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Insular Scots front vowels in Westray, Orkney

Introduction

Minority dialects have the potential to be a rich source of data on language variation and change. In many cases, however, the needed descriptive foundations are incomplete, making variationist approaches to such dialects difficult. This paper constitutes an attempt to solidify the phonological description of several vowel classes in the dialect spoken in Westray, Orkney. One of the northernmost islands in Orkney, Westray is a locale where a form of Insular Scots may still be heard among even young adult speakers. The natural self-containment of an island, combined with its post-insularity in an age of regular ferry service and high-speed Internet access, make Westray a tantalising site for research on the standardisation of traditional dialects.

Melchers (2004: 38) points out that 'there exists as yet no definite description of the present-day phonology of the Northern Isles'. Among the factors that make the construction of a vowel inventory for Insular Scots an especially complex task are the gradient nature of the traditional—standard speech continuum, the amount of local variation, and the remarkable sensitivity of the vowels to phonetic environment. The complications that have prevented previous researchers from furnishing what may seem like basic information on the dialect have, of course, come into play in my own work as well. But the attempt should not be given up as impossible, as a phonemic vowel inventory will be indispensable if we ultimately wish to draw on the language change data available here within the framework of variationist sociolinguistics.

Specifically, this paper presents my attempts to define and describe the contrastive front unrounded vowel phonemes in the Westray dialect. Using the lexical classes of Johnston (1997), which represent historical Older Scots vowel phonemes, I will undertake a somewhat limited exploration of the membership of these classes in the modern phonemic system. The data for this exploration come from a series of sociolinguistic interviews that I recorded in May 2007.

The description of Westray vowel classes broaches issues of phonetic space and phonemic distinctions, seeming to challenge traditional views

such as those of Martinet (1955). Just such a situation is recognised by Wolfram and Schilling-Estes (1995: 697), who point out that 'some obsolescing forms and unique configurations of forms in moribund dialect areas may be vital to our understanding of fundamental issues of language change and variation'. With more concrete description to rely on, the Westray dialect's vowel phonology may become a source of such insight.

Sociohistorical and linguistic context

Orkney has been inhabited for at least the past 5500 years, since the Neolithic period. It was ruled by the Picts during the Iron Age and then by the Kingdom of Denmark until 1468, when it became part of Scotland. Prior to this transfer the language of Orkney was the now-extinct Scandinavian language Norn, but immigration into Orkney from Scotland both before and after 1468 reinforced the introduction of the new language, Scots.[1]

Today Orkney has a total population of about 20,000 people, almost half of whom live in the capital city of Kirkwall or its neighbouring town, Stromness. Situated an hour and a half north of Kirkwall by ferry, Westray currently has a declining population of roughly 550 people. While many leave in their early twenties for lack of employment opportunities, those who have stayed have witnessed remarkable cultural changes in their lifetimes. These include an increase in the availability of secondary education, the arrival of mains electricity and high-speed Internet, and dramatic improvements in transportation. The people of Westray have mostly welcomed the changes as improvements, but they also voice regret for the concurrent decline of their dialect.

Overview of the lexical classes

The goal of this paper is to account for the alignment of the historical vowel classes of Older Scots with modern phonemic distinctions, thus clarifying the dialect's current phonemic inventory. Older Scots developed from Old English and was spoken between 1100 and 1700 A.D. (contemporaneous with Middle English). Modern Scots did not emerge until around 1700, slightly later than Modern English (Bergs, 2001). Table 1 presents Johnston's system of word classes for Scots dialects based on the Older Scots phonemes (1997). Historical lexical classes will be given in capital letters, while modern phonemes will be placed in slashes rather than represented by keywords.

Class keyword: front vowels	Older Scots source	Class keyword: back vowels	Older Scots source	Class keyword: diphthongs	Older Scots source
MEET	**/e:/**	OUT	/u:/	NEW	/iu/
BEAT	**/ɛ:/**	COAT	/ɔ:/	DEW	/ɛu/
MATE	**/a:/**	COT	/ɔ/	BITE	/i:/ short env.
BAIT	**/ai/**	CAT	/ɑ/	LOIN	/ui/
BOOT	/ɔ:/	CAUGHT	/ɑu/	LOUP	/ɔu/
BIT	**/ɪ/**	CUT	/ʊ/	VOICE	/ɔi/
BET	**/ɛ/**			TRY	/i:/ long env.

Table 1: Scots historical lexical classes (Johnston 1997). Classes pertinent to this paper in bold.

