



Vowel patterning of Mormons in Southern Alberta, Canada



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ABSTRACT

This paper examines the patterning of /æ/ in the English of Southern Alberta, Canada, with particular attention paid to differences between the general population and Mormons (members of the Church of Jesus Christ of Latter-Day Saints). Expanding on work by Meechan (1999) and Sykes (2010), who examine /aw/ and /ai/ diphthongs among the LDS population, we first show that /æ/ is significantly raised before /g/ among speakers in Southern Alberta. We then show that Mormons in the region do not display as strong raising in this linguistic environment. We attribute this to the strong social network of the Mormons in rural Southern Alberta which has a conservative influence on the /æ/ in the English of Mormon church members in the region. We further show that young Mormon women are the most divergent from their other Southern Alberta counterparts, which may be an indication of them being more conservative than other groups, contra many studies showing that women are innovators in sociophonetic change (for example Eckert 1989; Labov, 1990; Wolfram and Schilling-Estes, 1998), or it may be an indicator that these young Mormon women are innovators of a different pattern.

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1. Introduction

Utah is well known as the epicenter of the Church of Jesus Christ of Latter-Day Saints,¹ and sociolinguistic studies in Utah have often included religion as a linguistic variable given the importance of the Mormons in the region. (Baker and Bowie, 2010; Baker-Smemoe & Bowie, 2015, Di Paolo and Faber, 1990; *inter alia*) There has, however, been considerably less study of the linguistic patterning of Mormons outside Utah, with two notable exceptions: a doctoral dissertation by Meechan (1999), and a Master's thesis by Chatterton (2008). Meechan's important finding was that Mormons in Lethbridge, Alberta, Canada have lower rates of Canadian Raising than Catholics and Protestants, and was instrumental in the attestation of a distinct ethnolect based on religion in the region. This finding, as well as anecdotal accounts, is the underpinning of the present research. Our assumption in undertaking this research is that if Mormons are distinct in terms of rates of Canadian Raising, we should expect to find other elements of divergence between Mormons and non-Mormons, which would reinforce indicators of identity.² This is therefore the goal of this paper: to investigate another Canadian phonetic feature to see whether Mormons pattern differently in other areas as well, and to seek explanation of any patterns.

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¹ Mormons are members of the Church of Jesus Christ of Latter-Day Saints, sometimes known as LDS. In this paper, the terms *Mormon* and *LDS* will be used interchangeably to represent members of the church.

² Note that Baker-Smemoe & Bowie (2015) show that there are actually three groups of comparison to consider: active Mormons, inactive Mormons and non-Mormons, i.e. that the level of participation within a religion is a factor in linguistic variation, not just religious affiliation. All the speakers we interviewed would be considered active members, though we didn't elicit their level of participation. Baker-Smemoe & Bowie's findings make this a relevant future area for study to see whether such a three-way distinction holds in Southern Alberta.

Table 1
2001 census profile data of religion based on census subdivisions.⁴

	Total pop	Roman Catholic	Protestant	LDS	Hutterites ⁵	No religion	LDS in %
Raymond	3105	120	210	2380	0	160	76.7
Cardston county	4270	115	295	2375	1070	235	55.6
Magrath	1935	70	145	1435	0	200	74.2
Cardston	3355	310	110	2600	0	240	77.5
Glenwood	275	0	0	195	0	20	70.9

2. Latter-day Saints in Southern Alberta

We begin this paper with a brief history of the Mormon settlement into Southern Alberta, Canada. The high population and influence of the Mormons within Southern Alberta remain largely unknown among non-church members elsewhere in Canada and abroad, but history and demographics reveal the past and present importance of this group in the area.

2.1. Settlement

In 1887, as tensions between the United States government and Church of the Latter-Day Saints became more and more strained, a large number of LDS members began to migrate north from Utah into Southern Alberta, seeking a friendlier government and religious freedom (Palmer, 1972). They settled just north of the U.S. border in Canada, founding the town of Cardston, named after Charles Ora Card. They built farms and irrigated the land, and more and more church members arrived to settle the region. In 1895, Alberta became the first LDS stake founded outside of the United States.³ By 1911, the LDS in southern Alberta had established 18 communities in the region, and boasted ten thousand church members (Palmer, 1972). The Cardston temple was the first to be built outside the United States; announced in 1913 and dedicated in 1923.

The Mormon population continues to be an important part of the region today. According to the 2001 Canadian Census, 49.7% of Canada's entire Mormon population is situated in Alberta. In the 2001 Canadian Census, 8.5% of Lethbridge and 13% of Taber self-identified as Mormon, far higher than the national rate of .3% and even the provincial rate of 1.7%. This does not tell the whole story, however, as the province is large, and an extremely high segment of the Mormon population resides in a number of small towns in a sparsely-populated area within South-Western Alberta, where church members make up the majority of the population.

