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# The phonetic and social correlates of non-rhoticity and derhoticised /r/ in Edinburgh English



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## Introduction

### ❖ Rhoticity & social class in Scotland

- Approximants in Middle Class speech
- Derhotics and/or pharyngealized vowels in Working Class speech (Speitel & Johnston 1983)

### ❖ Urban, Central Belt varieties

- *Edinburgh* (e.g., Romaine 1978; Lawson et al. 2008, et seq.; Scobbie et al. 2008, 2013; Schützler 2010, et seq.)
- *Glasgow* (e.g., Macafee 1983; Stuart-Smith 1999, et seq.)

### ❖ Seven-step rhoticity continuum (Lawson et al. 2014)

- from deletion, to derhoticisation, alveolar/retroflex approximant, *schwar*, *tap*, and *trill*.

### ❖ The Problem...

- The *non-rhotic* and *derhotic* variants are **acoustically similar** but **maximally distinct socially**, used by Middle Class women and Working Class men, respectively.
- Auditorily distinguishing non-rhotic and derhotic variants is notoriously difficult, even for phonetically trained native speakers (cf. Stuart-Smith et al. 2014).

## Research Question

Lawson et al. (2014) showed articulatory differences between the *non-rhotic* and *derhotic* forms.

- Are these variants acoustically distinct? What are the cues?
- Is their social indexicality signalled more (or instead) by the quality of the preceding vowel than the quality of the rhotic?

## Procedure

We examine two of the several acoustic measures of derhotic /r/ described by Stuart-Smith et al. (2014).

1. For all non-rhotic or derhotic tokens, code for any 'breathy period' (Lawson et al. 2008) or 'audible frication' (Stuart-Smith et al. 2014) at the vowel offset, said to characterise derhoticisation.
  - Presence vs. absence
  - If present, then duration
2. Measure the F1 & F2 of the midpoint of the preceding vowel for the subset of tokens belonging to the START lexical set.
  - Lexical items correspond to Wells' (1982) lexical sets.
  - Any historical overlap with the BERTH/SQUARE set in Scottish speech (e.g. Zai 1942) is not apparent in the present data set.

## Data

Spontaneous speech, 7 M, 6 W, ages 57-69, 2\* SEC groups:

- **WC** School-leavers from age 16 or younger; worked in blue-collar jobs; parents in similar jobs
- **EMC** University graduates; attended private schools; worked in white-collar jobs; parents in similar jobs

\*Third, upwardly mobile SEC group: **NMC** (first in family to go to university or to have a white-collar job). NMC speakers show a high rate of approximant use and were excluded from this analysis due to scarcity of non-rhoticity/derhoticisation (Dickson & Hall-Lew 2015).

- Six 1-hour sessions, Nov 2013 to Jan 2014
- Same-sex, same-SEC groups of 2-3 speakers each
- Sessions led by the first author (F, EMC, Edinburgh)
- Speech prompted by a written list of topics: *childhood, education, family, work, life in Edinburgh*
- Interpersonal dynamics were impressionistically consistent across groups; friendly, casual and interactive.

## Results: Frication

- ❖ N=135 utterance-final tokens coded as either *non-rhotic* or *derhotic*:  
**51% realised with frication**

- ❖ Huge skew in class/gender representation in the data (Fig.3)

(Because approximant variants are favoured by all groups except the Working Class men.)