This paper will discuss the front unrounded vowels: MEET, BEAT, MATE, BAIT, BET, and BIT. I will take a special interest in four of these six classes, which I will call the E classes: BEAT, MATE, BAIT, and BET. I will focus on these classes because they cluster in the mid-front portion of the vowel space; existing accounts of their current status are unclear. To help avoid the complications of phonetic conditioning, I will restrict my analysis for the time being to vowels before voiceless alveolar stops (/t/). The BIT class appears to be quite coherent, with few lexical transfers to any other classes, and has a consistent phonetic realisation that is considerably lower and less peripheral than any of these other classes. Some MEET words, which are normally pronounced with something close to cardinal 1, [i], can also be pronounced [e], while some BEAT words cannot (always being pronounced with [i]).The phonemic incidence of words in these classes appears to be relatively stable and I will thus attribute it to a historical process of transfer in both directions between these classes rather than an additional source of synchronic variation. Wyld (1914) discusses a similar situation with Middle English, concluding that the cause of this transfer has been obscured. Setting aside issues of lexical incidence, however, and considering MEET to be the dialect's /i/ class and BEAT to be an E class, the central question becomes: How are the four E classes (BEAT, MATE, BAIT, and BET) phonologically arranged in Insular Scots today?

Previous research

Only a handful of authors have dealt with the phonemic inventory of modern Insular Scots. Melchers (2004), as mentioned previously, explicitly avoids the question of phonemic inventory of these varieties for many reasons. Rather than working from the Older Scots classes, Melchers uses Wells' lexical sets and gives a variety of possible realisations for each class. Although it is perfectly justifiable to refrain from positing a phonemic inventory, the disadvantage of her approach is that it conflates two problems and thus creates a larger problem. One problem is the alignment of Scots classes with Wells' English-specific classes, and the other is variation within each of these classes. As a result, the phonological description she provides is more helpful for classes that align more neatly with modern English classes than the E classes with which I am concerned.

Orten's (1991) thesis on the Kirkwall accent is slightly more revealing. She makes some claims on the nature of various phonemic classes, the most relevant of which is that Kirkwall has a full FLEECE merger, meaning that items belonging to the MEET and BEAT classes are pronounced with [i]. It becomes evident throughout her presentation that the phonemic inventory resulting from her analysis is very nearly standard; it certainly does not diverge from Scottish Standard English (SSE) in any systematic way. Where she does encounter hints of what might be guessed to be traditional dialect realisations of words, she dismisses them as peripheral to her analysis. For example, she mentions but downplays the possible use of vowel length to distinguish between *bid* and *bed* and the presence of an upglide to distinguish *made* from *maid*. Because her main informant is from the larger, less insular town of Kirkwall, it is not surprising that her data look relatively standard.

Johnston's chapter on Regional Variation in the *Edinburgh History of the Scots Language* (1997) is one of the most comprehensive resources on the phonology of non-standard Scots dialects. Johnston takes the valuable but inscrutable data from the Linguistic Survey of Scotland (LSS) (Mather and Speitel, 1986) and gives it an analysis based on the historical lexical classes described above. This yields a still-complex but more manageable account of this data, which come from a small handful of informants from both Kirkwall and the more remote islands. In Johnston's analysis, MEET contains [i(:)][2] except in certain subclasses which transfer to BITE—a case which is not attested in my data. He asserts that BEAT is 'isolatively merged with MATE under /e/,' although he acknowl-

edges that [i] 'may occur in any BEAT word' (Johnston, 1997: 457). He also reports that BEAT can be realised as [ɛː] before /k/. He sees a split development of the MATE class, merged with BEAT in most phonological environments but instead with BAIT before or after velars or /r/. In other environments, BAIT may apparently be realised as either [ɛː] or [eː]. The LSS data give [ë] and [ë] in variation for the BIT class. BET is reported to contain [ɛ(ː)~æ(ː)] before voiceless segments and [e(ː)~æ(ː)] before voiced. Johnston also suggests that in the latter case, the BET vowel has the potential to develop into an upgliding diphthong. Finally, he indicates that before /k/, all four E classes might be merged. In the following sections, I will report findings that differ from some of these claims, but Johnston's work provided an invaluable starting point for my own analysis.

A recent book by Millar (2007) deals again with the vowel phonology of Insular Scots. The phonological discussion is based heavily on Johnston (1997), but also incorporates new data from the author's own fieldwork. Millar's proposed arrangement differs from Johnston's in the following ways. He recognises the potential for some MEET words to be merged with BEAT under an E phoneme. He also says that BAIT is merged with MATE and BEAT and many DRESS words (where DRESS corresponds to BET) although BAIT, MATE, and BEAT may be long and offgliding in comparison to DRESS. DRESS is described as 'similar if not identical to' BEAT, MATE, and BAIT. He also reports [ɪ] for BIT rather than [ë].

It is evident that there is not yet a firm consensus regarding the phonological status of the historical vowel classes in Insular Scots. Note also that previous work has relied primarily on auditory coding and relatively small numbers of speakers. By introducing the use of tools such as spectrographic and statistical analysis over a somewhat larger participant pool, I hope to contribute clarity to the discussion.

Methodology

Participants

The interviews for this study took place over three weeks in May 2007. The twenty-seven speakers were all born and raised in Westray and have local Westray parents.[3] The participant group is a judgment sample balanced for age (18–34, 35–54, or over 55) and sex (four or five men and four or five women in each age group).