Locals know which are 'Mormon towns'. In Southern Alberta, telling someone that one is from Magrath, Raymond or Cardston relays more than simply telling them what town one comes from; it tells people one's religious affiliation, as the assumption in the region would be that someone from these towns is an LDS church member. In fact, non-Mormons from these towns will often speak up to dispel this assumption by saying 'I'm from Cardston but I'm not Mormon.' To confirm this anecdotal evidence and these local perceptions, we analyzed 2001 census data (the last census to list Latter-Day-Saints as a separate religion) and have compiled the results in Table 1.

The census data shown in Table 1 confirms that there is a very high concentration of LDS members in the so-called "Mormon corridor", with approximately three-quarters of inhabitants of the area self-identifying as Mormon. Note that although Cardston County appears to have a lower percentage of LDS members, this can be explained by the fact that there are Hutterite colonies within the county, accounting for 1070 people, or 25% of the area. If we consider that the Hutterites live on colonies and do not interact in a meaningful way with the rest of the population, including Mormons, we see that the Mormon influence will be much stronger than the numbers suggest at first glance. If we remove these Hutterites from the numbers, we get a rate of 74% Mormons in Cardston County, which is exactly in line with the other areas.

These numbers are important because they underscore the high population density of Mormon Church members in the area. Although small towns generally already have fairly 'dense and multiplex' networks, this high LDS population density means that members of these communities will necessarily have even closer, more intense and more multiplex social networks. This is important given the well-known prediction that close-knit networks resist language change:

...a close-knit, territorially based network functions as a conservative force, resisting pressures for change originating from outside the network... Close-knit networks, which vary in the extent to which they approximate to an idealized maximally dense and multiplex network, have the capacity to maintain and even enforce local conventions and norms - including linguistic norms - and can provide a means of opposing dominant institutional values and standardized linguistic norms.

[Milroy and Milroy, 1992, p. 3–4]

³ A *stake* is an administrative unit composed of eight to ten congregations, comparable to a diocese or a deanery. The creation of a stake means that the congregations in the region had grown sufficiently to permit reorganization of the existing district.

⁴ Not all religions are included, so numbers do not add up to total population. Protestant includes United, Anglican and 'other Christian' not listed in the census as options.

⁵ Hutterites (along with Mennonites and Amish) are one of three Anabaptist pacifist groups who immigrated to North America in the late 19th century to escape religious persecution. The Hutterites differ from Mennonites and Amish in that they live communally in colonies. Hutterites speak a variety of Low German as a first language, learning English in their own schools. Their separate living and schooling means they interact minimally with outsiders.

Having established the high density of Mormon community members in the region, we will turn to showing how this density is reinforced by the importance of the Mormon church in the daily family and social life of church members.

2.2. Social cohesion among LDS in Southern Alberta

Meechan (1999) explains that despite participating fully in Canadian society, attending public schools and universities and working 'in town', the Mormon community has 'largely remained a cohesive group reinforced by the social activities associated with their church'. It is undeniable that Mormons form a tightly knit network within the region. In this section we examine some of the ways in which this community remains a 'close-knit, territorially based network' before showing that this network indeed 'functions as a conservative force, resisting pressures for change originating from outside the network' in the sense of Milroy and Milroy (1992).

Mormons interact intensely with one another, establishing a tight community of their own. There are generally three hours of church services on Sundays; Monday is set aside for family night; there are singles activities during the week on Tuesday or Wednesday; and most people have 'callings' which are responsibilities within the church which vary, and which can range in terms of time commitment between a few times a month to upwards of twenty hours a week. In addition to these callings, men can be *home teachers*, assigned a number of families to visit once a month to teach the gospel, and women can be *visiting teachers*, assigned a number of women to visit. Visiting Teachers are encouraged to minister by 'stay(ing) in frequent contact through visits, phone calls, letters, e-mail, text messages and simple acts of kindness' (lds.org). Saturdays are often spent preparing for Sunday services. High school students also attend Seminary on weekdays for an hour before school. The time spent with other church members is clearly significant, and can be taken as a strong indicator of the intensity of the Mormon social network.

In terms of identity, there is evidence that Mormons in Southern Alberta view their religious identity as more important than their nationality; that their most important community is their church community, and that they feel affiliated both with Canada and the United States. Many LDS members have relatives and other connections in the United States; some spend summers or attend post-secondary schooling in Utah. Consider the following quotes from two women born in Alberta and lifelong LDS members, suggesting that their Canadian identity plays a secondary role in their lives.

- (1) "I was born in Cardston, eighteen miles from the border of Montana and another country...But our lives there were influenced by the Church, and that mattered even more than territorial boundaries." [Lund, 1996, p. 165]
- (2) "I grew up not only aware of my Mormon identity, but also having a strong affinity for things American. I sang "God Bless America" while my parents waited impatiently for the United States to enter World War II...and for some unaccountable reason, I never spoke with a "Canajun" accent. ("Eh?" is such a useful shibboleth – I envy those who use it with just the right inflection – it can't be faked!)" [Beecher, 1996, p. 174]

In (2), Beecher not only outlines her 'strong affinity for things American', but also even recognizes that her accent is not Canadian, despite having grown up in Canada. It is clear that LDS members feel a part of a community that transcends their national identity.

