First language versus dominant language intelligibility in “switched dominance” bilinguals

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Many models of bilingualism assume that a talker’s L1 will influence speech production in the L2 (e.g., Kroll, 2010; Flege, 1995) at the phoneme and word levels. This L1 filtering produces a foreign-accent in the L2 (Anderson-Hsieh & Koehler, 2006). However, heritage speakers (bilinguals who grew up in a home in which one of the languages spoken was not the dominant language of society) present a challenge to these models as heritage speakers dissociate L1 and language dominance. For example, in the United States, Spanish heritage speakers (SHS) are L1 Spanish speakers, yet due to English instruction in schools, they have become English dominant (Polinsky and Kagan, 2007), dissociating their L1 (Spanish) and dominant language (English). Based on studies showing that age of acquisition (AoA) is a strong predictor of performance in speech perception (Mayo et al, 1997; Shi, 2010), we may expect that that the early-acquired L1 (Spanish) of SHS will show native-like production (i.e. SHS will have native like production in both languages). However, based on limited usage and non-dominance, we may expect the Spanish of SHS to exhibit a foreign-accent and lower overall intelligibility than their dominant L2 (English). Thus, in this study we ask which language (if either) will be produced with lower intelligibility.

It has also been established that there is individual variation in L1 and L2 intelligibility at the sentence level (Bradlow et al, 1996; Munro, 1998). Work on L2 intelligibility variation has focused on L2 proficiency as the main predictor (e.g. van Wijngaarden et al, 2002). In view of the possibility of native-like production in both languages, we also ask whether SHS L1 and L2 intelligibility are correlated, demonstrating that talker-specific factors contribute to SHS speech intelligibility regardless of language status (i.e. L1 vs. L2, or dominant vs. non-dominant).

In the current study, we compared SHS speech intelligibility in Spanish and English. We recorded 10 Spanish heritage speakers’ productions of 110 simple sentences taken from the Hearing-in-Noise-Test (HINT; Soli, 2008) and embedded them in speech-shaped noise at two signal to noise ratios (SNR), -4 and -8 dB. Native L1 Spanish listeners and native L1 English listeners typed written responses to SHS productions of these sentences. Responses were scored as overall percent words correctly recognized, providing a speech intelligibility score for each SHS talker in each language. Results showed a significant drop in intelligibility from the easy to the hard SNR, but there was no significant effect of task language nor any task language by SNR interaction (Figure 1), indicating equivalent intelligibility across the two languages of these SHS. Acoustic analyses were also performed; however, no acoustic correlate significantly correlated with speech intelligibility suggesting that a combination of articulatory-acoustic factors underlies variation in overall intelligibility in both languages. At the easier SNR, no significant correlation was found between L1 and L2 speech intelligibility. However, results indicate a very strong, positive correlation between Spanish and English intelligibility (r = .84, t(18) = 6.7, p < .01) at the harder SNR (-8 dB) as shown in Figure 2 below.

These results suggest that Spanish heritage speakers, who dissociate L1 and language dominance, exhibit equivalent (and very high) intelligibility in both languages. Moreover, these SHS also demonstrate a cross-language dependency in overall intelligibility between both languages. SHS with low (or high) intelligibility in one language tend also to have low (or high) intelligibility in the other language, demonstrating a pattern of cross-language consistency rather than independence.
Figure 1: Overall intelligibility for SHS in each language at each SNR level

Figure 2: Relationship between English and Spanish intelligibility at easy (left) and hard (right) SNR levels

References:


