The Effect of Heritage on Canadian Shift in Vancouver

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Abstract

Modern urban communities are inherently heterogeneous (Nagy and Meyerhoff 2008), yet sociolinguistic studies often focus on the white majority (Trudgill 1974, 1986, Labov 2001), or treat different ethnic groups as distinct communities and identify divergent patterns (Horvath 1991, Santa Ana and Parodi 1998). Relatively few studies so far have looked at the participation of speakers with ethnic backgrounds in on-going sound changes that characterize the founding community (Boberg 2004, Roeder 2009, Hoffman and Walker 2010, Wong and Hall-Lew 2014, Riebold 2015). The current study investigates the status of the Canadian Shift (Clarke, Elms, and Youssef 1995, Pappas and Jeffrey 2013) among the four largest heritage groups in Vancouver. Forty-seven speakers stratified according to heritage group (British/mixed European, Chinese, Filipino, and South Asian) and gender took part in sociolinguistic interviews and word list reading designed to elicit the major allophonic patterns of vowels in Canadian English (Boberg 2008). Formant analyses of 1,813 tokens from the word list were conducted in Praat using the methods by Labov, Ash, and Boberg (2006). Results based on linear mixed effects regression models reveal that all four groups participate in the Canadian Shift as defined in Boberg (2008). We also find significant differences in specific dimensions of the change for each vowel, which perhaps are used by the different groups in the construction of ethnic identity.
The Effect of Heritage on Canadian Shift in Vancouver
Irina Presnyakova, Pocholo Umbal, and Panayiotis A. Pappas

1 Introduction

Modern urban communities are inherently heterogeneous, rarely have distinct ethnic boundaries within them, and are exceedingly multilingual. Nagy and Meyerhoff (2008:1) argue that most of the world speech communities today are multilingual, which is especially true of large urban centers like London, Berlin, Paris, Copenhagen, Mexico City, New York City, San Francisco, Toronto, Ottawa, and Vancouver, to name just a few. Sociolinguists today face the challenge of describing speech communities of such cities, as well as of sampling their informants from highly mixed ethnic populations represented by several generations of immigrants in addition to “true founder” populations (in North America, speakers of British origin whose families resided in the area for several generations).

The earliest studies that laid the foundation of variationist methodology included different ethnic groups as part of the speech communities under investigation; however, those groups were often quite self-contained and isolated from each other, and the mainstream community and their speakers maintained distinct ethnic identities (e.g., Portuguese and Gay Head Indians in Martha’s Vineyard, Labov 1963). Other early studies focused exclusively on the dominant community, which was most often monolingual and treated as homogeneous (Trudgill 1974). Similarly, later on some researchers preferred to focus only on the speech of the “founding population” (Trudgill 1986, Labov 2001, D’Arcy and Tagliamonte 2010, Sadlier-Brown 2012, Wassink 2015). While it allowed them to avoid any possible interference of the heritage languages, such an approach has been critiqued for having a limited scope because it only gives a partial picture of the dynamics of the entire speech community (Horvath and Sankoff 1987, Kerswill 1994).

Other approaches to sampling urban populations for a study of a multiethnic community include treating separate ethnic groups as distinct speech communities (Hofman and Walker 2010, Nagy, Chociej, and Hoffman 2014); describing discontinuities within the majority communities (Horvath 1991, Mougeon and Nadashi 1998, Santa Ana and Parodi 1998); or treating multiethnic groups as parts of one distinct speech community (this approach seems to be popular in Europe: Kotsinas 2001, Quist 2008, Cheshire et al. 2011; in North America, see Riebold 2015).

The studies that have been conducted up to now in Vancouver follow the “white majority” tradition. Take, for example, The Survey of Vancouver English (SVEN), arguably the most comprehensive description of English spoken in Metropolitan Vancouver to date, which, since its compilation, has been a source of data for many studies on Vancouver English (de Wolf 2004, Esling 2004, Murdoch 2004, etc.). While not explicitly discussed, it appears that the SVEN sample is biased towards Anglo-Canadian speakers: On the stage of the selection of areas of the city for the study, “districts with a high percentage of non-English speaking residents were automatically excluded” (Gregg 2004:7). 75% of the informants for SVEN had grandparents who spoke English as first language; 78% of informants spoke only English, 15% English and French, and 6% English, French, and Spanish.

Some other work on Vancouver English that follows this tradition include studies by Gregg (1957), Scargill and Warkentyne (1972), Chambers and Hardwick (1986), Sadlier-Brown (2012), and Pappas and Jeffrey (2013), as well as several comparative studies of regional varieties of Canadian English by Sadlier-Brown and Tamminga (2008), Gold (2008), Boberg (2008), and Swan (2016). A notable exception is the Vancouver Survey by Dollinger (2012) that includes a more diverse population in its sample.

According to Statistics Canada (Statistics Canada 2017a), today immigrants (born outside Canada) comprise more than 40% of the Metropolitan Vancouver population. And if we combine first- (foreign-born) and second- (those who have at least one foreign-born parent) generation immigrants, we get the staggering number of 67.9% (Statistics Canada 2017b). Here more than anywhere is relevant Kerswill’s (1994:23) suggestion that studies that focus only on the “founding population” are not really explorations of the larger speech communities, although they claim to be so, but “studies of smaller groups which are delimited on a particular criterion, that of ‘nativeness.’” The results
of such studies then should not be generalized in the way they are often done.

It should be noted also that if speakers with different ethnic backgrounds are included in the studies, the focus is more often on features that distinguish the speech of recent immigrant descendants from that of speakers from the founding community. For example, Dorian (1980) discusses ethnic markers, and Clyne (2000) and Wölck (2002) examine ethnolects, the varieties of the mainstream language spoken by ethnic groups. Other studies, such as Santa Ana 1996, have looked at how heritage speakers have different constraints on stable variables of the founders’ language (e.g., t/d deletion in Chicano English), whereas more recently (Fought 2003, Benor 2010) there has been a shift towards investigating the construction of ethnolinguistic repertoires with which the members of the ethnic groups index their identity.

Relatively few studies so far have looked at the participation of speakers with ethnic backgrounds in changes in progress that characterize the founding community. Horvath (1991) argues that in Sydney, the teenaged children of Italian immigrants were leading the shift away from the broad variety and towards the general one, whereas Greek teenagers (also second-generation) were maintaining the cultivated variety, which even Anglo-Celtic teenagers were moving away from. Boberg (2004) found that in Montreal English, speakers of Jewish heritage raise the nucleus of the diphthong /æw/ before a voiceless consonant; in other words, they participate in Canadian Raising, whereas speakers of Italian heritage do not. Hoffman and Walker (2010) discuss how the Canadian Shift pattern of second-generation speakers of Italian and Chinese heritage is almost identical to that of British heritage speakers who are descendants of the founding population. Wong and Hall-Lew (2014) focus on the BOUGHT vowel in New York City and San Francisco and show that Chinese Americans’ pronunciation of this vowel reflected the progression of the sound change in their respective regions. Finally, Riebold (2015) discusses the merger of the pre-velar /æg/, /æg/, and /æg/ among Japanese American, Mexican American and Yakama Nation speakers in Seattle. His main finding is that the speakers from the three non-white ethnic groups participate to varying degrees in the changes observed for Caucasian speakers.

Our report aims to add to the body of knowledge on the Canadian Shift and ethnic minorities’ participation in changes of the language of the mainstream community, by comparing the patterns of speakers from the four largest heritage groups in Vancouver: British/mixed European, Cantonese, South Asian, and Filipino. The Canadian Shift involves the systematic lowering and/or retracting of the vowels /æ/, /e/, and /i/, in response to the cot-caught merger (Clarke, Elms, and Youssef 1995). Labov, Ash, and Boberg (2006) define the shift as an F2 of /æ/ being less than 1825 Hz, an F1 of /e/ being greater than 650 Hz, and an F2 of /o/ being less than 1275 Hz. The Canadian Shift is a widespread, on-going sound change (Boberg 2008) affecting both urban and rural communities.

