



Perceptual normalization in convergence to English sibilants: A bilingual advantage?



Ivy Hauser (University of Texas Arlington)

Normalization in convergence

Main question: How does language background affect phonetic convergence?

- **Convergence:** process by which talkers alter production towards speech they hear
- **Normalization:** perceptual process by which listeners identify phones across different talkers with varying acoustics (Johnson and Sjerps, 2021)

Some evidence for convergence towards abstract normalized targets in imitation of:

- intonational patterns (cf. raw f0) (e.g. D'Imperio et al., 2014)
- relative degree of nasality (cf. absolute nasality) (Zellou et al., 2016)

→ When (if ever) do people converge to raw acoustics?

Case study: Imitation of English /s/ center of gravity (CoG) by native and non-native speakers

Methods: Delayed shadowing

Two conditions: enhanced or reduced CoG on model speech from talker with baseline high CoG

- 80 /s/-initial target words balanced for frequency and following vowel rounding
- 40 sonorant-initial filler words
- Sibilant spectra shifted up/down 15%

Participants: 33 L1 English and 30 L2 English

- L2 speakers: 8 L1 Spanish, 7 L1 Vietnamese, 4 L1 Telegu, 3 L1 Marathi, 2 L1 Tamil, 2 L1 Urdu, and 1 each L1 Farsi, Gujrati, Odia, and Tagalog

Predictions

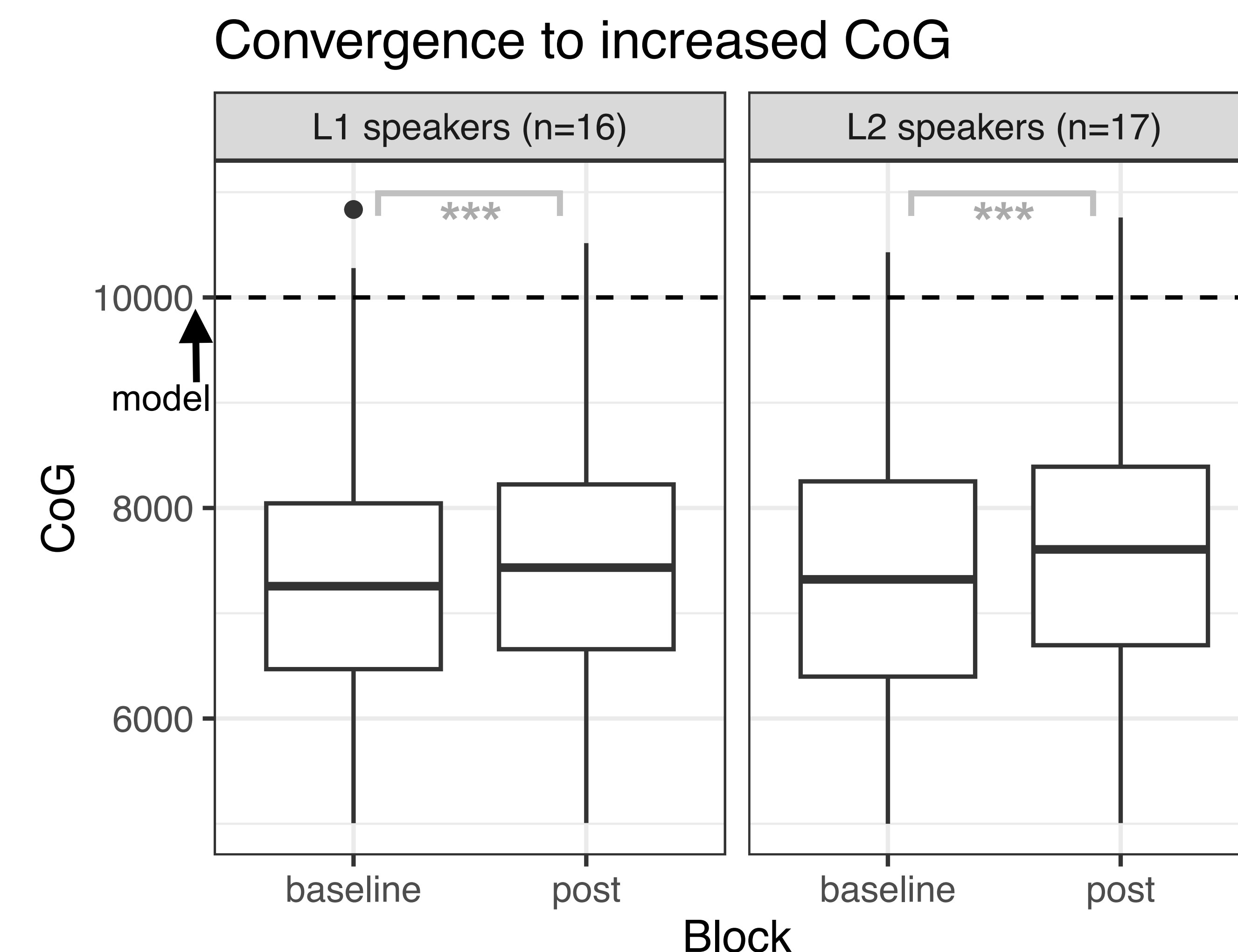
Direction of post-exposure shift depends on...

