



University of Pennsylvania Working Papers in Linguistics

Volume 19

Issue 2 *Selected Papers from NWAV 41*

Article 18

10-17-2013

The Phonology of the Canadian Shift Revisited: Thunder Bay & Cape Breton

Rebecca V. Roeder

University of North Carolina at Charlotte, rroeder@uncc.edu

Matt Hunt Gardner

University of Toronto, matt.gardner@utoronto.ca

This paper is posted at ScholarlyCommons. <http://repository.upenn.edu/pwpl/vol19/iss2/18>

For more information, please contact libraryrepository@pobox.upenn.edu.

The Phonology of the Canadian Shift Revisited: Thunder Bay & Cape Breton

Abstract

Previous accounts of the Canadian Shift, which have interpreted this diachronic process as a purely phonetic consequence of the low back LOT-THOUGHT vowel merger, have not clearly explained the strong connection between phonetic TRAP vowel retraction and the phonological process of the low back merger. This paper addresses this issue in several ways. Relying on the Modified Contrastive Specification theory (Dresher et al. 1994) and the Contrastive Hierarchy approach (Dresher 2009), two phonological frameworks, as well as phonetic insights from Vowel Dispersion theory (Liljencrants and Lindblom 1972) and Dispersion-Focalization theory (Schwartz et al. 1997, Schwartz et al. 2007), we propose that the catalyst of the Canadian Shift is a three-way merger of the PALM, LOT and THOUGHT lexical sets, in combination with a simultaneous change in the underlying feature specifications of the TRAP vowel. This results in a phonology that allows for the TRAP and DRESS vowels, in particular, to undergo the influence of the phonetic principles of dispersion and focalization, which lead to lowering and retraction in the acoustic vowel space. Comparison of data from speakers in Thunder Bay, Ontario, and Cape Breton, Nova Scotia, lends support to this hypothesis because the Cape Breton data reveals evidence of two concurrent phonological systems, despite no evidence of change over apparent time. Some Cape Breton speakers display the Ontario (i.e., inland Canada) Canadian Shifted vowel system, while others display a system that bears much greater resemblance to the Eastern New England non-shift dialect, where PALM merges with TRAP instead of LOT-THOUGHT. The current analysis thus predicts that the Canadian Shift or a similar change to the TRAP, DRESS, and KIT vowels will occur in any North American dialect where the PALM-LOT-THOUGHT merger occurs, unless an intervening phonological change alters the contrasts within the phonological system.

The Phonology of the Canadian Shift Revisited: Thunder Bay & Cape Breton

Rebecca V. Roeder and Matt Hunt Gardner*

1 Introduction

This paper aims to address Weinreich et al.'s (1968:102) actuation problem (or why certain but not other structural changes occur in a language at the time that they do) for a current North American vowel change: the Canadian Shift. Whereas previous work has suggested that the shift is a purely phonetic consequence of the low back merger, we propose that the phonological merger of the PALM, LOT and THOUGHT vowels in the input varieties that led to inland Canadian English also changed the underlying phonology of the TRAP vowel.¹ These phonological changes are what enabled the subsequent phonetic changes that are referred to as the Canadian Shift. This interpretation of the low back merger as part of a systemic change to the underlying phonology of the vowel inventory motivates the Canadian Shift in a theoretical way that has eluded previous analyses. Our hypothesis adopts the Modified Contrastive Specification theory (Dresher et al. 1994) and the Contrastive Hierarchy approach (Dresher 2009), two phonological frameworks, as well as phonetic insights from Vowel Dispersion theory (Liljencrants and Lindblom 1972) and Dispersion-Focalization theory (Schwartz et al. 1997, Schwartz et al. 2007). We explain how the shift is connected to the low back merger, why it affects the TRAP vowel most dramatically, and why the shift is characterized by lowering and retraction in the acoustic vowel space. This explanation is also compatible with observations on cross-linguistic typology (e.g., Schwartz et al. 2007:106). This paper presents, to our knowledge, the first socio-phonetic study of the Canadian Shift that integrates formal phonetic and phonological theory with empirical sociolinguistic methods. Section 2 introduces the Canadian Shift and outlines our proposal. Section 3 tests our theory using instrumental data from two dialects of Canadian English: Northern Ontario and the Maritimes. Section 4 presents conclusions and suggestions for future study.

2 The Actuation of the Canadian Shift

2.1 The Phonology of the Canadian Shift

The Canadian Shift is the well documented lowering and/or retraction of the TRAP, DRESS and sometimes KIT vowels over apparent time in Canadian English. Clarke et al. (1995), who first noted the shift based primarily on data from southern Ontario, hypothesized that it was triggered by the low back merger, which brought together the vowels of the traditional LOT and THOUGHT lexical sets. Numerous studies have since found evidence of the Canadian Shift across inland Canada (e.g., Labov et al. 2006, Boberg 2008), as well as Montreal (Boberg 2005) and the Atlantic Provinces (e.g., D'Arcy 2005, Sadlier-Brown and Tamminga 2008). Studies on the shift in Canadian English have consistently reported 1) a complete merger of LOT and THOUGHT in all speakers and 2) retraction and/or lowering over apparent time of both the TRAP and DRESS vowels. The most notable phonetic variation between studies is the variable attestation of KIT lowering/retraction (e.g., Clarke et al. 1995, Boberg 2005, Roeder 2012). As a point of reference for the current analysis, Figure 1 shows the trajectory of the shift as reported for Toronto speech

*Our deepest thanks for feedback on earlier versions of this paper from Jack Chambers, Elan Dresher, Yoon-Jung Kang, Ron Smyth, Sali Tagliamonte, Erik Thomas and the University of Toronto LVC Working Group

¹ Throughout this paper, Wells' standard lexical sets will be used to refer to vowel phonemes rather than IPA notation. Standard lexical sets can be used to refer to large groups of words that tend to share the same vowel, and to the vowel that they share (Wells 1982:xviii) and thus are more useful when discussing diachronic phonemic and/or phonetic change.

by Roeder and Jarmasz (2010).² The familiar diachronic lowering and retraction of TRAP and DRESS appears, in addition to further retraction of the merged PALM-LOT-THOUGHT vowel.

