The acquisition of the Spanish trill in child and adult heritage speakers

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The present study explores the development of the Spanish trill /r/ by US Spanish heritage speakers (SHSs). /r/ is produced with 2-3 brief contacts between the tongue tip and the alveolar ridge (Hualde, 2005), which requires complex coordination of articulators and a sufficient amount of oropharyngeal pressure (Solé, 2002; Lewis, 2003). Thus, typically developing monolingual children do not have full command of this sound until the age of 7 (Bosch, 1983). With respect to SHSs, studies have shown that adult SHSs tend to produce /r/ with a single occlusion using the same articulation as the apico-alveolar tap /ɾ/, although they maintain the /r/-/ɾ/ contrast using durational cues (Amengual, 2016; Henriksen, 2015).

The present study compares semi-spontaneous speech of child and adult SHSs to further understand how SHSs acquire the Spanish /r/. 16 college-aged adults (M=20.1 years, SD=1.7) and 20 children (M=10 years, SD=1.2) participated in the study. /r/ was elicited using a wordless picture book. All instances of /r/ were annotated by two coders based on the categories adapted from Rose (2010) (i.e., trill, approximant trill, tap, approximant tap, perceptual tap, tap+fricative, fricative, other) ($K=0.868$, $p<0.001$). Moreover, the number of occlusions, segment duration, and the duration of the first aperture of /r/ were analyzed.

Results of preliminary data with 6 child SHSs and 6 adult SHSs showed that the adults produced significantly higher rates of target-like /r/ (i.e., trill) (Mean=32.11%, SD=46.8%) than the children (Mean=5.98%, SD=23.82) (Estimate=-2.524, SE=1.272, z=-1.984, $p<0.05$) and their /r/ was produced with a significantly higher number of occlusion (Mean=1.41, SD=0.95) than that of the children (Mean=0.72, SD=0.82) (Estimate=-2.524, SE=1.272, t=-1.984, $p<0.05$). With regard to the duration of /r/, no significant difference was found between the children (Mean=66.1 ms, SD=38.6 ms) and the adults (Mean=66.4ms, SD=35.1ms). Similarly, the duration of the first aperture of target-like /r/ of the children (Mean=22.4ms, SD=9.6ms) and the adults (Mean=21.8ms, SD=6.7ms) did not significantly differ from each other. These durational values are within the ranges found for non-heritage Spanish native speakers, both children (Carballo & Mendoza, 2000) and adults (Henriksen, 2015). Our preliminary data showed that, while the child and adult SHSs in the present study articulated /r/ in a non-target-like manner (i.e., low trill rates and production of less than two occlusions) (supporting the account of acquisition without mastery [Montrul, 2016, 2018]), the adults performed better than the children (supporting delayed acquisition [Flores et al., 2017]). Further analyses will be conducted on the complete dataset to test the robustness of these patterns.

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