Cross-linguistic Perception of Subphonemic Stop Contrasts: Phonology Beats Phonetics

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Native speakers are usually sensitive only to the contrasts they are exposed to (Best 1993) and that are systemic (Flege 1995). Nonetheless, some studies show native speaker sensitivity to subphonemic differences (e.g., underlying voicing in Polish or German, Słowiaczek & Szymańska 1989; Kleber et al. 2009). We do not know, however, to what extent they are perceptually salient for speakers of other dialects and languages.

The aim of this paper is to provide a cross-linguistic comparison of perceptual responses to changes in obstruent constriction, based on the example of Spanish stops. Recently, it was shown that Canarian Spanish distinguishes as many as 6 systematically produced variants of stops given both /p t k/ and /b d g/ weakening. To see whether the variants confirmed in production are salient enough to be reliably distinguished in perception, we tested these contrasts on 4 groups: Canarians, Peninsular Spaniards, Poles and Germans (N=110). Peninsular Spanish has no /p t k/ weakening. Polish is a true voice language attending to the feature [voice], while German uses [spread glottis]. Both German and Polish lack non-spirant approximants but use the feature [continuant] to contrast stops with fricatives.

We conducted 1) a forced-choice AX task aimed at tapping into acoustic perception and 2) an AXB task focused on phonological categorization. 10 pairs of contrasts between a voiceless stop [p], a partially voiced stop [b̥], a fully voiced stop [b], a closed approximant [β] and an open approximant [β˕] were embedded in pseudowords: [ga**p**a], [re**p**e], [su**p**u], [la**p**afa], [de**p**eha], [nu**p**ula].

The AX task indicates that contrasts are recognized based on phonological categories, while minor subphonemic differences are treated as intra-category. It usually takes more than one phonological feature for sounds to be reliably distinguished. Spaniards had serious difficulties with most contrasts, while Poles and Germans probably reinterpreted approximants as /v/, which boosted accuracy. Poles were also above chance in voicing contrasts. In the AXB task, all participants did much better. Again, Spaniards fare worse when discriminating between stops and approximants, and Germans have problems with voicing. However, only Canarians treat [p] - [b̥] differently than [p] – [b], which is in line with the production data. They also responded systematically faster than all other groups by an average of 300-500ms. All in all, although some sensitivity to subphonemic contrasts is observed in native speakers, there is no evidence for (near-)categoricity. Also, native phonological categories prevail in non-natives in guiding both acoustic perception and categorization.

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