A SOCIOPHONETIC ANALYSIS OF FARSI VOWEL

SYSTEMS AMONG HERITAGE SPEAKERS AND

IMMIGRANTS OF PERSIAN ETHNICITY IN

OKLAHOMA

By

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Abstract: This study investigates the variation of Farsi vowel formants – F1 and F2 – among Persian-American heritage and immigrant speakers in Oklahoma, a topic which has been under-investigated. The participants were a group of 20 Persian adult immigrants – ten males and ten females – and 20 US-born Persian-American heritage speakers of Farsi – ten males and ten females. Data were gathered in the form of acoustic audio recordings of a 150-word word list carefully pronounced by the participants. A lexicon was created for the purpose of forced alignment, and vowel formants were extracted using DARLA. The vowel plots showed substantial similarity among all participants to the Farsi monolingual speakers' in Iran regarding the back vowels /u/, /o/ and /ɒ/. However, the front /i/ and /e/ sounds were a bit more back than that of the monolinguals. In regard to /æ/, both groups of female Persian immigrants and female Persian heritage speakers showed similarity to that of the monolinguals; however, male Persian immigrants and male Persian heritage speakers had a relatively raised /æ/. Overall, the whole vowel space for both the heritage speakers and immigrant generation is smaller and more centralized than that of the monolinguals.

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CHAPTER I

INTRODUCTION

This thesis investigates the variation of Farsi vowel formants – F1 and F2 – among Persian-American heritage and immigrant speakers of Farsi (often called "Persian") in Oklahoma, a topic which has been under-investigated in general ("Phonetics and phonology remain among the least understood properties of heritage languages"; Polinsky, 2018, p. 162) as well as in Farsi (Sedighi, 2010, 2018). It focuses on the Farsi produced by heritage speakers of Persian ethnicity born and raised in Oklahoma and that of their Persian parents' generation of immigrants. To the best of my knowledge, no other study has been done which has focused on the Farsi vowel system among a Persian-American ethnic group in the United States. This ethnic group has its own cultural practices and social networks.

Impressionistically speaking, Farsi heritage speakers sound different from Farsi monolinguals or even sequential bilinguals of Farsi and English, an impression confirmed by the Persian parents of the heritage speakers in Oklahoma (Dokhtzeynal & Sheikhbahaie, 2020). The motivation behind the present study was to determine if this difference is found in their vowel systems. This study investigates the possible influence of the English vowel system of the participants on their Farsi vowel system and vice versa. In addition, however, this study looks at causes of that variation that may lie in cultural practices and ethnic orientation (Nagy et al., 2014) as well as in social networks (Milroy & Milroy, 1985).

1.1 Goals

I set out to record speakers of Farsi in Oklahoma, both immigrant and heritage speakers from various demographic groups, determine their social networks, and group them into relevant categories. In what follows I will first compare the vowels produced by the immigrant generation in the US to monolingual speakers of Farsi in Iran and then compare the production of heritage speakers' vowels to those of the immigrant generation. These comparisons are based on the acoustic analysis of the recordings of 150-word list pronounced by the participants. I will correlate these findings with the respondents' identities and positions in their sociocultural environments. This study addresses two research questions: (1) Does the Farsi vowel system of heritage speakers differ from that of their parents' generation and modern standard Farsi? If so, how? (2) What social factors contribute to variation among heritage speakers' Farsi vowels?

1.2 Organization of Sections

Chapter 2 will consider relevant background information regarding the heritage language speakers in this study and provide a summary of the findings on relevant studies of heritage speakers of other languages. In Chapter 3 the methodology of the study is presented, explaining how respondents were selected and recorded and how the data was prepared for analysis. The results are presented in Chapter 4, including the results of impressionistic and acoustic analyses. Chapter 5 provides examples from individual speakers and explains their diverse social network and ethnic orientation. Chapter 6 concludes the study by summarizing the relevant findings and suggesting avenues for further study.

BACKGROUND AND REVIEW OF RELEVANT LITERATURE

2.1 Heritage language speakers

Van Deusen-Scholl (2003) defines heritage speakers as people "who have been exposed to

another language in the home and have either attained some degree of bilingual proficiency or

have been raised with a strong cultural connection to a particular language through family

interaction" (p. 222). Heritage language speakers are people who grow up in a home where a

language other than the dominant language spoken in the society is spoken and they subsequently

switch to speaking the dominant language of the society (Polinsky & Kagan, 2007). Drapper and

Hicks (2000) recognize a heritage speaker in an English dominant setting as "someone who has

had exposure to a non-English language outside the formal education system. It most often refers

to someone with a home background in the language, but may refer to anyone who has had in

depth exposure to another language" (p. 19). Polinsky (2008) emphasizes the importance of

"[u]nderstanding the nature of incomplete acquisition" to understanding acquisition (p. 40).

Polinsky (2008) also mentions that "heritage speakers [can] provide a crucial missing link

between competent L1 learners, balanced bilinguals, and possibly L2 learners" (p. 40). She also

believes that the importance of studying heritage language speakers lies in the fact that very little

is actually known about this population. These speakers have varying degrees of proficiency in

their heritage language. Valdés (2000) characterizes a heritage

speaker as someone… who is raised in a home where a non-English language is spoken, who speaks or merely understands the heritage language, and who is to some degree bilingual in English and the heritage language. They speak or hear the language spoken at home, but they receive all of their education in the official or majority language of the countries in which they live (p. 375).

Fishman's (2001) anthropological perspective on heritage languages in the US divides them into three groups: Indigenous languages spoken by aboriginal Native Americans, Colonial languages spoken by earlier settlers such as Spanish, German or French and Immigrant languages such as Arabic, Persian, Korean. Fishman's (2001) characterization is a "broad" one compared to Valdés' (2000, 2001) "narrow" definition, which is mostly proficiency-based. In fact, Fishman (2001) states that a heritage language might be one that the person might have no language ability in, but a cultural connection to that language. Similarly, Foley and Thompson (2003) define heritage language as "the language, which is frequently the means of establishing and reaffirming consolidation with one's origins, though linguistic proficiency is not a pre-requisite" (p. 99).

A heritage language can also reflect the socioeconomic class of the immigrant generation who spoke it at home (Valdés, 2014) and should not be compared to a language which is spoken by fully-competent speakers or the language of the media or literature (Polinsky & Kagan, 2007). Polinsky and Kagan (2007) hold that almost "nothing is known about the nature of phonological representations in heritage speakers" (p. 378), but several studies have investigated the phonetics/phonology of heritage speakers compared to the language spoken in the homeland. The below-mentioned studies are among the few studies of phonetics and phonology in relation to heritage speakers of different languages worldwide.

Tse (2016a, 2016b, 2016c, 2017) shows that the phonemic inventory of Cantonese heritage speakers in Toronto is similar to the Cantonese in Hong Kong, but Cheng (2017) finds that heritage

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Korean speakers in California are not participating in ongoing Seoul Korean sound changes. Kang and Nagy (2016) find that Korean heritage speakers in Toronto from an older generation than Cheng's (2017) Californian speakers participate in sound change in progress in Korea, but the younger generation in Toronto are leveling off or perhaps reversing the process.

Most relevant to the current study is Godson's (2003, 2004) work which looked at the vowel production of ten Armenian heritage speakers, ten Armenian immigrants and one Armenian monolingual speaker. She found that the heritage speakers' production of Armenian /i/, /ɛ/ and /a/ was closer to the English counterparts than those produced by the immigrants, but heritage speakers' production of the back vowels /o/ and /u/ was quite similar to that of the immigrant group. Asherov, Fishman, and Cohen (2016) examined the vowel reduction patterns of Russian heritage speakers residing in Israel. They propose that the system of vowel reduction of the Russian heritage speakers is a hybrid system which combines aspect of the heritage language (Russian) and Hebrew which is the dominant language in Israel. Ronquest (2016) provided a systematic analysis of Spanish vowels in 3 stylistic levels produced by Spanish heritage speakers. Her analyses confirmed an overall expansion effect of the Spanish heritage speakers' vowel space in controlled speech similar to that reported in previous studies. Also, vowel duration showed less variation than expected and was limited to low vowels, suggesting that vowel quality and duration may be affected independently of one another. Chang, Yao, Haynes, and Rhodes (2011) investigated the contrast between the production of Mandarin by heritage speakers, native Mandarin speakers and English L2 learners of Mandarin. They found that heritage speakers of Mandarin were the most successful at simultaneously maintaining language-internal and cross-linguistic contrasts; they believe that this maintenance may stem from a close approximation of phonetic norms that occurs during the heritage speakers' early exposure to both languages. Baker and Trofimovich (2005) compared the production of six English vowels and five Korean vowels of English and Korean monolinguals to early and late Korean-English bilinguals. They found that early bilinguals manifested a bidirectional L1-L2 influence and produced distinct acoustic realizations of both the L1 and L2

vowel systems; however, late bilinguals showed evidence of a unidirectional influence of the L1 on the L2 and produced L2 vowels that were "colored" by the acoustic properties of their L1.

2.2 Sociolinguistics

It was not until the famous study of social motivation of a sound change by William Labov (1963) that sociolinguists started to pay attention to the importance of vowels and their changes/shifts and to relate those changes to social as well as linguistic factors. In his research, Labov (1963) studied how the phonetic position of the first elements of the diphthongs /ai/ and /aʊ/ were raised to /ə/ in different regions of the island of Martha's Vineyard in Massachusetts based on factors such as age, occupation and ethnicity. This was the beginning of the so-called first wave in variationist sociolinguistics or language variation and change and continued with his subsequent study of New York department stores in which he showed how the rate of /r/ deletion could vary based on socioeconomic level and social class (Labov, 1972b). The second wave began with the study of social network in Belfast by Milroy and Milroy (1985), in which social mechanisms of linguistic change such as strong versus weak ties in a community were taken into consideration. The third wave was started by Eckert (2000), who studied language variation as social practice in the construction of identity by observing the students of a high school in Detroit, Michigan. By observing their social practices, she came up with three categories: jocks, in-betweens and burnouts and found that group membership was as or more important than social class and affected the phonetic realizations of the respondents' participation in the Northern Cities Vowel Shift. Eckert (2005) looks at variation "as a resource for the construction of social meaning" (p. 1) but also notes that there is no preferential order among the three waves of research and they all contribute to a greater understanding of variation and change. This study incorporates all three waves of variationist sociolinguistics in its focuses on the vowel system of Farsi produced by Persian heritage speakers residing in Oklahoma and their Iranian immigrant parents.

2.3 Quantitative Paradigm in Sociolinguistics

Bayley (2013) explains that the quantitative paradigm in sociolinguistics, which originated from the studies conducted by Labov in New York (1972b) and Philadelphia (1972a), is an approach whose central ideas lie in understanding a language by understanding its linguistic and social variables. In addition, diachronic change is also revealed in synchronic variation (Bayley, 2013).

A central idea in sociolinguistics has been that of the speech community, which Labov (1972c) defines not as a group of people whose usage agrees but as those who participate in a set of shared norms. These shared norms allow them to reveal a uniformity of abstract patterns of variation. Bayley (2013) holds that such "research has demonstrated the systematic nature of much of the linguistic variation previously thought to be random" (p. 89). Figure 1 shows both the presence of shared norms and the non-random occurrence of -ing pronounced as -in in New York City English as determined by both social status and stylistic level (i.e., the continuum from casual to formal speech). There is an enormous difference in the less formal -in variant for Lower Working Class and Upper Middle Class speakers, but as speech becomes more formal (in "Reading Style"), speakers from all social groups increase their use of the -ing form, even though their rates of -in remain distinct. That the "target" for formal speech is -ing represents the shared norm; that the direction and amount of change is controlled by both status and style shows that the use of the -in variant is far from random.
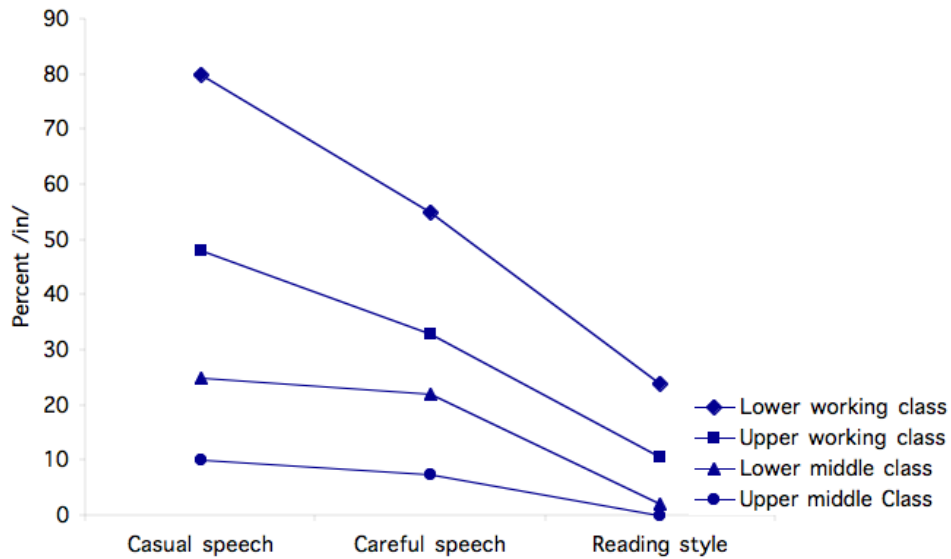
Figure 1. Social and stylistic stratification of (ing) in the random sample of the Lower East Side of New York City adults [N=81]: Labov 1966

With regard to vowel variation, Labov, Yaeger, and Steiner (1972) demonstrated that the determination of vowel formants is useful in studying variation and change. Formant 1 (F1) is inversely related to the height of a vowel and formant 2 (F2) is related to its degree of fronting in the mouth. Although there are several ways to calculate and represent F1/F2 values (all available at the NORM website (Thomas & Kendall, 2007)), this study used the Labov ANAE TELSUR G normalization method (see below).

2.4 Farsi heritage speakers of Persian ethnicity

Sedighi (2010, 2018), from an educational point of view, holds that because the most important point that middle-class Persian immigrant families have in mind regarding their children's future is their education and job, they neglect the importance of their children's acquisition of their heritage language and rarely take it into consideration. She also believes that heritage language has been paid attention to among other ethnic groups since they have a longer history of residence in the U.S. Perhaps for this reason among others, Farsi heritage language has been severely under-investigated. Farsi heritage speakers do not use their heritage language because they do not

need it when communicating with their peers, but when they are older and have been detached from their Persian culture and language, they often regret (and hold their parents responsible) for not learning their heritage language (Sedighi, 2010). A few examples of Farsi heritage language research are that of Gharibi and Boers (2017), who investigated the difference between young Farsi heritage speakers' oral narratives in New Zealand and their monolingual counterparts in Iran, who showed greater richness in their lexical repertoire. Moore and Sadegholvad (2013) studied the Farsi writing of heritage speakers in the context of a Farsi heritage language course and identified several morphological, syntactic, and orthographic features of heritage Farsi. Atoofi (2013) examined teachers' and students' linguistic markers of affect at a Farsi heritage language school in California and found how students and teachers use morphology, phonology and discourse structure to display particular affective stances. However, these studies are rather far removed from the phonetic concerns of this study.

2.5 Farsi Language

Modern standard Farsi, which is used in Iran, is an Iranian language within the Indo-Iranian branch of the Indo-European language family (Windfuhr, 2009). More than 30 million speakers speak Farsi as their first language (Lewis et al., 2009), and it is the official language of Iran with Tehrani dialect as its standard dialect (Zamir, 1982). Farsi is also spoken in Tajikistan and parts of Afghanistan.

The inventory of the Farsi vowel system contains three long vowels (/i/, /u/ and /ɒ/), and three short vowels (/e/, /o/ and /æ/), and two diphthongs (/ej/ and /ow/) (Miller, 2012). Figure 2 shows the articulatory/acoustic placement of these elements.
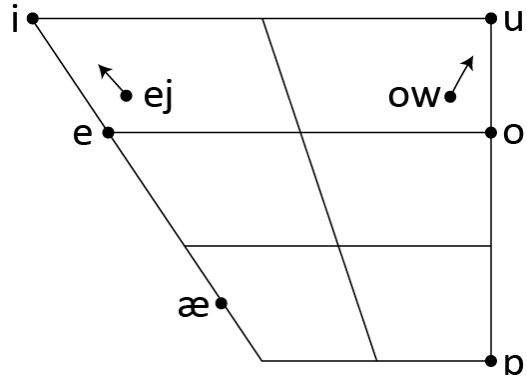
Figure 2. Vowel system of modern standard Farsi (Miller, 2012)

The existence of diphthongs in Farsi is, however, a matter of debate. Majidi and Ternes (1999) believe that Farsi has no diphthongs, but Yaesoubi (2010) maintains that it has the two diphthongs /ej/ and /ow/. Hakimi (2012), from a phonemic viewpoint, considers diphthongs in Farsi nothing but sequences of a vowel and a consonant glide (as suggested by the "j" and "w" symbols in Figure 2). However, the existence of diphthongs in Farsi is not investigated in the present study and only the six monophthongs will be measured.

2.6 Acoustics of Farsi vowels

Several studies have focused on the acoustic features of vowels – first and second formants – in Farsi (Ansarin, 2004; Aronow et al., 2017; Esfandiari et al., 2015; Ghaffarvand Mokari et al., 2017; Mohammadi et al., 2011). In his study, Ansarin (2004) reported the mean F1 and F2 produced by only female speakers of Farsi. Aronow et al. (2017) located the main acoustic placements of the 6 vowels of Farsi and focused on vowel duration of the vowels. They discovered that /i/ and /u/ which were historically believed to be long vowels of their short counterparts /e/ and /o/ are in fact shorter in duration than /e/ and /o/. Esfandiari et al. (2015) attempted to find the vowel space in Farsi by focusing on the language produced by 10 news reporters (5 males and 5 females) aged 35-50. The data were collected by recording Iran's national TV news broadcasts and were acoustically analyzed. Vowels were categorized in four groups produced by male and female speakers in

stressed and unstressed syllables and the mean of the two first formants of vowels were reported. Mohammadi et al. (2011) reported the production of vowels in isolation and not in the context of words by 30 male and 30 female Farsi speakers. Ghaffarvand Mokari et al. (2017) reported the F0, F1, F2, and F3 and the duration of the Farsi vowels of 28 male and 25 female Farsi monolinguals from the Tehrani dialect. The vowel measurements were done in words with /dVd/, /bVd/, and /hVd/ contexts. These measurements were used as the basis of comparison for the immigrant generation's Farsi vowel system in the present study. It was chosen because it systematically investigated the vowel systems of monolinguals of Farsi of both genders, whereas other studies used only women, TV-recorded data, or a smaller number of speakers. Figures 3, 4 and 5 are borrowed from Ghaffarvand Mokari et al. (2017) and show the aggregate results of vowels produced by male and female monolinguals of Farsi in Iran in 3 contexts of /dVd/, /bVd/, and /hVd/.
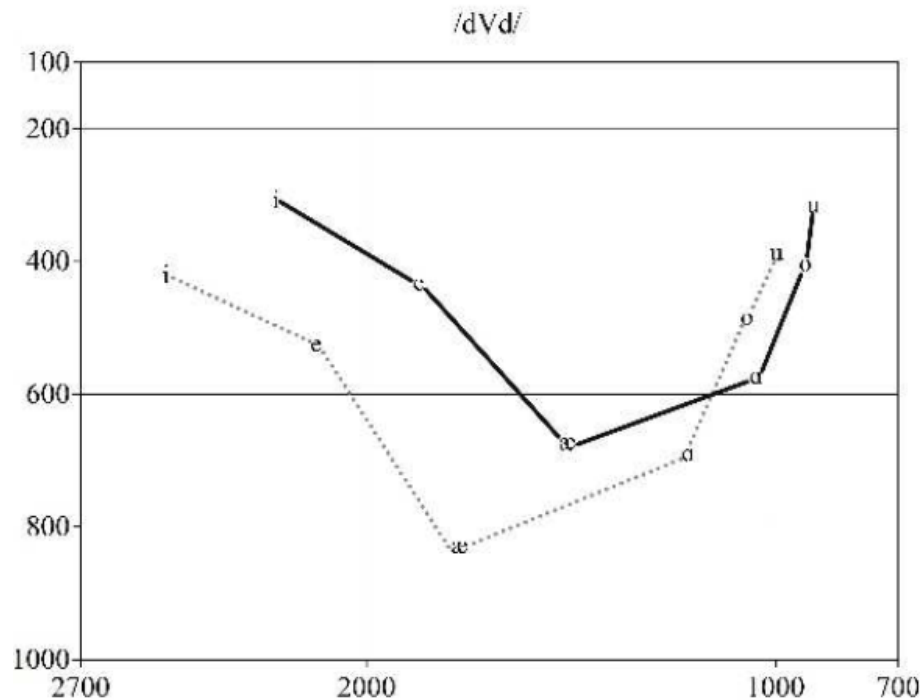
Figure 3. Vowel spaces of the mean values for six Farsi vowels in /dVd/ context. The solid lines represent male speakers' vowels space and the dashed lines represent female speakers' vowel space. (Ghaffarvand Mokari et al., 2017)
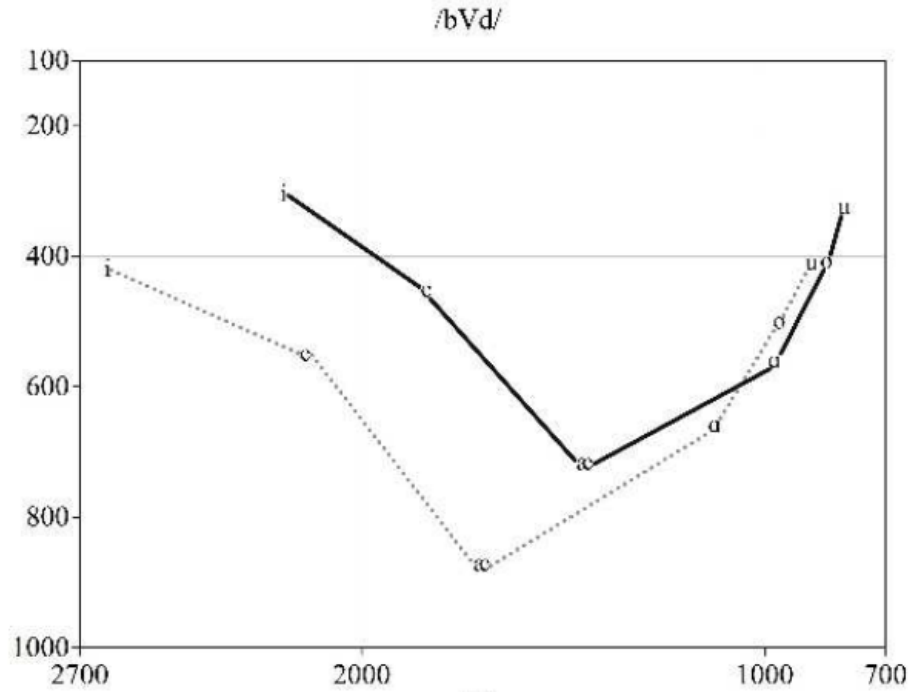
Figure 4. Vowel spaces of the mean values for six Farsi vowels in /bVd/ context. The solid lines represent male speakers' vowels space and the dashed lines represent female speakers' vowel space. (Ghaffarvand Mokari et al., 2017)
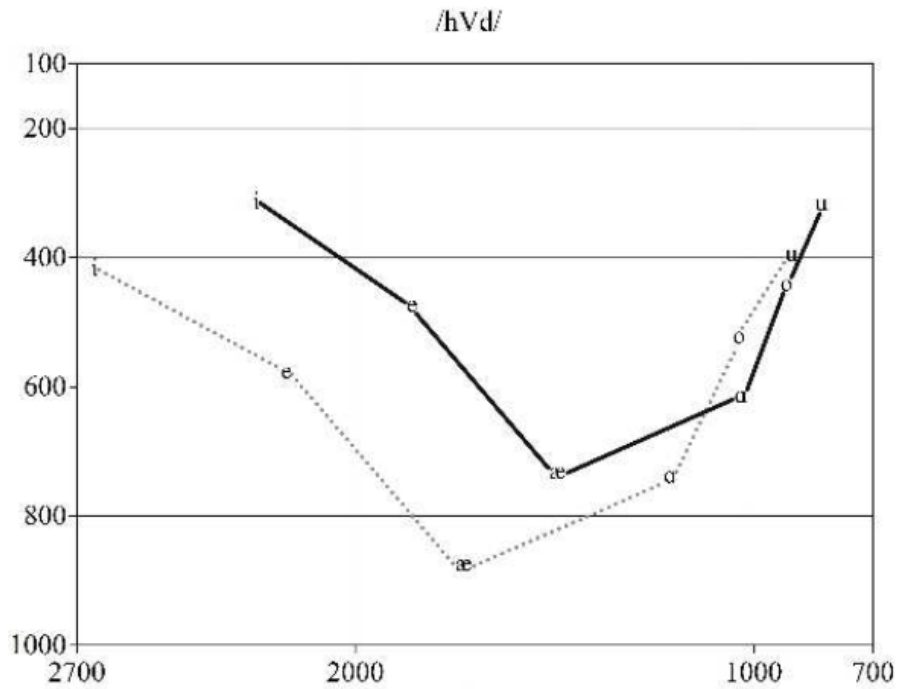
Figure 5. Vowel spaces of the mean values for six Farsi vowels in /hVd/ context. The solid lines represent male speakers' vowels space and the dashed lines represent female speakers' vowel space. (Ghaffarvand Mokari et al., 2017)

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Although many studies have extensively researched the vowel system of Farsi monolinguals and a few the vowel system of bilingual speakers of Farsi and English, none of these studies have considered the vowel system of Persian heritage speakers whose dominant language is English and their differences from that of their parents, if any.

CHAPTER III

METHODOLOGY: DATA COLLECTION

3.1. Participants

The participants in the present study are 20 immigrant adults (10 males and 10 females) of Persian ethnicity and 20 US-born Persian-American heritage speakers of Farsi (10 males and 10 females), whose parents are both Iranians who immigrated to the United States before or shortly after the Islamic revolution in Iran, which took place in 1979. They all live in Oklahoma City, Tulsa and Norman, Oklahoma. The US-born heritage speakers are all 18–35, and the immigrants are all over 35. The US-born heritage speakers speak Farsi with varying degrees of proficiency. Some of them were able to read the orthography of Farsi and some of them were not. When referring to the participants individually, pseudonyms are used.

3.2. Procedure

Before beginning the study, I attended several Persian cultural events in the participants' hometown where they gathered with their families and friends. After we got to know each other, I asked them to voluntarily participate in my study.

After obtaining written consent, participants were fitted with an Audio-Technica PRO 8HEx head-mounted microphone to allow freedom of movement during the interview. The interviews were recorded in .WAV format with sampling rate of 44.1 kHz using a Marantz PMD660 professional audio-recording device. The elicitation of data was done in two stylistic formats, through semi-structured interviews conducted in Farsi and through the reading of a wordlist. The wordlist was in the form of Microsoft PowerPoint slides containing the words in Farsi orthography and their closest translation in English for those heritage participants who could not read the Farsi orthography. The words were presented to the participants one at a time on each slide. In case of a mispronunciation or mistake, the participants were allowed/asked to read the words again. All the recordings were done in a study room at a library with no peripheral interfering noise. The recordings were all copied onto two password-protected computers and on two password-protected external hard drives.

3.3. Interview

I conducted a sociolinguistic interview in Farsi with a list of questions about the participants' views on Persian culture and language and asked them whether they read books in Farsi, listen to Farsi music or watch Farsi movies. I also asked the heritage speakers about their memories of travelling to Iran with their parents and whether they attended any cultural events in Iran. I pursued questions off these topics when the participants initiated them and showed interest. I also allowed them to ask me questions to keep the conversation going as long as possible to have enough naturally produced language in an informal conversational style to analyze for discourse and acoustic features in future work.

3.4. Demographic Information

The participants were asked to answer a list of demographic questions at the end of our interview. The demographic information form asked for their name, contact information, age, place of birth, profession, education, the people who are the participants' close friends/associates and their ethnicity, the people they were in touch with before they went to elementary school, family members and the language(s) they use to communicate with them. The other questions in the demographic information form were aimed at determining the cultural score of the participants to determine their level of engagement with the Persian/Iranian culture. The questions consisted of the type of food they eat – e.g., American, Iranian, etc., the reading/listening materials that they read or listen to and the language of the materials, the language(s) in which they communicate, the materials that they watch or the music that they listen to and the language of the materials, and finally the cultural events they attend – e.g., American events, Persian events, etc. However, these network scores had no clear effect on the vowel production so they will not be discussed further in this paper. The demographic information was collected from the participants on printed forms. The forms were then scanned and the files were saved on a password-protected computer. The interview questions are given in Appendix A and the social network and other demographic questions in Appendix C.

3.5. Wordlist

The wordlist that I designed for this study consisted of 150 Farsi words and phrases which included the 6 vowels in the phonetic inventory of Farsi in different phonetic environments. The phonetic environments were as follows:

- word-final position in CV words
- before/after all consonant phonemes in CVC words
- before/after all consonant phonemes in CVCC words

The wordlist is given in appendix B.

CHAPTER IV

DATA ANALYSIS AND RESULTS

Due to the lack of a forced aligner for Farsi, a pronouncing dictionary of Farsi words was created using English orthography and a modification of Arpabet (Shoup, 1980). The dictionary was used to time-align the recordings of the wordlist items to Praat (Boersma & Weenink, 2019) TextGrids using the Penn Phonetics Lab Forced Aligner – P2FA (Yuan & Liberman, 2008). The aligned files were manually hand-corrected to make sure that the vowel boundaries were correct. The aligned files were then uploaded to the DARLA web interface (Reddy & Stanford, 2015) to extract vowel formants using the semi-automated feature, which includes FAVE-Extract (Rosenfelder et al., 2014) and the Vowels R package (Kendall & Thomas, 2010). The vowels occurring in phonetic environments before /l/, /r/ and nasal sounds were filtered out and excluded from the results due to the possible effects these sounds can have on vowel formant values. For each participant, DARLA provided a spreadsheet containing information about each vowel, including the previous and the following sounds, the mean F1 and F2 values across vowel duration, and F1 and F2 values at 20%, 35%, 50%, 65% and 80% of vowel duration. For the purpose of the present study, the 35% and 80% F1 and F2 values were chosen in order to check for possible glides in Farsi vowels and to check for possible effects from the participants' English diphthongs on their Farsi vowels. Measurements from the participants' English vowels were taken from Dokhtzeynal (2020), who conducted a study on the English vowel system of the same Persian immigrants and Farsi heritage speakers who participated in the present study.

Formant values for monolinguals were taken from Ghaffarvand Mokari et al., who collected 252 tokens for males and 225 tokens for females. They calculated the formant values "by averaging the values at central 40% of the vowel duration for each token" (Ghaffarvand Mokari et al., 2017, p. 11). I plotted the vowels of the native speakers from Ghaffarvand Mokari et al.'s (2017) study in NORM (Thomas & Kendall, 2007) using the Labov ANAE, Telsur G normalization method, although the values for F1 and F2 extracted from Ghaffarvand Mokari et al. (2017) did not include offglides. This could be due to the fact that some scholars regard all Farsi vowels as monophthongs (Majidi & Ternes, 1999).

I treated the heritage and immigrant speakers in the same way, and the number of vowel tokens analyzed are shown in Tables 1 and 2.

Table 1. Number of vowel tokens from Persian immigrant males and females

vowel	immigrant females	immigrant males
/i/	93	81
/e/	116	97
/æ/	120	120
/ɒ/	154	137
/o/	78	61
/u/	90	66

Table 2. Number of vowel token for female and male heritage speakers of Farsi

vowel	female heritage speakers	male heritage speakers
/i/	118	98
/e/	103	97
/æ/	119	138
/ɒ/	153	169
/o/	79	77
/u/	101	96
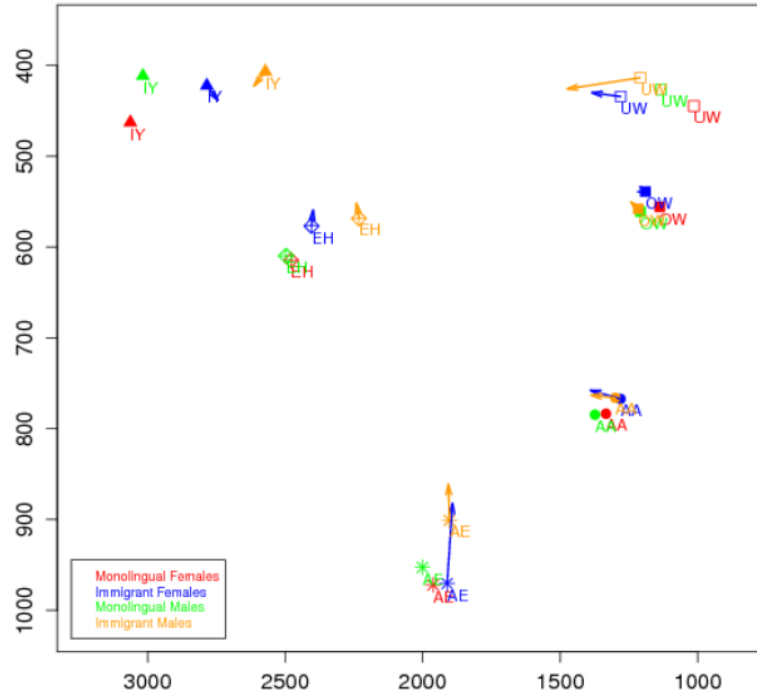
Figure 6. Comparison of Farsi vowels of the immigrant generation against monolingual speakers of Farsi in Iran from Ghaffarvand Mokari et al. (2017).

Vowels of the immigrant generation were compared against those of monolingual Farsi speakers in Iran to look for any effects of their L2 English experience on their L1 Farsi. In Figure 6, the red – females – and the green – males – colors are the Farsi vowels of the participants in Ghaffarvand Mokari et al.'s (2017). The blue – females – and the orange – males – colors are the Farsi vowels of the immigrant participants in the present study. In the above plot as well as the following plots, IY stands for the vowel /i/, EH for /e/, AE for /æ/, AA for /ɒ/, OW for /o/, and UW for /u/ in Farsi.

As shown in Figure 6, the F2 of /i/ produced by immigrant females is 278 Hz less than the F2 of /i/ produced by monolingual females, and the F2 of /i/ produced by immigrant males is 445 Hz less than the F2 of /i/ produced by monolingual males and is backer. So, the /i/ produced by both immigrant males and females is considerably backer than the monolingual F2 values. Similarly, the /e/ produced by immigrant males is 265 Hz backer that that of the monolingual males, but the difference for females is small.

The F1 nucleus of the vowel /æ/ produced by immigrant females is very similar to the /æ/ produced by monolingual females, but The F1 of /æ/ produced by immigrant males is 51 Hz less than that of monolinguals revealing a higher vowel. Both immigrant /æ/ vowels show short glides, probably not enough to be considered diphthongs, and since even weak glides are not shown in the native speaker data, this cannot be commented on. For male immigrants, however, /æ/ is slightly higher than the native speaker realization and could have been influenced by the higher local Oklahoma English /æ/ (see below).

Both immigrant males and females produce /ɒ/ and /o/ in the same cluster as monolingual speakers. Again, there are very short glides for /ɒ/, but these cannot be compared to the native data.

The nucleus for the vowel /u/ produced by immigrant males is close to the nucleus of its counterpart produced by male speakers in Iran, and, although its glide is 265 Hz long, it is in the opposite direction from the English one and again cannot be compared to the native realization. The F2 of the nucleus for the vowel /u/ produced by immigrant females is 267 Hz fronter than that of its counterpart produced by female speakers in Iran and could be indicative of an influence of extreme back vowel fronting in Oklahoma (see below)

Figure 7. Non-normalized vowel plot comparing the Farsi vowels of the male immigrants against male monolingual speakers of Farsi in Iran from Ghaffarvand Mokari et al. (2017).
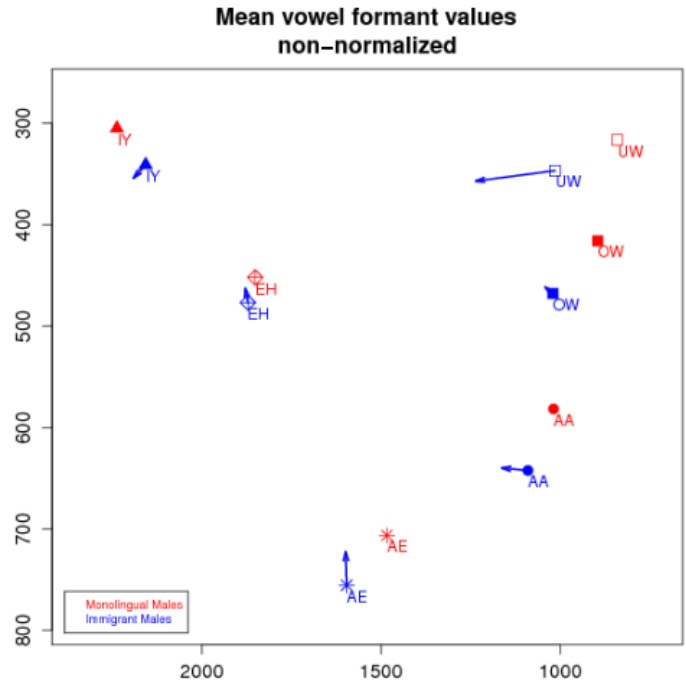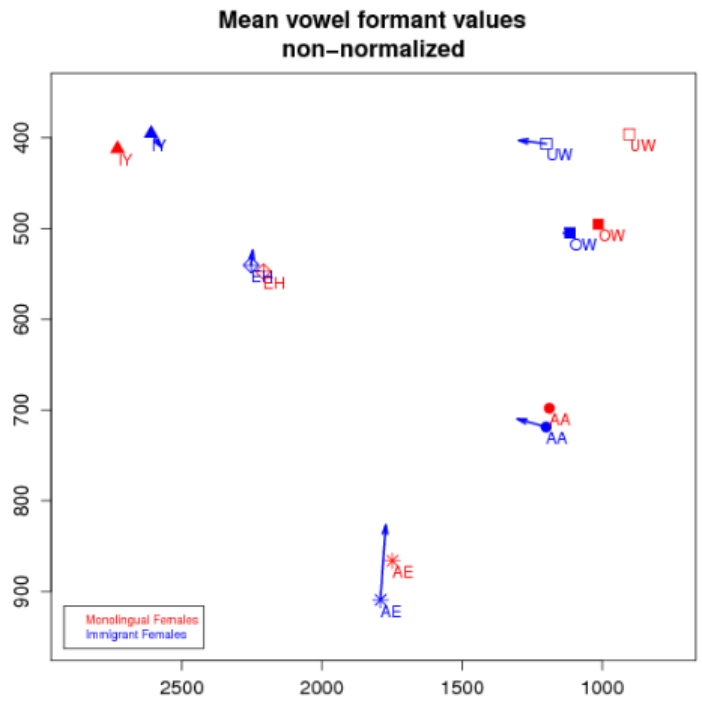

Figure 8. Non-normalized vowel plot comparing the Farsi vowels of the female immigrants against female monolingual speakers of Farsi in Iran from Ghaffarvand Mokari et al. (2017).

In figures 7 and 8, vowels of the immigrant generation were compared against those of monolingual speakers of Farsi in Iran to look for any effects of their L2 English experience on their L1 Farsi. The vowel plots show non-normalized aggregate vowels of immigrant males and immigrant females compared to monolingual males and monolingual females, respectively. In figure 7 and 8, the red – monolingual males/females – color is the Farsi vowels of the participants in Ghaffarvand Mokari et al.'s (2017). The blue – immigrant males/females – color is the Farsi vowels of the immigrant participants in the present study.

As can be observed in figures 7 and 8, the vowels of the immigrant generation are relatively in the same place as the monolinguals.
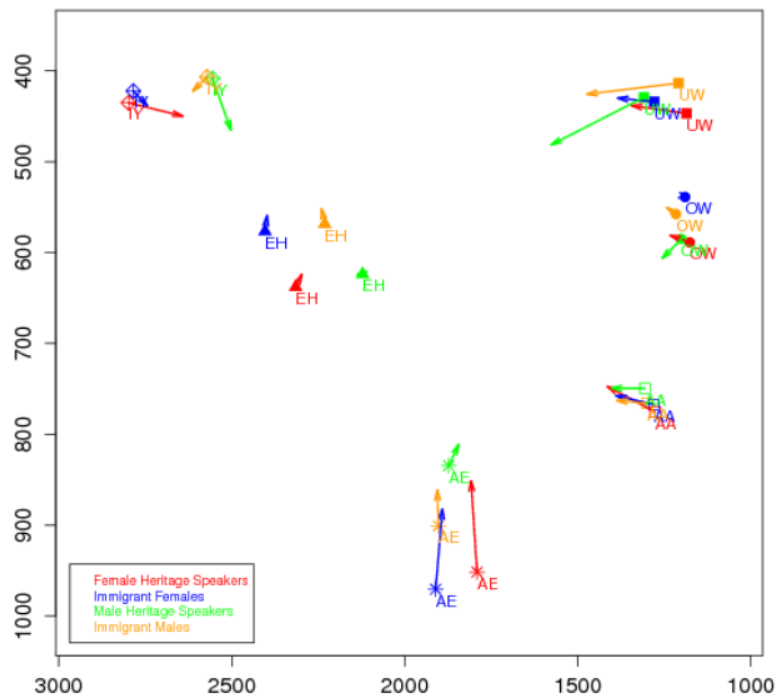
Figure 9. Comparison of Farsi vowels of heritage speakers against those of their parents' immigrant generation.

Polinsky and Kagan (2007) and Polinsky (2018) believe that the point of comparison for heritage language speakers should be the variety they are exposed to and not the standard language spoken in the homeland country. Figure 9, therefore, compares the heritage speakers' Farsi vowels –

22

females in red, males in green – to those of their parents' generation of immigrants from figure 6 – females in blue, males in orange. It is important to remember that the parents' generation vowels diverged very minimally from the native Farsi data.

Figure 9 shows that the nucleus of the vowel /i/ produced by male heritage speakers is very close to that produced by immigrant males. The glide for male heritage speakers is 57 Hz long, which is longer than that of immigrant males, but still cannot be compared to native Farsi. This glide however does not go in the same rising direction as native English /i/. The /i/ produced by female heritage speakers is also very close to the one produced by immigrant females, but the glide for female heritage speakers is about 157 Hz long, longer than that of immigrant females, but also not the direction that would indicate any English influence.

The /e/ vowel produced by heritage speakers is lower in comparison to that of the immigrant generation, but no noticeable glide can be observed which might indicate an English influence.

The nucleus of /æ/ produced by female heritage speakers is very close to that of immigrant females. The length of the glide is approximately the same at about 100 Hz. The nucleus of /æ/ produced by male heritage speakers is a little higher compared to that of immigrant males. However, the length of the glide is approximately the same at about 25 Hz.

Both male and female heritage speakers produce the back vowels in the same cluster as immigrant males and females. Therefore, there is not a big difference between their F1 and F2. The vowel /ɒ/ has a short glide of 100 Hz for male heritage speakers and 138 Hz for female heritage speakers. Like /e/, there is hardly any evidence of a glide in /o/, although male heritage speakers have a glide of 55 Hz. The vowel /u/ has a glide of 268 Hz for male heritage speakers, approximately the same as immigrant males; the female heritage speakers, like immigrant females, show no significant glides.

Overall, the nuclei of all three back vowels are in the same cluster and very similar in terms of their F1 and F2 between both generations and genders, and the length of their glides is also similar between generations.
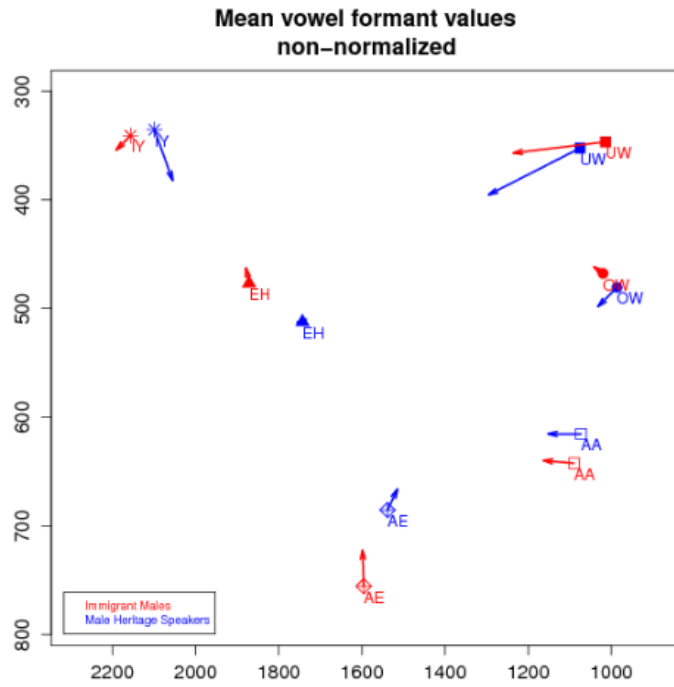

Figure 10. Non-normalized vowel plot comparing the Farsi vowels of the male immigrants against male heritage speakers of Farsi.
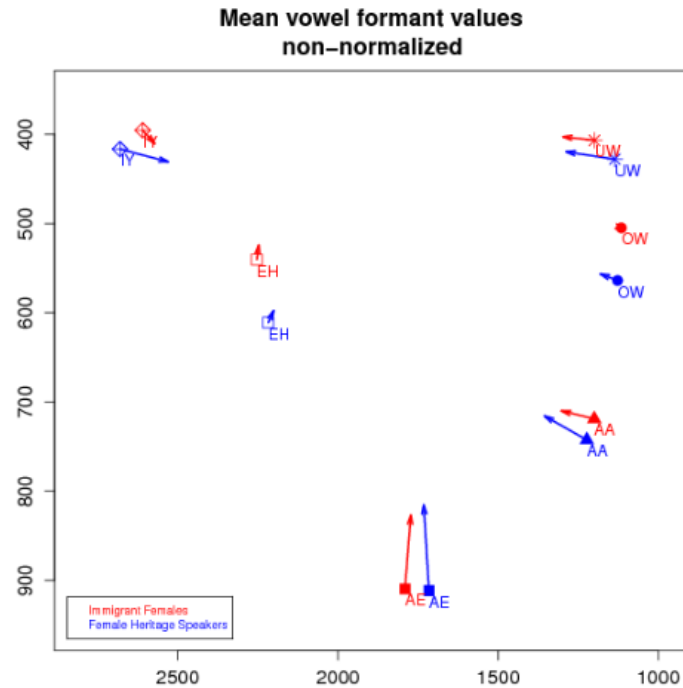
Figure 11. Non-normalized vowel plot comparing the Farsi vowels of the female immigrants against female heritage speakers of Farsi.

In figures 10 and 11, vowels of the heritage speakers of Farsi were compared against those of immigrant generation in the United States. The vowel plots show non-normalized aggregate vowels of male heritage speakers and female heritage speakers of Farsi compared to immigrant males and immigrant females, respectively. In figure 10 and 11, the red – immigrant males/females – color is the Farsi vowels of the immigrant participants and the blue – male/female heritage speakers – color is the Farsi vowels of the heritage speakers of Farsi who participated in the present study.

As can be observed in figures 10 and 11, the vowels of the heritage speakers of Farsi are relatively in the same place as the immigrant generation.
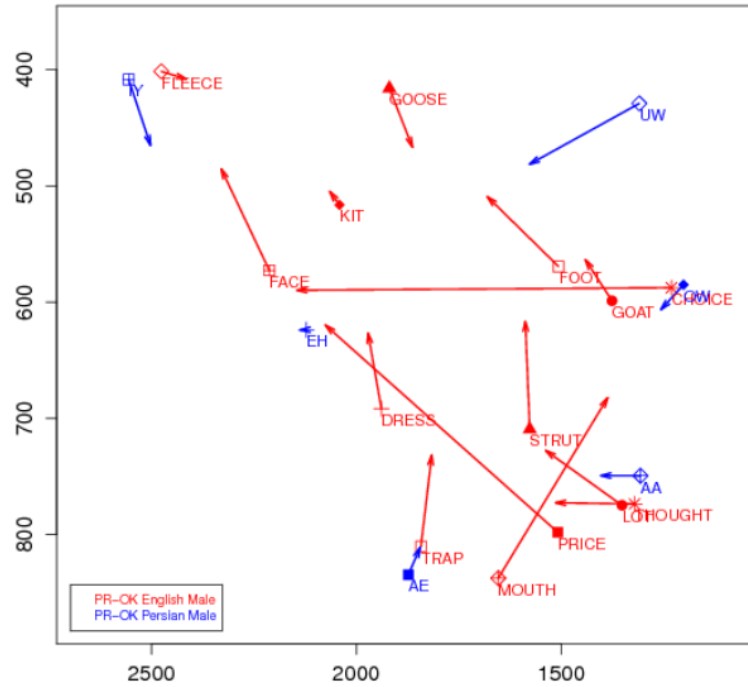
Figure 12. Comparison of Farsi vowels of male heritage speakers against their English (Dokhtzeynal, 2020).
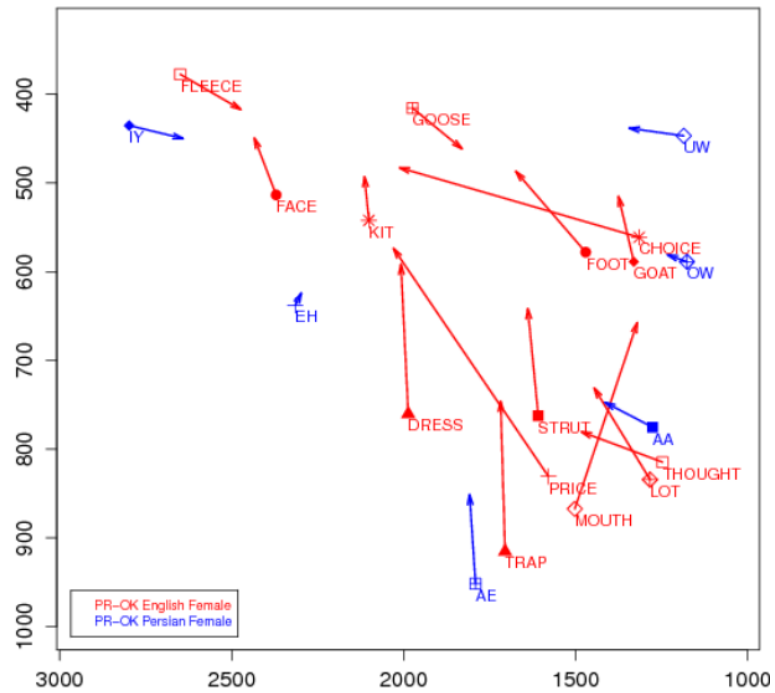
Figure 13. Comparison of Farsi vowels of female heritage speakers against their English (Dokhtzeynal, 2020).

