

Infants' sensitivity to sonority sequencing: evidence from behavior and pupillary synchronization

Rowena Garcia, Alan Langus & Natalie Boll-Avetisyan

University of Potsdam

From around 6 months of age, infants display knowledge of their native languages (Sundara et al., 2022). However, it is not clear whether their phonotactic sensitivity is influenced by universal biases. One potential universal phonotactic bias relates to sonority sequencing, preferring that consonants rise in sonority from the edges towards the vowel (Clements, 1990) with sonority rises (e.g., /blik/) as well-formed, and falls (e.g., */lbik/) as ill-formed. Newborn brains show higher activation with rises than with falls, supporting a sonority sequencing bias (Gómez et al., 2012). We hypothesize that this bias also influences older infants' perception. Using a central fixation paradigm with eye-tracking, (1) we predicted that infants would prefer rises over falls, indicated by looking time (LT) differences. (2) We predicted that infants' pupils would synchronize better to rises over falls, as pupil size changes match the auditory input's temporal regularities (Marimon et al., 2022). Five- (n=22) and 9-month-old (n=24) German-learning infants listened to nonwords with word-initial consonant-consonant rises (e.g., dlaga) versus falls (e.g., lbaga). Crucially, these consonant-consonant clusters never occur word-initially in German. LT data revealed longer LT for rises over falls (Est: 0.71, $p < 0.01$); while there was no sonority effect in the 5-month-olds (see Figure). Regarding pupillary synchronization, infants showed a significantly higher maximum cross-correlation between changes in pupil size and the auditory stimuli for rises than for falls (Est: 0.01, $p = 0.01$), with no age difference (Est: -0.001, $p = 0.68$). These results suggest that infants' perception is influenced by a sonority sequencing bias. While behavioral measures only indicate sensitivity to sonority in the 9-month-olds, pupillary synchronization may be a more sensitive measure, revealing sensitivity across ages. The findings highlight the need for considering potential effects of universal biases when studying infant perception.