Interview procedures

Interviews took place at the participants' homes or the flat where I was stationed in Pierowall, the only village in Westray. Participants were informed about the nature of the study and asked to sign a consent form before the interview began. I recorded the interviews directly onto a laptop using a Samson CU01 USB Studio Condenser microphone and Audacity, a free open-source sound editing software programme. Each interview began with the collection of basic demographic information and progressed to a word list. The word list was designed to elicit tokens of eighteen potentially distinct historical vowel classes (as shown in Table 1) in six different environments (preceding /t/, /d/, /n/, /l/, /r/, and word-finally). After reading the word list aloud at a comfortable pace, speakers participated in a guided conversation. This paper will focus on the word list, rather than conversational, data.

Minimal pair tests

There is also a minimal pair test component to this study, currently in the pilot phase with only three speakers tested so far (one male from each age group). Despite the small number of participants, I will describe the results of these tests in detail to raise some questions worth examining in the full sample.

The minimal pair test consists of thirty-three pairs of monosyllabic words that differ only in their vowel nuclei, with the onsets and codas identical (for example, *bit* and *bet*). Of these thirty-three pairs, sixteen had /t/ as the final consonant: in keeping with the rest of my analysis, which is restricted to vowels before /t/, I will focus on these sixteen pairs. The words all belonged to one of the six front unrounded vowel classes, MEET, BEAT, MATE, BAIT, BET, and BIT. I emphasised to the participants that I was interested in the words as they would say them to their family or friends and that there were no 'correct' answers. I showed them one pair of words at a time, asking them to say the words out loud and then to tell me whether the words sounded 'the same' or 'different.' I recorded the tests onto my laptop using the same set-up as the interviews, although they were conducted on separate occasions.

Data analysis

The word list and minimal pair data were segmented into word-length files in Audacity. I then used Praat to create spectrograms and perform

linear predictive coding (LPC) analyses (Boersma, 2001). The first and second formants (F1 and F2) for each vowel were measured where the vowel was most target-like, at a maximum point of F1 or the middle of a steady-state F1 (inflection points in F2 were also considered in unclear cases). I applied Nearey's (1977) normalisation algorithm to account for differences in vocal tract length resulting from age or sex.

I also used Praat to measure vowel length. I followed the procedure given by House (1961), using the presence of voicing, frication, and formant structure to determine the beginning and end points of each vowel.

Statistical analyses were conducted in Microsoft Excel. In addition to calculating means and standard deviations, I used two-tailed, independent samples t-tests assuming unequal variances to compare class averages. I chose a specified significance level of $\alpha=0.05$ but will occasionally report *p*-values that are either close to being significant (under $\alpha=0.10$), or are much more significant than $\alpha=0.05$.

Results and analysis

Minimal pair data: Speaker judgments

I first grouped the minimal pair test judgments by word class to see what classes were considered the same and different by each of the three pilot participants. The word classes were not entirely consistent in their arrangement, so the generalisations presented here represent some amount of abstraction away from questions of lexical incidence. Most notably, the younger and older males both gave [e] pronunciations for *meet* and *greet* but not *beet*: as previously discussed, I will consider this a matter of lexical transfer. The BIT class was consistently judged to be different from all the other classes, confirming my previous assertion that its status is not in question. The self-reported groupings are presented here in Table 2.

Phonetic realisation	Young male	Middle male	Older male
[i]	MEET	MEET	MEET
[e:]	MATE	MATE-BAIT	BEAT-MATE-BAIT-BET
[e]	BEAT-BET-BAIT	BEAT-BET	
[ɛ̈]	BIT	BIT	BIT

Table 2: Speaker judgments of front unrounded vowel classes in minimal pair tests

Table 2 suggests that all three speakers have different phonemic systems. The young male reports that MATE stands alone as a class and the other three E classes are merged, whereas for the middle-aged male MATE is merged with BAIT and BEAT is merged with BET. The older male judged all of the E words to be the same (BEAT, MATE, BAIT, and BET). The relationship between MATE and BAIT may be unclear, as the only minimal pair in the test that would have revealed either a distinction or a merger here is *bait-bate*. The somewhat forced word *bate* was commented upon as being strange or unfamiliar by two of the participants, although they still pronounced it consistently. But even if this represents a pronunciation borne not of familiarity with *bate* but of analogy with *mate*, it achieves the desired effect of placing the MATE vowel in a minimal pair frame with other *b_t* words. It is unfortunate that there are not more possible minimal pairs containing BAIT and MATE before /t/.[4]

What might the implications of the above arrangement be? If an apparent time interpretation were to be applied to the three speakers as a microcosm of the speech community, with each individual taken to represent a generation, the arrangements presented would be puzzling. It would appear that the four historical vowel classes (BEAT, MATE, BAIT, and BET) were merged under a single phoneme (/e:/) in the oldest male's speech and split into two phonemes, /e:/ (MATE and BAIT) and /e/ (BAIT and BET), in the middle aged male's speech, adding a vowel to the inventory. By the next generation, the number of phonemes remains constant, but a further split of BAIT out of the /e:/ phoneme to join the /e/ phoneme occurs. I use 'split' in a casual way here, but in fact we can observe that this process is not a split in the technical sense; rather, it appears to be an unmerger in that it yields reconstructed historical vowel classes. The mid front unrounded vowels would seem to be behaving in flagrant violation of Garde's principle that mergers are irreversible by linguistic means (Labov, 1994: 15).