The goal of this section has been to establish that the Mormon community in Southern Alberta bears many of the characteristics of a potential linguistic enclave: a shared immigration history, a strong sense of identity, and a dense and multiplex network of ongoing interactions. We could expect that this network would 'have the capacity to maintain and even enforce local conventions and norms – including linguistic norms – and can provide a means of opposing dominant institutional values and standardized linguistic norms' (Milroy and Milroy, 1992, p. 6). In order to test this hypothesis, we must first have a sense of the general sociolinguistic patterns among Southern Albertans. Although there is not an abundance of research that has been undertaken on English of the Canadian Prairies, we will review what is known before investigating some of the particular fine-grained linguistic differences of Mormon English spoken in Southern Alberta.

3. English in the Canadian Prairies

The sociolinguistic study of English in the Canadian Prairies has not been extensive. Among the previous research, we can count Nylvek (1993), which examined differences between rural and urban speakers in Saskatchewan using a postal questionnaire fashioned after those of the *Survey of Canadian English* (Scargill and Warkentyne, 1972). Labov et al. (2006), based on a telephone survey of 1–4 speakers per city, proposes that Canada is made up of three dialect areas, of which the Canadian West and Ontario make up one area. Boberg (2008) however argues that this large dialect region should be broken down further, proposing a more fine-grained view, with five dialect areas within Canada, differentiating Ontario from the Prairies from British Columbia. His work is based on a comparison of a number of phonetic phenomena among university students from across Canada attending McGill University in Montreal. It is from these phonetic phenomena that we draw our particular study, and we turn to the specific phenomenon of /æ/-raising before g in the Canadian context.

3.1. Raising of /æ/ before g

The variation in the phonetic realization of /æ/, sometimes called ‘short a’ (Boberg, 2008) in Canada is somewhat complicated. On the one hand, /æ/ is widely reported as lowering and retracting towards /a/, as part of the widely-studied Canadian shift (Clarke et al., 1995; Esling and Warkentyne, 1993; Hagiwara, 2006; Hoffman, 2010; Roeder, 2012; Roeder and Jarmasz, 2010; Sadlier-Brown and Tamminga, 2008), which is argued to be in reaction to the merger of the lower back vowels /ɑ/ and /ɔ/, a characteristic of most varieties of Canadian English (Clarke et al., 1995; Labov et al., 2006). On the other hand, /æ/ is reported to be raised before velars and nasals, with æ-raising before nasals most characteristic of Ontario, and æ-raising before velars most characteristic of the Prairie provinces (Boberg, 2008). Given that Canadian Raising has been found in lower rates among Mormons in Lethbridge (Meechan, 1999), we set out to see whether other phonetic characteristics of Canadian English might also not be found at the same rate within the Mormon community. Since short-a before g is claimed to be most raised in the Prairie provinces, and therefore most indicative of the region, we decided to investigate this particular phenomenon to determine whether there is a divide between /æ/-before-g raising between the Mormon community and general rural Southern Albertan (SAb) speakers.

4. Studying Southern Alberta English

The first linguistic research in Southern Alberta was undertaken by Meechan (1999) in her doctoral work, which investigates what is commonly referred to as the ‘Mormon drawl.’ Meechan found that Mormons had a lower rate of Canadian Raising than both Protestants and Catholics in Lethbridge, Alberta. Chatterton (2008) further hypothesized that ‘LDS speakers will pattern with the rest of the Area of Mormon Dominance, while the non-LDS speakers will pattern with the rest of General Canadian.’ (2008, p.17) In his Master’s research, however, he found no evidence of Utah phonetic characteristics such as the *card-cord* merger (Bowie, 2003) or pre-lateral laxing (*peel-pill* merger), at least among younger LDS speakers in Southern Alberta. He finds that ‘younger speakers are approaching a combination of features that does not match the non-LDS Cardston speakers, and are not approaching the general Canadian patterns, nor are they approaching a purely American dialect.’

- (3) Among LDS speakers, there appears to be a widespread, but not uniform, paucity in General Canadian feature use...Further, it appears that the “Mormon language” (Meechan, 1999, p. 53) of the area is leveling to a degree with language in the area. Though the LDS community uses Canadian features differently (usually less frequently) than their non-LDS counterparts, it may be that the result is somewhere between, yielding either a new dialect between the two existing source dialects, or reflecting a possible pre-existing subdialect already at work in Southern Alberta that is a reflection of the area’s position between the US West and General Canadian areas. It seems certain that the LDS speech community continues to maintain a distinct identity.

[Chatterton, 2008, p. 84]

The influence of Utah English in the speech of Southern Alberta Mormons remaining uncertain, the goal of our research is to uncover and examine patterns associated with this ethnolect. To this end, we investigated another Canadian linguistic feature, namely the raising of /æ/ before g, which has been found to be particularly robust in the Canadian Prairies (Boberg, 2008), hypothesizing that the ‘close-knit, territorially based network’ of the LDS in Southern Alberta will act as conservative force and will be apparent through LDS speakers being slower to adopt this phonetic change. If the LDS community is resisting Canadian Raising, as shown in Meechan’s (1999) research, it might be expected to also resist other Canadian changes at bay.

