YOU HAVE TO LEARN TO ADAPT: A SOCIOLINGUISTIC STUDY OF
CHINESE AMERICANS IN THE "ASIAN CITY" OF SOUTHEAST MICHIGAN

By

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ABSTRACT

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This dissertation explores the nature of dialect contact, ethnic identity construction by examining the extent to which the speech of second generation Chinese Americans (henceforth CAs), born and raised in Troy, Michigan, is affected by two local sound changes: the Northern Cities Shift (NCS), the dominant dialect among mainstream Michiganders of European American descent (Labov, Ash & Boberg 2006); and an emerging sound change in Michigan, the Elsewhere Shift (Kendall & Fridland, 2014).

The community investigated in this dissertation, Troy, is in southeast Michigan. It is distinguished by its large population of Chinese Americans and a long residence history of Chinese immigrants compared to other Asian groups (Metzger and Booza 2001). Referred to locally as "the Asian city of southeast Michigan", 19% of Troy residents are Asian and 5% self-identify as being of Chinese descent. Job opportunities in the auto industry, a high-quality education system, and a safe environment have been attracting an increasing number of Chinese immigrants to this area from the 1960s and continuing to the present day.

The acoustic and statistical analysis was carried out on the vowel system of 30 college-age Chinese American speakers, and 15 comparable European Americans serve as a reference group. Data collection was conducted by two interviewers: a male graduate student from China, and a European American undergraduate female student who was also from southeast Michigan. The data in this study were collected by a structured interview similar to a sociolinguistic interview.

The analyses show that Troy Chinese Americans are participating in the local vowel system

to the same degree as their European American cohort. Nonetheless, even though the two ethnic groups share similar social evaluation of those vowels, as indicated by the examination of contextual style-shifting, inter-ethnic differences were nonetheless found for the vowels THOUGHT, DRESS, STRUT, TRAP and TOO. Of these vowels, only TOO was sensitive to a change of interlocutor: Participants' nucleus of TOO was on average significantly backer with the male Chinese interviewer than with the female European American interviewer. I argue that inter-ethnic variation in the realization of TOO was found to be due to an effect of interlocutor identity, the F2 dimension of TOO is used by Chinese Americans as a way to index ethnic identity, solidarity, and localness in Troy, Michigan.

This study draws on research in variationist sociolinguistics. It joins a growing body of work within variationist sociolinguistics that investigates Asian American speakers in the U.S. (e.g., Hall-Lew 2009, Wong 2015, Bauman 2016). The purpose of this work is to contribute to our knowledge of the complex interactions between language, ethnicity identity and regional identity construction. In the variationist literature, there are a limited number of studies focusing on stylistic variation that signals response to interlocutor ethnicity (e.g., Rickford and McNair-Knox 1994 for African American English). This study serves as the first step towards investigating the stylistic variation of CAs' English – grounded in the variationist approach to ethnic minority English in the U.S. – and to enrich our understanding of intra-speaker and inter-speaker stylistic variation.

For my father

献给我的爸爸

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lead me to the door of formal linguistics, then by taking your strenuous phonology courses, I began to re-build my self-confidence which was lost years ago. Karthik, because of you, statistics becomes fun, experiment design becomes enjoyable. Anne, I will keep the envelope with a draft of my dissertation that has your handwritten comments all over on the top of my bookshelf, it will remind me how a diligent scholar should be.

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Chapter 1. Introduction

1.1 Overview

This dissertation is a sociolinguistic study, more specifically, this is a study in the field of
Language Variation and Change (LVC). LVC, also known as Variationist Sociolinguistics,
"deals with systematic and inherent variation in language, both in the present (synchrony) and in
the past (diachrony)" (Tagliamonte 2012: 15). The goal of variationist sociolinguistic studies is
to understand the mechanisms which link extra linguistic phenomena (the social and cultural)
with patterned linguistic heterogeneity (the internal, variable, system of language) (Sankoff
1988: 157).

One of the primary principles of variationist studies is that "the form of a language varies
as a reflection of social variation between and within communities" (Wagner & Ravindranath
2015: 264). Since the inception of variationist sociolinguistics in the 1960s, studies of the
English spoken by the U.S. population have often been on the majority ethnic group: White
European Americans (henceforth EA). Fewer variationist studies have examined ethnic minority
groups, with the exception of a long tradition of scholarship on the English of African Americans
(e.g., Labov 1969; Wolfram, Thomas and Green 1997) and of Latinx Americans (e.g., Poplack
1978; Fought 1999). Asian Americans[1] (henceforth AAs) are the ethnic minority group least
studied by sociolinguists (Fought 2004, Wolfram and Schilling-Estes 2006). Among AAs,
Chinese Americans (henceforth CAs) are the earliest arrived and largest ethnic group and are
especially fast-growing. With the increase in CA populations across the U.S., it is important to
incorporate this group of ethnic minority speakers in the description of variation and change

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[1] The term 'Asian American' is used by scholars as an umbrella term including multiple ethnicities, heritage
language backgrounds and heritage identities of Asia. In the current paper, Asian Americans refer to individuals who
are of East Asian descent, i.e. they or their parents or grandparents are from China, Korea, Japan, etc.

within local varieties of American English.

This dissertation focuses on second generation Chinese Americans who speak English as their native language, in order to examine their language use and identity practices. Specifically, it aims at exploring the nature of dialect contact by examining the extent to which the speech of second generation CAs, born and raised in Troy, Michigan, is affected by two local sound changes. One, the Northern Cities Shift (henceforth NCS), is claimed to be the dominant dialect among mainstream Michiganders of EA descent; the other is an emerging sound change in Michigan, which I shall refer to as the Elsewhere Shift. The second and third parts of this study will examine contextual stylistic variation, the effect of interlocutor, and their interaction with identity construction in CA English speech. The community investigated in this paper, Troy, is in southeast Michigan. It is distinguished by its large population of Chinese Americans and a long residence history of Chinese immigrants compared to other Asian groups (Metzger and Booza 2001). Acoustic and statistical analysis were carried out on the vowel system of speakers from Troy, as collected by a structured interview with many elements of a traditional sociolinguistic interview.

This study draws on research in variationist sociolinguistics. It joins a growing body of work within variationist sociolinguistics that investigates Asian American speakers in the U.S. (e.g., Hall-Lew 2009, Wong 2015, Bauman 2016). The purpose of this work is to contribute to our knowledge of the complex interactions between language, ethnicity identity and regional identity construction. In the variationist literature, there are a limited number of studies focusing on how stylistic variation indicates a speaker's response to the ethnicity of the interlocutor (e.g., Rickford and McNair-Knox 1994 for African American English). This study serves as the first step towards investigating the stylistic variation of CAs' English – groundeed in the variationist

approach to ethnic minority English in the U.S. – and to enrich our understanding of intra-speaker and inter-speaker stylistic variation.

This dissertation is organized as follows: The remainder of this chapter will provide some background on Chinese Americans in the U.S. and Michigan, previous variationist studies of Asian Americans, the ongoing and emerging local sound change in Michigan, and the theoretical background of this study. In Chapter 2, I describe the methodology in this study, including choosing the community, overview of the participants and fieldworkers, data collection and analysis procedure. Chapter 3 presents a description and analysis of Troy speakers' vowel system, and how it does and does not conform to the expected regional speech features. Chapter 4 explores Troy speakers' speech in different contextual styles, attempting to account for the inter-ethnic variation found in Chapter 3. Chapter 5 continues to investigate the inter-ethnic variation through an examination of interlocutor effect. Finally, Chapter 6 discusses the results and possible directions for future research.

1.2 The Chinese American Population in the U.S. and Michigan

The Chinese have a long history of migrating to the United States. The U.S. Immigration Commission recorded that the first Chinese arrived in California in 1820 (Bromwell 1969 [1856]: 24). The first wave of immigration came with the 1849-era California gold rush. After that, a series of anti-Chinese movements in California, especially the passing of the Chinese Exclusion Act in 1882 severely restricted immigration. Not until 1965, when the Immigration and Nationality Act abolished the national origins quota system, did an increasing influx of new immigrants arrive in the US (Zhang 2008). With the liberalization of emigration policies by the People's Republic of China (PRC) and Taiwan in the 1970s, this wave of immigration was

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comprised largely of Chinese students, immigrants, smugglers and their families during the last two decades of the 20th century (Chang 2003). According to the U.S. 2010 Census, the Chinese population in the U.S. has reached 3.29 million, accounting for 1.06% of the total U.S. population and it is the largest group among Asian Americans[2].

In Michigan, as reported in the 2010 U.S. Census, the Chinese population is 45,454, which constitutes 0.46% of the entire population of Michigan. It is the second largest ethnic group, following Asian Indians, among Asian Americans in Michigan. Thanks to China's implementation of its late 1970s economic reform policy ([改革开放政策], literally "reform and opening up policy"), travel abroad for purposes such as doing business, tourism, and to study became possible for the ordinary Chinese public from the 1980s onwards. A similar opening up occurred in Taiwan, where rigid government censorship of travel abroad has been cancelled since 1989. Thus, between 1990 and 2000, there was a tremendous 73.3% rise in the Chinese population in Michigan, followed by a 34.1% rise from 2000 to 2010 compared to the previous decade.

The Detroit Tri-County area (Oakland, Wayne and Macomb Counties) has the largest population of Chinese residents in Michigan. Chinese immigrants were initially attracted to this region by job opportunities in the auto industry. To quote one of my informants, who has been living in this area for more than 20 years:

> The auto industry in and around Detroit attracted Chinese gathered in Greater Detroit area, and Troy is their first choice of residence after the 1967 Detroit riot. The Chinese immigrants' traditional way of living by which they all live in and around Chinatown no longer exist. Now people all have each one's lifestyle. They (Chinese) scattered in all places, but Troy is still the place they will come

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[2] U.S. Census Bureau, 2006-2010 American Community Survey. Retrieved from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_SF4_B01003&prodType=table on August 24, 2017

for groceries and dining.

--- KY, male first generation Chinese American from Troy, Michigan

As this first generation immigrant depicted, the recently immigrated Chinese Americans in Michigan are no longer confined to inhabiting a concentrated area, like Chinatown. The members of the Chinese American community in Greater Detroit are in a rather loose connection with each other, based on their scattered residences. The composition of the newer Chinese immigrants has also changed since the 1960s' immigration wave. There are more "professional people" (KY, Troy, MI) nowadays moving to Michigan attracted to technical jobs in the auto industry, not as in the 1960s when most of the immigrants were working mainly as manual laborers in the auto industry. From the perspective of the linguist, the transformation in the nature of work, accompanied by the need in these non-manual jobs for more interaction with the European Americans, can be expected to have led to a change in the immigrants' English.

Though Chinese Americans constitute a large part of the ethnic minorities in Michigan, the immigration history of this minority group in Michigan is comparatively short with respect to that of the US coasts, especially in the suburbs of Metro Detroit[3]. Though scrutiny is needed for further investigation, the information I gathered from my informants is that most of the Chinese Americans in Troy are the first and second generation immigrants, based on which I decided to investigate second generation Chinese American immigrants, who are more likely to speak English as their native language.

In sum, despite a comparatively short immigration history, the change in lifestyles, and the transformation of the professions in that short time might have led the English of Chinese Americans in Michigan to be fully or partially accommodated to the characteristics of the

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[3] The first Chinese arrived in Michigan in the 1870s (Glazier and Helweg 2001), however, the Chinese that immigrated to suburbs of Metro Detroit started mostly after the Immigration Act of 1965 (Zia 2000).

majority, namely European American English. The aim of this project is to investigate the extent of this accommodation.

As an introduction, the rest of this chapter will provide a review of the existing literature on Chinese/Asian American English in variationist studies in section 1.3. Section 1.4 is a brief introduction of the main regional characteristic of European American English in Michigan: the Northern Cities Shift (NCS) vowel rotation. How the NCS has been affecting the English of local ethnic minorities will be discussed in section 1.5. Section 1.6 will describe a newer sound change emerging in the Midwest, the Elsewhere Shift. In section 1.7, I review the theoretical background of stylistic variation and the interlocutor effect. Section 1.8 introduces a more detailed structure of this dissertation.

1.3 Asian American English

In the first decades of the 21st century, there have been an increasing number of studies focusing on the interaction of regional dialect variation and ethnicity. This comes as a response to Labov's (2001) claim that ethnic minority groups typically do not participate in mainstream white (henceforth 'European American' or EA) sound change in United States English. However, studies focusing on African American English and Chicano English have shown that minority groups can and do participate in sound changes characteristic of the local European American community (e.g., Wolfram et al. 1997, Fought 1999, Roeder 2010), albeit sometimes more slowly, or not as fully.

As for Asian Americans, linguists have also usually found that Asian American English is either similar to the mainstream or heading in that direction. An early study of first generation Vietnamese immigrants to Northern Virginia (Wolfram, Christian, and Hatfield 1986) suggested

that the emerging variety of Vietnamese English was heading in the direction of Standard English. Mendoza-Denton and Iwai (1993) found that in California, while second generation Japanese Americans' English still showed some phonological influences from Japanese, the fourth generation had converged with the local mainstream EA variety. In recent years, there have been some studies on Asian Americans' accommodation to local phonological features of English. In Philadelphia, second generation and younger first generation Korean immigrants were more likely to acquire word-medial /t/ flapping than older first generation immigrants (Lee 2000). Younger speakers with younger ages of arrival (i.e., 1.5[4] and second generation) of Hmong Americans in the Minneapolis-St. Paul area accommodated to local norms for TRAP[5] fronting and raising (Ito 2010).

However, a few studies have been supporting the notion that Asian American English differs in identifiable ways from mainstream English, in features such as breathier voice, longer voice onset times (Newman and Wu 2011), and the finding that Asian Americans' speech is more syllable timed (Bauman 2016). So, which statement is true for Asian Americans? More importantly, what is true for Midwestern Chinese Americans? Research on Chinese Americans to date all focuses on coastal areas of the United States. Hall-Lew (2009) examined the merger of the low back vowels (LOT & THOUGHT), and the fronting of the two back vowels (GOOSE & GOAT) in San Francisco, California, one of the earliest and the primary points of entry to the mainland U.S. for Chinese immigrants. Results demonstrated that second and later generations of Chinese Americans in San Francisco share the same sound changes in apparent time as their European American counterparts.

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[4] The term "1.5 generation" (Rumbaut 2004) refers to individuals who immigrate to a new country before or during their early teens.
[5] Wells lexical sets (Wells 1982) are used in this paper to refer to vowel classes.

In contrast, Wong (2015) found that in New York City, second generation Chinese Americans who are more oriented to Chinese identity and have close ties to the Chinese community are *less* likely to use the local linguistic variants, including the raising of THOUGHT; and the fronting of GOOSE. Bauman's (2016) study also concentrated on the East coast but focused on Asian Americans who are sorority members in a public university in New Jersey. Acoustic analysis of the GOAT vowel showed that sorority members produce a more backed and monophthongal GOAT than their non-Asian peers. Bauman argued that for sorority members, it indexes both Asian ethnicity and participation in a community of practice (Wenger 1998).

Overall, however, variationist sociolinguistic investigation of Chinese Americans shows that they are generally participating in local sound changes. As is being shown increasingly for African American English (Wolfram & Schilling-Estes 1998: 174, Green 2002: 1, Wolfram and Thomas 2002), there are regional differences that could distinguish varieties of Asian American English. At least on the West and East coast of the U.S., the realizations of THOUGHT by Chinese Americans in New York City and San Francisco are more similar to their respective regional patterns than to one another (Wong & Hall-Lew 2014). How about the linguistic practice of Chinese Americans in the Midwest? Does it entirely match the phonology of local European Americans? How are they indexing their Chinese ethnic identity, if at all?

The current study focuses on the vowel system of Chinese Americans in Michigan. One aim is to examine to what degree Chinese Americans participate in the regional speech patterns of Lower Michigan. The most distinctive regional speech feature that has been discovered in this area is the sound change in progress known as the Northern Cities Shift (NCS), which will be briefly introduced in the next section.

1.4 Northern Cities Shift

The Northern Cities Shift (NCS) is a sound change that has been operating in the Inland North dialect region at the core of the larger Northern region (Labov, Ash, & Boberg 2006). The Inland North includes the cities along the Erie Canal (Rochester, Syracuse, Buffalo) and the cities around the Great Lakes (Cleveland, Detroit, Gary, Chicago, Milwaukee). It also includes the St. Louis corridor, extending from Chicago to St. Louis (Labov et al. 2006). The NCS is extending further north and east in New York state (Dinkin 2013) and northwest into Milwaukee and Madison (Labov et al. 2006). It is slowly making its way to the surrounding less-urban areas (Gordon 1997, Ito 1999).

The first report of the NCS was given by Fasold (1969) based on his examination of Shuy, Wolfram and Riley's data from Detroit (1967). Fasold described the raising of TRAP, the fronting of LOT and fronting and lowering of THOUGHT. Peterson and Barney's (1952) vowel system of American English, as in Figure 1.1, is often employed as the baseline from which the various vowel shifts have been derived. It is based on the vowel systems of 76 respondents, among whom most of the women and children grew up in the "Middle Atlantic speech area", and male speakers represented "a much broader regional sampling of the U.S." (Peterson and Barney 1952).

Figure 1.1: Pre-NCS English vowel system (Cited in
Bakos 2008:25, adapted from Peterson and Barney 1952)
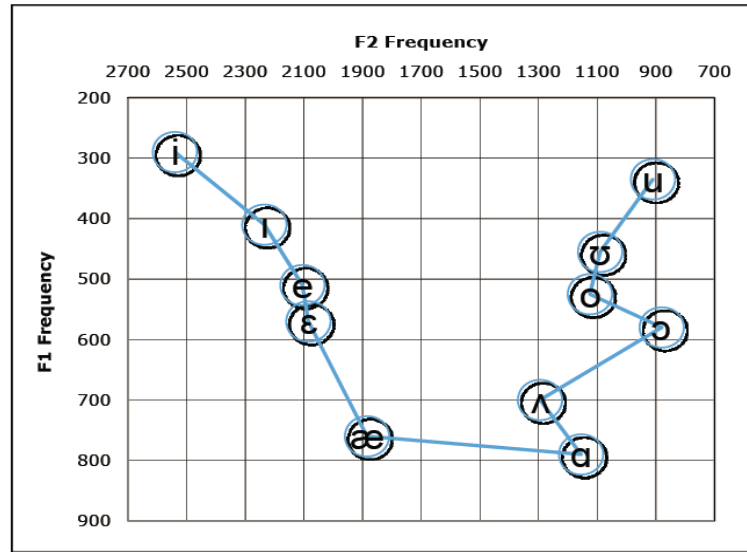
The above vowel system, sometimes referred to as the 'General American English of Peterson and Barney', is thought to have been the dominant accent in Michigan prior to the initiation of the NCS (Ito 1999).

Labov, Yaeger, and Steiner (1972) were the first to describe the NCS as a chain shift. Labov (1994) proposed that the NCS is a change in progress that has several interconnected steps[6]. The fronting and raising of TRAP is the initial step in the shifting process. The movement of TRAP creates a void in the vowel space that leads to the fronting of LOT and the lowering and fronting of THOUGHT. The movement of TRAP also prompts backing of STRUT (Eckert 1988), lowering or backing of DRESS, and lowering of KIT. In Figure 1.2, all the vowels that have been shifting are presented with arrows indicating the pre-NCS position (see Figure 1.1) and the position after shifting.

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[6] However, recent studies (e.g. McCarthy 2011) have suggested that the ordering of steps in NCS is not necessarily this straightforward; a closer investigation of the chain shifting is needed at the local level.

Figure 1.2: The Northern Cities Shift (Labov et al., 2006)
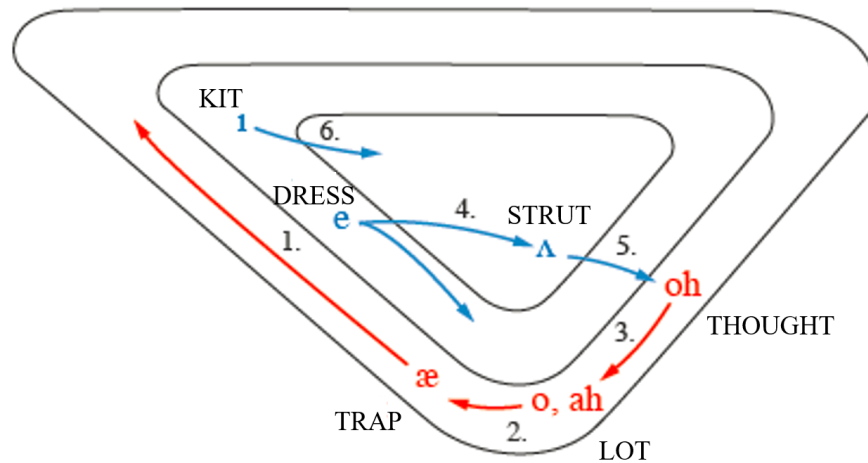
Previous research in Lower Michigan has shown that the European Americans in this area are participating in the NCS (see Gordon 2001 for a general review). Michigan's major southeastern cities such as Detroit, Ann Arbor, and Flint are identified as NCS-participating locales in the *Atlas of North American English* (ANAE: Labov et al., 2006). Studies have shown that the NCS has dispersed through the lower part of the state, being most advanced in larger cities like Grand Rapids (Knack 1991), or Ypsilanti (Evans 2001), while being present only in early stages in rural areas (Preston and Ito 1998, Ito 1999).

As previously noted, in comparison with the many sociolinguistic studies focusing on monolingual European American speakers of English, only a few published studies have been carried out on native speakers of English who are also members of an ethnic minority group, such as second or later generations of immigrants. With regard to immigrants' participation in the NCS in Michigan, two ethnic groups -- Mexican Americans (Roeder 2006 & 2010, Ocumpaugh 2010), and Lebanese Americans (Bakos 2008) -- have been recorded and analyzed, but there have been no such studies of the English of Asian Americans in Michigan. A review of the existing works on ethnic minorities will be provided in the next section.

1.5 Ethnic Minorities and NCS Studies in Michigan

Among the studies on the accommodation of speakers to the NCS, many have been within the domain of L1 European American English speakers' acquisition of NCS as a new urban speech pattern (e.g. Ito 1999), or discussed L1 European American English speakers moving to a different L1 English dialect region (e.g. Evans 2004). With regard to immigrants' participation in the NCS in Michigan, two ethnic groups -- Mexican Americans and Lebanese Americans -- have been recorded and analyzed.

Roeder (2010) explored language and dialect contact as they affect Mexican Americans in Lansing. Stressed vowel nuclei from word lists read by 12 European Americans and 14 Mexican Americans were analyzed. The results indicated "full accommodation" to local norms with regard to NCS vowels, with the exception of TRAP, which showed a complex distribution. The pre-nasal TRAP of older Mexican American men indicated a resistance to the local norm, while younger Mexican American women have accommodated to pre-nasal TRAP raising but variably to pre-nasal TRAP fronting. TRAP in other environments is generally more raised and fronted in the speech of Mexican Americans than that of European Americans. Roeder also found that age and gender play a key role: young women in Lansing, both European American and Mexican American, have adopted a more advanced stage of the NCS than men.

Ocumpaugh (2010) also investigated the vowel system of Mexican Americans (n=20), who were from Benton Harbor, Michigan, using word list data. Social variables that were investigated included gender, English acquisition location, age of arrival in Southwest Michigan, length of residence in Southwest Michigan, and participants' ethnic social networks. The results indicated that gender has a significant effect across all variables, with women having accommodated more to the local NCS norms than men had. Whether or not a speaker had

acquired their English in the Inland North had a significant effect on "both F1 and F2 values in all but two contexts" (Ocumpaugh 2010: 146), namely F2 of DRESS and F2 of THOUGHT. For age of arrival, women, and participants who arrived in Southwest Michigan at an early age (0-16 years old), appear to have been more successful at adopting the NCS than those who arrived late (above 17 years old). Length of residence, however, was not a significant predictor of the participation to the NCS. But it was social network that was the strongest predictor of the presence of NCS features. Participants who had dense, multiplex Mexican social networks did not show the rapid accommodation to the NCS displayed by the speakers with more open and non-Mexican networks.

However, in Dearborn, Michigan, 28 speakers from a community of Lebanese immigrants showed a vowel system that did not appear to be adapting to the NCS. The analysis in Bakos's (2008) study also focused on word list data. Factors such as age, gender, generation and socioeconomic status had a non-significant effect on NCS participation. Due to a large influx of Arabs over a short period (from the 1960s), the Dearborn Lebanese were not isolated arrivals into Michigan but immigrated as entire families. The community has been able to stay tight and self-sufficient. Bakos argued that the tightly connected ties among members of the speech community lead to resistance to the accommodation to the NCS, in line with Ocumpaugh's finding for speakers with dense Mexican networks in Benton Harbor.

Based on the literature, the extent of accommodation to local sound change by ethnic minorities in Michigan varies according to social characteristics such as gender, age of arrival, density of the community and connection to home country. However, no previous studies focusing on the ethnic minorities' participation of local sound change in Michigan have looked at data across different contextual styles (e.g., comparing interview data versus reading styles).

Roeder, Ocumpaugh and Bakos all restricted their analysis to the highly formal task of reading aloud a word list. By examining stylistic variation, it is possible to reveal minorities' accommodation of local sound change in free speech, and participants' implicit social evaluations of the vowels of interest.

1.6 The Elsewhere Shift

Although some authors have observed expansion of the Northern Cities Shift (e.g. Evans 2004, Roeder 2010, Ocumpaugh 2010 and Bakos 2008), most recent work on the Northern Cities Shift in urban areas reports that the NCS is receding (e.g. McCarthy 2001 in Chicago, Driscoll & Lape 2014 in Syracuse, Wagner et al. 2016 in Lansing). It appears that it is being replaced with a different sound system: the Elsewhere Shift.

The Elsewhere Shift (Fridland, Kendall & Fickle 2013) has also been termed the Canadian Shift (e.g., Clarke, Elms & Youssef 1995), the California Shift (e.g., Eckert 2008), and the Third Dialect Shift (e.g., Labov 1991). The main components of the Elsewhere Shift (Figure 1.3) are the merger of low-back vowels LOT and THOUGHT, the allophonic split of TRAP, the lowering and/backing of KIT and DRESS, the fronting of STRUT, and the fronting of high back vowels GOOSE and GOAT. Besides Canada and California as mentioned above, this shift has been reported in various areas in North America, such as Ohio (Durian 2012), Kansas (Kohn & Stitham 2015), and in the Upper Peninsula of Michigan (Rankinen 2014). Nesbitt and Mason (2016) show that European Americans from Lansing are adopting components more indicative of the Elsewhere Shift, which include: LOT retracting toward a low-back merger, post-coronal-GOOSE and GOAT fronting, and a nasal system for TRAP.

Figure 1.3: The Elsewhere Shift
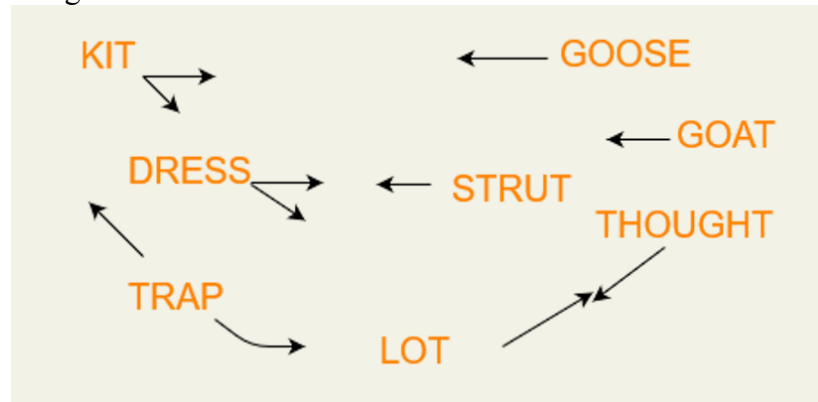
The observations of the Elsewhere Shift in Michigan draw our attention when studying this traditionally NCS characterized area, since components of the two sound changes are not all overlapping with each other. For example, the fronting of LOT in the NCS is reversed in the Elsewhere Shift. For the shared vowel shifts, such as DRESS lowering and/or backing, it is difficult if not impossible to tease apart speakers' production and perception toward the two sound changes (Savage 2017).