- **Normalized targets:** pattern in stimuli
- **Raw acoustic targets:** baseline relative to model

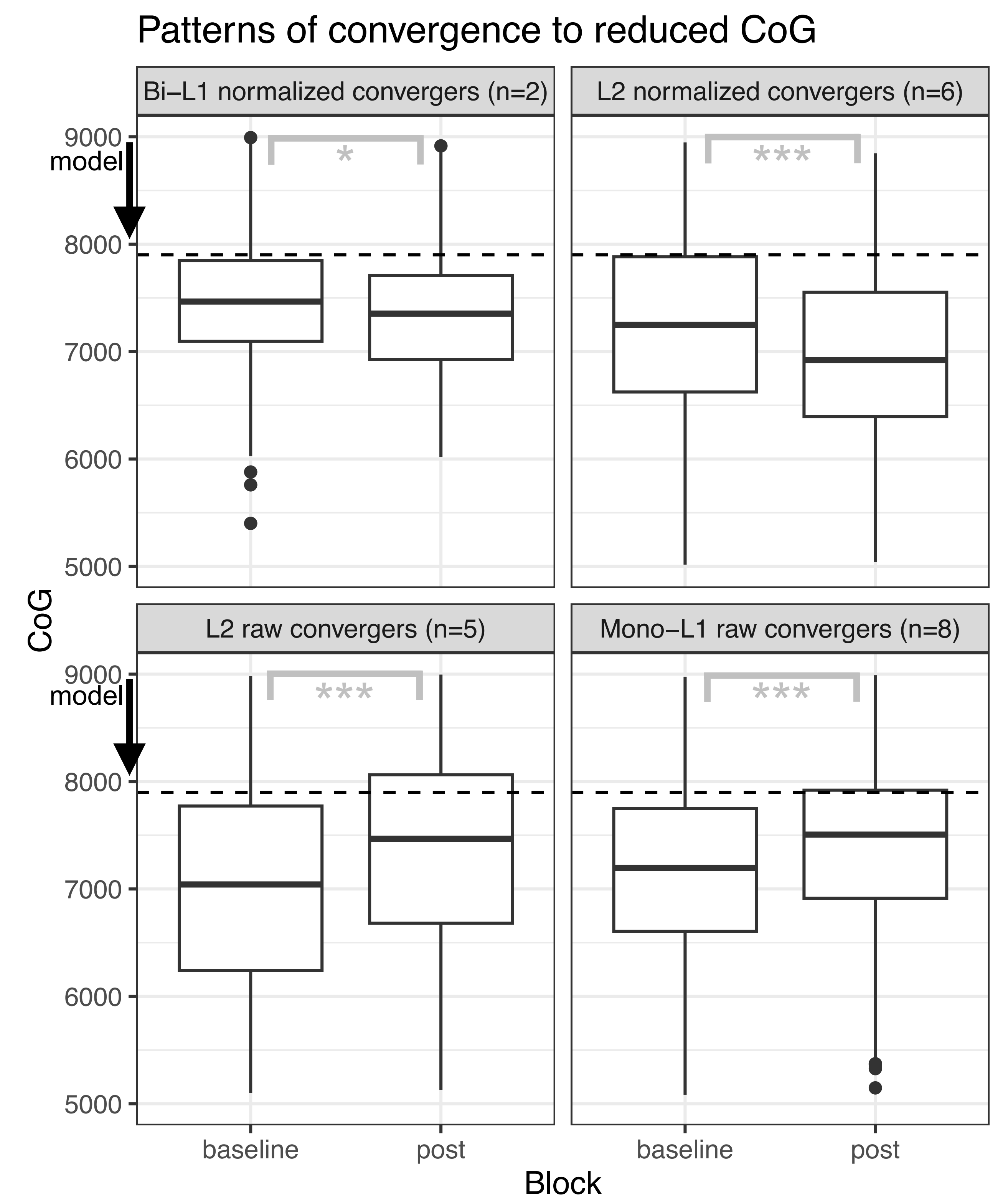
condition	target	low	avg	high
enhanced CoG	raw	→	→	model
	normalized	→	→	model
reduced CoG	raw	→	model	←
	normalized	←	model	←

Results: Enhanced CoG exposure

- Significant convergence for all groups
- No significant differences between language backgrounds (Hauser et al., 2023)



Results: Reduced CoG exposure



Discussion and conclusion

Main finding: More bilinguals converged to normalized CoG. Monolinguals converged to raw CoG.

- Direction of convergence not predicted by different L1/L2 pairings

Why? We're working on it.

- Maybe bilinguals were more attentive listeners?
- Maybe bilinguals have smaller or different /s/ representations, so more sensitive to shifts?