Respiratory Sinus Arrhythmia Differences in Autistic and Nonautistic Youth

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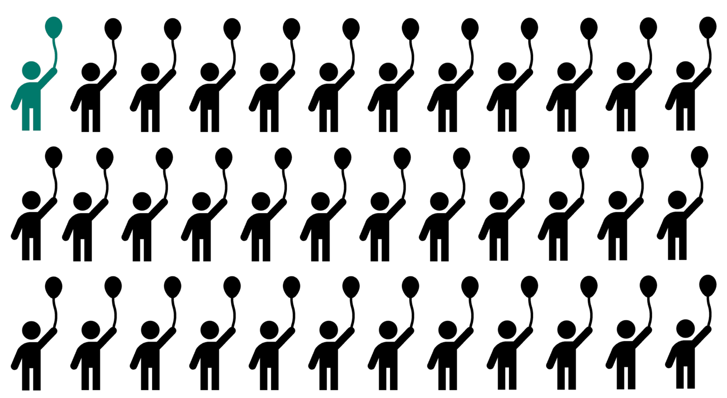
Background



1 in 36 youth
Is diagnosed with autism spectrum disorder (ASD)[1]

- Respiratory sinus arrhythmia (RSA) represents the activity of the vagus nerve which has been used as an indicator of parasympathetic activity.
- Low levels of RSA at rest indicate blunted parasympathetic activity
- Porges' Polyvagal Theory suggests that vagus nerve activity is linked to one's ability to regulate their physiological states and social behaviors (Porges, 2007).
- Many studies have shown that there is a difference in RSA values between autistic and nonautistic individuals (Cheng, 2020)
    - The difference is thought to be connected to weakened stress responses and a decreased ability to adapt in social situations
- Many of these studies, however, have lacked ecological validity as they were performed in a laboratory setting

Our Research

- Examined whether there were differences in respiratory sinus arrythmia at baseline between autistic and nonautistic youth
- We hypothesized that our results would corroborate past sources, but be more ecologically valid as participants perform baselines in more comfortable environments

Methods

Participants

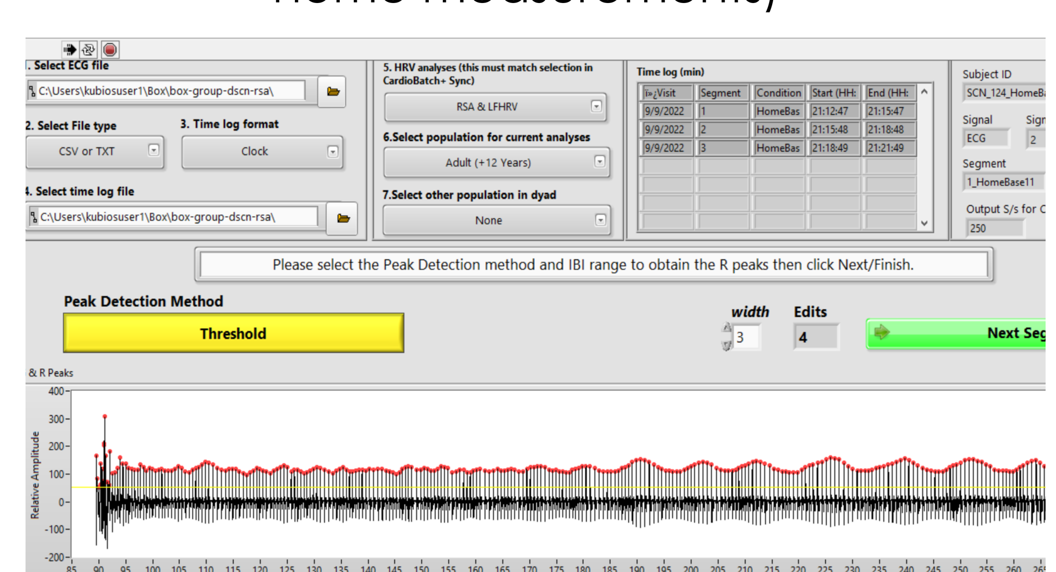
- **22 11 – 14-year-olds** (M_{age}= 12.9, *SD* = .85) with a diagnosis of ASD (autistic, *n* = 11) and without a diagnosis of ASD (non-autistic, *n* = 11)
- Youth were reported to be predominantly White (*n* = 14; 63.6%) and non-Hispanic (*n* = 8; 86.4%)
- Youth identified their biological sex as male (*n* = 12), female (*n* = 10)

