Respiratory Sinus Arrhythmia is Uncorrelated with Vocalizations Among Infants at High and Low Risk for ASD and ADHD

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INTRODUCTION

- Respiratory sinus arrhythmia (RSA), high frequency heart rate variability linked with regular respiration, is an index of vagal tone and parasympathetic activity.\(^1\)
- RSA is associated with effort allocation and emotion regulation,\(^1\) and is often measured in studies of infants.
- Increased RSA allows for behavioral adaptation and cognitive flexibility; reduced RSA is associated with maladaptive response to stress.\(^3\)
- Factors that disrupt regular respiration, such as talking, have been shown to affect RSA and other heartbeat derived measures in adults.\(^2\)
- It is unclear whether vocalizations affect RSA measurement in infants.

METHODS

Participants
- Total of 44 infants aged 12 (n = 27) and 18 (n = 17) months at familial risk for ASD (n = 17), familial risk for ADHD (n = 13), or low risk for both (n = 14).

Experimental Design
- Infants participated in a 3-minute parent-child play task.
- Actiwave single-channel ECG (CamnTech) collected data during the parent-child play task.
- MindWare\(^{\circledR}\) software used to clean heartbeat data and calculate RSA; raw values were analyzed.
- Coders were trained to 70% agreement on vocalization codes to be considered reliable.
- Infant vocalizations during the parent-child play task were coded in BORIS 6.3.9.

Analyses
- Correlations between mean RSA and duration of vocalizations during 3 minutes of video-recorded parent-child play were examined.

RESULTS

- The correlation between vocalization duration and RSA was not statistically significant (r = 0.08, p = 0.59; Fig. 2).
- Exploratory moderation analysis indicated that risk group did not moderate the association between vocalizations and RSA.

CONCLUSIONS

- Vocalizations were not correlated with RSA.
- Although we cannot prevent infants from vocalizing during certain tasks, we conclude that vocalizations do not interfere with the collection of valid RSA measurements in infants/toddlers.

Future Steps
- We can examine whether the association between vocalizations and RSA differs depending on emotional quality of vocalizations.
- We can investigate whether RSA is an early biomarker of later outcomes of ASD or ADHD as children age.

STRENGTHS & LIMITATIONS

Strengths
- No prior studies have examined associations between RSA and vocalizations in this age range.
- We addressed methodological weaknesses in prior literature.

Limitations
- Not all infants tolerated the electrodes.
- Vocalizations were not coded to capture emotional intent and reactivity.

REFERENCES


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