In the present study, Chinese Americans' participation in the Northern Cities Shift and the Elsewhere Shift will be investigated. European Americans from the same geographic region will also be examined as a reference group. Investigation of the two ethnic groups will proceed in the following steps: their overall production of the target vowels (Chapter 3), production in different styles (Chapter 4), and with different interlocutors (Chapter 5). The next section provides some background on stylistic variation that will be relevant for chapters 4 and 5. The sociolinguistic literature on style is extensive, so in what follows, the review is limited to the concepts and prior studies that are most relevant to this dissertation.

1.7 Stylistic Variation

As discussed in section 1.3, most previous studies of Asian Americans show that they are linguistically assimilated to the mainstream European American English of their respective speech communities. However, other than focusing on overall participation in a given sound change, not many studies of Asian Americans have considered style-shifting as a way of conveying Asian Americans' ethnolinguistic repertoire. Examination of style-shifting was also not included in prior studies of the NCS and ethnic minority groups in Michigan (e.g., Ocumpaugh 2010 for Mexican Americans, Bakos 2008 for Lebanese Americans). Furthermore, scholars have taken for granted that Chinese Americans *evaluate* local sound change the same way as their European American counterparts. This is in contrast to previous studies of other minority ethnic groups in the USA, which have shown that these groups evaluate language changes differently from majority groups, even as they participate in them. For example, in Fought (1999), Chicanos treat the fronting of GOOSE as a change from above[7] (Labov 1972), while California European Americans treat it as a change from below.

Based on Labov's (1972) Attention to Speech model, comparing linguistic behavior across styles allows us to investigate speakers' implicit knowledge of the social meaning of linguistic variables. The different distribution of norms in different styles was motivated by the amount of attention the speaker was paying to the act of speaking. Under this model, Labov developed a sociolinguistic interview comprised of several tasks that could elicit linguistic variables that were under investigation. Besides the interview, the other tasks developed by Labov include a reading passage, a word list, and a list of minimal pairs. This design of data

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[7] "Change from above" refers to linguistic change that is above the level of social awareness. Such changes often, but not always, originate in the higher social classes and are associated with societal prestige. "Change from below" refers to linguistic change below the level of social awareness, and often, but not always, originates in the mid- to lower social classes.

collection could elicit a continuum of speech style, from careful speech to casual/spontaneous speech. Numerous quantitative variationist studies employing this model and method (e.g. Trudgill 1974) reveal that speakers show a lower level of vernacular norms and higher levels for the standard norms as they move from casual speech to careful speech.

One major criticism of the Attention to Speech model is that it views speakers as passive respondents to changes in the external situation, rather than subjectively altering their speech according to the direct addressee, or who might be listening to or overhearing them. A different explanation of style-shifting, the Audience Design model, was proposed by Bell (1984), built on Communication Accommodation Theory (Giles 1973, Giles and Powesland 1975). Bell argued that any model of style should incorporate the reality that speakers participate in style-shifting in response to interlocutors or to other known or potential audiences, i.e., auditors, overhearers, and eavesdroppers. In this model, both the speaker and the interlocutor engage in style-shifting. Rickford and McNair-Knox (1994) provided quantitative support for this framework. They counted African American English features in the speech of a teenager, 'Foxy Boston', who was recorded in conversation with interviewers of different ethnicities: an African American, and a European American. The results of the study showed audience effects: Foxy uses higher frequencies of African American English features when talking with the African American interviewer than with the European American interviewer (although interlocutor familiarity might have been as influential as ethnicity: The African American interviewer was familiar, the European American was unfamiliar).

However, some studies (e.g., Bell and Johnson 1997, Bell 2001) found that speakers sometimes use features "against the demographic associations of the feature" (Bell and Johnson 1997: 15). Bell and colleague's study was conducted in New Zealand. Four interviewers (2

Maori and 2 Pakeha, one for each gender) and four interviewees (2 Maori and 2 Pakeha, one for each gender) were paired on gender and ethnicity, with other speaker characteristics controlled. The level of usage by the interviewers in this study of a discourse particle associated with Maori men, *eh*, increased as the demographic distance increases. This might suggest that speakers are not always converging linguistically with their addressees by accommodating themselves toward the speech of interlocutors. This study tells us that, *eh*, an "ingroup identity marker" that establishes solidarity among Maoris, could also be used to create closeness with speakers outside of the speech community. Another interpretation would be that the speakers were using *eh* to emphasize social distance, i.e., they were deliberately diverging in order to maintain ethnic and gender distance.

When style shifting by a speaker is not viewed as a passive reaction to existing situations, but as an active construction of speaker's identity and relationship with interlocutor, the theory is moving toward the third model, the Speaker Design model (e.g., Coupland 2001 & 2007, Schilling-Estes 2004). Different from the Attention to Speech model and Audience Design model, this approach acknowledges that speakers are agents, rather than merely respondents to shifts in speech style. A speaker's choice of style is the consequence of their self-identity construction. For example, in Coupland's (1984, 2001) studies, a Cardiff radio broadcaster uses various stylistic resources for different purposes; in Schilling-Estes (2004), African Americans' and Lumbee Indians' usage of some linguistic features varies according to the ethnic identities they wanted to construct.

The current study will employ both the Attention to Speech model in the analysis of context related style-shifting (in Chapter 4) and the Audience Design model and the Speaker Design model in the analysis of interlocutor effect (in Chapter 5). Based on the Attention to

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Speech model, speakers' different linguistic practices between careful and casual speech reveal their attitude toward the linguistic variables. With the power of the Attention to Speech model as an analytical tool, the following questions will be investigated in Chapter 4: What accounts for the ethnic differences of vowel productions of THOUGHT, DRESS, STRUT, TRAP and GOOSE that will have been found in Chapter 3 between Troy Chinese Americans and European Americans? Are the implicit social evaluations of these vowels different between the two ethnic groups that give rise to the variation?

Under the framework of the Audience Design model and the Speaker Design model, one way to see how individuals assert their ethnic identity is to examine intraspeaker style-shifting, to look at how they behave linguistically with intra-ethnic and inter-ethnic members. Following context-related style-shifting in Chapter 4, another aspect of the stylistic variation in this study will concentrate on variation in the speech of individual speakers as it may be affected by the identity of the interviewer, i.e. the interlocutor effect. As will be introduced in the next chapter, the data for the current study were collected by two interviewers of different genders, with different ethnic and linguistic backgrounds. The arrangement was in one setting, trying to minimize the Observer's Paradox (Labov 1972) while at the same, sociolinguistic variation in participants' speech was expected to be influenced by the different identities of the interviewers (Rickford and McNair-Knox 1994). In Chapter 5, the following questions will be explored: Do Chinese Americans perform a more "Chinese" linguistic repertoire with European Americans, or do they converge linguistically with European Americans? What will Chinese Americans do when interviewed by a native speaker of Chinese? Will they perform differently when interviewed by a European American?

1.8 Structure of the Dissertation

The remainder of this dissertation is organized as follows. Chapter 2 provides an overview of the methodologies, an introduction of the research site, participants, the background of the interviewers, and the data collection and analysis procedures. Chapter 3 presents the overall results of the acoustic analysis, and a comparison is made between the vowel systems of Troy Chinese Americans, Troy European Americans, and speakers of Lower Michigan. Chapter 4 investigates vowels presented ethnic variation in the previous chapter, THOUGHT, DRESS, STRUT, TRAP and TOO, in different speech styles. Chapter 5 further explores ethnic variations through the approach of interlocutor effect. Chapter 6 provides a summary of this study, followed by conclusions and questions for future research.

Chapter 2. Methodology

This dissertation focuses on speech production data collected in interviews with second generation Chinese Americans from Troy, Michigan. This chapter provides an overview of the methodologies that were followed in collecting and handling the data for the analysis in this study. I begin in Section 2.1 by explaining why Troy was chosen as the site of investigation. It is followed by an overview of the participants that I recruited in this study. Section 2.3 is a brief description of the two interviewers' social characteristics. In Section 2.4, the data collection and analysis procedures that were followed in this study will be introduced.

2.1 Chinese Americans in Troy

According to the U.S. 2010 Census[8], the Chinese population in the U.S. has reached 3.46 million, which accounts for 1.08% of the total U.S. population. It is the largest ethnic subgroup among Asian Americans: a group that also includes individuals such as those of Filipino, Korean, Vietnamese, and Japanese descent. In Michigan, the number of individuals who self-identify as ethnically Chinese is 44,496, which constitutes 0.5% of the entire Michigan population and is the second largest ethnic group among Michigan Asian Americans.

The first arrival of Chinese Americans in Michigan can be traced back to 1870 (Glazier and Helweg 2001), when the mining industry in the Upper Peninsula was prosperous. Later, from the early 1900s to the 1970s, when the auto industry was booming in the Detroit area, the opportunity to establish small business such as laundries and restaurants attracted the existing generations of Chinese Americans in the Upper Peninsula and the newly arrived Chinese immigrants to settle in Lower Michigan. A Chinatown was formed at the time, until the Detroit

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[8] Unless otherwise specified, all the demographic data of Asian American and Chinese American are from the U.S. Census Bureau, 2010 Census. Population group: Asian alone (400-499), Chinese alone 410-419.

Housing Commission condemned and relocated it in 1961. After that, many Chinese Americans moved outward to reside in the suburbs of Metro Detroit. With the Immigration and Nationality Act of 1965[9], another influx of Chinese American immigrants arrived in the U.S., a lot of whom had better educational background than their predecessors. This new wave of immigrants also did not engage in the same labor-intensive businesses as those who came before them, but came to work as professionals such as computer scientists and engineers in the auto industry. As for those Chinese Americans who, as previously mentioned, had moved out of Detroit, these middle-class Chinese American professionals reside in the suburbs of Metro Detroit as well. One of these suburbs is Troy (Figure 2.1), which is home to one of the state's largest proportions of Chinese Americans, and was therefore a natural choice as the place of investigation of this study.

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[9] Also known as The Hart-Celler Act, it abolished the quota system based on national origin that had structured American immigration policy since the 1920s, replacing it with a new immigration policy based on reuniting immigrant families and attracting skilled labor to the U.S. The policy greatly changed the demographic of the American population, as immigrants entering the U.S. under the new legislation came increasingly from countries in Asia, Africa and Latin America, as opposed to Europe (summarized from http://www.history.com/topics/us-immigration-since-1965, retrieved on October 4, 2017).

Figure 2.1: Map of Michigan (Retrieved and edited from https://www.mapsofworld.com/usa/states/michigan/outline-map.html on September 10, 2017)

Troy is the largest city in Metropolitan Detroit's northern suburbs in Oakland County, with a population of 80, 980 at the time of the 2010 U.S. Bureau Census. On Troy's official website[10], Troy is promoted with such phrases as: *Troy is one of the most dynamic and livable cities in Michigan*; *renowned for A+ rated schools*; *excellent public services*; *a vibrant business and technology center,* etc. Referred to locally as "the Asian city of southeast Michigan", 19.1% of Troy residents are Asian; and 5% self-identify as being of Chinese descent. Job opportunities in the auto industry, a high-quality education system, and a safe environment have been attracting an increasing number of Chinese immigrants to this area from the 1960s to the present day.

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[10] https://www.troymi.gov/, retrieved on November 12, 2015.

Figure 2.2: John R Square. (It is a plaza where you can find Chinese grocery stores, restaurants, and other Chinese-run businesses. Photo taken by the author in 2014)

Many of the participants' parents in this study, who are first generation immigrants, came to the U.S. in the 1960s for higher education, and have resided in Troy working as mechanical/computer engineers in major auto companies after finishing graduate school. The education system in Troy is another attraction to Chinese immigrants. Troy High School, which was ranked 6th in Michigan by U.S. News in 2017[11], is one that most Chinese Americans attend. Another of Michigan's highly ranked high schools, International Academy, was once ranked 9th in the Newsweek rankings of the best public high schools in the U.S.[12], and is also located in the

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[11] Retrieved on October 4, 2017 from https://www.usnews.com/education/best-high-schools/michigan/districts/troy-school-district/troy-high-school-10335.
12 Retrieved on October 6, 2017 from http://www.theoaklandpress.com/general-news/20160419/bloomfield-hills-international-academy-tops-ranking-of-michigan-schools

Troy school district. Additionally, when asked why their parents chose Troy, many of the participants referred to safety. In 2011, Troy was ranked the safest city in Michigan, as well as the 19th safest city in the nation[13]. With the concentration of Chinese Americans working as professionals, more Chinese immigrants have also since moved to this area to provide services to the Chinese American community, such as Chinese catering and grocery stores (see Figure 2.2). In June 2015, the grand-opening ceremony of 168 Asian Mart (see Figure 2.3), an Asian grocery located on the edge of Troy declared the opening of the largest Asian market in southeast Michigan[14].

Figure 2.3: 168 Asian Mart, the largest of its kind in Michigan (Retrieved on October 6, 2017 from *http://www.168asianmarket.com/*)
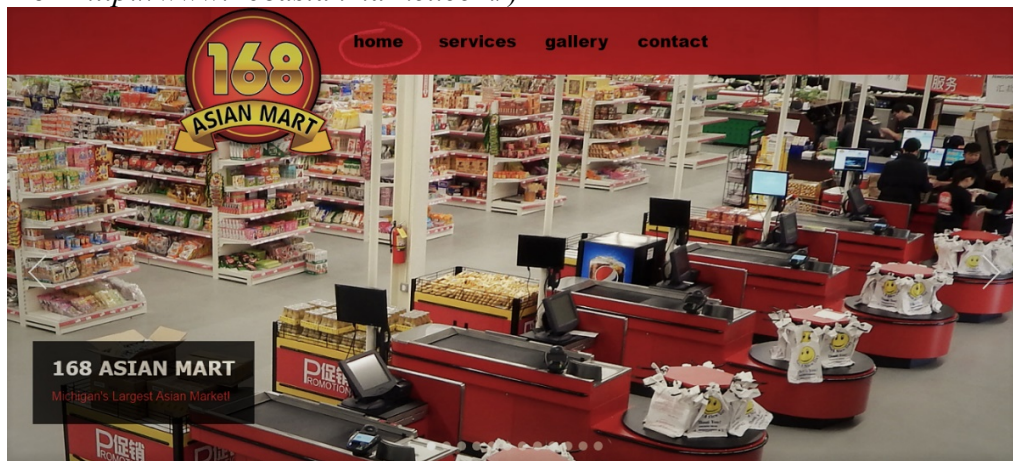
Since the majority of the influx of the Chinese immigrants in Troy started at around the 1960s, the immigration history of Chinese Americans in Michigan is fairly short. As a result, my recruitment of L1 English speakers was limited to second generation Chinese American immigrants, as there are relatively few adult members of the third generation in Troy.

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[13] Retrieved on October 6, 2017 from https://en.wikipedia.org/wiki/Troy,_Michigan
[14] Retrieved on October 6, 2017 from http://www.freep.com/story/life/food/2015/06/02/asian-mart-madison-heights/28342825/

Fortunately, the majority of second generation Chinese immigrants in Michigan are native speakers of English.

2.2 Participants

I recruited 30 second generation college-age Chinese Americans (16 male, 14 female). To be eligible for the study, participants had to fulfill the requirements that they be fluent speakers of English and have never attended any L2 English language school, have not lived in any places out of Michigan for more than 6 months, and both of the participants' parents are of Chinese descent. Participants' heritage language background is varied within a limited proficiency level of Mandarin, Cantonese, Taishanese, and Taiwanese. Although to control participants' language background would be ideal, the potential effect of different varieties of Chinese on participants' English production is minimized by two factors. First, all of them stated that the primary, if not the sole, language they use in and out of home settings is English. Secondly, the production data in Section 3.1 presents a phonology that clearly conforms to local non-Chinese norms by all the Chinese American participants, regardless of their heritage language background.

Besides the 30 Chinese Americans, 15 European Americans (4 male, 11 female) of the same age group were interviewed as a reference sample of European American residents from Troy. At the time of data collection, all participants were studying as undergraduates at Michigan State University in East Lansing, Michigan, which is 80 miles west of Troy. The Chinese American participants were recruited mostly through mass recruitment e-mail distribution by the Office of the Registrar at Michigan State University, targeted to students who were Chinese Americans from Troy, Michigan. A few participants were recruited from Chinese classes. Others were recruited via flyers posted at Michigan State University, by the author's personal contacts,

and through secondary contacts made via the initial participants. The European American

participant were recruited mostly via flyers posted at Michigan State University. Table 2.1.1 and

2.1.2 is a summary of participants' demographic information (a more detailed list of participants

can be found in Appendix A).

Table 2.1.1: Summary of Chinese American Participants

Chinese American		N
Gender	Male	16
	Female	14
Age	18-19	20
	20-21	9
	22-23	1
	Mean Age	19.37
College Year	Freshman	4
	Sophomore	15
	Junior	7
	Senior	4
Total		30

Table 2.1.2: Summary of European American Participants

European American		N
Gender	Male	4
	Female	11
Age	18-19	12
	20-21	3
	22-23	0
	Mean Age	18.8
College Year	Freshman	6
	Sophomore	6
	Junior	3
	Senior	0
Total		15

2.3 Data Elicitation and Acoustic Analysis

All the interviews were conducted in English in the Michigan State University Sociolinguistics Lab over two periods, first from March 2015 to October 2015, and then from March 2016 to October 2016.

The data in this study are from recordings of short interviews (Appendix B), a passage reading (Appendix C), and a wordlist reading (Appendix D). The interview generally lasted for 20 minutes. It started with the collection of demographic information and then moved on to discussion of some pre-designed topics. Besides questions about basic demographics, there were also questions about family immigration history, educational background, parents' occupation, and some metalinguistic questions at the end about primary language used at home, etc. The entire interview with each of the participants is included in the acoustic analysis to maximize the data size. Following the principles from Labov (1984), during the interview, I made my best attempt to speak naturally, to ask concise questions, and to intervene little in the conversation. After that participants were asked to read a short passage and a word list, both of which were designed for NCS studies and have been used extensively (e.g. Roeder 2006, Bakos 2008, Wagner et al. 2016).

All recordings were conducted using a Zoom H1 digital recorder with an Audio-Technica PRO 70 clip-on microphone. The vowel formant frequencies were obtained in the following steps: First, the recordings were transcribed and time-aligned in ELAN (Max Planck Institute for Psycholinguistics). Second, vowel measurements (F1, F2) were extracted using the FAVE suite (Forced Alignment & Vowel Extraction, Rosenfelder, et al. 2011). In order to compare vowel formant data for different speakers, the FAVE suite's normalized formant data (normalized F1, normalized F2), were used for the present study. For the normalization, "FAVE-extract follows

the Lobanov (1971) normalization procedure, which transforms a speaker's vowel space into z scores using the overall grand mean and standard deviation for the whole vowel system. These z scores are then re-scaled to Hertz values[15]" that are used in this study.

All the tokens collected in the interviews that are function words, which are frequently unstressed, and those with the target vowels before nasals and liquids are excluded (see Appendix E). Some of the extracted tokens had to be recoded because they were miscategorized by FAVE, e.g., the word "law" is extracted into the vowel class THOUGHT by FAVE, but it is in the LOT class in Michigan (See Appendix E for a list of recoded tokens). A total number of 57,087 primary-stressed vowel tokens were retained for analysis. Quantitative analyses were performed in R (R Core Team 2013), and visualizations of the data were plotted with the "ggplot2" package (Wickham 2009).

2.4 The Interviewers

The interviews with the Chinese American participants were conducted twice in an interval of at least a week. The first interview was conducted by me, an international graduate student from China, who speaks English as a second language. The second interview was conducted by a European American college-age female student from southeast Michigan, who is a native speaker of English. The 14 re-interviewed Chinese Americans (Table 2.2) are a subset of the 30 Chinese American participants (Table 2.1.1) that had participated in the first interview. This subsample of participants was selected based on convenience of recruitment, which was to include anyone who agreed to be re-interviewed. The demographic characteristics of this subsample are similar to the characteristics of the larger Chinese Americans sample in Age

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[15] FAVE website: http://fave.ling.upenn.edu/usingEF.html. Retrieved on January 17, 2018.

(19.36 for the subsample, 19.37 for the larger sample), in College Year (more students in their

sophomore year participated in both samples). But the gender ratio was skewed, with more male

participants in the subsample (16 male:14 female for the larger sample, 9 male:5 female for the

subsample). It might be a concern that there are uneven number of participants of different

gender for the two samples. However, gender is not the focus of this study, and I will leave it for

future discussion.

Table 2.2: Summary of the re-interviewed Chinese Americans

Re-interviewed Chinese American		N
Gender	Male	9
	Female	5
Age	18-19	10
	20-21	4
	22-23	0
	Mean Age	19.36
College Year	Freshman	0
	Sophomore	10
	Junior	3
	Senior	1
Total		14

The two interviewers shared some characteristics with the Chinese American

participants, but differed from them in other respects. My Chinese ethnic and cultural

background had the potential to lessen the social distance between myself and the participants.

Many times during the interview, either as an opening of the conversation, or after the discussion

of a participant's major/minor and campus life, if I brought up topics such as Chinese food,

Chinese festivals, and a travel experience to China, this would almost always relax the

interviewee. Another topic that I found could always elicit a focused discussion by the participants is about the difference in opinions they had (which some of them are still having) with their parents, who grew up in China.

At the same time, I also differed in nationality, language background and age from the participants. I started to learn English in classroom settings in China when I was twelve. By the time of data collection, I had been living in the U.S. for four years. My English is fluent but not entirely native-like. Many of the participants asked me where I was from out of politeness. Their reactions confirmed to me repeatedly that they knew I was Chinese by my English. In addition, my experience as a Chinese national who had lived in China for almost thirty years before I came to the U.S. for graduate school reminded some participants of their parents' life trajectory, a lot of whom also moved to the U.S. for further education in their late twenties, and for job opportunities in the auto industry. So although I was only 10 to 14 years older than the participants, it is likely that they perceived me as being similar to their parents. However, it was impossible to be sure whether my background as a Chinese national, and as someone who was perceived to be similar to the participants' parents, made me more approachable and familiar, or less approachable and familiar. There is also the possibility that the participants were adapting their spoken English by slowing down or simplifying, i.e. that they were employing foreigner talk (Ferguson, 1971). So a second interviewer was included in this study.

The other interviewer, who is a European American college age female student at Michigan State University, presented some distinctly contrastive characteristics. She is an English native speaker who grew up in the same northern suburban area of Detroit as the participants, she is in the same age group and shares the same college education experience with the participants. The interviews with Chinese Americans conducted by her proceeded more

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smoothly with topics more closely related to college life, such as dormitory living experiences,

club activities in campus, and some shared life experience of American youths. The participants

were talking about and demonstrating more of their American-side of life with the European

American interviewer. In the excerpt below, Adam[16] talks about the experience of living on

campus with the European American interviewer. This is a topic that was brought up a lot during

participants' interviews with the European American interviewer, an experience I never asked

about.

Interviewer: So how did you like living in Brody?

Adam: I thought it was pretty nice, it just like, it's really far from everything. Especially
from the like, engineering building. I think if you were to live on campus, the best is
probably be Shaw cause, it's like a five minute walk. So like everything you need like
library, engineering building.

In contrast, the conversations with me were involved with more Chinese-related topics.

The following excerpt is an example. In this excerpt, Garet talks about the time when he was sent

to Chinese school by his parents. This is an unpleasant experience that almost all the Chinese

American participants had had. Asking them to share their stories about it always worked well.

Interviewer: Did you like to go to Chinese school when you were little?

Garet: Not at all. I don't think anyone really enjoys going to Chinese school, until like the
later years, cause like, like they started having like after school things. They could do
like, I remember those one like, Chinese yo-yo thing they had one year. And yeah, they
had like a lot of different things, so once that started coming up, it was like, more fun,
like OK we made it through our two hours of class, now we get like an hour of like, fun,
more fun stuff, yeah, and by like ninth and tenth grade like, the class got really small,

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[16] This participant's name and all subsequent names of the participants are pseudonyms.

there were like ten people, so we just, all got to know each other and stuff, we became good friends.

In sum, each of the two interviewers shared some social characteristics and differed in others with the participants. At the same time, the different social factors between interviewers, such as age and gender, might also have various impacts on the interviewees' speech. From the perspective of the participants, who were told to talk about their immigrant experiences as Chinese Americans when being recruited, the most salient difference between the interviewers is their ethnicity: the Chinese interviewer has a similar heritage cultural background to the Chinese-American participants; the European American interviewer has the same American way of life experience with them. Focusing on the interviewers' ethnicity, this study investigates the interlocutor effect in participants' speech in Chapter 5.

2.5 Summary

This chapter provided demographic information for Chinese Americans in the U.S. and Michigan, gave a brief description of Chinese Americans' life in Troy, background of the participants and interviewers, and the data collection and analysis procedures of this study. The next chapter presents the results of acoustic analysis of Troy speakers, discusses the degree of participation in the NCS by both Troy Chinese Americans and European Americans, and compares the vowel systems of both groups of participants from Troy.

Chapter 3. Accommodation to the Northern Cities Shift

In this chapter, first, results of the acoustic analysis of Troy speakers' data are presented to discuss the extent to which the speech of Troy speakers conforms to the previously attested Inland North regional vowel pattern, the Northern Cities Shift (NCS). Then the vowel system of the Troy Chinese Americans is compared with that of local European Americans (Section 3.2). After that, the Troy vowel system is compared to speakers of another location in Lower Michigan, Lansing (Section 3.3), with a focused investigation of the TRAP vowel (Section 3.4). The last section discusses the emergence of the Elsewhere Shift in the Inland North.

3.1 The NCS Score: Troy Chinese Americans vs. Inland North speakers

To quantify speakers' degree of participation in the NCS, Labov's (2007) vowel mean diagnostics were employed to provide a general picture of the participation in the NCS by Troy Chinese Americans. The five criteria are presented in Table 3.1. See also Figure 1.2 for a visual representation of the relevant vowels.

Table 3.1: The five criteria of NCS participation (Labov 2007)

UD criterion	LOT is fronter than STRUT
ED criterion	DRESS less than 375 Hz fronter than LOT (F2 of DRESS - F2 of LOT < 375 Hz)
EQ criterion	TRAP is both fronter & higher than DRESS
AE1 criterion	TRAP is higher than 700 Hz (F1 of TRAP is lower than 700 Hz)
O2 criterion	LOT is fronter than 1500 Hz (F2 of LOT is higher than 1500 Hz)

Following Labov, speakers' degree of participation in the NCS was rated on a five-point scale according to how many of the above criteria they satisfied. Dinkin (2013) has argued that these criteria are not entirely unproblematic. For example, all the criteria are categorical summaries of continuously varying quantities, so if two speakers' TRAP F1 measurements were both lower than 700 Hz, they would get a NCS score of 0 for this criterion, which obscures the possibility that their TRAP might still differ in the degree of raising. However, Dinkin (2013: 11) suggests that despite the disadvantages, these criteria "succeed in forming clear and consistent dialect boundaries". Therefore, these five criteria were still used in this study to discuss the overall degree of participation of Troy Chinese Americans to the NCS; then the vowel systems of Chinese Americans in Troy were compared with the age-matched European American reference group from Troy. Data presented in this chapter are aggregated from recordings of Chinese Americans in all the three speech styles, interviewed by the Chinese interviewer. All vowel means are quantified following the methods introduced in Chapter 3.

