all participants of this study are of a similar age range, ethnicity, and socioeconomic background, gender remains a key variable amongst them. In general, women tend to produce phonological forms that are considered more standard, or of a higher prestige, than local dialectal forms (Tagliamonte 2012; Trudgill 1983). Furthermore, while both genders tend to be aware of the values associated with form variants, women usually assign a negative attitude to local or lower-prestige forms, while men are more likely to use (and positively value) those forms (Wolfram & Fasold 1974; Trudgill 1972). Concerning Pittsburgh English, gender is
considered to be the main factor governing /aw/ variation, with monophthong usage appearing
more frequently and consistently in male speech (Johnstone & Kiesling 2008). To see if this
trend emerged in this study, I selected five male and five female participants.\(^{12}\)

Table 4.1 below provides the information about participants that was key to the selection
process: (i) that they are over the age of eighteen, (ii) that they have been in the area for over ten
years, and (iii) that they are from an area outside of SW PA. It is crucial that they are not from
SW PA, as the features I examine – monophthongal /aw/ and the [ɔ] merger – are found only in
this area.\(^{13}\) Appendix A provides more detailed background information on participants,
including educational and occupational information.

I knew all participants beforehand, either as family friends or acquaintances of family members.
Though ten people participated in the data collection process, only nine are included in this
analysis. One female participant, though she considered Florida her original home, was born and
raised in the Pittsburgh area until the age of five. As such, she was excluded from this analysis.

\(^{12}\) One female participant was excluded from the data analysis.
\(^{13}\) With the exception of EM and SS, all participants are from a native dialect area that uses the low-back vowel split. Though EM and SS are from dialect areas with a merged vowel, each dialect area has the [a] realization.
\(^{14}\) ‘Hometown’ here refers to where participants were born. For most participants, this is also where they lived until they moved to SW PA.

<table>
<thead>
<tr>
<th>ID</th>
<th>Age at time of interview</th>
<th>Gender</th>
<th>Hometown(^{14})</th>
<th>Years in SW PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDa</td>
<td>68</td>
<td>Male</td>
<td>Cincinnati, OH</td>
<td>20</td>
</tr>
<tr>
<td>DDb</td>
<td>55</td>
<td>Male</td>
<td>Apalachin, NY</td>
<td>35</td>
</tr>
<tr>
<td>PT</td>
<td>58</td>
<td>Male</td>
<td>Braintree, MA</td>
<td>32</td>
</tr>
<tr>
<td>KO</td>
<td>35</td>
<td>Male</td>
<td>Olyphant, PA</td>
<td>17</td>
</tr>
<tr>
<td>RD</td>
<td>54</td>
<td>Male</td>
<td>Green Cove Springs, FL</td>
<td>11</td>
</tr>
<tr>
<td>JS</td>
<td>53</td>
<td>Female</td>
<td>East Point, GA</td>
<td>29</td>
</tr>
<tr>
<td>JL</td>
<td>52</td>
<td>Female</td>
<td>Lighthouse Point, FL</td>
<td>20</td>
</tr>
<tr>
<td>EM</td>
<td>54</td>
<td>Female</td>
<td>Erie, PA</td>
<td>20</td>
</tr>
<tr>
<td>SS</td>
<td>44</td>
<td>Female</td>
<td>North York, Ontario</td>
<td>13</td>
</tr>
</tbody>
</table>

*Table 4.1: Demographic information on study participants*
4.2.2 Data and collection

Data collection occurred between late June and early August 2013. I met with participants either at my family’s home in Monroeville, PA or in the rental hall of the American Legion post in Trafford, PA. I recorded all interviews using an Olympus VN-702PC digital voice recorder. I chose to record in .wav format, as it has a clearer sound quality than other formats. The .wav format is considered standard in linguistic fieldwork, as it is not a compressed format; with mp3s and other compressed files, we do not know what is lost (Bowern 2008). This format is also beneficial as the Praat acoustic suite uses a default .wav input (Boersma & Weenink 2013), meaning I did not need to convert my sound files for analysis.

Although this analysis focuses on data elicited from careful speech styles, participants did complete a larger Labovian-style sociolinguistic interview. During the interview, participants provided fairly extensive biographical information and engaged in conversation, in addition to providing data via a word-list and passage reading. §4.2.2.1 details the prompts used for careful speech data elicitation and §4.2.2.2 discusses the recorded conversation portion of the interview.

4.2.2.1 Careful speech data used for acoustic analysis

While SW PA has not previously been analyzed as a D2 area, Pittsburgh English as a D1 is well-documented. My data collection procedure is based on Johnstone & Kiesling’s (2008, 2011) D1 studies of Pittsburgh English, as their careful speech prompts and interview questions specifically target the phonological forms that are both common and unique to the area. The reading passage used in this study is an adapted version of a story entitled Donald McMunn that was written for the Pittsburgh Speech & Society Project (Johnstone & Kiesling 2011). The passage targets numerous forms, such as the low back-vowel merger, /aw/, /aj/, /ow/ fronting,
epenthetic ‘r’, velarized /l/, and the /ul/~uwl/ merger. As my study focuses only on the first two of these forms, I edited the passage to include more tokens of those forms. The reading passage can be found in Appendix B. I also compiled a short word-list containing both words from the reading passage and additional examples of /aw/ and the low-back vowels. The word-list can be found in Appendix C. All participants completed the word-list reading, but not all participants completed the passage reading. As a result, the data set includes more tokens from some participants. However, as discussed in §4.1.2, both prompts can be considered under a single analysis of careful speech. As such, data from all participants is given equal consideration in this analysis. Appendix D lists the words analyzed from the reading passage and word-list, and also which participants read each prompt. The methods used to analyze the collected data are provided in §4.2.3.

4.2.2.2 Casual speech data

Though it is not included in the acoustic analysis, I also elicited casual speech data from the participants of this study. Replicating previous research done in the area (Johnstone & Kiesling 2008:19), I first asked participants if they had heard of ‘Pittsburghese’. If they had, I asked them to provide their definition of ‘Pittsburghese’, and if possible, any examples. The information provided by participants in this task provides valuable insight into the forms used in their careful speech data, particularly how their awareness of, and attitudes towards, the dialect may influence the phonological forms they produce. Probing awareness of ‘Pittsburghese’ reveals if the participants of this study have awareness of SW PA as a dialect community. Any explicit examples of the dialect that they provide shows what features – if any – they view as

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15 There are various reasons why the passage was not read aloud by some participants, including time constraints and comfort-levels.
being characteristic of the area. Furthermore, we can determine whether an awareness (or lack thereof) of the low-back vowel merger and /aw/ variation correlates with either the presence or absence of these forms in participants’ production data. See Chapter 7 for a more in-depth discussion of the role of language awareness and attitudes in participants’ phonological production.

4.2.3 Acoustic analysis and presentation of data

From the collected data, I included between four and ten tokens of each /a/, /ɔ/, and /aw/ from each participant for acoustic analysis.\(^\text{16}\) With the exception of one /a/ word (modern), all analyzed vowels appeared in monosyllabic words. For the bisyllabic word, the analyzed vowel is in the stressed syllable. I avoided polysyllabic words where the vowel in question is not in the primary stress position, because unstressed vowels (particularly the monophthongs) are often reduced to [ʌ] or [ə].

There are more tokens of /aw/ than the back vowels included in this analysis. Because diphthongs involve a change in quality over their duration, they are considered more variable than monophthongs, which are of a static quality. To address this variation, Di Paolo et al. (2011) suggest analyzing twice as many diphthong versus monophthong tokens. While the monophthongs /a/ and /ɔ/ are less variable than the /aw/ diphthong, it can be difficult to discern if the vowel in question is underlyingly /a/ or /ɔ/. As my own back vowels are merged, I could not rely on my own intuition as to whether a word should be analyzed as /a/ or /ɔ/. For words that I was unsure of, I classified them per Labov et al. (2006), whose survey of the low-back vowels in American English includes lists of which words belong to each vowel class.

\(^\text{16}\) The reason why each participant may not have the same number of tokens is due to the fact that some participants read only the word-list and not the reading passage. Chapters 5 (low-back vowels) and 6 (/aw/) provide details on the phonetic environments of the targeted vowels and the number of tokens analyzed for each participant.
I used the Praat program, a suite designed for conducting acoustic analyses of recorded speech (Boersma & Weenink 2013), to extract formant readings of the vowels in question. Five formants over the duration of each vowel were automatically extracted. In cases where the automatic readings were anomalous (for example, placed a low-back vowel in a high-front region), I analyzed the formants manually using the ‘display formants’ option on the vowel spectrograms. Rather than using the default frequency settings, I extracted formants in male speech at a maximum of 5,000 Hz and female speech at 5,500 Hz. This is to compensate for the differences in average frequency range of the two genders (Styler 2013). Men tend to produce vowels at lower formant values than women do, so the maximum value for men is set lower. I have included only F1 and F2 values in this analysis, as they are the base values needed for determining the height and backness of vowels. The F1 and F2 values are used for construction of vowel graphs to visually analyze the vowel space of participants, and also show if vowels (particularly /ɑ/ and /ɔ/) are merged in a single area or split. See Chapter 5 for a discussion on determining if the low-back vowels were merged or split.

Due to the inherent quality differences between monophthongs (no change) and diphthongs (quality change), formant readings for the low-back vowels were taken at different time points in their duration than for /aw/. Monophthongs are considered to be of a static quality over their duration, and are usually measured at their midpoint (Di Paolo et al. 2011). I thus extracted F1 and F2 values for back vowels halfway through their duration. Using this method, monophthongs appear as a single point on the vowel charts. In order to capture the change in quality that occurs over the duration of a diphthong, two formant readings are taken – F1 and F2 values for both the onset of the pure vowel of the diphthong were taken, as well as further on in the duration to capture the offglide portion of the sound (Watt et al. 2011). Following Di Paolo

17 This is the default setting in Praat for formant extraction.
et al. (2011) and Styler (2013), I took the measurements for all /aw/ tokens at 20% (onset) and 80% (offglide) of the duration. Using this method, diphthongs appear as a vector on the vowel charts, showing the movement between onset and offglide.

Finally, I charted the F1 and F2 values for all vowel tokens, with each participant charted separately. While many different charting styles exist, I plotted the vowels using the NORM suite (Thomas & Kendall 2012). The NORM program was particularly beneficial for this study, as it auto-scales the results and makes a clear visual differentiation between monophthongs and diphthongs. The program is furthermore extensively used in sociolinguistic research (Nycz 2013a, b; Eberhardt 2008, 2009; Irons 2007, amongst others), and thus the results of this study can be more straightforwardly compared to previous research. The specific results of my acoustic analysis and charting of the vowels is discussed in Chapters 5 (low-back vowels) and 6 (/aw/).
5. The low-back vowel merger

In this chapter, I discuss the production of the low-back vowels /ɑ/ and /ɔ/ by participants in this study. Based on the results of my analysis, I propose that three of nine participants have acquired the Pittsburgh English [ɔ] realization of the low-back vowel merger. In §5.1, I discuss previous analyses of the low-back vowel merger in Pittsburgh English. In §5.2, I present the methods used to analyze the low-back vowels more generally and the analysis adopted in this study. In §5.3, I discuss the findings of this analysis – (i) five of nine participants have retained the low-back vowels of their D1; (ii) three of nine participants have acquired the D2 low-back vowel merger; and (iii) one participant is likely undergoing a merger-in-progress, indicating a shift from the D1 to D2 feature.

5.1 Low-back vowels in Pittsburgh English

The merger of the low-back vowels /ɑ/ and /ɔ/ is a common feature of many dialects of American English, such as the West, Canada, upper New England, SW PA, and areas of the Midland (Labov et al. 2006). Kurath & McDavid (1961) note that, in all dialect areas where the merger is present – except for SW PA – the merger is realized as [ɑ]; they furthermore suggest that SW PA is also the only American English dialect area which lacks the phoneme /ɑ/. Instead, the low-back vowel merger in SW PA is typically realized as [ɔ] and occasionally [ɒ], in the space intermediate between /ɑ/ and /ɔ/ (Wetmore 1959; Kurath & McDavid 1961; Labov et al. 2006; Eberhardt 2008). Thus, while the merger in this dialect area can show phonetic variation, with production of the merged vowel varying between the higher, rounded [ɔ] or the more intermediate [ɒ] vowel space, it is also restricted in that it does not encroach into the lower, fronted [ɑ] range.
Labov et al. (2006) posit the low-back vowel merger as a defining feature that sets SW PA apart from the rest of the geographically adjacent Midland dialect area. Apart from the unique [ɔ] realization instead of the usual [ɑ], the Pittsburgh area is also distinct from the surrounding Midland area in the completeness of the low-back vowel merger. The Pittsburgh English merger has been stable since at least the early 20th century and is merged in both production and perception in all phonetic environments. As such, I treat all the low-back vowel tokens elicited from participants in this study as part of a single data set and do not explore the effects of phonetic environment on the results. However, due to the coloring effects liquids have been shown to have on vowels in Pittsburgh English (Johnstone et al. 2002, Eberhardt 2009), I do not include any tokens where the targeted vowel precedes a liquid. See §6.2 for more information on the interaction of liquids and /aw/ variation.