4.1. The Southern Alberta Corpus of English (SACE)

The data for the present study is drawn from the Southern Alberta Corpus of English (SACE), a larger ongoing project investigating ethno-religion and rurality as variables in linguistic variation in Southern Alberta. Participants were interviewed in their homes between 2011 and 2013, and three types of data were collected: a 180-long word list based on Boberg (2008), the *North Wind and the Sun* reading passage, and a sociolinguistic interview which lasted on average 45–60 min. Each participant had lived in their location for the majority of their lives, since at least 3 years old, and had not lived elsewhere other than for short periods.⁶ All speakers were digitally recorded at 44 kHz in uncompressed WAV format. The Mormon interviews were recorded using Sennheiser lavalier microphones and an Edirol digital recorder, and the other Southern Albertan (SAb) interviews were recorded using an HBB Flashmic. Currently, the SACE includes 144 speakers stratified by

⁶ One notable exception to this is Mormons who serve missions (males for two years and females for 18 months). It has been suggested to us that missions are particularly formative in terms of language development. It can be the first time they are abroad with a large number of speakers from other regions, and the Canadians tend to get teased for their accent. At the very least, they become acutely aware that they sound ‘different’ from American Mormons, and this linguistic awareness should not be ignored.

Table 2
Stratification of SACE holdings.

Age	Urban				Semi Urban				Rural				Mormon				First Nations		Hutterite					
	m		f		m		f		m		f		m		f		m		f					
	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	NP	NP	NP	NP	NP					
18–25	2	3	4	2	0	2	3	2	4	4	5	2	2	0	2	2	2	3						
35–50	1	0	4	1	1	1	2	1	2	3	4	4	4	1	3	4	1	11						
60+	2	2	3	0	1	0	3	2	3	5	5	8	2	2	2	4	4	2	1	1				
n=	5	5	11	3	2	3	8	5	9	12	14	14	8	3	7	10	0	7	0	16	0	1	0	1

Table 3
Southern Alberta speakers selected for study.

Speakers	M	F	
Young Mormon	2	4	27 Mormon
Middle Mormon	4	7	
Old Mormon	4	6	
Young Southern Albertans	5	5	31 SAB
Middle Southern Albertans	4	6	
Old Southern Albertans	4	7	
Total	23	35	

urbanity, socio-economic status, ethno-religion, age and sex. The distribution of the current holdings is given in Table 2 below.⁷

From the SACE, 27 rural Mormon adults and 31 adults from rural areas in Southern Alberta who were not members of the Mormon community were selected, as outlined in Table 3 below.

Designated as 'young' is the 18–25 years old group, 'middle,' the 35–50 year old group, and 'old' are those speakers over 60 years of age at the time of the interview. The Mormon participants were from the southwest corner of Alberta encompassing the towns of Cardston, Glenwood, Magrath, Raymond and Taber. The Other Southern Albertan speakers were primarily from towns northeast of Lethbridge including Brooks, Vulcan, and Taber. Note that there are both Mormon and SAB speakers from Taber, which is a town on the border between the Mormon region and non-Mormon region. Taber has a higher Mormon population than the other towns in the SAB region at approximately 10% (see Table 4), but is at a much lower rate than the other Mormon towns. The geographical coverage of the interviewees is given in Fig. 1.

Fig. 1 above shows the geographical split of the interviewees, and Table 4 below shows the difference in religious practice of the two geographic areas by adding the more northeast areas from which the general Southern Alberta population is drawn from, showing how the religion, and specifically the Mormon (LDS) population between the two areas, differs substantially.

The towns south of Lethbridge correspond to those shaded in Table 4 above, which are approximately three-quarters Mormon, while those north-east of Lethbridge correspond to the unshaded cells of the table, where the Mormon community membership is negligible, between 0 and 3%. Recall that Taber is on the cusp of the two areas, with a Mormon population of 10%. In conducting our analyses, we did separate these speakers to see whether there was any difference in their patterns, given that their numbers are much smaller than in the other communities, but no significant differences between Taber Mormons and the other Mormons were found. That said, it would be interesting to pursue this question more deeply with a more extensive study.

4.2. Data studied

The current study reports on a subsection of the wordlist data. The list of words, with their phonetic environments, is included in Table 5. The following words were extracted from a 180-word long wordlist for each speaker, and as stated above, only the word list tokens were measured for the analysis presented here.