The first step towards sorting out this puzzle is to examine the actual productions of these speakers during the minimal pair tests. As Labov demonstrated, it is possible for speakers to have a *near-merger*, where they report that two words sound the same yet pronounce them with a consistent difference (1994: 363). There are several ways we might expect relatively similar vowels to differ. Among these are quality, including both height and advancement; rounding; quantity (length); and glide presence or direction. Since the vowels under consideration are the front unrounded vowels, I will not consider rounding. I will also gloss over

the various glide possibilities—as is typical in Scots dialects, the vowels under discussion are primarily monophthongs. Instead I will consider both quality and quantity. I will include some discussion of the MEET class because it is implicated in the arrangement of these classes (that is, despite my simplifying assumptions, MEET and BEAT are intertwined with respect to lexical incidence and SSE); the BIT class will be left aside because its phonemic status is clear.

Minimal pair data: Quality differences

For each speaker, measurements of F1 and F2 taken from the vowel spectrograms were used to compare the qualities of each lexical class. The lexical classes were then combined according to the speaker's self-identified phonemes to examine the reliability of these identifications.

The quality of the vowels the young male judged to be the same showed no statistically significant differences ($p>0.05$ for both F1 and F2), and the vowels he judged to be different do differ significantly ($p<0.05$ for both F1 and F2). Since the speaker's judgment concurs with his production, I conclude that his BEAT, BET, and BAIT classes are merged. When the data from these three classes are collapsed and compared to the data for MATE and MEET, t-tests show a significant difference on both F1 and F2 ($p<0.05$) between the combined BEAT-BET-BAIT class and the MATE class, and that both also differ significantly from MEET on at least one dimension, as expected ($p<0.05$ for F1; MATE does not differ significantly from MEET on F2, with $p>0.05$). Chart 1 shows the young male's average quality of each of the five historical classes, while Chart 2 collapses these classes as he judges them to be the same or different. For this speaker I will call BEAT-BET-BAIT /e/ and MATE /e:/, for reasons that will become clear in the discussion of length.

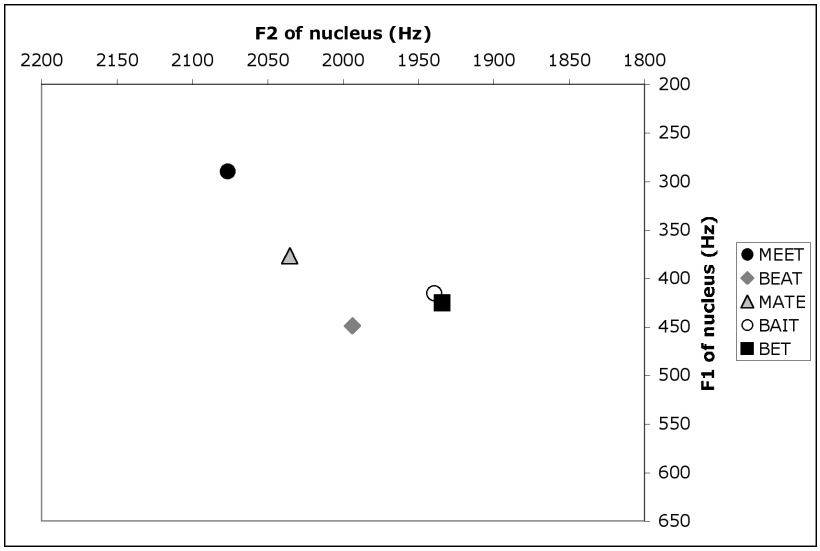

Chart 1: Historical lexical class averages in the young male's minimal pair data

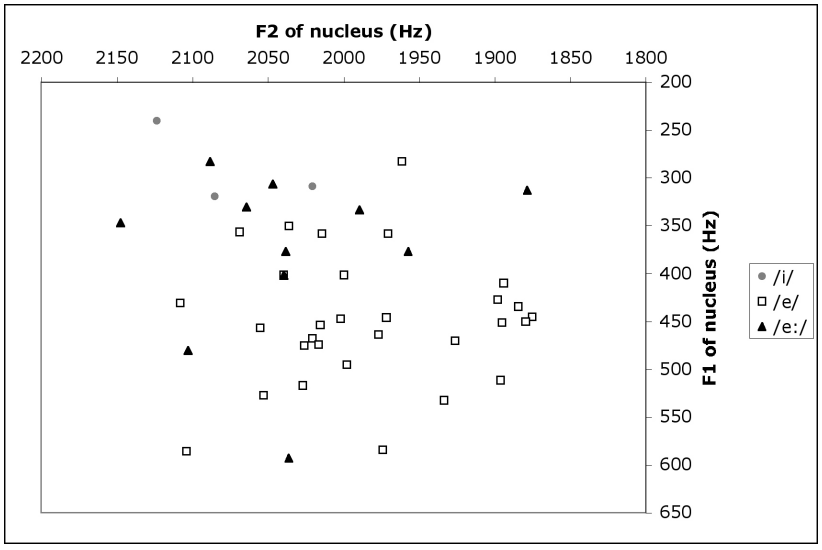

Chart 2: Tokens of self-identified phonemes in the young male's minimal pair data

