Neural tracking of nursery rhymes: development and relations with vocabulary outcomes

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Speech consists of regularities at different timescales. A recent discovery is that brain oscillations align their activity to modulations in the speech signal, which already occurs during infancy. The degree to which infants exhibit this neural tracking can be linked to their language development. For example, cross-sectional research demonstrates that the neural tracking of stressed syllables in nursery rhymes at 10 months, but not at 14 months, predicts vocabulary outcomes at 24 months (Menn et al., 2022). This raises several questions: How does neural tracking develop across different frequency bands (i.e., at the stressed syllable, syllable, and phonological rates) from infancy to toddlerhood, and is neural tracking at each rate and age predictive of children's language outcomes? To address these questions, we turn to the longitudinal YOUth cohort study following Dutch children during pregnancy into childhood, aiming to capture meaningful individual differences in neural tracking across development. EEG measurements were collected at three time points (at 5 months, 10 months, and around 3 years of age). During these measurements, children viewed clips in which two female actors alternately sang Dutch nursery rhymes. Language outcomes were assessed at the final wave (around 3 years) using the Peabody Picture Vocabulary Test (PPVT-III-NL) and the Dutch version of the Communicative Development Inventory (N-CDI). Data collection has been completed (>500 children participated). In the coming months, we will analyse the development of neural tracking from infancy to toddlerhood at the three frequency bands of interest. We will also assess the predictive value of the degree of neural tracking at each frequency band and age group for children's expressive and receptive vocabulary outcomes around 3 years. Our study seeks to confirm and expand upon existing findings by examining a larger, longitudinal group of neurotypical children and sampling at three time intervals into early childhood.