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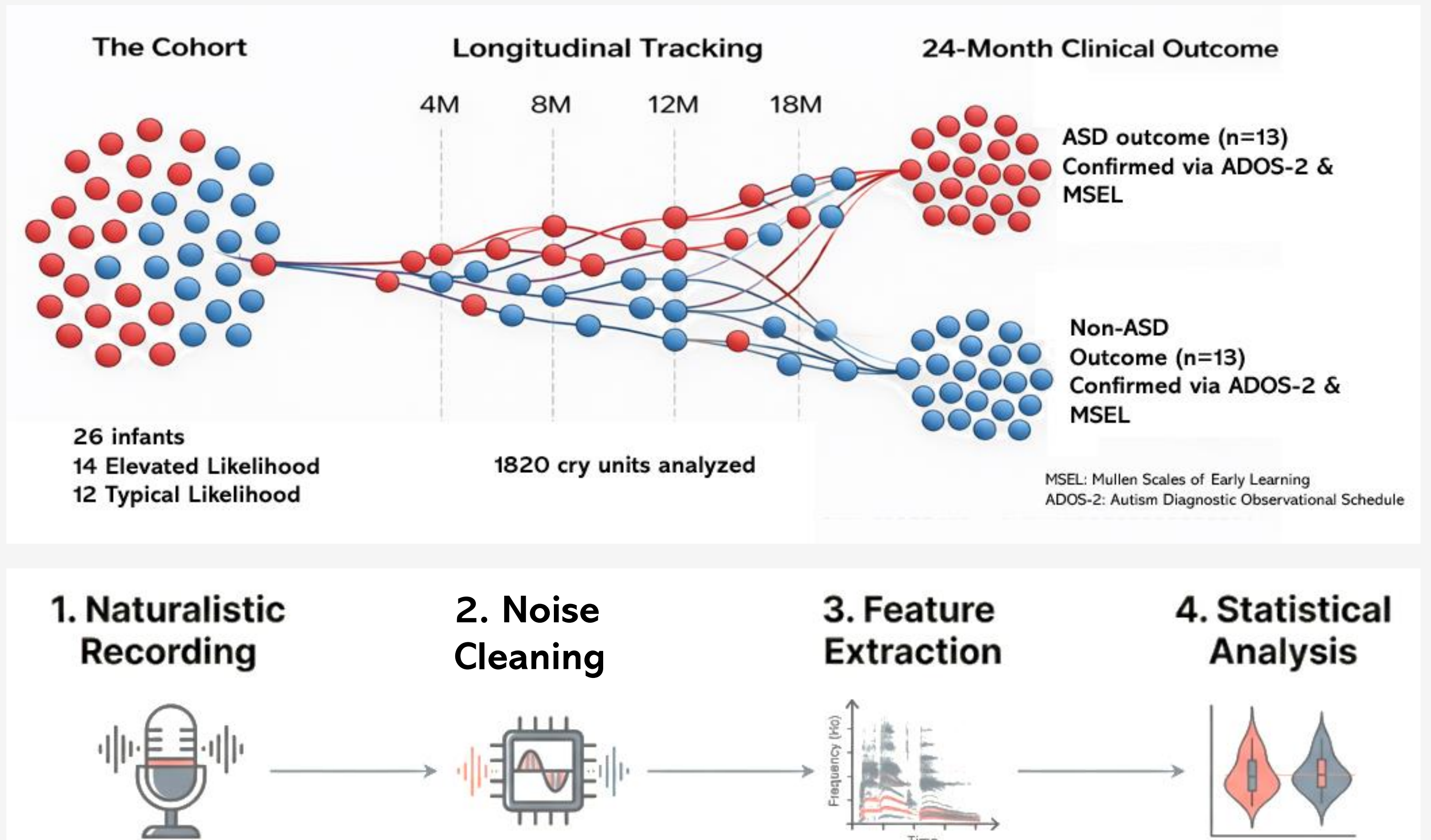
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Introduction