Each participant was assigned an NCS score, which is the number of the above criteria a speaker's vowel system satisfied. In Table 3.2, the bracketed numbers in the second column from the left are the number of Troy Chinese Americans satisfying the corresponding NCS score. In the same column, the percentages represent the proportion of the 30 Chinese Americans who satisfied each criterion. The remaining columns provide, for comparison, the proportions of speakers satisfying each criterion of Inland North speakers in the Atlas of North American English (hereafter ANAE; Labov, William, Ash & Boberg, 2006), and in the rest of the ANAE speaker sample.

Table 3.2: The NCS scores of Chinese American speakers from Troy, MI vs. *ANAE*'s Inland North speakers and the rest of the ANAE sample

NCS scores	CA, Troy (n = 30)	*ANAE* Inland North (n = 61)	*ANAE* elsewhere (n = 385)
5	0% (0)	36%	1%
4	0% (0)	26%	1%
3	3% (1)	16%	3%
2	3% (1)	16%	9%
1	10% (3)	5%	21%
0	84% (25)	0%	66%

In the Inland North, the majority of the speakers (a total of 62%) meet 4-5 criteria, and none met zero criteria; whereas in Troy, most of the Chinese Americans (84%) do not satisfy a single criterion. Of the remainder, 13% meet 1-2 criteria, and only one of them meets 3 criteria. The Troy Chinese Americans bear a greater resemblance, therefore, to speakers outside of the Inland North, of whom 66% have a NCS score of zero and 30% of them have a score of 1-2. This is surprising because Troy is just 20 miles to the north of Detroit, and 50 miles to the south of Flint: two major cities in southeast Michigan within the Inland North isogloss that were sampled in the ANAE. We will return to this discussion of why Troy Chinese Americans, in terms of the NCS, are more like the speakers outside of the Inland North, in the next section (Section 3.2).

Although most of the Troy Chinese American speakers meet none of the NCS criteria, yet the NCS features are not completely absent. Table 3.3 lists how many of the 30 Chinese Americans in this study satisfy each of the five criteria, compared with speakers of the ANAE's Inland North and the rest of the ANAE speakers.

Table 3.3: Number of Chinese Americans from Troy satisfying the criteria vs. Inland North speakers and the rest of the ANAE sample

ANAE criterion	CA, Troy (percent/number)	ANAE Inland North (n = 61)	ANAE elsewhere (n = 385)
UD	0% (0)	93%	15%
ED	17% (5)	84%	13%
EQ	3% (1)	66%	3%
AE1	7% (2)	84%	17%
O2	0% (0)	46%	5%

None of the Troy Chinese Americans in my dataset satisfied the UD and O2 criteria, which indicates that fronting of LOT and backing of STRUT are not advanced enough to meet the NCS criteria. However, the ED, EQ, and AE1 criteria are satisfied by a small number of participants, which indicates that they are to some extent participating in TRAP fronting and raising, and DRESS lowering and backing. The vowel system regarding the Northern Cities Shift of Chinese Americans in Troy is illustrated in Figure 3.1, in which the normalized means of the six NCS vowels produced by the 30 Troy Chinese Americans are presented. The data used to calculate these means was derived by aggregating across all speech styles in interviews with the Chinese interviewer[17]. The x-axis of the vowel plot represents the vowel frontness/backness (normalized mean F2), and the y-axis represents the height of the vowel (normalized mean F1). The vowel plot below showed us that Troy Chinese Americans do not exhibit the NCS features, such as TRAP fronting and raising, LOT fronting, THOUGHT lowering, the lowering and/or backing of DRESS, which confirms our investigation by comparing the NCS scores between participants in this study with *ANAE* speakers.

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[17] As introduced in Chapter 2.3, vowels that are before liquids are excluded. Since the NCS involves the general raising of TRAP, in this part of the discussion, tokens of TRAP in all phonemic environments were included. Discussion of TRAP in pre-nasal and pre-oral conditions will be seen in Section 4.4.

Figure 3.1: The Northern Cities Shift vowels of Chinese Americans (N=30) in Troy, MI
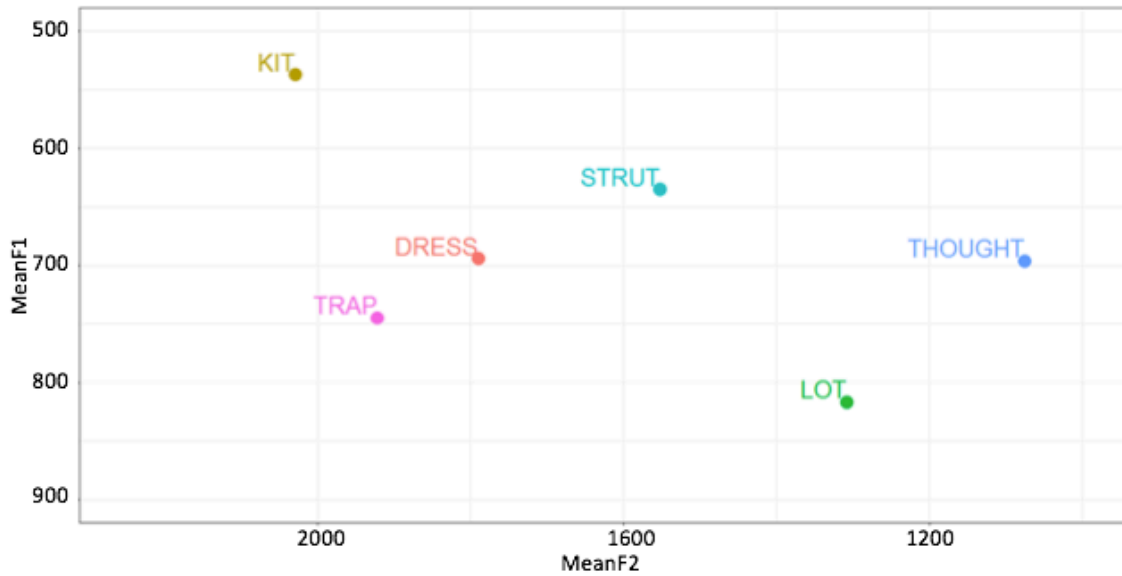
Figure 3.2 is a plot of the NCS vowels of the most advanced NCS speaker among Troy Chinese Americans, Ada. According to NCS criteria (see Table 3.1), she meets the ED, EQ, and AE1 criteria, which indicates that Ada has DRESS lowering and backing, and TRAP fronting and raising. However, even for Ada, LOT fronting is not present in her vowel system, at least by the ANAE criteria: her normalized mean F2 of LOT is only 1303.5 Hz. (Recall that F2 of LOT greater than 1500 Hz is regarded as fronted according to ANAE).

Figure 3.2: NCS vowel system of Ada

Jaclyn (Figure 3.3) meets none of the NCS criteria. A comparison with Figure 3.2 shows that Jaclyn's TRAP is lower than Ada's. The normalized mean F1 of Jaclyn's TRAP is also greater than 700 Hz, the ANAE threshold for TRAP raising. Jaclyn's mean F2 of LOT (1234 Hz) is much backer than Ada's (1303 Hz) as well. Visual observation of Jaclyn's vowel plot finds no indication of the NCS.

Figure 3.3: NCS vowel system of Jaclyn

Comparing participants in this study with ANAE speakers, the Troy Chinese Americans pattern less with the speakers from the Inland North than with those outside the dialect area. The Chinese Americans in this study, like Mexican-Americans from Lansing (Roeder 2006 & 2010), but unlike Mexican-Americans from Benton Harbor (Ocumpaugh 2010), are well-integrated into the majority ethnic community. It is surprising to see that there are not many NCS features in their speech.

Several potential causes of this lack of affiliation with the expected local phonology are worth considering. First, there is the possibility of an interference effect from Chinese. However, as introduced in the previous chapter (see section 2.2), the participants in this study have a limited proficiency level of various varieties of Chinese. Their dominant language is English, even when they are at home conversing with their parents. More importantly, all the Chinese Americans in this study are second generation immigrants who were born and raised in the U.S., so that they have native competence in English.

Second, as previously discussed, studies of the NCS have shown that the NCS is diffusing outwards from urban areas to smaller cities and towns. Troy is not a city of the same stature as the major Inland North cities such as Chicago, Detroit, or even Buffalo. It certainly must have received the NCS later than these larger cities, via the cascade effect (Callary 1975). However, with both the size of the local population (80,980 in Troy, 2010 U.S. Census) and the distance to Detroit (20 minutes' drive), Chinese American speakers from Troy were expected to have more NCS features than they have shown in this study. As native speakers of English who live in southeast Michigan, which is a core Inland North area, what makes their vowel system so different from other Inland North speakers?

Another possibility is this: Maybe they have lots of ties to Chinese/Chinese American communities outside the Inland North, like the Ypsituckians in Michigan, some of whom had not adopted TRAP-raising because they maintained ties to Southern speech community members, e.g., friends and family who have migrated North with them, and also friends and family still in the South (Evans 2004). The case is true for some participants that they have relatives, close or remote, living in California. A few of them did mentioned that they went to California to have a family reunion during summer vacations. But it is still unclear to what degree this connection affects their speech. Have they adopted some speech features in California, e.g., the Elsewhere Shift? I will return to this discussion in later section (section 3.5)

Or is it an ethnic identity marker, whereby non-use of the NCS pattern (or lagging behind) is part of Chinese Americans' stylistic bricolage in Troy? Are they distancing themselves from the majority European American community, i.e. as a form of speaker design? To address that, we need to know what the vowel system is like for the Troy European Americans. Are they participating in the NCS to the same degree as the rest of the Inland North

speakers? In the next section, Troy Chinese Americans' vowel system is compared with that of the local European Americans.

3.2 Troy Local Phonology: European American and Chinese American

This section presents the NCS vowel systems of 15 European Americans from Troy, who serve as a reference group to compare with the Chinese American participants in this study. Many previous studies of ethnic minorities in the U.S. such as Asian Americans (Hall-Lew 2009, Wong 2015), Mexican Americans (Ocumpaugh 2010), and Lebanese Americans (Bakos 2008) lack the direct comparison between the target participants and corresponding majorities of the local population: typically European Americans. Therefore, it is important to include Troy European Americans in this study, as I am trying to investigate how the Chinese Americans' speech is situated within the Troy speech community.

First, before comparing vowel plots between Troy Chinese Americans and European Americans, let us employ the NCS criteria again to see how the Troy European Americans conform to it. The data included here was derived by aggregating across all speech styles in interviews with the Chinese interviewer.

Table 3.4: The NCS scores of speakers from Troy, MI vs. ANAE's Inland North speakers and the rest of the ANAE sample

NCS scores	CA, Troy (n=30)	EA, Troy (n=15)	ANAE Inland North (n=61)	ANAE elsewhere (n=385)
5	0% (0)	0% (0)	36%	1%
4	0% (0)	0% (0)	26%	1%
3	3% (1)	0% (0)	16%	3%
2	3% (1)	13% (2)	16%	9%
1	10% (3)	13% (2)	5%	21%
0	84% (25)	74% (11)	0%	66%

Note: CA = Chinese American, EA = European American

From Table 3.4, we observe that the majority of Troy European Americans (74%) do not conform to the NCS according to any of the criteria. Only 4 of the 15 speakers meet any criteria at all, and whereas 1 Chinese American speaker (Ada) meets 3 criteria, the Europeans meet no more than 2. As with Troy Chinese Americans, the Troy local European Americans more closely resemble the ANAE elsewhere speakers.

Table 3.5: The number of speakers from Troy satisfying the criteria vs. Inland North speakers and the rest of the ANAE sample

ANAE criterion	CA, Troy (percent/number)	EA, Troy (n=15)	ANAE Inland North (n = 61)	ANAE elsewhere (n = 385)
UD	0% (0)	0% (0)	93%	15%
ED	17% (5)	27% (4)	84%	13%
EQ	3% (1)	7% (1)	66%	3%
AE1	7% (2)	7% (1)	84%	17%
O2	0% (0)	0% (0)	46%	5%

Note: CA = Chinese American, EA = European American

In Table 3.5, the four European American speakers who meet NCS criteria are represented. All four meet the ED criterion, which indicates that they have DRESS backing; among the four of them, one has TRAP raising (AE1), another has TRAP raising and fronting (EQ). In sum, the combined information from Table 3.4 and Table 3.5 shows that the two Troy ethnic groups resemble each other more than either group resembles one of the ANAE subgroups. Visual inspection of their NCS vowels confirms our observation. The vowel plot presented in Figure 3.4 demonstrates normalized mean F1 and F2 values of the six NCS vowels, for both the European Americans and the Chinese Americans.

Figure 3.4: Vowel systems of Troy European Americans (n=15, in blue) vs. Troy
Chinese Americans (n=30, in red)
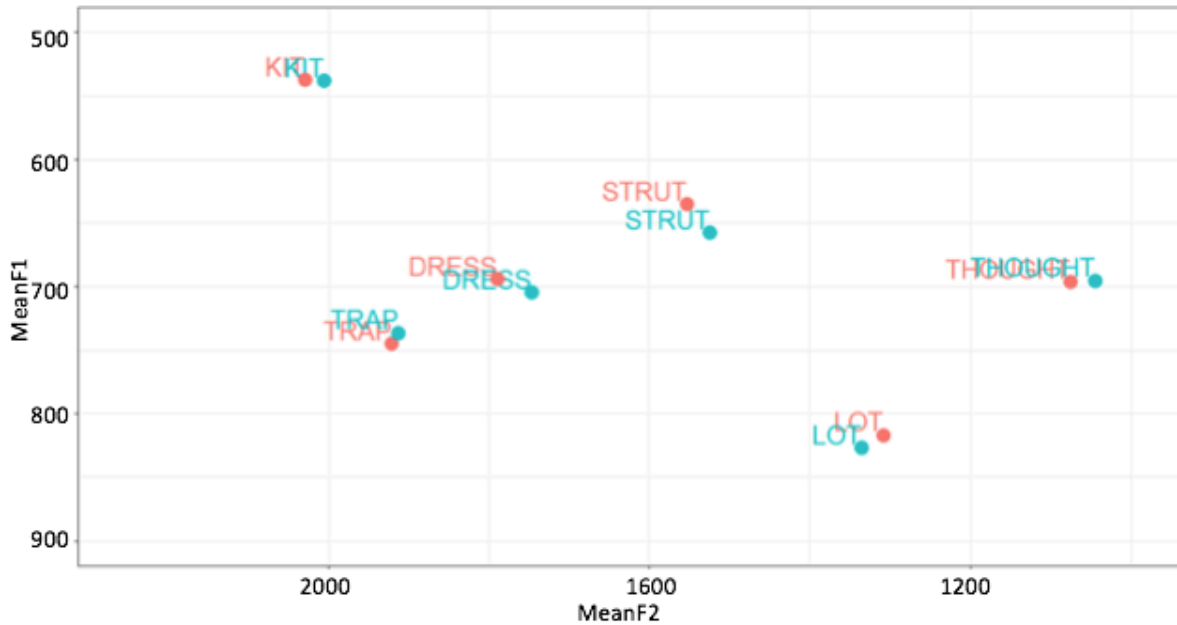
Figure 3.4 reveals a strong similarity between the Chinese Americans and European

Americans. All the target NCS vowels of the Chinese Americans are very close to the European

Americans'. This vowel configuration of Troy speakers, however, does not resemble the NCS

system. The major components of the vowel shift such as TRAP fronting and raising, LOT

fronting, THOUGHT lowering, the lowering and/or backing of DRESS, were not found in the

majority of the Troy speakers.

In order to examine more closely the differences in each of the vowels between the Troy

Chinese Americans and the European Americans, a multivariate analysis of variance

(MANOVA) was conducted on the normalized data, with ethnicity as a fixed factor, and the

normalized mean F1 and the normalized mean F2 of each vowel as dependent variables.

Table 3.6.1: Multivariate Analysis of Variance (MANOVA) comparing the normalized mean F1 of Chinese Americans (n=30) and European Americans (n=15)

| | **F1** | | **F1** | | | |
| | CA | | EA | | | |
	Mean	**SD**	**Mean**	**SD**	**F**	**p**
TRAP	741.26	29.72	737.50	24.50	0.18	0.68
LOT	817.41	19.97	823.87	19.13	1.07	0.31
THOUGHT	697.12	17.94	695.45	17.44	0.09	0.77
DRESS	693.59	14.72	704.43	16.68	4.97	**0.03**
STRUT	635.65	16.34	658.06	19.03	16.87	**<.001**
KIT	536.07	13.55	538.35	11.59	0.31	0.58

P-value of the variables with statistically significant (p< .05) differences between Chinese Americans and European Americans are marked in bold.

Table 3.6.2: Multivariate Analysis of Variance (MANOVA) comparing the normalized mean F2 of Chinese Americans (n=30) and European Americans (n=15)

| | **F2** | | **F2** | | | |
| | CA | | EA | | | |
	Mean	**SD**	**Mean**	**SD**	**F**	**p**
TRAP	1928.75	72.77	1914.01	50.70	0.49	0.49
LOT	1312.58	58.80	1337.19	32.45	2.26	0.14
THOUGHT	1080.78	48.73	1049.96	47.89	4.05	**0.05**
DRESS	1790.95	45.73	1745.72	28.89	12.16	**0.001**
STRUT	1549.63	43.35	1522.96	35.04	4.26	**0.04**
KIT	2027.69	58.79	2008.93	36.82	1.27	0.27

P-value of the variables with statistically significant (p< .05) differences between Chinese Americans and European Americans are marked in bold.

Despite the clear similarities between the Chinese American and European American vowel systems that were evident upon visual inspection of Figure 3.4, statistically significant differences do nonetheless obtain between ethnic groups. There is a difference in F2 for one vowel (THOUGHT), and a difference in both F1 and F2 for two other vowels (DRESS and STRUT).

European Americans' normalized mean THOUGHT is backer than that of Chinese Americans by 30.82 Hz. Figure 3.5 is a plot of the normalized mean THOUGHT vowels produced by Troy European Americans and Chinese Americans. The red dots represent Chinese Americans and the blue dots European Americans, with ellipses representing the 95% confidence region for each ethnic group. To further investigate this question, I calculated Pillai scores (Adank *et al* 2004) which measure the difference/overlap between DRESS of the two groups. On a scale of 1 to 0, a low Pillai score indicates a large degree of overlap between two clusters of vowels, while higher score indicates a small degree of overlap. The Pillai score of THOUGHT between Chinese Americans and European Americans is 0.09, which indicates a large overlap.

As we will see in later discussion, comparing to DRESS and STRUT which are different between the two groups in both height and frontness, the difference for THOUGHT is not as obvious, only in one dimension, F2. Data from individual speakers tell us that, although THOUGHT is backer for European Americans than for Chinese Americans, the Troy Chinese Americans are participating in the THOUGHT shifting as the local European Americans do.

Figure 3.5: THOUGHT vowel produced by Troy European Americans (in blue) vs. Troy Chinese Americans (in red)
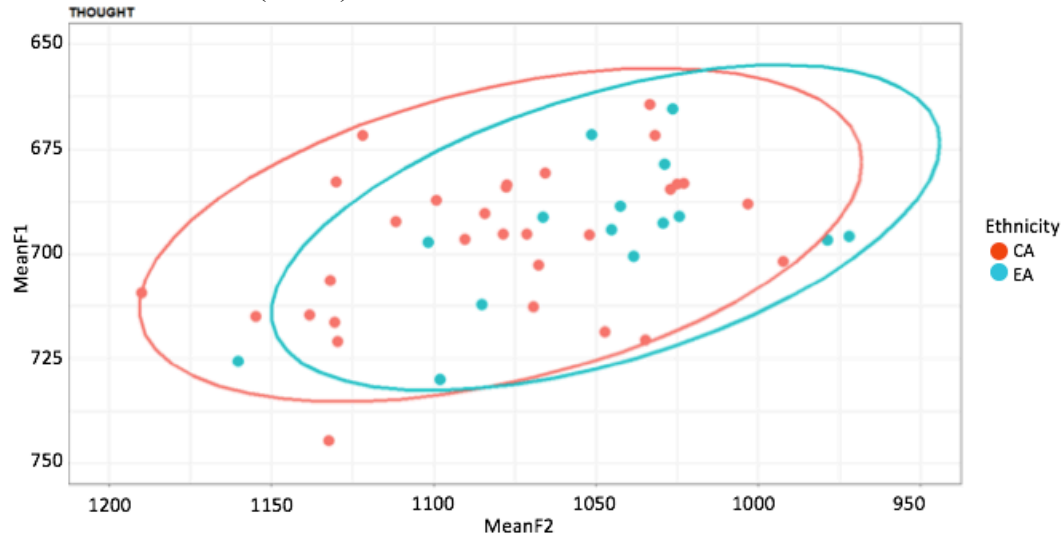
Statistical results (Table 3.6.1 & Table 3.6.2) also show that the frontness (indicated by F2) and the height (indicated by F1) of the DRESS vowel are significantly different ($p < .05$) between the two ethnic groups: European Americans' DRESS is lower (10.84 Hz difference in F1) and backer (45.23 Hz difference in F2) than Chinese Americans'.

DRESS lowering and/or backing was previously reported for European Americans among working class Detroit adolescents (Eckert 1988), young, middle class suburban Detroiters (Evans et al. 2000), and young adults in Greater Lansing (Wagner et al. 2016). As mentioned earlier, a direct comparison of the European American locals to the ethnic groups is missing in most previous studies of Michigan speech[18].

In the present study, the mean F1 and F2 values for DRESS produced by both Troy European Americans and Chinese Americans are plotted in Figure 3.6, with ellipses representing the 95% confidence region for each ethnic group. From this plot, we find a large degree of

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[18] A notable exception is Roeder (2010), which includes six European American women as a control group.

overlap of DRESS by the two groups of speakers. The Pillai score of DRESS between Chinese Americans and European Americans is 0.23, which indicates a large overlap. So, data from individual speakers show us that, though DRESS is fronter and higher for Chinese Americans than for European Americans, the Troy Chinese Americans are participating in the DRESS shifting as the local European Americans do, but to a somewhat lesser extent.

Figure 3.6: DRESS vowel produced by Troy European Americans (in blue) vs. Troy Chinese Americans (in red)
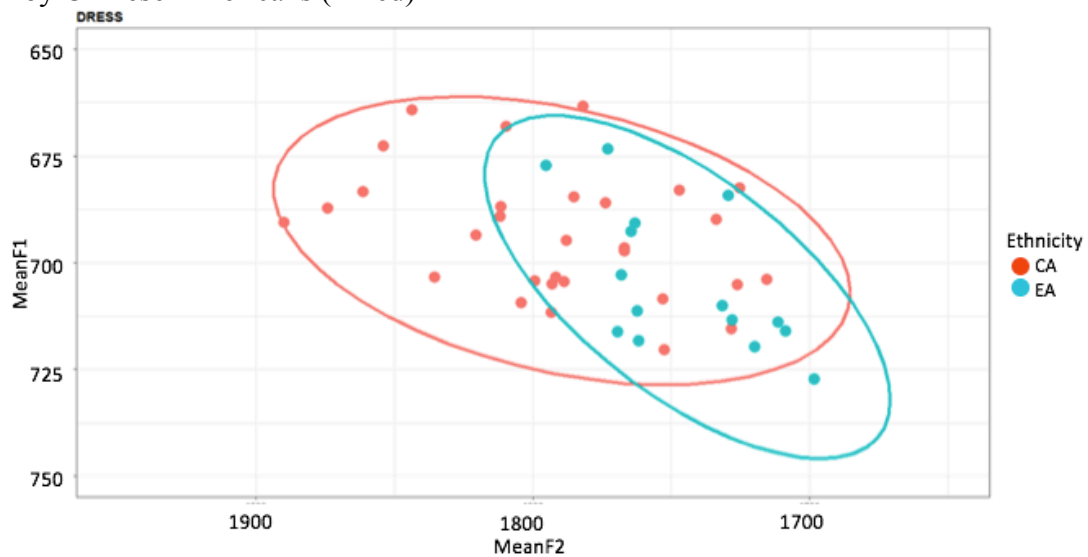
Lastly, statistical analysis shows that the STRUT vowel is significantly different (p<.05) across ethnic groups: European Americans have a significantly backer (26.67 Hz difference in F2) and lower (22.42 Hz difference in F1) STRUT than Chinese Americans. Figure 3.7 is a plot of the normalized mean STRUT vowels produced by Troy European Americans and Chinese Americans, with ellipses representing the 95% confidence region for each ethnic group.

Figure 3.7: STRUT vowel produced by Troy European Americans (in blue) vs. Troy Chinese Americans (in red)
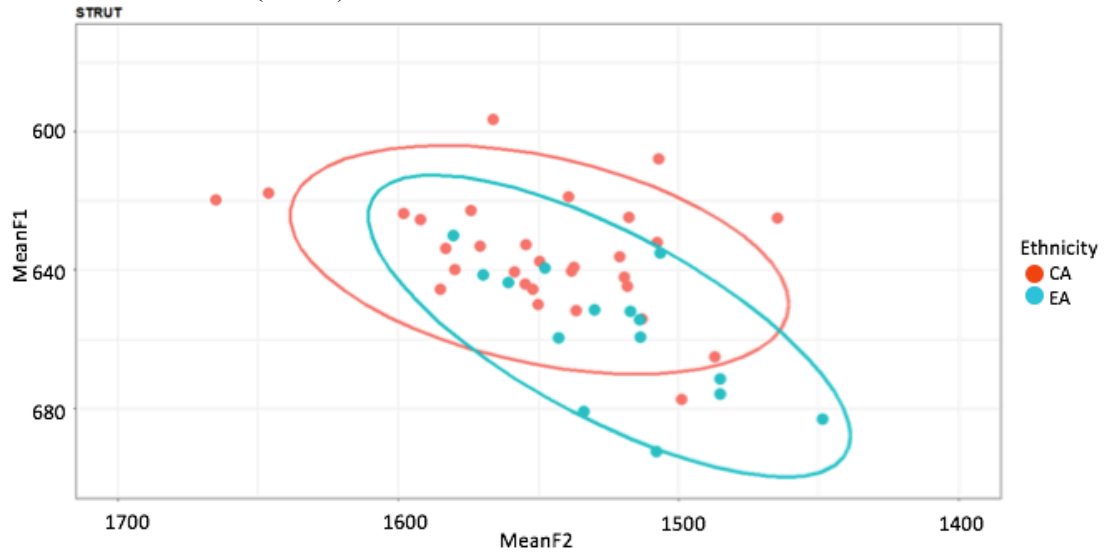
The Pillai score of STRUT between Chinese Americans and European Americans is 0.28, indicating a large overlap. However, it is notable in the above configuration that five of the Chinese Americans are outliers (Defined as individuals who fell out of the 95% confidence region of their ethnic group, i.e. individuals who "do not appear to follow the characteristic distribution of the rest of the data" (StatSoft Statistics Glossary) of their ethnic group)[19] for STRUT. It is the same case for THOUGHT and DRESS that, a few of the Chinese American speakers are either outliers or on the edge of the 95% confidence region. To identity whether the outliers of each of the three vowels are the same speakers, a table summarizing the Chinese American outliers for the above three vowels is presented below (Table 3.7).

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[19] StatSoft Statistics Glossary, http://www.statsoft.com/Textbook/Statistics-Glossary, retrieved January 15, 2018.

Table 3.7: Chinese American outliers for THOUGHT, DRESS, and STRUT

	Outliers				
THOUGHT	Felix	Carl	Daisy		
DRESS	Mike	Adam	Nathan	Landon	Daniel
STRUT	Mike	Adam	Macy	Oliver	Elaine

We can find that among all the outlier speakers for the three vowels, only Mike and Adam are consistently different from the European Americans in their production of DRESS and STRUT. A previous study found that Mike and Adam have a close-knit Chinese social network and are leading a Chinese oriented lifestyle (Zheng 2015). However, there are other CAs in this sample who also have a dense Chinese social network, but who are not phonological outliers, e.g., Barry, Barbara, and Cara. However, since social network and lifestyle were not the focus of this dissertation, this information was not collected for all the 30 Chinese Americans, so a comparison of these two social characteristics cannot be made.