In spite of the robust presence of the Canadian Shift in Vancouver, there are only a few studies investigating the linguistic and social conditioning of the shift (Hirayama 2000, Sadlier-Brown and Tamminga 2008, Pappas and Jeffrey 2013). These studies reveal that /æ/ is furthest along the shift, followed by /e/. Only Hirayama (2000) and Sadlier-Brown and Tamminga (2008) report the start of /i/-shifting. Among the Vancouver speakers, Pappas and Jeffrey (2013) show that all twelve speakers exhibit /æ/-retraction; ten out of twelve exhibit /e/-lowering, but all produce /e/-retraction. In terms of the social parameters, it is the younger speakers that are more advanced, with both males and females showing a greater degree of /æ/-retraction and both /e/-retraction and lowering. However, whereas males seem to have already caught up with females in terms of /æ/ they are still lagging behind females with respect to /æ/, indicating that this vowel is still undergoing change.

We draw from two parallel projects which were initiated at SFU as post-graduate theses and are inspired by the research conducted by Boberg (2004), Nagy, Chociej, and Hoffman (2014), Hoffman (2010), and Hoffman and Walker (2010), which has examined the English production patterns of ethnic minorities and heritage speakers in the two other metropolises of Canada, Montreal and Toronto. The report is also a response to the call put out by Hall-Lew and Yaeger-Dror (2014) to extend the scope of studies into the intersection between language and ethnicity to other minority communities as well. The comparison shows that the four largest groups of heritage speakers in Vancouver all participate in the Canadian Shift in terms of the threshold values mentioned above. At the same time, we do find significant differences in specific dimensions of the change.

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1The variables follow Labov, Ash, and Boberg’s (2006) and Boberg’s (2008) notation for ease of comparison.
for each vowel, which, perhaps, are used by the different groups in the construction of ethnic identity.

2 Diversity in Vancouver

Vancouver’s profile as a multicultural and multiethnic center is the result of the several distinct waves of immigration to the Canadian West, which started, according to Chambers (1991), with American loyalists arriving to BC in the second half of the eighteenth century, followed by British settlers in the middle of the nineteenth century, European and British migrants in the beginning of the twentieth century, and global migrants from all over the world starting in the middle of the twentieth century and continuing to this day.

According to the Canada Census, in 2016, the population of the Metro Vancouver comprised 2,426,235 people, including 989,540 immigrants (Statistics Canada 2017a). Interestingly, 38.7% of the Metro Vancouver population reported multiple ethnic origins; that is, with parents having different ethnic backgrounds. More than 200 different, non-North American, ethnic origins are represented in the city, with more than 150 non-aboriginal, non-English, and non-French languages spoken as the mother tongue. Residential segregation is rather moderate: Hiebert (2009:33) reports that even in “White dominant” areas of Metro Vancouver, 34% of residents are recent immigrants; similarly, neighborhoods known for predominance of one ethnic group (e.g., Chinese in Richmond and South Asian in Surrey) still have a very large proportion of people with diverse ethnic backgrounds.

The majority of immigrants to Metro Vancouver are from China (19.1%), India (12.7%), the Philippines (9.8%), and Hong Kong (7.2%). 142,535 newcomers arrived to Metro Vancouver since the last census (2011–2016), and among those, immigrants from Iran and South Korea hold fourth and fifth place after China, India and the Philippines (Statistics Canada 2017a). In 2016, 57.1% of people living in Vancouver reported English as their mother tongue and 44.7% an immigrant language as their mother tongue. Among the non-official languages reported as mother tongues, Chinese languages taken together account for about 37.7% (including 22.3% Mandarin and 21.3% Cantonese), Indo-Aryan 12.5% (predominantly Punjabi at 10.3%; Hindi accounts for 3.9%) and Tagalog accounts for 6.5%. Other language with the most speakers include, in the declining order, Korean, Persian, Spanish, German, and Vietnamese (Statistics Canada 2017a).