Next I turn to the middle-aged male's data. Consistent with his judgments, there is no significant difference on either dimension between BEAT and BET (p>0.05). The same is true for MATE and BAIT. T-tests of BEAT and BET combined versus MATE and BAIT combined show a statistically significant F1 difference (p<0.05) but not a significant F2 difference (p>0.05). The speaker is thus accurate in his judgment that these vowels differ in his production. For this speaker I will call BEAT-BET /e/ and MATE-BAIT /e:/. The arrangement of the historical vowel classes in his minimal pair data is shown in Chart 3. Chart 4, which shows the fields of dispersion of /e/ and /e:/, makes it clear that there are dramatic overlaps in these vowels despite the statistical findings.

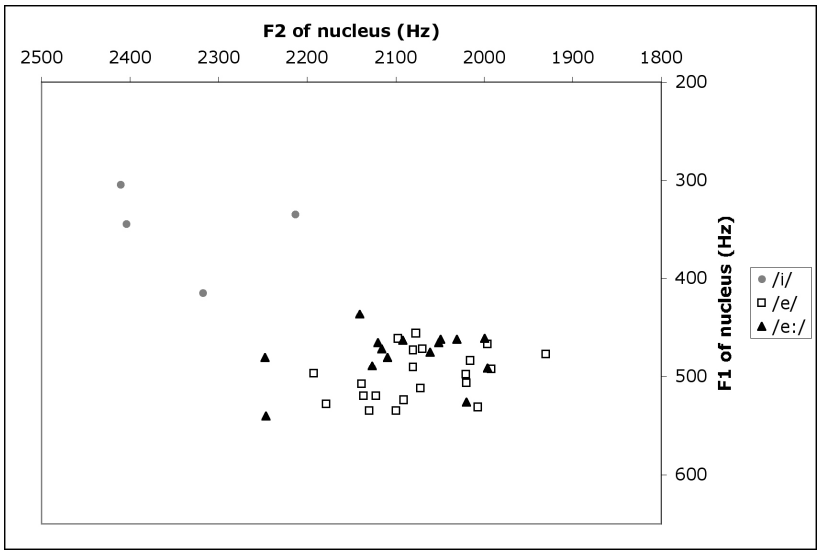

Chart 3: Historical lexical class averages in the middle male's minimal pair data

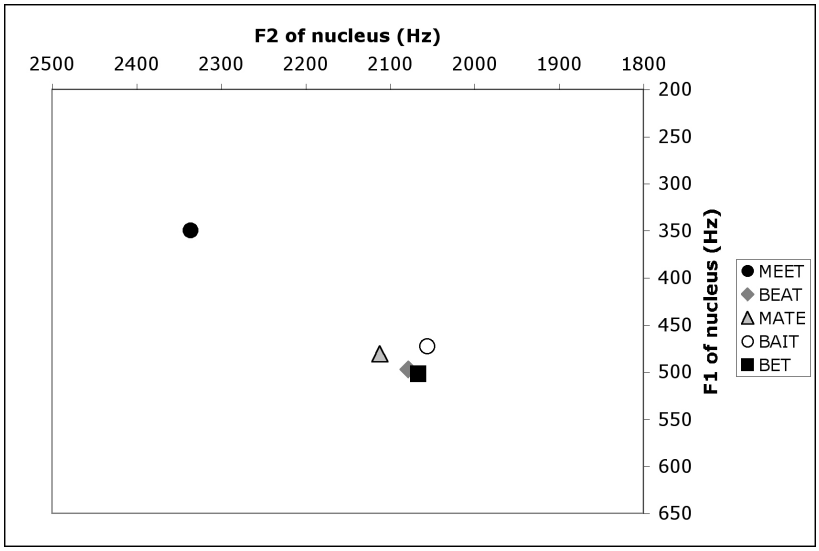

Chart 4: Tokens of self-identified phonemes in the middle male's minimal pair data

Finally, I consider the minimal pair production data from the older male. Recall from the beginning of this section that he judged all of the E classes to be the same. However, t-tests comparing the classes show that there are in fact statistically significant differences on the F1 dimension between BEAT and MATE and between BET and MATE ($p<0.05$). BEAT and BET, however, show no such difference ($p>0.05$). It appears that for this speaker, BEAT and BET are merged in opposition to MATE. The status of BAIT is less clear: t-tests show no significant differences on any dimension between BAIT and any other E class. This most likely indicates that BAIT lies in the overlap between MATE and BEAT/BET and thus does not achieve a statistically significant difference from either one. This speaker displays what appears to be classic near-merger behaviour: a small distinction in quality on a single dimension (although Labov reports that the difference in a near merger is most often in F2, rather than F1 (1994: 359)) that is not perceived as different by the speaker. His actual average production values for each of these classes are shown in Chart 5.