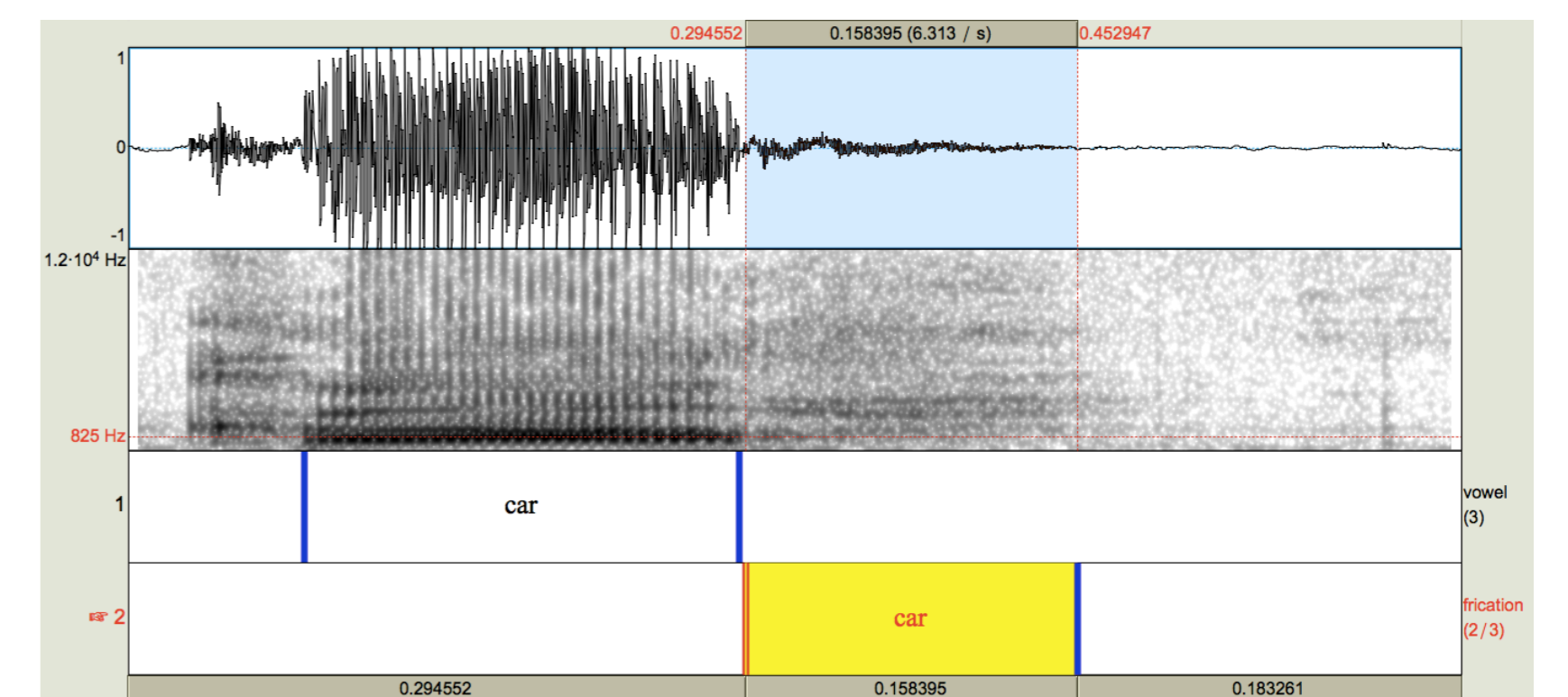


Figure 1: *car* spoken by a Working Class male from Edinburgh

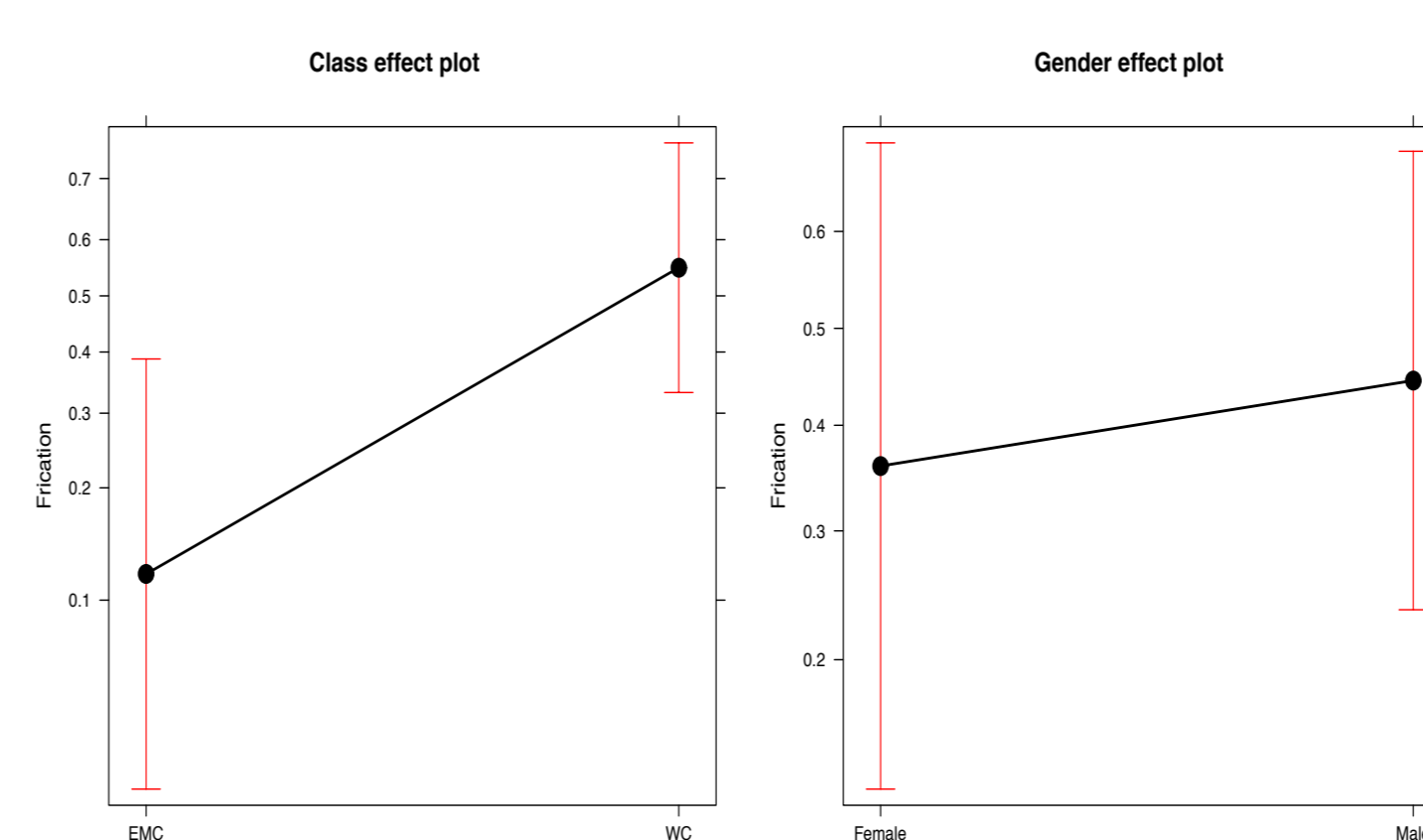


Figure 2: Effects plot of a mixed logit regression analysis

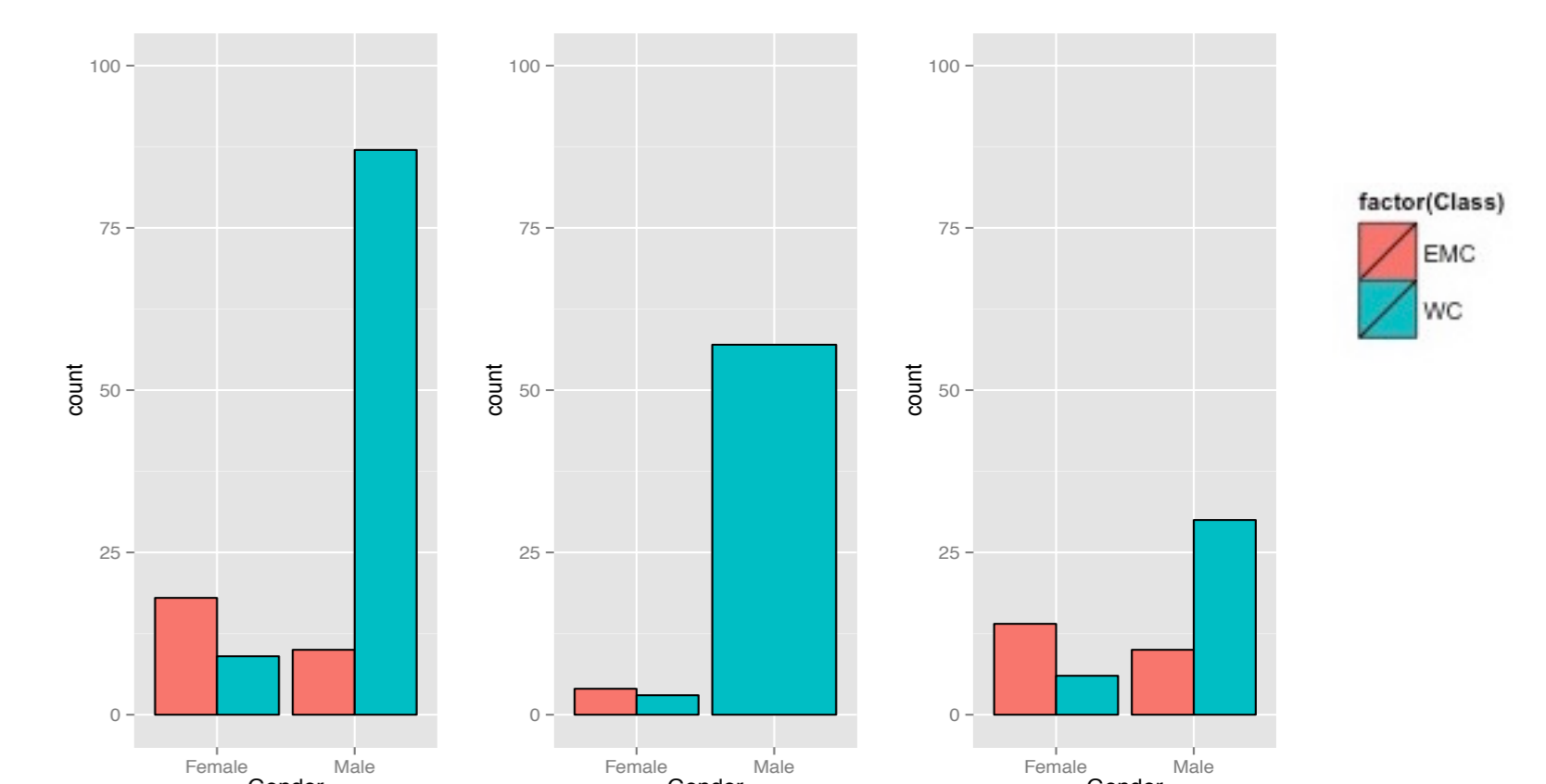


Figure 3: (a) all tokens, (b) tokens with frication, (c) tokens without

### ❖ Results: Presence vs. Absence

- Presence of frication favoured statistically by WC speakers (*lmer*, Figure 2)
- Low Ns precluded testing a GENDER\*CLASS interaction effect (but see Figure 3)

### ❖ Results: Duration (when present)

- Duration of frication is also longest for WC speakers, but individually variable.

### ❖ Frication as a distinguishing cue? Well...

- The derhotic breathy period is only discernible for utterance-final tokens.
- Duration measurements are highly variable (affected by, e.g., microphone distance), and so might be problematic for some field-based recordings.

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## Results: Vowel Quality

- ❖ A small subset of a small subset: N=79 utterance-final START tokens coded as *non-rhotic* or *derhotic*.
  - Proceed with caution!

- ❖ Group differences in vowel quality?
  - Orthogonal to rhoticity results.

