

Are there L1 and L2 effects in the speech of young speakers of Māori?

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Abstract

This paper examines the vowel production of eight young male speakers of Māori in order to assess whether there are pronunciation differences between those who were raised as L1 speakers of Māori and those who clearly learnt English first. We demonstrate that the L1 speakers produce two vowel pairs, /a:/ (WĀ), /a/ (WAKA) and /ü:/ (TŪ), /u/ (TUKU) significantly farther back than the L2 speakers. We suggest that these back articulations may be being used subconsciously by young L1 speakers as a marker to make their pronunciation more like a 'traditional' Māori pronunciation, and less like modern New Zealand English.

1. Introduction

Māori has been spoken in New Zealand for approximately 800 years. Over the last 150 years it has been increasingly threatened by English. Until the mid 20th century, most Māori spoke the Māori language, while becoming increasingly bilingual in English. Surveys carried out during the 1970s found that the number of fluent Māori speakers had declined to approximately 60,000, most of whom were over sixty years of age (Benton, 1991a: 29, 1991b: 196). The major concern was that, with few young adults speaking Māori, inter-generational transmission of the language had been interrupted (Benton & Benton 2001; Fishman, 1991). These findings helped to stimulate revitalization efforts since the 1980s with a particular focus on producing a new generation of younger speakers. This paper examines the vowel production of eight young male speakers of Māori in order to assess whether there are pronunciation differences between those who were raised as L1 speakers of Māori and those who clearly learnt English first.

2. Background

2.1. Māori revitalization

Following the results of surveys in the 1970s (see Benton, 1991), serious efforts at revitalization of the Māori language were started. These were 'flax roots' efforts, organized by the Māori people, rather than imposed by the government. The first of the new initiatives was the development of preschool *kōhanga reo* (language nests). These started in 1982 with the aim of supporting and encouraging the use and retention of te

reo Māori. They constitute a total immersion te reo Māori whānau (family) programme for mokopuna (young children) from birth to six years of age, and are now distributed throughout the country (see <http://www.kohanga.ac.nz>). Bilingual units in mainstream primary schools had existed since 1977. *Kura kaupapa Māori* (Māori immersion schools) were established in 1985 so that children who had completed *kōhanga reo* would not lose their language schools. The first *whāre kura* (Māori medium high school) was established in 1993 (Hoani Waititi, West Auckland) and there are now about 20 throughout the country, with more in the North Island than the South Island because of the population distribution. There are currently three *wānanga* (tertiary institutions) offering certificates and diplomas (especially for work skills related courses) and also degrees. At adult level, there are *wānanga reo* (immersion courses for adults of varying lengths) and *Te Ataarangi* (a movement for adult education in Māori language using Gattegno's 'Silent Way' and Cuisenaire rods, (see Benton & Benton, 1999). (For current details on Maori-medium programmes see Ministry of Education, 2006.)

At the start of the twenty-first century, the number of people who say that they can speak Māori to some extent is increasing, but the number of fluent speakers continues to decline. Māori currently make up approximately 14% of the New Zealand population. In 2001, Te Puni Kōkiri (the Ministry of Māori Development) surveyed 5000 Māori aged 15 and older to ascertain the health of the Māori language (Te Puni Kōkiri, 2002). 42% of those surveyed said they could speak the Māori language to some extent, but only 9% said they could speak it 'well' or 'very well' so that they could 'talk naturally and confidently in Māori about domestic or community subjects without making errors' (2002: 9). Unfortunately, children who were attending *kōhanga reo* or

kura kaupapa Māori were too young to be included in the survey.