3 Methodology

3.1 Participants and Data

The results reported here are based on the analysis of the data collected by the first author focusing on speakers of British, South Asian and Chinese heritage in Vancouver and the work completed by the second author for his Master’s thesis on the Filipino community of Vancouver. Both studies follow the model of Hoffman and Walker (2010), who compared the usage of three mainstream variables across different groups of heritage speakers and concluded that the pattern of variation that they observe is mostly the result of the construction of ethnic identity, and not of imperfect learning of the standard.

As our aim was to compare the Canadian Shift pattern of the most prominent heritage groups in Vancouver, the dataset for this report was constructed from speakers with British/mixed European, Cantonese, South Asian, or Filipino heritage. Filipino speakers were recruited from the family and friends network of the second author, while all others were recruited among students at Simon Fraser University. The British heritage speakers are all third-generation Canadians born in Vancouver. The other groups are second-generation Canadians, who were either born in Vancouver or moved to the city before the age of 5, with the exception of two Filipino speakers who arrived at the ages of 10 and 12. The average age of participants is a little less than 21 years. Table 1 provides details about the number and gender of the participants from each group.

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2 The term 'Immigrants' includes persons who are, or who have ever been, landed immigrants or permanent residents. Immigrants who have obtained Canadian citizenship by naturalization are included in this category. In the 2016 Census of Population, 'Immigrants' includes persons who landed in Canada on or prior to May 10, 2016 (Statistics Canada 2017a).
Table 1: Classification of participants.

In terms of their linguistic background, most of the participants reported having been exposed to their heritage languages to varying degrees in their childhoods. The degree of bilingualism varies greatly, as well as that of formal instruction in a heritage language. Many speakers reported speaking their heritage languages with their grandparents who looked after them while they were children and attending heritage language schools while in elementary school. All the participants are fluent speakers of English and they all self-identified as native speakers during the recruitment stage.

Data collection consisted of recorded sociolinguistic interviews which covered a wide variety of topics but also focused on issues of heritage. Based on questionnaires by Hoffman and Walker (2010) and Nagy, Chociej, and Hoffman (2014), we engaged participants in discussion about their family and local networks, use of their heritage languages, visiting relatives abroad, and celebrations, as well as their own perceptions of their identities. At the end, the participants were asked to read the word list used in Boberg (2008), which comprises 145 lexical items designed to elicit the major allophonic pattern of vowels in Canadian English.

3.2 Analysis

The results reported today are based on the analysis of 1,813 tokens found in the word list. Following the methods laid out in the ANAE by Labov, Ash, and Boberg (2006) and Boberg (2008, 2010) for the Phonetics of Canadian English project, the tokens were subjected to acoustic analyses using linear predictive coding (LPC), and measurements were conducted using Praat. The measurements for F1 and F2 were taken according to the algorithm described in Boberg (2008:134): We placed the cursor at the maximal value of F1 for vowels whose main articulatory gesture is tongue lowering and raising, while for vowels where the tongue moves in a horizontal direction, we measured at a point of inflection in F2. Otherwise, the cursor was placed in the middle of the steady state of the vowel. The resulting values were normalized using the Nearey’s (1978) method, which is also used by Boberg (2008), so that we can compare our results to those from the rest of Canada reported in Boberg (2010). Vowel plots were created using Rbrul 3.1.1.

4 Results

Figure 1 presents the short vowel means for each group, and it shows that all four groups clearly participate in the Canadian Shift as defined by Boberg (2008:130). All groups have an F1 for /e/ that is above 650 Hz, an F2 for /æ/ that is below 1825 Hz, and an F2 for /o/ that is below 1275 Hz. There is also evidence of the double merger of /o/, /oh/, and /ah/ in the low back position described by Boberg (2010:147) in Standard Canadian English.

In order to determine whether there are any vowel differences by GENDER or HERITAGE GROUP we first tested for interaction between these two factors and TYPE OF VOWEL, in separate runs for F1 and F2. We used the package Rbrul 3.1.1, using the formula seen in Table 2, including random intercepts and slopes for SPEAKER and WORD. The results show that for F1, there is indeed significant interaction between HERITAGE and TYPE OF VOWEL, but not between GENDER and TYPE OF VOWEL. For F2, on the other hand, both interactions are significant.