Figures 12 and 13 show the English vowels (red color) of the male/female heritage speakers as well as their Farsi vowels (blue color). Four vowels are pronounced similarly in both languages: /i, æ, ɑ/ɒ, o/ (FLEECE, TRAP, LOT/THOUGHT, GOAT in figures 12 & 13). English /o/ (GOAT) is slightly fronter compared to Farsi /o/, as is typical for Oklahoma English (Tillery & Bailey, 2008). Farsi /e/ is in a position distinct from both English /ɛ/ and /e/ (DRESS and FACE in figures 12 & 13), so it does not appear to have been affected by either English vowel. Similarly, Farsi /u/ is completely distinct from the fronted English /u/ (GOOSE). Dokhtzeynal (2020) observed that the English /æ/ produced by these heritage speakers is backed and lowered compared to that of European-American Oklahoma English. Although this could be an effect of Farsi /æ/ on their English /æ/, the Oklahoma /æ/ vowel is often raised compared to other varieties of English, particularly California where it is lowered and backed (see below).
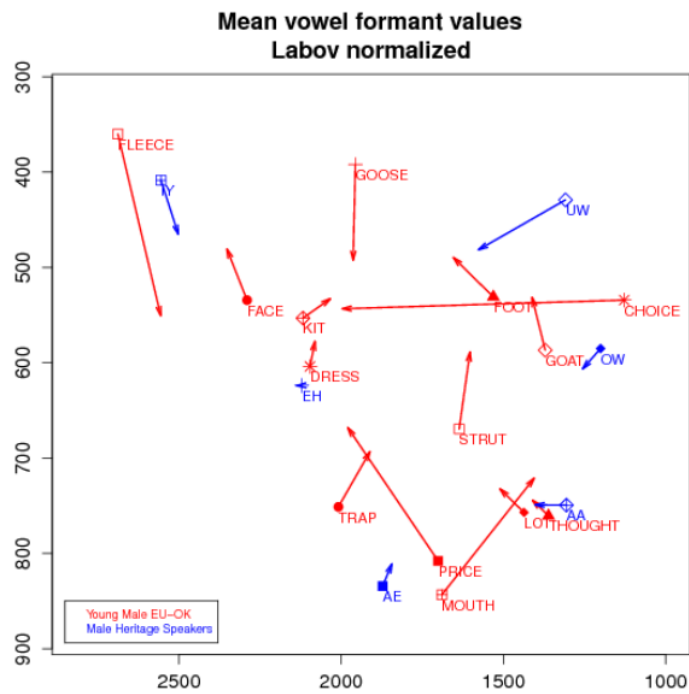
Figure 14. Comparison of Farsi vowels of male heritage speakers against the English of young male European-Oklahomans.

Figure 14 demonstrates the comparison of Farsi vowels of male heritage speakers against the

English vowels of young male European-Oklahomans. As can be observed the Farsi /i/ is roughly

in the same place as FLEECE. The vowel /e/ is in the same place as the DRESS vowel which is

comparatively higher in their vowel space than it is in the female European-Oklahoman space.

The vowel /æ/ is lower than the TRAP vowel. The vowel /ɒ/ in the same place as

LOT/THOUGHT vowels. The vowel /o/ is a little bit backer than the GOAT vowel. It can also be

observed that the Farsi /u/ is much backer than the GOOSE vowel which is fronted in Oklahoma
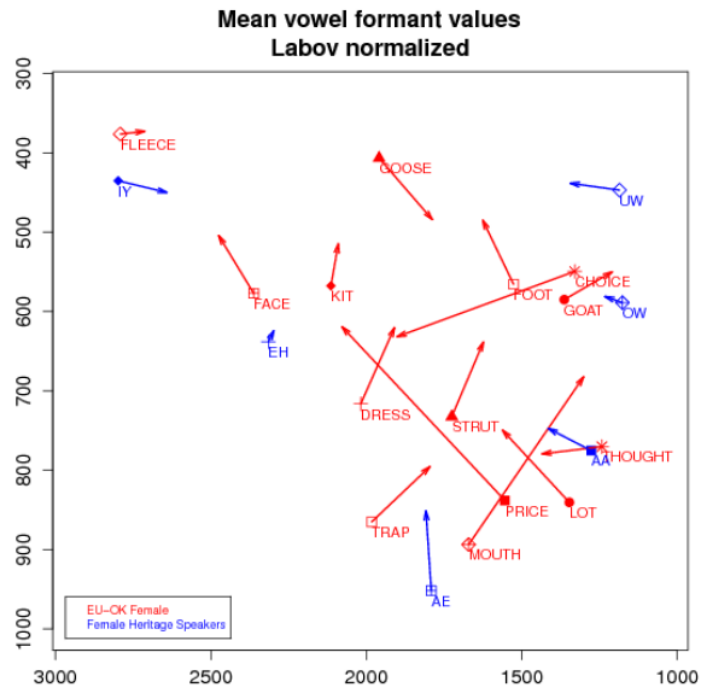
English.

Figure 15. Comparison of Farsi vowels of female heritage speakers against the English of young
female European-Oklahomans.

Figure 15 demonstrates the comparison of Farsi vowels of female heritage speakers against the

English vowels of young female European-Oklahomans. As can be observed the Farsi /i/ is a little

bit lower than the FLEECE vowel. The vowel /e/ is a little bit higher than DRESS and roughly in

the same place as FACE but does not have any sign of a glide. The vowel /æ/ is lower than

TRAP. The vowel /ɒ/ in the same place as THOUGHT. The vowel /o/ is a little bit backer than

the GOAT vowel. It can also be observed that the Farsi /u/ is much backer than the GOOSE

vowel which is fronted in Oklahoma English.

CHAPTER V

INDIVIDUAL SPEAKERS' DEMOGRAPHIC INFORMATION

The previous chapter showed the aggregate results of the participants in this study, demonstrating the lack of influence of English on their Farsi in wordlist style. However, in a folk linguistic study of the same Persian-immigrant community, parents of heritage speakers stated that their children have a foreign accent in their Farsi and they sound like "Armenians" in Iran (Dokhtzeynal & Sheikhbahaie, 2020). To explore the possibility that this "Armenian accent" is reflected in heritage speakers' vowel systems, this chapter takes a look at individual participants' vowel spaces. To allow for other interpretations of variation between speakers as well, this chapter also presents the content of the interviews and the network of the participants. Ultimately, this contextualization seeks understanding of the beliefs expressed by the speakers, their thoughts and attitudes toward Farsi, and toward Persian culture. For the purpose of being concise, 8 participants have been selected out of the 40 participants in this study based on being heritage speaker or immigrant, gender and level of proficiency in Farsi. It is worthy to note that all heritage speakers were able to speak Farsi and answer the researcher's questions in their interviews. They could also carry on a conversation with different levels of proficiency in Farsi. Also, the immigrant generation's Farsi was not influenced by their English to a large extent as far as the researcher can tell. The aggregate vowel plots in the previous chapter showed that the vowels of immigrant generation are relatively in the same place as those belonging to the monolinguals of Farsi, and the vowels of heritage speakers of Farsi are relatively in the same

place as those belonging to the immigrant generation. In this chapter, we want to see whether the diverse demographic information of the participants has any effect on the position of the vowels of individual speakers.

5.1 Brief selective participant summaries

In the following section, a selection of 8 individuals involved in this study will be addressed shortly in terms of their social network and their attitudes toward Farsi language and Persian culture. It will also begin introducing some of the more discourse analytic analysis. There exists no specific order for their presentation and their ordering ought not to be confused with any other system of categorization or ranking. The names used for these participants are all pseudonyms. The following table presents a synopsis of the factors which have been taken into account for choosing these individuals. It is worthy to note that the Farsi level of proficiency for the heritage speakers and immigrant generation has been determined, according to Common European Framework of Reference for Languages (CEFR) (Consejo, 2001), by the researcher himself as a native speaker of Farsi.

Table 3. Individual speakers' demographic information

No.	Name	Gender	Heritage speaker/Immigrant generation	Farsi level of proficiency according to CEFR
1	Ava	Female	Heritage Speaker	B1 – intermediate
2	Pari	Female	Heritage Speaker	C2 – proficient
3	Payam	Male	Heritage Speaker	B1 – intermediate
4	Hadi	Male	Heritage Speaker	C1 – advanced
5	Davood	Male	Immigrant generation	C2 – proficient
6	Reza	Male	Immigrant generation	C2 – proficient
7	Fariba	Female	Immigrant generation	C2 – proficient
8	Ladan	Female	Immigrant generation	C2 – proficient

5.1.1 Ava, 19, Norman
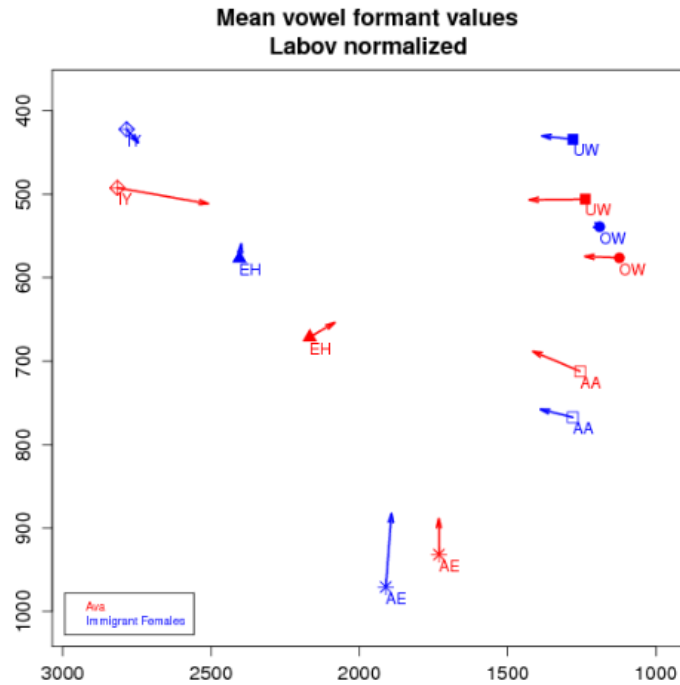
Figure 16. Comparison of Ava's Farsi vowels against immigrant females' generation.

Ava is a female heritage speaker of Farsi. She is a freshman in psychology. She is single and is

living with her parents. She has lived in Norman most of her life. She moved from San Diego,

California to Norman, Oklahoma with her family when she was 3. She thinks that Oklahoma is

boring and everything in it is the same. That is why she really likes to move to a big city like New

York or even back to California. She does not like to travel to Iran due to her negative experience

of being reprimanded by a police woman for not properly wearing her veil. However, she likes

the Persian culture and Farsi language and even is attending a Farsi class for improving her

heritage language. Her Farsi level of proficiency is not high (based on the intuition of the

researcher and compared to other female heritage participants), yet she is able to read Farsi

orthography. She thinks that "there is a just a closer cultural bond between Iranians" and this is

what she likes about being an Iranian-American. She is glad that she has been born in the US and,

at the same time, she has the option of having access to another ancestral culture. Based on her

demographic information, she states that she speaks English 97% of her time and in Farsi for only

3% of her time during a day. She even speaks English to her parents and rarely switches to Farsi. She is in touch with Americans 80% of her time so she normally speaks English to them.

As can be observed in figure 16, which is her individual plot compared to the female immigrant generation's aggregate results, her vowels are relatively in the same place as the immigrants'. It can also be observed that her Farsi vowel system is not affected by her English system (Dokhtzeynal, 2020).

5.1.2 Pari, 29, Tulsa

Figure 17. Comparison of Pari's Farsi vowels against immigrant females' generation.

Pari is a female heritage speaker of Farsi. She holds a master's degree in anthropology. She is single. She has lived in Tulsa most of her life. She thinks that there is not much to do in Oklahoma and she is planning on moving to a city like Seattle. She really likes traveling to Iran because of having a lot of relatives. She also has a big network of Iranian immigrants, mostly graduate students. She really likes the Persian culture and Farsi language. Her Farsi level of proficiency is excellent (based on the intuition of the researcher and compared to other female

heritage participants). Before knowing that she is a heritage speaker of Farsi, the researcher could not tell that she was born in the US. She is able to read Farsi orthography. She is glad that she has been born in the US and, at the same time, she has the option of having access to another culture. She travels to Iran every two years. Based on her demographic information, she states that she speaks English 60% of her time and in Farsi for 40% of her time during a day. She speaks in Farsi to her parents and rarely switches to English. She is in touch with Americans 10% of her time and in touch with Iranians 90% of her time. She really likes Persian food and she attends almost any Persian cultural event in Oklahoma.