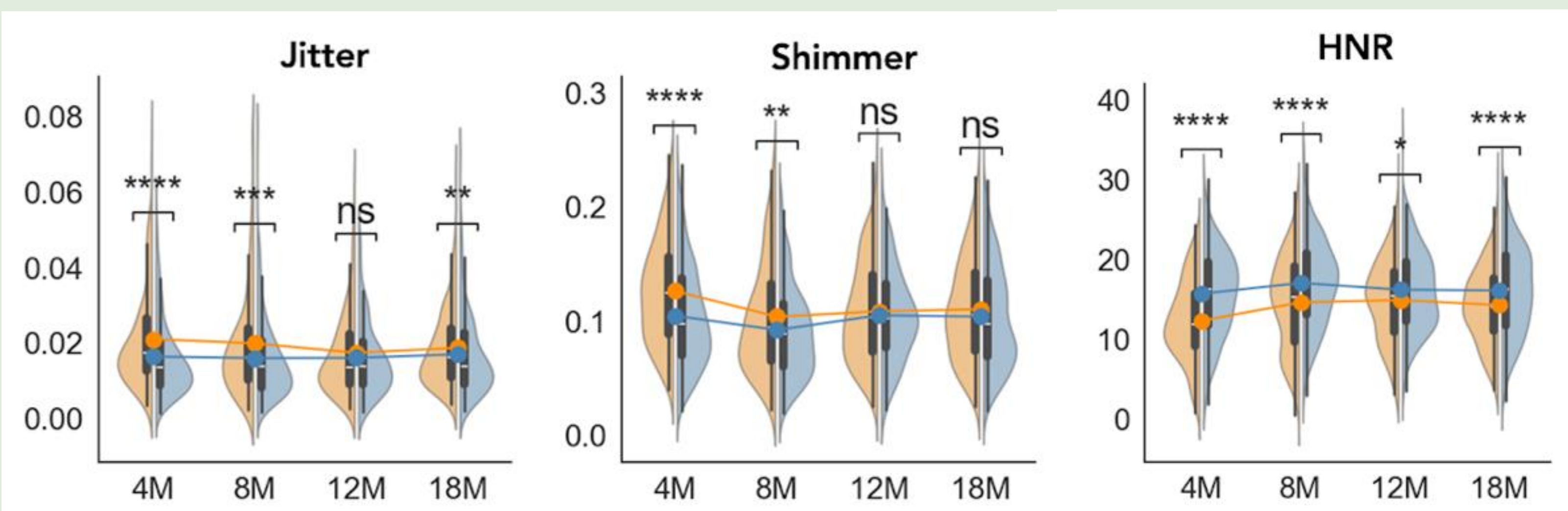
Background: Infant crying is an early communicative act reflecting the neurophysiological integrity of the brainstem and motor systems. While previous studies show atypical acoustics in autism (altered pitch, stability), most are cross-sectional.

Objective: This study investigates the longitudinal evolution of cry acoustics from 4 to 24 months in infants with elevated (EL) and typical (TL) likelihood of autism, later categorized into an ASD or non-ASD group based on their 24-month ADOS-2 clinical concern levels to identify early biomarkers.