While the status of the low-back vowels is not, on its own, a defining feature of dialect areas, Labov et al. (2006) argue that the merger will have a unified status in each dialect area; it will be complete, absent, or in-progress for all speakers. The Pittsburgh English merger is not only consistent in its phonetic realization and completeness in all environments, but also across speakers. Eberhardt (2008, 2009) suggests that the merger is common to all native speakers of Pittsburgh English, with no apparent differences attributable to race, ethnicity, gender, or other socioeconomic factors. As will be shown in §6.1, this contrasts sharply with monophthongal /aw/, whose production is often influenced by phonetic environment and speaker variables.
5.2 Analyzing the low-back vowels

Conducting an acoustic analysis of the low-back vowels is relatively straightforward, as they can be treated like other monophthongal vowels. As monophthongs are considered to be of a steady quality across their duration, multiple formant readings are not needed. Formants are the distinguishing frequency components (measured in Hz) that allow us to acoustically differentiate vowels. One set of formant readings is taken at the midpoint (50%), where the vowels are at their most stable point (Watt et al. 2011). As previously described in Chapter 4, F1 and F2 readings are used to plot vowel tokens; plotting the vowels on a vowel graph provides a visualization of where in the vowel space production occurs.

When dealing with the possibility of a merger, it is important to analyze tokens per the underlying vowel class they belong to (/ɑ/ or /ɔ/). I categorized elicited words based on their classification in Labov et al. (2006). The underlying vowel class of elicited words (and the participants who took part in the task) is shown below in Table 5.1.

<table>
<thead>
<tr>
<th>Word-list</th>
<th>Reading Passage</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɔ/-class:</td>
<td>dawn, talk, taught, caught</td>
</tr>
<tr>
<td>/ɑ/-class:</td>
<td>don, modern, cot, pot</td>
</tr>
<tr>
<td>Participants:</td>
<td>All</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɔ/-class:</td>
<td>caught, dawn, walk, long</td>
</tr>
<tr>
<td>/ɑ/-class:</td>
<td>modern, crops, don’s, pots, cots</td>
</tr>
</tbody>
</table>

Table 5.1 Low-back vowel elicited tokens

In this study, when words belonging to both the underlying /ɑ/ and /ɔ/ classes are produced in the same [ɔ] space, this is taken as an indication of acquisition of the Pittsburgh English merged low-back vowel. Table 5.1 shows why participants’ vowel graphs (see §5.3) do not all have the same number of tokens; since not all participants completed the reading passage elicitation, fewer tokens are analyzed for some of the participants.

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18 Vowel spaces (i.e. the F1 and F2 range in which a phoneme is produced) can vary across dialects and speakers. For each participant, I use both the visualization of the vowel graphs and the merged/split indication of p-values to determine if production of the low-back vowels overlaps or is distinct.
As vowel graphs provide a visual representation of where in the vowel space tokens are produced, tokens from both /ɑ/ and /ɔ/ classes converged in a single phoneme space indicates that they are merged in production, while two separate production spaces is indicative of a split. This visual analysis can be strengthened by using t-tests to get a p-value of the F1 and F2 averages for both /ɑ/ and /ɔ/ class tokens. A t-test is a statistical calculation used to determine the probability (p, thus p-value) that two sets of data significantly differ from one another.

A p-value is a statistical calculation that reveals whether there is a significant difference between two sets of values. Statistical significance refers to the probability that a result is not due to chance; thus, a significant difference indicates that the separation between two data sets is empirically valid and not due to chance (Sirkin 2005). Di Paolo et al. (2011) propose that if there is no significant difference between two sets of values, this is indicative of overlap, and thus merged vowels. However, a significant difference between two sets of values indicates that the vowels do not overlap, and thus are split. The p-value standard for merger studies is .05; a p-value less than .05 is significant (indicating a split), while a p-value greater than .05 is insignificant (indicating a merger).

I used the statistical formula =T.test in the Microsoft Excel program\(^{19}\) to calculate two p-values for each participant: one comparing the F1 values between the /ɑ/ and /ɔ/ classes and another comparing the F2 values. The F1 p-value indicates whether or not the two classes are split in height, while the F2 p-value indicates whether or not they are split in backness. The use of p-values gives us a statistical calculation of the state of the low-back vowels to accompany the acoustic analysis shown in a speaker’s vowel graph (the plotting of the vowels using F1 and F2). Three possibilities emerge: (i) when both the F1 and F2 p-values are insignificant, the vowel

---

\(^{19}\) T-tests come in two main forms: paired and independent. A paired T-test assumes there is a correlation between the two sets of values being compared, while an independent T-test does not. I used an independent T-test, as the F1 and F2 values of each class are independent of each other.
graph shows an overlap of where /ɑ/ and /ɔ/ are produced, as is typical of a merger; (ii) when both the F1 and F2 p-values are significant, the vowel graph shows /ɑ/ and /ɔ/ produced in distinct vowel spaces, thus indicating a split; and (iii) when one p-value is significant (split) and the other insignificant (not split), the corresponding vowel graph shows no clear indication of merger or split. This mismatch could indicate that a participant’s vowels may currently be undergoing movement or shift. As shown in §5.3, all three of the aforementioned possibilities are present in this study’s participant pool.

5.3 Results of the low-back vowel analysis

The participants in this study display variation in the production of the low-back vowels /ɑ/ and /ɔ/; participants vary both in whether their low-back vowels are merged or split and also in their average formant values (indicating the phoneme’s relative location in the vowel space). As most participants come from different native dialect areas, it is to be expected that they produce their vowels in slightly different locations and show varying distances between vowels. I have, thus, treated each participant individually, using their vowel graph and p-values (and not the status and/or location of other participants’ vowels) as indicative of the status of their low-back vowels. Table 5.2 provides the F1 and F2 averages for each participant’s /ɑ/ and /ɔ/, and also the p-values for each vowel class.
<table>
<thead>
<tr>
<th>Participant</th>
<th>/ɑ/ average</th>
<th>/ɔ/ average</th>
<th>p-value</th>
<th>/ɑ/ average</th>
<th>/ɔ/ average</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDa</td>
<td>861.25</td>
<td>1135.75</td>
<td>.0263</td>
<td>1135.75</td>
<td>1135.75</td>
<td>.0012</td>
</tr>
<tr>
<td>DDb</td>
<td>620.56</td>
<td>967.44</td>
<td>.0026</td>
<td>872.50</td>
<td>872.50</td>
<td>.0034</td>
</tr>
<tr>
<td>PT</td>
<td>630.00</td>
<td>986.50</td>
<td>.6917</td>
<td>960.75</td>
<td>960.75</td>
<td>.3433</td>
</tr>
<tr>
<td>KO</td>
<td>703.00</td>
<td>1057.00</td>
<td>.588*</td>
<td>880.50</td>
<td>880.50</td>
<td>1.627*</td>
</tr>
<tr>
<td>RD</td>
<td>629.89</td>
<td>973.11</td>
<td>.5119</td>
<td>949.75</td>
<td>949.75</td>
<td>.3363</td>
</tr>
<tr>
<td>JS</td>
<td>785.78</td>
<td>1232.44</td>
<td>.2657</td>
<td>1147.63</td>
<td>1147.63</td>
<td>.0059</td>
</tr>
<tr>
<td>JL</td>
<td>874.11</td>
<td>1330.22</td>
<td>.0115</td>
<td>1146.13</td>
<td>1146.13</td>
<td>.0022</td>
</tr>
<tr>
<td>EM</td>
<td>979.75</td>
<td>1402.50</td>
<td>.1507</td>
<td>1274.00</td>
<td>1274.00</td>
<td>.2946</td>
</tr>
<tr>
<td>SS</td>
<td>798.75</td>
<td>1188.75</td>
<td>.1694</td>
<td>1051.25</td>
<td>1051.25</td>
<td>.1118</td>
</tr>
</tbody>
</table>

Table 5.2: Participants’ F1/F2 averages and p-values

In plotting each participant’s vowels and calculating their p-values, three main results emerged. In §5.3.1, I discuss participants who have retained a split between /ɑ/ and /ɔ/, showing no indication of acquiring the Pittsburgh English merger. In §5.3.2, I discuss participants who show a merger between /ɑ/ and /ɔ/, and whether it is the Pittsburgh English [ɔ] realization or the more common [ɑ]. In §5.3.3, I discuss participants whose production data does not conclusively support either a merger or a split, and explain how this situation could be indicative of a merger-in-progress.
5.3.1 Retained split between /ɑ/ and /ɔ/

Four participants – KO, DDa, DDb, and JL – have both F1 and F2 p-values that are less than .05, which signifies that there is no overlap between their /ɑ/ and /ɔ/ class tokens. This strongly indicates that they have retained the low-back vowel split of their native dialects and have not acquired the [ə] merger of their D2. KO, DDa, and DDb furthermore have a distinct acoustic split between the two classes, visually represented by the split between the two vowel spaces in their vowel graphs. For JL, the split is evident, but not as striking as that shown by the other three participants. Figures 5.1 through 5.4 below provide an individual vowel graph for each participant, showing the plotted location of all their /ɑ/ and /ɔ/ tokens.20

Of the four participants who have retained a split and produce /ɑ/ and /ɔ/ as two distinct vowels, KO appears to have the strongest contrast between the two low-back vowels. As shown in Table 5.2 above, KO has the largest Hz distance separating /ɑ/ and /ɔ/, with the F1 difference at 133 Hz and the F2 difference at 177 Hz. As shown in Figure 5.1 below, all of KO’s /ɑ/ tokens are produced in the fronted, lower [ɑ] space and all examples of /ɔ/ are produced in the higher [ɔ] space; there is no production overlap (thus no sign of a merger) with his low-back vowels.

20 As previously discussed in §4.2.3, I used the NORM program to generate the vowel graphs for both the low-back vowels and the diphthongs. As the NORM program does not currently support IPA font, alternate symbols are used to represent /ɑ/ and /ɔ/. Per the suggestion of Thomas & Kendall (2012), the program’s creators, I have substituted Arpabet notation – a phonetic transcription code which assigns a two letter Unicode-accessible sequence to IPA symbols. Tokens belonging to the /ɑ/ class are marked AA, while tokens belonging to the /ɔ/ are marked AO.
The strength of his acoustic split is reinforced by his significant p-values. In addition to the largest Hz difference separating his low-back vowels, KO also has the smallest p-values of all participants, with F1 at $4.58^{-8}$ and F2 at $1.62^{-7}$. The fact that his p-values are nearing zero\(^{21}\), bolstered by the visual split of his vowels when plotted, indicates that KO’s low-back vowels are stable in their split, showing no evidence of any merge at all, let alone the unique Pittsburgh English realization of the merger. While not as low as KO’s, DDa’s p-values (F1 .0263; F2 .0012) also indicate that he produces /ɑ/ and /ɔ/ class vowels distinctly – as [ɑ] and [ɔ], respectively. The vowel graph in Figure 5.2 provides visual confirmation of DDa’s split acoustic production of the low-back vowels.

\(^{21}\) Negative exponents indicate a value often too small to write in full decimal form. For comparison, the p-value standard of .05 would be 1/20 in fraction form. KO’s F1 p-value would be $\sim 1/193,608$; this number is well below .05, indicating a highly significant difference between his /ɑ/ and /ɔ/ F1 values.
DDb also produces a visually notable split between his low-back vowels. This retained split is furthermore supported by his p-values – F1 .0026 and F2 .0034 – which fall below the <.05 standard for a vowel split. There is also an acoustic distance separating his average /ɑ/ and /ɔ/ class production (values shown in Table 5.2 above), with the F1 separation at ~50 Hz and the F2 separation at ~95 Hz. However, there is some production overlap seen with a minority of his elicited low-back vowels. DDb produced three /ɑ/ tokens as [ɔ], indicated by their clustering in the higher, back position with all of his /ɔ/ tokens. This can be seen in DDb’s vowel graph, shown in Figure 5.3 below.
Figure 5.3: DDb low-back vowels

I propose that these three shifted tokens are not evidence that DDb has acquired the Pittsburgh English [ɔ] realization of the low-back vowel merger. As we have already seen, the low-back merger in SW PA is complete in all phonetic environments (Labov et al. 2006). As such, if DDb had acquired the merger, we would expect the majority – if not all – of his /ɑ/ tokens to be produced as [ɔ].

I also propose that the shifted tokens are not evidence of a merger-in-progress, because the shifted tokens are specific lexical items. Of the three shifted tokens, two are of an identical type: the name Don. This is also DDb’s first name. When asked to talk about his knowledge of Pittsburgh English, DDb indicated that people in the area had difficulty understanding his name when he said it; he said they often thought he said his name was Dan. As the [ɑ] DDb would use in Don is not used in SW PA, it is possible that he consciously altered his pronunciation to [ɔ] in order to be understood. It is then very likely that DDb’s merged production is an isolated,
lexically-conditioned event and not indicative of a larger shift towards [ɔ].\(^{22}\) Participants’ awareness of – and attitudes towards – Pittsburgh English speech features is further discussed in Chapter 7.

JL is the fourth and final participant whose p-values (F1 .0115; F2 .0022) indicate retention of the D1 low-back vowel split. However, unlike KO, DDa, and DDb, JL’s plotted vowels (shown in Figure 5.4) do not appear as cleanly split; there is no clear delineation between her /a/ and /ɔ/ class tokens.

As the vowel graph in Figure 5.4 shows, JL appears to have some /a/ tokens shifting back towards the [ɔ] production space. If we compare her average /a/ and /ɔ/ formant values to the

\(^{22}\) The third shifted token is ‘pot’. It is unclear why he shifted this back to [ɔ], as he produced ‘pots’ in the expected front [a] space. I leave this issue for future research.
average American woman’s given by Hillenbrand et al. (1995), we see that there may be some movement of her /ɑ/ class overall. This is shown in Table 5.3 below.

