

Enhancement of Phonological Features in Infant-Directed Speech Matches Time-Course of Feature Acquisition

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Infants start acquiring native phoneme categories within their first year of life, potentially aided by parental adaptations in infant-directed speech (IDS). In the brain, acquired phonemes are represented as bundles of so-called phonological features (Mesgarani et al., 2014), which become activated upon phoneme perception. Here, we are asking whether parents enhance features when interacting with infants. We conducted a longitudinal analysis of maternal feature enhancement in 98 mother–infant dyads using time-aligned phonological transcripts of IDS at 7, 11, and 24 months of infant age. We examined two measures that were recently shown to relate to feature acquisition (Menn et al., 2023): First, the durations of features in speech, as features often span multiple successive phonemes making them longer than individual phonemes. Second, the temporal convergence of feature durations and prosodic modulations (prosodic similarity). Mixed-effects models revealed enhancements in duration ($t = -8.53$, $p < .001$) and prosodic similarity of phonological features ($t = -16.21$, $p < .001$) in IDS compared to adult-directed speech (ADS). Notably, feature enhancements in IDS decreased with infant age (both $p < .001$), and the trajectory at which features become ADS-like differed between features (both $p < .001$). Why do parents enhance particular phonological features for a longer period in infancy? We assessed a potential relationship between the developmental trajectory of IDS feature enhancement and the order of feature acquisition in infancy, taken from our cross-sectional electroencephalography results. Strikingly, maternal enhancement of phonological features decreased faster for those features acquired at an earlier age (duration: $t = -3.06$, $p = .002$; prosodic similarity: $t = 12.25$, $p < .001$). In sum, results indicate a dynamic interplay between parental enhancements of phonological features and infants' feature acquisition. We suggest that parental enhancements of phonological features in IDS in duration and prosody aids infants' feature acquisition—analogue to prosodic bootstrapping.