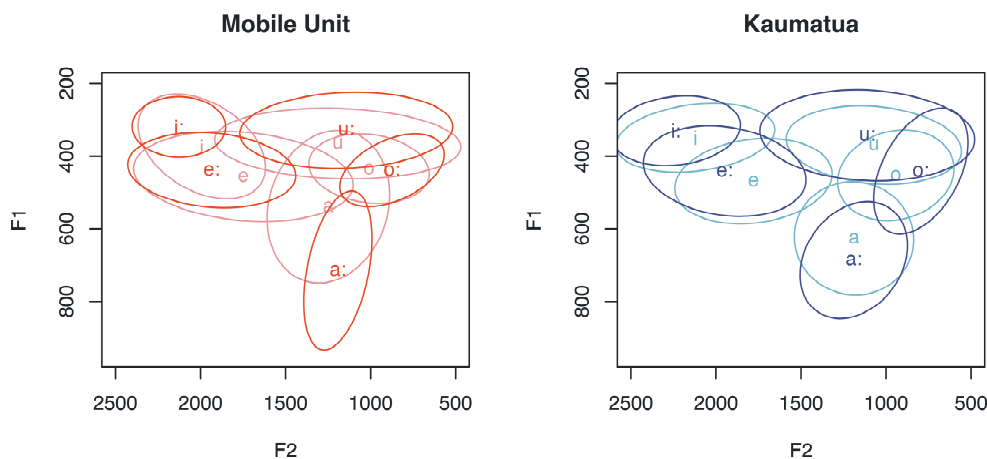


Figure 1: Vowel spaces for MU (left) and Kaumātua (right) in Hz

2.2. Māori phonology

The Māori vowel system is usually analyzed in terms of five short vowels, /i, e, a, o, u/. These may occur alone or in sequences. Within morphemes, and variably across morpheme and even word boundaries, sequences of like vowels are realized as a single phonemically long vowel, and many sequences of unlike vowels are realized as diphthongs, which include some sequences of $V_1V_1V_2$ (for details see Bauer, 1993; Harlow, in press). This paper is concerned with the quality of the five short and long monophthongs. In keeping with the convention for the naming of English vowels devised by Wells (1982), we will be naming the Māori short and long vowels PIKI, /i/, KETE, /e/, WAKA, /a/, MOKO, /o/, TUKU, /u/, PĪ, /i:/, KĒ, /e:/, WĀ, /a:/, MŌ, /o:/ and TŪ, /u:/ respectively to represent both the relevant phoneme and the set of words that contain that phoneme. Māori syllable structure is straightforward; all syllables are open, onsets are empty or consist of a single consonant and peaks are any of the monophthongs or diphthongs, (C)V(V(V)).

2.3. The MAONZE project

The MAONZE project is studying change in pronunciation over time in the Māori language (see Harlow, Keegan, King, Maclagan & Watson, 2005 for a summary). We are analyzing three groups of speakers:

- a group of ‘historical’ speakers born in the late 1800s and recorded in the 1940s by the Mobile Disc Recording Unit of the New Zealand Broadcasting Services. (The original recordings are kept in the Radio New Zealand’s archives, Sound Archives Nga Taonga Korero, in Christchurch.) This is the MU speaker group,
- Kaumātua born in the 1920s and 1930s; the K group,
- Young speakers born in the 1970s and 1980s and divided into first language (L1) speakers of Māori and second language (L2) speakers of Māori; the Y group,

There are seven Māori speakers in the MU database all of whom will be analyzed. When the project is complete, they will be compared with ten kaumātua and five young L1 and five young L2 speakers. This paper focuses on the pronunciation of the young speakers.

2.4. Previous results

Figure 1 presents the vowel spaces for four MU speakers and eight kaumātua (Maclagan, King, Harlow, Watson and Keegan, 2006). All speakers keep all short and long vowels significantly different from each other. Similarly, all short/long pairs are significantly different from each other both in F1/F2 space and in length. The major difference between the MU and the kaumātua is in the lowering of waka, so that it is much closer to wā (Maclagan, Harlow, King, Keegan & Watson, 2004).

3. Methodology

3.1. Speakers

This paper focuses on the pronunciation of the young speaker group. Eight speakers born between 1969 and 1984 are analyzed: five L1 speakers and three L2 speakers. We intend to record two more young L2 speakers to even the groups. In spite of revitalization, there are still relatively few young speakers who are genuinely L1 speakers of Māori. In order to be classified as L1, speakers had to be raised in a Māori speaking environment. None of the speakers’ parents were L1 Māori speakers, but the grandparents of the young L1 speakers were, and, as is common in Māoridom (Metge, 1995), the grandparents were very involved in their home life. Only one of the young speakers attended kōhanga reo (L1Y05), but all young L1 speakers attended Māori medium primary schools. The three young L2 speakers learnt Māori at school; one attended a bilingual primary school, the two other speakers learnt Māori at high school and university.

3.2. Data

The speakers were recorded in Māori and in English for approximately an hour. All Māori interviews were carried out by interviewers familiar with the speakers. The English interviewer was a stranger to two of the young L2 speakers. The speakers read word lists and passages and engaged in relatively casual conversation with the interviewers. Interviews were recorded on Sony DAT recorders (TCD-D8) with Sony tie clip microphones (ECM-T145). The interviews were backed up to CD and converted to .wav format for analysis. Interviews were transcribed using Transcriber (<http://trans.sourceforge.net/en/presentation.php>) and analyzed in Praat (<http://www.fon.hum.uva.nl/praat/>).

3.3. Analysis

Vowel tokens for analysis were taken from syllables with no stress induced reduction. Approximately 30 tokens of each vowel were analyzed, where possible including no more than five tokens from any individual word type. Because some vowels occur relatively infrequently (Harlow, in press: 68), it was not always possible to find 30 appropriate tokens. Pi and TŪ were the vowels for which fewest tokens were found. F1, F2 and length were measured for all vowels. Vowels preceded or followed by another vowel or diphthong were not included in the analysis. Vowels followed by a pause, or in audibly hesitant words were not included in the length analysis. Formant measurements were taken during the steady state portion of the vowel. If there was no steady state, formant readings were taken at the F2 maximum (and F1 minimum) for front vowels, the F1 maximum (and F2 minimum) for central vowels and the F2 minimum (and F1 minimum) for back vowels. For length measurements, consonant transitions were included within vowel measurements as long as vowel formants could be seen (i.e.

as long as there was voicing). Māori does not have syllable final consonants and, with the exception of /r/, anticipatory transitions were not common. Any anticipatory transitions that did occur were included in the vowel length if there was no break before the initial consonant of the following word.

4. Results

Figure 2 presents the mean duration results, in msec, for all the monophthongs for the young L1 and L2 speakers. The Kaumātua (K) durations are included for comparison. The first standard deviation is shown as a line in the centre of the bar. It can be seen that for any of the short vowels the mean durations for the L2 speakers are always longer than for the L1 and the K speakers. For the most part, the mean durations for the L1 speakers are closer than those from the L2 speakers to those from the Kaumātua. Thus the distinction between the long and short vowel pairs for L1 is greater than L2. For pi, PIKI, WAKA, MOKO, TŪ, and TUKU, the mean durations of the L1 speakers are closer to the Kaumātua than to L2. Only for KĒ and MŌ are the mean durations for L1 closer to the L2 speaker.

Figure 3 presents the vowel spaces for the young L1 and L2 speakers on plots of the first and second formant. Both groups of young speakers have raised KĒ/KETE so that they are considerably closer to pi/PIKI than for either the MU or the K speakers (Maclagan et al., 2004; Maclagan et al., 2006). The most obvious difference between the two groups of young speakers is the greater variance in production, shown by the larger ellipses for the younger group which enclose 95% of the tokens. Because there are fewer speakers in the L2 group than the L1 group, the addition of extra speakers may reduce the size of the ellipses for the L2 by allowing some outliers to be excluded; it is unlikely to reduce them so that they are similar in size to those for the L1 speakers.

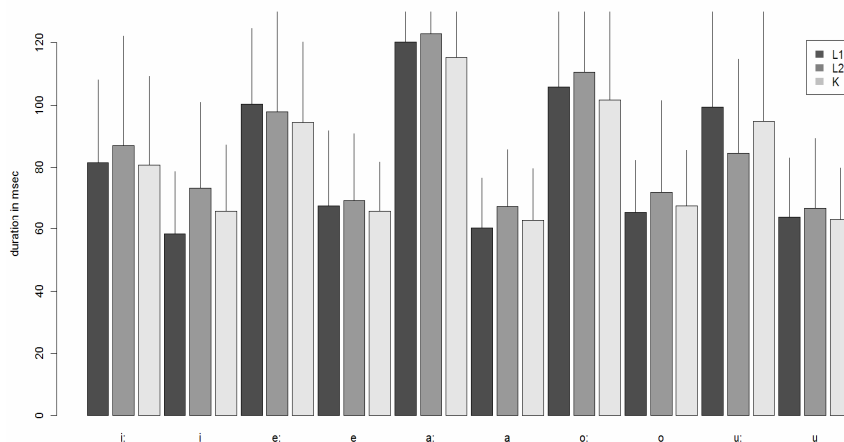


Figure 2: Bar plot of the mean duration for the monophthongs in msec for L1, L2 and the Kaumātua (K), with first standard deviation marked as a line in centre

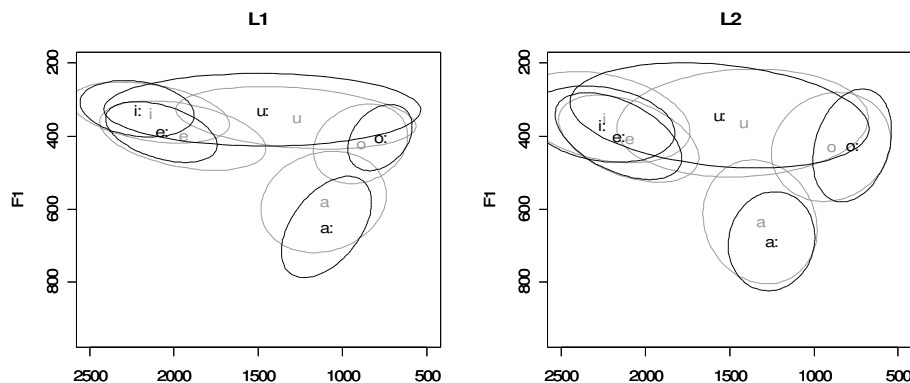


Figure 3: F1/F2 vowel spaces for young L1 (left) and L2 (right) speakers in Hz. Long vowels in dark gray, short vowel in light gray.

Previous results had indicated that the MU and K speakers kept the vowel pairs significantly different in both quantity and quality (Maclagan et al., 2004; Maclagan, Harlow, King, Watson & Keegan, 2005). We therefore compared the F1/F2 values and the lengths for the long/short vowel pairs to determine the extent to which the L1 and L2 speakers were keeping them distinct (see figures 3 and 4).

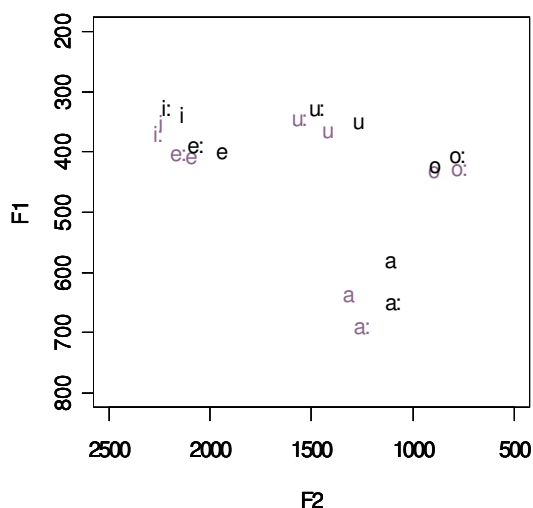


Figure 4: Comparison of mean F1 and F2 values in Hz for L1 (black) and L2 (grey).

The L1 speakers keep all the short/long vowel pairs significantly distinct (t-tests showed $p < .01$ for all formant comparisons except $k\bar{e}/kete$ F1 and $w\bar{a}/waka$ F2). The L2 speakers, by comparison, do not make significant distinctions for $\bar{p}\bar{i}/piki$ (F1, F2 and length), $k\bar{e}/kete$ (F1, F2) or F1 for $m\bar{o}/moko$ and $t\bar{u}/tuku$.

Euclidean distances (ED), calculated from the first and second formant values, were used as a further check on the

distinctiveness between the vowel pairs (see table 1). For three vowel pairs, $\bar{p}\bar{i}/piki$, $k\bar{e}/kete$ and $t\bar{u}/tuku$ the ED for the L1 speakers is greater than for the L2 speakers. For the other two pairs, the L2 have greater EDs.