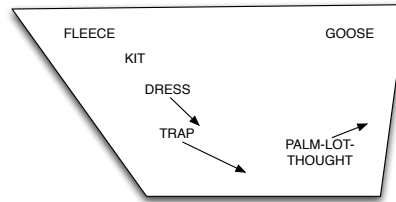


Figure 1: The Canadian Shift in Toronto (adapted from Roeder and Jarmasz 2010)³

Although we do not contest the seminal insight made by Clarke et al. (1995) that the Canadian Shift is the result of the phonological merger of LOT and THOUGHT, we believe phonology plays an even more profound role in this process of change. Phonetic explanations of the shift have not transparently explained the strong correlation between TRAP retraction and the low back merger, which is apparent in study after study, either. We propose that the Canadian Shift is composed of two components: a systemic phonological change that involves a three-way low back merger, and a phonetic change driven by universal tendencies for symmetrical, focalized systems of phonetic implementation. The phonetic change can only occur if the phonological change happens first. To formalize the phonological component of this model, we adopt the Modified Contrastive Specification Theory (Dresher et al. 1994), the Contrastive Hierarchy Theory (Dresher 2009), and the Successive Division Algorithm (Dresher 2009). Under this approach, phonemes are only specified for features that are contrastive, and it is only these contrastive features that are active within the phonology. This eliminates redundancy because a phoneme is only specified for a feature if such specification is needed to distinguish it from another phoneme.

Figure 2 illustrates the algorithm as applied to the vowels of inland Canadian English. The phonemes are initially divided based on a single feature, [+/- Peripheral] in this case. Oxford (2012) argues that [+/- Peripheral] is the highest ranked feature in English for historical, phonotactic, and articulatory reasons. In addition, giving peripherality scope over all other features is in agreement with the Labov et al. (2006) classification of all vowels in English as being part of either a peripheral or non-peripheral track within the vowel space.

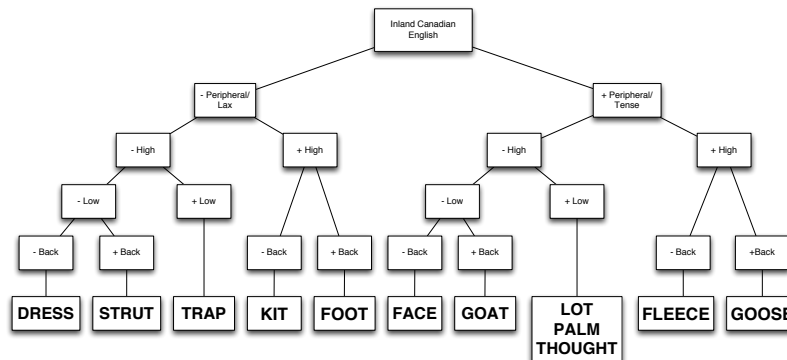


Figure 2. Contrastive hierarchy for inland Canadian English

After this first division, the inventory is sub-divided again based on a second feature, here the binary height feature [+/- High]. Next, the [-High] vowels are specified for [+/- Low]. And finally,

² Roeder and Jarmasz (2010) also found dramatic fronting of the GOOSE vowel over apparent time in Toronto speech, but this is not noted in Figure 1 because it is not thought to be related to the Canadian Shift.

³ The results reported in Roeder and Jarmasz (2010) are based on interview data extracted from the Toronto English Project, collected by Tagliamonte (2003-2006).

the [+/- Back] feature is only needed in order to differentiate the [-High, -Low] vowels from one another. Specifying the two [+ Low] vowels for backness would be redundant because they already contrast with every other vowel in the system, and they contrast with each other in the highest ranked feature [+/- Peripheral]. Following this model, each phoneme contrasts in at least one feature with every other phoneme in the inventory. Figure 3 shows these same divisions as a schematized vowel plot. The internal solid line divides the [+ Peripheral] vowels from the [-Peripheral] vowels. The two horizontal dotted lines divide the inventory using the height features [+/- High] and [+/- Low], and the vertical line represents the [+/- Back] distinction.

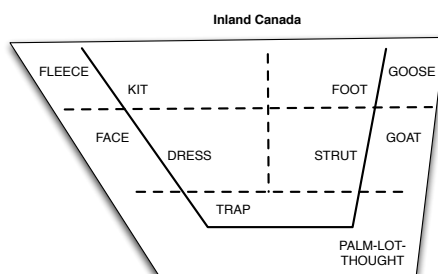


Figure 3. A vowel quadrilateral illustrating the inland Canadian English contrastive feature hierarchy shown in Figure 2.