Praat textgrids were created semi-automatically via script for the wordlist recordings, and the vowel boundaries were aligned on the left and right edges, also semi-automatically, via script. The second author aligned all the vowel boundaries in order to ensure consistency within the vowel, and boundaries were checked by the first author during the first two weeks in order to ensure agreement. Once the vowels were aligned, a script was used to extract the F1, F2 and F3 at the 20%, 50% and 80% points, based on Praat's formant recognizer. Frequency range was set at 4000 Hz for men and 5000 Hz for women, with the dynamic range set at 30 dB (Ladefoged, 2003). The script also recorded the vowel duration from the beginning to the end

⁷ M = male, f = female, P = professional, NP = non-professional, FN = First Nations (Blackfoot or Plains Cree), Hutt = Hutterite. Urban speakers are from Calgary, Semi-urban are from Lethbridge, Rural are from smaller communities in Southern Alberta and are not affiliated with the communities specified in the SACE. Socio-economic status was found to not be significant and therefore is not discussed here.

Table 4
2001 census profile data of religion based on census subdivisions.⁸

	Total pop	Roman Catholic	Protestant	Mormon	Hutterite	No religion	Mormon in %
Raymond	3105	120	210	2380	0	160	76.7
Cardston county	4270	115	295	2375	1070	235	55.6
Magrath	1935	70	145	1435	0	200	74.2
Cardston	3355	310	110	2600	0	240	77.5
Glenwood	275	0	0	195	0	20	70.9
Taber (District)	6010	1125	1155	620	455	540	10.3
Taber (Town)	7505	1615	2135	975	0	1020	13.0
Vulcan county	3780	355	1225	55	605	645	1.5
Vulcan	1650	200	595	50	0	340	3.0
Rockyford	375	125	170	0	0	65	0.0
Newell county no. 4	7140	990	1760	190	735	1265	2.7

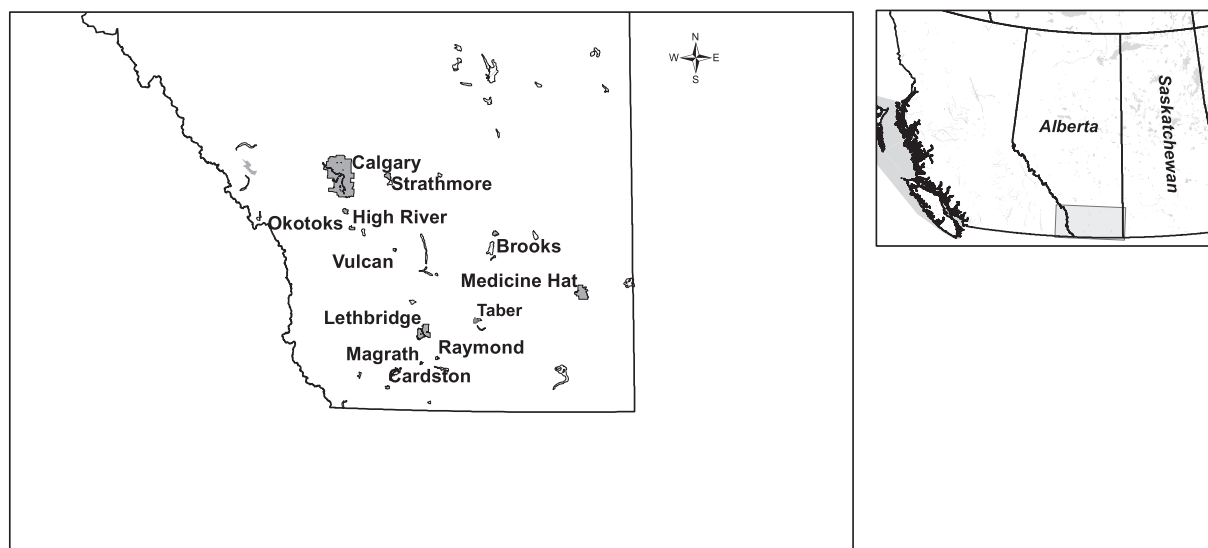


Fig. 1. Geographical coverage of speakers.

of the vowel transition. A number of outliers, due to faulty recognition by Praat, were removed from the dataset. In the analysis, we used the midpoint (50% measurement).⁹ The F1, F2 and F3 values for the midpoints were then input into NORM to normalize the data using the Lobanov (1971) normalization method, following Watt et al. (2011) showing that this method was the most reliable and robust. With the midpoints measured and normalized, we performed one-way ANOVA and MANCOVA tests in SPSS to determine statistical significance of the differences between groups. In the next section, we turn to the results of this study.

5. Results

Overall, religion was shown to be a statistically significant factor in the production of /æɪg/, with age and religion found to covary, meaning that Mormon speakers pronounced /æɪg/ differently from the Other Southern Albertans (SABs). The mean measurements are given in Table 6, with the significant mean difference bolded.

To determine whether religion was a significant factor in determining æ-raising before /g/, we performed a one-way ANOVA with F1 as the dependent variable testing religion as the factor. Religion was a statistically significant factor in F1 ($M = 653$, $SD = 120$, $p < .001$). We also performed a one-way ANOVA with F2 as the dependent variable testing religion as a factor, but there was no significance for F2 ($M = 1976$, $SD = 277$, $p = .587$). A visualization of the above data is given in the

⁸ Not all religions are included, so numbers do not add up to total population. Protestant includes United, Anglican and 'other Christian' not listed in the census as options.

