Allophonic perception in Spanish: the case of intervocalic /s/ voicing
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While production studies of allophonic variation are now commonplace, we still do not have a clear understanding of how and if native speakers perceive subphonemic differences. This project experimentally investigates the perception of the variable process of intervocalic /s/ voicing in Spanish and shows that, while distinct from categorical perception, allophonic perception is displayed by listeners, although its robustness depends on the phonological context. Furthermore, this study offers an evaluation of the methodological approaches to explore this kind of perception.

The gradient, variable realization of intervocalic /s/ as [z] has been attested in a few modern dialects of Spanish, including Highland Ecuadorian Spanish (HES). Previous production studies have shown that it is conditioned by linguistic and social factors; most notably position within a word. Intervocalic /s/ is voiced significantly more in word-final context (las alas) as compared to word-initial (la sopa) and word-medial (casa) contexts (Chappell 2011, Strycharczuk 2012, among others). To date, no study has systematically addressed the perception of this variation.

Twenty-four native speakers of HES participated in two tasks in an online experiment, the design of which was adapted from Boomershine et al. (2008). In the first, a similarity rating task, participants heard pairs of audio files and rated these pairs on a scale of 1 very similar to 6 very different. The second was a traditional discrimination task in which the participants heard these same pairs and decided if the two tokens were the same or different (Liberman et al. 1957). For the stimuli, I recorded a native speaker of HES saying sequences of words that pertain to the three contexts described above (asa, la saca, las ata), producing voiced and voiceless variants of each. All stimuli were equated for peak amplitude and inserted into the tasks described. The pairs of audio files either had the same type of voicing, “identity” pairs ([asa] vs. [asa]) or different voicing ([aza] vs. [asa]), “difference” pairs. These test items were mixed with fillers and there were three blocks of each type of task, one pertaining to each phonological context. The results were analyzed using two-tailed chi-square and t-tests.

Results indicate that in the similarity rating task participants rated difference pairs as significantly more different than identity pairs. The robustness of this effect is ordered, however, by context: word-medial (p < 0.05), word-final (p < 0.03), and word-initial (p < 0.0001). This is mirrored in the results for the discrimination task, in which participants responded “different” significantly more to difference pairs than identity pairs, most robustly in word-initial and final contexts. These results confirm that subphonemic differences are heard and that this perception can be dependent on phonological context (Ranbom & Connine 2009, Boomershine et al. 2008, Johnson & Babel 2010). Furthermore, the particular effect of phonological context suggests a connection between production and perception. It is precisely in the environment where there is less intervocalic [z], word-medially, in which listeners perceive least consistently
the difference between [s] and [z]. Finally, this study shows that despite the challenges of testing for allophonic perception, namely not being able to rely on orthography, it is possible to develop a sound methodology that is successful at capturing this.