Compared to Chinese Americans, the European Americans showed much less variance. Table 3.8.1 and Table 3.8.2 present the difference of standard deviation between Chinese Americans and European Americans for the six NCS vowels. Except for the F1 of DRESS and STRUT, all the standard deviations of the Chinese Americans' are larger than that of the European American (indicated by the positive value of SD difference). This tells us that there is a lot of inter-individual variation within the Chinese Americans.

Table 3.8.1: Standard deviation of F1 for NCS vowels by ethnic group

F1	SD	SD	
Vowel	CA	EA	Difference
TRAP	29.72	24.50	5.22
LOT	19.97	19.13	0.84
THOUGHT	17.94	17.44	0.50
DRESS	14.72	16.68	-1.96
STRUT	16.34	19.03	-2.69
KIT	13.55	11.59	1.96

Table 3.8.2: Standard deviation of F2 for NCS vowels by ethnic group

F2	SD	SD	
Vowel	CA	EA	Difference
TRAP	72.77	50.70	22.07
LOT	58.80	32.45	26.35
THOUGHT	48.73	47.89	0.84
DRESS	45.73	28.89	16.84
STRUT	43.35	35.04	8.31
KIT	58.79	36.82	21.97

Note: A positive value of difference indicates that the SD of CA is larger than that of EA, a negative value of difference indicates that the SD of EA is larger than CA's

Although in terms of statistical analysis, differences in the production of THOUGHT, DRESS and STRUT were found between the two ethnic groups, observation of the vowel configuration in Figure 3.4 shows us that the vowel systems of the two ethnic groups from Troy are quite similar to each other. Furthermore, not many existing studies have focused on STRUT, and the criteria on THOUGHT shifting is impressionistic, as pointed out by Roeder, who noted that the parameters for THOUGHT shifting are "not well defined" (Roeder 2006: 72). I will leave the discussion about STRUT and THOUGHT for future research. None of the rest of the vowel means emerge as statistically significantly different from each other between Troy Chinese Americans and European Americans.

In the discussion of overall results in section 3.1, when the NCS criteria were employed, we drew the conclusion that the Troy Chinese Americans do not seem to participate in the NCS. A remaining question was that for these second generation immigrants who were born in the U.S., speak English as their native language, and live in the core Inland North dialect region which is home to the NCS, why was the presence of NCS features so limited? Now when we compare the vowel systems of Chinese Americans and European Americans from Troy, we may have an explanation that in the sense of Troy local phonology, Chinese Americans are fully participating in the local speech community. In other words, Chinese Americans in Troy are not accommodating to the speech of other Inland North speakers: they are mirroring the speech of Troy local speakers in their age group, who themselves are not obviously participating strongly in the Northern Cities Shift[20].

3.3 NCS in Michigan: Troy and Lansing

It is surprising to find that the NCS is only weakly evident among Troy speakers, because earlier studies (e.g., Callary 1975, Ito 1999, Labov et al. 1972, Labov 1994) have shown that young European Americans, who are from urban areas, and from the middle classes are more "shifted" in the NCS. Based on the parents' occupation information I collected during the interviews, I found that they are either engineers, accountants working in the auto industry, or owners of restaurants, etc., so it is reasonable to assume that the participants in this study were raised in middle class families. The city of Troy, as introduced in section 2.1, is in any case not a rural area, but a thriving city in the Detroit suburban area. Then how to account for the limited

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[20] Although for DRESS and STRUT, it looks as if the European Americans are more advanced in the direction of NCS movement than the Chinese Americans are.

presence of NCS features in middle class European Americans from Troy, who are supposed to be more advanced in the NCS than rural speakers, according to previous research?

We may find explanations from recent studies which have reported that the NCS is retreating (e.g., McCarthy 2011 for Chicago; Driscoll and Lape 2014 for Syracuse; Thiel 2017 for Ogdensburg, NY; Wagner et al. 2016 for Lansing). Take Lansing as an example, which is the capital of the state of Michigan, located an hour west of Troy[21]. In Lansing, studies based on recordings made in the late 1990s and early 2000s found that the NCS was well advanced among younger European Americans (e.g., Evans et al. 2000) and some ethnic minorities (e.g., Roeder 2006 for Mexican Americans). However, a more recent apparent time study by Wagner and colleagues (2016) found that among middle class Lansing young European American speakers (n = 29), the fronting of LOT is undergoing reversal, the lowering of DRESS continues but is less vigorous in backing, and TRAP is undergoing re-organization from across-the-board raising to a continuous or nasal system (Dinkin 2011).

Figure 3.8 displays the mean vowel positions for young European American speakers of Greater Lansing adapted from Wagner et al. (2016). This study used apparent time data from two sources: sociolinguistic interviews of 29 college age European Americans who grew up in Greater Lansing, which is labeled as the Younger generation (in blue); and oral histories of 21 former auto plant workers in Lansing, MI (date of birth 1907 to 1971), which is labeled as the Older generation (in red). The vowel systems of Troy European American speakers are presented here in Figure 3.9. Note that because Wagner and colleagues observed an emerging nasal TRAP system in Lansing, a distinction is made in Figures 3.8 and 3.9 between pre-nasal (HAND) and pre-oral (TRAP) means for both Lansing and Troy speakers. In Figure 3.8, the aforementioned

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[21] Besides proximity, having access to data is another reason for comparing Troy with Lansing

Lansing apparent time changes – backing of LOT, lowering of DRESS and separation of TRAP

and HAND – are evident.

Figure 3.8: Vowel system of Lansing European American speakers. Younger generation (in blue), Older generation (in red) Adapted from Wagner et al. (2016)
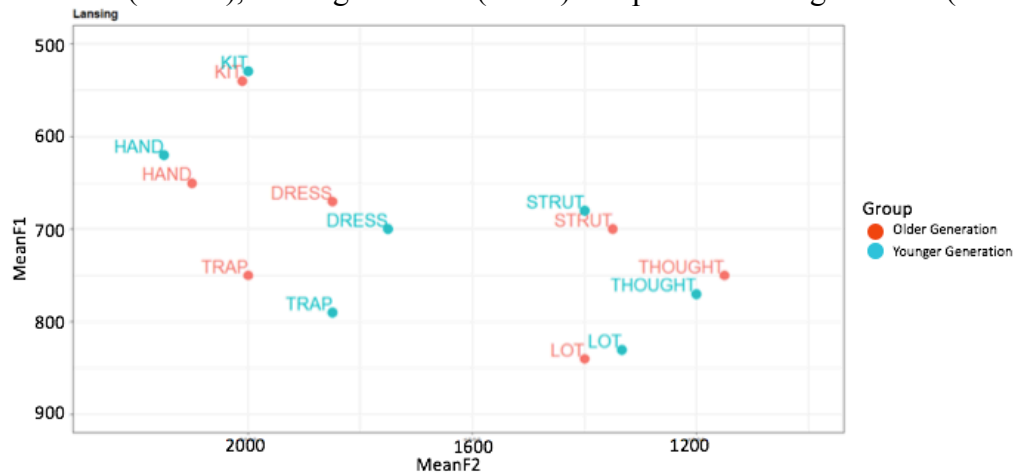
Figure 3.9: Vowel system of Troy European Americans with TRAP in pre-nasal (HAND) and pre-oral (TRAP) conditions
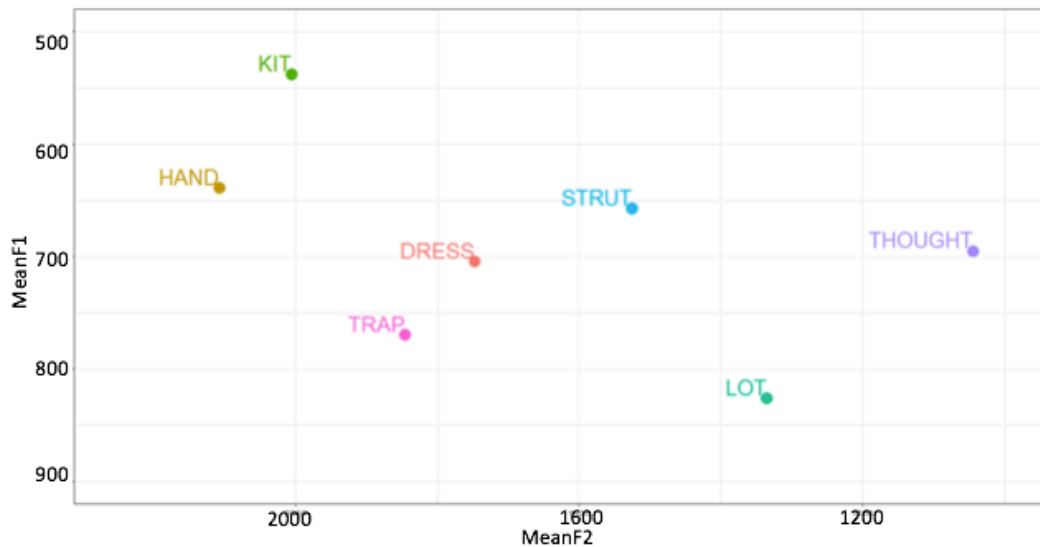
A high level of resemblance can be found when comparing the vowel configurations of

European Americans from Lansing and Troy. The departures from the NCS in Lansing, i.e.,

reversal of the fronting of LOT, continuation of the lowering of DRESS, and the reorganization of TRAP from a raised to a continuous or nasal system, are also evident in Troy. Recall that the mean F2 of LOT for Troy European Americans is 1335 Hz, which does not indicate fronting according to ANAE criteria[22]. More discussion of LOT stylistic variation among Troy Chinese Americans, which reveals speakers' implicit knowledge of LOT, will be seen in Section 4.1.

DRESS continues to lower and back in Lansing; in Troy, DRESS is also one of the most advanced NCS vowels. Savage and colleagues (2016) found that it is lowered more in reading than in spontaneous speech, suggesting that speakers consider the lowered pronunciation to be appropriate for formal style. Evidence for style shifting of DRESS among Troy speakers will be addressed in the next chapter.

Overall, the NCS vowel configurations of European Americans from Lansing and Troy are similar. We can also find some resemblance if we bring Troy Chinese Americans into the comparison. The vowel systems of both the Chinese Americans and the European Americans from Troy are re-displayed here in Figure 3.10, this time with separation of the pre-nasal and pre-oral environments for TRAP.

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[22] F2 of LOT larger than 1500 Hz is regarded as fronted according to *ANAE* criteria.

Figure 3.10: Vowel system of Troy European Americans (in blue) vs. Chinese Americans (in red) with TRAP in pre-nasal (HAND) and pre-oral (TRAP) conditions
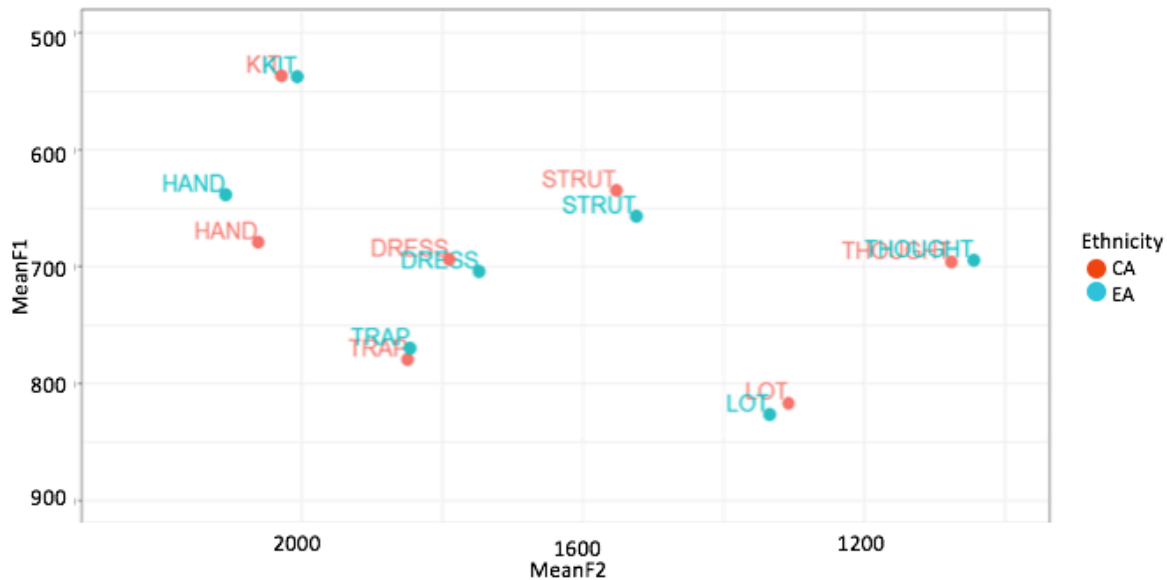
We can find that the overall vowel configuration between data from Lansing speaker and Troy speaker looks similar, regardless of speakers' ethnicity. As with European Americans from Lansing and Troy, who exhibit LOT reversal and continuation of DRESS shifting, Troy Chinese Americans' LOT is not fronted (F2 = 1308 Hz); DRESS is indicating lowering and backing, though to a lesser degree than the European Americans (see Section 3.2).

Surprisingly, we found the dispersion of TRAP (pre-oral) and HAND (pre-nasal) in both Lansing and in Troy, which can also be seen in Chinese Americans (see Figure 3.10), none of whom exhibit the expected raised system of TRAP (Labov et al.2006). The next section explores the allophonic distribution of the TRAP vowel class.

3.4 TRAP system

Three main configurations of the TRAP system have been described in previous studies (Labov et al.2006, Dinkin 2011), including: (i) the nasal system: HAND (the pre-nasal allophone of TRAP) is relatively high and discretely different from TRAP; (ii) the continuous system: TRAP is spread out over a continuous area of phonetic space, in which HAND tokens are higher than pre-oral ones; (iii) the raised system: all tokens of TRAP are high, but a sharp difference can still be found between HAND and pre-oral allophones.

In Greater Lansing, TRAP is reorganizing from a raised system to a continuous or nasal system (Wagner et al. 2016): the degree of distinctiveness between HAND and TRAP means increase from older to younger generations of speakers. TRAP tokens of all the 45 Troy speakers (n = 4620) derived by aggregating across all speech styles in interviews with the Chinese interviewer are plotted in Figure 3.11, in which HAND tokens are marked in red, TRAP in blue, with a horizontal line indicating the 700 Hz threshold of TRAP raising categorized by *ANAE*.

Figure 3.11: The TRAP system of Troy speakers (n = 45). HAND are in red, TRAP are in blue.
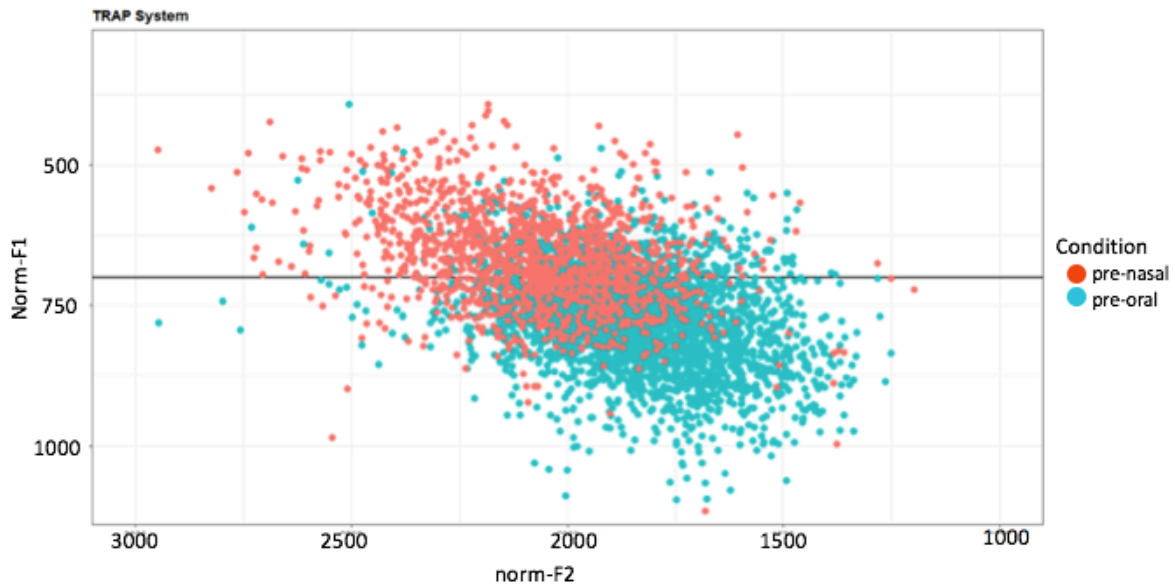
Note: The horizontal line indicating the 700 Hz threshold of TRAP raising

In Figure 3.11, there is no sharp gap between the two clusters of allophones: some tokens of each allophone share the same phonetic space. This is in accordance with prior studies' description of the continuous system. In conclusion, the TRAP system in Troy also presents the potential for allophonic split, which is in line with speakers from Greater Lansing (Wagner et al. 2016).

As shown in Figure 3.10, Troy European Americans are more advanced in HAND fronting and raising than for Chinese Americans. To investigate if there is an ethnic difference within the TRAP system, a multivariate analysis of variance (MANOVA) was conducted on the normalized data, with ethnicity as a fixed factor, the normalized mean F1 (Table 3.9.1) and the normalized mean F2 (Table 3.9.2) of TRAP and HAND as dependent variables.

Table 3.9.1: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F1 of TRAP and HAND of Troy Chinese Americans and European Americans

	F1		F1			
	CA		EA			
	Mean	SD	Mean	SD	F	p
TRAP	779.00	84.31	769.55	90.73	8.82	0.28
HAND	679.34	86.44	638.91	82.47	70.77	**<.001**

P-value of the variables with statistically significant (p< .05) differences between Chinese Americans and European Americans are marked in bold.

Table 3.9.2: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F2 of TRAP and HAND of Troy Chinese Americans and European Americans

	F2		F2			
	CA		EA			
	Mean	SD	Mean	SD	F	p
TRAP	1848.79	198.61	1845.99	196.99	0.15	0.70
HAND	2061.11	219.01	2108.11	239.98	13.63	**<.001**

P-value of the variables with statistically significant (p< .05) differences between Chinese Americans and European Americans are marked in bold.

The results show that both of the two dimensions of HAND are significantly different between the ethnic groups in Troy: European Americans' HAND is higher (40.42 Hz difference in F1) and fronter (47 Hz difference in F2) than that of Chinese American. It is unclear at this present state of knowledge whether Chinese Americans are lagging behind the European Americans in this reorganization of TRAP system from raised to continuous. Alternatively, they could be intentionally distancing themselves from the European Americans via their production of TRAP, as a way of indexing their ethnic identity. Data from older generations of speakers would be needed to investigate the first possibility using the apparent time construct. For the second possibility, which – in line with the Speaker Design model – assumes that Chinese Americans in Troy may be agentively constructing a linguistic identity, see the discussion in Chapter 6.

3.5 The Emergence of the Elsewhere Shift in the Inland North

As I have discussed earlier in this chapter, recession of the NCS has been observed in places such as Chicago (McCarthy 2011), Syracuse (Driscoll and Lape 2014), Lansing (Wagner et al. 2016), and now Troy. In the meantime, another vowel change, the Elsewhere Shift (Section 1.6), which has been found in a wide range of dialect regions across North America, has been observed in Lansing (Nesbitt & Mason 2016) and very recently in the Detroit area (Acton and colleagues 2017). Besides the abovementioned TRAP system changing to a nasal or continuous system, retraction of LOT, and continued lowering of DRESS, evidence of the Elsewhere Shift found in Lansing includes fronting of coronal-initial GOOSE (referred to as TOO in this study) and GOAT (Nesbitt & Mason 2016). In Troy, high back vowel fronting was also observed. Figure 3.12 plots the normalized means of all NCS vowels, with two of the Elsewhere Shift

vowels as well: GOOSE (classified as TOO and BOOT according to the preceding phonological environment) and GOAT.

Figure 3.12: The NCS and high back vowels of Troy speakers. Normalized means of Chinese Americans are in red, European Americans are in blue.

In Figure 3.12, the previously found evidence of Elsewhere Shift in Lansing is also evident in Troy, the lowering of TRAP, reversing of LOT, lowering of DRESS. For the high back vowels, the most salient one is the fronting of TOO, which is consistent with findings in Lansing. To investigate if there is an ethnic difference in the high back vowels, a multivariate analysis of variance (MANOVA) was conducted on the normalized data, with ethnicity as a fixed factor, the normalized mean F1 (Table 3.10.1) and the normalized mean F2 (Table 3.10.2) of TOO, BOOT, and GOAT as dependent variables.

Table 3.10.1: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F1 of GOOSE and GOAT of Troy Chinese Americans and European Americans

	F1		F1			
	CA		EA			
	Mean	SD	Mean	SD	F	p
TOO	453.66	59.79	439.75	57.62	0.81	0.37
BOOT	420.16	66.93	403.46	65.64	0.78	0.38
GOAT	647.95	81.79	640.61	87.78	5.78	**< .05**

P-value of the variables with statistically significant (p< .05) differences between Chinese Americans and European Americans are marked in bold.

Table 3.10.2: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F2 of GOOSE and GOAT of Troy Chinese Americans and European Americans

	F2		F2			
	CA		EA			
	Mean	SD	Mean	SD	F	p
TOO	1791.26	358.49	1952.35	347.66	10.01	**.002**
BOOT	1345.28	323.92	1369.73	304.87	1.31	0.25
GOAT	1274.08	236.55	1284.23	255.42	1.31	0.25

P-value of the variables with statistically significant (p< .05) differences between Chinese Americans and European Americans are marked in bold.

From the above tables, we find that the two ethnic groups of Troy exhibit statistically significant difference in F2 of TOO. Both the ethnic groups indicate fronting of TOO in Figure 3.12. However, European Americans produce significantly fronter TOO than Chinese Americans, with a difference of about 160 Hz in F2. The mean F1 of GOAT is also significantly different between the two groups, whereby Chinese Americans' GOAT is lower than that of their European peers (though the difference is just about 7 Hz). However, as reported by *ANAE* and described in the Elsewhere Shift, the fronting of GOAT is a widespread change in progress throughout contemporary American English that was focused on previous studies. In one of the most recent studies of Asian Americans in New Jersey, a more backed GOAT compared to non-

Asian speakers was found among Asian American sorority members, which might index Asian ethnicity (Bauman 2016). Thus, the GOAT-lowering difference between Troy CA and EA is not included in the further investigation of this study. The remaining question is, what accounts for the ethnic differences observed in the above, including THOUGHT, DRESS, STRUT, HAND, and TOO? The next chapters will attempt to provide some evidence.

3.6 Summary

To conclude this section, based on the NCS criteria, the comparison of Troy Chinese Americans with the ANAE's Inland North speakers and the rest of the ANAE corpus indicated that the Chinese American participants from Troy do not conform to the NCS. However, when comparing Troy Chinese Americans with the local European Americans, we found that the Troy Chinese Americans are participating in the local vowel system to the same degree as their European American cohort. In both ethnic groups of Troy, DRESS is lowering and backing, LOT is not fronting, and TRAP is distributed in accordance with the continuous TRAP system, consistent with studies focusing on European Americans (Wagner et al. 2016) and Mexican Americans (Roeder 2006) from the Greater Lansing area.

These results are in line with prior studies, such as the ANAE (Labov et al. 2006) and the parallel study of Lansing (Wagner et al. 2016), which lead us to believe that, the previously reported widespread NCS in the Inland North is retreating. But importantly, what we have seen in Troy is the overall overlap between the two ethnic groups' vowel systems. This indicates that in terms of linguistic practice, at least in their overall production, young Chinese Americans are well-integrated with the local speech community, just as they are in San Francisco (Hall-Lew 2009) and New York City (Wong 2015).

Labov (1966) defines a speech community not only by shared realization of the local phonology, but by shared *evaluation* of the local phonology. In Troy, the overall production of the two ethnic groups looks the same, although there are some significant differences. Chinese Americans' THOUGHT is fronter, DRESS and STRUT of European Americans' are backer and lower, and European Americans' HAND are fronter and more raised, and TOO are also fronter. We want to know what drives these differences. Is it because the two ethnic groups evaluate those vowels differently? Or are their evaluations the same, but Chinese Americans are just lagging behind their European American counterparts in ongoing change? The next chapter will be devoted to the observation of the stylistic variation of Troy speakers' speech, to better answer the question of why there are ethnic differences in some of the NCS vowels (THOUGHT, DRESS, STRUT, and TRAP), and TOO in the Elsewhere dialect. The different speech styles that were collected in this study, namely spontaneous speech/free speech (interview) and careful speech (passage reading, wordlist reading), should provide us with a tool to examine participants' implicit evaluation of the above vowels, which could be the factor that affects their speech. Another potential factor affecting the ethnic variation comes from the social characteristics of the interviewer. As introduced in Chapter 2, the primary interviewer in this study was the author: an international student of Chinese, who is a L2 English speaker. The overall results reported in this chapter, especially the vowels with ethnic variations, could be due to an effect of the Chinese nationality of the interlocutor. To better resolve this question, Chapter 5 will compare data collected by the Chinese interviewer, and by the European American interviewer.

Chapter 4. Style-shifting

The overall acoustic analysis of Troy Chinese Americans and European Americans was discussed in the preceding chapter. Comparison of the vowel configurations of the two groups revealed that Chinese Americans' vowel system was almost fully accommodated to the local speech community. Nonetheless, inter-ethnic differences were still found for the vowels THOUGHT, DRESS, STRUT, TRAP and GOOSE. This chapter attempts to determine whether differences in implicit, subjective evaluation of these vowels, as revealed by style-shifting, are responsible. I start with a brief discussion of the previous research on the English phonetics and phonology of Asian Americans. This is followed by a description of the methods used in the present study, and the results of a style-shifting analysis for each of the abovementioned vowels.

4.1 Background

As discussed in Chapter 2, previous studies of Asian Americans of various ethnicities, such as Vietnamese in Northern Virginia (Wolfram et al. 1986), Japanese in California (Mendoza-Denton & Iwai 1993), Koreans in Philadelphia (Lee 2000), Hmong in Minneapolis-St. Paul (Ito 2010[23]), and Chinese in San Francisco (Hall-Lew 2009) and New York City (Wong 2015) show that Asian Americans are linguistically assimilated to the mainstream European American English of their respective speech communities. However, other than focusing on overall participation in a given sound change, most studies of Asian Americans have not included style-shifting as a way of further examining Asian Americans' ethnolinguistic repertoire. Furthermore, scholars have taken for granted that Asian Americans *evaluate* local sound change the same way

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[23] In Ito (2010), data from Hmong Americans were analyzed from a translation task of specific terms (kinship terms, food items, etc.), data from EAs came from a wordlist reading. Thus, the style between the two ethnic groups was not comparable.

as their European American counterparts. This is in contrast to previous studies, which have shown that minority groups evaluate language changes differently from majority groups, even as they participate in them (Fought 1999).

As for recent studies of ethnic minorities in Michigan, only wordlist data were analyzed (e.g., Roeder 2010 and Ocumpaugh 2010 for Mexican Americans, Bakos 2008 for Lebanese Americans). The discussion of results from a single contextual style could not provide us the tool to examine closely the intra-speaker differences that are concealed in speech styles. In this dissertation, participants' spontaneous speech was collected by an interview; the careful speech was collected by a passage reading and a wordlist reading. Categorized by the relative degree of attention paid to speech (Labov 1966), spontaneous speech provides a more natural, less controlled stylistic context, while the careful speech provides a more monitored style of speech. By comparing speech of different styles among individual speakers, we may find intra-speaker variations that could not be revealed from the overall production data. The variation we may find that is embedded in different styles derives from and mirrors the social evaluation of linguistic variants in the speech community (Labov 1972, Bell 2001). The previous study has shown that minority groups evaluate language changes differently from majority groups, even as they participate in them: in Fought (1999), Chicanos treat GOOSE-fronting as a change from above, while California EAs treat it as a change from below. In Troy, it might be the case that CAs are participating in the local sound change to the same degree as their EA counterparts, but their evaluations of the linguistic variants are different from the local EA speech community. With the knowledge of Chinese Americans' speakers' implicit evaluations of those variables, I will then continue to investigate if there are stylistic variations between Troy Chinese Americans and European Americans. The stylistic variation of inter-ethnic group speakers may help us to

understand the ethnic variations that were found in the previous chapter. The data under investigation in this chapter are all collected by me, a L2 English speaker who is a Chinese citizen.

