Examining the relationship between exposure, lexical proficiency, and VOT in English heritage speakers

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Heritage speakers (i.e., HSs) are early bilinguals that acquire a societal minority language (i.e., heritage language, or HL) near-simultaneously with the majority language of the broader community (Benmamoun et al., 2013). Such acquisitional trajectories result in variable amounts of exposure and use of the HL, leading to intra and inter-speaker variation in speech production (Chang & Yao, 2022; Kupisch, 2020). It is thus crucial to examine the speech of HSs as they develop their two grammars in order to collect synchronous measures of input-output (Meisel, 2019) and build connections between phonetic cross-linguistic transfer and development of the bilingual linguistic system (Kehoe & Girardier, 2020). In this study, we ask whether the amount of input-output and lexical proficiency in the HL influence the production of Voice Onset Time (i.e., VOT). We examine speakers for which English is their HL and Spanish and Catalan are their majority languages. Spanish and Catalan voiceless stops are unaspirated and are produced with short-lag VOT (i.e., shorter than 30 ms), while English word-initial voiceless stops are aspirated and have long-lag VOTs (i.e., 30 ms or longer) (Flege & Eefting, 1986; Read et al., 1992). It is therefore expected for VOT to increase with the amount of language exposure and use of English, as well as with higher lexical proficiency.

12 child English HSs (age range = 4;0 - 8;0, mean age = 7;5 y.o.) raised in a Spanish-Catalan-speaking community completed a series of tasks individually and with their English-speaking caregiver. To elicit semi-spontaneous speech, we designed a version of the 'Who is who' game containing 8 stressed /pɛ/, /pʌ/ and /pɪ/ in the initial syllable (e.g., *pumpkin* [ˈpʰʌmpkɪn], *pencil* [ˈpʰɛnsəl], *pillow* [ˈpʰɪloʊ]). The child HSs were recorded using the app ShurePlusMotiv®. VOTs were obtained from the waveform displayed in Praat (Boersma & Weenink, 2020) and manually segmented. A background questionnaire based on previous studies (Paradis et al., 2010; Unsworth, 2016) was administered to the child caregivers. In addition, children completed the Peabody Picture Vocabulary Test (PPVT), a receptive vocabulary test (Dunn, 1959).

A linear mixed-effects model was run with the variables age, output score, input score, and lexical proficiency as fixed effects and the variables word and participant as random effects. A main effect of lexical proficiency was found ($\beta = 0.09$, $SE = 0.03$, $t = 3.00$, $p = 0.02$), indicating that children with higher lexical proficiency scores produce longer VOTs (See Figure 1). Neither input score, output score, nor age showed a significant effect on VOT. Our results, thus, support a connection between the development of the phonetic system and that of the lexicon but do not explain variation with regard to the amount of exposure and use of the HL.

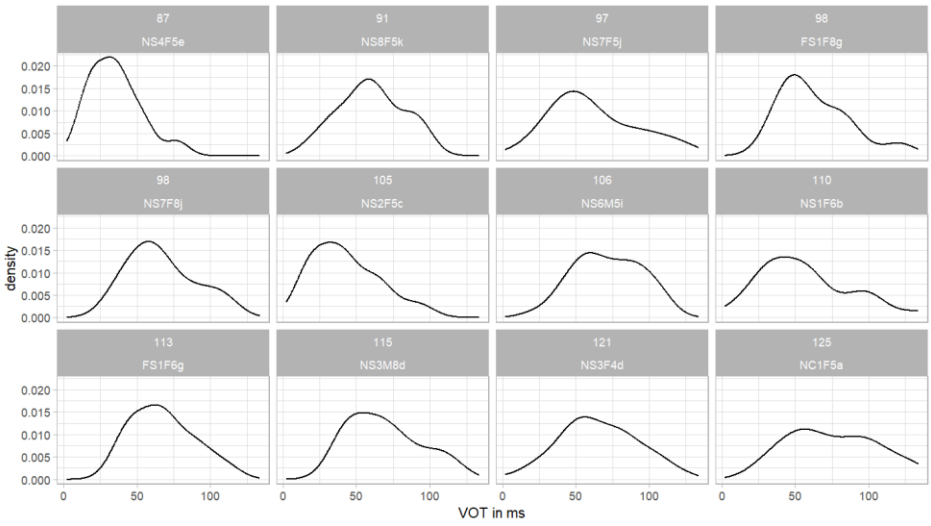

Figure 1. Density plots of VOT in ms by lexical proficiency (upper facet label) and participant (lower facet label)

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