Maclagan et al. (2004) had suggested that the two young L2 speakers analyzed showed influence from New Zealand English (NZE) on their Māori vowels, especially in the fronting of $t\bar{u}$ and $tuku$. Auditory analysis indicated that the MU speakers' $w\bar{a}$ and $waka$ were produced farther back than the younger speakers'. We therefore calculated the ED between the mean values for Māori $t\bar{u}$ and English $GOOSE$ and between Māori $w\bar{a}$ and English $START$ for each of the speakers (see table 2). All of the L1 speakers have greater $w\bar{a}/START$ ED than the L2, with the F2 values indicating that the L1 speakers are producing $w\bar{a}$ farther back. Although the mean ED for $t\bar{u}/GOOSE$ is greater for the L1 than the L2, the standard deviation is extremely large. Three of the L1 speakers (L1Y01, L1Y03 and L1Y04) all have large EDs, and $t\bar{u}$ farther back than $GOOSE$. L2Y02 has a similarly large ED and a relatively back $t\bar{u}$.

Table 1: Euclidean distances in Hz between vowel pairs for L1 and L2 speakers

	L1	L2	
$\bar{p}\bar{i}/piki$	78	23.	L1>L2
$k\bar{e}/kete$	128	62	L1>L2
$w\bar{a}/waka$	71	87	L1<L2
$m\bar{o}/moko$	117	129	L1<L2
$t\bar{u}/tuku$	196	138	L1>L2

Table 2: Euclidean Distance in Hz between $w\bar{a}/START$ and $t\bar{u}/GOOSE$ for each speaker

Speaker	$w\bar{a}/START$	$t\bar{u}/GOOSE$
L1Y01	134	329
L1Y02	162	60
L1Y03	231	546
L1Y04	195	684
L1Y05	145	119
Mean (sd)	174 (40)	348 (268)
L2Y01	87	111
L2Y02	109	317
L2Y03	114	172
Mean (sd)	103 (14)	200 (105)

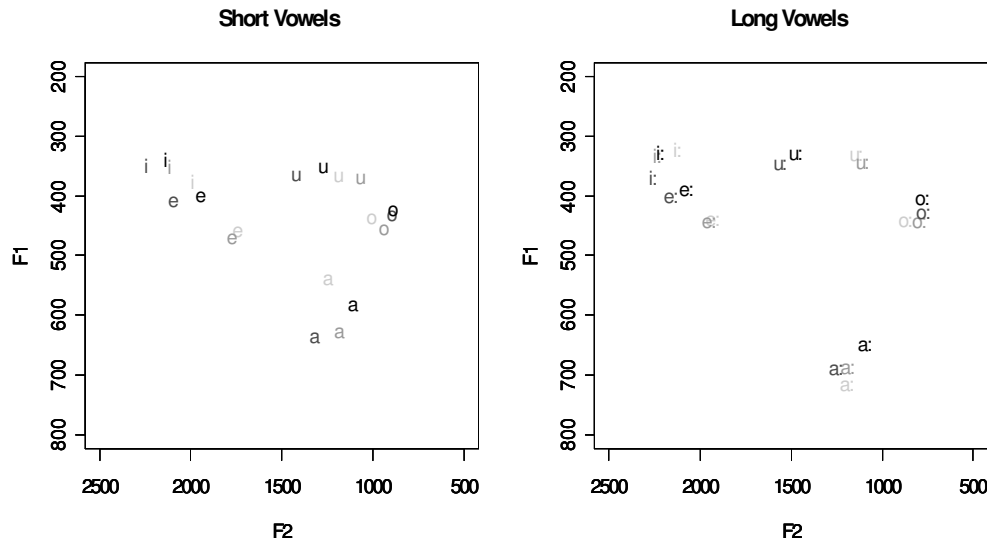


Figure 5: Comparison of the mean 1st and 2nd formant values for long (right) and short (left) vowels for MU (very pale grey), K (pale grey), L2 (dark gray), L1 (black).