On the basis of these results, we conducted separate runs for F1 and F2 for the vowels /i/, /e/, /æ/, and /o/ with HERITAGE and GENDER as fixed variables, random intercepts for SPEAKER and WORD, and a random slope for WORD. The only vowel where there are no significant differences for either formant is /o/. We present the detailed results for each of the other vowels in the following tables.
Figure 1: Short vowel system across heritage groups.

Table 2: LMM for four vowels of the Canadian English Short vowel system (/i/, /e/, /æ/, /o/).

<table>
<thead>
<tr>
<th></th>
<th>Total N</th>
<th>d.f.</th>
<th>Intercept</th>
<th>G mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F1: Model Basics</strong></td>
<td>1813</td>
<td>55</td>
<td>705.4</td>
<td>708.9</td>
</tr>
<tr>
<td>Deviance</td>
<td>20384.21</td>
<td>AIC</td>
<td>20317.16</td>
<td>R² fixed</td>
</tr>
<tr>
<td><strong>F1: Predictors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heritage * Vowel</td>
<td>15</td>
<td>-2.55</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>Gender * Vowel</td>
<td>5</td>
<td>-2.79</td>
<td>0.205</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the results of the mixed effects model for the high front vowel /i/. The only significant effect is that of HERITAGE for F2, that is, in terms of retraction. The Tukey-Kramer HD post-hoc tests show that the main driver of this effect is that Cantonese speakers, with a mean F2 value of 1969 Hz, are retracting /i/ significantly more than the other three groups, whose mean F2 values range from 2049 to 2123.
changes in progress (e.g., Canadian Raising and of that lead women in retraction. and Filipino women lead the most, and S. Asian speakers the least, and there is also interaction with of /æ/. In the case of each vowel and Hall itself, this finding strengthens the idea of treating speakers with heritages other than British or American English and Boberg (2008 Canadian Shift in terms of the threshold values posited by Labov et al.), our results show that there is significant difference in specific dimensions of the change for /æ/, Table 4 shows that the only significant effect for F1 (lowering) is GENDER, as women lower this vowel more than men (p = 0.04). In the model for F2 (retraction), we see that both HERITAGE (p = 0.02) is significant and GENDER (p = 0.058) is at the threshold for significance, but there is also significant interaction between them (p = 0.04). The Tukey-Kramer HD post-hoc tests suggests that the HERITAGE difference is based on the opposition between South Asian speakers who retract the least and Chinese speakers who retract the most. In terms of GENDER, we see that female speakers lead in retraction. Furthermore, as can be seen in Figure 2, the interaction between HERITAGE and GENDER is based on the fact that for South Asians, males retract /æ/ more than women.

Finally, for /e/, HERITAGE is significant in terms of lowering (F1, p = 0.006). The Tukey-Kramer HD post hoc tests indicate that it is Filipino speakers who lead all other groups, with an F1 value of 930 Hz. GENDER is significant in retraction (F2, p = 0.0001), with female speakers leading once again, with an F2 of 1674 Hz as opposed to 1777 Hz for men.