As can be observed in figure 17, which is her individual plot compared to the female immigrant generation's aggregate results, her vowels are relatively in the same place as the immigrants'. It can also be observed that her Farsi vowel system is not affected by her English system (Dokhtzeynal, 2020). Her /i/ and /ɒ/ are very close to the /i/ and /ɒ/ produced by the immigrants. Her /e/ and /æ/ are relatively in the same place as the immigrants. The most interesting observation is about her /o/ and /u/ which are even backer than the female immigrants. Her social network and relationship with Iranians who have recently immigrated to the US for their studies in addition to her regular travels to Iran and communicating with her relatives in Iran has helped her to maintain her Farsi in the same level of most immigrants. Her input for Farsi has been from both immigrant generation and Iranian students in America, and this can be seen in her vowel system to a large extent.
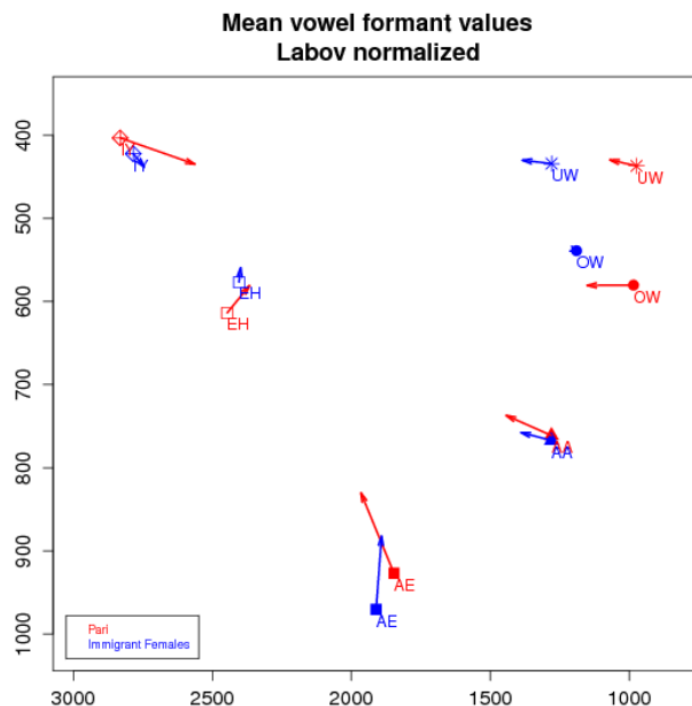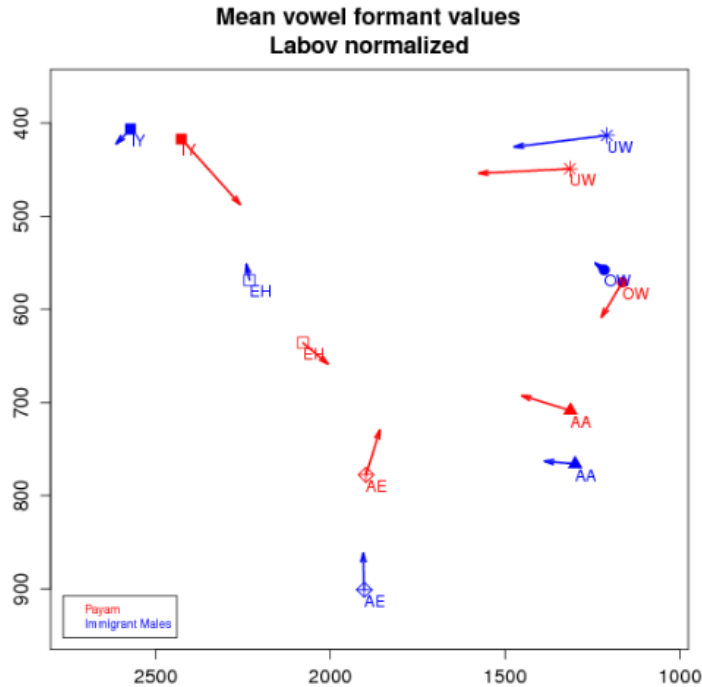
5.1.3 Payam, 26, Tulsa

Figure 18. Comparison of Pari's Farsi vowels against immigrant females' generation.

Payam is a male heritage speaker of Farsi. He has lived in Tulsa most of his life. He really likes videogames and is the event coordinator of a game company in Oklahoma. He is single and does not like to travel to Iran. He does not care much for Persian culture or Farsi language. His Farsi level of proficiency is poor (based on the intuition of the researcher and compared to other male heritage participants). He is unable to read Farsi orthography. He is glad that he has been born in the US. Based on his demographic information, he states that he speaks English 100% of his time during a normal day. He speaks in English to his parents and rarely switches to Farsi. He is in touch with Iranians or Iranian-Americans for only 2% of his time. He really likes Persian food, and the reason for such preference is that his parents own a Persian restaurant. He does not attend any Persian cultural event in Oklahoma.

As can be observed in figure 18, which is his individual plot compared to the male immigrant generation's aggregate results, his vowels are relatively in the same place as the immigrants'. It can also be observed that his Farsi vowel system is not affected by his English

system (Dokhtzeynal, 2020). His /æ/ is a little bit higher than the immigrants'. This has been

observed in the aggregate vowel plot for all male heritage speakers compared to immigrants

before.

5.1.4 Hadi, 35, Norman
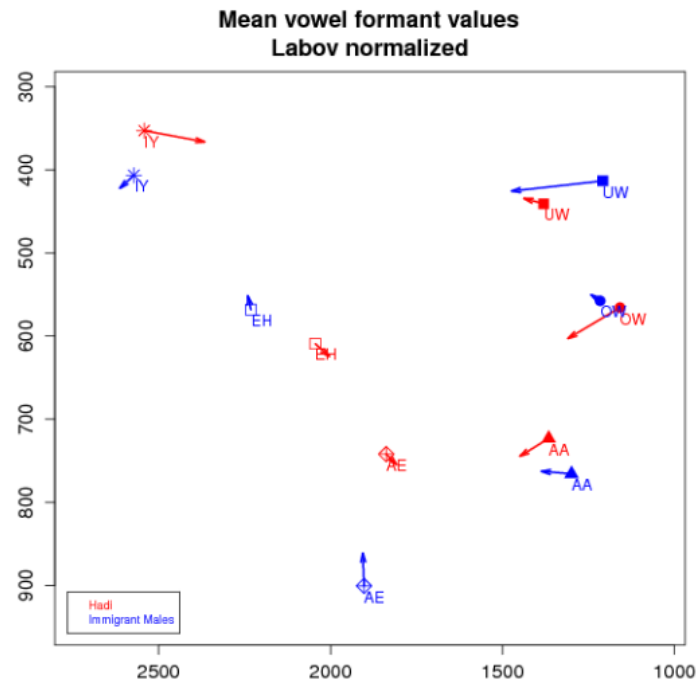
Figure 19. Comparison of Hadi's Farsi vowels against Immigrant males' generation.

Hadi is a male heritage speaker of Farsi. He is an attorney in construction business. He has lived

in Norman most of his life. He is married to a female heritage speaker of Farsi. He thinks that

there is not much to do in Oklahoma, but that is OK for him since he spends a lot of hours during

a day working. Due to the nature of his job, he is in touch with Americans a lot. He is working in

a construction business owned by his father and that is why he is in touch with Iranian

immigrants as well. He really likes to travel to Iran and visit his relatives, but because of his job

he is unable to do so. He also has a big network of both Americans and Iranian immigrants,

mostly his family members and relatives in Oklahoma. He really likes the Persian culture and

Farsi language. His Farsi level of proficiency is excellent (based on the intuition of the researcher

and compared to other male heritage participants), yet he has an English-influenced accent in his

Farsi. He is able to read Farsi orthography. He is glad that he has been born in the US and, at the

same time, has the option of having access to another culture. Based on his demographic

information, he states that he speaks English 70% of his time and in Farsi for 30% of his time

during a day. He speaks in Farsi to his parents and rarely switches to English. He is in touch with

Americans 50% of his time and in touch with Iranians 50% of his time. He really likes Persian

food and he really likes to attend Persian cultural events in Oklahoma.

As can be observed in figure 19, which is his individual plot compared to the male

immigrant generation's aggregate results, his vowels are relatively in the same place as the

immigrants'. It can also be observed that his Farsi vowel system is not affected by his English

system (Dokhtzeynal, 2020). His /æ/ is a little bit higher than the immigrants'. This has been

observed in the aggregate vowel plot for all male heritage speakers compared to immigrants
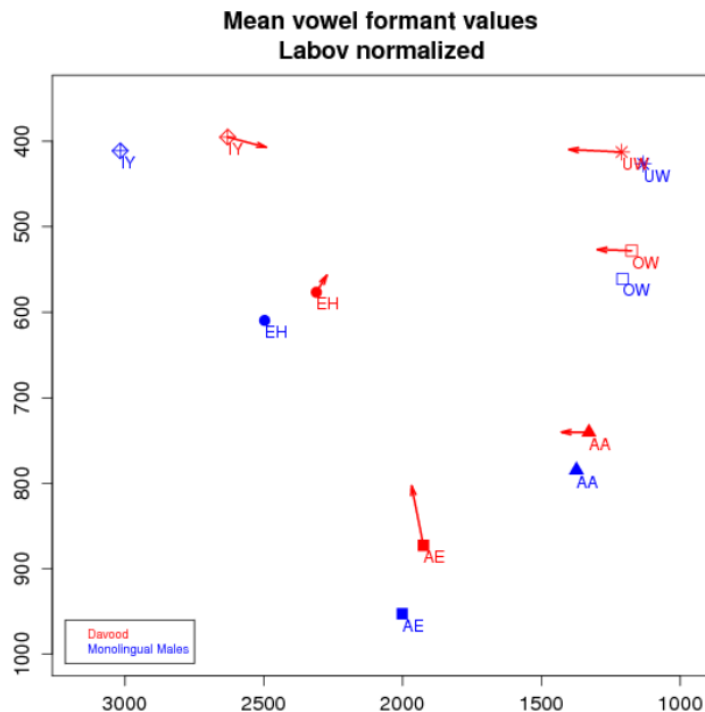
before.

5.1.5 Davood, 69, Norman

Figure 20. Comparison of Davood's Farsi vowels against monolingual males in Iran.

Davood is a male Iranian immigrant who has been living in the US for 49 years. He is in construction business and holds a master's degree in engineering. He has lived in Norman part of his life and part of his life in California. He is married to a female Iranian immigrant. He thinks that there is not much to do in Oklahoma, but that is a calm place for him and his family to live in. He spends a lot of hours during a day working. Due to the nature of his job, he is in touch with Americans 95% of his time during a day. He is in close touch with Iranians 5% of his time during a day. He does not like to travel to Iran and he stated that he is "done with Iran." Most of his family members are living in the US in California and not many of them are living in Oklahoma. He really likes the Persian culture and Farsi language and studies history of Persia in his free time. His Farsi level of proficiency is excellent (based on the intuition of the researcher and compared to other immigrant participants), yet he has a slight, but not very noticeable, English-influenced accent in his Farsi as far as the researcher can tell. He is glad that he has been living in the US especially after the revolution in Iran which took place in 1979. He immigrated to the US based on a scholarship that he was awarded by the government of the time and when he graduated in the US the revolution took place in Iran and he decided to stay in the US. Based on his demographic information, he states that he speaks English 50% of his time to Americans and also his daughter and in Farsi for 50% of his time during a day to his wife and his mother in-law who is living with them. He really likes Persian food and he really likes to attend Persian cultural events in Oklahoma, especially poetry recitals. He really likes to be an Iranian and really misses the time of the Shah before the revolution when he was a teenager.

As can be observed in figure 20, which is his individual plot compared to the male monolinguals in Iran, his vowels are relatively in the same place as the monolinguals. It can also be observed that his Farsi vowel system is not affected by his English system. His /i/ is a little bit backer than the monolinguals. This has been observed in the aggregate vowel plot for all male immigrants compared to monolinguals before.

5.1.6 Reza, 63, Norman
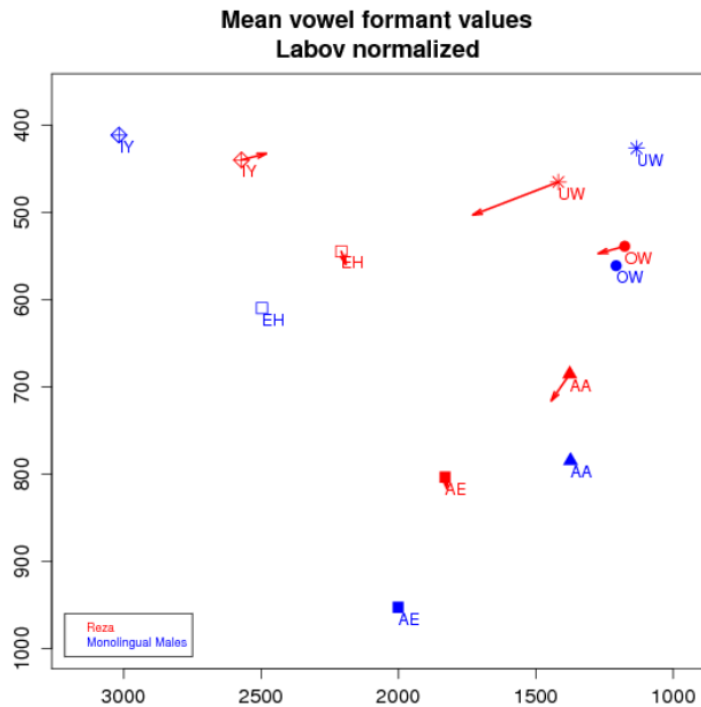

Mean vowel formant values
Labov normalized

Figure 21. Comparison of Reza's Farsi vowels against monolingual males in Iran.

Reza is a male Iranian immigrant who has been living in the US for 41 years. He is in

construction business and holds a master's degree in engineering. He has lived in Norman most of

his life. He is married to a female Iranian immigrant and has two male children. He thinks that

there is not much to do in Oklahoma, but that Oklahoma has a great potential for business growth.