⁹ We gathered the necessary data to analyze the trajectory, recognizing that trajectory tracking of the vowel would be preferable (cf. Di Paolo and Yaeger-Dror, 2011), but report only on the midpoint here. However, we expect that the multiple point analysis will emphasize our findings and leave the trajectory information for further study.

Table 5
List of words studied in phonetic context.

Phonetic environment	Words
/æ/ before voiced velar /g/	tag, bag, gag
/æ/ before nonvelar nasals	stamp, band, tan, ham
/æ/ before velar nasal /ŋ/	bang, hanger
/æ/ before other	sack, happy, sat, bad, cast, tap, sad

Table 6
Mean F1 and F2 for /æ/ and /æɡ/.

	N	F1	F2	Mean difference	
				F1	F2
/æɡ/					
Mormon	75	699 Hz	1988 Hz	91 Hz	40 Hz
SAb	73	608 Hz	1963 Hz		
/æ/					
Mormon	192	857 Hz	1716 Hz	17 Hz	96 Hz
SAb	196	874 Hz	1620 Hz		

vowel plot below in Fig. 2. All vowel plot data is normalized with Lobanov (1971) and then scaled, using in the Vowels.R package (Thomas and Kendall, 2007) for R:

We can see from the graph in Fig. 2 that overall, the Mormon /æ/ is not as retracted as the general rural /æ/, and that the Mormon /æɡ/ is not as raised as the general rural /æɡ/. This is evidence supporting Meechan's (1999) work showing that Mormon speakers in Southern Alberta have a religion-based ethnolect. We will now examine more closely the differences within the Mormon and Southern Alberta groups to investigate details of the variation.

We also tested socio-economic status to see whether another social category could explain differences in /æɡ/-raising. Socio-economic status was not found to be a factor in F1 based on a one-way ANOVA ($M = 654$, $SD = 120$, $p = .128$) or in F2 ($M = 1976$, $SD = 277$, $p = .673$). As a result we have collapsed all data.

5.1. Interplay of religion, age and gender

Men and women are well known to pattern somewhat differently phonetically, not only in terms of formant frequency due to physiological reasons. Women tend to have more peripheral vowels than men (Hagiwara, 2006) and women also tend to be

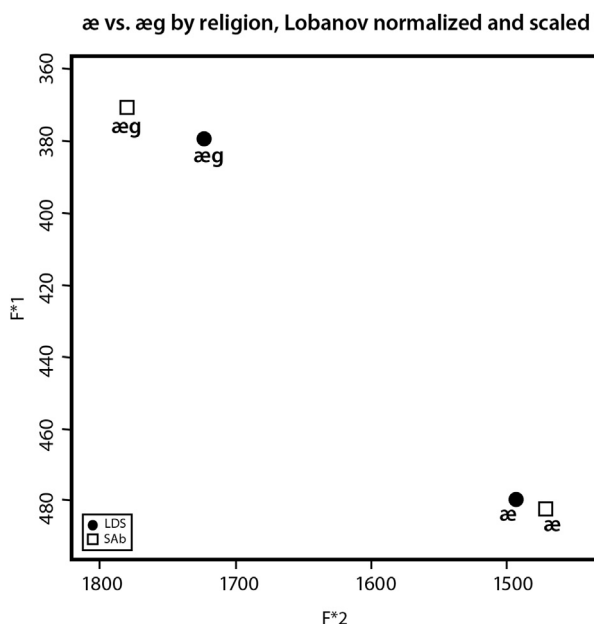


Fig. 2. Lobanov (1971) normalized, scaled graphs of wordlist tokens comparing LDS (Mormon) to SAb/æ/ vs. /æɡ/.

leaders in sociophonetic change, as stated above. For these reasons, we will now look at women and men separately to examine patterning. Consider the plot in Fig. 3 below, which shows the vowels for just women, broken down by the age (including just the old and young speakers) and religion.

In Fig. 3, we see that there are striking differences between the vowels of LDS (Mormon) women and SAb women. The SAb women display the greatest Cartesian distance between /æɡ/ and /æ/, with the expected apparent-time differences where younger women are leading the greater differentiation between the two vowels. On the other hand, LDS women maintain vowels that are much closer to each other, especially the group of old LDS women, who have the most conservative /æ/, i.e., it is the least retracted and lowered. Most striking, however, is that the young LDS women are extremely conservative in terms of their /æɡ/; they lag behind even the older SAb speakers, and even appear more conservative than older LDS women in terms of this change. Let us then look at the men broken down in the same categories in Fig. 4.

Fig. 4 tells a slightly different story, in that the vowels of LDS men seem to follow a different pattern than the SAb men. The SAb men have more retracted /æ/ and more peripheral /æɡ/, while the LDS men's vowels are both closer together, showing a lack of both retraction and raising as compared to their non-LDS counterparts. It is worth pointing out that these graphs are based on fewer vowels than the others, as shown in Table 7 below (See Table 7).