Methods

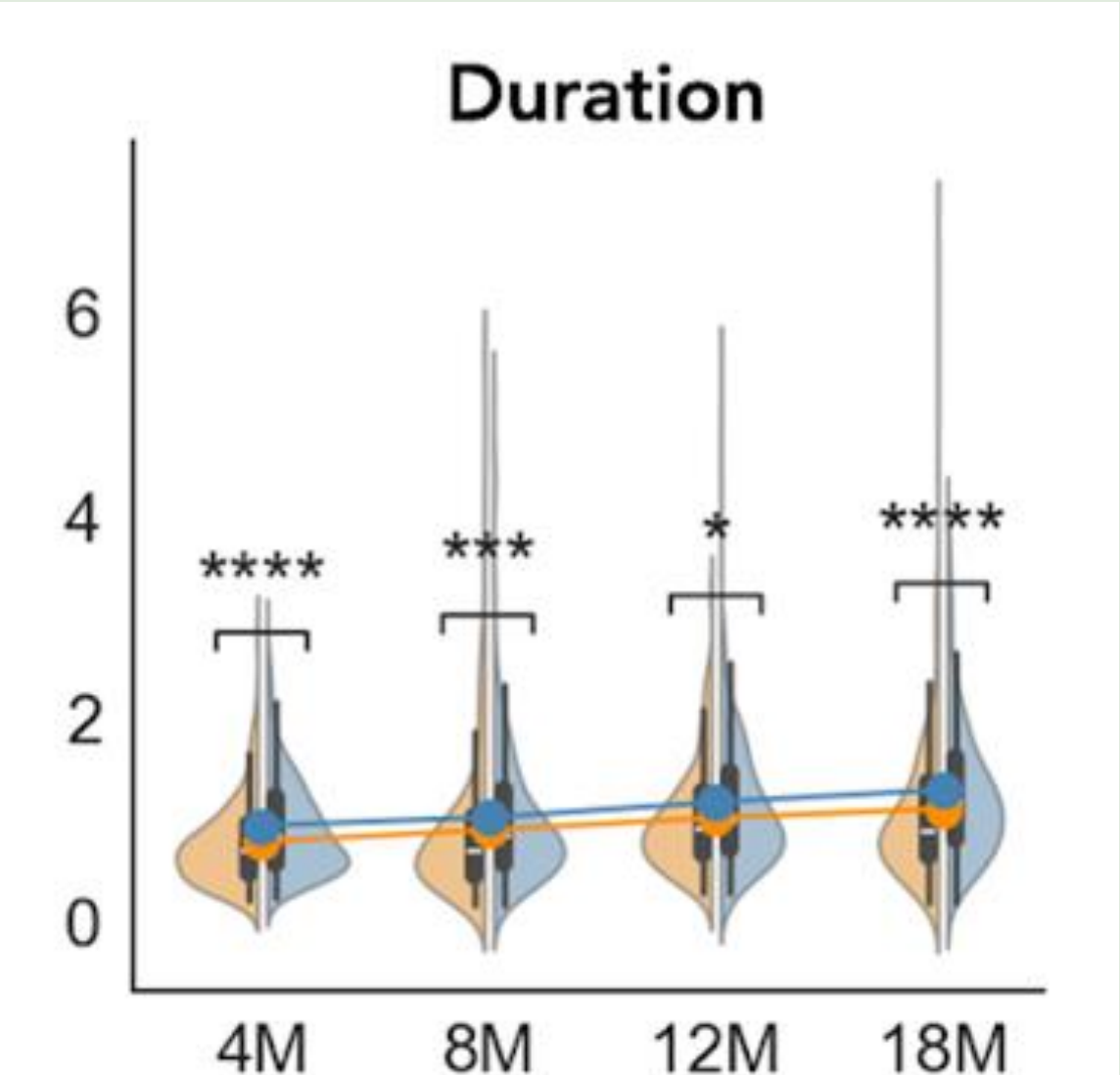
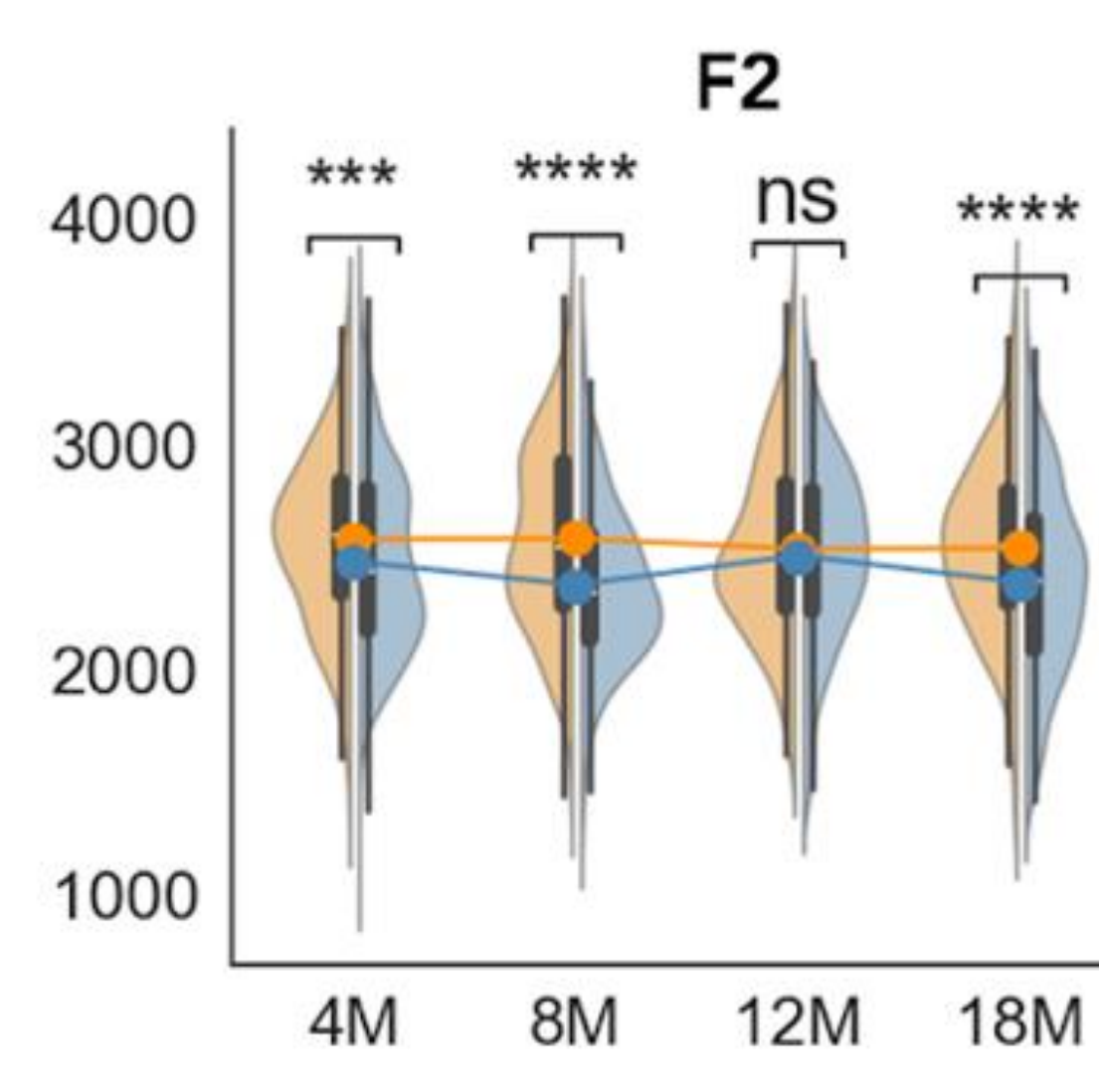


