

Before Words: How innate knowledge shapes preverbal infants' use of prosody to express communicative functions

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Preverbal infants systematically vary prosody to express different communicative functions (Esteve-Gibert & Prieto, 2012), but the mechanisms underlying this ability remain unclear. We asked how infants begin to acquire prosodic form–meaning mappings, focusing on pitch. We hypothesised that infants first use pitch following innate biases (H1), and gradually rely less on these biases as they gain language-specific knowledge (H2).

We examined the Frequency Code (henceforth, FC; Ohala, 1983), which outlines that smaller larynxes produce higher pitch than larger ones; consequently, speakers use higher pitch or a rising pitch pattern to sound ‘small’ (e.g., uncertain, as in questions/requests) and lower pitch or a falling pitch pattern to sound ‘big’ (e.g., confident, as in statements/comments). We compared Dutch- and Stockholm Swedish-exposed infants because Dutch typically uses rising questions and falling statements (Haan, 2001), following FC (Ohala, 1983), whereas Swedish uses falling contours for both (House, 2004).

Monolingual infants (13 Dutch-exposed, 12 Swedish-exposed) participated in 15-minute home play sessions (see Image 1) twice per month at 3, 5, and 7 months. Sessions included four play conditions designed to elicit requests and comments. Audio was segmented (see Image 2) in Praat (Boersma, 2024). Using videos in ELAN (Max Planck Institute for Psycholinguistics, 2024), speech-like vocalisations were coded as requests or comments (analysis-1), and requests were classified as initial or follow-up bids (analysis-2). Mean pitch per vocalisation was extracted using ProsodyPro (Xu, 2013), and the effects of communicative function, language, and age were analysed using linear mixed-effects models (van Niekerk et al., 2024).

Analysis-1 (n=2689 comments, n=1454 requests) revealed a main effect of function ($p<0.001$) and function×age interaction ($p<0.001$) with requests having higher pitch than comments across ages, but with larger differences at 7 than at 3 months. Analysis-2 (n=98 initial requests, 980 follow-up requests) revealed function×age interaction ($p<0.01$) with 3-month-olds marking follow-up requests with higher pitch than initial requests, but 7-month-olds marking both request types with similarly high pitch. No language-related effects emerged in either analysis.

Infants systematically used pitch cross-linguistically, with patterns evolving between 3–7 months yet remaining consistent with the FC (Ohala, 1983). Results support H1 but not H2, suggesting biologically motivated biases underpin prosodic form–meaning mappings throughout the early preverbal phase.

References

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Images and Figures

Image 1: Observational set-up in home setting with participant-led positioning



Image 2: Vocalisation segmentation in Praat using audio recordings