He owns a massive construction business which he operates with his family. He spends a lot of

hours during a day working. Due to the nature of his job, he is in touch with Americans 25% of

his time during a day. He is in close touch with Iranians 75% of his time during a day. As he

states he has created "a bubble" for himself and his family and close relatives which helps them

in keeping their close contact with each other. That is why he speaks Farsi a lot during a day. He

travels to Iran very often and he really likes to help charity organizations in Iran. Most of his

family members are living in the US in Oklahoma. He also has many distant relatives in Iran that

he pays a visit to when traveling to Iran. He really likes the Persian culture and Farsi language

and studies history of Persia in his free time. He still listens to traditional Farsi music and loves Farsi poetry. His Farsi level of proficiency is excellent (based on the intuition of the researcher and compared to other immigrant participants), and he does not seem to have any English-influenced accent in his Farsi. He is glad that he has been living in the US especially after the revolution in Iran which took place in 1979. Based on his demographic information, he states that he speaks English 20% of his time to Americans and in Farsi for 80% of his time during a day to his wife and his heritage children. He also speaks Farsi to many co-workers who are Iranians as well. He really likes Persian food and likes to attend as well as hold Persian cultural events in Oklahoma. He is very fond of heritage speakers of Farsi and wants them to learn as much as they can about their ancestral culture and language. He really likes to be an Iranian and really misses the time of the Shah before the revolution when he was a teenager.

As can be observed in figure 21, which is his individual plot compared to the male monolinguals in Iran, his vowels are relatively in the same place as the monolinguals. It can also be observed that his Farsi vowel system is not affected by his English system. His /i/ is a little bit backer than the monolinguals. His /u/ is a little bit fronter but still close to the Farsi /u/ produced by monolinguals. His /ɒ/ is a little bit higher but still close to the Farsi /ɒ/ produced by monolinguals. His vowel /e/ is little bit backer and a little bit higher than monolinguals and his /æ/ is little bit higher, but these differences have been observed in the aggregate vowel plot for all male immigrants compared to monolinguals before.

5.1.7 Fariba, 61, Tulsa

Figure 22. Comparison of Fariba's Farsi vowels against monolingual females in Iran.
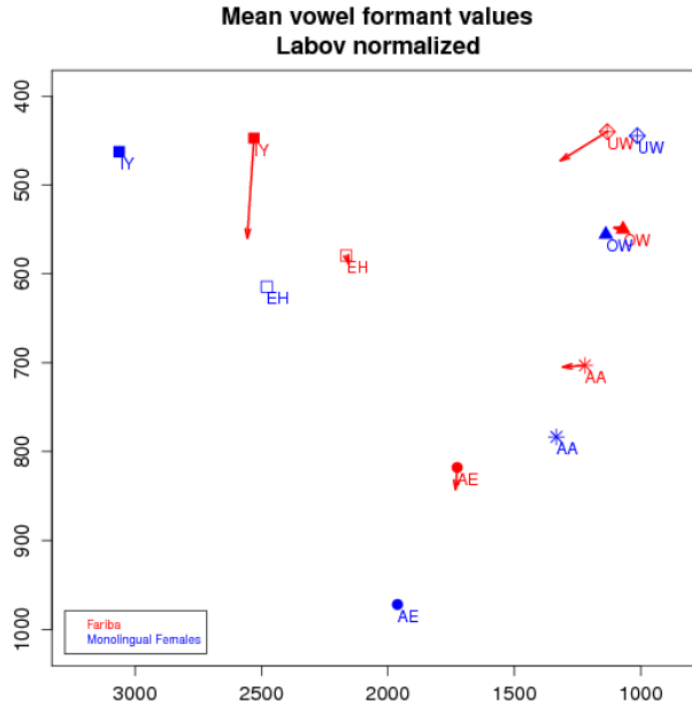
Fariba is a female Iranian immigrant who has been living in the US for 30 years. She and her

husband own a restaurant. She has lived in Tulsa most of her life. She is married to a male Iranian

immigrant and has two children. She spends a lot of hours during a day working in her restaurant.

Due to the nature of her job, she is in touch with Americans 25% of her time during a day. She is

in close touch with Iranians and Iranian-Americans 75% of her time during a day. She teaches a

voluntary Farsi class intended for heritage speakers of Farsi. As she states she does not need to

use English a lot during a day. She speaks Farsi to her husband who is her colleague. She also

speaks Farsi to her children. She is in touch with her relatives in Iran and her relatives in the US

and normally she speaks in Farsi with them. She really likes to travel to Iran, but she is unable to

do so due to the nature of her job which requires her constant presence. She also has many distant

relatives in Iran that she talks to over the phone. She really likes the Persian culture and Farsi

language and that is the reason for her to volunteer to teach Farsi to heritage speakers. She still

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listens to traditional Farsi music and loves Farsi poetry especially the poems of Rumi, a 13th-century Persian poet. Her Farsi level of proficiency is excellent (based on the intuition of the researcher and compared to other immigrant participants), and she does not seem to have any English-influenced accent in her Farsi. She is glad that she has been living in the US especially after the revolution in Iran which took place in 1979. Based on her demographic information, she states that she speaks English 50% of her time to Americans and in Farsi for 50% of her time during a day to her husband and her heritage children. She really likes Persian food and likes to attend Persian cultural events in Oklahoma. She is very fond of heritage speakers of Farsi and wants them to learn as much as they can about their ancestral culture and language. She really likes to be an Iranian and really misses the time of the Shah before the revolution when she was younger.

As can be observed in figure 22, which is her individual plot compared to the female monolinguals in Iran, her vowels are relatively in the same place as the monolinguals. It can also be observed that her Farsi vowel system is not affected by her English system. Her /i/ is a little bit backer than the monolinguals. Her /u/ and /o/ are relatively in the same place as the ones produced by monolinguals. Her /ɒ/ is a little bit higher but still close to the Farsi /ɒ/ produced by monolinguals. Her vowel /e/ is little bit backer and a little bit higher than monolinguals but this difference has been observed in the aggregate vowel plot for all female immigrants compared to monolinguals before.

The only observable difference which has not been seen in the aggregate vowel plot is her /æ/ which is a little bit higher than the monolinguals. It is relatively in the same place as male heritage speakers of Farsi. This could be explained based on her demographic information. She stated that she teaches Farsi to heritage speakers and that she is in close contact with them for at least 2 hours each day.

5.1.8 Ladan, 49, Tulsa
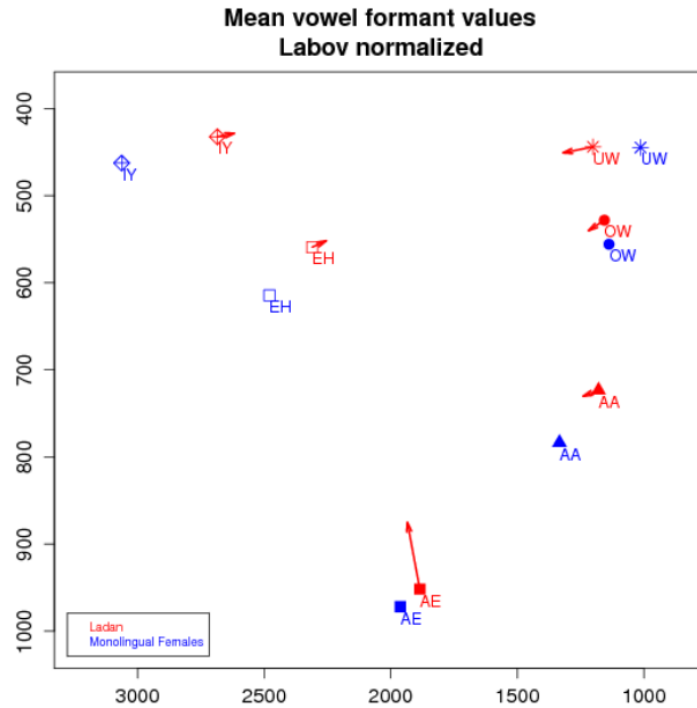
Figure 23. Comparison of Ladan's Farsi vowels against monolingual females in Iran.

Ladan is a female Iranian immigrant who has been living in the US for 25 years. She is a sales

manager at a shop in Tulsa. She has lived in Tulsa most of her life. She is married to a male

Iranian immigrant and has two male children. She spends 8 hours during a day working. Due to

the nature of her job, she is in touch with Americans 20% of her time during a day. She is in close

touch with Iranians and Iranian-Americans 80% of her time during a day. She speaks Farsi and

sometimes English to her husband who is a university professor. She also speaks Farsi and

English to her children. Her children mostly answer her in English. She is in touch with her

relatives in Iran and her relatives in the US and normally she speaks in Farsi with them. She

really likes to travel to Iran, but she is unable to do so due to the nature of her job which requires

her constant presence. She also has many distant relatives in Iran that she talks to over the phone.

She really likes the Persian culture and Farsi language. She still listens to traditional Farsi music

and loves Farsi poetry especially the poems of Rumi, a 13th-century Persian poet. Her Farsi level

of proficiency is excellent (based on the intuition of the researcher and compared to other immigrant participants), and she seems to have a slight English-influenced accent in her Farsi as far as the researcher can tell. She is glad that she has been living in the US especially after the revolution in Iran which took place in 1979. Based on her demographic information, she states that she speaks English 40% of her time to Americans and in Farsi for 60% of her time during a day to her husband and her heritage children. She really likes Persian food and likes to attend Persian cultural events in Oklahoma. She really wants to teach her heritage children Farsi and wants them to know more about their ancestral culture and language but they refuse to do so. Her children are 16 and 18 are still very young. She really likes to be an Iranian and really misses the time of the Shah before the revolution when she was younger.

As can be observed in figure 23, which is her individual plot compared to the female monolinguals in Iran, her vowels are relatively in the same place as the monolinguals. It can also be observed that her Farsi vowel system is not affected by her English system. Her /i/ is a little bit backer than the monolinguals. Her /u/ and /o/ are relatively in the same place as the ones produced by monolinguals. Her /ɒ/ is a little bit higher but still close to the Farsi /ɒ/ produced by monolinguals. Her vowel /e/ is little bit backer and a little bit higher than monolinguals and her /æ/ is relatively in the same place as the monolinguals.

5.2 In summary

As it can be observed in the above vowel plots, the 6 Farsi vowels of the individuals are relatively in the same place as the initial source that they have been exposed to. So, the accent that heritage speakers are believed to have by native speakers of Farsi cannot be because of their vowels. The aggregate vowel plots from the previous chapter as well as the individual vowel plots in this chapter clearly show that this perceived accent is not related to the position of the vowels, and the diverse demographic information and social network of the participants has not had any effect on the production of the vowels.

CHAPTER VI

DISCUSSION

The results of this study suggest that the six Farsi vowels of Persian immigrants and heritage speakers in Oklahoma are not affected by their English vowels because the immigrants' vowel systems were very similar to those of monolingual Farsi speakers in Iran, and second-generation Persian-American heritage speakers' vowel systems were very similar to those of their immigrant parents' generation. Therefore, it can be concluded that the accent that native Farsi speakers perceive in heritage Farsi might have a different source. The source of this perceived accent in heritage speakers could be looked for in consonants such as approximants because of their difference between Farsi and English. It could also be looked for in the prosody of their Farsi or the differing rhythmic patterns of English and Farsi. (English is commonly described as a stress-timed language while Farsi is a syllable-timed language (Windfuhr, 1979)). The accent that native speakers perceive to belong to heritage speakers was said to be similar to "Armenians" in Iran (Dokhtzeynal & Sheikhbahaie, 2020). This perception could be due to the fact that Armenians have been immigrants in Iran for many generations and Iranians do not have a better or different touchstone to compare their perception of heritage speakers' Farsi with. The demographic information of the participants and their diverse social network and ethnic and heritage orientation as well as identity difference does not have an effect on their vowels. Participants do not show variation in their Farsi as far as their vowel systems are concerned, and their English and Farsi vowels can be observed as completely separate systems (Dokhtzeynal, 2020).

Speech style and social network strength may also play roles in heritage Farsi pronunciation. Future work will analyze the more casual conversational speech collected during the interviews for the present study, which will be facilitated by the creation of a forced aligner for Farsi. The analysis of the spontaneous speech may reveal different or similar patterns.

Future studies may also involve collecting data from the large Persian ethnic communities in Los Angeles or Toronto, which may show tighter social networks than the communities in Oklahoma. The results of future studies could be compared against the results of the present study in Oklahoma. This would, in turn, support us in drawing more definite conclusions.

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APPENDICES

APPENDIX A: INTERVIEW QUESTIONS

Questions in English	Questions in Farsi
What is your name?	اسم شما چیه؟
How old are you?	چند سالتونه؟
Do you have brothers and sisters?	خواهر و برادر دارید؟
What is your major?	رشته تحصیلیتون چیه؟
What is your father's job?	شغل پدر چیه؟
What is your mother's job?	شغل مادر چیه؟
Is your father Iranian or not?	آیا پدر ایرانی هستند یا نه؟
Is your mother Iranian or not?	آیا مادر ایرانی هستند یا نه؟
Where were you born?	کجا به دنیا آمدید؟
Where did you go to school?	کجا مدرسه رفتید؟
What languages do you speak?	به چه زبان هایی صحبت می کنید؟
When did you start speaking the languages that you know?	چه زمانی شروع به صحبت زبان ها کردید؟
Do you have relatives in Iran?	آیا اقوام در ایران دارید؟
Do you travel to Iran and meet relatives?	آیا به ایران سفر می کنید و اقوام را می بینید؟
What is your idea about Persian (Iranian) culture and Farsi (language)?	نظر شما نسبت به فرهنگ ایران و زبان فارسی چیه؟
Do you read books in Farsi? What is your favorite book in Farsi?	آیا کتاب به فارسی می خوانید؟ کتاب مورد علاقتون چیه؟
Do you read Persian poems?	آیا شعر فارسی رو می خونید؟
Do you listen to Iranian music (pop, traditional, etc.)?	آیا موسیقی ایرانی (پاپ و سنتی) و فارسی گوش می دهید؟
Do you watch Iranian movies? If yes, name some.	آیا فیلم فارسی نگاه می کنی؟ لطفا نام ببرید.
Do you know any songs or poems in Farsi?	آیا شعری به فارسی بلد هستید که بخونید؟
What is your favorite Iranian food?	غذای مورد علاقه ایرانی شما چیست؟
If you have travelled to Iran, which cities and places have you visited?	اگر به ایران سفر کردید از چه شهرها و مکان هایی دیدن کردید؟
Do you talk to your relatives in Farsi or not?	آیا با اقوام فارسی صحبت می کنید یا نه؟
Name some items in your home such as paintings, etc. which shows Persian and Iranian culture.	چیزهایی که در خانه خود دارید که فرهنگ ایران را می رساند نام ببرید.