Measures

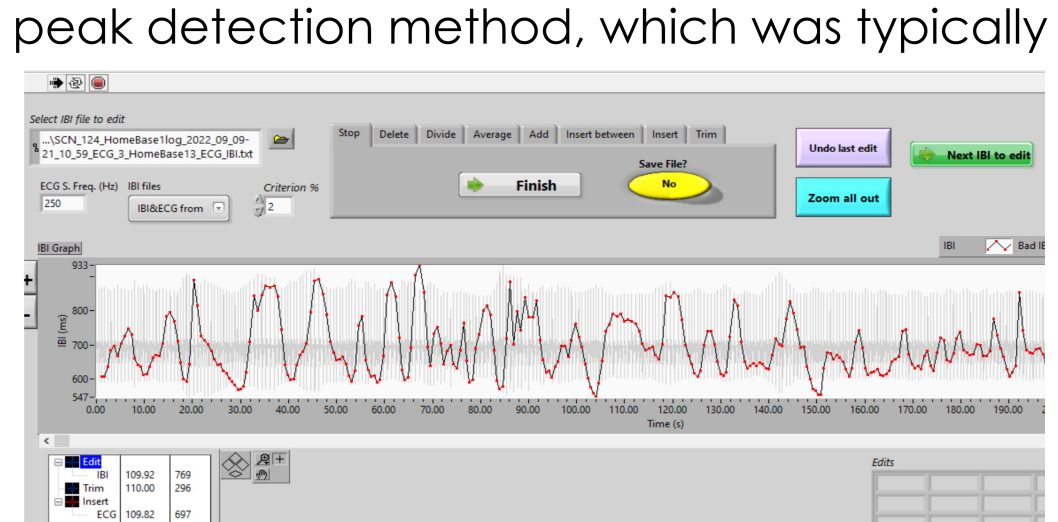
- **RSA**
    - ECG and respiration data collected via the Zephyr bioharness and biomodule, which were later processed into RSA.

Procedures

Participants were asked to wear this bioharness a total of four times to collect nine minutes of baseline data (1 collection in-lab, and 3 at-home measurements)



After splicing the data, we first ran the data through CardioPeak to find the best RSA peak detection method, which was typically threshold.

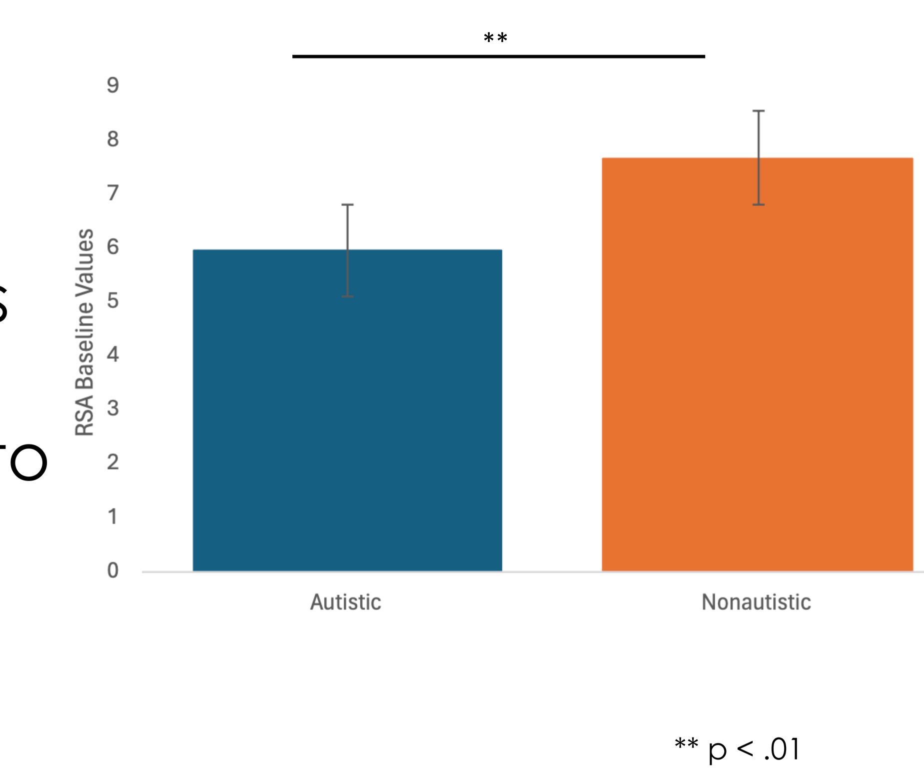


CardioEdit allows us to make small specific edits to make the data easier to read. At the end of editing, we ran all the data sets through CardioBatch to obtain the average RSA values for each individual set.

Results & Future Directions

Results

- An independent samples t-test was used to examine group differences in RSA.
- We found that there were significant differences in RSA values between autistic and nonautistic individuals (t=3.247, p= <0.01).
- Autistic adolescents were found to have lower RSA during at-home baselines (M_{ASD}= 5.97, SD=1.03), relative to the nonautistic group ($M_{NON-ASD}$=7.70, SD=1.10)



Discussion

- Our data supported previous research findings that adolescents with autism have a baseline RSA relative to nonautistic adolescents, but now in an ecologically-valid setting.
- Further research should include more participants, especially from underrepresented communities (female, racial minorities).
- Use this research to further analyze how a blunted RSA may be connected to the prevalence of anxiety in autistic individuals.

Selected References

Contact Information

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