Key Findings

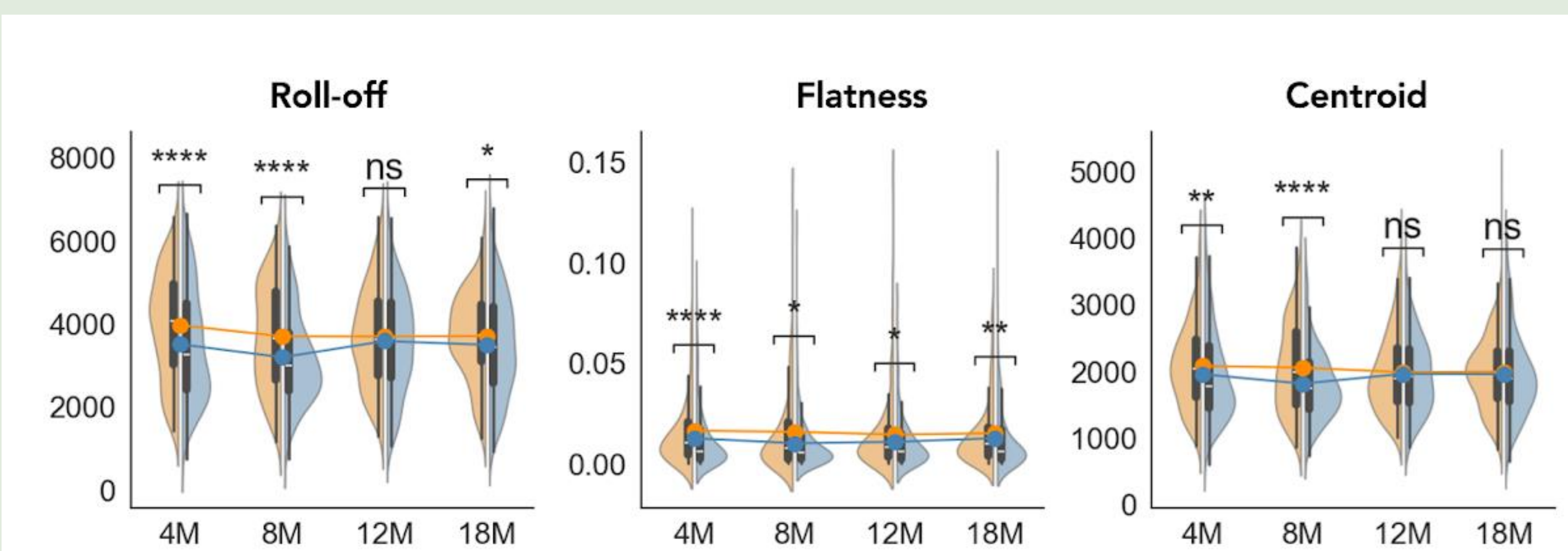


Voice Quality: The ASD group showed consistently **higher Jitter and Shimmer**; and **lower HNR**, indicating greater instability and irregularity in vocal fold vibration and "noisier" and less harmonic cries.

Formant frequencies & Duration: A consistently **higher F2 mean** was observed in the ASD group, suggesting differences in tongue positioning (more forward). **Cry duration** was significantly **shorter** in the ASD group across all ages.



Spectral Energy Distribution: the ASD group produced cries with **higher spectral Flatness, Centroid and Roll-off**. This suggests their cries were "noisier", potentially due to more tension or stability in vocal fold vibration.



Conclusions

These findings highlight the potential of cry acoustics as non-invasive, early vocal biomarkers for autism. When integrated longitudinally with complementary multimodal data, they may enable more precise and timely identification of atypical neurodevelopment.

References

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