English	Farsi
Are you learning Farsi language by going to class?	آیا داری زبان فارسی را با کلاس رفتن یاد می گیری؟
Are your friends more Iranian or Foreign?	ایا بیشتر دوست ایرانی دارید یا خارجی؟
Do you speak Farsi when talking to your parents or not?	آیا با پدر و مادر فارسی صحبت می کنید؟
Do you attend Iranian and Persian cultural events in America such as Nowruz (The Persian new year)?	ایا در مراسم های ایرانی در امریکا شرکت می کنید مثل نوروز؟
What do you know about Iran's past? What have your family told you about Iran's past?	از گذشته ایران چی میدونی؟ خانوادت از ایران چی برات گفتن؟
What memories do you have of Iran?	خودت چه خاطره ای از ایران داری؟
What do you (dis)like about Iran?	چیا از ایران برات جالبه و چیو دوست نداری؟
Do you have friends in Iran?	آیا دوست در ایران داری؟
Which neighborhoods have you visited in your parent(s)' hometown?	کدام محله های شهر محل زندگی پدر و مادرت را دیدی؟

APPENDIX B: WORD LIST

I am going to show some words on the computer. If you do not know the orthography of the word in Farsi, I encourage you to look at its English equivalent and try to pronounce its Farsi equivalent. Please, take your time and then pronounce the word. Then, I will hit a button to have it move to the next screen.

you – تو - /to/	nine – نُه /noh/	day – روز – /ruz/
two – دو - /do/	ten – دَه - /dæh/	secret – راز – /rɒz/
three – سه – /se/	six – شِش – /ʃeʃ/	table – میز – /miz/
until – تا - /tɒ/	king – شاه – /ʃɒh/	goose – غاز – /ʁɒz/
we – ما - /mɒ/	village – دِه – /deh/	goat – بُز – /boz/
with – با - /bɒ/	shower – دوش – /duʃ/	Gaz (a kind of confectionary) – گَز - /gæz/
road – جاده – /dʒɒdde/	ear – گوش – /guʃ/	
smell – بو - /bu/	lip – لَب – /læb/	cow – گاو – /gɒv/
that – کِه - /ke/	quick – زود – /zud/	beige – بِژ – /beʒ/
without – بی - /bi/	one hundred – صَد - /sæd/	I – مَن – /mæn/
no – نَه - /næ/	chimney – هود – /hud/	door – دَر - /dær/
Iran – ایران – /irɒn/	fertilizer – کود – /kud/	snake – مار – /mɒr/
Iranian – ایرانی - /irɒni/	smoke – دود - /dud/	partner – یار – /jɒr/
Persia – پارس – /pɒrs/	shout – داد - /dɒd/	bread – نان – /nɒn/
Persian – پارسی - /pɒrsi/	saw – دید – /did/	light – نور – /nur/
king of Iran – شاهِ ایران - /ʃɒh e irɒn/	was – بود – /bud/	flower – گُل - /gol/
	wind – باد – /bɒd/	mud – گِل - /gel/
cheek – لُپ - /lop/	bad – بَد – /bæd/	strength – زور – /zur/
one – پِک - /jek/	apple – سیب – /sib/	blood – خون – /χun/
chique – شیک - /ʃik/	sleep – خواب – /χɒb/	woman – زَن – /zæn/
coat – کُت - /kot/	wood – چوب – /tʃub/	work – کار – /kɒr/
chalk – گچ - /gætʃ/	land – مُلک – /molk/	load – بار – /bɒr/
empty – پوک - /puk/	Man – مَرد – /mærd/	thorn – خار – /χɒr/
gas tank – باک – /bɒk/	carpet – فَرش – /færʃ/	garlic – سیر – /sir/
seven – هَفت – /hæft/	bear – خِرس – /χers/	lion – شیر – /ʃir/
love – عِشق – /eʃG/	nap – چُرت – /tʃort/	late – دیر – /dir/
name – اِسم – /esm/	skin – پوست – /pust/	tail – دُم – /dir/
eight – هَشت – /hæʃt/	carry – حَمل – /hæml/	donkey – خَر – /χær/
twenty – بیست – /bist/	yellow – زَرد – /zærd/	cave – غار – /ʁɒr/
hard – سَخت – /sæχt/	five – پَنج – /pændʒ/	blind – کور – /kur/
sixty – شَصت – /ʃæst/	knowledge – عِلم – /elm/	trachea – نای – /nɒj/

wool – پَشم - /pæʃm/	pain – دَرد - /dærd/	when – کِی - /kej/
morning – صُبح - /sobh/	leaf – بَرگ - /bærg/	head – سَر - /sær/
mucus – خِلط - /χelt/	wolf – گُرگ - /gorg/	money – پول - /pul/
warm – گَرم - /gærm/	yogurt – ماست - /mɒst/	green – سَبز - /sæbz/
cubic sugar – قَند - /Gænd/	eyelid – پِلک - /pelk/	lock – قُفل - /Gofl/
hen – مُرغ - /morG/	west – غَرب - /ʁærb/	friend – دوست - /dust/
thief – دُزد - /dozd/	east – شَرق - /ʃærG/	before – قَبل - /Gæbl/
mind – فِکر - /fekr/	trace – رَد - /ræd/	feather – پَر - /pær/
victorious – پیروز - /piruz/	leader – رَهبَر - /ræhbær/	cheese – پَنیر - /pænir/
quiet – آرام - /ɒrɒm/	tablecloth – رومیزی - /rumizi/	final – آخر - /ɒχær/
outside – بیرون - /birun/	boss – رَییس - /ræʔis/	alarm – آژیر - /ɒʒir/
quick – سَریع - /sari/	fox – روباه - /rubɒh/	forced – مجبور - /mædʒbur/
generous – گریم - /kærim/	tiny – ریز - /riz/	grapes – أنگور - /ængur/
fear – هَراس - /hærɒs/	newspaper – روزنامه - /ruznɒme/	path – مَسیر - /mæsir/
butter – کره - /kære/	bandit – راه زن - /rɒhzæn/	meet – دیدار - /didɒr/
dark – تیره - /tire/	length – طول - /tul/	mushroom – قارچ - /Gɒrtʃ/
dust – تُراب - /torɒb/	moon – ماه - /mɒh/	lead – سُرب - /sorb/
hole – سوراخ - /surɒχ/	leather – چَرم - /tʃærm/	cedar – سَرو - /særv/
worm – کِرم - /kerm/	width – عَرض - /ærz/	dish – ظَرف - /zærf/
round – گِرد - /gerd/		

NB: The IPA phonemic representations were not included in the Power Point Slides presented to the participants.

APPENDIX C: DEMOGRAPHIC INFORMATION

Research into the language of Iranian-Americans

About you:

Date of Interview _____

Contact Information:

Name

_____

Address:

_____

Phone (or other contact means)

_____

Demographic Information:

Age (or Date of Birth) _____

Place of birth (State, city) _____

Sex _____

Profession _____

Education _____

1. What percentage of people from the following groups are your close friends and associates now?

A. Americans (White Anglos) _____

B. Iranians (immigrants)_____

C. US-born Iranians _____

D. African-Americans_____

E. Mexican-Americans _____

F. Indian-Americans (originally from India) _____

G. Other _____

2. What percentage of people from the following groups were you in touch with during your childhood and before you started to go to school? (Please consider close friends, cousins, daycare time and / or babysitters)

A. Americans _____

B. Iranians _____

C. Iranian-Americans _____

D. African-Americans _____

E. Mexican-Americans _____

F. Indian-Americans _____

G. Other _____

3. What percentage of the following people did / do you spend most of your time with? In what language did / do you speak with them most of the time? What was / is their occupation? Where were they born?

Mother _____ Language: _____ Occupation: _____ Place of birth:

_____

Father _____ Language: _____ Occupation: _____ Place of birth:

_____

Brother_____ Language: _____ Occupation: _____ Place of birth:

_____

Sister _____ Language: _____ Occupation: _____ Place of birth:

_____

Grandmother (Mother's side)

Language: _____ Occupation: _____ Place of birth: _____

Grandfather (Mother's side)

Language: _____ Occupation: _____ Place of birth: _____

Grandmother (Father's side)

Language: _____ Occupation: _____ Place of birth: _____

Grandfather (Father's side)

Language: _____ Occupation: _____ Place of birth: _____

Close friend # 1_____ Language: _____ Occupation: _____ Place of birth:

_____

Close friend # 2 _____ Language: _____ Occupation: _____ Place of birth:

_____

Close friend # 3 _____ Language: _____ Occupation: _____ Place of

birth: _____

Cousin # 1_____ Language: _____ Occupation: _____ Place of birth:

_____

Other (**)**

Cousin # 2 _____ Language: _____ Occupation: _____ Place of birth:

_____

Other (**)**

Cousin # 3 Language: _____ Occupation: _____ Place of birth: _____

Other (**)**

Cousin # 4 Language: _____ Occupation: _____ Place of birth: _____

4. What percentage of the food you eat is of the following types?

A. American: _____

B. Persian: _____

C. Mexican: _____

D. Others: _____

5. What percentage of your readings is in the following languages? Feel free to add

any other languages you might know.

English: _____

Farsi: _____

Spanish: _____

Other: _____

6. What percentage of your listening is in the following languages? Feel free to add

any other languages you might know.

English: _____

Farsi: _____

Spanish: _____

Other: _____

7. What percentage of your speech is in the following languages? Feel free to add any other languages you might know.

English: _____

Farsi: _____

Spanish: _____

Other: _____

8. What percentage of the movies you watch, or the music you listen to is in the following languages?

English: _____

Farsi: _____

Spanish: _____

Other: _____

9. What percentage of the events you attend have the following cultural themes?

American: _____

Persian: _____

Spanish: _____

Other: _____

APPENDIX D: CONSENT FORM

Consent Form — How Iranian-American Speakers Speak their Heritage Language, Farsi

Researchers: Masoud Sheikhbahaie

This is a study of how Iranian-American speakers talk when they speak their heritage language, Farsi. In this study, we are not at all interested in "right" and "wrong" and would never refer to the results of this research that way. We are fascinated by the way language changes from place to place, and our study will contribute to the scientific knowledge of language and our ability to advise people in education, the law, and other public domains that are concerned with language. I would be happy to discuss these objectives with you before your decision to participate or during or after the interview.

I will record your speech and ask questions about what you think about language. I will also ask you about your life history in order to collect demographic information. I will ask you to read a list of words in Farsi and also a short text if you can read Farsi and if you are comfortable doing so. This interview should take no more than an hour. Your participation is completely voluntary, and you may choose not to participate at all, or you may refuse to participate in certain parts of the interview, refuse to answer certain questions, or stop participating at any time, and you can ask me to stop recording at any time. There are no known risks associated with this project which are greater than those ordinarily encountered in daily life, and nothing that affects you would result if you decide not to participate in whole or in part.

Any written or publicly presented results will discuss group findings, not information that would identify you. All research records will be stored permanently in a locked file cabinet at Oklahoma State University and the voice-recordings will be stored indefinitely on a password-protected computer and only the Primary Investigator or Co-Primary Investigator(s) and individuals responsible for research oversight will have access to them. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research. We may play your recorded voice as part of our reports at academic conferences, on academic websites, or in academic videos. If at any time after you have completed this interview, you would like to withdraw, we will destroy your recording.

If you have concerns or questions about this study, such as scientific issues, how to do any part of it, please contact Masoud Sheikhbahaie, Oklahoma State University, (405) 269-6855 or masoud.sheikhbahaie@okstate.edu. You may also contact Dr. Dennis R. Preston, Oklahoma State University, (405) 744-3631 or dennis.preston@okstate.edu.

If you have questions about your rights as a research volunteer or would simply like to speak with someone other than the research team about concerns regarding this study, please contact the IRB at (405) 744-3377 or irb@okstate.edu. All reports or correspondence will be kept confidential.

I have read and fully understand this form. I sign it freely and voluntarily. A copy has been given to me.

_____

Signature of Participant   Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____

Signature of Researcher   Date

VITA

Masoud Sheikhbahaie

Candidate for the Degree of

Master of Arts

Thesis: A SOCIOPHONETIC ANALYSIS OF FARSI VOWEL SYSTEMS AMONG
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Completed the requirements for the Master of Arts in English at Oklahoma
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