Nevertheless, even with fewer data, similarities to the women emerge, where the LDS appear to be more conservative in terms of /æɡ/-raising, yielding vowels with a lesser Cartesian distance from each other.

5.2. Middle age groups

We have limited the above plots to the old and young groups, to highlight what kind of changes may be taking place in apparent time, and how far along those changes are. We have deliberately left out the middle age group up until now, so as not to complicate the plots, but also because the middle age groups do not pattern in the same way. Consider then, now, the vowel plots below for all women. Fig. 5 shows the Southern Albertan speakers while Fig. 6 shows the LDS (Mormon) speakers.

Comparing the three ages between the women in Fig. 6, it is clear that there are different patterns at work between the two groups. The SAb women all appear to follow a similar pattern, with two different vowels, an /æ/ which is clearly retracted and an /æɡ/ that is clearly raised, with the vowels getting slightly further from each other as the age of the speakers increases. On the other hand, the middle LDS women have the vowels that are furthest from each other on the vowel plot. It looks as though young and old speakers within the LDS community have more similar vowels than the middle group. This suggests further that while there is a difference between LDS and the SAb speakers, this difference neutralizes somewhat among the middle-aged group. This may be part of the well-known linguistic marketplace effect (Chambers, 2003), where women in their prime working and child-rearing years may have more incentive to be more normative in their speech due to economic and social capital gained through normative speech patterns. Note that this does seem to level off after retirement age, as predicted, and the older LDS women again become more different from SAb. Further longitudinal research is necessary, however, to see whether this is indeed age-grading or whether other forces are at work.



Fig. 3. Lobanov normalization and scaling of WLS tokens of /æ/ and /æɡ/ for young and old women in the sample.

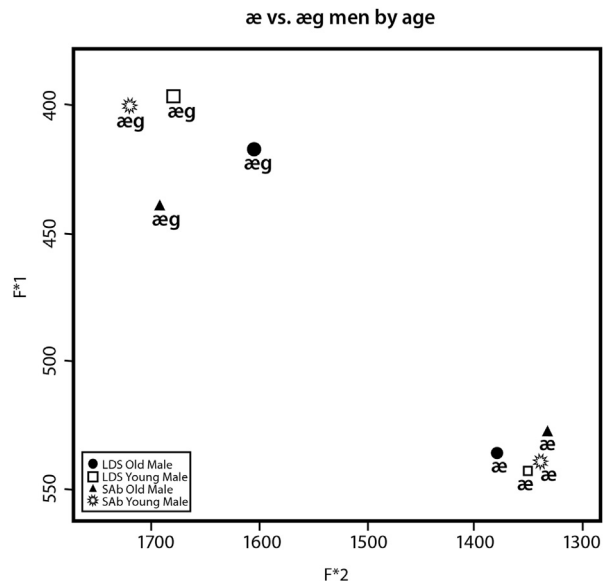


Fig. 4. Lobanov normalization and scaling of WLS tokens of /æ/ and /æg/ for young and old men in the sample.

Table 7
N for male speakers per vowel.

N per speaker	æ	æg
LDS old male	27	12
LDS young male	15	6
SAb old male	25	12
SAb young male	27	11

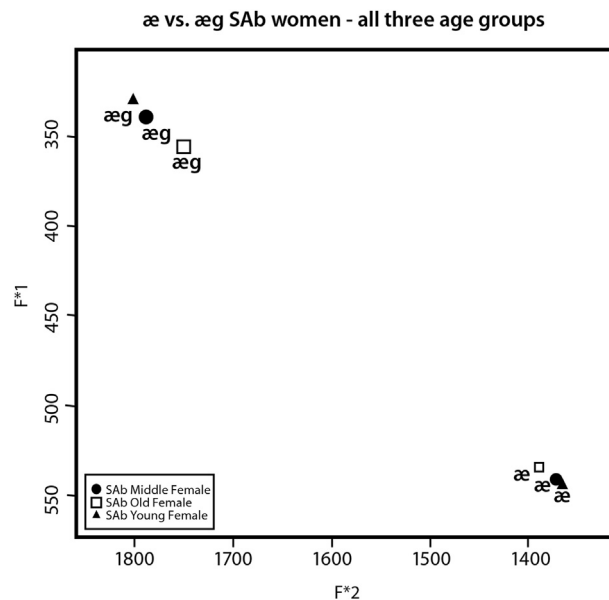


Fig. 5. Comparison of the Lobanov normalization and scaling of WLS tokens of /æ/ in different environments for all SAb women in the sample.

5.2.1. æ-raising in the overall vowel space

Though the Lobanov method has been found to be an accurate method of normalization with a small number of vowels, ideally, peripheral vowels in the inventory should be included for best results in normalization, especially the corners of the vowel space (Clopper, 2009). Not only are normalization results stronger, it is visually easier to see in the overall system the state of the change. To this end, we now add vowel measurements from other vowels from our wordlist in order to see them in



Fig. 6. Comparison of the Lobanov normalization and scaling of WLS tokens of /æ/ in different environments for all LDS (Mormon) women in the sample.

context, without reporting on these other vowels otherwise. Consider the vowel plots in Fig. 7, with a partial vowel inventory including these corner vowels, comparing young LDS speakers to young SAb.