4.2 Results

In Chapter 3.2, when a comparison was made between vowel systems of Troy European Americans and Chinese Americans, statistical results indicated that the normalized means of the following vowels, THOUGHT, DRESS, STRUT, HAND, and TOO (re-presented in Figure 4.1), are significantly different between the two ethnic groups.

Figure 4.1: Normalized means of the vowels that are significantly different between Chinese Americans (in red) and European Americans (in blue)
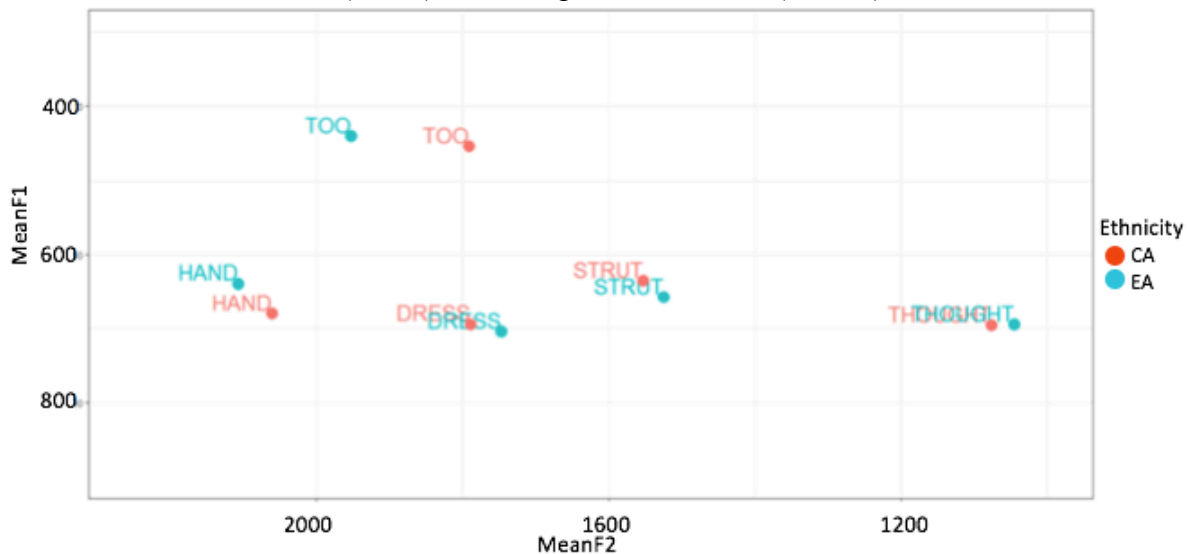
For each of the vowels, firstly, intra-speaker variation is compared across Chinese Americans' spontaneous speech (i.e., interview) and careful speech (i.e., passage reading and wordlist reading). This comparison will reveal the Chinese Americans' evaluations of these

vowel variables. Secondly, inter-speaker variation associated with contextual styles of each of the five vowels will be compared between European Americans and Chinese Americans. This will provide insight into the cross-ethnic differences in vowel realization reported in Chapter 4, determining whether they are motivated by different evaluations by each ethnic group.

4.2.1 THOUGHT

THOUGHT in the Inland North has been observed to have been lowered and fronted over time (Labov et al. 2006). The lowering and fronting of THOUGHT is also an Elsewhere Shift characteristic. Statistical results in Chapter 3.2 showed that Chinese Americans' mean F2 of THOUGHT is significantly fronter than the mean produced by European Americans, i.e., the Chinese Americans are ahead of their European American counterparts with respect to the expected direction of sound change of the NCS and the Elsewhere Shift, at least in the F2 dimension of THOUGHT. This is in contrast with the other vowels that exhibited ethnic differences in Chapter 3, for which Chinese Americans lag behind their European counterparts. Because of its exceptional pattern, Chinese Americans' THOUGHT in different styles is investigated first. Figure 4.2 plots the means for THOUGHT by Troy Chinese Americans in three stylistic contexts: interview (in red), passage reading (in green), and in wordlist reading (in blue)[24].

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[24] This color arrangement of speech styles is used throughout the dissertation.

Figure 4.2: Normalized means of THOUGHT in interview (in red), passage reading (in green), and wordlist (in blue) by Troy Chinese Americans (n=30)
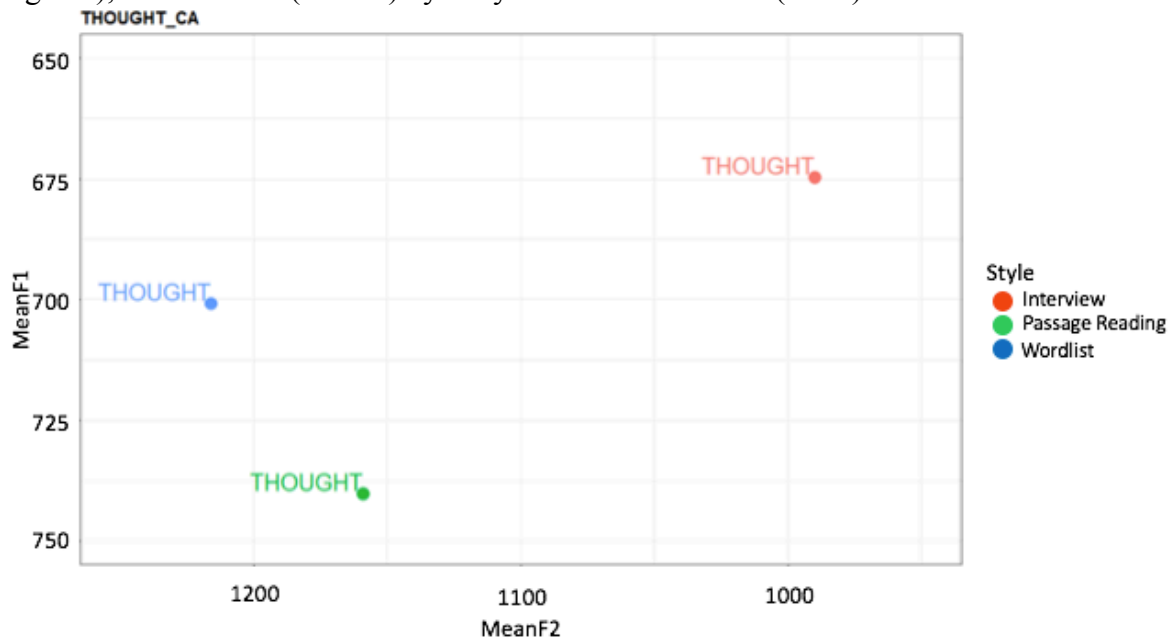
Data for the three contextual styles in Figure 4.2 show that Chinese Americans are shifting THOUGHT towards the expected direction of the NCS and the Elsewhere Shift more in careful speech (passage reading, wordlist reading) than in spontaneous speech (interview) by as much as 200 Hz. Moreover, THOUGHT is fronted the most in wordlist. In other words, with regard to THOUGHT, Chinese Americans sounded more NCS-like and more Elsewhere Shift-like in their most monitored speech style. This observation indicates that THOUGHT fronting and lowering is evaluated positively by Troy Chinese Americans. Then how about the local European Americans? Is it different social evaluations of THOUGHT that lead to the production

difference between the two ethnic groups? Figure 4.3 plots the means of THOUGHT produced

by Chinese Americans (circles) and European Americans (triangles) in three contextual styles[25].

Figure 4.3: Normalized means of THOUGHT in interview (in red), passage reading (in green), and wordlist (in blue) by Chinese Americans (circles) and European Americans (triangles)
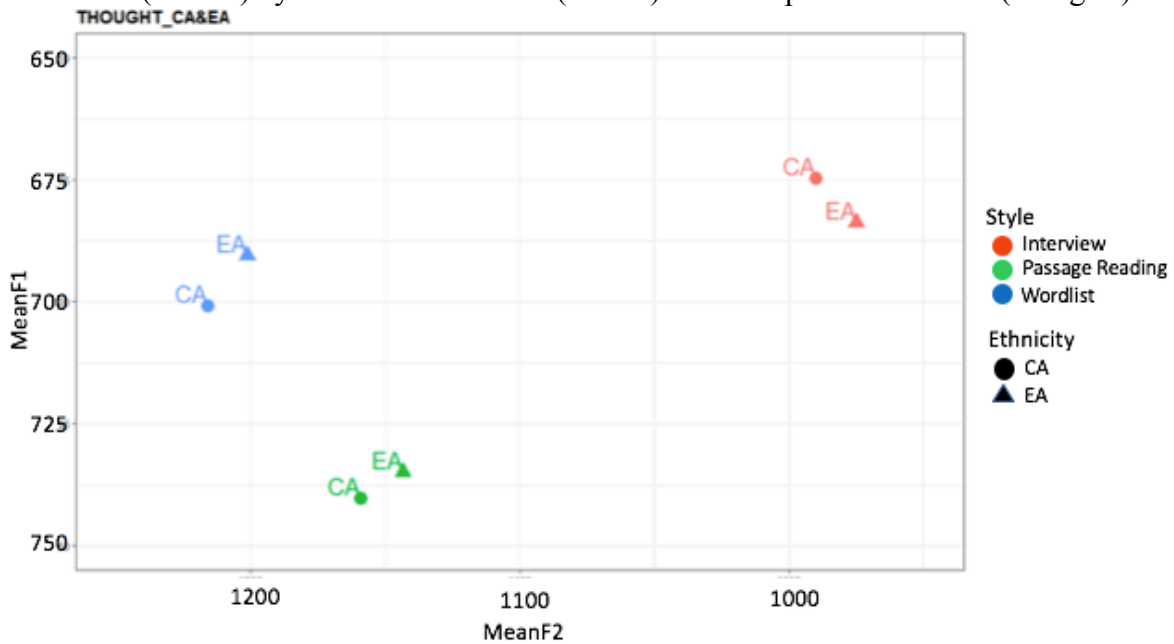
As shown in the above figure, European Americans and Chinese Americans present the

similar distribution of means of THOUGHT along the F1 and F2 dimension: THOUGHT is

fronted more in both of the careful speech styles, in which means of the wordlist fronted the

most; THOUGHT in spontaneous speech is backed the most. Though the general distribution of

THOUGHT across styles is the same, slight variance is also found: European Americans' mean

nuclei of THOUGHT are backer than Chinese Americans' in all speech styles (also lower in

spontaneous speech).

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[25] This shape arrangement for the ethnic groups is used throughout the dissertation.

Observations from the above found no attitudinal difference toward THOUGHT between European Americans and Chinese Americans in Troy: both groups appear to evaluate fronted THOUGHT as having higher social prestige than a backer realization. Then how to account for the ethnic variance in the overall production we found in the previous chapter? I will leave the discussion for the next chapter.

4.2.2 DRESS

The expected direction of shift for DRESS in both the NCS and the Elsewhere shift is lowering and/or backing (Labov et al. 2006). Overall, DRESS for Troy speakers does exhibit the shift, with European Americans' DRESS more advanced than Chinese Americans' DRESS in both dimensions. To investigate this ethnic variation, means for DRESS in different styles for Chinese Americans are plotted in Figure 4.4, following the same color arrangement for speech styles as in the last figure.

Figure 4.4: Normalized means of DRESS in interview (in red), passage reading (in green), and wordlist (in blue) by Troy Chinese Americans (n=30)
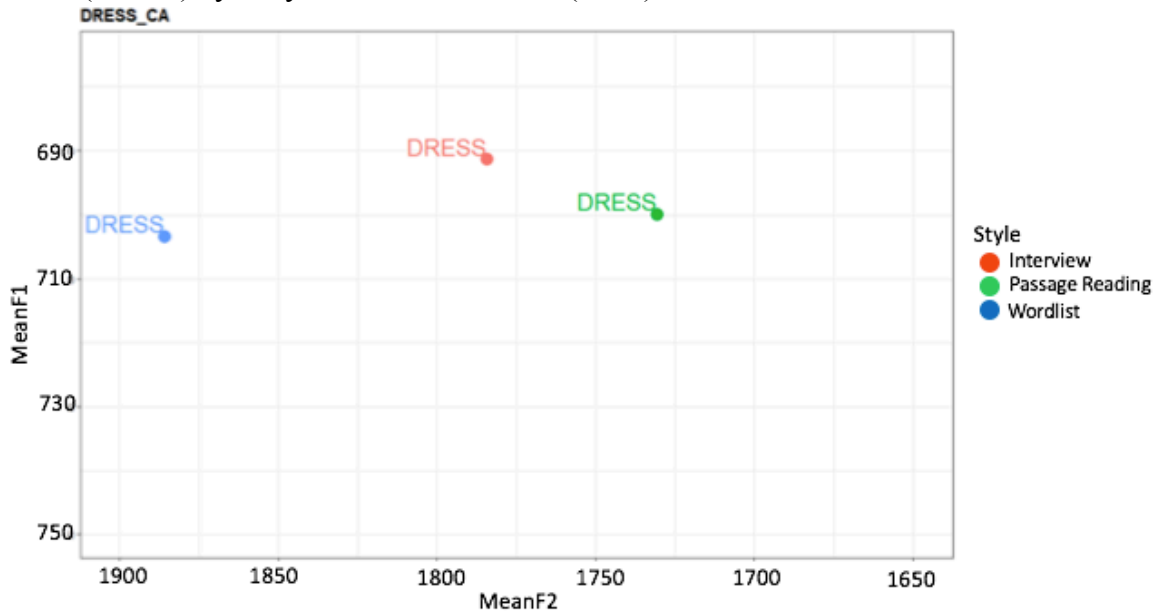
What we can observe from the above figure is that DRESS is slightly lower in both of the careful speech styles, i.e., passage and wordlist reading, although the F1 difference between interview style and the other two styles is only about 10Hz. The above stylistic variation of DRESS can be interpreted as Troy Chinese Americans evaluating DRESS lowering positively. But there is no direct answer for their attitude toward backing of DRESS, since, DRESS is backing the most in passage reading, whereas it is in wordlist reading that Chinese Americans are most conservative in backing of DRESS. We turn to the local European Americans for an answer. In Figure 4.5, means of DRESS for European Americans (in triangles) are plotted together with that of Chinese Americans (in round dots).

Figure 4.5: Normalized means of DRESS in interview (in red), passage reading (in green), and wordlist (in blue) by Chinese Americans (circles) and European Americans (triangles)
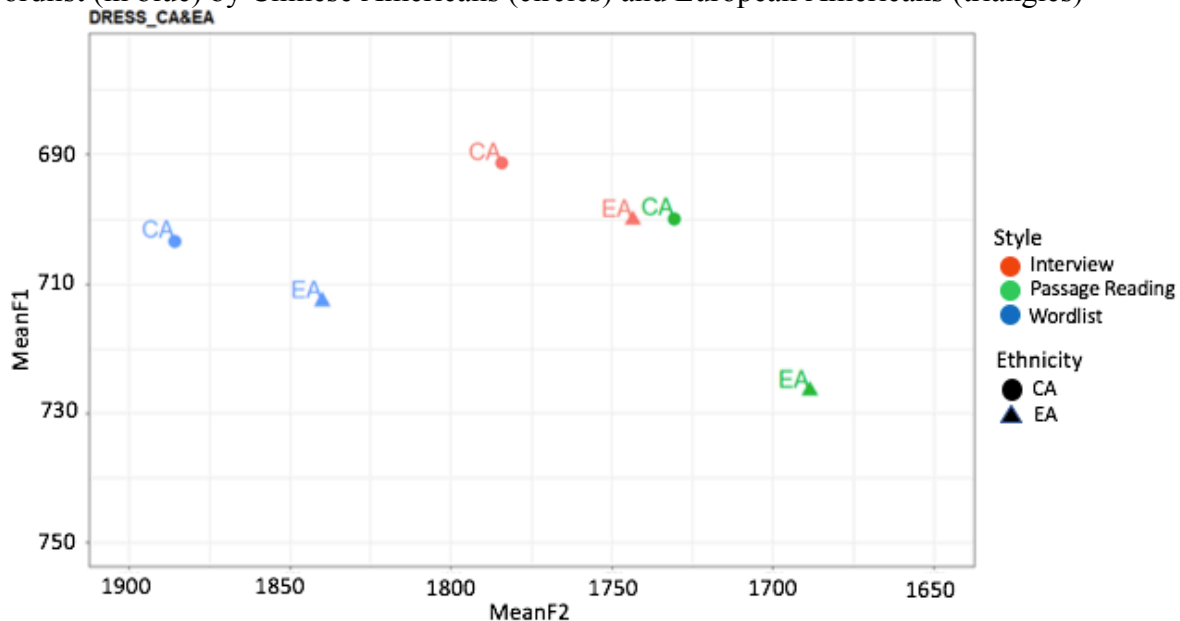
Figure 4.5 shows a similar distribution of DRESS across all three styles of speech for both ethnic groups: the most lowered DRESS for each group is in careful speech, with DRESS most backed in passage reading, while it is least backed in the wordlist. These observations indicate that in the F1 dimension, there is a weak correlation with attention to speech: DRESS is higher in spontaneous speech than in reading speech. There is no correlation between F2 and attention to speech. In general, European Americans produce the most lowered and backed DRESS across all speech styles. Nonetheless, even though the European Americans are backer and lower than Chinese Americans in all styles, production data show us that the implicit evaluations of European Americans and Chinese Americans toward DRESS are still in line with each other.

4.2.3 STRUT

The backing of STRUT is an expected direction of shift in the NCS (Labov et al. 2006), but as discussed in Chapter 3, it was not observed in Troy. Nonetheless, ethnic variation was still found, with Chinese Americans' STRUT realized as less backed and lowered than that of European Americans. Means of STRUT in different styles for Chinese Americans are plotted in Figure 4.6.

Figure 4.6: Normalized means of STRUT in interview (in red), passage reading (in green), and wordlist (in blue) by Troy Chinese Americans (n=30)
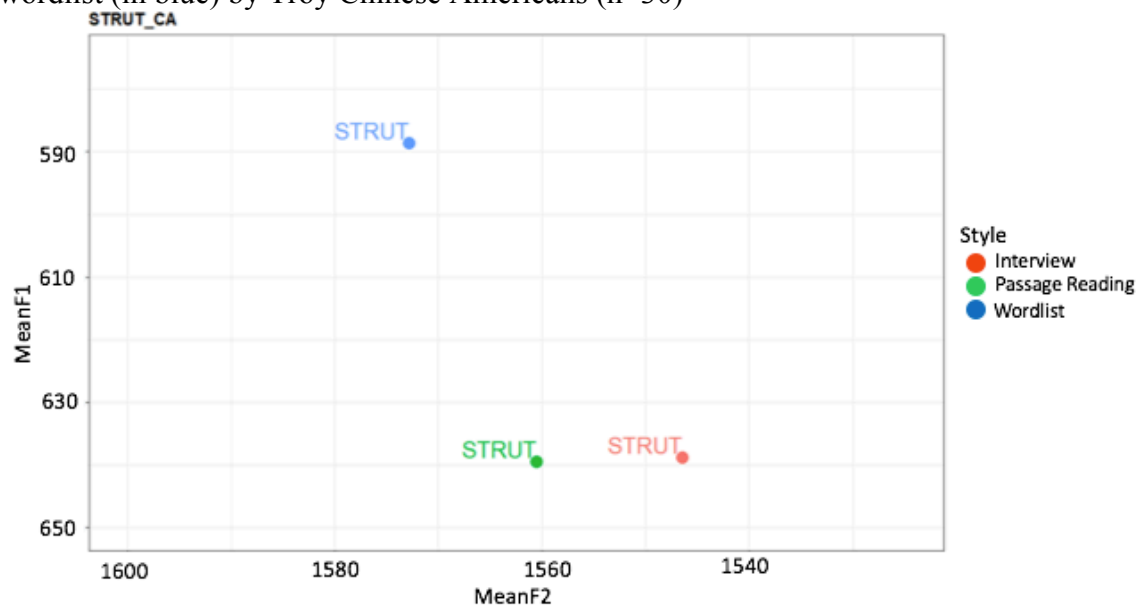
As shown in the above figure, when producing STRUT in the three speech styles, Chinese Americans back STRUT the most in spontaneous speech and to a lesser degree in passage reading. In their most careful speech style, wordlist reading, STRUT is in the most fronted and raised position in the vowel configuration compared to in the other two contextual styles: It is fully 50 Hz higher than the means for the other two styles. These results tell us that,

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though Chinese Americans back their STRUT in the most casual style and connected read speech, they are still quite conservative on STRUT backing in their most monitored speech (word list). Do European Americans evaluate STRUT the same way? Figure 4.7 plots means of STRUT for both European Americans and Chinese Americans.

Figure 4.7: Normalized means of STRUT in interview (in red), passage reading (in green), and wordlist (in blue) by Chinese Americans (circles) and European Americans (triangles)
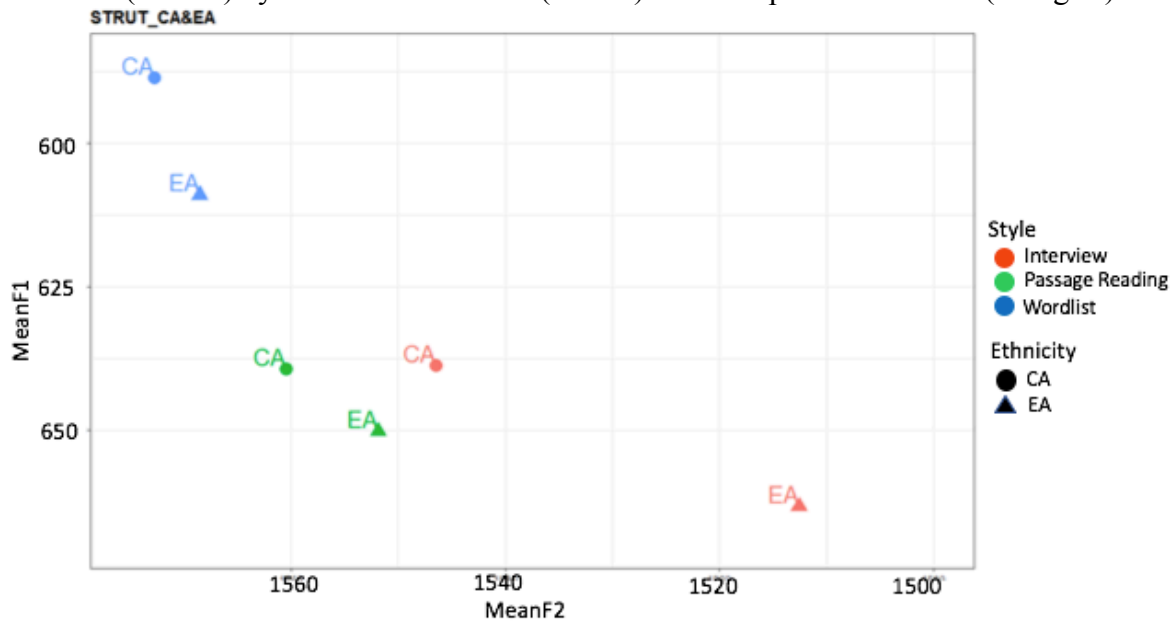
Overall, although we saw in Chapter 3 that European Americans back STRUT more than Chinese Americans do, Figure 4.7 reveals that speakers of both ethnicities share an evaluation of backed and lowered STRUT as being inappropriate in the formal context of word list reading. Both ethnic groups back and lower STRUT the most in their spontaneous speech, and to a lesser degree in careful speech styles, within which the least in both groups' wordlist reading. Again, European Americans are backing and lowering their STRUT more than Chinese Americans do

across all speech styles. The shared implicit attitude toward STRUT of the two groups still cannot account for why there is ethnic variation of the vowel.

4.2.4 HAND

The pre-nasal tokens of TRAP, which are referred to as HAND in this study, exhibit raising and fronting among Troy speakers, with European Americans being more advanced in the sound change. Figure 4.8 plots Chinese Americans' means of HAND in three speech styles.

Figure 4.8: Normalized means of HAND in interview (in red), passage reading (in green), and wordlist (in blue) by Troy Chinese Americans (n=30)
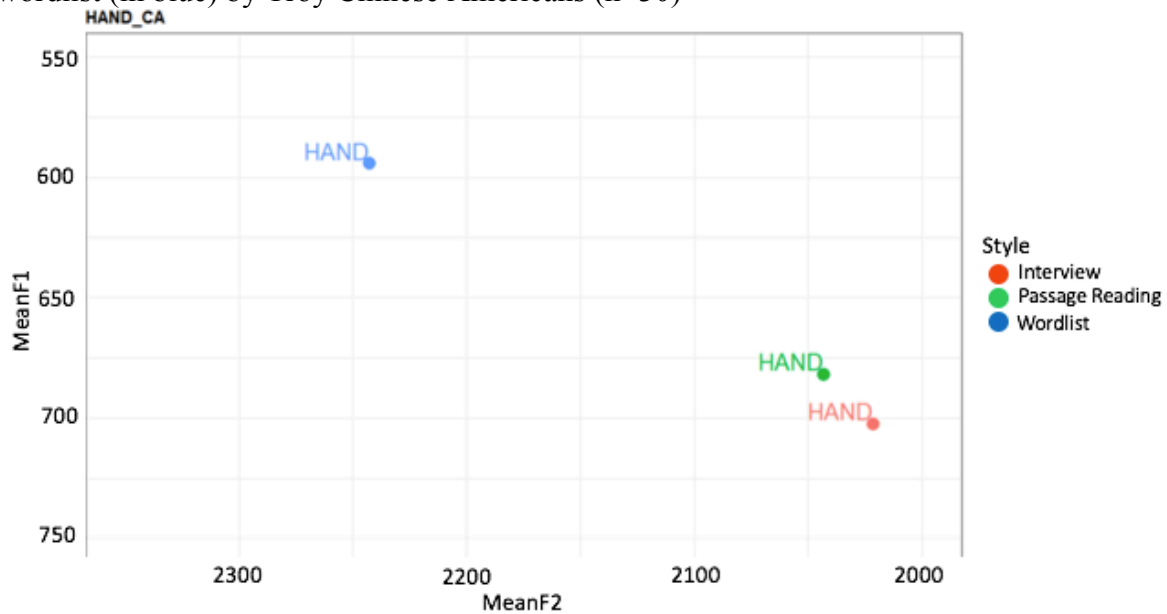
Although Chinese Americans are more conservative regarding the shifting of HAND compared to their European American cohorts, they still exhibit the most raised and fronted HAND in their wordlist reading, and to a lesser degree in passage reading. The least shifted HAND is found in spontaneous speech. Figure 4.9 plots the means of HAND for both groups of speakers in their different styles of speech.