<table>
<thead>
<tr>
<th></th>
<th>JL</th>
<th>Hillenbrand et al. (1995)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɑ/ average (F1, F2)</td>
<td>(875, 1330)</td>
<td>(936, 1551)</td>
</tr>
<tr>
<td>/ɔ/ average (F1, F2)</td>
<td>(781, 1146)</td>
<td>(781, 1136)</td>
</tr>
</tbody>
</table>

Table 5.3: JL and Hillenbrand et al. (1995) averages

JL’s average /ɔ/ class production is nearly identical to the average American English female production. However, her /ɑ/ class production values indicate a shift higher up and further back than the average female’s production. This could indicate either that (i) JL’s /ɑ/ is shifting towards the back [ɔ] vowel space or (ii) JL naturally produces /ɑ/ closer to /ɔ/, resulting in a less drastic split. An explanation for the slight mismatch between her p-values and vowel graph visualization is beyond the scope of this analysis and is left as an issue for further research. However, I propose that JL’s significant p-values and the fact that not all of her /ɑ/ tokens have shifted back towards a merged area is evidence that JL has retained a low-back vowel split.

5.3.2 Merger of /ɑ/ and /ɔ/

Four participants – PT, RD, SS, and EM – have both F1 and F2 p-values that are greater than .05, indicating that there is no significant difference between their /ɑ/ and /ɔ/ class tokens. This reveals that their low-back vowels are not split in production. I assume that ‘not split’ p-values are indicative of a merger. However, to determine whether their merger is acquired, we must examine whether their merger is realized as the more common [ɑ] or the unique Pittsburgh English [ɔ]. To do this, we must analyze participants’ formant values and location of tokens on

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23 Irons (2007), in examining the low-back vowels in Kentucky English, notes that these vowels are usually followed by an upglide in Southern American English dialects. The loss of this upglide can trigger vowel movement. JL is from a Southern D1 area, and lived throughout the American South before moving to SW PA. Further research into JL’s vowels is needed to see if upglide loss is occurring, which could then account for her low-back vowels.
their vowel graphs. In §5.3.2.1, I discuss participants who I propose have acquired the Pittsburgh English merger (PT, RD, and SS). In §5.3.2.2, I discuss EM, and the evidence that she has retained her D1 [a] merger and has not acquired the Pittsburgh English [ɔ] realization.

5.3.2.1 Merger: acquired [ɔ] realization

PT and RD both show very strong evidence that they have acquired the Pittsburgh English [ɔ] realization of the low-back vowel merger. Compared to the other participants, their p-values are exceptionally high (PT: F1 .6917; F2 .3433 and RD: F1 .5119; F2 .3363), demonstrating that their /ɑ/ and /ɔ/ formant values overlap. When we examine their plotted vowels, we can see that both PT and RD produce /ɑ/ and /ɔ/ merged in the higher, back [ɔ] space, with no tokens occurring in the [ɑ] space. PT’s vowel graph is shown in Figure 5.5 and RD’s in Figure 5.6.

![Figure 5.5: PT low-back vowels](image)
For comparison purposes, I have included Hillenbrand et al.'s (1995) proposal of the average American male’s /ɑ/ (yellow asterisk) and /ɔ/ (green triangle) formant values in each graph. Both PT and RD produce all of their tokens clustered in the space surrounding the average [ɔ] token. Note that neither participant has any tokens in the same region as the average [ɑ], which is why I propose that they produce no tokens in the typical [ɑ] space. Table 5.4 shows how PT and RD’s /ɑ/ and /ɔ/ formant averages compare to the averages proposed by Hillenbrand et al.

<table>
<thead>
<tr>
<th></th>
<th>PT</th>
<th>RD</th>
<th>Hillenbrand et al. (1995)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɑ/ average (F1, F2)</td>
<td>(630, 986)</td>
<td>(630, 973)</td>
<td>(768, 1333)</td>
</tr>
<tr>
<td>/ɔ/ average (F1, F2)</td>
<td>(638, 960)</td>
<td>(637, 950)</td>
<td>(652, 997)</td>
</tr>
</tbody>
</table>

Table 5.4: PT, RD, and Hillenbrand et al. (1995) averages

As this comparison shows, PT and RD produce both vowel classes at formant values very close to the average /ɔ/ proposed by Hillenbrand et al., but far from the average /ɑ/. Furthermore, both
participants produce the majority of their vowels farther back than the average /ɔ/ proposed by Hillenbrand et al. This is also consistent with acquisition of the Pittsburgh English merger. Labov et al. (2006) propose that speakers of the dialect overwhelmingly produce [ə] further back in their vowel space than speakers of other American dialects. Based on their insignificant p-values and acoustic overlap of /ɑ/ and /ɔ/, I propose that PT and RD have acquired the Pittsburgh English realization of the low-back vowel merger.

SS also has p-values indicative of a low-back vowel merger (F1 .1694; F2.1118). SS’s plotted vowels are shown in Figure 5.7.

Figure 5.7: SS back vowels
However, unlike PT and RD – who come from D1 areas where the low-back vowels are split – SS comes from a D1 area (Ontario, Canada) where the low-back vowels are merged as [α].

Thus, while I assume that SS’s p-values are indicative of a merger, we cannot assume that she is using the Pittsburgh English realization of the merger without further analysis. We need to examine the acoustic distribution of her low-back vowels, visualized on her vowel graph, to determine the quality ([α] or [ɔ]) of her merger. As Figure 5.7 shows, SS produces most tokens clustered together; all but two /ɑ/ tokens are merged in the higher and more back [ɔ] vowel space. If we compare SS’s average low-back vowels to Hillenbrand et al.’s (1995) values for the average American female – shown in Table 5.5 below – we find further support that her merger is the acquired [ɔ] realization rather than a retained [α] one.

<table>
<thead>
<tr>
<th></th>
<th>SS</th>
<th>Hillenbrand et al. (1995)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɑ/ average (F1, F2)</td>
<td>(798, 1188)</td>
<td>(936, 1551)</td>
</tr>
<tr>
<td>/ɔ/ average (F1, F2)</td>
<td>(728, 1051)</td>
<td>(781, 1136)</td>
</tr>
</tbody>
</table>

*Table 5.5: SS and Hillenbrand et al. (1995) averages*

This comparison shows that SS produces her average /ɑ/ token much closer to [ɔ] than to [α]. If SS had retained the [α] merger of her D1, we would expect her averages for both classes to fall closer to /ɑ/, not /ɔ/ as they do. I propose that, in addition to her insignificant p-values and plotted vowels, the comparison of SS’s production with that of the average female demonstrates that SS has acquired the Pittsburgh English realization of the low-back vowel merger.

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24 See Labov et al. (2006) for a general discussion of the Canadian merger. Nycz (2013a) provides a detailed analysis of native speakers of Canadian English and their acquisition of the low-back vowel split after moving to other dialect areas.
5.3.2.2 Merger: retained [a] realization

EM is the fourth participant whose p-values suggest that her low-back vowels are merged (F1 .1507; F2 .2946). Like SS, EM also requires special consideration, as she is also from a D1 area (Erie, PA) where the low-back vowels are merged as [a]. As Figure 5.8 below shows, EM produces the majority of her low-back vowels merged in a lower, fronted position; consequently, I propose that the merger signified by her p-values is indicative of [a] rather than [ɔ].

As with SS, comparing EM’s average low-back vowels to the average American English female’s production proposed by Hillenbrand et al. (1995) – shown in Table 5.6 – elaborates on the quality of her merger.
EM’s average /ɑ/ and /ɔ/ formant values reveal that she produces her low-back vowels closer to [ɑ] rather than [ɔ]. Her averages fall closer to Hillenbrand et al’s average for /ɑ/, which is to be expected of the [ɑ] realization of the low-back vowel merger. This comparison, compounded by the fact that her vowel graph shows that she produces no /ɑ/ tokens shifted back towards the [ɔ] space, is why I propose that EM’s insignificant p-values indicate a retained [ɑ] merger, and not an acquired [ɔ] merger.

5.3.3 ‘Other’: no clear evidence of merger or split

One participant, JS, shows no clear evidence of either having a low-back vowel merger or split. Her F1 p-value (.2657) suggests a merger along the height dimension, while her F2 p-value (.0059) suggests a split of whether the vowels are fronted or more back. As shown in Figure 5.9, this conflict in p-values is reflected in JS’s vowel graph; there is no clear split between /ɑ/ and /ɔ/ tokens, but they are also not merged in a single area. Rather, some /ɑ/ tokens are shifted farther back into the [ɔ] vowel space; /ɔ/ tokens appear to be losing height while retaining their relative backness.
As JS comes from a D1 area with a complete low-back vowel split (the American South), the shifted production shown in Figure 5.9 above indicates that her low-back vowels have undergone a movement, though not a complete shift to the Pittsburgh English [ɔ] merger. Instead, I propose that JS’s low-back vowels may be undergoing a merger-in-progress, a process in which two distinct vowel phonemes are converging upon a single production point (Hall-Lew 2013).

As discussed in §2.2.3, Bigha (2010), Labov (1994), and Hall-Lew (2013), among others, argue that a key feature of mergers-in-progress is a situation called ‘flip-flop’. Flip-flop occurs when speakers with split vowels occasionally produce tokens from one class in the other’s production space; concerning the low-back vowels, this would entail a speaker with split vowels producing some /a/ tokens as [ɔ] and/or some /ɔ/ tokens as [a]. Both Labov and Hall-Lew furthermore claim that this production reversal signals that the vowels are beginning to shift to a merged production area. As highlighted in Figure 5.10 below, JS produces two /a/ tokens as [ɔ]
(circled in the top right corner of the graph), and three of her /ɔ/ tokens are produced on the right periphery of her [a] space (circled in the bottom right of the graph).

Figure 5.10: JS shifted low-back vowels

Apart from these five shifted tokens, JS’s vowel graph shows a production split between the low-back vowels. Based on this distribution, together with the fact that she has one p-value indicating a merger and one indicating a split, I propose that JS’s low-back vowels may be undergoing a merger-in-progress. While there is no indication that JS has acquired the Pittsburgh English merger, she is showing a shift away from her D1 split. Whether or not this movement is influenced by her exposure to Pittsburgh English in her D2 area of SW PA is an issue for further research.
5.4 Summary

In American English dialect areas where the low-back vowels /ɑ/ and /ɔ/ are merged, the merger is typically realized as [ɑ]. SW PA is unique in that the merger is realized as [ɔ]. The merger is furthermore complete in both production and perception in all phonetic environments, and is considered a defining feature of the dialect area. As the feature is unique to the area, its use by speakers who are not native to the area indicates that the speakers are acquiring features of Pittsburgh English as a D2.

Using speakers’ F1 and F2 formant values, their low-back vowels can be plotted on a vowel graph, providing a visual representation of their acoustic production. Thus, this visual representation shows if the vowels are merged in a single area or split. Conducting t-tests to determine a p-value that reveals any overlap of /ɑ/ and /ɔ/ on the F1 and F2 dimensions also reveals whether the vowels are merged or split. A value below .05 means that there is a significant difference between the values, and thus that the vowels are split. A value above .05 tells us that there is no significant difference, and thus that the vowels are not split on that dimension; I take this to mean that the vowels are merged. Using both vowel plotting and p-values, I determined whether or not the participants of this study had acquired the Pittsburgh English realization of the low-back vowel merger.

This analysis revealed that three of the nine participants in this study – RD, PT, and SS – show evidence of having acquired the Pittsburgh English [ɔ] realization of the low-back vowel merger. Five participants show no evidence of shifting towards this merger; KO, DDa, DDb, and JL have retained the low-back vowel split of their D1, while EM has retained the [ɑ] realization of the low-back vowel merger found in her D1. The final participant, JS, does not pattern with any of the above participants, as one of her p-value indicates a merger and the other
indicates a split. There is, then, some type of movement occurring with her low-back vowels, which I propose is likely a merger-in-progress.
6. /aw/

In this chapter, I present an analysis of the variations of /aw/ produced in the speech of this study’s participants. I also discuss how this analysis can be used to evaluate whether or not participants in this study are shifting towards a reduced monophthongal [a] pronunciation. In §6.1, I provide an overview of previous research on /aw/ diphthongs in SW PA. §6.2 details the methods commonly used to analyze diphthongs, and presents the methods I adopt for this study. In §6.3, I argue that this analysis shows that three of the nine study participants have acquired the Pittsburgh English /aw/ pronunciation.

6.1 /aw/ in Pittsburgh English

While /aw/ monophthongization is now recognized as a steady and unique characteristic of Pittsburgh English, it is still unclear exactly when this feature emerged in the dialect and from where it evolved (Labov et al. 2006; Eberhardt 2008). Through examination of notes from early field work done in the region, Johnstone et al. (2002) conclude that the monophthongal variant was not present in the speech of Pittsburgers born before 1900. Figure 6.1 below shows the progression of /aw/ pronunciation among males born from 1850 through the 1970s.

