Report

Mothers Consistently Alter Their Unique Vocal Fingerprints When Communicating with Infants

Elise A. Piazza [1, 2, 3] ⊠, Marius Cătălin Iordan [1, 2], Casey Lew-Williams [2]

Highlights

- Infant-directed speech is an important mode of communication for early learning

- Mothers shift the statistics of their vocal timbre when speaking to infants

- This systematic shift generalizes robustly across a variety of languages

- This research has implications for infant learning and speech recognition technology

Summary

The voice is the most direct link we have to others' minds, allowing us to communicate using a rich variety of speech cues [1, 2]. This link is particularly critical early in life as parents draw infants into the structure of their environment using infant-directed speech (IDS), a communicative code with unique pitch and rhythmic characteristics relative to adult-directed speech (ADS) [3, 4]. To begin breaking into language, infants must discern subtle statistical differences about people and voices in order to direct their attention toward the most relevant signals. Here, we uncover a new defining feature of IDS: mothers significantly alter statistical properties of vocal timbre when speaking to their infants. Timbre, the tone color or unique quality of a sound, is a spectral fingerprint that helps us instantly identify and classify sound sources, such as individual people and musical instruments [5–7]. We recorded 24 mothers' naturalistic speech while they interacted with their infants and with adult experimenters in their native language. Half of the participants were English speakers, and half were not. Using a support vector machine classifier, we found that mothers consistently shifted their timbre between ADS and IDS. Importantly, this shift was similar across languages, suggesting that such alterations of timbre may be universal. These findings have theoretical implications for understanding how infants tune in to their local communicative environments. Moreover, our classification algorithm for identifying infant-directed timbre has direct translational implications for speech recognition technology.