

# The effect of regional variation on speech processing: evidence from an eye-tracking experiment.



UNIVERSITY OF LEEDS

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## RESEARCH QUESTION

Does information about the speaker's accent embedded in the speech signal affect the time-course of spoken word recognition?

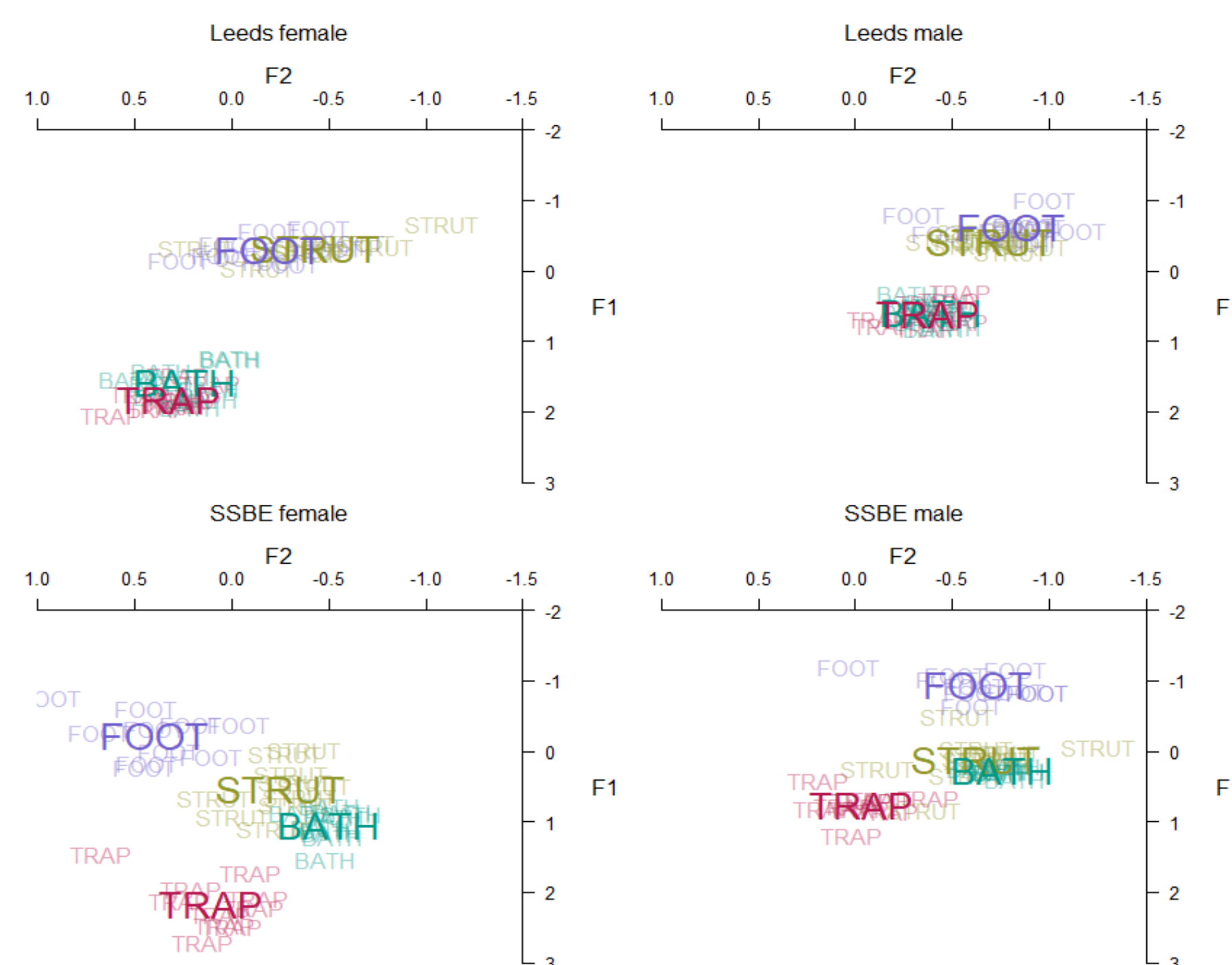
## INTRODUCTION

- Hearing speech produced in an unfamiliar accent has a processing cost (Adank, et al. 2009; Floccia, et al. 2006), although listeners can rapidly adapt to novel talkers and accents (e.g., Bradlow & Bent, 2007, cf. Shaw et al. 2018).
- However, when listening to a familiar accent, **perceived information about the speaker** has been shown to affect low-level speech perception (e.g., Strand, 1999) and lexical access (e.g., Koops et al., 2008), arguably facilitating processing.
- These experiments often use pictures or words to cue a specific social category (e.g., gender, age, region) explicitly, but it is unclear whether **brief exposure to accent-specific phonetic features in the speaker's speech alone** would also influence speech processing.