As to the relationship between phonetics and phonology, contrastive feature specifications such as [+ Peripheral] or [- Back] can be viewed as placing limits on *relative* pronunciation, although they are clearly not instructions for *specific* phonetic implementation. For instance, a [+ Low] vowel ought not be the vowel in the system pronounced with the lowest F1. The major phonetic implication encoded in the contrastive hierarchy presented for inland Canada is that TRAP is not specified as [- Back]. We propose that this absence of a horizontal aspect feature is what allows for subsequent TRAP movement phonetically. The Modified Contrastive Specification Theory, Contrastive Hierarchy Theory, and Successive Division Algorithm allow us to explain why TRAP is the phoneme to move and suggest why it centralizes in the vowel space.

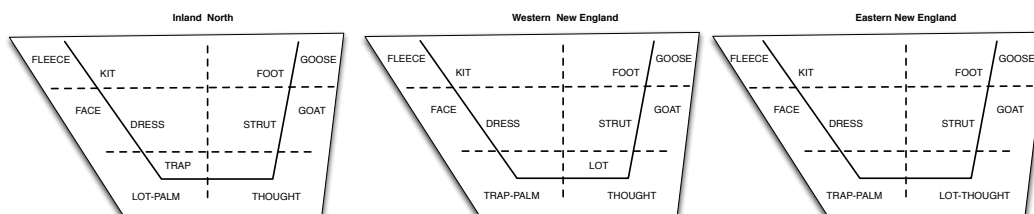


Figure 4. Three vowel quadrilaterals illustrating the Inland North, Western New England and Eastern New England contrastive feature hierarchies.

The inland Canadian system differs from systems with more than two low vowels, such as the dialects presented by Labov et al. (2006) for the U.S. Inland North and Eastern and Western New England. In such systems, the [+/- Back] feature is needed in the [+ Low] portion of the vowel space to differentiate two [+ Peripheral] low vowels (Figure 4). Therefore, the same framework that explains the actuation of the Canadian Shift also provides phonological reasoning for Boberg's (2010:155) claim that the independence of PALM from LOT-THOUGHT prevents the Canadian Shift in Eastern New England. Merged TRAP-PALM cannot retract because it is specified as [+ Low, - Back] and contrasts with the [+ Low, + Back] merged LOT-THOUGHT.

3.2 The Phonetics of the Canadian Shift

The loss of a horizontal aspect feature for TRAP in inland Canadian English enables TRAP

movement but does not *ipso facto* entail movement. Thus to explain why TRAP moves, and its direction of movement, we adopt Schwartz et al.'s (1997, 2007) Dispersion-Focalization Theory. Focalization refers to formant convergence, or areas of the spectrum where formants are closest. For example, a point of focalization is created by the proximity of F2 and F3 in the high front FLEECE vowel, which appears in the vowel inventory of virtually every attested human language (Schwartz et al. 2007:107). Dispersion refers to maximization of perceptual distance in the acoustic vowel space. As stated by Schwartz et al. (2007:110), “the basic principle underlying Dispersion-Focalization Theory is to associate a structural dispersion cost based on inter-vowel perceptual distances (dispersion) and a local cost based on intra-vowel perceptual salience (focalization).” Emerging from ideas first proposed by Liljencrants and Lindblom (1972) and Stevens (1972, 1989), the driving force behind the development of this theory has been to understand the connection between phonology and the physiological aspects of speech communication—perception and production (Schwartz et al. 2007:104). This theory has primarily been used to explain first language acquisition and cross-linguistic typology, but we believe it is quite useful for enhancing the understanding of systemic vowel shifts such as the Canadian Shift.

Once the phonology creates the suitable conditioning environment, the movement of the TRAP vowel to a low and retracted position brings F1 and F2 values closer together, in accord with the principle of focalization. Through this movement, the TRAP vowel has increased its perceptual salience and maintained maximum perceptual distance from other vowels without violating the broad boundaries prescribed by the phonological contrasts. The subsequent lowering/retraction of the DRESS and KIT vowels may occur as a result of phonetic analogy (cf. Durian 2012) as well as dispersion, mirroring the fronting of the GOAT vowel that is often attested in tandem with GOOSE-vowel fronting (Labov 1994) in some dialects. The processes of dispersion and focalization thus explain why the direction of movement for the Canadian Shift is a natural consequence of the phonological changes that are a part of the low back merger.

3 The Canadian Shift in Thunder Bay and Cape Breton

The preceding theoretical explanation for the Canadian Shift depends upon a three-way merger of the PALM, LOT and THOUGHT lexical sets. The LOT-THOUGHT merger in Canadian English can be traced back to the United Empire Loyalists⁴ who established the first English-speaking communities in inland Canada (Chambers 2008). And despite some attestation of variable TRAP-PALM merger in Ontario historically (e.g., Avis 1956:52, Kinloch and Avis 1989:411), Boberg (2010:130) reports that PALM has now fully merged with LOT-THOUGHT in standard (i.e., inland) Canadian English. In comparison, there is evidence of a variable TRAP-PALM merger and a variable LOT-THOUGHT merger reported as recently as 2010 from Nova Scotia (Kieffe and Kay-Raining Bird 2010), though these same authors claim that young speakers in the region are “flattening their accents...to conform with prestige dialects further west” (Kieffe and Kay-Raining Bird 2010:62), suggesting a move towards a more inland Canada type of phonology. The comparison of data from Thunder Bay, Ontario, and Cape Breton, Nova Scotia that we present in this section indicates that despite a possible TRAP-PALM merger historically, the Canadian Shift is now well established in Thunder Bay, and the phonological system matches that of other inland Canadian cities (i.e., Toronto). In Cape Breton, we show evidence of two different phonological systems: one matching Thunder Bay and Toronto, the other more closely aligned with Eastern New England (see Figures 3 and 4). These two systems result in some speakers with the Canadian Shift, and others without it, supporting our hypothesis that the Canadian Shift is only possible after the three-way low back merger as it occurs in inland Canada.

