

Correlations of prevocalic VOT and preconsonantal vowel duration: Evidence from New Zealand English



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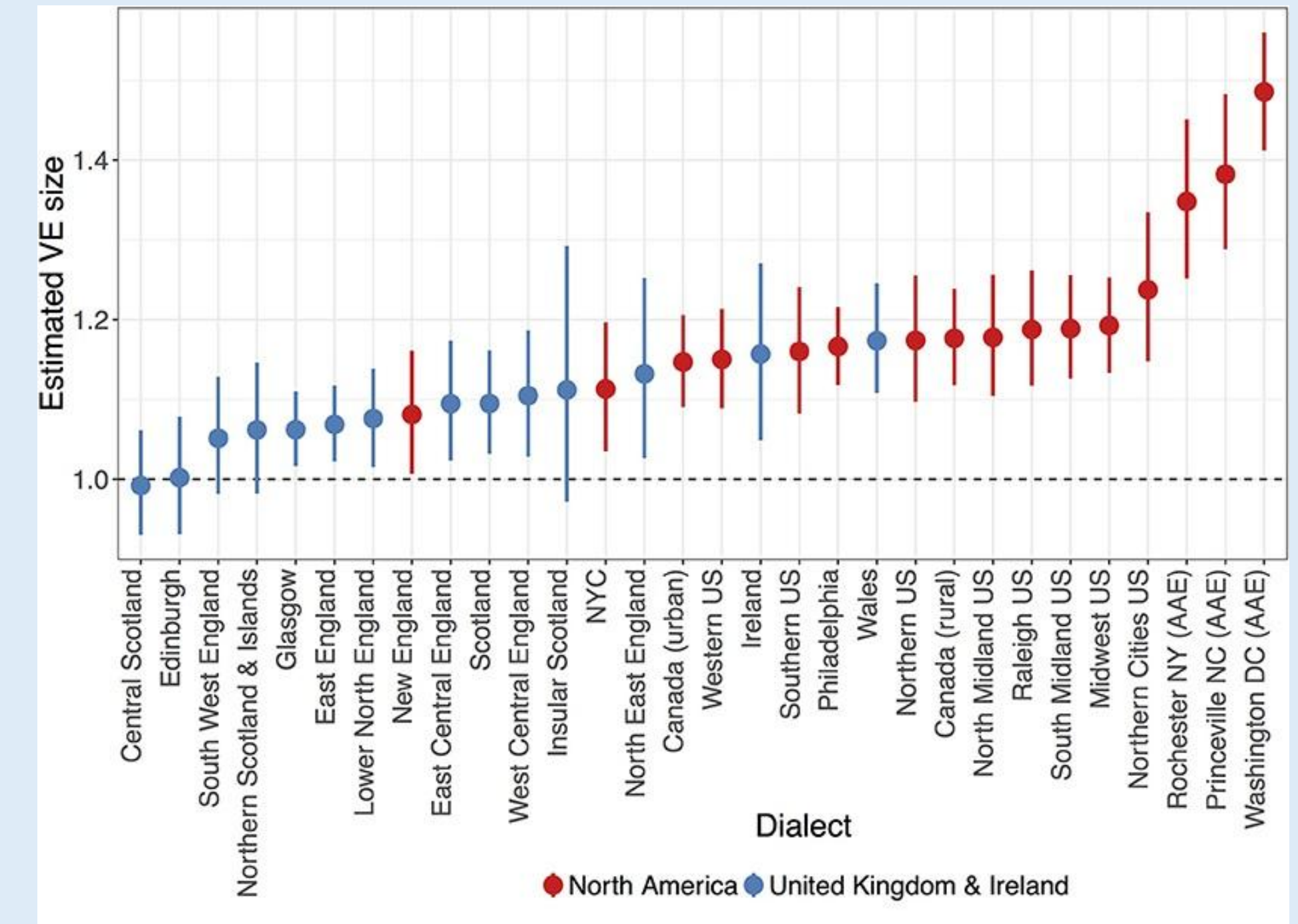
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1. THE VOICING EFFECT (VE)