## AUDIO STIMULI

### Audio stimuli

- Naturally-produced words recorded by 2 Leeds & 2 SSBE speakers (2 f, 2m)
- Embedded in carrier sentence: "I'm asking you to access \_\_\_\_\_" (Evans & Iverson, 2004)
- Leeds accent: [aɪm 'æskɪŋ ju tə 'ækses]
- SSBE accent: [aɪm 'ɑ:skɪŋ ju tə 'ækses]

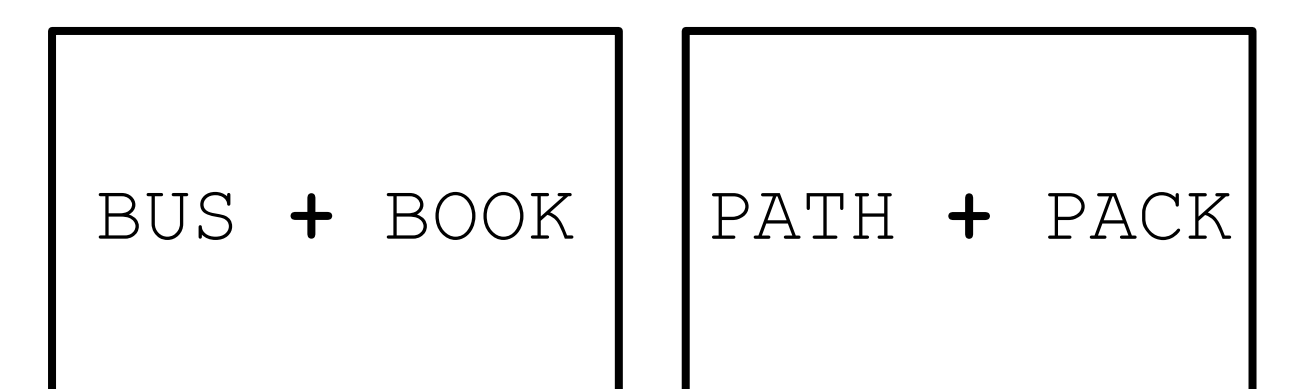


### Visual stimuli (following Best et al, 2013)

- Visual World Paradigm (Tanenhaus et al., 1995)
- 2 printed words per trial
- Words were CVC, CVCC, CVCV, CVCVC, CVCCVC
- Not semantically related

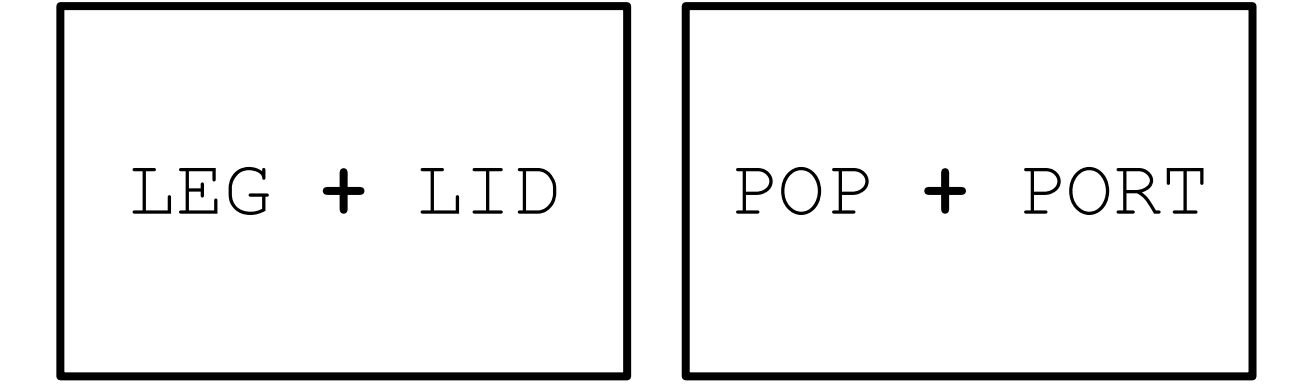
### 20 Test sets

- 10 BATH-TRAP contrasts
- 10 FOOT-STRUT contrasts
- Controlled for frequency



### 20 Filler sets

- Contrasts are 'acoustically similar', e.g., DRESS-KIT, LOT-THOUGHT



## DESIGN

### Procedure

- Eyelink 1000 Plus eye-tracker (500 Hz sampling rate).
- Each trial consisted of a target-competitor pair.
- Each accent was presented in a block and the presentation of blocks was counterbalanced.
- Trials within the block were randomised.
- Participants read the words, looked at a fixation cross in the centre which triggered the audio and clicked on the word they heard.