![Graph showing changes in monophthongal /aw/ usage across five generations of working-class Pittsburgh men.](image-url)
While the [a]-type pronunciation is not as strong as in previous generations (shown in the decline from above 2.5 to below 2.5 starting with the 1950-69 generation), the average pronunciation of the diphthong across male speakers in the area is closer to [a] than to [aw].\textsuperscript{25} The 1.0-3.0 scale here is a perceptual ranking; speakers’ pronunciations were categorized based on the researchers’ perception of their recorded speech. While, in this study, I provide an acoustic rather than perceptual analysis, Johnstone et al.’s (2002) study provides a useful comparison for the participants in this study, as it describes the variation in D1 pronunciation of /aw/. Their study reveals that a reduced diphthong vector (a diphthong with a weakened glide) and monophthongal [a] are characteristic of a Pittsburgh English pronunciation of /aw/; the presence of these features amongst the participants of this study thus indicates the D2 acquisition of the pronunciation. The method used for analyzing diphthong glides and how to classify them as full or weakened is shown in §6.2

While the monophthongal variant can occur in any phonetic environment, Johnstone & Kiesling (2008) argue that it is more likely to occur before liquids or nasals than obstruents. Many studies indicate that the diphthong rarely occurs with a weakened-glide word-finally (Thomas 2001; Johnstone et al. 2002; Eberhardt 2008). While the monophthongal pronunciation can occur across all phonetic environments, previous research indicates that it is limited to a subset of speakers of Pittsburgh English. Eberhardt’s (2008, 2009) work on AAE in Pittsburgh indicates that African Americans native to the dialect area do not use the [a] pronunciation. Rather, based on Eberhardt’s acoustic analysis of participants’ /aw/ formant readings, the average /aw/ diphthong across AAE speakers is very strong. I follow Eberhardt in analyzing

\textsuperscript{25}If we consider a rating of 2.0 as the midpoint between [aw] (1.0) and [a] (3.0), a rating above 2.0 falls closer to [a] than to [aw]. This study also indicates that when researchers refer to ‘monophthongal /aw/’ in Pittsburgh English, it refers both to the true monophthongal [a] and also the diphthong with a weakened glide (in the 2-2.5 range). What seems to be key is that ‘monophthongal /aw/’ excludes the typical diphthong [aw] (1.0).
participants’ diphthongs using a Euclidian distance (see §6.2), as this distance tells us if a diphthong is strong, weak, or monophthongal. Furthermore, I can compare the Euclidian distances of the D2 speakers of this study to the D1 speakers of Eberhardt’s study to see which group produces a stronger /aw/ diphthong.

6.2 Analyzing diphthongs

In general, diphthongs are a challenging feature to analyze; they involve a change of quality over their duration, which often causes considerable variation in production across speakers. Consequently, strictly auditory and perceptual analyses of diphthongs are largely insufficient, as variations in glide strength can be hard to discern and quantify in this manner (Thomas 2001). Instead, acoustic analysis is most often used in studying diphthongs. When examining individual tokens, the configuration of the F1 and F2 bands on spectrograms indicates whether a vowel is produced as a monophthong or a diphthong. Figure 6.2 shows a monophthongal [a], while Figure 6.3 shows a diphthongal [aw] pronunciation of the same word.

*Figure 6.2: Spectrogram of ‘down’ with monophthong (DDb)*
Monophthongs are steady over their duration, and thus formant bands appear as (roughly) parallel lines; the relative lack of vertical movement of the formant bands indicates that the quality of the vowel is static. As shown in Figure 6.2, the F1 and F2 bands for this /aw/ production are steady over the vowel’s duration, indicative of a monophthongal [a] pronunciation. Unlike monophthongs, the height and backness of diphthongs change quality over the course of their duration. Reflecting this dynamicity, their F1 and F2 bands both shift during the diphthong’s production. As shown in Figure 6.3, the F1 and F2 bands for a diphthongal production of [aw] are not static; instead, we can see that F1 increases while F2 decreases across the duration.

Formant readings for diphthongs are taken at both the onset and offglide of the vowel, so that the vowel can be plotted as a vector. This traces the vowel’s movement and allows for a calculation of the Hz value of the movement. Di Paolo et al. (2011) suggest that calculating the Euclidian distance – the length of the vector/Hz value of the change from onset to offglide – is

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26 Recall from Chapter 4 that Di Paolo et al. (2011) recommend taking the onset reading at 20% and the offglide reading at 80% of the vowel’s duration. This is done to minimize the potential effect that surrounding segments may have on the quality of the vowel.
the best method for analyzing diphthongs. The formula for calculating the Euclidian distance is given in Figure 6.4.

\[ \text{Distance} = \sqrt{(F_{1\text{onset}} - F_{1\text{glide}})^2 + (F_{2\text{onset}} - F_{2\text{glide}})^2} \]

*Figure 6.4: Euclidian distance formula [Di Paolo et al. (2011)]*

A larger Euclidian value indicates a more significant movement (or change in quality) from the onset to the glide, and thus a stronger diphthongal pronunciation. Conversely, a smaller value indicates less movement, and thus more of a monophthongal pronunciation. This calculation is commonly used in studies of variation of the /aj/ diphthong. In a study on /aj/ variation in Tennessee communities, Fridland (2003) proposes that a full glide (strong diphthong) has a Euclidian distance value of 300-500 Hz, a short glide (weakened diphthong) has a value of 100-200 Hz, and a monophthongal pronunciation has a value of less than 100 Hz.

/aw/ variation is less frequently studied, and as Eberhardt (2009) notes, there is not yet such a scale indicating just how weakened the /w/ glide must be for /aw/ to be perceived as [a]. However, Eberhardt provides the Euclidian distance average for all the participants in her study as ~447 Hz; she proposes that this is a strong glide indicating that no monophthongal pronunciation is present. I use Fridland’s (2003) Euclidian distance classification, as (i) it has been used in other diphthong studies and (ii) the three-way classification of strong diphthong, weakened diphthong, and monophthong is comparable to Johnstone et al.’s (2002) perceptual scale of /aw/ production. The perceptual scale also provides a three-way classification ranking of 1.0 ([aw], strong diphthong), 2.0 (weakened diphthong), and 3.0 ([a], monophthong). In §6.3.2, I propose that the participants of this study who produce a weakened diphthong (per Fridland’s scale) are comparable to the average /aw/ production by D1 speakers of Pittsburgh
English as presented by Johnstone et al. (shown in Figure 6.1 above). Furthermore, Thomas (2001) suggests that a strong glide realization of /aw/ should reach to at least the [ɔ] range. Thus, as a reference point, I have also plotted each participant’s [ɔ] average on their diphthong graphs below. However, as I have not collected tokens to construct each participant’s complete vowel space, the average only serves as a visual reference as to how far back their diphthongs span.27

As discussed in §6.1, monophthongal /aw/ commonly occurs before nasals and liquids. However, I have excluded tokens of /aw/ that occur before liquids for two reasons: (i) liquids generally tend to color vowels and obscure their quality (Labov et al. 2006) and (ii) even Pittsburghers who do not use reduced diphthongs elsewhere often will before liquids (Eberhardt 2009).28 Furthermore, though one token in a word-final position (how) is represented on each participants’ vowel graph, I did not include it in the numerical analysis of the diphthongs.29 The tokens included in the analysis are split between those where the vowel is followed by a nasal and by an obstruent. The words analyzed are listed in Appendix D.

6.3 Variation in participants’ productions of /aw/

Overall, the participants of this study display significant variation in their production of /aw/. The large range of Euclidian distance values amongst participants suggests that the participants vary in the acoustic strength of their glide and, thus, degree of quality change in their diphthongs. Table 6.1 below shows each participant’s average Euclidian distance.

27 Euclidian distances are given focus, as the vector lengths are calculated independently of the position of other phonemes in participants’ vowel spaces. The Hz value difference between the onset and glide of the diphthong independently shows whether the diphthong is relatively strong or weak. To determine whether participants have a wider or narrower vowel space, other vowels would need to be elicited; thus, [ɔ] cannot be used as the sole reference point for diphthong strength. Further research is needed to determine the accuracy of the [ɔ] comparison.
28 Observation (ii) is also based on my personal observations as a native speaker of the dialect.
29 In §6.3, I discuss participants’ average Euclidian distance (i.e. their average production of /aw/). Because the word-final position is not an environment where D1 speakers of Pittsburgh English produce monophthongal /aw/ (see §6.1), I did not include the formant values for how in the Euclidian calculations. All other examples of /aw/ are included, as they occur in environments where either a diphthongal or monophthongal variant occur.
This variation is visually demonstrated in Figure 6.5, which shows the average diphthong vector (whose Hz length corresponds to the distances in Table 6.1) for each participant.
If participants did not vary in the strength of their diphthongs, we would expect the diphthong vectors for the participants to be of a more uniform length and to be produced in a more restricted area. However, as Figure 6.5 above shows, vector lengths are inconsistent and the diphthongs are produced at different degrees of height and backness.

Despite this variation in /aw/ production, there is one parallel that can be drawn across participants: no participant’s average Euclidian distance is less than 100 Hz. Per Fridland’s (2003) classification of Euclidian distance and the associated diphthong strength of /aj/, a distance less than 100 Hz indicates a monophthongal pronunciation. Thus, using Fridland’s value standards, there is no evidence that any participant of this study is consistently using a monophthongal [a] pronunciation of /aw/. Considering Fridland’s other two ranges – 300-500 Hz for full glides and 100-200 Hz for short glides – participants can be grouped according to their average Euclidian distances. In §6.3.1, I discuss those participants who have retained a strong diphthong – those whose Euclidian distances are indicative of a full glide. In §6.3.2, I discuss participants who have a weakened diphthong – those whose Euclidian distances are indicative of a short glide.

With the exception of EM, who seems to produce an exceptionally strong diphthong, all participants have an individual average Euclidian distance below that of ~447 Hz found in Eberhardt’s (2009) study of African American D1 speakers of Pittsburgh English. Furthermore, the overall average Euclidian distance across the nine participants in this study is 317.9659 Hz. This also indicates that the participants in this study produce diphthongs with a much shorter glide-distance than those produced by the participants in Eberhardt’s study. Thus, though there is no evidence of full monophthongization, overall the participants of this study – non African

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30 Though no participant’s average is below 100, the vowel graphs in §6.3.1 and §6.3.2 show that some participants do have one or more individual monophthongal tokens of /aw/. As diphthongs are by their nature variable, this is to be expected. This variation is also found in Fridland’s (2003) participant pool.
American speakers for whom Pittsburgh English is a D2 – produce a weaker diphthong than African American D1 speakers of Pittsburgh English. Fridland’s (2003) Euclidian distance classifications and Eberhardt’s analysis of /aw/ are helpful comparison points for the analysis in this study; as a native speaker of the dialect, it is often difficult to discern the quality of /aw/ based on perception alone.

6.3.1 Participants with a strong diphthong

Five participants – EM, JL, JS, KO, and SS – have an average Euclidian distance that is indicative of a strong diphthong. While DDa’s average of 292.7855 Hz falls below the benchmark of 300 Hz that Fridland (2003) sets for a strongly gliding [aj] diphthong, I argue that DDa’s Euclidian distance is near enough to the range for his [aw] to be considered fully gliding.31 As such, I analyze DDa as a sixth participant who produces a strongly gliding diphthong with no signs of a shift to monophthongization. Figures 6.6 through 6.11 below provide an individual graph for each participant, showing all of their /aw/ tokens.32 All vowel graphs include the participants’ average [ɔ] token as a reference point of how far back the diphthong vectors span (see §6.2 above for discussion).

Of the six participants with strongly gliding diphthongs, EM produces the most consistent and strongest diphthongal [aw]. Her shortest Euclidian distance – 554.0787 Hz for the word how

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31 Fridland (2003) categorizes 100-200 Hz as a short glide and 300-500 Hz as a full glide. There is a gap in this classification, as the 201-299 Hz distance is not included in either category. DDa’s ~293 Hz average falls at the far upper end of this intermediary range, which is why I have included him in the 300+ full glide category. Furthermore, DDa comes from an area of the US bordering on a variation of a southern dialect. As e.g. Hazen (2002), Irons (2007), and Thomas (2001) have pointed out, speakers from the Southern US tend to produce diphthongs with slight off-glide weakening. None of DDa’s individual Euclidian distances were below 100 Hz, meaning that he did not produce any monophthongal variants of /aw/. Thus, it is likely that his average Euclidian distance falls slightly below Fridland’s full glide range due to influence from his native dialect (D1) and not influence from Pittsburgh English (D2).

32 As previously discussed in Chapter 4, the graphs do not include the same number of tokens because some participants read only the word-list and not the reading passage.
– is beyond Fridland’s 300-500 Hz range for strong diphthongs. Her shortest glide is also stronger than any individual diphthong produced by DDa, KO, and SS. JL (down: 680.2132 Hz) and JS (down: 683.4829 Hz) both have a maximum diphthong above this range, but produce no other diphthong with a Euclidian distance above 550 Hz. Furthermore, EM’s plotted diphthongs, shown in Figure 6.6, all extend past her average [ɔ] in both height and backness.

![Figure 6.6: EM diphthongs](image)

Though her Euclidian values are noticeably lower than EM’s – as is true of all other participants – SS also produced all her diphthongs in the 300-500 Hz full glide range (Figure 6.7 below). In addition, SS is similar to EM in that all of her diphthong vectors extend past the height of her average [ɔ]. As Thomas (2001) argues that a strong [aw] diphthong should glide to at least the [ɔ] range, the length of EM and SS’s diphthong vectors provides further evidence that these two
participants produce strong, stable diphthongs. Thus, I argue, they have not acquired the Pittsburgh English /aw/.