3.1 The Canadian Shift in Thunder Bay

Roeder (2012) compared the Canadian Shift in Thunder Bay, a small former port city in northwestern Ontario, with Toronto, which is an 18-hour drive south and east from Thunder Bay. The study revealed very similar vowel systems and patterns of change over apparent time in the

⁴ United Empire Loyalists were known as Tories in the United States during this time (Chambers 1993:4).

two cities. Figure 5 presents a comparison of mean values for speakers under age 25 in Thunder Bay (N = 15) and Toronto (N = 9). MANOVA results showed that young people from Thunder Bay, as a group, were slightly less advanced into the Canadian Shift than young people from Toronto. Similar to the results reported for Toronto in Roeder and Jarmasz (2010), Roeder (2012) found little evidence of community-level change over apparent time in Thunder Bay for the TRAP, DRESS or KIT vowels, indicating that the shift had largely run its course by 2012.

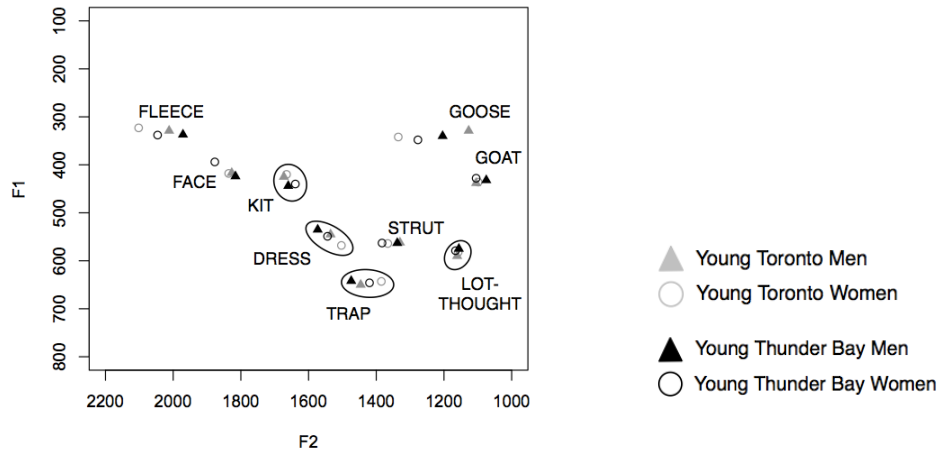


Figure 5. Vowel chart of group means comparing young speakers from Thunder Bay (ages 12-20) and Toronto (ages 18-24); total N = 24 (adapted from Roeder 2012)

From an historical perspective, the observed similarities between Thunder Bay, Toronto, and elsewhere in inland Canada are unsurprising. United Empire Loyalists from Pennsylvania, New Jersey, New York and western Vermont migrated to southern Ontario in the late 18th century, becoming the first permanent settlers and forming the dialect that would take lasting root there (Chambers 2008:8). A century later, during the late 19th century, this dialect was carried westward en masse after the opening of the trans-national rail lines in 1885. Chambers (1993:12) argues that the English spoken in Ontario during the mid-19th century included the LOT-THOUGHT merger well before being transported westward throughout Canada. Labov et al. (2006:171) provides evidence that the merger in Thunder Bay is a three-way merger of the PALM, LOT and THOUGHT lexical classes, as in the rest of inland Canada, and the current analysis finds no evidence that contradicts these observations. If the three-way low back merger is the catalyst for the Canadian Shift, as we propose, it is logical that the shift will take place in any variety in which this merger has occurred. So ongoing contact between Thunder Bay and Toronto residents would not have been necessary for the Canadian Shift to have occurred simultaneously in both cities. For the purposes of the current study, therefore, data from Thunder Bay is used as representative of the Canadian Shift in mainstream inland Canadian English.

3.2 The Canadian Shift in Industrial Cape Breton data

Industrial Cape Breton is on the eastern part of Cape Breton Island, which forms the northern part of the Canadian province of Nova Scotia, some 3,000 kilometres away from Thunder Bay and 2,000 kilometres from Toronto. Cape Breton Island, like the rest of the Canadian Maritime provinces, is isolated from Ontario by neighboring Maine and French-speaking Quebec, and so is separated both geographically and culturally from the continuum of inland Canadian English. Although Industrial Cape Breton is similar to Thunder Bay in that both cities have lost their traditional industries recently and are experiencing substantial out-migration, unlike Thunder Bay the original input dialect to English in Nova Scotia was not primarily from western Pennsylvania and Upstate New York. Prior to America's Revolutionary War, some 2,000 New England families moved to Nova Scotia to take up land that had been occupied by deported French colonists. Following the war, about 14,000 Loyalists streamed into Nova Scotia. Unlike those that emigrated

to Ontario, these Loyalists came from Eastern New England, especially Massachusetts and Connecticut (Chambers 2008:8). Given this difference in historical migration patterns and the ongoing isolation of Cape Breton Island, there is no reason to expect similar dialects in Thunder Bay, Ontario, and Industrial Cape Breton. In fact, Cape Breton should share dialect features with Eastern New England, where, despite a LOT-THOUGHT merger, the Canadian Shift is blocked by the merger of PALM and TRAP⁵.