Figure 4.9: Normalized means of HAND in interview (in red), passage reading (in green), and wordlist (in blue) by Chinese Americans (circles) and European Americans (triangles)
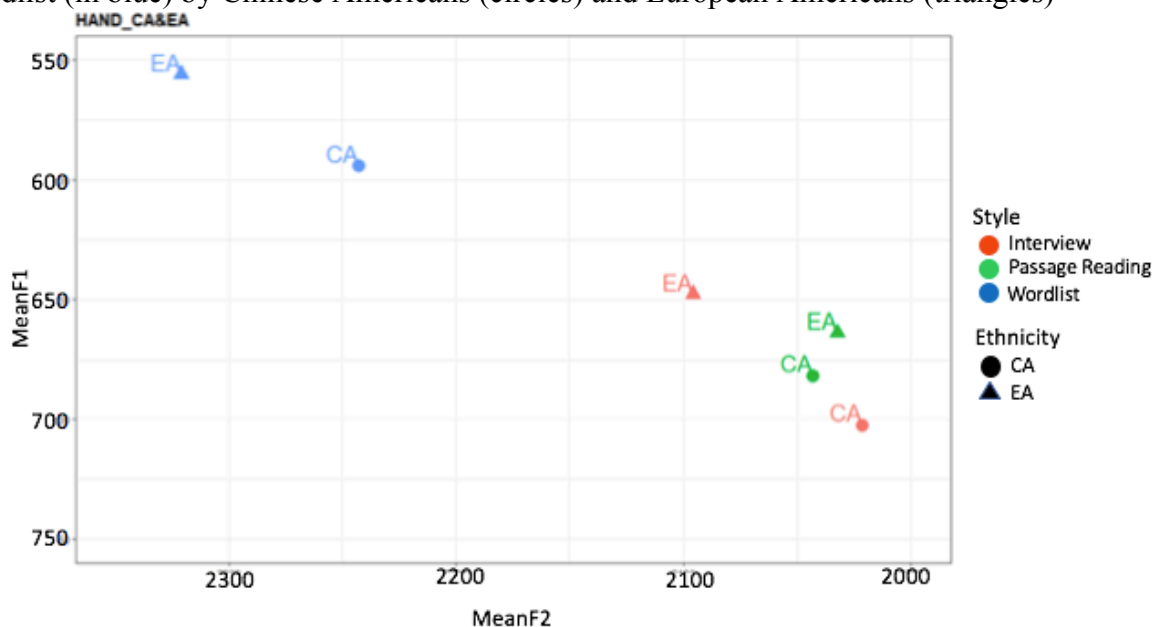

We find that the Chinese Americans and European Americans are sharing the similar evaluations of HAND in their careful speech styles: both groups fronting and raising their HAND the most in the wordlist. However, variation was found in the other two contextual styles: European Americans raise and front their HAND more when being interviewed than reading a passage, whereas Chinese Americans' HAND are raised and fronted more in passage reading than in interview. In general, in each of the speech styles, European Americans are more advanced in HAND fronting and raising compared to that of Chinese Americans. However, these observations still cannot tell us why there is ethnic difference in the shifting of HAND.

4.2.5 TOO

The fronting of GOOSE (/u/ in *goose, boot, soon* etc.) is a component of the Elsewhere Shift and

is a widespread sound change across North American English (Labov et al.2006). The post-

coronal tokens of GOOSE are referred to as TOO in this study. The TOO environment exhibits

fronting in both Troy European Americans and Chinese Americans, with European Americans

being more advanced in the shift, as we saw in Chapter 3.5. Figure 4.10 plots Chinese

Americans' means of TOO in interview (in red) and passage reading (in blue)[26].

Figure 4.10: Normalized means of TOO in interview (in red) and passage reading (in blue) by
Troy Chinese Americans (n=30)
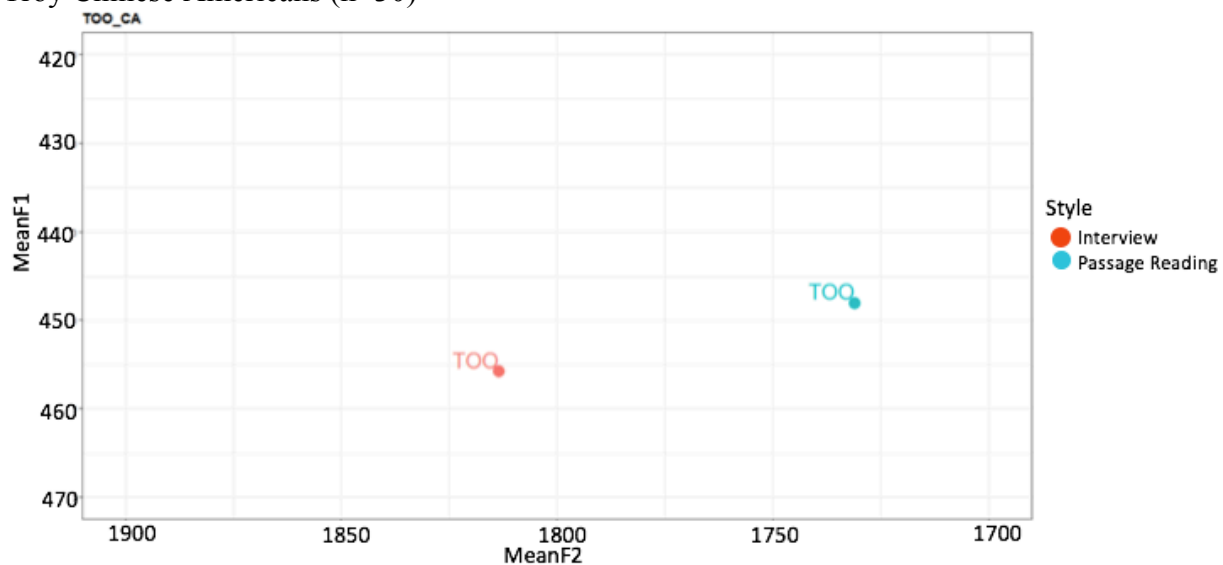
Although in both speech styles, tokens of TOO indicate fronting (F2>1700 Hz even in

passage reading), Chinese Americans exhibit more fronting of TOO in spontaneous speech than

in their careful speech. Figure 4.11 plots means of TOO by both of the groups.

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[26] Data of TOO in wordlist are not available since, when data collection procedure of this study was designed, the emphasis was placed on the NCS vowels, so post-coronal GOOSE tokens were not included in the wordlist.

Figure 4.11: Normalized means of TOO in interview (in red) and passage reading (in blue) by Chinese Americans (round dot) and European Americans (triangle dot) of Troy
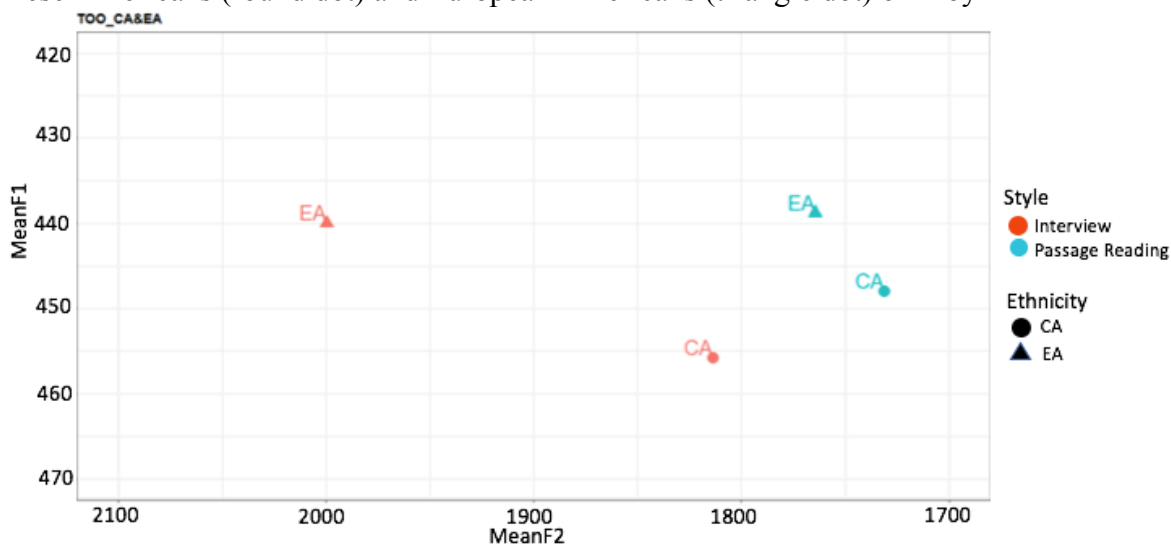
The above figure shows us that, Troy European Americans are fronting their TOO in spontaneous speech considerably more than in their careful speech, the configuration of which is similar to Chinese Americans'. A slight difference of style-shifting between the two groups is that, the divergence between spontaneous speech and careful speech for European Americans is much larger than that of Chinese Americans. Once again, we found that Troy European Americans are more advanced in the shifting of TOO.

4.3 Summary

This chapter investigates intra-speaker and inter-speaker contextual style-shifting of the five vowels that exhibit ethnic variation. As can be found in Table 4.3.1, which lists the findings for the vowels that are of interest of this and last chapter, the general stylistic pattern indicates that, Troy young people do not have fronted LOT or raised TRAP, which appears as if they are

adopting the Elsewhere Shift. Put together with apparent prestige of fronted STRUT, and assuming that fronted THOUGHT, backed and lowered DRESS and raised and fronted HAND are probably also being evaluated as the Elsewhere Shift (not the NCS) features, this all adds up to a positive evaluation of the Elsewhere Shift, with the exception of TOO[27]. Nonetheless, the similar production pattern across those vowels by the two ethnic groups indicates that the two ethnic groups share some similar social evaluations toward those vowels. Further study on speakers' perceptions of the abovementioned vowels among the Troy speech community may provide more evidence on this topic.

Table 4.1: Summary of findings for Style-shifting: The Prestige value of the NCS vs. the Elsewhere Shift

THOUGHT, **DRESS & HAND**	Troy speakers shift in the same direction as the NCS and the Elsewhere Shift in careful speech
STRUT	Troy speakers shift in the direction of the Elsewhere Shift (i.e. fronter), not the NCS (i.e. backer)
TOO	Troy speakers shift away from the Elsewhere Shift

Labov (2001: 86) comments on the study of style-shifting that "Groups of speakers who are in contact with the community but are still excluded from its main rights and privileges will often participate in the use of linguistic variables with altered stylistic patterns. This applies to minority ethnic groups (Poplack 1978, Labov 1963)". Yet here, the stylistic patterns that are found in this section reinforce the conclusion in Chapter 4 that in the overall production, young Chinese Americans in Troy are well-integrated with the local speech community. The question

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[27] Not all the scholars working on the Elsewhere Shift thinks that the high back vowels are necessarily a part of the Elsewhere Shift; they might be independent sound changes. So that might make TOO available for less positive evaluation among other vowels in this chapter.

remains open as to what accounts for the ethnic variation, even when both of the groups are sharing the same degree of social awareness of those variables, and are shifting in the same direction in their production.

If the ethnic variations are not due to different evaluations, another influential factor comes from the interviewer, since data under investigation in this chapter are all collected by me. According to Bell's (1984, 2001) audience design framework, speakers often accommodate (Giles 1973) to the linguistic norms of their interlocutor. As illustrated in Rickford and McNair-Knox (1994), the African American participant generally uses higher frequencies of African American Vernacular English (AAVE) variants when talking with the African American interviewer than with the European American fieldworker. However, Rickford and McNair-Knox were unable to show the interlocutor effect conclusively, and in fact suggested that the difference was due to FAMILIARITY of the Black interviewers, versus the unfamiliar European American interviewer. In the current study, familiarity is controlled for since participants did not know either interviewer. So it might be the case that the Chinese Americans expresses a form of ethnic solidarity with the Chinese interviewer, by employing variants of certain vowels that were less-local, and more global-sounding. To get further insight into this hypothesis, the next chapter further explores the interlocutor effect by comparing a subset group of Chinese Americans' data collected by me, and by a college student who is a native speaker of English.

Chapter 5. Interlocutor Effect

In the last chapter, vowels that exhibited ethnic variation were analyzed across contextual styles.

The similar production pattern across those vowels by the two ethnic groups indicates that the

two ethnic groups share similar social evaluations of those vowels. Thus it does not appear to be

the case that the Chinese American speakers realize those vowels differently because they and

their European American counterparts subjectively evaluate them differently. Instead, the

Chinese Americans might have linguistically accommodated to the Chinese interviewer more

than the European Americans did (i.e. audience design). Or, they might have positioned

themselves differently with respect to the Chinese interviewer than did the European Americans

(i.e. speaker design). This chapter continues to explore ethnic variation through an examination

of the interlocutor effect. The chapter is organized as follows: first is a brief introduction to the

methodology. Following are results of each of the vowel that was investigated in this chapter.

The last section is a summary of findings.

5.1 Background

According to the Audience Design model (Bell 1984), any model of style-shifting that seeks to

account for speakers' style-shifting behavior should incorporate speakers' responses to

interlocutors. In attention-to-speech studies, such as Labov 1972 and Trudgill 1974, the

interviewer was kept constant across participants, in order to control for an effect of interlocutor.

But Bell argued that this effect was itself an important object of investigation since in real life,

speakers do not interact with one – and only one – interlocutor. In Rickford and McNair-Knox

(1994), an African American English speaker, 'Foxy Boston', was recorded in conversations

with interviewers of different ethnicities. Results showed some higher frequencies of African

American English features used by Foxy when talking with the African American interviewer than with the European American interviewer, which is an indication of interlocutor effects, though other social variables such as how well the participant knew the addressee could also have played an important role in the style-shifting.

In the current study, Chinese American speakers often talk about their experiences as Americans who are living in Western culture, but who are also living with their families, immersed in their first generation immigrant parents' Chinese-oriented lifestyle. This is exemplified in the excerpts below, where Hank and Nathan talk about what they think of their parents who have deep roots in China and Chinese culture but who live in the U.S.

Hank: … cuz like, my parents like, I don't think they understand like… American culture and all that. So, and since me and my sisters were born and raised, like the American life, lifestyle they have to, like explain to them, all that stuff.

Nathan: …our family is definitely like, is isolated in terms of like, being lined up to date with like current news and, they don't really care much for like CNN or like NBC or like FOX or whatever, the American news show. They mostly read like, I don't know it's like, Baidu… They read Chinese news like, Weibo and like, go on like Wechat or whatever, so like they are not really like informed I'd say like, like what's going on in the U.S.

The Chinese American speakers' struggle between their identities as Americans and Chinese gives rise to a question of whether there is an effect of interlocutor on participants' speech: do the Chinese Americans diverge from their mainstream European American English when the interviewer is Chinese? All of the data so far presented were from interviews with me, a Chinese national. Although the CA speakers' phonology appears to be almost identical to the EAs' phonology, key differences in the realization of THOUGHT, DRESS, STRUT, HAND, and TOO could be due to the CAs' response to a Chinese interviewer. Therefore, to answer these questions, a second interviewer, ES, was subsequently included in this study.

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ES is a European American college-age female student from southeast Michigan. She was recruited into this project as an undergraduate research assistant. However, the two interviewers differed from each other not only in their ethnicities, but their age, gender, language background, etc. are also different (c.f. Rickford & McNair-Knox 1994). The demographic characteristics of the two interviewers do not allow for me to control for the effect of interviewer ethnicity only. Thus my hypothesis was adjusted as follows: The Chinese Americans were predicted to adjust their vowel phonology, so that the mean nuclei of THOUGHT, DRESS, STRUT, HAND and TOO were no longer significantly different from that of their Troy European American counterparts, with an interviewer who was not me. Going forward, the hypothesis is not specific about which demographic features of the Chinese interviewer (me) caused them to diverge from European American speech patterns in the first round of interviews. Now, the prediction is simply that they will converge with the European American speech patterns if talking to the second interviewer, ES. Since any interlocutor effect cannot be solely attributed to interviewers' ethnicity, in the following sections, the Chinese American interviewer (me) will be referred to neutrally as Interviewer-1, and the European American interviewer (ES) will be referred to as Interviewer-2. A subset of 14 Chinese Americans were re-interviewed by Interviewer-2 (see Chapter 2.4 for more information of this subsample of participants).

The rest of this chapter reports the acoustic and statistical analysis of the five vowels that exhibited variation across Troy Chinese Americans and European Americans, as reported in Chapter 3: THOUGHT, DRESS, STRUT, HAND, and TOO. The analysis of each of the five vowels in this chapter starts with (1) a visual inspection of the plotted means of the target vowel, and then (2) a multivariate analysis of variance (MANOVA) is conducted with the normalized F1 and F2 of each vowel as dependent variables, and interviewer as a fixed factor.

In an ideal study, super tokens, namely "variant forms from the same speaker in the same stretch of discourse" (Tagliamonte 2011: 111), are expected to be included in the analysis. However, the nature of sociolinguistic interviews decides that the exact questions/topics that are used in each of the interviews are unavoidably different. In this study, the two interviews of the same speaker are conducted by two interviewers, which leads to more variations of the lexical items that were collected, i.e. the words that were collected from the two interviewers of each speaker. Furthermore, realization of a given vowel varies across phonological environments. However, if all the phonological independent variables in each regression were included, it would not have enough statistical power, since the data sets are fairly small, especially for the data in passage reading and word list. Additionally, specific lexical items can have quirky effects, independent of their phonological profile. Thus, after step (2), if a difference was found on either the F1 or F2 dimensions, in order to eliminate the effect of lexical items that were collected by the two interviewers, (3) a linear mixed-effects model regression is performed using the function *lmer* in package *lme4* (Bates and Sarkar 2007) in the R statistical environment (R. C. Team 2013). The model includes F1 and/or F2 of the target vowel as dependent variable (whichever was found to exhibit a significant difference in MANOVA). The independent variables (fixed effect) is the INTERLOCUTOR, i.e. Interviewer-1 and the Interviewer-2, with Interviewer-2 set as the reference level. LEXICAL ITEM is entered into the model as a random factor. If a significant main effect of INTERLOCUTOR was observed, this indicates that inter-group differences across ethnicities for that vowel may actually be an effect of interlocutors.

5.2 Results

5.2.1 THOUGHT

In Chapter 4, I found that the normalized mean of THOUGHT produced by Chinese Americans is significantly fronter than European Americans'. Furthermore, in Chapter 4, the two ethnic groups show a similar direction of style-shifting along the F1 and F2 dimension: THOUGHT is more fronted in careful speech than in spontaneous speech. This suggests that although there is an interethnic difference in overall production of THOUGHT, both ethnic groups evaluate THOUGHT variation in the same way. Figure 5.1 plots the normalized means of THOUGHT by Troy Chinese Americans with the Interviewer-1 (in green), and with Interviewer-2 (in blue). The mean of THOUGHT produced by the European Americans is reproduced (in red) as a reference point.

Figure 5.1: Normalized means of THOUGHT with Interviewer-1 (in green) and Interviewer-2 (in blue) by Troy Chinese Americans (n=14)
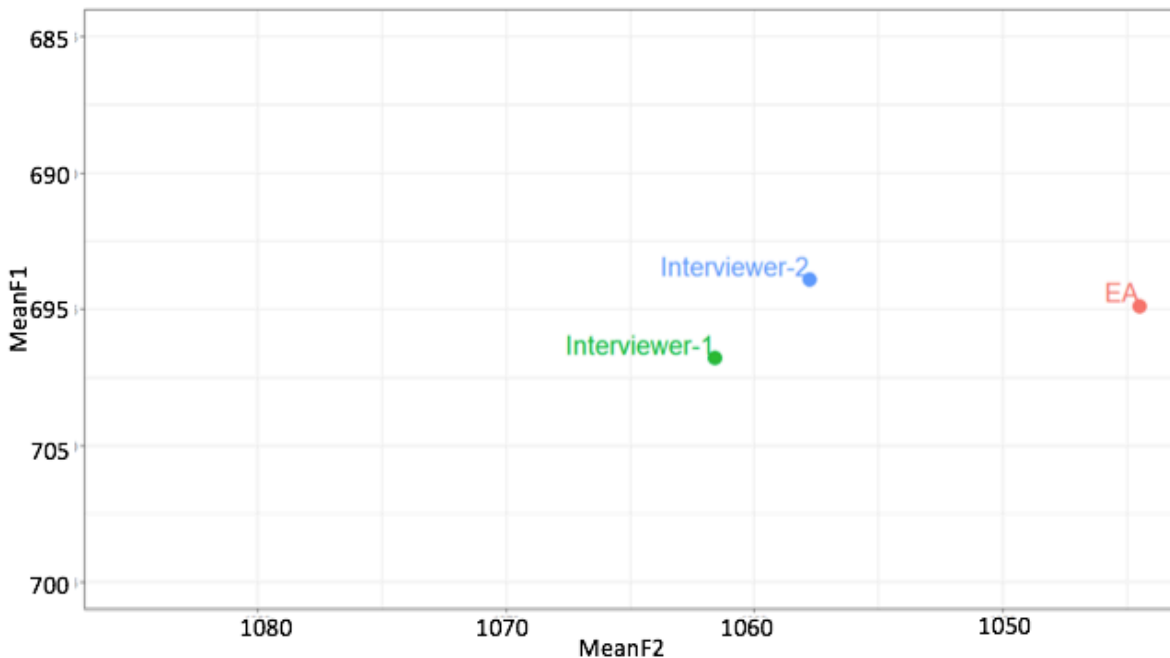
Visual inspection of the above figure finds that Troy Chinese Americans' mean of THOUGHT is more fronted with Interviewer-1 than with Interviewer-2, although the difference is extremely small, at only about 5Hz. It is consistent with the result in Chapter 3 that Troy Chinese Americans' mean of THOUGHT is more fronted than that of the European Americans. To put it in another way, although we saw in Chapter 3 that CAs' THOUGHT was fronter than EAs' THOUGHT, with Interview-2, we see CAs' mean of THOUGHT shift slightly up and back in the direction of the EA mean (the red circle in Figure 5.1). To more closely examine the difference of means of THOUGHT exhibited between interviewers, a multivariate analysis of variance (MANOVA) was carried out. Unsurprisingly, although the direction of the difference is suggestive, the MANOVA results in Table 5.1 do not indicate a significant effect of INTERLOCUTOR in either the F1 (p= .58) or the F2 dimension (p = .71).

Table 5.1: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F1 and F2 of THOUGHT with Interviewer-1 and Interviewer-2

THOUGHT	Interviewer-1		Interviewer-2			
F1	Mean	SD	Mean	SD	F	p
	696.78	119.34	693.89	114.66	0.301	0.58
F2	Mean	SD	Mean	SD	F	p
	1061.58	227.61	1057.8	223.34	0.14	0.71

5.2.2 DRESS

In Chapter 3, the means of DRESS between Troy Chinese Americans and European Americans exhibit a significant difference in both the frontness and the height of the vowel, with European Americans' DRESS lower and backer. From the discussion of stylistic variation of DRESS in Chapter 4, we found that both ethnic groups' mean of DRESS exhibits a similar direction of style-shifting: both groups' mean of DRESS lower and backer in spontaneous speech than

careful speech, which indicates that the two ethnic groups share the same social evaluation of

DRESS. In this section, first, the abovementioned ethnic variation is explored through comparing

the means of DRESS across the two interlocutors. The normalized means of DRESS by Troy

Chinese Americans with Interviewer-1 (in green), and with Interviewer-2 (in blue) are shown in

Figure 5.2. The mean of DRESS produced by the European Americans is reproduced (in red) as

a reference point.

Figure 5.2: Normalized means of DRESS with Interviewer-1 (in green) and Interviewer-2 (in blue) by Troy Chinese Americans (n=14)

The observation we can get from this figure is that the re-interviewed Chinese

Americans' mean of DRESS is lower and backer with Interviewer-2 than with Interviewer-1. In

Lansing, European Americans' mean of DRESS was lower and backer in careful speech

(Wagner et al. 2016). Troy CAs' lowered and backed their mean of DRESS more in re-

interviewed speech indicates that the CAs really are orienting to a local norm. This result is

consistent with the overall vowel configuration of Troy Chinese Americans and European Americans, in that the EAs' mean of DRESS is lower and backer than the Chinese Americans'. A MANOVA analysis indicates that there is a significant difference (p < .05) of F1 of DRESS between interviews conducted by the two fieldworkers. Therefore, the following discussion focuses on the F1 of DRESS.

Table 5.2: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F1 and F2 of DRESS with Interviewer-1 and Interviewer-2

DRESS	Interviewer-1		Interviewer-2			
F1	Mean	SD	Mean	SD	F	p
	694.41	84.06	701.06	90.70	4.35	**0.04**
F2	Mean	SD	Mean	SD	F	P
	1790.21	189.20	1788.89	197.38	0.04	0.85

P-value of the variables with statistically significant (p< .05) differences are marked in bold.

To more accurately model the effects of interlocutor for DRESS, a linear mixed-effects model regression was performed following the abovementioned methodology. The model includes F1 of DRESS as dependent variable; independent variable is the INTERLOCUTOR, LEXICAL ITEMS in the data base was included as random effect. Results are given in Table 5.3.

Table 5.3: Regression model for F1 of DRESS

Random Effects					
Groups	Name	Variance	Std. Dev.		
Lexical items	(Intercept)	4016	63.37		
Residual		4468	66.84		
Number of objects: 3084. Number of groups: word, 495					
Fixed Effects					
	Estimate	Std. Error	df	t-value	p-value
(Intercept)	708.8954	3.9853	638.600	177.876	< .0001
Interlocutor	-0.4629	2.7108	2933.400	-0.171	0.86

The regression results show us that, there is no significant effect of interviewer (p = 0.86) on the F1 of DRESS. With LEXICAL ITEMS as a random effect included in the model, the results indicate that the distinction between DRESS produced with the two interviewers is an effect of lexical items. In other words, it is due to the differences in words that were produced by Chinese American speakers with the two interviewers that give rise to the distinction of F1 of DRESS. I will come back to the lexical effect of DRESS later in this chapter (Chapter 5.6). The next section investigates the ethnic variation of STRUT.

5.2.3 STRUT

The overall production across all styles by Troy speakers indicates that European Americans' STRUT is lower and backer than that of Chinese Americans. Comparison of style-shifting for the two groups reveals that speakers of both ethnicities lowered and backed their STRUT more in spontaneous speech, than in their careful speech. Since contextual styles cannot account for the ethnic variation, this section investigates the effect of interlocutors on STRUT. The normalized means of STRUT by Troy Chinese Americans with the two interviewers are shown in Figure 5.3. The mean of STRUT produced by the European Americans is reproduced (in red) as a reference point.

Figure 5.3: Normalized means of STRUT with Interviewer-1 (in green) and Interviewer-2 (in blue) by Troy Chinese Americans (n=14)
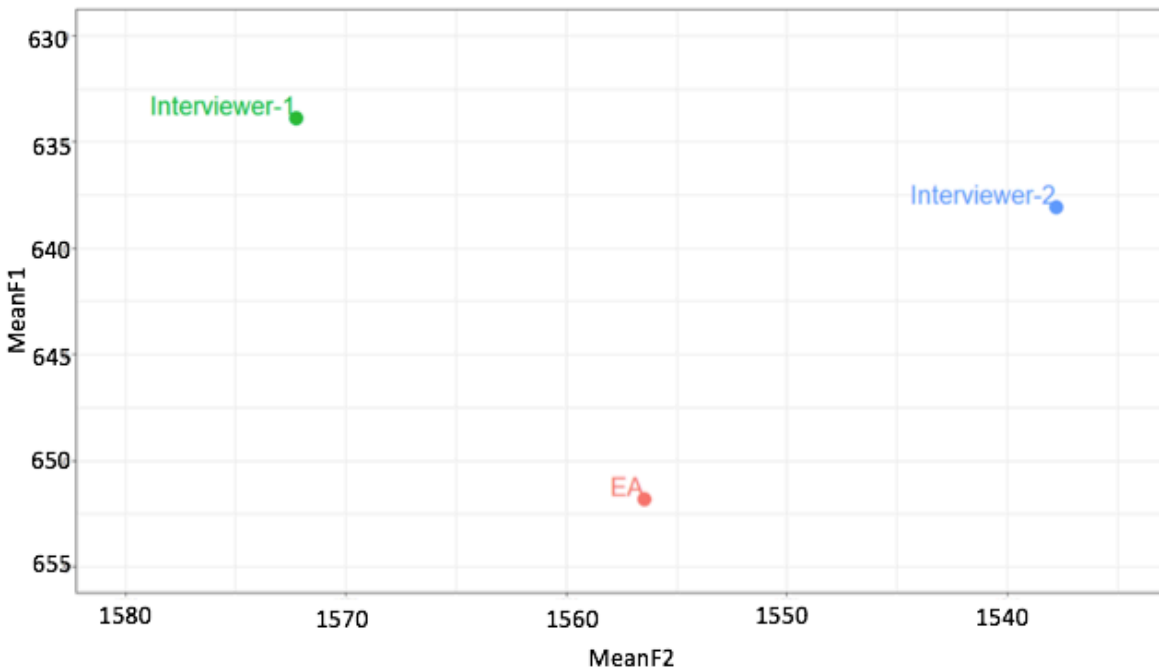
Visual inspection found that the mean of STRUT produced with Interviewer-2 by CAs is very slightly lower and somewhat backer than when it is produced with Interviewer-1. In fact, the CA speakers' STRUT was even backer with Interviewer-2 than the mean STRUT nucleus of the European American participants. This configuration resembles the distribution of STRUT produced by Troy Chinese Americans and European Americans. Before we jump to a conclusion that it is the interlocutors that play the role in ethnic variation of STRUT, let us confirm there is indeed a statistical distinction between means of STRUT produced with different interviewers. A multivariate analysis of variance (MANOVA) was conducted on the normalized data, with interviewer as a fixed factor, and the F1 and F2 of STRUT as dependent variables. Results are shown in Table 5.4.