## PREDICTIONS

### BATH-TRAP

The BATH-TRAP distinction in SSBE will help listeners disambiguate the words earlier; they will look at the target earlier in the SSBE condition.

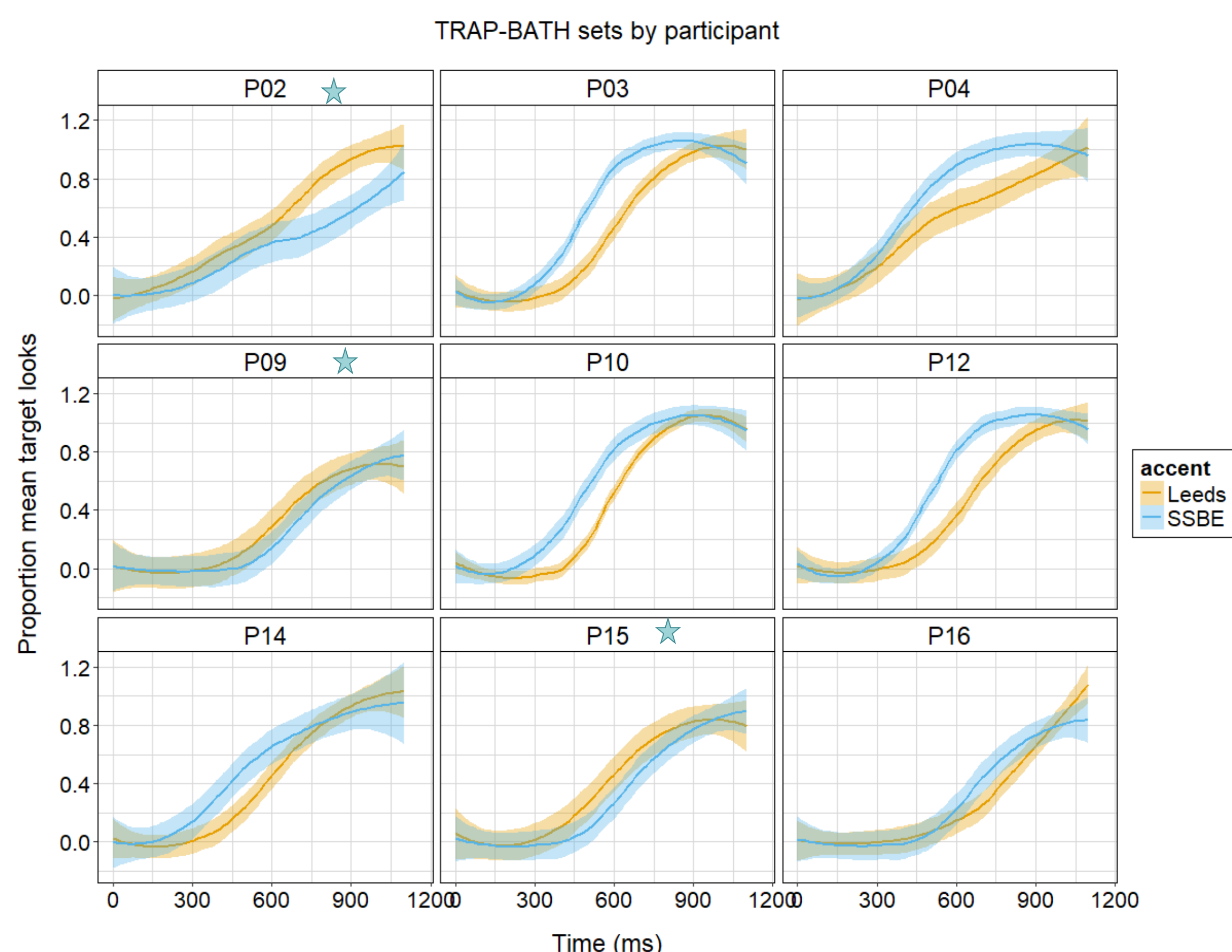
### FOOT-STRUT

The FOOT-STRUT distinction in SSBE will not necessarily help listeners disambiguate the words earlier, as this is not a native contrast; both accent conditions will be similar.