Note that with the additional context of the corners of the vowel space, the difference in vowel height between the /æg/ of the young LDS women and the young SAb women becomes even more striking: the vowel in this environment is of the same height as /ɛ/ for the young LDS women but as high as /ɪ/ for the other young SAb women.

6. Discussion and conclusions

We have provided apparent-time evidence of a phonetic change in progress in Southern Alberta, namely that /æ/ is raising before /g/ (or æg-raising), particularly among younger speakers. Our evidence comes from vowel formant data showing that the /æ/ of younger speakers is considerably higher before /g/ than for the older speakers in our corpus, consistent with Boberg (2008). The fact that young women are æg-raising especially strongly supports the conclusion that this is a change in progress, given the well-established notion that young women tend to be leaders of linguistic change. However, we have also shown that there is a difference in the realization of æg-raising between Mormon speakers and other Southern Albertan speakers, offering evidence of the existence of a religion-based ethnolect in the region. We saw further that this difference is most striking among the young women in the sample.

In Section 2, we discussed the history and current demographics of the LDS in Southern Alberta, showing that they live in a small area with a high population density of other LDS members, and that this, coupled with their time-consuming obligations to the church, result in a very tight social network situation, where ties to their church are often stronger than ties to their country. Meechan (1999) showed that these ties were reflected in the different Canadian Raising rates, and suggested that other linguistic differences may also be present between the two groups. The present work supports Meechan's work, showing another difference in regional raising rates, this time /æg/-raising.

The present study reveals a new pattern; that is that there are interesting differences between the sexes when it comes to /æg/-raising. The sex differences are particularly interesting because they show that while young SAb women are leading the innovation of æg-raising, young LDS women have moved the least. In fact, young Mormon women show virtually no difference as compared to their grandmother's generation. The young Mormon men are closer to their counterparts in the SAb population, though there as well, they appear somewhat more conservative. Why should there be such a difference between the young men and women, and why are young women among the most conservative speakers, rather than the linguistic innovators that we see more generally? One explanation is found in Sykes (2010) in his justification of gender divisions in his own study:

Mormon boys and girls are instilled from a very young age the importance of Mormon gender roles. Gender segregated religious instruction begins as early as four years old and continues throughout a member's lifetime. At the age of 12, Mormon boys are initiated into the church's lay priesthood. At 18, boys are initiated into a higher level of priesthood in preparation for a two-year religious mission that is expected of them. Girls are initiated into the women's organization, the 'Relief Society.' It is clear then that gender and gender roles are an especially salient feature of the Mormon community.

[Sykes, 2010, p. 19]



Fig. 7. Comparison of the Lobanov normalization of WLS tokens for partial vowel inventories for Young SAb and LDS (Mormon) women in the sample.

LDS women's close-knit social networks will reinforce the linguistic norms they hear around them, effectively disallowing easy change. LDS men have somewhat looser and broader network in that they go abroad on a mission; they are breadwinners within a greater Southern Alberta community; they often do post-graduate study and professional programs. Their speech will as a result be more susceptible to change. This is interesting because it means that the linguistic innovators within the LDS speech community in Southern Alberta are generally not the young women, contra most work on the topic (Eckert, 1989, 1999; Labov, 1990; Wolfram and Schilling-Estes, 1998). Therefore, in addition to supporting previous work of the existence of an LDS ethnolect in Southern Alberta based on religion, our findings underlie how linguistic patterns can reflect particular social structures. The differing gender roles within the LDS and other SAb communities are revealed when we look attentively at the linguistic patterns. It is important, then, to consider the effect religion has on other social variables within the greater social structure.

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Appendix A

The socioeconomic metric was calculated by combined a score for *education* and a score for *occupation*. Occupation was scored on a scale of 1–6 using the National Occupational Classification Matrix (<http://www30.hrsdc.gc.ca/NOC/English/NOC/2006/Matrix.aspx>), as found in the table below.

Unemployed	=	1pt
Skill level D (cashiers, security guards, cleaners, laborers etc)	=	2 pts
Skill level C (clerical assistants, healthcare assistants, sales representatives, drivers, etc.)	=	3 pts
Skill level B (clerical supervisors, lab technicians, paralegals, sales supervisors, chefs, trades supervisors, etc.)	=	4 pts
Skill level A (accountants, lawyers, doctors, librarians, teachers)	=	5 pts
Upper Management	=	6 pts

Education was scored as in the table below:

No high school diploma	=	1 pt
High school diploma	=	2 pts
Apprenticeship certificate, trade certificate, diploma	=	3 pts
Some university, college certificate or university certificate below bachelor level	=	4 pts
University degree: bachelor level	=	5 pts
Graduate degree or professional school	=	6 pts

The combined score, ranging from a minimum of 2 to a maximum of 12, determines the speaker's socioeconomic group: scores of 2–6 are designated non-professional; scores of 7–12 are designated professional.

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