![Figure 6.7: SS diphthongs](image)

The other participants with the strongest diphthongs – DDa, JL, JS, and KO – show more variation in their individual /aw/ tokens than EM and SS do. DDa’s /aw/ production is shown in Figure 6.8 below. DDa has one token (down: 101.1781 Hz) with a Euclidian distance in the short glide range. The value is, furthermore, just barely above the monophthongal range. However, as the rest of his glides are in the strong range, I argue that this single token is not an indication that he is shifting to the weaker diphthongal or fully monophthongal pronunciation found in SW PA.

33 This variation includes the location of their diphthong vectors compared to their average [ɔ]. While not all of their vectors surpass the height of [ɔ] (as is the case for EM and SS), the majority of DDa, JL, JS, and KO’s diphthong vectors surpass or closely approach the height of [ɔ].
Like DDa, JS also has one token (pound: 166.4332 Hz) with a Euclidian distance indicative of a short glide. Her /aw/ tokens are shown below in Figure 6.9.
While the aforementioned diphthong is considerably weakened, the rest of JS’s tokens each have a glide distance above 300 Hz. As previously discussed in §6.1, /aw/ is more likely to have a weakened glide when it precedes a nasal consonant. Although JS’s shortest glide occurs in *pound*, on average, JS’s /aw/ diphthong is stronger when it precedes nasals than in any other environment; the three other tokens apart from *pound* which are in this pre-nasal environment have a Euclidian distance above 400 Hz. If JS was showing signs of acquiring the Pittsburgh English pronunciation of /aw/, we would not expect such strong glides in this phonetic environment.

KO and JL show more variation in their diphthong production. However, with only 20% of their /aw/ tokens (two each out of ten) having a Euclidian distance below 300 Hz, I propose that this variation is due to the inherently variable nature of diphthongs and not a shift towards a Pittsburgh English pronunciation. KO’s plotted diphthongs are shown below in Figure 6.10.
KO produced two of his /aw/ tokens (house: 158.4487 Hz and south: 168.5764 Hz) within the short glide range indicative of a weakened diphthong. However, his average Euclidian distance (324.2585 Hz) remains in the full glide range, meaning that his average diphthong is produced with a full glide. Furthermore, KO’s two weakened diphthongs occur in an environment preceding obstruents, and he shows no signs of a weakened diphthong preceding a nasal. If he were acquiring the Pittsburgh English pronunciation, we would expect a weakened diphthong to also precede nasals, as this environment is more frequently targeted for a weakened glide than before obstruents.

JL shows the greatest range in diphthong production. Her plotted diphthongs are shown in Figure 6.11 below.
Of her /aw/ tokens with a Euclidian distance below 300 Hz, one is indicative of a shortened glide (*round*: 169.6732 Hz) and the other can be classified as having a monophthongal pronunciation (*pound*: 46.2277 Hz) per Fridland’s (2003) classification of diphthong glides. While both of these short glides occur in the pre-nasal environment – which is where we would expect to find the most monophthongal-type tokens – JL did not produce any other weakened diphthongs. Her remaining eight tokens were produced with full glides, and her average Euclidian distance of 339.3209 Hz falls within the full glide range. Because D1 speakers of Pittsburgh English more consistently produce weakened and monophthongal /aw/ (Johnstone et al. 2002; Johnstone & Kiesling 2008), I argue that JL’s 20% production rate of these variants (two out of ten /aw/ tokens) is not evidence of an acquired Pittsburgh English /aw/ pronunciation. Furthermore, JL’s two weakened /aw/ tokens occur in a minimal pair environment: *round* and *pound*. If her weakest diphthongs occur only in this specific environment, this could be an isolated event and
not indicative of an acquired shortened glide. However, additional /aw/ tokens would need to be analyzed in order to confirm these generalizations, and thus I leave this issue for further research.

6.3.2 Participants producing a weakened diphthong

Three participants – PT, RD, and DDb – show evidence of a weakened diphthong, as indicated by their average Euclidian distances. As shown in Table 6.1 above, these three participants have an average value in the 100-200 Hz range, which demonstrates that they produce diphthongs with a significantly shortened glide. Figure 6.4 above, which plots each participants’ average /aw/, reveals that their average diphthong vector is noticeably shorter than those of other participants. Across the participants with strong diphthongs, there is variation in the location of the nucleus and glide of /aw/; this is to be expected with such a variable vowel. However, PT, RD, and DDb pattern very closely together in regards to the location of their /aw/ nucleus and glide. This decreased variability is consistent with a pronunciation being reduced towards [a], as monophthongal vowels tend to have steadier formant values over their durations. Individual diphthong tokens for each of these participants are shown below in Figures 6.12 through 6.14 below.

PT shows a very clear contrast between monophthongal and diphthongal /aw/. His two longer vectors have Euclidian values in the 200s, indicative of an intermediary glide between the short and full glide ranges. Three of his five tokens have values below the 100 Hz monophthongal range – 31.6228 Hz, 39.0131 Hz, and 93.7223 Hz. His plotted diphthongs are shown below in Figure 6.12.
As a result of these three monophthongal tokens, PT has the smallest average Euclidian distance of all participants at 148.4287 Hz, indicating that he produces the weakest diphthongal variation of /aw/. This average value, in addition to the fact that the majority of his tokens were produced as monophthongal [a], provides evidence that he has acquired the Pittsburgh English variant of /aw/. Note, though, that his smallest Euclidian distance (31.6228 Hz) is for the word how, where the diphthong occurs in a word-final environment. As discussed in §6.1 above, /aw/ rarely, if ever, is reduced by native dialect speakers in this environment. This may, then, be a sign of overgeneralization, a situation in which speakers apply a feature beyond the environments where it is typically found. As Lightbown & Spada (2006) note, overgeneralization is common in the acquisition of linguistic features.
RD has an average Euclidian distance of 172.6741 Hz, an indication that he also produces a weakened diphthong with a short glide. His plotted diphthongs are shown in Figure 6.13 below.

Figure 6.13: RD diphthongs

RD produced two monophthongal tokens (78.5175 Hz and 86.3713 Hz), both for the word *down*. He also produced two tokens with intermediary glides (236.1223 Hz and 263.1289 Hz). Two of his ten /aw/ tokens were produced with full glides; *south*, at 300.0417 Hz, barely passes Fridland’s (2003) minimum Euclidian distance of 300 Hz for a diphthong with a full glide. His other fully gliding diphthong was *how*, with a distance of 552.903 Hz. His remaining four tokens fell within the short glide range of a weakened diphthong, with Euclidian distances ranging from 106.8925 Hz to 185.1324 Hz. RD’s production of *how*, the only diphthongal token with an unarguably strong glide, mimics a D1 Pittsburgh English /aw/. This word-final position, again, is the least likely environment for diphthong-weakening by native speakers of the dialect.
(Thomas 2001; Johnstone et al. 2002). As this is the only token where he retains a strong diphthong (also indicating that he does produce full diphthongs), there is overall strong evidence that RD is acquiring the D2 Pittsburgh English /aw/ pronunciation; he produces the variants of /aw/ in the same phonetic environments as found in the speech of D1 speakers of the dialect.

DDb also shows signs of a weakened diphthong and shortened glide, as illustrated by his average Euclidian distance of 165.8784 Hz. His plotted diphthongs are shown in Figure 6.14 below.

His /aw/ production data is interesting, as he produces monophthongs, short glides, and strong glides; these variants are distributed fairly equally in the two main environments – when /aw/ precedes a nasal and when it precedes an obstruent. DDb produced one fully gliding diphthong (>300 Hz) and one shortened glide (100-200 Hz) in each environment. His shortened pre-nasal /aw/, with a Euclidian distance of 102.3426 Hz, has a shorter glide than his pre-obstruent /aw/
(182.7019 Hz). This patterns with the Pittsburgh English distribution, where the pre-nasal environment is considered slightly more conducive for diphthong weakening than the pre-obstruent environment. DDb also shows this pattern in his monophthongal /aw/ production. He produced four such variants, two in the pre-nasal position and two in the pre-obstruent position. DDb’s smallest monophthongal value (27.6586 Hz) occurred in a pre-nasal position, while his largest monophthongal value (96.5661 Hz) occurred in a pre-obstruent position. Finally, while DDb produced monophthongs in the two expected environments, his production in word-final position (how) resulted in a Euclidian distance above 300 Hz, indicative of a strong diphthong; this is, as previously discussed, where D1 speakers of Pittsburgh English tend to produce their strongest diphthongs.

Overall, while none of these three participants have an average Euclidian distance that falls within the sub-100 Hz monophthongal range, they all produce individual tokens of monophthongs and also weakened diphthongs with significantly shortened glides. This yields an average Euclidian distance in the mid- to high-100s for PT, RD, and DDb. This average glide distance demonstrates that their average /aw/ token is produced with a shortened glide, an intermediary between diphthongal [aw] and monophthongal [a]. As shown in Figure 6.1 above, Johnstone, et al. (2002) argue that, based on perceptual data, the average native Pittsburgh male’s /aw/ realization falls between [aw] and [a]. Thus, I argue that these three participants in this study have acquired the Pittsburgh English variant of /aw/, as their average production falls into an intermediary range similar that of D1 speakers of the dialect.
6.4 Summary

The realization of /aw/ as [a] is a unique phonological feature of the Pittsburgh English dialect. The diphthong is often produced as monophthongal [a], and it is, on average, produced with a noticeably shortened glide by non-African American speakers native to the dialect area (Eberhardt 2009). This average pronunciation is closer to [a] than to [aw] (Johnstone et al. 2002). This unique pronunciation is most likely to occur preceding liquids or nasals, but it also fairly common preceding obstruents. Native speakers rarely if ever produce a weakened diphthong in a word-final position.

In analyzing diphthongs, calculating the Euclidian distance allows us to see the Hertz (Hz) change between the nucleus and glide of the vowel; a larger value indicates a stronger diphthong. Using Fridland’s (2003) Euclidian value ranges to determine the strength of a diphthong’s glide, I argue that participants in this study fall into two categories based on whether they produce a strong (fully gliding) or a weakened (shortened glide) diphthongal [aw]. These categories are shown in Table 6.2 below.

<table>
<thead>
<tr>
<th>Strong Diphthongs</th>
<th>Weakened Diphthongs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td><strong>Average Euclidian distance (Hz)</strong></td>
</tr>
<tr>
<td>EM</td>
<td>676.1548</td>
</tr>
<tr>
<td>SS</td>
<td>341.9501</td>
</tr>
<tr>
<td>DDa</td>
<td>292.7855</td>
</tr>
<tr>
<td>JS</td>
<td>400.2421</td>
</tr>
<tr>
<td>KO</td>
<td>324.2586</td>
</tr>
<tr>
<td>JL</td>
<td>339.3209</td>
</tr>
</tbody>
</table>

*Table 6.2: Categorization of Euclidian Distances*
Six participants – EM, SS, DDa, JS, KO, and JL – have an average Euclidian distance that is indicative of a strongly gliding diphthong; thus, it appears that they have not acquired the Pittsburgh English /aw/. The three remaining participants – PT, RD, and DDb – have an average Euclidian distance that is indicative of a weakened diphthong. These averages, along with the fact that all three produce individual monophthongal tokens in the predicted environments (pre-nasal and pre-obstruent), reveal that they have acquired the Pittsburgh English /aw/.
7. Speaker variables and feature distribution

In this chapter, I discuss some variables that may be influencing the use – or avoidance – of Pittsburgh English phonological features by participants in this study. Previous dialectology studies have shown that factors such as socioeconomic class, age, gender, attitudes towards the dialect area, and awareness of dialect features can significantly influence whether or not speakers use certain dialectal features (Trudgill 1972; Wolfram 1974; Le Page & Tabouret-Keller 1985; Tagliamonte 2012). As discussed in Chapter 4, I attempted to control for age and socioeconomic class when choosing participants for this study. As participants all fall into roughly the same age range and are members of the same social circle, age and socioeconomic background are excluded from the present discussion. In §7.1, I briefly revisit the results of the low-back vowel and diphthong analyses, focusing on to what extent participants’ use of these features is predictable. In §7.2, I present an overview of participants’ attitudes towards the SW PA dialect area and awareness of the dialect features, and show how their comments correlate with their (non-)use of the low-back merger and weakened diphthong. Finally, in §7.3 I discuss how participants’ gender influences their use of D2 features, with support for this discussion drawn from previous dialect studies.

7.1 Participants’ usage of Pittsburgh English features

Considering the two unique features of Pittsburgh English discussed in Chapters 5 and 6 – the [ɔ] realization of the low-back vowel merger and the monophthongal or weakened diphthongal /aw/ – there are four possible production combinations that can manifest in participants’ speech: (i) only the merger is present; (ii) only the weakened diphthong is present;
(iii) both features are present; or (iv) neither feature is present. Table 7.1 below shows the distribution of the two features across the nine participants.

<table>
<thead>
<tr>
<th>Merger only</th>
<th>Weakened diphthong only</th>
<th>Both present</th>
<th>Neither present</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td>DDdb</td>
<td>PT</td>
<td>DDa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RD</td>
<td>EM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JS&lt;sup&gt;34&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>KO</td>
</tr>
</tbody>
</table>

Table 7.1: Feature distribution across participants

While these features have never previously been studied as indicators of the acquisition of Pittsburgh English as a D2, they have been extensively documented as key features of the speech of those who speak the dialect natively. Johnstone et al. (2002) suggests the following possible relationship between the [ɔ] merger and weakened /aw/: the back-vowel merger as [ɔ] leaves a vacancy in the front-vowel space and, as a result, “[a] is available as a realization for /aw/” (151). Following Johnstone et al.’s analysis, we would expect that participants presenting a weakened or monophthongal /aw/ also produce the [ɔ] realization of the back-vowel merger.