<p>| F1/F2 ~ Heritage * Gender + (1 | Speaker) + (Gender | Word) |</p>
<table>
<thead>
<tr>
<th>F1: Model Basics</th>
<th>Total N</th>
<th>d.f.</th>
<th>Intercept</th>
<th>G Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>375</td>
<td>13</td>
<td>537.4</td>
<td>534.8</td>
</tr>
<tr>
<td>F1: Model Fit</td>
<td>Deviance</td>
<td>AIC</td>
<td>R² fixed</td>
<td>R²</td>
</tr>
<tr>
<td></td>
<td>4205.5</td>
<td>4177.7</td>
<td>0.05</td>
<td>0.57</td>
</tr>
<tr>
<td>F1: Predictors</td>
<td>d.f.</td>
<td>AIC if dropped</td>
<td>p value</td>
<td></td>
</tr>
<tr>
<td>Heritage</td>
<td>3</td>
<td>-0.71</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>-1.9</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>Heritage * Gender</td>
<td>3</td>
<td>-2.5</td>
<td>0.32</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>F2: Model Basics</th>
<th>Total N</th>
<th>d.f.</th>
<th>Intercept</th>
<th>G Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>375</td>
<td>13</td>
<td>2053.8</td>
<td>2052.3</td>
</tr>
<tr>
<td>F2: Model Fit</td>
<td>Deviance</td>
<td>AIC</td>
<td>R² fixed</td>
<td>R²</td>
</tr>
<tr>
<td></td>
<td>4768.6</td>
<td>4729.5</td>
<td>0.09</td>
<td>0.51</td>
</tr>
<tr>
<td>F2: Predictors</td>
<td>AIC if dropped</td>
<td>p value</td>
<td>Levels</td>
<td>Count</td>
</tr>
<tr>
<td>Heritage</td>
<td>+8.77</td>
<td>0.001</td>
<td></td>
<td>British</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Canton.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Filipino</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S. Asian</td>
</tr>
<tr>
<td>Gender</td>
<td>-1.81</td>
<td>0.93</td>
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</tr>
<tr>
<td>Heritage * Gender</td>
<td>-5.03</td>
<td>0.8</td>
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<table>
<thead>
<tr>
<th>F2: Tukey-Kramer HD</th>
<th>S. Asian</th>
<th>British</th>
<th>Filipino</th>
<th>Canton.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Asian</td>
<td>-74.01</td>
<td>-14.95</td>
<td>3.14</td>
<td>81.91</td>
</tr>
<tr>
<td>British</td>
<td>-14.95</td>
<td>-62.83</td>
<td>-44.93</td>
<td>33.71</td>
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<tr>
<td>Filipino</td>
<td>3.14</td>
<td>-44.93</td>
<td>-67.56</td>
<td>11.14</td>
</tr>
<tr>
<td>Canton.</td>
<td>81.91</td>
<td>33.71</td>
<td>11.14</td>
<td>-70.57</td>
</tr>
</tbody>
</table>

Table 3: LMM results for /i/.

For the vowel /e/, Table 4 shows that the only significant effect for F1 (lowering) is GENDER, as women lower this vowel more than men (p = 0.04). In the model for F2 (retraction), we see that both HERITAGE (p = 0.02) is significant and GENDER (p = 0.058) is at the threshold for significance, but there is also significant interaction between them (p = 0.04). The Tukey-Kramer HD post-hoc tests suggests that the HERITAGE difference is based on the opposition between South Asian speakers who retract the least and Chinese speakers who retract the most. In terms of GENDER, we see that female speakers lead in retraction. Furthermore, as can be seen in Figure 2, the interaction between HERITAGE and GENDER is based on the fact that for South Asians, males retract /e/ more than women.

Finally, for /æ/, HERITAGE is significant in terms of lowering (F1, p = 0.006). The Tukey-Kramer HD post hoc tests indicate that it is Filipino speakers who lead all other groups, with an F1 value of 930 Hz. GENDER is significant in retraction (F2, p = 0.0001), with female speakers leading once again, with an F2 of 1674 Hz as opposed to 1777 Hz for men.

5 Conclusion

Our results show that the four largest groups of heritage speakers in Vancouver all participate in the Canadian Shift in terms of the threshold values posited by Labov et al. (2006) in the Atlas of North American English and Boberg (2008, 2010) in Phonetics of Canadian English project. In and by itself, this finding strengthens the idea of treating speakers with heritages other than British or Anglo-Celtic as members of the same speech community (see also cited above Riebold 2015, Wong and Hall-Lew 2014).