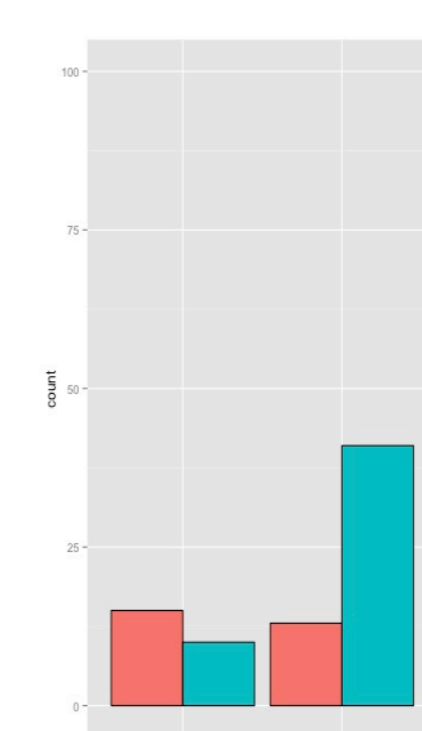


Figure 4: Count of all tokens of non-rhotic & derhotic START

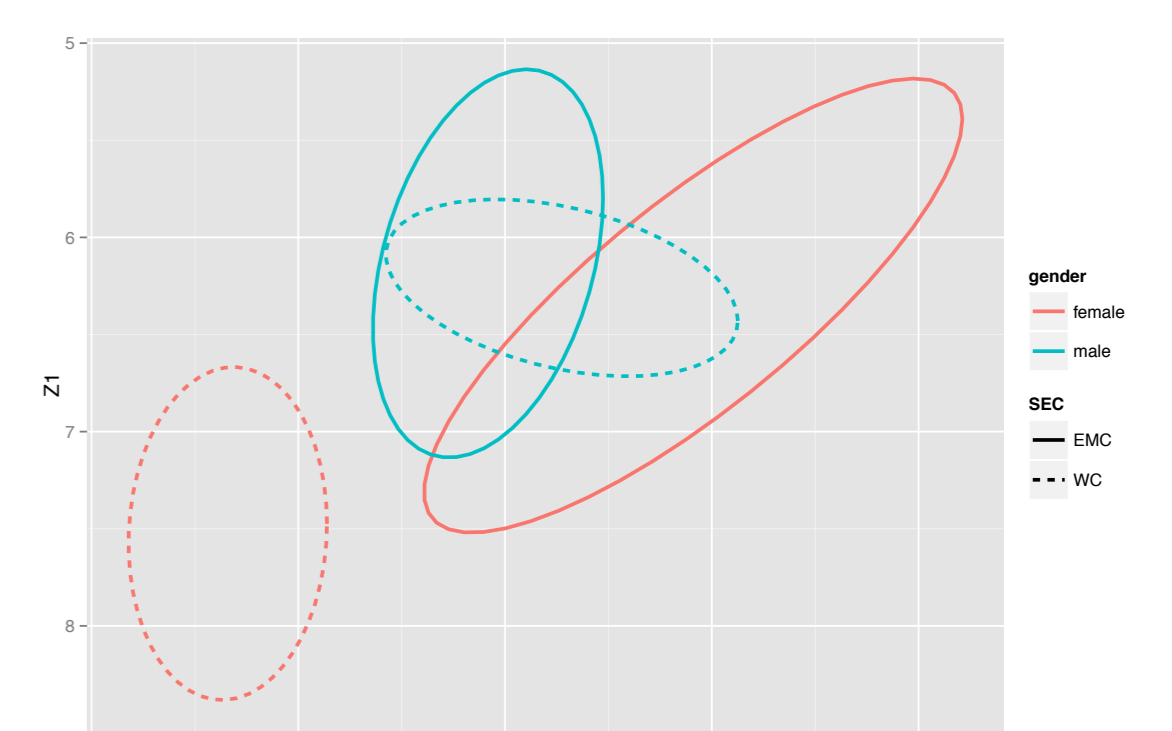
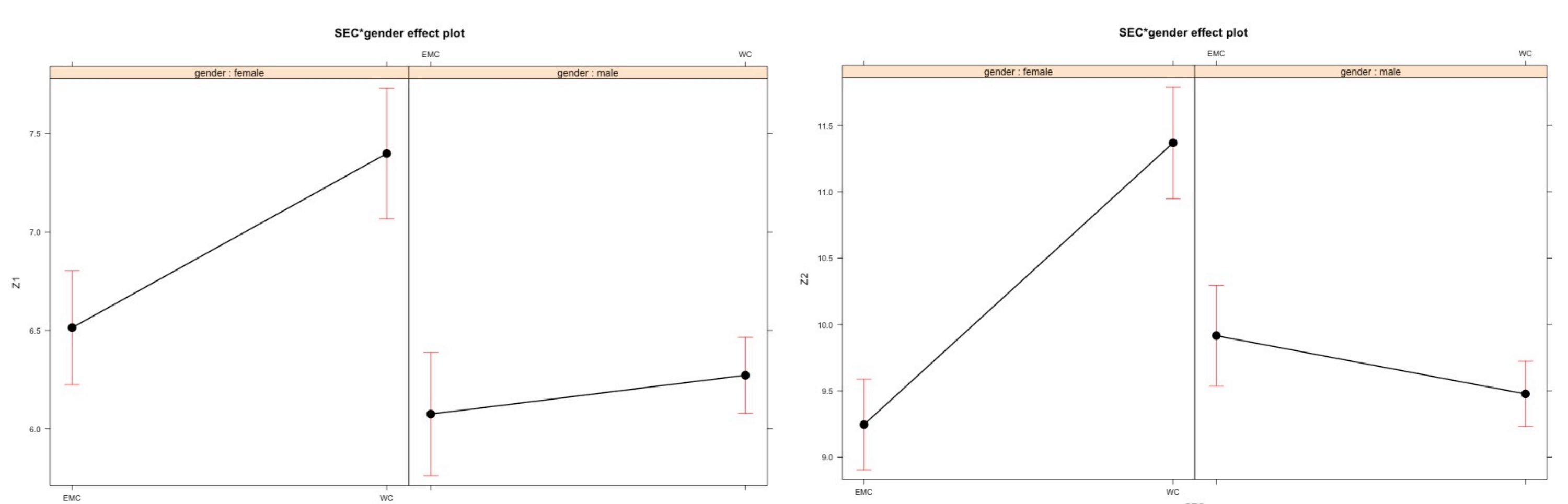


Figure 5: Bark-transformed F1 & F2 distributions by class and gender



Figures 6 & 7: Effects plot of a mixed linear regression analyses for (a) Bark-transformed F1 and (b) F2

### ❖ Results

- **F1:** Men favour higher vowels than women. Within gender, EMC are higher than WC.
- **F2:** EMC women & WC men favour backer variants. WC women are strikingly fronted.

## Discussion & Future Directions

While it is in some cases possible to take frication as a cue to distinguish non-rhotic and derhotic variants, frication is only a useful cue in utterance-final contexts. The quality of the preceding vowel might give further cues to social indexicality, but the vowel quality varies independently of the quality of the rhotic and is not a useful cue for distinguishing non-rhoticity from derhoticisation. Future analysis will consider all the rhotic lexical sets and normalise the formant data for gender.

References available upon request.