As Table 7.1 above shows, for PT and RD this relationship is borne out, as they have acquired both the [ɔ] merger and a consistently weakened diphthong. As Johnstone et al.’s hypothesis proposes that the merger must be realized as [ɔ] and that no low-back tokens are produced as [a], all the participants in the neither present column also support this feature relationship. The proposal entails that the [ɔ] merger is needed for monophthongal /aw/ to occur; so for speakers who do not use this merger, we would also expect that they do not use monophthongal /aw/. DDa, JL, JS, and KO produce /a/ as [a] and thus have retained a low-back

<sup>34</sup> As shown in §5.3.3, JS has conflicting p-values (one merged and one split). However, I have categorized her as presenting neither the merger nor the weakened diphthong. While the values may indicate a merger-in-progress, they do not show evidence of this being the Pittsburgh English realization of the merger. Thus, in discussing the role of language awareness/attitudes and gender, I assume JS uses neither feature.
vowel split. EM, on the other hand, produces a merged [a] vowel for both /a/ and /ɔ/. For these participants, the /a/ space is occupied by a low-back vowel, and none of them present a weakened diphthong.

However, the proposal cannot account for SS’s or DDb’s feature distribution. SS uses the [ɔ] merger, but retains a strong [aw] diphthong; Johnstone et al., however, predict that this merger should be accompanied by a weakened diphthong. Furthermore, DDb’s use of weakened and monophthongal /aw/ (but not the merger) is also not predicted, as the merger is predicted to be present in order for the /aw/ diphthong to be weakened. Thus, while Johnstone et al.’s (2002) proposal accounts for the both and neither present participants, it does not account for the participants that have only one of the features present in their grammar.35

The feature distribution across the participants also tells us about their acquisition (or avoidance) of Pittsburgh English as a D2. Because the [ɔ] realization of the low-back vowel merger and monophthongal /aw/ are unique phonological features of SW PA, I argue that the presence of either of these features in participants’ speech indicates some degree of acquisition of Pittsburgh English as a D2.36 As PT and RD produce both of the unique phonological features of the dialect area, I propose that they show stronger evidence of D2 acquisition than the other participants. SS and DDb, who each use one feature, have acquired the phonological aspects of the Pittsburgh English dialect to a lesser degree than PT and RD have. The remaining

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35 I base this claim on the analysis given in Johnstone et al. (2002), which considers both features together. However, if we view the features as two stages, with the merger being stage 1 and the monophthong being stage 2, it is possible that Johnstone et al.’s proposal could still account for SS’s use of the merger; she would be in stage 1, and either has not yet or will not acquire stage 2. DDb, however, is still not predicted by this proposal; he uses the monophthong but not the merger, meaning he did not acquire the stage 1 feature before the stage 2 feature.

36 I say ‘some degree of acquisition’ because a dialect also involves lexical and syntactic features, not just phonological ones. As I do not investigate such features in this study, I make no claims as to whether they are present or absent in the speech of the participants of this study. However, as the phonological features discussed here are not found in any other American English dialect, their use by non-native speakers of the dialect shows that the speakers must have acquired these features as a result of D2 acquisition. See Chapter 8 for a discussion on issues in determining what constitutes dialect acquisition.
participants – DDa, EM, JL, JS, and KO – use neither of the unique features, indicating that they have retained their D1 phonological variants and have not acquired D2 pronunciations.

We have then, so far, seen which features the participants in this study have acquired and avoided, but have not yet investigated why the participants pattern as they do. Dialectologists, as previously mentioned, often investigate social characteristics of speakers in order to reveal whether such characteristics influence the use or avoidance of dialectal features. In the following sections, I discuss participants’ dialect awareness/attitudes and gender, showing that these characteristics can partially account for the phonological feature distribution found in this study.

7.2 Awareness of – and attitudes towards – Pittsburgh English

Dialects can often pinpoint geographic or social origins. Speakers tend to not only be aware of dialects, but to have opinions or attitudes towards them. The extent to which speakers are aware of a dialect feature and whether they view that feature positively or negatively can significantly impact speakers’ usage or avoidance of it (Nycz 2013a,b). Examining participants’ comments about Pittsburgh English can provide insight into their (non-)use of the [ɔ] merger and weakened or monophthongal /aw/. In §7.2.1, I provide an overview of previous research on dialect awareness, focusing on SW PA and particularly the low-back vowel merger and /aw/ monophthongization. In §7.2.2, I discuss participants’ comments on the dialect area and whether or not they seem to (i) be aware of Pittsburgh English and (ii) convey an attitude towards the dialect and its features.
7.2.1 Dialect awareness and its effect in SW PA

When speakers move to a D2 area, they either gradually begin to use or continue to avoid the features of the new dialect. Whether a speaker uses or avoids dialect features is heavily influenced by speakers’ awareness of these new features, and also whether they view the dialect positively or negatively. If speakers avoid the new dialect, it is often because “they may wish to keep their accents as a signal to listeners of their linguistic background” (Szabo 2006). In this way, they show that they are aware of the differences between their native dialect and new surroundings, but have preference for the former (Gluszek et al. 2011). Conversely, if speakers are aware of the new dialect, and feel it is to their benefit to use it, they may undergo convergence, “a process by which individuals shift their speech styles to become more like that of those with whom they are interacting” (Giles & Smith 1979: 46). Nycz (2013b) argues that a shift towards a D2 can be dependent on a single known feature of the dialect and that speakers avoid using stigmatized (or negatively viewed) features; however, “if people see the feature as being associated with some identity that they view positively, then they might more quickly adopt it” (351). As the [ɔ] realization of the low-back vowel merger and monophthongal /aw/ are each unique to SW PA, we would expect these features to factor into speakers’ awareness of the Pittsburgh English dialect.

As expected, there is a high level of dialect awareness in SW PA (Johnstone 2009); locals commonly refer to Pittsburgh English as ‘Pittsburghese’. Johnstone (2009) argues that this awareness is widespread, present “even among people who do not themselves have strong local accents, including outsiders who live in the area” (159). ‘Pittsburghese’ is depicted daily in
newspaper cartoons and columns\textsuperscript{37}, by local TV personalities, and is even the basis of punch-lines and fabricated characters by radio disk-jockeys. The use and discussion of the dialect is part of everyday life in SW PA. Recently, ‘Pittsburghese’ has gained more widespread awareness, given the success of comedians such as Pittsburgh Dad and Billy Gardell, natives of the area who base their nationally-seen acts on the unique speech and characteristics of SW PA.\textsuperscript{38}

While awareness of the dialect as a whole is widespread, levels of awareness of specific phonological features greatly differs across speakers. Though vowel mergers are often a defining feature of a dialect, they are thought to be below speakers’ level of social awareness (Labov 1994; Irons 2007; Nycz 2013b); thus, there is usually no overt judgment associated with mergers, and such a feature does not factor into speakers’ attitudes towards a dialect area. Eberhardt (2008) suggest that natives of SW PA use the merger, but may not be aware of the feature; she explains that, “while the low-back merger is…very much a part of the linguistic character of the city, the feature is not popularly viewed as characteristic of the local dialect” (289). Accordingly, it seems that the Pittsburgh English \( \text{id} \) realization of the low-back vowel merger is largely unnoticed by D1 speakers in the area. In §7.2.2, I show how this study suggests that outsiders in the area also tend to be unaware of the presence of the low-back vowel merger, as only one participant indicated any degree of awareness of the feature.

The status of /aw/ in SW PA stands in stark contrast with that of the low-back vowel merger. Johnstone et al. (2002) and Labov et al. (2006), among others, propose that the weakened or monophthongal /aw/ is not only the most recognizable, but also the most

\textsuperscript{37} See Gleason (1967) and Petrucelli (2008) for two interesting views on Pittsburghese; the first is a more academic take and popularized the use of the term Pittsburghese, while the second is a more humorous take from the viewpoint of an outsider in the area.

\textsuperscript{38} Pittsburgh Dad is a You-Tube show, presented as brief skits in which a stereotypical looking and sounding dad goes through daily life in Pittsburgh. Billy Gardell bases his stand-up comedy skits on his life in Pittsburgh, often beginning with an introduction containing several Pittsburgh English lexical and phonological items, which he says “is to say hi to the guys from my hometown”. He then offers to ‘translate’ for people not from the area (Rodriguez 2011).
stereotyped, feature of Pittsburgh English. When linguistic features are stereotyped (whether positively or negatively), they are not only recognizable, but often “become objects of discussion in the communities in which they are known” (Tagliamonte 2012: 30). Indeed, /aw/ is the most represented feature in both spoken and written local-sounding speech in Pittsburgh English (Johnstone et al. 2002). The monophthongal pronunciation is written as *ah* and plastered across T-shirts, mugs, posters, and books. *Downtown* is written *dahntahn, out as aht*, and most importantly, those living in the dialect area recognize this unique spelling as representative of that unique pronunciation. Johnstone (2009) argues that this feature has become so stereotyped that it is contributing to the dialect’s commodification. Pittsburgh English, particularly through the written form of /aw/ as *ah* on books and shirts, has become a marketable item, available as a tool for financial gain. It is thus very clear that there is a high level of awareness of the status of monophthongal /aw/ in the dialect area. Johnstone & Kiesling (2008) suggest that speakers who are aware of monophthongal /aw/ and associate it with local speech usually lack the feature in their own speech; speakers who claim to be unaware of the stereotyped status of the monophthong are largely the ones who use it. This claim, like that concerning the low-back vowel merger, is also supported by this study. As will be discussed in §7.2.2, participants who retained the strongest diphthongal /aw/ were the most aware of (and had the strongest opinions about) the feature. In contrast, the only participant who was unaware of the feature’s stereotype most frequently produced the monophthongal or weakened /aw/. 

7.2.2 Participants’ awareness and attitudes towards Pittsburgh English

The acoustic analysis presented in Chapters 5 and 6 was based on careful speech styles – analysis of word-lists and passage readings elicited from participants. To gauge speakers’ awareness of – and any overt attitudes towards – Pittsburgh English, I engaged participants in casual speech which was, essentially, a conversation about the dialect. Following Johnstone & Kiesling’s (2008) study of speakers native to the dialect area, I first asked participants if they had heard of ‘Pittsburghese’. If they indicated that they were familiar with the term, I then asked them to provide a definition and some examples. Using their definitions and the examples they provided as representative of the dialect area, we can draw some generalizations about the participants’ awareness of Pittsburgh English. Furthermore, we can examine whether or not dialect awareness influences their (non-)use of the [ɔ] merger and weakened or monophthongal /aw/. In §7.2.2.1, I present an analysis of the level of awareness of the dialect features shown in participants’ comments. In §7.2.2.2, I discuss whether there is a relationship between participants’ comments and their attitude towards the dialect area and its features.

39 I use the term Pittsburgh English in my analysis of phonological features, but Pittsburghese when talking about the history and awareness of the dialect. Johnstone (2011) argues that “an account of Pittsburgh speech from a linguist’s perspective would avoid the term ‘Pittsburghese’… [as] it can have negative connotations” (6). As a native to the area, I grew up hearing the term Pittsburghese and can attest to the negativity sometimes associated with it – although the term is just as often used with pride. In this study, I asked participants about Pittsburghese because this is the term used by natives to the area, referring both to the unique speech style and the broader social issues attached to them. Pittsburgh English is a way to refer strictly to the lexical and phonological features of the dialect, not the identity encased in Pittsburghese.
7.2.2.1 Participants’ awareness of Pittsburgh English features

Overall, the data of this study reveals that all of the participants have some level of awareness of the dialect area and its features. The main indication of this awareness is that eight of the nine participants said they had heard of ‘Pittsburghese’ and were able to provide a definition. While RD indicated that he was not familiar with ‘Pittsburghese’, he was able to provide examples of lexical items that are unique to the dialect area, showing that he is at least aware of specific dialect markers. When asked to provide examples of ‘Pittsburghese’, participants’ comments centered on lexical items that they believed to be specific to SW PA. Three items in particular stand out due to their prevalence in participants’ comments – *yinz*, *n’at*, and *redd up*. Five participants (RD, DDb, EM, JS, and SS) discussed *yinz*, a colloquial second-person plural similar to *ya’ll* (as in ‘What are *yinz* doing?’); three participants (RD, DDa, and DDb) brought up *n’at*, a general extender often added to the end of sentences which usually reads as ‘amongst other things’ (as in ‘I need to buy bread, *n’at*’); and three participants (DDa, KO, and SS) mentioned *redd up*, a regional expression of ‘to clean up’ (as in ‘*Redd up* the house before company comes over’). Beyond these three constructions, JL’s definition of ‘Pittsburghese’ included “words that don’t exist” in other areas of the country. While these comments concern lexical items unrelated to the phonological features explored in this study, the fact that these same items were consistently pinpointed by participants as unique to the area shows that they are aware of some of the characteristics of Pittsburgh English.

