

# **Babies Babbling in the Wild: Long-Form Recordings to Study Infants' Vocal Development and Speech Environments**

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Traditional laboratory experiments have significantly advanced our understanding of speech and language use, but a reliance on controlled environments limits our ability to ensure observations generalize to real-world communication. In this talk, I offer a complementary approach that extends beyond the confines of the lab setting, aiming to enable us to test extant theories' generalization to everyday interactions with greater statistical power through larger samples. Our approach is anchored on employing machine learning to analyze speech behavior as it unfolds in real-world interactions captured through long-form recordings. These data can be interrogated in very different ways. For instance, in a 13-author collaborative study, we analyzed over 40,000 hours of audio from 1,001 children across 12 countries. Correlation analyses suggested that maturation and speech exposure were more important predictors of infants' speech development than gender and socioeconomic status. Another way in which such data can be used is to assess the extent to which causal models predict general milestones in the infant population. For example, in one study, we use state-of-the-art self-supervised learning models to argue that tailored biases are needed to face the rich variability of naturalistic audio, meaning that uninformed statistical learning cannot suffice. I couch these examples within a larger discussion of the promises and pitfalls of wearable technology to study language and communication.