- Aka Pre-Fortis Clipping: vowels are shorter before voiceless/fortis consonants
- VE size is larger in English than in other languages (Chen 1970, Cho 2016, etc.)
0.51-0.60-0.70 0.80-0.90 (Russian, Spanish, German, Polish...)
- More recently: research into VE size in spontaneous speech and its non-uniformity in English varieties (Tanner et al. 2020)
- However, studies do not investigate phonological/functional explanations (properly/fully)

2. VE SIZE AND VOT

- Relationship between VE size and average prevocalic VOT:
 - the US: dialectal variation but generally, aspiration is heavy in fortis and lenes are voiceless
 - England: dialectal variation but generally, less heavy aspiration; a number of voice languages with weak or no aspiration in the North/North-East (Durham, Yorkshire, Lancashire, the Black Country, etc.)*
 - Scotland: voice languages in Scots-speaking areas (the Lowlands)**
- The heavier the overall aspiration in a system, the larger the average VE:
 - cross-linguistically: a more strongly aspirated / more voiceless fortis system implies less voiced lenes (-> constant perceptual distance)
 - in coda: less/no aspiration -> fortis-lenis distinction perceptually less salient -> it is no more cued in VOT but in preconsonantal vowel duration
- BUT: the functional load of vowel duration also depends on the status of vowel length in the dialect



3. THE STATUS OF VOWEL LENGTH

- Vowel length is phonologically secondary to vowel quality (tenseness/laxness) in US English
- Forms of word-final devoicing in many regions in the US and in African American English -> extra lengthening before devoiced lenes
- On the other hand: Scottish Vowel Length Rule (Aitken's Law)
- These factors may also contribute to the VE scale established by Tanner et al. (2020)

4. DATA AND ANALYSIS

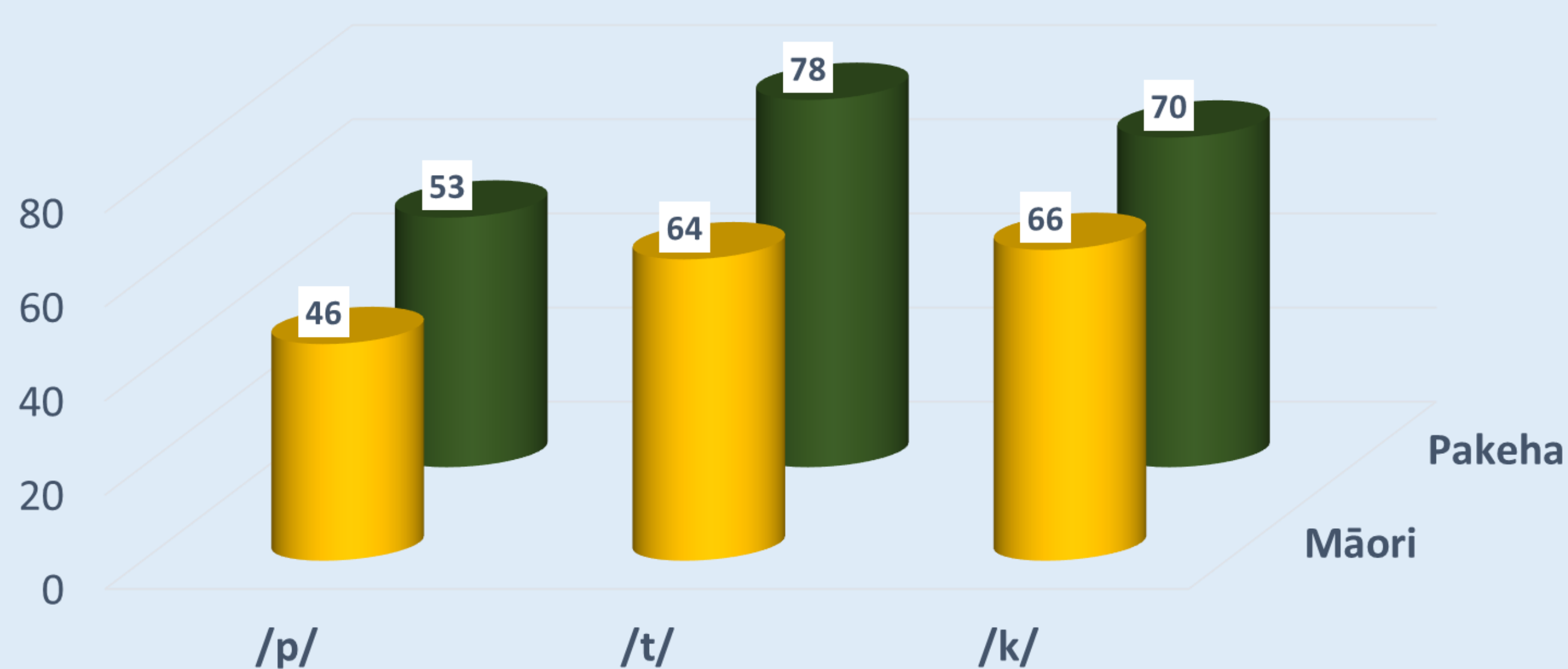
- To test whether a correlation between VOT and VE exists independently of the vowel system, we investigated two forms of New Zealand English (NZE) whose vowels overlap: Pākehā English (PE) and Māori English (ME)
- 4 Pākehā and 4 Māori informants
- Recording corpora of spontaneous speech
- Vowel duration for 7 vowels and VOT for the fortis plosives measured
- Statistical analysis: lme4 package in R