## PARTICIPANTS

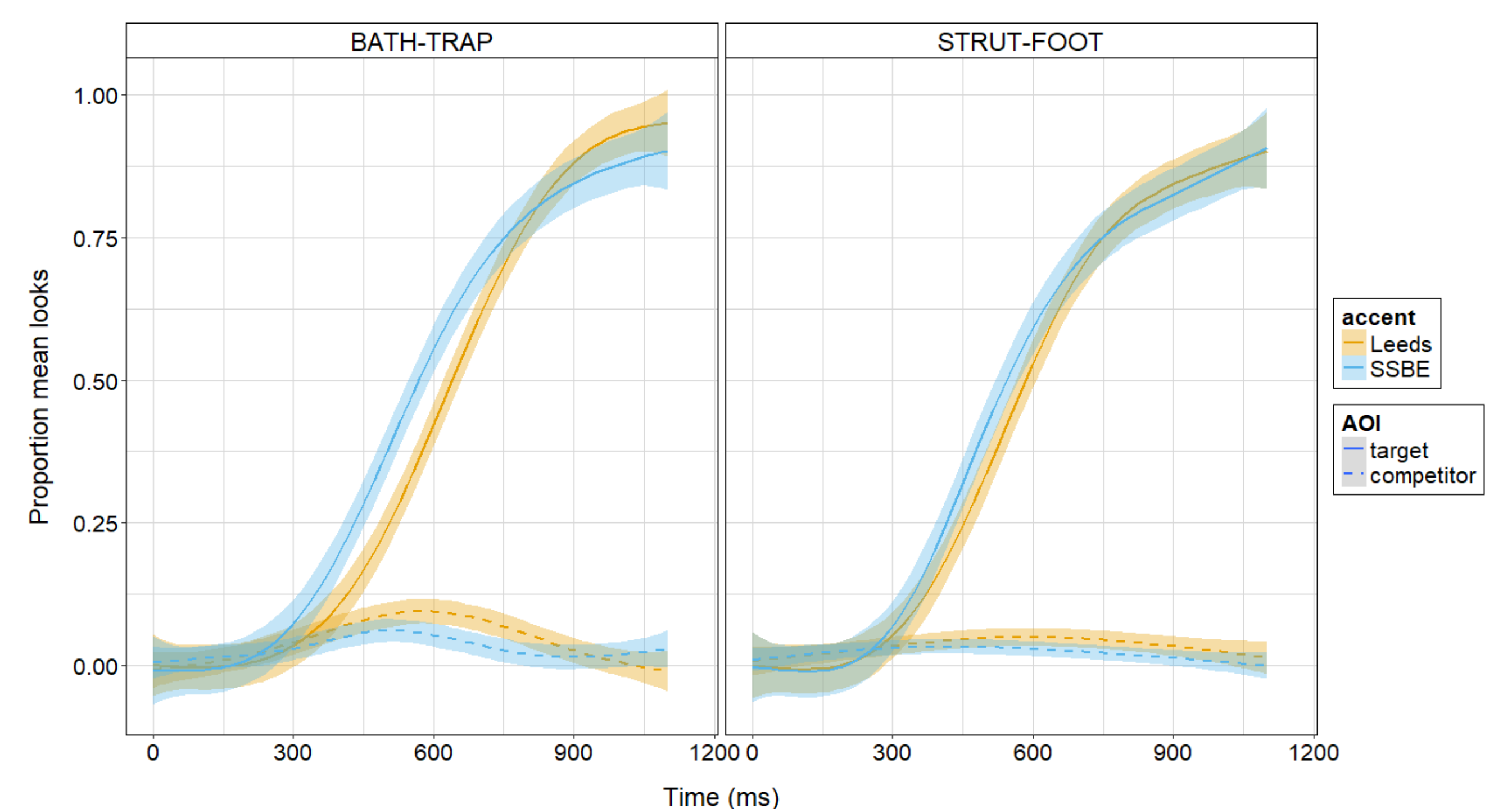
- 17 participants were tested (8 were excluded). The remaining 9:
- were 18-44 years old (mean = 28.9), 7 f, 2m
- were monolingual, born and raised in the North of England
- had not lived elsewhere for more than 8 months
- had parents who were monolingual and born in the North of England
  - only the parents of one participant lived elsewhere (P16)
- reported no speech, language, hearing or visual impairments

## INDIVIDUAL DIFFERENCES



- Not all participants show a clear distinction between conditions
- P02, P09 and P15 reported not to have a contrast between TRAP and START. They used a front vowel for both lexical sets.

## RESULTS



- Separate GAMM models were fitted for each variable following Sóskuthy (2017).
- Model comparison suggested that the inclusion of the parametric term and the smooth difference term for accent significantly improves the model fit for the BATH-TRAP model, but not STRUT-FOOT.

## DISCUSSION

- BATH-TRAP:** Despite the non-native vowel distribution, overall, Northern listeners are able to use this contrast to facilitate processing.
  - However, listeners who do not have the contrast (P02, P09, P15) perform similarly with Leeds & SSBE - there is no SSBE advantage.
- STRUT-FOOT:** Northern listeners do not use this contrast to facilitate processing.
  - They don't have a STRUT vowel. It is possible they don't have a robust representation of this category.
- Overall, listeners were faster with STRUT-FOOT in both Leeds and SSBE and BATH-TRAP in SSBE than BATH-TRAP in Leeds.

### Future work

- Finish data collection (Northern listeners), control group of SSBE listeners.

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