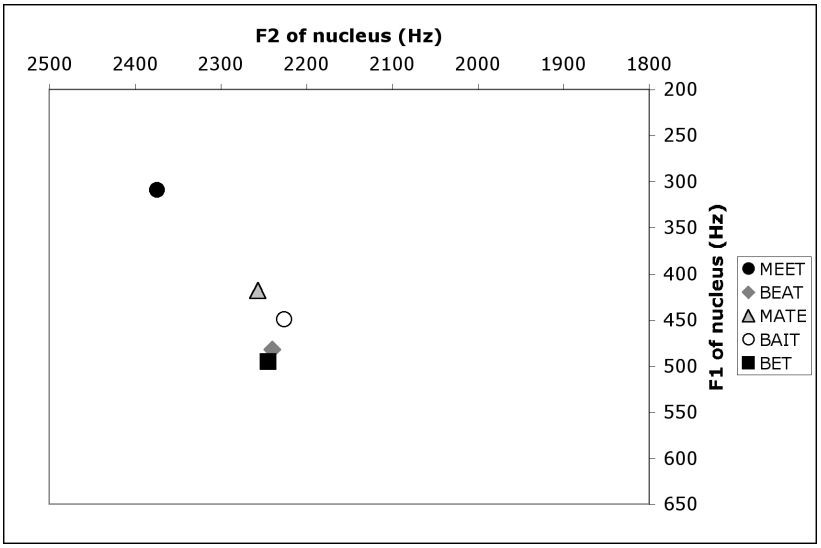

Chart 5: Historical lexical class averages in the older male's minimal pair data

Minimal pair data: Quantity differences

For each speaker's minimal pair data, we can see that there are a number of possible phonemes which, although they achieve statistically significant differences on one dimension or another, overlap considerably in their distributions. In other words, if these are indeed phonemes they seem to lack the normal margins of security (Martinet, 1955). As mentioned previously, there is another way in which we might expect phonemes to differ even when they occupy nearly the same parts of vowel space; namely quantity. That length might be a salient means of vowel differentiation in this dialect was suggested to me by the young male speaker during his minimal pair test. Given such minor differences in quality that nonetheless produce reliable judgments of "different," the measurement of vowel length seemed worth pursuing.

Table 3 shows the length results for /e/ and /e:/ for the young and middle aged speakers. Bear in mind that /e/ for the young male represents BEAT/BET/BAIT and /e:/ represents only MATE, while /e/ for the middle aged male represents BEAT/BET and /e:/ represents BAIT/MATE.

	Young male		Middle male	
	/e/	/e:/	/e/	/e:/
Average length	.075	.150	.083	.144
Standard deviation	.013	.026	.011	.029
Range of lengths	.046-.099	.111-.182	.063-.104	.113-.170
Length t-test	$p<0.001$		$p<0.001$	

Table 3: Length measurements for /e/ and /e:/ in the young and middle males' minimal pair production data. All measurements given in seconds.

The young male's /e/ and /e:/ classes show a highly significant length difference ($p<0.001$) that is in fact categorical: the ranges do not overlap. The same is true of the middle aged male's data. This suggests that it is the length difference, rather than the minor and heavily overlapping quality differences, that is more salient for these two speakers in their differentiation of these front vowel classes. But what about the results from the older male, who did not distinguish between any of the E classes? Table 4 shows the mean length and standard deviations for each of these classes as produced by the older male. The classes are arranged in order of increasing length.

	Mean length	Standard deviation	Range of lengths
BEAT	0.091	0.019	0.069-0.121
BET	0.099	0.034	0.067-0.153
MATE	0.105	0.027	0.075-0.141
BAIT	0.118	0.029	0.075-0.158

Table 4: Mean length and standard deviation by historical lexical class for the older male's production in the minimal word test. All measurements given in seconds.

There is a much less clear length distinction here than for either of the other speakers. The length ranges are slightly shifted but overlap heavily. However, t-tests show that there is a significant difference ($p<0.05$) between the longest and shortest classes, BEAT and BAIT, and that the difference between BEAT and MATE is also approaching significance at $p=0.08$. The difference between MATE and BAIT is not significant, suggesting that it would be accurate to describe MATE and BAIT as merged long /e:/ for this speaker (recalling that the quality difference

between these two classes was also not significant on either F1 or F2). But what about BET? T-tests do not actually reveal any significant differences between the length of BET and the length of any other E class. Just as BAIT appeared to be merged in quality with every other class, despite those classes not being merged with each other, so BET appears with length. And just as BAIT is located phonetically in between the higher and lower values of E, so BET has an average length that is intermediate.

Interestingly, in the interaction of length and quality lies a possible mechanism for the maintenance of a complex series of distinctions in the older male's phonology. If we were to allow for these intermediate values — BAIT on quality and BET on length — to represent distinctions despite the fact that they do not achieve statistical significance, we would see a pattern emerge that distinguishes all four E classes, as shown in Table 5.