Table 5.4: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F1 and F2 of STRUT with Interviewer-1 and Interviewer-2

STRUT	Interviewer-1		Interviewer-2			
F1	Mean	SD	Mean	SD	F	p
	633.88	112.20	638.07	294.82	1.65	0.20
F2	Mean	SD	Mean	SD	F	p
	1572.28	114.70	1573.78	294.41	16.72	**< .0001**

P-value of the variables with statistically significant (p< .05) differences are marked in bold.

Results in the above tables show us that, there is a significant difference on the F2 of STRUT between data collected by different interviewers, while no such difference was found on F1 of STRUT. To more closely investigate whether the differentiation of backness of STRUT is due to an interlocutor effect, instead of an influence of the different lexical items that were used by the speakers during the interviews with different interviewers, a linear mixed-effects model regression was conducted with the same methods used in previous sections. Results can be seen in Table 5.5.

Table 5.5: Regression model for F2 of STRUT

Random Effects

Groups	Name	Variance	Std. Dev.		
Lexical items	(Intercept)	78380	280.0		
Residual		30647	175.1		
Number of objects: 4971. Number of groups: word, 863					
Fixed Effects					
	Estimate	Std. Error	df	t-value	p-value
(Intercept)	1602.507	11.186	1008.000	143.260	< .0001
Interlocutor	-9.321	5.732	4488.000	-1.626	0.10

Observation from the above table found that, with lexical items included as a random effect in the model, Chinese Americans' F2 of STRUT with two interviewers do not exhibit

significant difference. This tells us that, different lexical items that were used during the interviews with the two interviewers is the influential factor that leads to the distinction of STRUT that we found in the precious MANOVA analysis. More discussion of the lexical effect of STRUT can be found later in this chapter (Section 5.6). Ethnic variation of HAND will be investigated in the next section.

5.2.4 HAND

In the comparison of overall production between the two ethnic groups from Troy, I found that European Americans' mean of HAND is significantly fronter and more raised than that of Chinese Americans. However, the two ethnic groups' style-shifting of HAND was in the same direction: both fronting and raising their HAND the most in careful speech (wordlist and passage reading). In this section, HAND produced by Chinese Americans in their interviews with two interlocutors will be examined. Firstly, means of HAND are plotted in Figure 5.4, with HAND with Interviewer-1 (in green) and Interviewer-2 (in blue). The mean of HAND produced by the European Americans is reproduced (in red) as a reference point.

Figure 5.4: Normalized means of HAND with Interviewer-1 (in green) and Interviewer-2 (in blue) by Troy Chinese Americans (n=14)
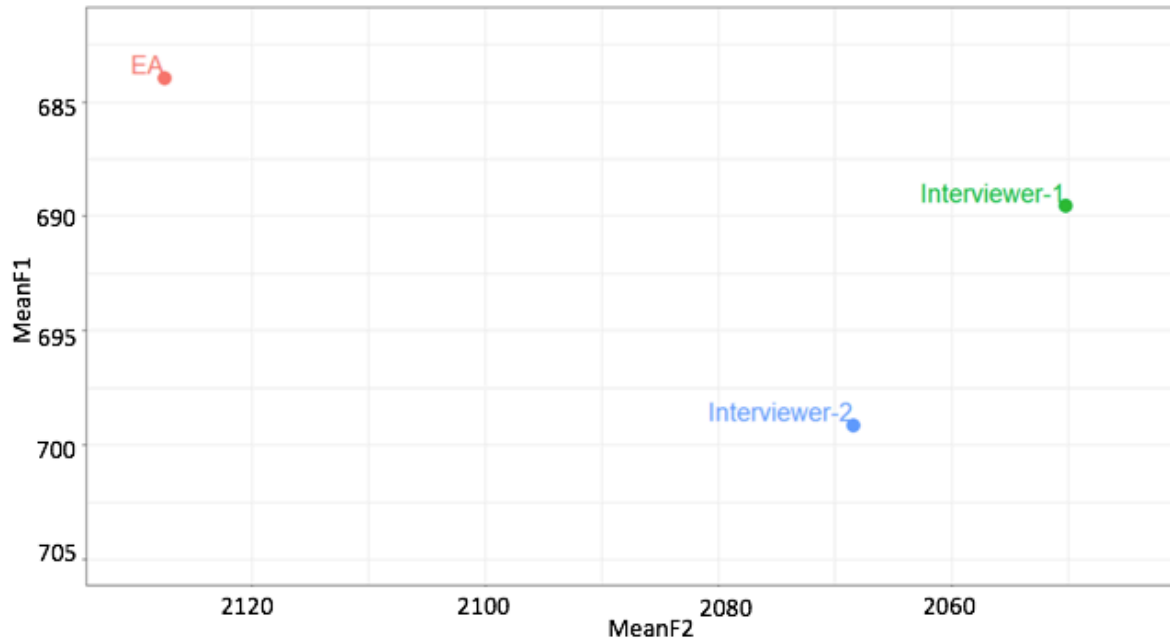
In the above figure, the mean of HAND with Interviewer-2 is fronter than that with Interviewer-1. However, it does not indicate much HAND raising (F1 < 700 Hz) according to the ANAE, and it is even lower than the mean of HAND in interviews with Interviewer-1. So, if HAND with different interlocutors presents a different picture in the F1 dimension than what we have found in Chapter 3 (mean of HAND by EAs is more raised and fronted than for CAs), can we still account for the ethnic variation of HAND in the F2 dimension? Table 5.6 are results of a MANOVA test of Chinese Americans' mean F1 and F2 of HAND with the two interviewers.

Table 5.6: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F2 of HAND with Interviewer-1 and Interviewer-2

HAND	Interviewer-1		Interviewer-2			
F1	Mean	SD	Mean	SD	F	p
	689.53	84.03	699.12	97.14	2.62	0.11
F2	Mean	SD	Mean	SD	F	p
	2050.23	189.79	2068.45	208.27	1.97	0.16

Results in Table 5.6 show that, HAND produced by Chinese Americans with the two interviewers is not significantly different from each other in both F1 and F2 dimensions. Thus, the effect of interlocutor is not evidence that we can use to account for the ethnic variation of HAND that was found in Chapter 3.

5.2.5 TOO

In this section, the interlocutor effect on TOO by Troy Chinese Americans will be investigated to try to find what drives the ethnic variation of TOO demonstrated between Troy Chinese Americans and European Americans, whereby European Americans' mean of TOO is fronter than Chinese Americans'. Results of style-shifting of the two ethnic groups in Chapter 4 showed the same direction of shifting: both groups fronted TOO in spontaneous speech more than in careful speech. To see if different interviewers influence Chinese Americans' TOO production, first of all, let us take a look at the means of TOO by those re-interviewed Chinese American speakers in the figure below. The mean of TOO produced by the European Americans is reproduced (in red) as a reference point.

Figure 5.5: Normalized means of TOO with Interviewer-1 (in green) and Interviewer-2 (in blue) by Troy Chinese Americans (n=14)

Visual inspection of the above figure finds that the speakers' mean of TOO produced with Interviewer-2 is fronter (by about 80Hz) and slightly more raised than with Interviewer-1, which is consistent with the previously found ethnic variation of TOO that, the Troy European Americans' mean of TOO is fronter than that of the Chinese Americans'. To further examine the distinction of means of TOO between interlocutors, a multivariate analysis of variance (MANOVA) was conducted on the normalized data, with ethnicity of the interviewer as a fixed factor, the normalized F1 and F2 of TOO as dependent variables, the results of which are shown in Table 5.7.

Table 5.7: Multivariate Analysis of Variance (MANOVA) comparing the Normalized Mean F1 and F2 of TOO with Interviewer-1 and Interviewer-2
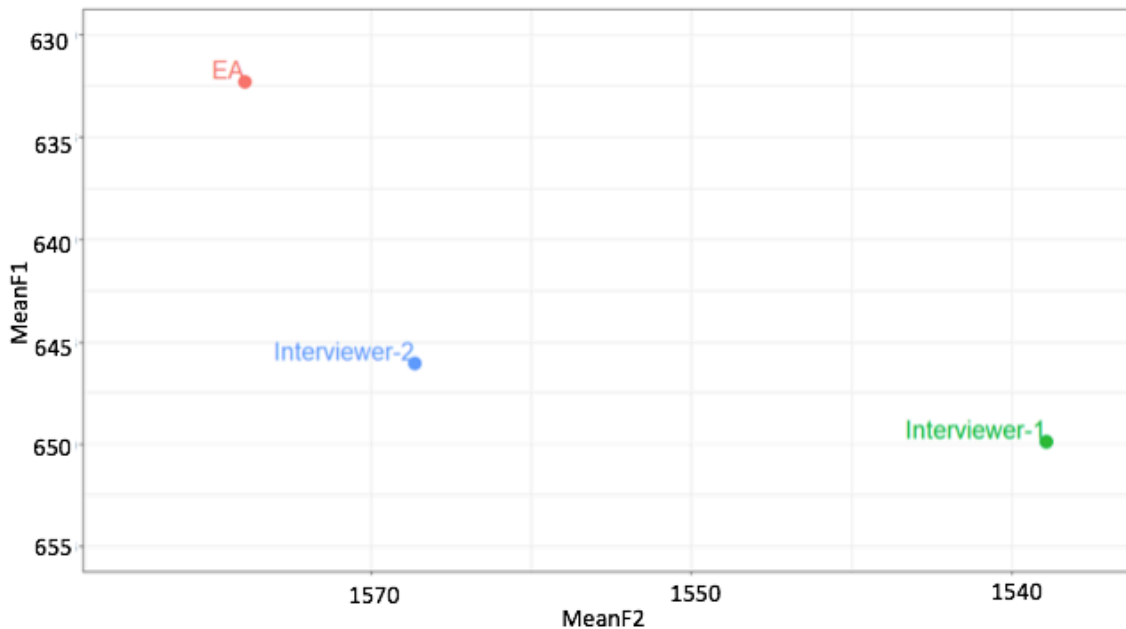
TOO	Interviewer-1		Interviewer-2			
F1	Mean	SD	Mean	SD	F	p
	459.88	60.24	456.04	57.93	0.81	0.37
F2	Mean	SD	Mean	SD	F	p
	1795.7	380.85	1874.59	321.63	10.01	**< .001**

P-value of the variables with statistically significant (p< .05) differences are marked in bold.

The result shows that the F2 of TOO has a significant difference between different interlocutors: tokens with Interviewer-2 have a significant fronter TOO (p < .001) than that with Interviewer-1, while F1 of TOO does not demonstrate a significant difference. To be able to more accurately examine the effect of interlocutors, a mixed-effects linear regression was conducted including LEXICAL ITEM as a random effect, the results of which are listed in Table 5.8.

Table 5.8: Regression model for F2 of TOO

Random Effects

Groups	Name	Variance	Std. Dev.		
Lexical items	(Intercept)	83180	288.4		
Residual		72075	268.5		
	Number of objects: 829. Number of groups: word, 62				

Fixed Effects

	Estimate	Std. Error	df	t-value	p-value
(Intercept)	1595.25	45.90	71.50	34.757	< .0001
Interviewer	39.87	20.52	804.50	1.943	**0.05**

The regression model shows that the F2 of TOO between interviews with different interlocutors remains significantly different even with lexical items included in the statistical

test. Thus, the ethnic variation of TOO that was found previously may correlate with interlocutors, which performs as a predictor.

5.6 Summary

In this chapter, I have demonstrated that among the five vowels that have exhibited ethnic variation between Troy Chinese Americans and European Americans, (1) no significant difference was found for the frontness of THOUGHT between interlocutors, (2) the mean of DRESS with Interviewer-2 is significantly lower, however, the regression analysis shows it to be a lexical effect, (3) the significantly backer STRUT with Interviewer-2 also turns out to be a lexical effect[28], and (4) the more fronted mean of HAND on a plot with Interviewer-2 is not statistically significant in a MANOVA test, (5) F2 of TOO is the only vowel dimension that was found to be affected by a change of interviewer. In the case of TOO, Chinese American participants shifted their mean F2 value in the direction of the European American mean. TOO was more fronted with Interviewer-2 (the European American interviewer) than with Interviewer-1 (the CA interviewer).

This claim (Number 5 in the above) is made based on the evidence that the means of F2 of TOO produced by Troy Chinese Americans with the Chinese interviewer and the European American interviewer are significantly different from each other, which is statistically examined by the MANOVA test between interviewers and mixed effects linear regression testified that the lexical items are not an influential factor on the vowel variation. Besides, the directions of shifting for TOO by Troy Chinese Americans with the European American interviewer are

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28 The examination of the lexical effect of STRUT and DRESS was done by checking the distribution of lexical items from data collected by Interviewer-1 vs. Interviewer-2. However, no obvious pattern that might account for the lexical effect of STRUT and DRESS was found.

consistent with their European Americans counterparts, though the degree of shifting for TOO in its F2 dimension is to a lesser extent than Troy European Americans.

Although the other vowels do not appear to be subject to a statistically significant interlocutor effect, visual inspection of the plots shows a similar trend of distribution as we saw for the cross-ethnic variation in Chapter 4. For example, the mean of STRUT by Troy European Americans is lower and backer than Troy Chinese Americans. Likewise, the STRUT produced by Troy Chinese Americans with the European American interviewer (Interviewer-2) is lower and backer than with the Chinese interviewer (Interviewer-1). What might account for the Troy Chinese Americans' *convergence* with the European American interviewer, are the CAs shifting toward a more Elsewhere Shift-like system when interacting with the EAs? Is this an indication of their responses to the EAs as audience members in the Audience Design model (Bell 1984)?

Figure 5.6 provides us a visual inspection of the vowel systems between Troy Chinese Americans and the European American interviewer (Interviewer-2). In Figure 5.6, means of all the five vowels that exhibited inter-ethnic variation found in Chapter 3 were plotted. As before, the three sets of data in the plot are marked by different colors: Troy CAs' means with Interviewer-1 are in green, with Interviewer-2 are in blue, and Interviewer-2's (the EA) means are in red. Compared with the green circles (CAs with Interviewer-1), all the blue circles (CAs with Interviewer-2) were closer to the red ones (the EA interviewer) in various degrees, except for THOUGHT. It indicates that Troy CAs *are* converging with the EA interviewer.

Figure 5.6: Normalized means of the vowels that exhibited inter-ethnic variation by Troy Chinese Americans (n=14), including means with Interviewer-1 (in green), Interviewer-2 (in blue), and the EA interviewer's means (in red)
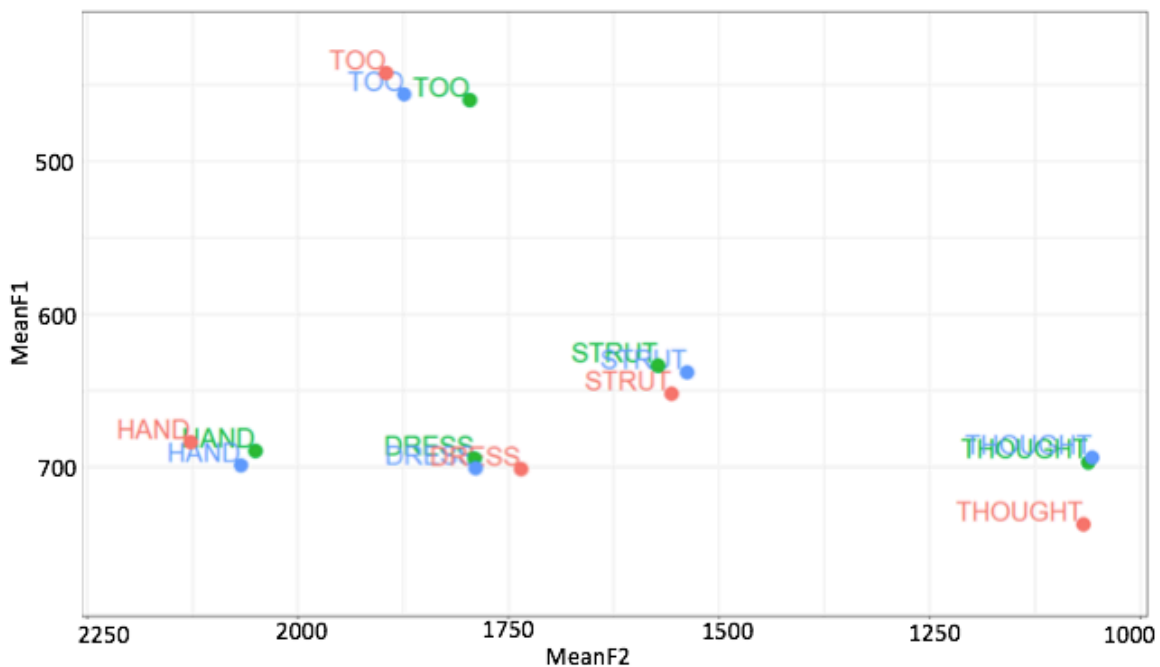
However, when interviewed by a Chinese national, with whom the topics were focused more on Troy, the place they were born and raised, the participants may be *diverging* from their interlocutor, asserting their localness by using a more conservative pattern. As Bell put it in the Audience Design model, "...linguistic features operate as identity markers which is the basis of how style means in the audience design framework" (Bell 2001: 160).

Another speculation would be that the author's Chinese ethnicity is not driving CAs' to sound more local, but more supra-local. When conversing with a Chinese interviewer, participants unintentionally switched to a more Chinese-oriented persona, and the linguistic resources they use are thus different from when talking to a European American. It might be the case that the Chinese Americans expressed a form of ethnic solidarity with a Chinese interviewer, by employing variants of certain vowels that were more supra-regional, i.e., one of the main components of the Elsewhere Shift, TOO. This would be like the Chinese Americans in

New York City and New Jersey, who are indexing a Chinese ethnic identity by avoiding local linguistic variants. In Wong (2015), although second generation CAs pronounce the local features (THOUGHT-raising & GOOSE-fronting) in line with EAs,, those who are more oriented to Chinese identity and have close ties to the Chinese community are *less* likely to use the local linguistic variants. In Bauman (2016), Asian sorority members in New Jersy produced backer GOAT vowels than non-Asian speakers, while the fronting of GOAT has been noted as an ongoing local sound change. It would also be in line with some preliminary findings by Eric Acton and colleagues in the metro Detroit area that TOO is backer for Jewish-Americans than for non-Jewish European Americans (Acton *et all* 2017). This supports the idea that a less fronted TOO is an assertion of non-mainstream ethnic identity, at least in southeast Michigan.

Or it could be a combined effect of interviewer and topics in the interview, as a lot of my interviews were about experiences as a Chinese American living in Troy. This is reminiscent of the Japanese Americans in Ervin-Tripp's early study, who found it difficult to discuss topics related to Japan and Japanese life when speaking in English (Ervin-Tripp 1973). Troy Chinese Americans might shift their speech when talking about Chinese-related experiences. One of the linguistic variables could be the unconsciously manipulated TOO. However, it still does not explain why there is no such variation between interlocutors for the other Elsewhere Shift vowels, such as THOUGHT, DRESS, and HAND. For this, a language attitudes study of the social meanings of THOUGHT, DRESS, HAND, STRUT and TOO is required, which goes beyond the current project.

The relative effects of audience and topic are still not well understood. Bell (1984:178-182) asserted that topic plays a much lesser role in style-shifting than audience. While on the other hand, even if the CAs associate the topic of "Chinese family, Chinese identity" with

Chinese audiences such as their parents and other family members, this effect could be multiplied when there is an actual Chinese addressee with them. So topic and addressee could be having a simultaneous effect.

This chapter of the analysis has been limited by some practical constraints. First, this study included two interviewers of different ethnicities. As Labov (2001: 85) pointed out, the kinds of data most desirable for sociolinguistic studies are "very exacting: high quality recordings…with a variety of interlocutors and social situations". In practice, few variationist sociolinguistic studies have managed to record the same speakers in such a variety of circumstances. Certainly, it would always be ideal to include more interviewers of various social characteristics. By including two interviewers, this study is an advance on most others of its kind, but it must be acknowledged that two very heterogenous interviewers is not an ideal solution either. Second, this study would have benefited if the speech of the Chinese interviewer could have been included in the discussion. Unfortunately, since it was not the focus of the initial design of the study, the sound quality of the author in the recordings is not sufficiently good for acoustic analysis. Third, it would be obviously better to know if the Troy European Americans also exhibit some extent of interlocutor effect, but that is beyond the scope of this dissertation. I will leave it for future research.

Chapter 6. Conclusion

6.1 Chinese Americans in Michigan

One of the major goals of this dissertation has been to illuminate the language use of Chinese Americans in the Midwest. As discussed in chapter 1, this ethnic group has been little studied by quantitative sociolinguists in general, and rarely outside of the coastal regions of the US. Yet this community has a lot to offer sociolinguistic analysis, not least because Midwestern Chinese communities are concentrated in small pockets surrounded by a majority of non-Chinese – indeed, non-Asian – Americans. This makes the Midwestern Chinese communities different in many ways from the coastal communities that are more numerous and better connected to one another. In this final chapter, I begin by describing the broader linguistic and cultural context in which this research is embedded. I then provide a summary of findings in this dissertation, followed then by possible future directions of this work.

As introduced earlier, the immigration history of Chinese Americans in southeast Michigan is fairly short, especially compared with cities in coastal areas such as New York City and San Francisco, which have had geographic convenience for immigrants as a first stop to the U.S. While the long residence history of Chinese Americans in such areas is beneficial to sociolinguistic research, e.g. by making it easier to recruit participants, it also has its disadvantage for topics like how a speaker's ethnic identity is affecting their speech. This is because the third and/or fourth generation immigrants are usually monolingual speakers of English (Macias 1989), whose speech had completely converged with the local dialect (Mendoza-Denton & Iwai 1993).

In this study, 30 second generation Chinese Americans from Troy Michigan were recruited. A typical composition of Chinese/Chinese American families in Troy and in southeast

Michigan as well is: first generation immigrant parents in their late 40s to early 50s who came to the U.S. when they were 20 to 30-years-old; their second generation children who are U.S. citizens by birth, at or around college age; another generation of grandparents, who either live in the house as short-term visitors or moved to the U.S. to spend their later years with their family. What is more interesting is the different varieties of language they use with each other: (1) Between parents, who are 1st-generation immigrants, it is usually a variety of Chinese, Mandarin, Taiwanese, Cantonese, or Taishanese, etc. But it is not always the case for both parents to share a mutually intelligible variety. For example, speakers of Cantonese do not necessarily understand someone speaking Mandarin, and vice versa. In that family, parents would use English between each other. (2) Between siblings, who are 2nd-generation immigrants, the language that is used is almost always English, which is their first language. (3) Between parents and their children, one generation will accommodate to the other generation's first language when needed. For example, parents would have to speak English when they want to lecture their children or need some kind of help from them. Just as one of the speakers describes what she would have to do when she has to ask her parents for something:

> Elaine: …sometimes I'll switch to Mandarin when I need to ask my dad's permission to, to… You know what a Chinese family's like. When I want to like, sleepover at my friend's house, I'll talk to my dad in Mandarin. You know, his English is, is okay, but I'd feel better to ask him such things in Mandarin, you know, just, just to… I don't know, I just feel like he likes me to speak Mandarin with him.

The third case is conversation across generations. Since most of the grandparents do not speak English at all, the 2nd-generation Chinese Americans either rarely talk to their grandparents, or talk to them in poor Mandarin, or in a combination of Chinese varieties as mentioned above. Most of the speakers feel some degree of guilt for not talking with their

grandparents or not talking with them to the degree expected by their parents, but it seems like there is nothing they can do about it. The language barrier is there, and will be there.

Outside of their family and Chinese community, the world in front of those 2nd-generation Chinese Americans is different: the outside world is an English dominant, mainstream western culture society. As Nathan says when talking about life in Troy, there is a lot for them to adapt to after they leave home for college, and leave Troy for the outer world.

Interviewer: What's Troy like?

Nathan: Troy, um, if you don't mind like, me just like… Troy is definitely like a really sheltered place I think. It's like, I want to say, thirty or forty percent Asian population[29]. So like growing up, going to like Troy High you don't get the sense that like, hey like the outside world there's just not that many Asians in general… like go into Troy High and seeing that like, hey, like most of like maybe a half of your classmates are gonna be Asian gives you a sense like, comfort, you know like, a conformity that you don't really get here, I think. It's a very sheltered place, for sure… well, you have to learn to adapt, right? Because, obviously you're not gonna be living in Troy forever so… once I go out like… it's going to be a lot more diverse locale so you get to learn how to deal with like other people, interact with people that you don't normally do.

The 30 second-generation Chinese Americans that I have recruited and interviewed in this study, live in a family with such complex and interesting language practices, and in a western society with their eastern cultural background. The investigation of their speech contributes to our discussion of the relationship between ethnicity, identity and language. A summary of findings in this study is provided in the next section.

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[29] This is just this speaker's impressionistic observation. According to U.S. Bureau 2010 Census, 19% of Troy residents are Asian, 5% have Chinese descent.

6.2 Concluding Remarks

This dissertation joins a growing body of work within variationist sociolinguistics and dialectology that samples Asian American speakers on the East and West coast communities of the U.S. (Hall-Lew 2009, Wong 2015, Bauman 2016). Given the relative paucity of variationist sociolinguistic studies focusing on Chinese Americans, this study contributes to our understanding of how Chinese Americans' English interacts with local phonology in the Midwest.

In Chapter 1, I introduced the immigration history of Chinese nationals into the U.S. and Michigan. To discuss Chinese Americans' participation in local sound change, I introduced the Northern Cities Shift and an emerging sound change in Michigan, the Elsewhere Shift. Previous variationist studies on Asian American English and ethnic minorities' participation in the NCS in Michigan were reviewed. Finally, theories of stylistic variation were introduced and discussed. Each of the three models of stylistic variation has its focus and therefore are all employed in this study: The Attention to Speech model focused on the interaction between one interviewer and one speaker; the Audience Design model and the Speaker Design model concentrated on speaker's response and identity construction respectively to different interlocutors/audiences.

In Chapter 2, I provided an overview of the place of investigation, the participants, the interviewers, and the methodologies that were followed in collecting and handling the data. In this chapter, I made a case for the need to include a second interviewer who has different social characteristics with the first interviewer. The variation of Chinese American participants' speech when interacting with two interviewers reminds us that there is more to do for future research in the study of ethnic identity construction.

