

# Infants track the rhythms of speech and song

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## Introduction

The musical structure of songs may help listeners neurally track syllable onsets (VBdN et al., 2020), which could underlie better word learning from music than speech (Ma et al., 2021). The musical features of infant-directed (ID) utterances similarly show word learning benefits (Thiessen et al., 2005), suggesting similar boosts in neural tracking for ID compared to monotone utterances.

Our study used cerebro-acoustic phase coherence as an index of neural syllable-rhythm tracking, to determine whether infants and adults are better at tracking ID vs. monotone spoken and sung utterances.

## Method

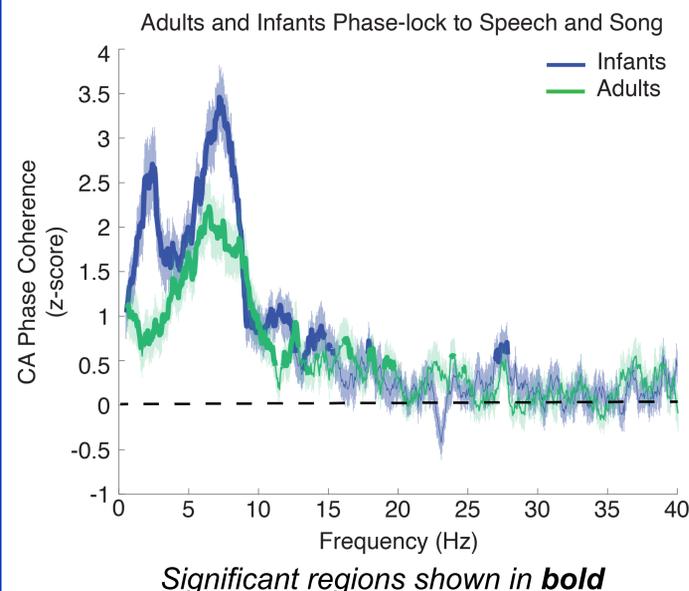
33 four-month-olds and 32 adults passively listened to 44 spoken/sung and ID/monotone versions of the children's stories "George and Martha."

Infants watched a live silent puppet show while sitting on their caregiver's lap, and adults watched an excerpt of an animated movie without audio.

