What is the relationship between speech perception and production in bilinguals?

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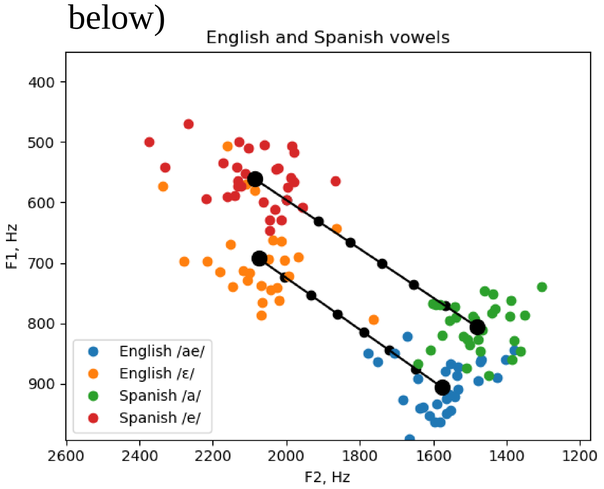
1. Background

- **Motor theories**: speech sounds perceived directly as articulatory gestures[1]
- **Sensorimotor theories:** speech sounds perceived as sounds; auditory targets delimit production through corrective motor feedback. Motor information used if perception is hindered[2,3]
- **L2:** Perception & production accuracy in L2 not always correlated[4]: high individual variability

2. Method[5]

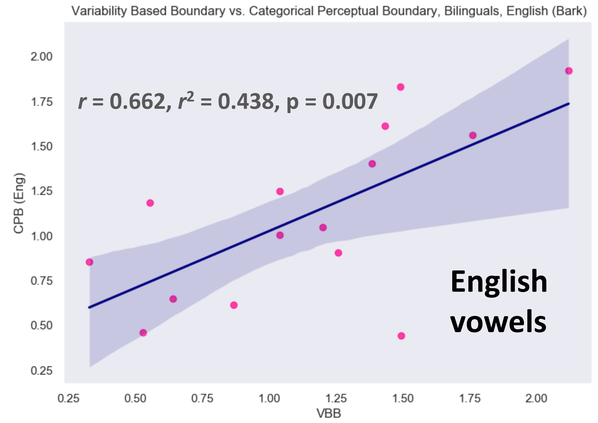
- 17 **Spanish-dominant** bilinguals & 9 controls produced **English** vowel pairs /æ/,/e/ and **Spanish** /a/,/e/
- Individual categorical perception test stimuli resynthesised from each speaker's vowels, using 8 black dot coordinates to generate F1, F2 (see below)

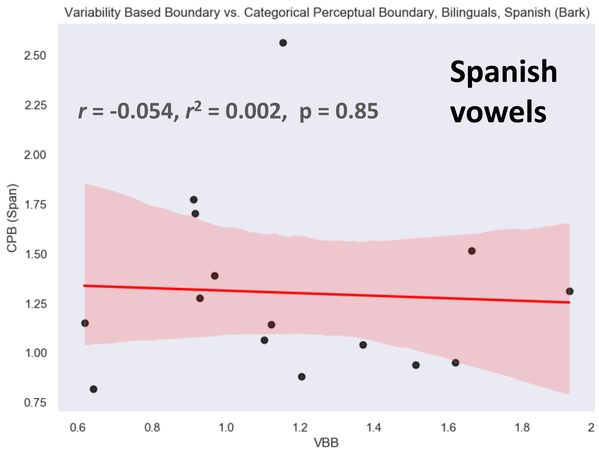


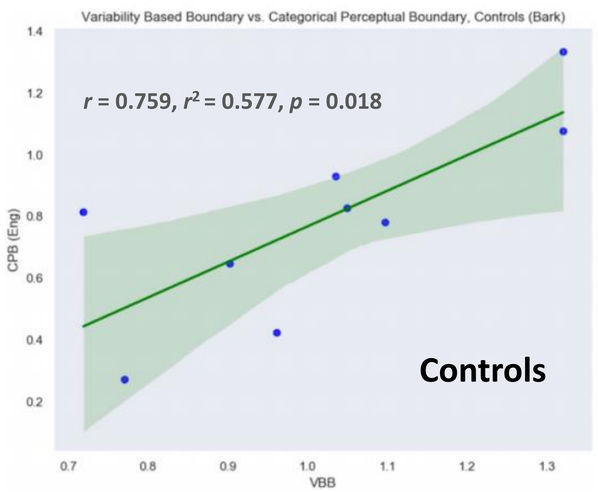
- Categorical perception test score multiplied by vowel mean distance/8 to calculate perceptual boundary

3. Results

- **VBB** (Vowel Variability Based Boundary) x **CPB** (Categorical Perceptual Boundary) correlated significantly in **bilinguals speaking (L2) English**, and monolingual controls
- Correlation **not significant** in bilinguals speaking Spanish
- Speakers bootstrapping vowel boundaries in **less-differentiated language**, potentially from access to subvocal rehearsal/phonological loop during perception[6]
- Low correlation between production/ perception suggests **primarily auditory processing[7] in bilinguals speaking Spanish**
- Fast inter-stimulus intervals hinder access to phonological loop[8]: Spanish speakers may process stimuli/perform task faster
- Less crowded vowel space in Spanish, so no additional motor information needed for perceptual differentiation







4. Conclusions

- Result supports **sensorimotor over motor models:** if perception were entirely gesture-based, CPB and VBB would be mapped to the same location in vowel space regardless of processing speed/vowel space crowding
- **Integration of auditory and motor information** a useful processing strategy, especially when vowel spread higher or perceptual information unclear
- **Further research**: effects of ambient language, L2 proficiency and processing speed on correlation, adding in Spanish monolinguals

5. References & Acknowledgements

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