Among the few previous instrumental sociophonetic studies of Nova Scotia vowel systems is Gardner (2008), a study on the vowel pronunciations of six Nova Scotians who had recently moved to nearby Newfoundland. This study found that despite stylistic low back vowel fronting, speakers did show a Canadian Shift-like pattern in their vowel system. Gardner (2011), an analysis of 29 speakers from the Gardner Cape Breton English Corpus, found that some speakers in the community showed evidence of the Canadian Shift while others did not. This study also concluded that the shift was not an incremental generational change in the community. One piece of evidence in support of this conclusion was the observation that a lowered and retracted TRAP vowel did not correlate with speaker age, education, sex, or local affiliation; these are all factors that have been shown to correlate with change over time in numerous apparent time studies. Therefore, although the inland Canadian dialect has overt prestige in the community, the aggregated data did not initially display the expected pattern of accommodation.

As a first step towards gaining a clearer picture of the Canadian Shift in Industrial Cape Breton for the current study, a comparison was made of word-list data from the Thunder Bay and Industrial Cape Breton corpora. Table 1 presents the sample distribution for the current analysis. Thirty speakers from the Roeder Thunder Bay Corpus were compared to 29 speakers from the Gardner Cape Breton English Corpus. Both samples were stratified by age and sex, with speaker age ranging from 12 to 88 for Thunder Bay and from 18 to 92 for Cape Breton.

Age	12-20	31-53	59-64, 88	Age	18-21	24-50	53-70	82-92
TB Men	7	2	4	CB Men	3	5	4	2
TB Women	8	4	5	CB Women	3	5	4	3

Table 1. Thunder Bay and Industrial Cape Breton sample distribution

At each site the word list data was collected using a digital recorder and a cardioid lavalier microphone. Although the words in the two lists were not the same, the selection of words for each list was circumscribed based on similar phonological constraints. The target vowels in each list were in primary stress position and did not appear before a liquid⁶ or nasal, or in a glide context. Both word lists included target vowels after labial and coronal consonants and before non-liquid and non-nasal coronal consonants. The Thunder Bay data additionally included vowels in initial position or before /p, b/. The same Praat script was used to measure all the data, and when normalization was needed, the Lobanov method was used via the NORM website (Thomas

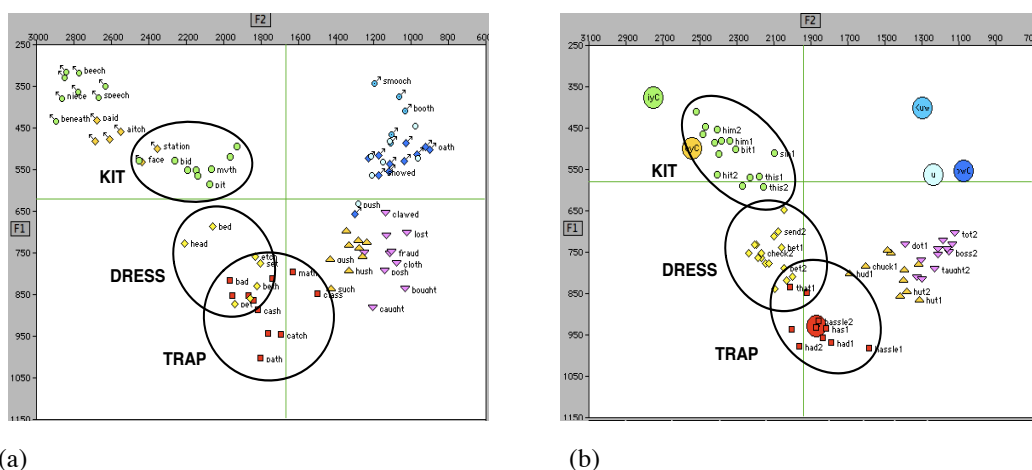
⁵ In contexts where /ɪ/ vocalizes in New England speech, START tends to merge with PALM. In r-less and r-full dialects in both New England and Nova Scotia, START is also pronounced relatively further forward in the vowel space than in other North American dialects. Labov et al. (2006:230) report that even when formerly r-less New England communities stop vocalizing /ɪ/, identification of the nuclei of START and PALM as the same remains. Kiefe and Kay-Raining Bird (2010) report recessive variable r-lessness in Nova Scotia, and explicitly draw a connection between southern Nova Scotia speech and that of Eastern New England. The oldest male speaker in the Gardner Cape Breton English Corpus is also variably r-less. He does not exhibit a Canadian Shift pattern.

⁶ The phonological constraints used in constructing the Cape Breton word list precluded PALM words, with the exception of *father*. The pronunciation of PALM words in Cape Breton speech was checked for each speaker using casual conversation data. This revealed mostly back PALM pronunciations, though some speakers (e.g., the oldest male speaker) had a clear PALM-TRAP merger. As Gardner (2008) showed, LOT and THOUGHT can also be stylistically fronted for Nova Scotia speakers in casual speech, so the limited front PALM pronunciations by some other speakers does not necessarily preclude a PALM-LOT-THOUGHT merger for those speakers.

and Kendall 2012). A total of 7833 tokens were included in the statistical analysis.