At the same time, we do find significant differences in specific dimensions of the change for each vowel: Cantonese speakers lead in the retraction of /i/, and Filipino speakers lead in lowering of /æ/. In the case of /e/, the pattern of variation is more complex. Cantonese speakers retract this vowel the most, and S. Asian speakers the least, and there is also interaction with GENDER, as British and Filipino women lead the men in their respective groups, but for South Asian speakers, it is men that lead women in retraction. It is possible that these differences have to do with the construction of ethnic identity by second-generation immigrants in Metro Vancouver. Future research on other changes in progress (e.g., Canadian Raising and /æ/ allophones) will shed more light on this issue.
THE EFFECT OF HERITAGE ON CANADIAN SHIFT IN VANCOUVER

F1/F2 ~ Heritage * Gender + (1 | Speaker) + (Gender | Word)

**F1: Model Basics**

<table>
<thead>
<tr>
<th>Total N</th>
<th>d.f.</th>
<th>Intercept</th>
<th>G Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>316</td>
<td>13</td>
<td>708.4</td>
<td>718.6</td>
</tr>
</tbody>
</table>

**F1: Model Fit**

<table>
<thead>
<tr>
<th>Deviance</th>
<th>AIC</th>
<th>R^2 fixed</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3574.1</td>
<td>3547.6</td>
<td>0.05</td>
<td>0.57</td>
</tr>
</tbody>
</table>

**F1: Predictors**

<table>
<thead>
<tr>
<th>AIC if dropped</th>
<th>p value</th>
<th>Levels</th>
<th>Count</th>
<th>Mean Hz</th>
</tr>
</thead>
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<tr>
<td>Gender</td>
<td>+2.15</td>
<td>0.04</td>
<td>Female</td>
<td>210</td>
</tr>
<tr>
<td>Heritage</td>
<td>+0.33</td>
<td>0.09</td>
<td>Male</td>
<td>106</td>
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<tr>
<td>Heritage * Gender</td>
<td>-0.32</td>
<td>0.51</td>
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</tr>
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</table>

**F2: Model Basics**

<table>
<thead>
<tr>
<th>Total N</th>
<th>d.f.</th>
<th>Intercept</th>
<th>G Mean</th>
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<tbody>
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<td>13</td>
<td>1865.1</td>
<td>1851.8</td>
</tr>
</tbody>
</table>

**F2: Model Fit**

<table>
<thead>
<tr>
<th>Deviance</th>
<th>AIC</th>
<th>R^2 fixed</th>
<th>R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4403.9</td>
<td>4368.4</td>
<td>0.09</td>
<td>0.43</td>
</tr>
</tbody>
</table>

**F2: Predictors**

<table>
<thead>
<tr>
<th>AIC if dropped</th>
<th>p value</th>
<th>Levels</th>
<th>Count</th>
<th>Mean Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heritage</td>
<td>+3.43</td>
<td>0.02</td>
<td>British</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Canton.</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Filipino</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S. Asian</td>
<td>70</td>
</tr>
<tr>
<td>Gender</td>
<td>+1.58</td>
<td>0.058</td>
<td>Female</td>
<td>210</td>
</tr>
<tr>
<td>Heritage * Gender</td>
<td>-2.27</td>
<td>0.04</td>
<td>Male</td>
<td>106</td>
</tr>
</tbody>
</table>

**F2: Tukey-Kramer HD**

<table>
<thead>
<tr>
<th>S. Asian</th>
<th>British</th>
<th>Filipino</th>
<th>Cantonese</th>
</tr>
</thead>
<tbody>
<tr>
<td>-73.451</td>
<td>-14.506</td>
<td>-9.066</td>
<td>43.837</td>
</tr>
<tr>
<td>43.837</td>
<td>-3.950</td>
<td>-19.475</td>
<td>-59.973</td>
</tr>
</tbody>
</table>

Table 4: LMM results for /e/.

Figure 2: Distribution of /e/ according to gender and heritage group.
In closing, we note that these results are based on an etic approach to ethnicity, in that we have grouped speakers according to their heritage. Many recent studies (cf. Hoffman and Walker 2010, Nagy, Chociej, and Hoffman 2014, Newlin-Łukowicz 2015) have shown that when an emic approach is used, in which ethnicity is treated as a constructed rather than a fixed characteristic, some very interesting aspects of how speakers can index their affiliation to an ethnic group through language are revealed. Thus, future research should examine the pattern of variation in Vancouver English through such an emic approach to ethnicity. We plan to use the ethnic orientation portion of our interviews in order to examine the pattern of Canadian Shift in Vancouver from such a perspective.

**References**


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