40 Participants’ definitions varied. However, being able to give a definition shows they are aware enough of the dialect to describe it.
41 See Johnstone et al. (2006) for a discussion on the perceived uniqueness of lexical items in Pittsburgh English.
42 There are multiple uses for *n’at*. Its usage has been debated in research on Pittsburgh English (Johnstone et al. 2006) and, even though I am native to the area, I find it difficult to describe. The ‘amongst other things’ meaning can be seen in business names like *Banners N’at*, a company that makes banners and other graphic designs. This meaning can also be seen in its more conversational usage, where *n’at* is added to the end of sentences. For example, in response to *What did you do today?*, a Pittsburgher may say *Oh, went to work, n’at*. 89
Most participants also indirectly referenced monophthongal /aw/ as being characteristic of the dialect area. JL referred most directly to the feature, when she mentioned that the [aw] sound is spelled “like a-h” in the area; not only does this demonstrate awareness of the feature in general, but her mentioning of the spelling used in the area indicates familiarity with the portrayal of /aw/ in local written forms. Five other participants (DDb, JS, KO, PT, and SS) showed awareness of monophthongal /aw/ through reference to specific lexical items. The most frequent example given was downtown; DDb, KO, and PT each mentioned that it is pronounced as [da:nta:n] in Pittsburgh English. DDb also compared the monophthongal and diphthongal pronunciations when he discussed how people from the area “say [da:n] instead of [dawn]”. I think it is likely that DDb, KO, and PT all mentioned the same word due to its frequent use in both oral and written caricatures of Pittsburghese. Although this is a single lexical item, the fact that participants were able to pronounce it with monophthongal /aw/ and compare it to the typical pronunciation (in the case of DDb) indicates awareness of the feature. Recall that Johnstone & Kiesling (2008) claim that speakers who are aware of monophthongal /aw/ as a local feature do not use it in their own speech. Thus, the fact that DDb and PT both consistently produced weakened (and often monophthongal) variants of /aw/ is unexpected. It is then likely that awareness of /aw/ alone cannot account for the feature’s distribution across participants.

JS and SS, the other two participants who indirectly referenced monophthongal /aw/, do not use the feature in their own speech; in fact, as shown in Chapter 6, they have some of the strongest retained diphthongs. Though they are aware of the feature and offered examples of it, neither JS nor SS produced the monophthong as [a] in their examples. JS mentioned that people in SW PA say “[hæs] instead of [haws]”; this shows she is aware that it is pronounced differently, but [æ] may be the closest approximation to the Pittsburgh English monophthongal
[a] that JS can produce. Similarly, SS said that she knows “it’s like [dәntawn], something like that”; when I asked if she meant [dәnta:n], she said yes. I would argue that SS is aware of the different pronunciation of /aw/, even if her approximation had a different vowel quality. JS and SS may avoid using the feature because they are aware of it and its connotations, or may not use the feature simply because they cannot correctly produce the sound.

Participants’ overall awareness of monophthongal /aw/ is largely shown through specific lexical items. However, it is unclear whether this awareness can account for their use or avoidance of the feature. The relationship between use of the [ɔ] realization of the low-back vowel merger and participants’ awareness of it, on the other hand, is much more straightforward: the majority of participants (eight of nine) did not show awareness of the merger. Assuming that mergers occur below our level of conscious awareness and have no social value attached to them, the general lack of awareness found in this study is to be expected. DDb, however, has a unique awareness of the merger. When describing features he thought were unique to SW PA, DDb said:

They got the soft – the softer...like, everything with an ‘a’ is an ‘a-w’. Like when I grew up in New York, my name ‘d-o-n’ was pronounced [dan]. Okay? Down here, they don’t say [dan], they say [dәn]. So it’s the same pronunciation as the female Dawn and it took me a while, but I found myself saying the same thing. Because if I told people my name was [dan], they would call me Dan. [laughs]. So now, I’m [dәn].

As was shown in Chapter 5, DDb has retained a low-back vowel split in all but three tokens. Two of these tokens were Don, which is his name; he produced each with [ɔ] rather than his usual [a]. As his explanation above shows, DDb is aware of the merger, particularly as it relates to the pronunciation of his name. While mergers occur below social awareness, I would argue

43 Recall from §7.1 that Johnstone et al. (2002) propose that the [ɔ] merger is needed so that [a] is open for monophthongal /aw/. As JS has retained the low-back vowel split, she already uses [a] for /a/, which may be why she does not use it when producing her approximation of the monophthong; the vowel-space is not available for her.
that names – the way that individuals are identified – are an exception to this claim. Speakers want to be understood by others. Thus, DDb’s awareness of the merger likely accounts for his production: the merger is used where it is necessary for comprehensible communication. Recall from §2.1 Herold’s (1997) claim that one motivation for shifting from the split to the merger is that it makes communication easier. If the speakers that one is in contact with do not distinguish between /ɔ/ and /ɑ/, the merged vowel is easier to use when communicating with them. As the speakers with whom DDb communicates in SW PA have a merged vowel, his name is more easily communicated and understood when produced with the merged vowel.

To summarize, the participants of this study all show a general awareness of Pittsburgh English, with some showing a more detailed awareness of the dialect features than others. The awareness of the two features under examination in this study – the low-back vowel merger and monophthongal /aw/ – largely patterns as we would expect. Participants are much more aware of /aw/, a feature which is highly salient in the dialect community and which carries a social stigma. The merger, a feature lacking social values, is below the level of conscious awareness.

7.2.2.2 Participants’ attitudes towards Pittsburgh English

As was shown above, participants were all generally aware of Pittsburgh English, but the distribution of their features varied: some participants produced both [ɔ] and weakened /aw/, some produced one feature, and some produced neither feature. Thus, awareness alone cannot explain the feature distribution across participants. Examining awareness and stigma, Nycz (2013b) argues that it is not just awareness of a dialect, but also whether the dialect and its features are viewed positively or negatively, that influences its use amongst speakers. Indeed, comments by the participants of this study shed light on their attitudes towards Pittsburgh
English, and it appears that these attitudes tend to correlate with their (non-)use of the two studied features.

Five participants (DDa, EM, JL, JS, and KO) use neither the [ɔ] realization of the low-back vowel merger nor the weakened/monophthongal /aw/. Examining their comments reveals that their attitudes towards Pittsburgh English may account for this lack of acquired features. JL’s comments reveal that she views Pittsburgh English negatively. When asked to define Pittsbughese, JL said that it was “slurring of words and dropping prepositions”. Later, when she was describing local vowel pronunciations, JL said, “People at work will say stuff like that and I tell them ‘No, that’s not how you say that. That’s not right’.” JL’s comments indicate that, for her, Pittsburgh English is an incorrect way to speak, that its features (mainly pronunciations) are stigmatized. As she does not want to associate herself with what she views to be incorrect, it is not surprising that JL does not use the unique phonological features of the dialect.

While not as direct as JL’s comments, DDa, EM, JS, and KO also made comments that indicate disassociation with Pittsburgh English, which may account for the fact that they produce neither feature under examination in this study. These four participants all said that Pittsburghese was ‘very unique’ to SW PA, or something used only in the area by those native to the area. Although this is not necessarily a negative perception of Pittsburgh English (as is JL’s), to call the dialect ‘unique’ or to say that it is unique to the people native to the area merely reflects that Pittsburgh English is something these participants do not associate themselves with. Pittsburgh English is something that identifies speakers native to SW PA, which the participants are not. If avoidance of D2 features is a conscious choice by this group, they are choosing to use their D1 features instead; they have retained the features of the dialect area that they associate
with. This is to be expected per Szabo’s (2006) claim, previously discussed in §7.2.1, that speakers often view their accent and dialect as being part of their background.

Three participants (DDb, PT, and RD) use the Pittsburgh English /aw/.44 Their attitudes towards Pittsburgh English show greater variation than the attitudes of participants who do not use the feature. As previously mentioned, RD is the only participant who said that he was unfamiliar with the term ‘Pittsburghese’. Unsurprisingly, he furthermore offered no comments indicating any particular attitude towards the dialect.45 As such, RD’s use of the feature may partially be a result of the fact that he is unaware of any negative social value associated with it. Similarly, DDb’s comments were relatively neutral. When asked to define ‘Pittsburghese’, he focused not on any particular features and what he thought of them, but rather a historical account of what he believed to be the origin of the dialect. This lack of negative perceptions toward or disassociation with Pittsburgh English (both of which are observed for participants lacking the phonological features) leaves DDb more amenable to Pittsburgh English. PT, however, offered a more polarizing view, saying that Pittsburghese is “butchering the English language” and has “improper pronunciation”. Like JL, PT’s comments show that he views Pittsburgh English somewhat negatively; it is then unexpected that he produces both weakened and monophthongal tokens of /aw/, the feature that is most stigmatized in the dialect area. It is most likely the case that he is just unaware that he himself uses the feature. Reconciling PT’s attitude with his feature distribution is left for further research. What we can conclude, though, is that PT’s comments, in comparison to RD and DDb’s, demonstrate that speakers who use the same dialectal features do not necessarily view the dialect in the same way.

44 PT and RD also use the merger, as does SS. However, as no awareness of the merger was shown, it is not considered in the present discussion.
45 I explained Pittsburghese to RD and asked if he knew of any specific features. He mentioned yinz and n’at, but said that was all he could list; he did not offer any comments about his opinion of these features.
To summarize, the majority of participants in this study conveyed varied attitudes towards Pittsburgh English. Participants who use neither of the features under investigation in this study made comments suggesting that they either viewed Pittsburgh English as incorrect, or as something that they do not identify themselves with. These are reasons often cited as influences of the avoidance of dialectal features (Nycz 2013b). The comments made by participants using the Pittsburgh English /aw/ were more varied, but notably did not include the association of identity with dialect features which is typical of other participants’ comments. Thus, while language attitudes are not the sole determining force in D2 acquisition, their importance and influence cannot be overlooked.

7.3 Gender and dialect features

The relationship between speakers’ gender and their use of dialect features has long been studied in sociolinguistics (Trudgill 1972, 1983; Wolfram & Fasold 1974; Cheshire 2002). As the participants for this study are both male and female, it is worthwhile to investigate whether gender influences their (non-)use of either the Pittsburgh English realization of /aw/ or the low-back vowel merger. In §7.3.1, I provide an overview of previous research concerning gender and dialect use and discuss the gender-bias associated with /aw/. In §7.3.2, I explain how gender correlates with the distribution of /aw/, but not the low-back vowel merger, across the participants of this study.
7.3.1 Previous research on gender in dialectology

The investigation of the influence of gender and other social constructs on dialect use became highly prevalent in the late 1960s and early 1970s. In one of the first surveys of social dialects in American English, Wolfram (1969) claimed that “females show a greater sensitivity to socially evaluate linguistic forms than do males” (78). This awareness of forms is reflected in “both their actual speech and attitudes towards speech” (Wolfram & Fasold 1974: 93). Thus, if a feature is stigmatized, females are more likely than males to be sensitive to it. Because stigmatized forms tend to be avoided, we would expect female speakers to use such forms less often than male speakers do. Conversely, when female speakers use a dialect feature, this usually indicates that they have a neutral opinion of it or may even view it positively or as desirable. In a study of social dialects of British English, Trudgill (1972) describes this female behavior as the use of prestige forms – women favor features that they view as socially desirable and not stigmatized. Trudgill also argues that the opposite is true of male speakers. He explains how “for male speakers, non-standard WC [Working Class] speech forms are highly valued, although these values are not usually overtly expressed. These covert values lead to sex-differentiation of linguistic variables of a particular type” (1972: 194). Thus, while female speakers tend to openly value (overt prestige) more standard speech forms, males use non-standard forms without directly reflecting their value (covert prestige). In Trudgill’s study, language attitudes and dialect use correlate with gender. In §7.3.2, I argue that the distribution of /aw/ amongst participants of this study also correlates with gender.

Several later studies reaffirm this correlation between gender and dialect features. In particular, the female association with prestige forms is commonly discussed. Trudgill (1983), Milroy et al. (1994), Cheshire (2002), and Watt (2002), amongst many others, all argue that this
desire for prestige (or avoidance of non-standard forms) causes women to use forms that have the widest geographic range, those forms which are seen as supra-local or nationally standard. Applying this proposal to the current study, diphthongal /aw/ would be supra-local while monophthongal /aw/ would be a local form, geographically isolated to SW PA. Recall that /aw/ is stigmatized in this dialect area and has a polarizing range of social values attached to it. In a study of rural American English, Hazen (2002) found that male speakers use stigmatized forms twice as often as female speakers do. Again, the reason for this variation is claimed to be due to the fact that female speakers convey condescension towards these forms, while male speakers do not.

Previous research on Pittsburgh English has focused more on phonology and feature awareness than the effect of speaker gender on feature distribution. However, there is some indication that monophthongal /aw/ usage in particular is heavily influenced by speaker gender. Men in SW PA are more likely to use the /aw/ monophthong than women are, and women tend to convey stronger attitudes towards the feature (Johnstone et al. 2002; Johnstone & Kiesling 2008). This claim is to be expected, as /aw/ is highly salient and socially-charged. The [ɔ] realization of the low-back vowel merger, however, is a feature that speakers are largely unaware of, and consequently there is no overall social value attached to it. Eberhardt (2008, 2009) found that native Pittsburghers did not discuss this feature and that there was no indication that either gender used the feature more than the other did. As such, we would hypothesize that, in the current study, participant gender factors into the distribution of the variants of /aw/, but not the [ɔ] merger.
There is no clear indication that participant gender influences the acquisition of the [ɔ] realization of the low-back vowel merger in this study. Of the three participants that have the merger, two are male (PT, RD) and one is female (SS). Of the six participants who do not use the merger – those who retained the low-back vowels of their D1 – three are male (DDa, DDb, KO) and three are female (EM, JL, JS). This distribution shows that the feature’s use is split almost exactly in half between the two genders. The fact that use of the Pittsburgh English merger amongst participants in this study does not correlate with speaker gender is predicted. As mergers are believed to occur below the level of conscious awareness, speakers do not assign a social value to them. It is this social value that differentiates the genders, with females favoring prestige forms that tend to be supra-local and males preferring working-class local forms. Thus, since the merger is not a social feature, gender does not factor into its distribution.