Results indicated that, as in Thunder Bay, all 29 Cape Breton speakers displayed a complete merger of LOT and THOUGHT. This was unsurprising since the merger is attested in the parts of Eastern New England (e.g., Labov et al. 2006:63) from where the initial English speakers in the Maritimes originated and in inland Canada, to where young speakers are said to be accommodating their speech (Kieffe and Kay Raining-Bird 2010:62). Despite a consistent LOT-THOUGHT merger, only 16 of the 29 Cape Breton speakers displayed TRAP, DRESS and KIT vowel pronunciations that can be categorized as Canadian shifted. This Canadian Shift pattern is exemplified in Figures 7a and 7b.

Figure 7a shows all recorded tokens for a 51-year-old woman who has lived in Cape Breton her entire life. TRAP is low and central, with a few tokens even appearing in the lower right-hand quadrant of the vowel space. DRESS and KIT are low and retracted. Figure 7b shows the vowel space for a 19-year-old woman from Thunder Bay. Her pronunciations reflect an advanced stage of the Canadian Shift. Her TRAP vowel pronunciations are so uniformly retracted that the mean is in the lower right quadrant of her vowel space. KIT and DRESS are in similar relative positions in the speech of both women, retracted towards the central line of the vowel space. Pronunciations of the merged low back vowel are similar in both speakers, as well, with an F1 range matching that of the DRESS tokens. Both charts in Figure 7 clearly reflect the symmetrical, triangular pattern of the Canadian Shifted speech. Symmetrical, triangular systems that maximize the use of plain vowels, those without secondary features, are strongly favored in languages of the world (Schwartz et al. 2007:106), suggesting that the Canadian Shift pattern might reflect universal tendencies.



(a)

(b)

Figure 7a. Vowel chart for a 51-year-old Cape Breton woman, interviewed in 2011.

Figure 7b. Vowel chart for a 19-year-old Thunder Bay woman, interviewed in 2008.

Fifteen other Cape Breton English speakers have similar vowel systems to the 51-year-old woman represented in Figure 7a. In contrast, the other thirteen Cape Breton speakers present a dramatically different pattern. This pattern is illustrated in Figure 8, which shows all recorded tokens for an 82-year-old woman who has spent her whole life in Cape Breton. TRAP is not the central point vowel of the system for her; instead, TRAP forms an anchor in the lower left quadrant of the vowel space that is counter-balanced by the merged LOT-THOUGHT vowel in the lower right quadrant. Tokens of the TRAP vowel and the merged LOT-THOUGHT vowel are produced with similar F1 values. In addition, some of the DRESS vowel tokens for this speaker are in the top left quadrant, unlike the speakers in Figure 7. The speaker's KIT vowel tokens are all high and front. While this pattern was observed in the oldest speaker in the Cape Breton data (age 92), it is not a recessive feature; it was also the pattern for the youngest speaker (age 18).

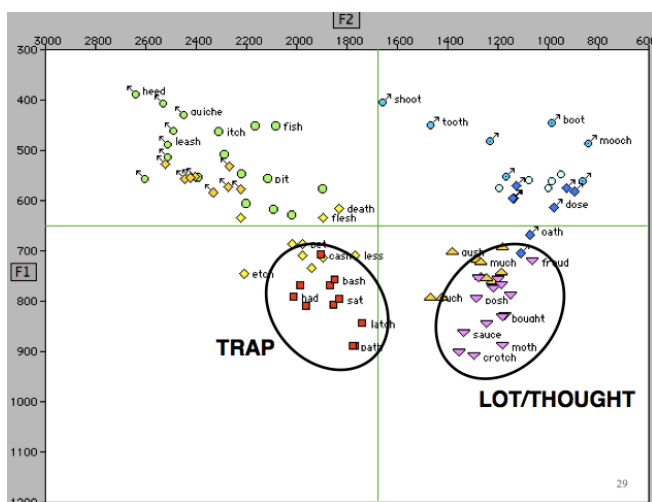


Figure 8. Vowel chart for an 82-year-old Cape Breton woman, interviewed in 2011.

Crucially, linear regression analysis of the Cape Breton data showed no statistically significant change over apparent time for any vowel; thus, the observed variation between the two patterns cannot be explained as a phonetic change in progress that is based on one underlying phonology. The mainstream dialect of inland Canada carries prestige in Cape Breton (Kieffe and Kay–Raining Bird 2010: 62), while some pronunciations associated with the local dialect are highly stigmatized. Although the group whose speech fits a non-Canadian Shift pattern of pronunciation includes both the youngest and the oldest speaker, microanalysis revealed social characteristics for each speaker that are compatible with traditional sociolinguistic explanations for why people use locally-marked speech. These include age, occupation, and local orientation, as well as a desire to garner covert prestige. And the four individuals from Cape Breton whose speech displayed the most progressive and iconic version of the Canadian Shift all had social networks that included very strong off-island ties. So geolinguistic diffusion might be expected here. But the isolation of the island from inland Canada, as well as rampant out-migration by young people, appears to be keeping this process at bay. Therefore, while the conclusion that the Canadian Shift is not an incremental change in Industrial Cape Breton warrants further research, we propose that more than one phonological system for English currently exists in Cape Breton. The persistence of two phonologies can be explained by the fact that, unlike inland Canada, the PALM-LOT-THOUGHT merger was not historically part of the Eastern New England dialect that was the input to Industrial Cape Breton.

Our observations indicate that, for speakers who grew up immersed in a traditional Cape Breton dialect and continue to strongly identify with being local, PALM and TRAP are merged. Even if some words from the PALM class migrate to a LOT-THOUGHT pronunciation, the low front vowel remains [+ Peripheral] and so must also be [- Back], blocking the Canadian Shift. Only speakers who are immersed in an innovative dialect as children, or who aspire to sound non-local early enough, can adopt a phonology in which TRAP is specified as [- Peripheral]. For these innovative speakers, a Canadian Shift phonology is not just possible, it is inevitable.

4 Conclusion

This paper has interpreted the observed pattern of the Canadian Shift as a complementary interaction between systemic phonological change and universal phonetic principles. More specifically, we have used the Modified Contrastive Specification Theory and the Contrastive Hierarchy theory to explain why the low back merger triggers the Canadian Shift. Dispersion-Focalization theory explains why the Canadian Shift is an incremental phonetic change that takes place in speech communities that experience or have inherited the PALM-LOT-THOUGHT merger. Numerous studies confirm the phonetic pattern of acoustic redistribution that constitutes the Canadian Shift. The proposed phonological explanation is strengthened by evidence of two

distinct and enduring systems in Industrial Cape Breton, despite no conclusive evidence of change over apparent time there. The observation that some Industrial Cape Breton speakers have a phonological system that includes the Canadian Shift while others display a pattern modeled after the original input dialect of Eastern New England also explains the variable attestations of the Canadian Shift in Maritimes English in past literature.

The current analysis predicts that the Canadian Shift or a similar change to the TRAP, DRESS, and KIT vowels will occur in any North American dialect where the PALM-LOT-THOUGHT merger occurs, unless an intervening phonological change alters the contrasts within the phonological system. With this in mind, it is important to note that very similar patterns of change over apparent time have been documented in California (e.g., McGuire et al. 2011, Kennedy and Grama 2012) and several Midland varieties of American English (e.g., Bigham 2010, Durian 2012), as well as in Alaska (Bowie et al. 2012) and Hawai'i (Grama et al. 2012). A three-way low back merger is completed in most of these areas (Labov et al. 2006), and so the lowering/retraction of the TRAP, DRESS, and KIT vowels would be predicted by the hypothesis presented in this paper. Results differ somewhat for the Midlands, where this pattern of change can occur in areas where the low back vowels are not fully merged for all speakers. Bigham's Evolutionary Emergence Model of language change presents an elegant explanation of why the speech of individuals can be expected to vary widely despite community-level patterns of change over time. However, Durian (2012) provides evidence of a Canadian Shift-like pattern in Columbus, Ohio, even though the merger does not appear to be spreading over apparent time there. Therefore, although there is mounting evidence that the PALM-LOT-THOUGHT merger and TRAP retraction are intrinsically connected, in a way that is compatible with cross-linguistic typology, it remains unclear whether the dialects in all of these areas are governed by the same phonological patterns. Future work on this question, especially in the area of laboratory phonology (Ohala and Jaeger 1986), would likely provide useful insight into whether a default pattern is emerging in areas of North America that have experienced extensive population mobility and dialect mixing.

References

- Avis, Walter S. 1956. Speech differences along the Ontario-United States border. III. Pronunciation. *Journal of the Canadian Linguistic Association* 2:41–59.
- Boersma, Paul, and David Weenink. 2013. Praat: Doing phonetics by computer [Computer program]. Version 5.3.50, retrieved 21 May 2013 from <http://www.praat.org/>
- Bigham, Douglas. 2010. Correlation of the low-back vowel merger and TRAP-retraction. *University of Pennsylvania Working Papers in Linguistics* 15:21–31.
- Boberg, Charles. 2005. The Canadian Shift in Montreal. *Language Variation and Change* 17:133–154.
- Boberg, Charles. 2008. Regional phonetic differentiation in standard Canadian English. *Journal of English Linguistics* 36:129–154.
- Boberg, Charles. 2010. *The English Language in Canada: Status, History and Comparative Analysis*. Cambridge: Cambridge University Press.
- Bowie, David, Tracy Bushnell, Alison Collins, Peter Kudenov, Stacie Meisner, Melissa Ray, Brennan Scotland, Noelle Valentine, Becky Dricoll, Jessa Joehnk, and Katie Kubitskey. 2012. A very northern California shift? The vowel system of southcentral Alaska. Paper presented at NWAV 41, Indiana University.
- Chambers, J.K. 1993. 'Lawless and vulgar innovations': Victorian views of Canadian English. In *Focus on Canada*, ed. S. Clarke, 1–26. Amsterdam: John Benjamins.
- Chambers, J.K. 2008. The tangled garden: Relics and vestiges in Canadian English. *Anglistik* 17:7–21.
- Clarke, Sandra, Ford Elms, and Amani Youssef. 1995. The third dialect of English: Some Canadian evidence. *Language Variation and Change* 7:209–228.
- D'Arcy, Alexandra. 2005. The development of linguistic constraints: Phonological innovations in St. John's English. *Language Variation and Change* 17:327–355.
- Dresher, B. Elan. 2009. *The Contrastive Hierarchy in Phonology*. Cambridge: Cambridge University Press.
- Dresher, B. Elan, Glyne Piggott, and Keren Rice. 1994. Contrast in phonology: Overview. *Toronto Working Papers in Linguistics* 13: iii–xvii.
- Durian, David. 2012. *A New Perspective on Vowel Variation across the 19th and 20th Centuries in Columbus, OH*. Doctoral Dissertation, The Ohio State University.