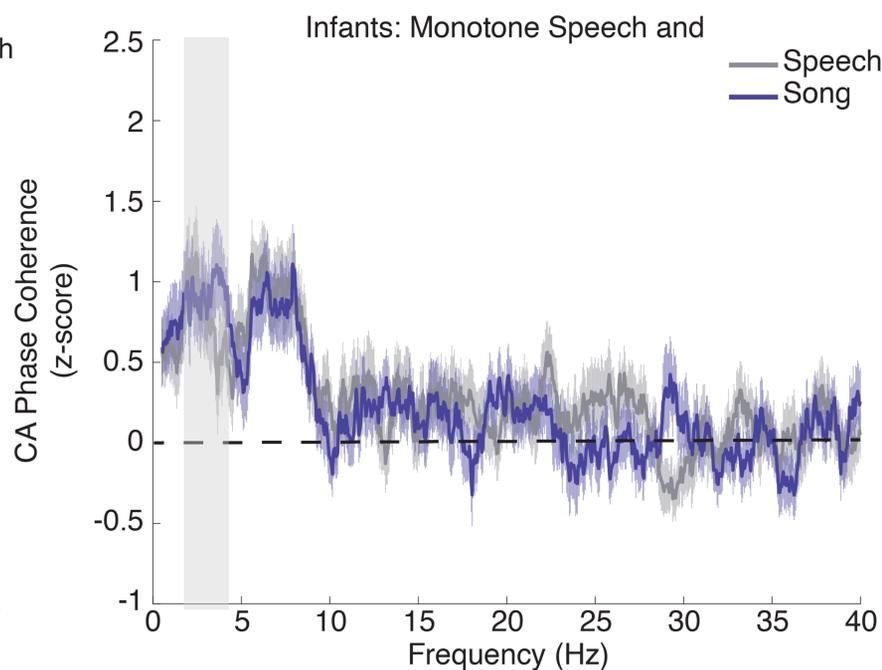
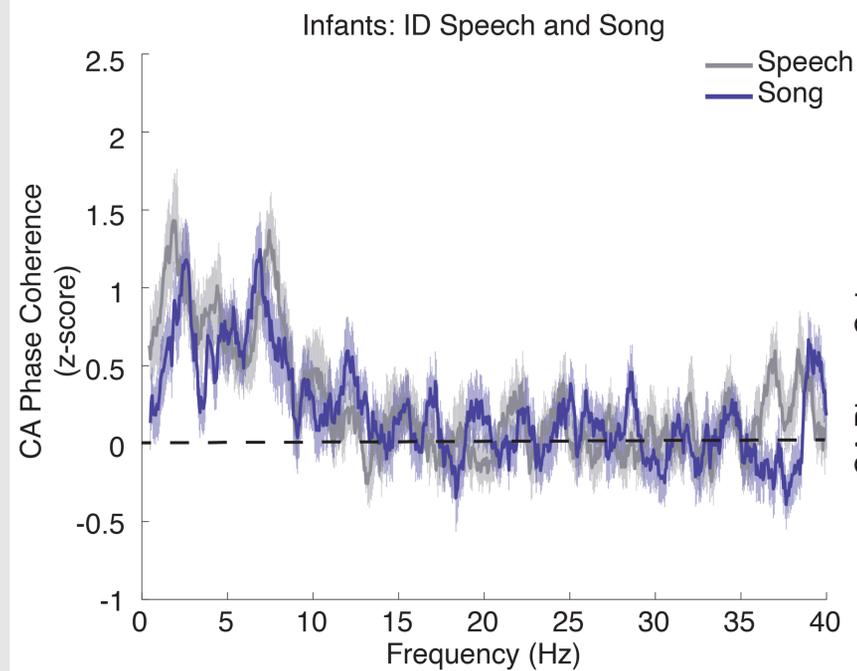
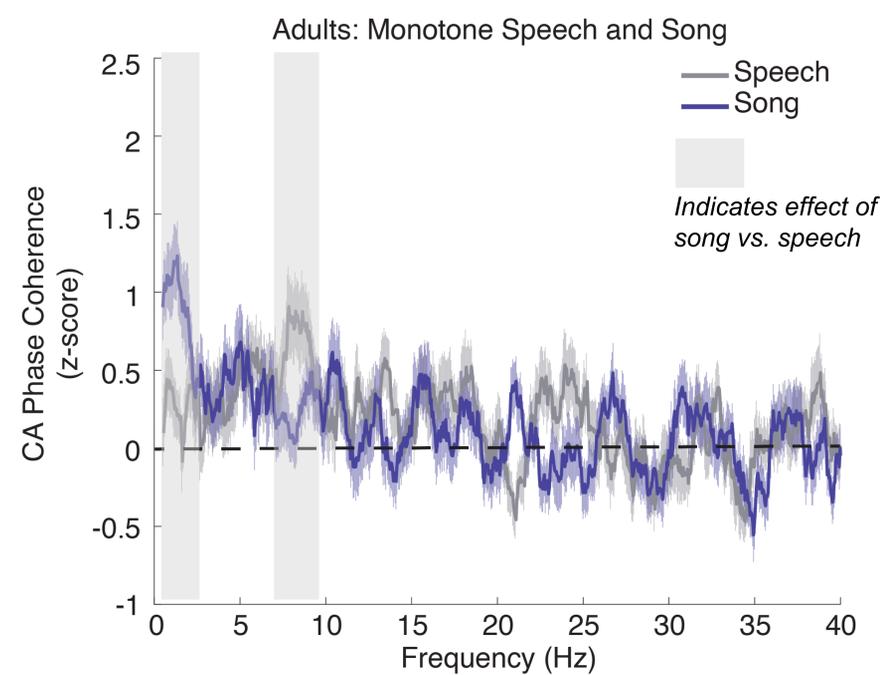
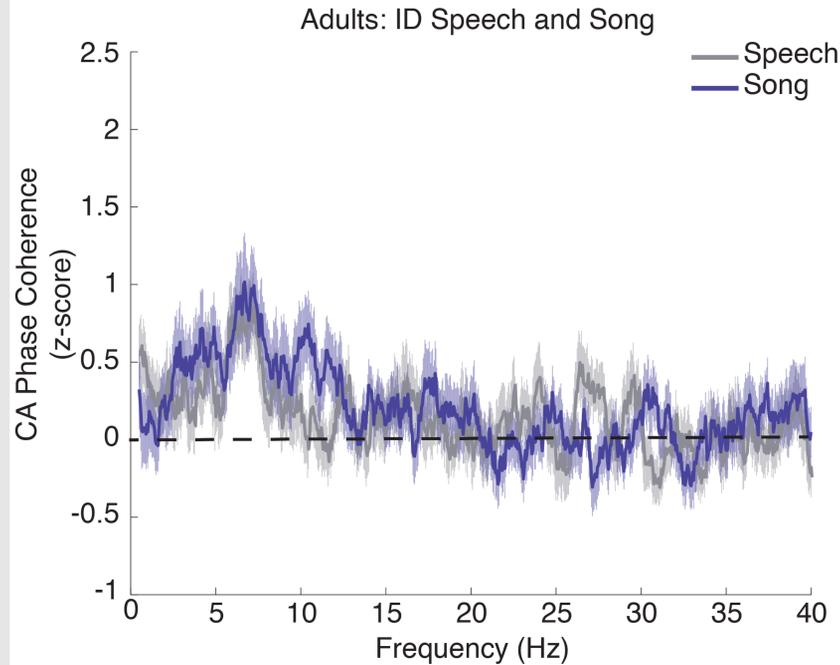
All participants were fitted with 128-lead EGI electrode nets and data was processed using FieldTrip and Artifact Blocking for artifact removal.

Coherence was z-score transformed with baseline of 1000 random permutations.

## Results: Infants vs. Adults



## Results



## Discussion

- Adults and infants both neurally tracked utterances above chance (t-test compared to zero).
- Neither group tracked ID and monotone utterances differently.
- Adults and infants had greater coherence for song than speech for monotone utterances, but adults also showed greater coherence to speech than song for theta-alpha.
- Infants had greater coherence in the delta, theta, and alpha bands than the same frequency bands in adults
- Monotone utterances brought out neural tracking differences between song and speech.

## References

Ma, Fiveash, Hellmuth Margulis, Behrend, Forde Thompson, 2019, *Quarterly Journal of Experimental Psychology*, 73(7). Thiessen, Hill & Saffran (2005). *Infancy*, 7(1), 53-72. Vanden Bosch der Nederlanden, Joanisse, & Grahn, 2020, *NeuroImage*, 214, 116767.

## Acknowledgments