Class	Relative height	Relative length
BEAT	Low	Short
MATE	High	Long
BAIT	Mid	Long
BET	Low	Mid

Table 5: Relative height and length of the older male speaker's E classes.

Table 5 shows that no two classes have the same combination of relative height and relative length for the older speaker. Although there are two clearly low classes (BEAT and BET), they do not have the same relative length, and although there are two clearly long classes (MATE and BAIT), they do not have the same relative height. Although this tenuous configuration is inconsistent with previous models such as those of Martinet's margins of security (1955) or Labov's vowel subsystems (1994), it is plausible that it might still furnish the conditions necessary for each of these classes to develop differently in later generations' speech. By the same reasoning, it would also allow for the code-switching that all the speakers I interviewed could perform. If we were to observe, for example, that BEAT and BET are entirely merged in quality for this speaker, how could we account for his effortless ability to pronounce BEAT words with /i/ in casual speech with an outsider like myself, yet never hypercorrect BET words to an /i/? This should only be possible if in fact his 'merged'

BEAT and BET classes retain a marginal distinction that allows them to be separated.[5]

The patterns seen in the minimal pair data offer some tantalising suggestions of changes that might be taking place and means of differentiating vowels that seem unusually similar by phonological standards. But this data comes only from three speakers, which can hardly be considered reliable under normal sociolinguistic assumptions. To find out whether such patterns exist in the Westray speech community as a whole, we must turn to the word list data from the full judgment sample of speakers.

Word list data: Quality differences

To evaluate whether the historical lexical classes are differentiated by quality in the overall speaker sample, I combined all of the speakers' word list tokens for each E class (excluding tokens containing /i/). The overall distribution of tokens in each E class, BEAT, MATE, BAIT, and BET, is shown in Chart 6. The average for each of these classes is shown in Chart 7.

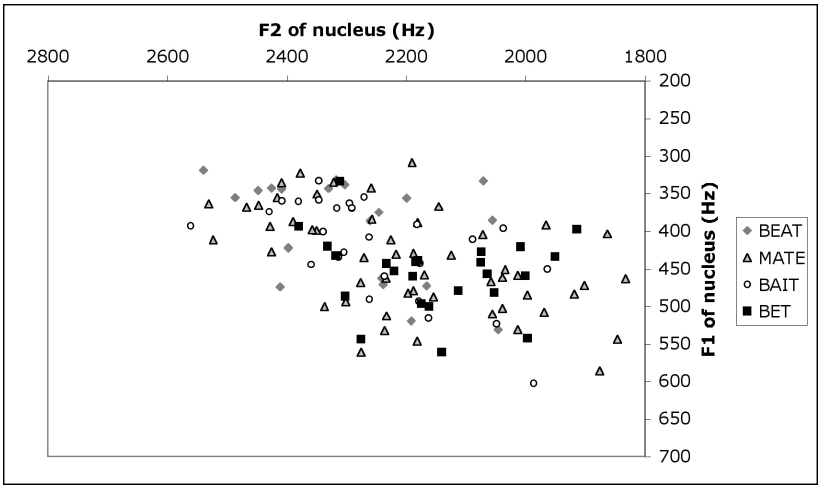

Chart 6: Overall word list token distribution of each historical lexical class in word list data from all speakers

T-tests performed on the data organised in this fashion revealed that there was no significant difference in the quality of BEAT and BAIT and an equal lack of difference between MATE and BET, but that each of these vowels does differ significantly from the opposing two at $p<0.05$

on both dimensions (with the minor exception that the difference on F1 between MATE and BAIT is only close to significance, at p=0.09; these two classes are still significantly different on F2). This seems to suggest that BEAT and BAIT are merged and MATE and BET are merged. When these class pairs are combined and t-tests are run again, these two groups (BEAT+BAIT and MATE+BET) are shown to be highly significantly different (p<0.001) on both height and advancement. It seems reasonable at this point to propose that we have two phonemes here, a more peripheral one composed of the words that historically belonged to the BEAT and BAIT classes of Older Scots, and a more centralised one composed of the words that historically belonged to the MATE and BET classes in Older Scots. Notice, however, the considerable overlap of all four classes in the vowel space, as evident in Chart 6.

In the minimal pair data we saw that quality may not be the only salient means of differentiating vowels in this dialect. It thus seems imperative to investigate patterns of length in the word list data as well.

