# Intra- and cross-modal differences in the processing of phonological categories: Enhanced discrimination in the visual domain

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Perceptual Categorization (PC) of phonemic contrasts offers a valuable lens to examine how modality shapes phonological processing. While in spoken languages there is constrained sensitivity to discrimination of non-native phonemic contrasts (Abramson & Lisker 1970), sign languages (SLs) show finer discrimination of such contrasts (Emmorey et al. 2003). This difference provides an opportunity to investigate how central processing mechanisms interact with modality-specific perceptual constraints. Our study investigates PC of phonemic contrasts in users of Catalan Sign Language, Spanish Sign Language and Dutch Sign Language. A MetaHuman avatar sign four handshape contrasts that involve changes in finger selection or finger position. We explore the impact of variant type, SL knowledge and SL on PC. The contrasts include existing and non-existing handshapes in the phonological repertoire of the SLs to examine the role of linguistic knowledge. We also test non-signers to explore the impact of familiarity with the visual modality. We present pseudosigns in an ABX (categorization) task and a same-different (discrimination) task. Results show that PC depends on contrast type. For changes in finger selection between existing handshapes, the classic PC pattern is found. By contrast, when the addition of a selected finger results in a non-existing handshape, the pattern is random across participants. As for finger position, curving shows less degree of PC and spreading is contrastive between +/- contact between fingers. Thus, category seems to be dependent on the anatomical features that serve as reference points. Similar patterns are found in the three groups, which indicates that categorization of these contrasts might not be driven by linguistic knowledge. Our findings reveal that SL users retain a broader ability to perceive non-native distinctions. These findings highlight the role of the visual modality in shaping phonological categorization and contribute to a better understanding of language processing from an intra- and cross-modal perspective.

**References:** • Abramson, A.S. & L. Lisker (1970). Discriminability along the voicing continuum: Cross-language tests. *Proceedings of the Sixth International Congress of Phonetic Sciences*. Prague: Academia, 569–573. • Emmorey, K., McCullough, S., & D. Brentari (2003). Categorical perception in American Sign Language. *Language and Cognitive Processes* 18(1), 21–45. Psychology Press Ltd.