However, participant gender does seem to play a role in the distribution of weakened and monophthongal /aw/. All three of the participants (DDb, PT, RD) whose average Euclidian distance indicates a significantly weakened diphthong are male. Recall that this pronunciation is associated with working-class males and is a local form, as SW PA is the only place it is found in North America; males are more amenable to local forms than females are. Diphthongal /aw/ is the standard supra-local pronunciation that is found in all English dialects; it is the supra-local forms that are valued and favored by female speakers. The distribution of /aw/ amongst participants in this study, then, correlates with speaker gender.

In sum, the findings of this study replicate the claims found in previous research on the correlation between speaker gender and the use of dialect features. While previous studies focused on D1 features, the current study shows that gender also plays a role in the acquisition of
D2 features. Gender factors into the distribution of /aw/, which has a social value assigned to it by speakers. However, gender does not factor into the distribution of the low-back vowel merger, which lacks this social value.

7.4 Summary

In this chapter, I discussed variables that could potentially account for the feature distribution across participants in this study. I addressed Johnstone et al.’s (2002) proposal that the low-back vowel merger shifting to [ɔ] left the front-vowel space available for a monophthongal realization of /aw/; if a speaker has monophthongal /aw/, they should also have the [ɔ] merger. This proposal neatly accounts for speakers in this study who use both of the features. It also accounts for participants who have neither feature, as a lack of the [ɔ] merger would entail a lack of monophthongal /aw/. However, it is unclear whether this proposal accounts for the speakers using only the merger. Furthermore, it does not predict the behavior of one speaker in this study who has a monophthongal /aw/ but not the merger. Thus, Johnstone et al.’s proposal cannot wholly account for the feature distribution seen across the participants in this study.

The influence of social variables on dialect usage provides some further insights into the feature distribution across participants in this study. I focused on the effect of dialect awareness and attitudes on the distribution of [ɔ] and /aw/, explaining how it only applies to /aw/. Vowel mergers tend to occur below the level of conscious awareness; as expected, the participants as a whole did not indicate any awareness of the unique quality of the low-back vowel merger in Pittsburgh English. Thus, neither their awareness nor their attitudes factor into whether or not they produced the merger. However, monophthongal /aw/ is well-known in SW PA, to the point
that it is stereotyped. The majority of participants in this study indicated awareness of this feature as unique to the dialect area. This awareness of the dialect, and accompanying attitudes towards it, does seem to influence the use of monophthongal /aw/. All the participants lacking the feature conveyed attitudes that either view the dialect as negative or as something with which they do not identify. As monophthongal /aw/ is well-known as a marker of the dialect, it is unsurprising that these speakers do not use it. It is then unexpected that PT uses monophthongal /aw/, because his comments indicated that he views Pittsburgh English negatively.

Similarly, speaker gender correlates with the distribution of /aw/. Only male speakers used the weakened or monophthongal /aw/. This is to be expected, as stereotyped or local features are favored by male speakers and avoided by female speakers. Furthermore, the use and non-use of the [ɔ] merger is fairly evenly split between male and female speakers. This is to be expected; as speakers are unaware of the merger, they do not favor or disfavor it. Previous research suggests that gender influences the acquisition of D1 variation; this study provides evidence that this influence also extends to D2 feature acquisition, as gender correlated with the distribution of /aw/ amongst the participants of this study.
8. Conclusion

In this chapter, I summarize the findings and analysis of this thesis in regards to the acquisition of two phonological features by adults in southwestern Pennsylvania (§8.1). In §8.2, I discuss the implications of this research and in §8.3 I describe some issues for further research raised by this analysis.

8.1 Summary

In this thesis I investigated the D2 acquisition by adults of two unique phonological features of Pittsburgh English – the [ɔ] realization of the low-back vowel merger and monophthongal /aw/. Nine native speakers of English participated in this study. I conducted an acoustic analysis of tokens of these two features, which were extracted from elicited careful speech data from each speaker. This acoustic analysis revealed that one participant produced only the [ɔ] merger, one participant produced only monophthongal /aw/, two participants produced both features, and five participants produced neither feature. I propose that this feature distribution shows that the phonological features of Pittsburgh English can be acquired in a D2 context.

I discussed the role of speakers’ dialect awareness and gender in feature acquisition in order to account for this feature distribution. Mergers typically occur below speakers’ level of conscious awareness, so they have no perceivable social value attached to them (Labov 1994; Irons 2007). As expected, the speakers in this study did not indicate awareness of this feature, and thus awareness cannot account for the presence or absence of the merger. Its distribution also did not correlate with speaker gender. However, previous research indicates that speakers in SW PA are highly aware of monophthongal /aw/ (Johnstone 2009). Furthermore, speakers who have this awareness usually do not produce the feature; those that do produce the feature tend to
be male (Johnstone & Kiesling 2008). The findings of the current study support these claims: speakers who described monophthongal /aw/ as stereotypical of Pittsburgh English do not produce the feature and all three speakers who produce the feature are male.

8.2 Implications

This thesis is the first study to analyze Pittsburgh English as a D2. In doing so, not only does it add to the existing documentation of the dialect’s phonological features, but also demonstrates that these features can be acquired. Although the Pittsburgh English dialect is spoken throughout SW PA and not just in the city of Pittsburgh proper (Kurath & McDavid 1961; Johnstone et al. 2006), the majority of studies focus on populations within the city limits. The participants of the current study reside in the suburban communities of Monroeville and Trafford, not within the city of Pittsburgh. As Wetmore (1959) and Labov et al. (2006) do for Pittsburgh English as a D1, this thesis documents the D2 presence of the dialect’s phonological features in smaller communities in SW PA.

In this thesis, I propose that adults can acquire the phonological features of a D2. This proposal provides support for Flege’s (1995) argument that production and perception of speech sounds remain malleable across a speaker’s life span. If speakers can adapt their production despite their age, adults can acquire and produce features of their D2. As I showed via acoustic analysis, some participants of this study produced Pittsburgh English features as they are produced by native speakers of the dialect. Thus, contra Tagliamonte & Molfenter (2007), adults as well as children can acquire the features of a D2 with native-like competency.

Previous D1 research indicates that mergers occur below conscious awareness (Labov 1994; Irons 2007) and that their distribution does not correlate with speaker gender (Eberhardt
Natives of SW PA are aware of monophthongal /aw/; those speakers that indicate awareness usually do not use the feature. Furthermore, the feature is used more often by men than by women (Johnstone & Kiesling 2008). This thesis shows that these D1 claims are also borne out in a D2 context. The participants of this study generally did not indicate awareness of the merger, and it was not clear that either gender used the feature more than the other. However, participants indicated awareness of /aw/; those that described it as stereotypical of the area did not use the feature, and all three participants producing the feature were male. Thus, the same speaker variables that factor into the distribution of D1 features are also applicable to the distribution of D2 features.

8.3 Issues for further research

This thesis focuses on the acquisition of phonological features of Pittsburgh English. However, there are also unique lexical items and syntactic structures found in the dialect. Recall that Chambers (1992) proposes that lexical aspects of the D2 are acquired earlier than phonological features of the D2. Thus, next steps would include studying the participants’ acquisition of Pittsburgh English lexical items; based on Chambers’ proposal, we would expect to find that the participants who produce the merger or monophthong also produce Pittsburgh English lexical items. Analyzing the participants’ (non)-use of lexical and syntactic features would also yield a more comprehensive understanding of how many D2 features they have acquired.

The analysis put forth in this thesis is based on an acoustic analysis of participants’ speech data. Another next step would be to conduct a perceptual analysis of the data set. Perceptual analysis is often used in D1 studies of Pittsburgh English, particularly as it concerns
the variants of /aw/ (Johnstone et al. 2002; Johnstone & Kiesling 2008). Munro et al. (1999) also base their D2 study of Alabama English diphthongs on a perceptual analysis. As the participants of this study are in constant contact with native speakers of Pittsburgh English, in a future study I would ask native speakers of the dialect to judge recorded speech examples from the participants in this study. While my analysis reveals if participants’ pronunciations of /aw/ and the low-back vowel merger match the acoustic standards of Pittsburgh English, a perceptual analysis would further reveal if participants’ production matches what native speakers perceive as standard Pittsburgh English.

This thesis also raises a bigger question: what constitutes a D2? Similarly, how many (and what type) of features must participants produce before they can be said to have acquired a D2? In this thesis, I propose that participants have acquired the phonological features of Pittsburgh English. As discussed in Chapter 7, there were participants who acquired one of the two features, both of them, and neither of them. In a strictly phonological context, we would not argue that the participants producing neither of the features have acquired Pittsburgh English as a D2. However, further research into non-phonological features is needed to confirm whether such participants have acquired other aspects of Pittsburgh English.

This thesis also raises questions about variation in feature production. In §5.3.1, I argued that DDb does not produce the Pittsburgh English low-back vowel merger, even though he produced three tokens of /a/ as [ɔ]; I proposed that, as two of three tokens were of his name, this was a lexically-conditioned shift and not indicative of the acquired merger. Similarly, in §6.3.1, I argued that DDa’s average Euclidian distance was somewhat shortened due to the influence of his D1, and not acquisition of the D2 monophthongal /aw/. These examples raise larger questions: how many tokens can be exceptions to feature acquisition, and are there speaker-
specific features (such as D1 traits) that can account for these exceptions? Further research on
the status of lexical exceptions or D1-based exceptions, for example, can give us a clearer picture
of how much variation is allowable in the acquisition of a D2 feature or retention of a D1 feature.
## Appendix A
Participants’ demographic information

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Gender</th>
<th>Age</th>
<th>Education</th>
<th>Occupation</th>
<th>Hometown</th>
<th>Years in SW PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDa</td>
<td>Donald D.</td>
<td>male</td>
<td>68</td>
<td>MBA</td>
<td>Sales</td>
<td>Cincinnati, OH</td>
<td>20</td>
</tr>
<tr>
<td>DDb</td>
<td>Don D.</td>
<td>male</td>
<td>55</td>
<td>High school</td>
<td>Manufacturing</td>
<td>Apalachin, NY</td>
<td>35</td>
</tr>
<tr>
<td>EM</td>
<td>Eleanor M.</td>
<td>female</td>
<td>54</td>
<td>High school</td>
<td>HR assistant</td>
<td>Erie, PA</td>
<td>20</td>
</tr>
<tr>
<td>JL</td>
<td>Jeanine L.</td>
<td>female</td>
<td>52</td>
<td>Associate’s degree</td>
<td>Office manager</td>
<td>Lighthouse Point, FL</td>
<td>20</td>
</tr>
<tr>
<td>JS</td>
<td>Jeanne S.</td>
<td>female</td>
<td>53</td>
<td>CNA certification</td>
<td>Hospice care worker</td>
<td>East Point, GA</td>
<td>29</td>
</tr>
<tr>
<td>KO</td>
<td>Kevin O.</td>
<td>male</td>
<td>35</td>
<td>High school</td>
<td>Bank analyst</td>
<td>Olyphant, PA</td>
<td>17</td>
</tr>
<tr>
<td>PT</td>
<td>Peter T.</td>
<td>male</td>
<td>58</td>
<td>Bachelor’s degree</td>
<td>Lawn care</td>
<td>Braintree, MA</td>
<td>32</td>
</tr>
<tr>
<td>RD</td>
<td>Robert D.</td>
<td>male</td>
<td>54</td>
<td>High school</td>
<td>Craftsman</td>
<td>Green Cove Springs, FL</td>
<td>11</td>
</tr>
<tr>
<td>SS</td>
<td>Stephanie S.</td>
<td>female</td>
<td>44</td>
<td>High school</td>
<td>Salesperson</td>
<td>North York, Ontario</td>
<td>13</td>
</tr>
</tbody>
</table>
Donald McMunn grew up along the Allegheny River before there were modern appliances for things like washing clothes. They raised a few cattle, kept chickens and ducks ‘round for the good eggs, and grew crops like alfalfa that they sold for a few cents a pound. They hunted for deer and squirrel for the meat and the skins. Although their house was just a few miles from Pittsburgh as the eagle flies, it could have been the olden days there. Many adults couldn't read or write, and children didn't always know too much, either. Don's family would wash their pots and pans in the nearby stream, despite the fact that the water had caught an odd reddish-brown color from the iron works upstream. Down the river to the southwest, smoke and flames from the stacks of the steel mills showed the strength of modern-day industry, but Don and his family lived in an old-fashioned way, rising from their cots at dawn to walk the length of their hillside fields, checking on the livestock. After a long day behind a plow or a spinning wheel, they whiled away the time at home. They took pleasure in singing, while Don's wife hemmed old clothes and crocheted shawls, protecting herself from the cold.
Appendix C
Word list

how
giant
wheel
will
yeah
tired
house
has
pill
peel
about
no
down
dawn
don
talk
taught
modern
caught
cot
pot
go
iron
out
at
steal
still
steel
Appendix D
Analyzed tokens

Word list

/aw/:  how, house, about, down, out
/s/:    dawn, talk, taught, caught
/a/:    don, modern, cot, pot
Participants: all

Reading Passage

/aw/:  round, pound, house, down, south
/s/:    caught, dawn, walk, long
/a/:    modern, crops, don’s, pots, cots
Participants: DDb, JL, JS, KO, RD
References