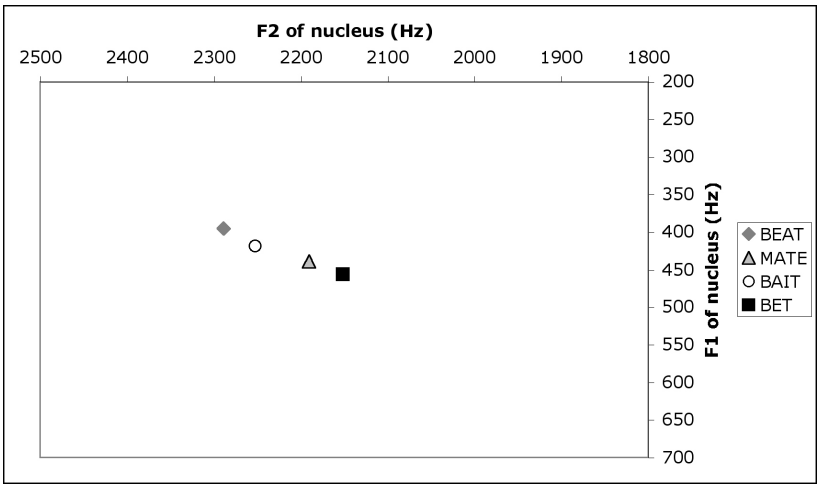

Chart 7: Average value for each historical lexical class in word list data for all speakers combined

Word list data: Quantity differences

The determination of which vowels had longer and shorter values was not as clear-cut as in the minimal pair data, because each class was represented by only one or two tokens in the word lists. Averages, standard

deviations, and length ranges were thus not useful tools. A slightly more subjective approach was therefore necessary, one in which I arranged the vowels of each speaker in order of descending length and noted natural breaks in length groupings while respecting the ranked order. One speaker was excluded entirely because he showed what appeared to be random length differences (and had other irregularities in his word list data, perhaps related to hearing difficulties). Four other speakers, including the older male speaker from the minimal pair tests, showed no discernable length distinctions and will not be considered in this analysis.

For the remaining participants, there seem to be two predominant patterns of length groupings: a minority pattern with MATE, BAIT, and BET being longer than BEAT (the long-BET pattern), and a somewhat more common pattern with MATE and BAIT being longer than BEAT and BET (the short-BET pattern). Outside of these four speakers, thirteen speakers had the short-BET pattern, and nine had the long-BET pattern. T-tests show that when the tokens are grouped in this way, the lengths of the long and short vowel categories are significantly different within each pattern, at $p<0.001$. Furthermore, a t-test comparing the long /e:/ tokens of short-BET speakers and long-BET speakers and a t-test comparing the short /e/ tokens of speakers from each pattern revealed that the long tokens are not significantly different in length across patterns, nor are the short tokens.

These results provide quantitative support to the otherwise-subjective placement of the length breaks, suggesting that the decisions made were valid and both patterns do indeed exist. Further research might investigate why there should be two (or perhaps more) phonological configurations available within a single speech community; this may be a case of idiosyncratic variation such as that documented by Dorian (1994) in a similarly small and homogeneous population.

Merger avoidance

The interaction of quality and quantity for speakers with a short-BET pattern can be analysed along the same lines as the data for the older male speaker's minimal pair test. When the E vowels are differentiated in both quality and length, a four-vowel distinction can be maintained in a relatively small region of the vowel space, as shown in Table 6. This arrangement indicates that none of these classes are truly merged for these speakers, again helping solve the problem of merger irreversibility with respect to the speakers' ability to control the SSE variants of these classes. This result illustrates two merger-avoidance strategies outlined by Harris

(1985) in his discussion of the MEAT-MATE merger in Hiberno-English: length contrast and peripherality contrast.

Class	Quality	Length
BEAT	Peripheral	Short
MATE	Non-peripheral	Long
BAIT	Peripheral	Long
BET	Non-peripheral	Short

Table 6: Quality and length of historical lexical classes in word list data for short-BET pattern speakers

But what about the long-BET speakers? With a long BET, we would expect these speakers to have a full merger of BET and MATE, as both classes would be non-peripheral and long. The answer will probably need to be found in one of the other possible merger-avoidance strategies outlined by Harris, the most likely of which seems to be the development of a glide. Future analyses should quantify glide presence and direction.

Conclusion

The results I have discussed here constitute a useful step towards understanding the complex vowel phonology of the Insular Scots dialect spoken in Westray. The front vowel configuration presented in the analysis of the word list data is more straightforward and well-documented than previous accounts, although it stands to be complicated by future analysis of the same classes in contexts other than before /t/. Future work taking a similar approach to the back vowel classes and diphthongs could provide a comprehensive vowel phonology for the dialect, making the dialect a good candidate for study by students of more general principles of language variation and diachronic change. By exploring data that fail to conform to often-assumed principles of phonology and of language change, the data in this paper illustrate the potential value of exploring under-documented minority dialects.

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Notes

1 Note that, because of the Norse presence and the islands' remote location, Scottish Gaelic has never been a significant linguistic entity in Orkney

2 With optional length determined by the Scottish Vowel Length Rule; see Bergs (2001)

3 With two exceptions: one speaker had a parent from a neighbouring island, and another had one from northern Scotland.

4 *Gait* and *gate* were unfortunately overlooked and will be included in future minimal pair tests, although this will raise the issue of the conditioning of MATE after velars.

5 The same question remains for the middle and young speakers, for whom I have not yet found a means of differentiating between classes merged in length and quality.