It is not surprising to find in chapter 3 the overall accommodation of Troy Chinese

Americans to the NCS and the Elsewhere Shift. However, the Chinese community in Michigan is

surrounded by a majority non-Asian Americans: Chinese Americans constitute 1.3% of the total

population in Michigan; while in the coastal areas such as New York City, 6.8% of the local

population is Chinese Americans (U.S. Census Bureau, 2014 American Community Survey).

Unlike previous studies on Chinese American English in the coastal areas (Hall-Lew 2009,

Wong 2015), some vowels of the Midwest Chinese American exhibited ethnic differences when

compared to that of the local European Americans, i.e., THOUGHT, DRESS, STRUT, TRAP,

and TOO. Furthermore, except for THOUGHT, the rest of the NCS vowels of Chinese

Americans are all lagging behind their European American counterparts. These results suggested

that the socially well-integrated Chinese American community in Troy Michigan still exhibits

subtle linguistic differences from the local main-stream European Americans.

In Chapter 4, I presented an analysis of Troy speakers' speech in different styles, i.e.,

spontaneous speech (interview) and careful speech (passage reading, wordlist reading), expecting

to account for the ethnic differences in the above vowels through examination of participants'

implicit evaluation of those vowels. Yet similar production patterns across those vowels by the

two ethnic groups indicated that the two ethnic groups shared similar social evaluations toward

those vowels.

Another influential factor on variation is the social characteristics of the interviewer, and

so it was worth examining whether this drove the inter-ethnic variation observed. In Chapter 5, I

continued with the exploration of the ethnic differences through an examination of the

interlocutor effect and found that there is no significant difference for THOUGHT and HAND

between interlocutors; the difference of DRESS and STRUT between interviewers was shown by

regression analysis to be a lexical effect; and only the frontness of TOO was found to be affected by a change of interviewer: Chinese American participants shifted their mean F2 value in the direction of the European American pattern. TOO was more fronted with Interviewer-2 (the European American interviewer) than with Interviewer-1 (the Chinese interviewer). As Nathan said in his interview (excerpt in section 6.1), with so many Asian Americans living in Troy, the city is "a really sheltered place". When Chinese Americans like Nathan go outside of Troy, a sheltered place with so many people sharing their background, they have to "learn to adapt". This variation of TOO could be one of their adaptions to the outside world, although why this vowel specifically is doing so much identity work for Chinese Americans is a question that remains to be answered.

The finding of interlocutor effect contributes to our understanding of the role of ethnicity in sound change. It also contributes to our knowledge of the complex interactions between language, ethnic identity and regional identity construction. The employment of two interviewers underscores the influence of social characteristics of the interviewer to data collection (Rickford & McNair-Knox 1994). Participants' variation in TOO-fronting in this study is obviously influenced by the change of interviewers. The fronting or not fronting of TOO was used by Chinese Americans as a way to index ethnic identity, solidarity and localness. As the Asian sorority members avoid GOAT-fronting (Bauman 2016) to mirror their Asian ethnicity, this avoidance of TOO-fronting among Troy Chinese Americans could be a general way for ethnic minorities to "not sound white", which is also found among the Jewish speakers in southeast Michigan (Acton *et al*. 2017). As a component of the Elsewhere Shift, the sound change which is emerging in the Midwest, we lack a clear picture of what the social meaning of TOO-fronting is

to the local speech community[30]. Can we find this kind of variations among other ethnic minorities when fieldworkers of either in or outside of the ethnic group are involved in data collection? As Fought reminded us, it is important to keep in mind how intraethnic and interethnic discourse could affect the realization of linguistic variable (Fought 2004).

In the remaining section, I will discuss some limitations of this project, as well as directions for future research.

6.3 Future Directions

As with almost all studies, this dissertation was limited by time and other practical constraints, and there are a number of issues that merit further exploration. This study would certainly have benefited from data from speakers of older generations. My choice of this group of college age 2nd-generation Chinese Americans was out of practical reasons, but also because in southeast Michigan, this is the only group of ethnically Chinese residents who speak English as their native language. What will later studies find, if more Chinese Americans who speak native English are recruited and put into different age groups? I believe apparent time data could reveal more about the potentially subtle ways in which Chinese American English might differ from mainstream US English.

Chinese Americans in this study have different heritage language backgrounds. But as pointed out by Hall-Lew (2009), even if all the participants in a study were controlled so that they all speak, e.g. Cantonese, as their heritage language, it might raise more questions than it solved. A lot of the factors would be difficult if not entirely impossible to control, such as, the

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[30] Although cf Morgan, DeGuise, Acton, Benson & Shvetsova 2017, who likewise find that a backer TOO appears to be indexical of a Jewish-American identity in southeast Michigan. The relationship between TOO and minority ethnicity in Michigan deserves further attention.

language proficiency, frequency of use, and frequency of exposure (Hall-Lew 2009: 207). The best I could do for this study was to find speakers with limited knowledge of their heritage language. It would be ideal to recruit speakers who do not know/speak any heritage language, e.g., 2nd-generation Chinese Americans who are the younger siblings in a family are usually described by my participants as such.

This study investigated Chinese Americans' implicit evaluation toward the NCS and Elsewhere Shift vowels through different styles of speech. An alternative way is to conduct a perceptual study, which elicits participants attitude more directly. Another constraint is that the two interviewers in this study differed from each other not just in their ethnicity. It would be ideal if future research on Chinese American style-shifting could control other social characteristics of the interviewers such as their gender and age.

As I have mentioned earlier in section 6.6, another direction of research is to explore if the Troy European Americans also exhibit some extent of interlocutor effect, and if the effects go in the same direction as for the Chinese Americans. This project is currently in progress: seven EA speakers were re-interviewed by the second interviewer; the recordings are under transcription. Through this analysis I attempt to investigate to whether we could find interlocutor effect among European Americans. If we could, would it be exhibited in the same vowel as Chinese Americans, would it be the same direction of shift as it exhibited in Chinese Americans? What will it tell us about Troy speakers' local and global awareness?

APPENDICES

APPENDIX A. LIST OF PARTICIPANTS

Table A.1: List of participants

Sub	Pseudonym	Gender	Age	Year in college	Re-interviewed
Sub_1	Adam	M	19	Sophomore	YES
Sub_2	Barry	M	19	Sophomore	
Sub_3	Ada	F	19	Sophomore	
Sub_4	Carl	M	20	Junior	
Sub_5	Barbara	F	21	Senior	
Sub_6	Daniel	M	21	Senior	
Sub_7	Cara	F	20	Junior	
Sub_8	Daisy	F	19	Sophomore	
Sub_9	Elaine	F	18	Freshman	
Sub_10	Fanny	F	18	Junior	
Sub_11	Eddie	M	23	Senior	
Sub_12	Ginny	F	18	Freshman	
Sub_13	Felix	M	19	Sophomore	
Sub_14	Hailey	F	19	Sophomore	YES
Sub_15	Iris	F	19	Sophomore	
Sub_16	Garet	M	20	Junior	YES
Sub_17	Jaclyn	F	19	Sophomore	YES
Sub_18	Kacy	F	19	Sophomore	YES
Sub_19	Hank	M	19	Sophomore	YES
Sub_20	Irwin	M	18	Freshman	
Sub_21	Jack	M	19	Sophomore	YES
Sub_22	Karl	M	21	Senior	YES
Sub_23	Landon	M	18	Freshman	
Sub_24	Laura	F	19	Sophomore	YES
Sub_25	Mike	M	20	Junior	YES
Sub_26	Macy	F	20	Junior	
Sub_27	Nathan	M	20	Junior	YES
Sub_28	Oliver	M	19	Sophomore	YES
Sub_29	Park	M	19	Sophomore	YES
Sub_30	Nicky	F	19	Sophomore	YES
Ref_1	Olivia	F	19	Sophomore	
Ref_2	Quentin	M	18	Freshman	
Ref_3	Radley	M	18	Freshman	
Ref_4	Paula	F	18	Freshman	
Ref_5	Rachel	F	18	Freshman	
Ref_6	Sally	F	20	Junior	

Table A.1 (cont'd)

Ref_7	Terra	F	20	Junior	
Ref_8	Sam	M	18	Freshman	
Ref_9	Ursula	F	19	Sophomore	
Ref_10	Vera	F	19	Sophomore	
Ref_11	Wendy	F	19	Sophomore	
Ref_12	Tad	M	19	Sophomore	
Ref_13	Xandra	F	19	Sophomore	
Ref_14	Yasmin	F	20	Junior	
Ref_15	Zina	F	18	Freshman	

(Sub = Chinese Americans, Ref = European American reference group)

APPENDIX B. INTERVIEW QUESTIONS

(The following questions were used as a guide during the interview)

[Basic demographic information]
1. Can I get your first name? Can you spell that for me?
2. When and where were you born? Where did you grow-up? [get full residential
3. history, especially for participants prior to age 6]
4. How old are you? Is this your first year at MSU? Do you have a major?
5. Where are you from? When and where were you born? Where did you grow-up?
6. Have you ever lived outside of Michigan? (If yes) Where and for how long?

[About Troy]
1. When did you/your family come to Troy?
2. How long have you lived in Troy?
3. What is Troy like?
4. Why do you think there are so many Asian Americans/Chinese Americans in there? Why do they choose Troy?

[Education & Occupation]
1. What your parents did/do for a living?
2. Which high school did you go to? What was it like?
3. Are you doing any part time job? What's your plan after graduation?

[Network]
1. Who are all the people you lived with growing up? Who are all the people you live with now?
2. How well do you know people that you work with / live in this neighborhood?

[For European-American]
1. Are there many Asian/Chinese restaurants in Troy? Have you been to any of them? How is the food there?

[For Chinese-American]
1. Are there many Asian/Chinese restaurants in Troy? Have you been to any of them? How is the food there?
2. What do you eat at home? Does your family eat more Chinese food or American food? Which do you like more?

[Language use, for CAs]
1. What language or languages did you/do you speak at home?
2. Did you go to Chinese language school?

"A Bad Day for Ducks"
(Created by Dennis Preston, Oklahoma State University)

Tom and Bob were supposed to meet at Tom's house. They planned to go to a pond and watch the ducks that lived there. While waiting for Bob, Tom picked up around the house. The weather had turned cold. He put the electric fan in the garage and did the dishes.

He wanted to have a snack before he left, so he peeled an apple and cut it into slices. He bit into one, but it was awful, probably rotten. He spit it out and tried to rinse his mouth out with hot coffee. He poured it into a tin cup, but when he put it up to his lips, he spilled it on his hand. His hand puffed up and hurt a lot, so he stuck it under the faucet to make it feel better.

He grabbed a dusty hat out of the closet and shook it, but he couldn't get the dirt off. He got a cap instead and put a scarf around his neck and put on his socks and boots. He saw a big hole in his sock, but Bob was already late. His alarm buzzed, and it was past two o'clock. Nothing was working out.

Just then Bob phoned and said he wanted to talk. He told Tom that the flock of ducks had left the muddy pond. A pack of dogs had chased them off. Tom was sad; he had really wanted to see the ducks slosh around in the water, but Bob said they could go shoot some pool instead. Tom thought that was a good idea and forgot all about the ducks and his burned hand.

APPENDIX D. WORD LIST

Sam	awful	hate	bead	bug
past	possible	hope	foot	John
mesh	stop	watch	puff	ride
have	rag	brag	tin	food
body	plant	rack	pause	fish
mop	laugh	jazz	logic	neck
ask	toy	bath	Tom	caught
dust	make	mouse	banker	doll
hole	cabin	business	buzz	gun
tip	pot	father	dad	Saginaw
bet	bell	weather	night	pal
horse	head	cash	mess	dull
block	has	mattress	Bob	saw
oil	good	boot	black	pat
state	gone	bun	Lansing	apple
road	hit	end	gamble	bite
pull	pen	lost	pool	song
pig	closet	car	fist	
fed	gosh	house	step	
chalk	loud	fog	tall	

APPENDIX E. LIST OF WORDS EXCLUDED/RECODED FROM DATA ANALYSIS

Table E.1: Excluded function words

A, AH, AM, AN, AND, ARE, AREN'T, AS, AT, AW
BECAUSE, BUT
COULD
EH
FOR, FROM
GET, GONNA, GOT, GOTTA, GOTTEN
HAD, HAS, HAVE, HE, HE'S, HUH
I, I'LL, I'M, I'VE, I'D, IN, IS, IT, IT'S, ITS
JUST
MEAN, MY
NAH, NOT
OF, OH, ON, OR, OUR
SAYS, SHE, SHE'S SHOULD, SO
THAN, THAT, THAT'S, THE, THEM, THERE, THERE'S, THEY, TO
UH, UM, UP
WAS, WASN'T, WE, WERE, WHAT, WHEN, WHICH, WHO, WITH, WOULD
YEAH, YOU, YOU'VE

Table E.2: Recoded tokens due to errors by FAVE

LOT recoded to THOUGHT
alcohol, awesome, awful, awfully, awkward, chalk, chocolate, fall, fog, foster foster's, frog, kickball, law, soft, sophomore, wash, washed, washer, washers washing, Washington

REFERENCES

REFERENCES

Acton, Eric, Daniele Benson, Kelsey DeGuise, Beau-Kevin Morgan & Alla Shvetsova. (2017). *Shifts toward the supra-regional in the Northern Cities region: Evidence from Jewish women in Metro Detroit*. Paper presented at New Ways of Analyzing Variation (NWAV) 46, Madison WI.

Adank, Patti, Roel Smits, & Roeland Van Hout. (2004). A comparison of vowel normalization procedures for language variation research. *Journal of the Acoustical Society of America*, 116.3099-3107.

Bakos, J. (2008). *An examination of the adaptation to the Northern Cities Chain Shift by Lebanese immigrants in Dearborn, Michigan*. MA thesis, Michigan State University.

Bauman, Carina. (2016). *Speaking of sisterhood: A sociolinguistic study of an Asian American sorority*. Doctoral dissertation, New York University.

Bates, D., Martin, M., Ben B., &Steve W. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67(1),* 1-48.

Bell, A. (1984). Language style as audience design. *Language in Society, 13,* 145–204.

Bell, A. (2001). Back in style: Reworking audience design. In J. R. Rickford & P. Eckert (Eds.), Style and variation (pp. 139-169). Cambridge/New York: Cambridge University Press.

Bell, A., & Johnson, G. (1997). Towards a sociolinguistics of style. *University of Pennsylvania Working Papers in Linguistics, 4 (1),* 1–21.

Bromwell, W. J. (1969). *History of immigration to the United States: Exhibiting the number, sex, age occupation and country to birth of passengers arriving from foreign countries by sea 1819 to 1855*. New York: Augustus M. Kelley. (Originally published in 1856. New York: Redfield.).

Callary, R. (1975). Phonological change and the development of an urban dialect in Illinois. *Language in Society, 4,* 155–170.

Chang, I. (2003). *The Chinese in America: A narrative history*. New York: The Penguin Group.

Clarke, S., Elms, F., & Youssef, A. (1995). The third dialect of English: Some Canadian evidence. *Language Variation and Change, 7,* 209-228.

Coupland, N. (1984). Accommodation at work: Some phonological data and their implications. *International Journal of the Sociology of Language, 46,* 49–70.

Coupland, N. (2001). Language, situation and the relational self: Theorising dialect-style in sociolinguistics. In J. R. Rickford & P. Eckert (Eds.), *Style and variation* (pp. 185-210). Cambridge/New York: Cambridge University Press.

Coupland, N. (2007). *Style: Language variation and identity*. Cambridge, UK: Cambridge University Press.

Dinkin, A. J. (2011). Nasal short-a systems vs. the Northern Cities Shift. *Penn Working Papers in Linguistics, 17(2),* 71–80.

Dinkin, A. J. (2013). Settlement patterns and the eastern boundary of the Northern Cities Shift. *Journal of Linguistic Geography, 1(1),* 4–30.

Driscoll, A., & Lape, E. (2014, October). *Reversal of the Northern Cities Vowel Shift in Syracuse, New York*. Paper presented at New Ways of Analyzing Variation (NWAV) 43, Chicago, IL.

Durian, D. (2012*). A new perspective on vowel variation across the 19th and 20th centuries in Columbus, OH*. Doctoral dissertation, Ohio State University.

Eckert, P. (1988). Adolescent social structure and the spread of linguistic change. *Language in Society, 17,* 183–208.

Eckert, P. (2008). Where do ethnolects stop? *International Journal of Bilingualism, 12,* 25–42.

Max Planck Institute for Psycholinguistics (2016). ELAN: The Language Archive [Computer software]. Retrieved from http://tla.mpi.nl/tools/tla-tools/elan/

Ervin-Tripp, S. M. (1973). *Language acquisition and communicative choice*. Stanford, CA: Stanford University Press.

Evans, B. E. (2001). *Dialect contact and the Northern Cities Shift in Ypsilanti, Michigan*. Doctoral dissertation, Michigan State University.

Evans, B. E. (2004). The role of social network in the acquisition of local dialect norms by Appalachian migrants in Michigan. *Language Variation and Change, 16(2),* 153–167.

Evans, B. E, Ito, R., Jones, J., & Preston, D. R. (2000). Change on top of change: Social and regional accommodation to the Northern Cities Chain Shift. In H. Bennis, H. Ryckeboer, & J. Stroop (Eds), *De Toekomst van de Variatielinguïstiek (a special issue of Taal en Tongval to honor Dr. Jo Daan on her ninetieth birthday)* (pp. 61-86).

Fasold, R. (1969). *A sociolinguistic study of the pronunciation of three vowels in Detroit speech: Manuscript.* Georgetown University.

Rosenfelder, I., Fruehwald, J., Evanini, K., & Yuan, J. (2011). FAVE (Forced Alignment and Vowel Extraction) [Computer software]. Retrieved from http://fave.ling.upenn.edu.

Ferguson, C. (1971). Absence of copula and the notion of simplicity: A study of normal speech, baby talk, foreigner talk and pidgins. In D. Hymes (Ed.), *Pidginization and creolization of languages*. London: Cambridge University 'Ness.

Fought, C. (1999). The English and Spanish of young adult Chicanos. *IRCS report,* 97-109.

Fought, C. (2004). Ethnicity. In J. K. Chambers, P. Trudgill, & N. Shillin-Estes (Eds.), *The handbook of language variation and Change*. Malden, MA: Blackwell.

Fridland, V., Kendall, T., & Fickle, C. (2013, October). *Vowel shift patterns in a multiregional production and perception database*. Paper presented at New Ways of Analyzing Variation (NWAV) 42, Pittsburgh, PA.

Giles, H. (1973). Accent mobility: *A model and some data. Anthropological Linguistics, 15,* 87–105.

Giles, H., & Powesland, P. F. (1975). *Speech style and social evaluation.* London, UK: Academic Press.

Glazier, J., & Helweg, A. W. (2001). *Ethnicity in Michigan: Issues and people*. East Lansing, MI: Michigan State University Press.

Gordon, M. J. (1997). *Urban sound change beyond city limits: The spread of the Northern Cities Shift in Michigan*. Doctoral dissertation, University of Michigan.

Gordon, M. J. (2001). *Small-Town values, Big-City vowels: A study of the Northern Cities Shift in Michigan*. Durham, NC: Duke University Press.

Green, Lisa. (2002). *African-American English: A linguistic introduction*. Cambridge: Cambridge University Press.

Hall-Lew, L. (2009). *Ethnicity and phonetic variation in a San Francisco neighborhood*. Doctoral dissertation, Stanford University.

Ito, R. (1999). *Diffusion of urban sound change in rural Michigan: A case of the Northern Cities Shift*. Doctoral dissertation, Michigan State University.

Ito, R. (2010). Accommodation to the local majority norm by Hmong Americans in the Twin Cities, Minnesota. *American Speech,* 85(2), 141-162.

Knack, R. (1991). Ethnic boundaries in Linguistic variation. In P. Eckert (Ed.), *New ways of analyzing sound change* (pp. 251-272). San Diego, CA: Academic Press.

Kohn, M., & Stithem, C. (2015, October). *The third vowel shift in Kansas: A supra-regional shift with regional variation*. Paper presented at New Ways of Analyzing Variation (NWAV) 44, Toronto, Canada.

Labov, W. (1963). The social motivation of a sound change. *Word, 19,* 273–309.

Labov, W. (1966). *The social stratification of English in New York City*. Cambridge, UK: Cambridge University Press.

Labov, W. (1969). The logic of non-standard English. In J. Alatis (Ed.), *Georgetown Monographs on Language and Linguistics, 22,* 1–44.

Labov, W. (1972). The isolation of contextual styles. In W. Labov (Ed.), *Sociolinguistic patterns* (pp. 70-109). Philadelphia: University of Pennsylvania Press.

Labov, W., Yaeger, M., & Steiner, R. (1972). A quantitative study of sound change in progress. Report on National Science Foundation Contract NSF-GS-3287. Philadelphia, PA: University of Pennsylvania.

Labov, W. (1984). Field methods of the project on linguistic change and variation. In J. Baugh & J. Sherzer (Eds.), *Language in use* (pp. 28–53). Englewood Cliffs, NJ: Prentice Hall.

Labov, W. (1991). The three dialects of English. In P. Eckert (Ed.), *New ways of analyzing sound change* (pp. 1-44). Orlando, FL: Academic Press.

Labov, W. (1994). *Principles of linguistic change: Internal factors*. Vol. 1. Oxford: Blackwell.

Labov, W. (2001). *Principles of linguistic change: Social factors*. Vol. 2. Oxford: Blackwell.

Labov, W., Ash, S., & Boberg, C. (2006). *The atlas of North American English: Phonetics, phonology and sound change*. Berlin and New York: Mouton de Gruyter.

Labov, W. (2007). Transmission and diffusion. *Language, 83,* 344–387.

Lee, H. (2000). *Korean Americans as speakers of English: The acquisition of general and regional features*. Doctoral dissertation, University of Pennsylvania.

Macias, R. (1989). *Bilingual teacher supply and demand in the United States.* USC Center for Multilingual, Multicultural Research and the Tomas Rivers Center.

McCarthy, C. (2011). The Northern Cities Shift in Chicago. *Journal of English Linguistics, 39(2),* 166-187.

Mendoza-Denton, N., & Iwai, M. (1993). "They speak more Caucasian": Generational differences in the speech of Japanese-Americans. In R. Queen& R. Barrett (Eds.),

Proceedings of the First Annual Symposium about Language and Society-Austin (SALSA). Austin: University of Texas.

Metzger, K., & Booza, J. (2001). Asians in the United States, Michigan and Metropolitan Detroit. *Center for Urban Studies Working Paper Series*, No. 7.

Nesbitt, M., & Mason, A. (2016, October). *Evidence of the Elsewhere Shift in the Inland North*. Paper presented at New Ways of Analyzing Variation (NWAV) 45, Vancouver, Canada.

Newman, M., & Wu, A. (2011). "Do you sound Asian when you speak English?" Racial identification and voice in Chinese and Korean Americans' English. *American Speech*. *86(2),* 152-178.

Ocumpaugh, J. L. (2010). *Regional variation in Chicano English: Incipient dialect formation among L1 and L2 speakers in Benton Harbor, MI*. Doctoral dissertation, Michigan State University.

Peterson, G. E., & Barney, H. L. (1952). Control methods used in a study of the vowels. *Journal of the Acoustical Society of America, 24,* 175-184.

Poplack, S. (1978). Dialect acquisition among Puerto-Rican bilinguals. *Language in Society, 7,* 89–103.

Preston, D., & Ito, R. (1998). Identity, discourse, and language variation. *Journal of Language and Social Psychology, 17,* 465-483.

Rankinen, W. (2014). The Michigan Upper Peninsula English vowel system in Finnish American communities in Marquette County. *American Speech, 89(3),* 312-347.

R Core Team (2013). R: A language and environment for statistical computing [Computer software]. R Foundation for Statistical Computing, Vienna, Austria. Retrieved from http://www.R-project.org/

Rickford, J. R. & McNair-Knox, F. (1994). Addressee- and Topic influenced style shift: A quantitative sociolinguistic study. In D. Biber & E. Finegan (Eds.), *Sociolinguistic perspectives on register* (pp. 235-276). New York/Oxford: Oxford University Press.

Roeder, R. V. (2006). *Ethnicity and sound change: Mexican American accommodation to the Northern Cities Shift in Lansing, Michigan*. Doctoral dissertation, Michigan State University.

Roeder, R. V. (2010). Northern Cities Mexican American English: Vowel production and perception. *American Speech, 85(2),* 163–184.

Sankoff, D. (1988). Sociolinguistics and syntactic variation. In F.J. Newmeyer (Ed.), *Linguistics: The Cambridge survey*. Cambridge: Cambridge University Press.

Savage, M., Wagner, S., Nesbitt, M., Mason, A., & Pevan, E. (2015, October). *Ignorant and annoying: Inland Northerner's attitudes towards NCS short-o*. Paper presented at NWAV 44, Toronto, Canada.

Savage, M. (2017). Attitudinal responses to two NCS vowels among Inland North speakers. Unpublished manuscript.

Schilling-Estes, N. (2004). Constructing ethnicity in interaction. *Journal of Sociolinguistics, 8,* 163–195.

Shuy, R. W., Wolfram, W., & Riley, W. K. (1967). *A Study of Social Dialects in Detroit.* (Final report project 6-1347.). Washington, DC: Office of Education.

Tagliamonte, S. A. (2012). *Variationist sociolinguistics: Change, observation, interpretation*. Oxford, UK: Wiley-Blackwell.

Trudgill, P. (1974). *The social differentiation of English in Norwich*. Cambridge: Cambridge University Press.

Rumbaut, R. G. (2004). Ages, stages and generational cohorts: Decomposing the immigrant first and second generations in the United States. *International Migration Review, 38,* 1160-1205.

Wagner, S. E., & Ravindranath, M. (2015). Sociolinguistics: Language in social environments. In K. Allan (Ed.), The Routledge handbook of Linguistics/ Routledge. (pp. 264-280).

Wagner, S. E., Mason, A, Nesbitt, M., Pevan, E., & Savage, M. (2016). Reversal and re-organization of the Northern Cities Shift in Michigan. *University of Pennsylvania Working Papers in Linguistics, 22 (2): Selected Papers from NWAV 44*, 171-179.

Wells, J. C. (1982). *Accents of English*. Cambridge University Press.

Wenger, E. (1998). *Communities of practice*. Cambridge: Cambridge University Press.

Wickham, H. (2009). ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag, New York.

Wolfram, W., Christian, D., & Hatfield, D. (1986). The English of adolescent and young adult Vietnamese refugees in the United States. *World Englishes, 5,* 47–60.

Wolfram, W., Thomas, E., & Green, E. (1997). Dynamic boundaries in African American vernacular English: The role of local dialects in the history of AAVE. Paper presented to the American Dialect Society, New York.

Wolfram, W., Shilling-Estes, N. (1998). *American English*. Malden, MA: Blackwell.

Wolfram, W., & Thomas, E. R. (2002). *The development of African American English.* Oxford, UK and Malden, MA: Blackwell.

Wolfram, W., & Schilling-Estes, N. (2006). *American English: Dialects and variation. Language in Society*, vol. 25. Malden, MA: Blackwell Publishing.

Wong, A. W-M., & Hall-Lew, L. (2014). Regional variability and ethnic identity: Chinese Americans in New York City and San Francisco. *Language and Communication, 35,* 27–42.

Wong, A. (2015). *Diverse Linguistic resources and multidimensional identities: A study of the Linguistic and identity repertoires of second generation Chinese Americans in New York City.* Doctoral dissertation, New York University.

Zhang, D. (2008). *Between two generations: Language maintenance and acculturation among Chinese immigrant families*. EI Paso: LFB Scholarly Publishing LLC.

Zheng, M. (2015, October). *Chinese-American accommodation to the Northern Cities Shift in Southeast Michigan*. Poster presented at New Ways of Analyzing Variation (NWAV) 44, Toronto, Canada.

Zia, H. (2000). *Asian American dreams: the emergence of an American people*. New York: Farrar, Straus, and Giroux.