5. Discussion

As we move from the historical MU speakers to the kaumātua to the young speakers, there is a consistent pattern of vowel movement, with the kaumātua vowel means being placed between the MU and the young speakers (Maclagan et al., 2005). When the young speakers are divided into L1 and L2 groups, it can be seen that the L1 speakers' vowels are between the kaumātua and the L2 (see figure 5). The visual impression of figure 5 is supported by the Euclidean Distances shown in table 1.

While individual K speakers do not keep some long/short vowel pairs distinct in quality, as a group, the K speakers distinguished between all vowel pairs in both quality and quantity (Maclagan et al., 2005). In that they keep the vowel pairs distinct, the L1 speakers are again more like the K speakers than are the L2 speakers.

To further test our hypothesis that there is a difference between the L1 and L2 speakers, and that the L1 speakers are more like the Kaumātua, we performed a Bayesian classification experiment, based on the first two formants and the duration data. We trained a Bayesian classifier on the Kaumātua data and tested it on the L1 and L2 data. We found that 61% of the L1 data was correctly identified when the classifier was trained with the Kaumātua data, compared to 52% of the L2 data being correctly identified. We performed a further test where we trained the classifier on the L2 data and tested it with the L1 data. Here we found that 62% of the L1 data was correctly identified when the classifier was trained on L2 data. The results of the classification experiment confirm the findings of this paper that there is a difference between the data from the L1 and L2 speakers, and

the data from the L1 speakers are more like the Kaumātua than that from the L2 speakers.

The major difference between the MU and K speakers was the lessening of the qualitative difference between *wā* and *waka*, while the length distinction was retained (figure 2 and Maclagan et al., 2005). From figure 5 it can be seen that the L1 speakers produce both *wā* and *waka* farther back than even the MU speakers. One explanation for this could be that this is a hypercorrect reaction to the continuing fronting of *START* in NZE (see Gordon et al., 2004). The more retracted versions of *wā* and *waka* serve to make the L1 speakers' Māori vowel spaces more distinct from their English vowel spaces than is the case for the L2 speakers. Since the relatively back pronunciation of *wā* is one of the most audible characteristics of the historical Māori speakers – the young L1 speakers have somewhat overshot the historical model. The retracted pronunciation of *wā* and *waka* may act as identity markers for the young L1 speakers.

Over time, there has been a tendency for NZE *GOOSE* and Māori *TŪ/TUKU* to front (Gordon et al., 2004; Maclagan et al., 2004). In addition, /u/ vowels tend to be fronted after /t/ (Stevens & House, 1963), and more /u/ vowels in Māori occur after /t/ than after other consonants. A count of a text of over 570,000 characters (Pötatau 1991) shows that the sequences of /t/ plus either *TŪ* or *TUKU* account for over 28% of all sequences of a consonant plus either of these vowels (the next highest consonant is /k/ at 21% of all consonants before *TŪ* and *TUKU*). The fronting of *TŪ* and *TUKU* from the MU speakers to the K speakers and on to the young speakers is therefore not surprising. In addition Māori English, an ethnically marked variety of NZE (which is not spoken by all or only Māori, see Bell, 2000; Holmes, 1997; King, 1999) is often characterized as having particularly front pronunciations of *GOOSE*. It may be that the relatively back *TŪ* and *TUKU* pronunciations of the young L1 speakers serve to distinguish their Māori from pronunciations associated with Māori English in particular as well as NZE in general.

6. Conclusions

Research carried out by the MAONZE project has shown that over the last hundred or so years there have been appreciable shifts, both qualitative and quantitative, in the Māori system of five long and five short vowels. In general, the trend has two directions, one is the decrease in the distinction between the long and short monophthongs, the other is the shift of some individual monophthongs towards or in parallel with NZE. The results reported in the present study suggest that, at the present, it is the cohort of young L2 speakers of Māori, probably representing the large majority of modern younger speakers, who are carrying both these trends forward. We note however that these results are from 3 L2 speakers, and 5 L1 speakers, and so must be considered preliminary. We need to increase the numbers of L2 speakers and ideally L1 speakers too to establish that the findings hold for a larger sample size.

7. Acknowledgements

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8. Note

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