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Insights into the development of perceptual-motor linkages for speech: A new view from data on pre-babbling infants' processing of *infant* speech

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Research Questions

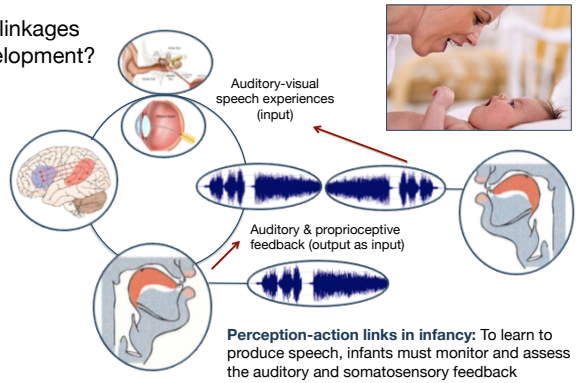
How and *when* do perceptual-motor linkages for speech emerge during infant development?

A new view:
Examining infant speech development processes through the widening vantage point of infants' perception of *infant* speech

How do infants perceive their *own* self-generated speech, or speech produced by *another* infant?

AND

How might this change with perceptual and babbling experience to support speech development?



Perception-action links in infancy: To learn to produce speech, infants must monitor and assess the auditory and somatosensory feedback generated by their own vocalizations.

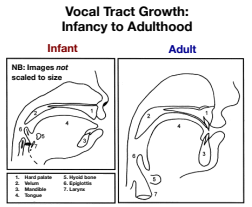
Infant Speech

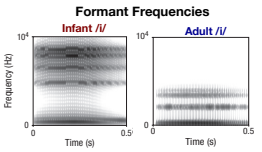
How is infant speech different from adult/child speech?

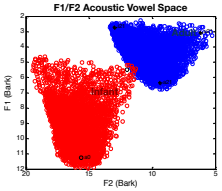
Vocal tract anatomy
Infant speech has a unique acoustic signature due, in large part, to the distinct morphology of the infant vocal tract. The infant vocal tract is not simply a shrunken version of the adult vocal tract; it has a tongue body that is proportionately larger, and a more sloping oropharyngeal tract.

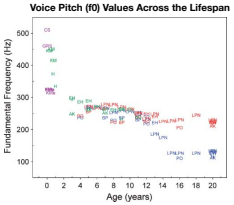
Higher voice pitch
Infant speech has a higher voice pitch because infants' vocal cords are shorter and less massive.

Higher resonant frequencies
Infant speech has higher formant frequencies because the length of the infant vocal tract is shorter than the adult vocal tract.









Do *pre-babbling* infants prefer listening to infant speech?

Vowel stimuli: Infant and adult (female) /i/ tokens

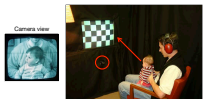
Alternating Trials

Test Orders

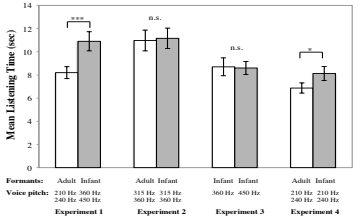
Condition 1: **Adult Infant Adult Infant ...**

Condition 2: **Infant Adult Infant Adult ...**

Sequential preferential listening procedure



Mean looking time by trial type

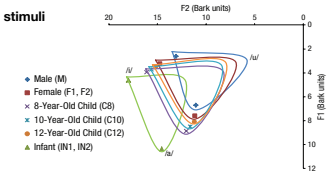


Four experiments showing that infants selectively attend to vowel sounds with infant vocal properties, i.e., voice pitch and/or formant frequency values.

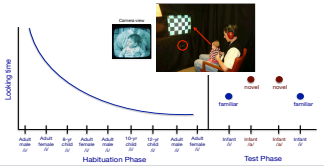
Masapollo, Polka, & Ménard, under review

How do *pre-babbling* infants categorize infant speech sounds?

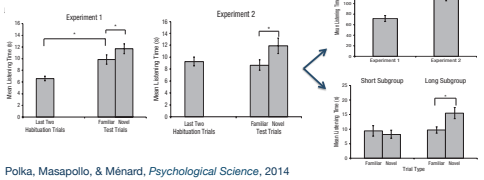
Vowel stimuli



Look-to-listen habituation procedure



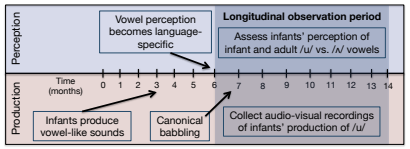
Mean looking time by trial type



Polka, Masapollo, & Ménard, *Psychological Science*, 2014

Do perceptual biases for listening to infant speech influence later *production* skills?

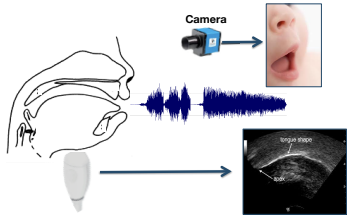
Tracking speech perception *and* production abilities longitudinally in the same infants



Does *contingent social feedback* within caregiver-infant dyads influence the acoustic properties of vowels produced by infants?

Rvachew, Polka, Masapollo, & Ménard, in progress

Do infants vocalize more (and/or produce more speech-like sounds) when they listen to infant vs. adult speech?



Ménard, Polka, & Masapollo, in progress

Can infants successfully infer the *source* of infant speech sounds?

Visual stimuli

Will infants selectively attend to infant faces over adult faces when they hear infant speech, and to adult faces over infant faces when they hear adult speech?

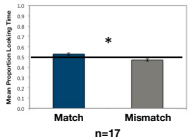
Design: Faces presented *side-by-side*

Pre-test (instrumental music, 1 trial, infant-controlled)

Test (vowels played 8 trials; infant-controlled)

Post-test (instrumental music; 1 trial, infant-controlled)

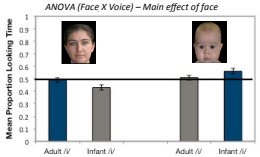
Mean proportion listening times



n=17

Face-voice combinations (n = 17)

ANOVA (Face X Voice) – Main effect of face



Masapollo, Polka, Vouloumanos, & Ménard, in progress