Speaker	Age	Gender	Education	Occupation	Speaker	n
M1	67	male	tertiary	writer	M1	126
M2	47	female	tertiary	university professor	M2	132
M3	59	female	tertiary	musical artist	M3	110
M4	85	male	tertiary	writer, politician	M4	112
P1	54	female	tertiary	broadcaster/writer	P1	112
P2	59	male	tertiary	reporter/journalist	P2	122
P3	38	female	tertiary	digital content mng	P3	118
P4	55	male	tertiary	broadcaster	P4	112
Total					Total	944

5.2 Aspiration

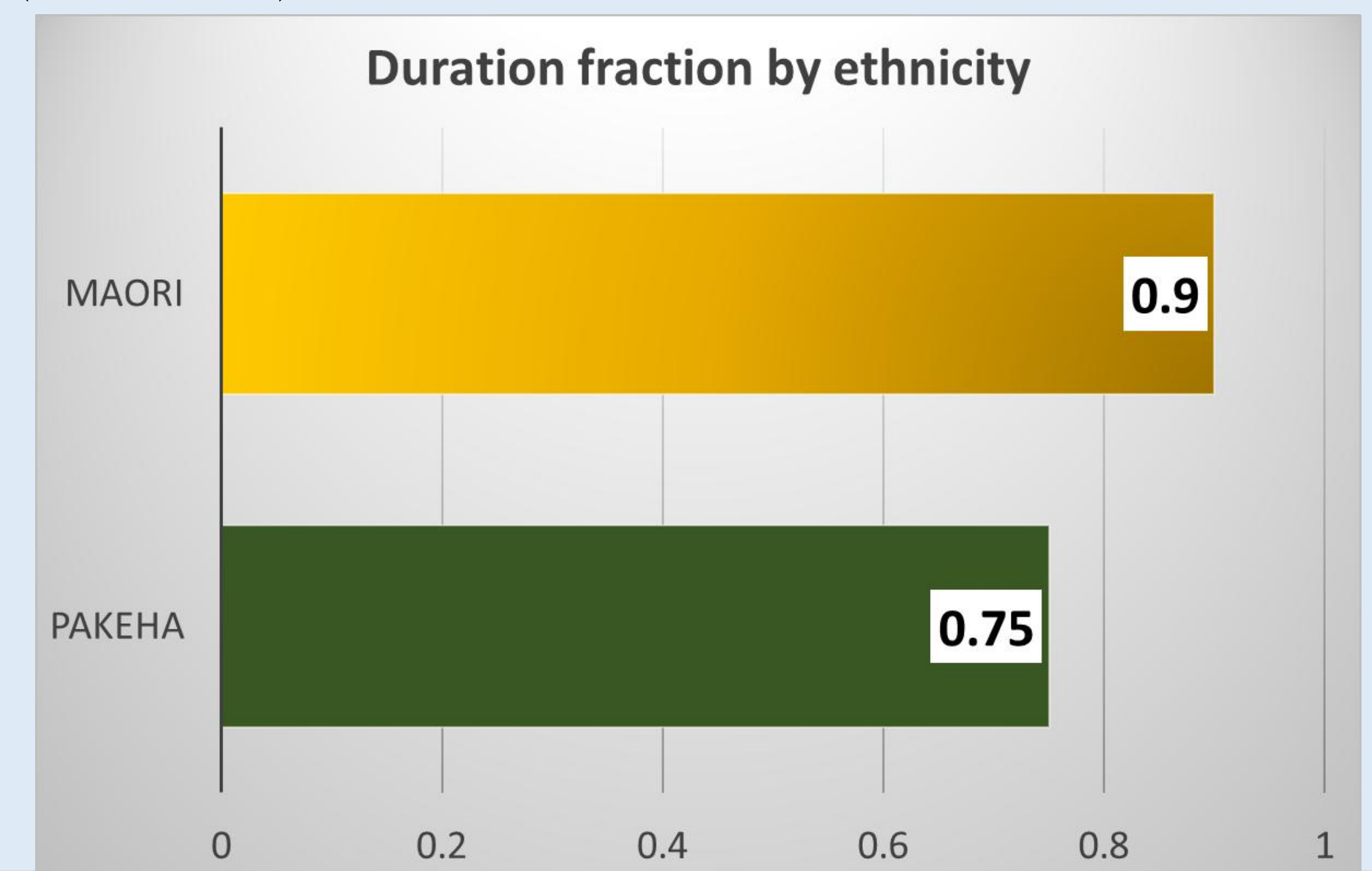
- PE: long VOT (68 ms) - strong aspiration
- ME: shorter VOT (60 ms) - weaker aspiration, but no unaspirated tokens

Māori and Pākehā VOT duration



5.1 Voicing Effect

- PE: great VE size (fraction/ratio: 0.75/1.32) but VE size is smaller compared to the results of previous studies due to the more spontaneous speech style
- ME: small VE size (fraction/ratio: 0.9/1.10)
- Voice-ethnicity interaction: the voice slope is steeper for Pākehā speakers by 16 (<0.0001***)



5.3 Where are ME and PE located on Tanner et al.'s scale?

- East Central England 1.09
- Scotland 1.10
- Maori English 1.1**
- West Central England 1.11
- NYC 1.12
- North East England 1.14
- Canada (urban) 1.15
- Western US 1.15
- Canada (rural) 1.17
- Ireland 1.17
- Philadelphia 1.17
- Southern US 1.17
- North Midland US 1.18
- Northern US 1.18
- Wales 1.18
- Raleigh US 1.19
- South Midland US 1.19
- Midwest US 1.20
- Northern Cities US 1.24
- New Zealand English 1.32**
- Rochester NY (AAE) 1.35



6. CONCLUSION

VOT and the VE correlate irrespective of the vowel system of a dialect: (1) PE has longer VOT and a larger VE size; (2) ME has shorter VOT and a smaller VE size; (3) even though all our informants use the same NZE vowels, i.e., the function of vowel length vs vowel quality is the same for both speaker groups.

* Wells (1982); Kerswill (1987); Harris (1994); Clark (2004); Whisker-Taylor & Clark (2019); Balogné Bérces (2022); etc.

** Abercrombie (1967); Wells (1982); Stuart-Smith (2004); Iverson & Salmons (2008); Balogné Bérces (2022); etc.

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