- Gardner, Matt Hunt. 2008. Frontin': Low back vowels and six Nova Scotians living in St. John's. Paper presented at the 32nd Annual Meeting of the Atlantic Provinces Linguistic Association, Dalhousie University.
- Gardner, Matt Hunt. 2011. Beyond the Phonological Void: Contrast and the Canadian Shift. Generals paper, University of Toronto.
- Grams, James, M. Joelle Kirtley, Katie Drager, Sean Simpson, and Rebecca Clifford. 2012. Language change in Hawai'i: KIT, DRESS and TRAP in motion. Paper presented at NWAV 41, Indiana University.
- Kennedy, Robert, and James Grams. 2012. Chain shifting and centralization in California vowels: An acoustic analysis. *American Speech* 87:39–56.
- Kieffe, Michael, and Elizabeth Kay-Raining Bird. 2010. Canadian Maritime English. In *The Lesser-Known Varieties of English: An Introduction*, ed. D. Schreier, P. Trudgill, E.W. Schneider and J.P. Williams, 59–71. Cambridge: Cambridge University Press.
- Kinloch, A.M., and Walter S. Avis. 1989. Central Canadian English and Received Standard English: A comparison of pronunciation. In *English Across Cultures, Cultures Across English: A Reader in Cross-cultural Communication*. ed. O. García and R. Otheguy, 403–420. Berlin: Mouton de Gruyter.
- Labov, William. 1994. *Principles of Linguistic Change: Internal Factors*. Oxford: Blackwell.
- Labov, William, Sharon Ash, and Charles Boberg. 2006. *The Atlas of North American English*. Berlin: Mouton de Gruyter.
- Liljencrants, Johan, and Björn Lindblom. 1972. Numerical simulation of vowel quality systems: The role of perceptual contrast. *Language* 48:839–862.
- McGuire, Grant, Angela Aiello, Jackie DeLeon, Tariq El-Gabalawy, Lauren Negrete, Alice Nicholls, and Kansonra Vanpykeren-Gerth. 2011. Sub-phonemic correlates of gender and regional identity in California. Poster presented at the 162nd Meeting of the Acoustical Society of America, San Diego, CA.
- Ohala, John J. and Jeri J. Jaeger. 1986. Introduction. In *Experimental Phonology*, ed. J.J. Ohala and J.J. Jaeger, 1–12. Orlando, FL: Academic Press.
- Oxford, Will. 2012. On the contrastive status of vowel length. Paper presented at the 2012 MOT Phonology Workshop, University of Toronto.
- Roeder, Rebecca. 2012. The Canadian Shift in two Ontario cities. *World Englishes* 31: 478–492.
- Roeder, Rebecca, and Lidia-Gabriela Jarmasz. 2010. The Canadian Shift in Toronto. *Canadian Journal of Linguistics* 55:387–404.
- Sadlier-Brown, Emily and Meridith Tamminga. 2008. The Canadian Shift: Coast to coast. *Proceedings of the 2008 annual conference of the Canadian Linguistics Association*. p.1-14.
- Schwartz, Jean-Luc, Louis-Jean Boë, Natalie Vallée, and Christian Abry. 1997. The Dispersion-Focalization Theory of vowel systems. *Journal of Phonetics* 25:255–286.
- Schwartz, Jean-Luc, Louis-Jean Boë, and Christian Abry. 2007. Linking Dispersion-Focalization Theory and the Maximum Utilization of the Available Distinctive Features Principle in a Perception-for-Action-Control Theory. In *Experimental Approaches to Phonology*, ed. M.-J. Solé, P.S. Beddor, and M. Ohala, 104–124. Oxford: Oxford University Press.
- Stevens, Kenneth. 1972. The quantal nature of speech: Evidence from articulatory-acoustic data. In *Human Communication: A Unified View*, ed. E.E. Davis, Jr., and P.B. Denes, 51–66. New York: McGraw Hill.
- Stevens, Kenneth. 1989. On the quantal nature of speech. *Journal of Phonetics* 17:3–45.
- Tagliamonte, Sali A. 2003-2005. Linguistic changes in Canada entering the 21st century. SSHRC grant no. 410-2003-0005.
- Thomas, Erik R. and Tyler Kendall. 2012. NORM: The vowel normalization and plotting suite. (Version 1.1) [Computer Program]. Retrieved May 27, 2013, from <http://ncslaap.lib.ncsu.edu/tools/norm/>
- Weinreich, Uriel, William Labov and Marvin Herzog. 1968. Empirical foundations for a theory of language change. In *Directions of Historical Linguistics*, ed. W.P. Lehmann and Y. Malkiel, 95–188. Austin: University of Texas Press.
- Wells, John C. 1982. *Accents of English I: An Introduction*. Cambridge, NY: Cambridge University Press.

Rebecca V. Roeder
 Department of English
 University of North Carolina at Charlotte
 Charlotte, NC 28223-0001
 rroeder@uncc.edu

Matt Hunt Gardner
 Department of Linguistics
 University of Toronto
 Toronto, ON M5S 3G3
 matt.gardner@utoronto.ca