

English Prosody Comprehension in Heritage Speakers: Is One's Mother's Tongue the Same as One's Mother Tongue?

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Background. Heritage speakers have been defined as individuals who learn a minority language from immigrant family members at an early age, yet go on to acquire the dominant language spoken in wider society (Polinsky & Kagan, 2007). Past studies have compared the prosody of heritage speakers in their heritage language with that of their native counterparts (e.g., Wiese, 2022). However, no research has compared prosodic ability of heritage speakers in their dominant language with native speakers of the same dominant language. In this study, we compared prosody comprehension of native English (NE) speakers with speakers whose dominant language is English but who are heritage speakers of another language (henceforth English dominant heritage or EDH speakers). We found that although EDH speakers could tell that two utterances were prosodically different, and could comprehend affective and lexical prosody as well as NE speakers, they were much worse at using prosody to parse anything above the word level.

Methods. Eighty-four college students (61 female, 23 male) participated, and in a prescreening questionnaire, all answered “yes” to the question “Are you a native speaker of English?” All participants reported living exclusively in the US prior to age 13, but 15 of the 84 were actually EDH speakers because, on a demographics questionnaire, they reported that the first language they learned was not English. The remaining 69 participants were NE speakers.

To assess prosodic abilities, we created an online adaptation of the in-person clinical Profiling Elements of Prosody in Speech Communication (PEPS-C; Peppé et al., 2003). Online-PEPS-C (O-PEPS-C) includes 7 subtests each of which has 16 trials. In the discrimination subtest, participants hear two low-pass filtered speech samples and indicate whether they are the same or not. In the affect subtest, participants say whether a single word is said with positive or negative affect. The lexical stress subtest assesses participants’ ability to distinguish between words that differ minimally in stress (e.g., *inSULT* vs. *INsult*). Another subtest assesses participants’ ability to discriminate between question and declarative intonation in a single word (e.g., *carrots?* vs. *carrots.*). In the phrase stress subtest, participants hear a compound word or adjective-noun phrase embedded in the same sentence (e.g., *The green house/greenhouse spoils the view*) and indicate which is said. The boundary subtest assesses participants’ sensitivity to phrase boundaries by having them distinguish between minimal pairs of phrases (e.g., *Chicken, fingers, and fruit/Chicken-fingers and fruit*). Lastly, in the contrastive stress subtest, participants first hear a context story (e.g., “Earlier today, the person on the screen bought some socks. But when she got home, she had forgotten to buy one color.”) Participants then hear the “forgetful” shopper say either, “I wanted BLUE and black socks” (indicating they forgot to buy blue socks) or “I wanted blue and BLACK socks” (indicating they forgot black ones). After hearing the context and spoken sentence, participants indicate which color socks the shopper forgot to buy.

Results. Trial accuracy data were normalized to compensate for differences between mean subtest scores. A Bayesian ANOVA (JASP Team, 2022) with one within-subjects factor (subtest), one between-subjects factor (NE/EDH) and “item” as a random factor revealed that the best model ($BF_{10} = 1.07 \times 10^6$) had a main effect of language background, but no effect of

subtest or interaction between the two factors, with NE speakers grossly outperforming EDH speakers ($BF_{inclusion} = 7.40 \times 10^5$; see Fig.1). To further explore the NE/EDH effect for different aspects of prosody, we conducted separate Bayesian ANOVAs for each of the 7 subtests. These analyses revealed that NE speakers outperformed EDH speakers in boundary ($BF=1.73 \times 10^3$), contrastive stress ($BF=2.86 \times 10^3$) and phrase stress ($BF=1.40 \times 10^3$) subtests. Notably, there were no NE/EDH differences for lexical, discrimination, declarative/interrogative or affective subtests. These results suggest that, despite English being their dominant language, EDH speakers have poorer comprehension of aspects of prosody above the word level than NE speakers.

Discussion. These results are consistent with theories that argue that not all aspects of prosody are the same, at either the linguistic or the psycholinguistic level. Research shows an early critical period for phoneme perception (6-12 months), and generally shows that phonology is more sensitive to critical period effects than syntax, with little to no effect for lexical learning (e.g., Ruben, 1997). Recent research also suggests that even high-school-age children can perform at near-native competence on tests of written syntax (Hartshorn et al., 2018). There is clear evidence of hierarchical linguistic structure in both prosody and syntax, and linguists and psycholinguists have long argued that there are correspondences in prosodic and syntactic hierarchies. Our results suggest that EDH speakers can develop native-level competence in affective uses of prosody (perhaps universal) and lexical level (reflecting a lack of critical period effect), but when it comes to the upper levels of the hierarchy, they do not display native-level ability to use prosody in sentence parsing.

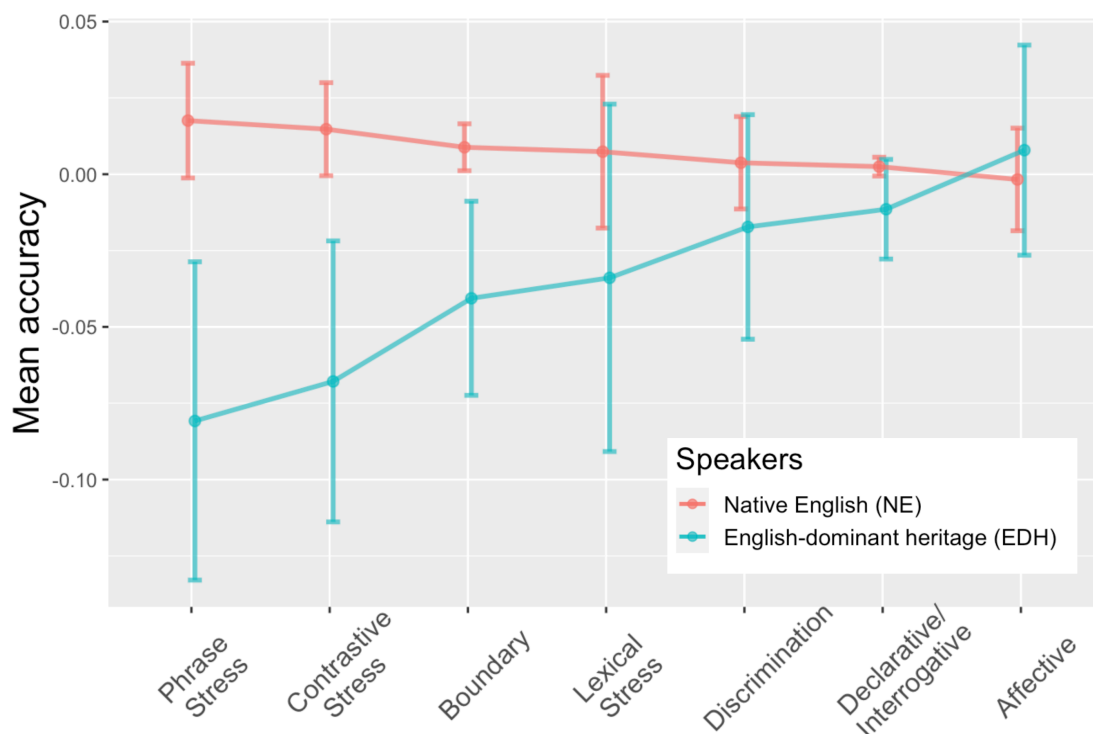


Figure 1. Mean accuracy scores by PEPS-C subtest. Individual trial scores were normalized to compensate for differences between mean subtest scores. Error bars represent 95% credible interval.

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