Pupillary Response in Adults with ASD During Tasks with Social and Nonsocial Cognitive Load
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Introduction
The Pupillary light reflex (PLR) is a motor reflex controlled by the parasympathetic division of the autonomic nervous system. While pupillary constriction is reflexive, it can be influenced by cognitive factors (Cohen et al., 2015). Prior research suggests possible differences in tonic and phasic pupillary responses in individuals with autism (e.g., Anderson et al., 2013; Fan et al, 2009).

Objective
The objective of the study was to assess group differences between participants with Autism Spectrum Disorder (ASD) and Typically Developing (TD) individuals in their PLR response at baseline, and in response to a cognitive task with and without social content.

Methods

Participants:
Adults with ASD (age 18 – 25) recruited from the Rhode Island Consortium for Autism Research & Treatment (RI-CART) and healthy controls recruited from the community.

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<tr>
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<th>ASD (N =12)</th>
<th>TD (N=8)</th>
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<tbody>
<tr>
<td>Sex</td>
<td></td>
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<tr>
<td>Male</td>
<td>8 (66.7%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>Female</td>
<td>4 (33.3%)</td>
<td>5 (62.5%)</td>
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<tr>
<td>Age</td>
<td>21.37 (SD = 2.21)</td>
<td>23.05 (SD = 2.36)</td>
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<td>IQ</td>
<td>107.33 (11.33)</td>
<td>103.25 (21.18)</td>
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Procedures & Apparatus
- PLR measured during 3 conditions (3 runs/condition)
  1. Baseline (no cognitive load)
  2. Auditory social cognitive load (counting positive or negative sounds; sound files from a stimulus library standardized for emotional valence (IADS, Bradley & Lange, 1999)
  3. Auditory non-social cognitive load (counting odd or even numbers from a series of complex numbers)
- PLR’s elicited/measured with Compact Integrated Pupillograph CIP (AMTech, Weinham, Germany)
- Tests conducted in a room with ambient light measured at the CIP to be 1.50 +/- 0.50 LUX at the CIP

Measures
Pupillary light reflex (PLR) latency: milliseconds from stimulus onset to reaction onset

Analytic Plan
Repeated measures ANOVA of PLR latency with main effects of condition and group and group by condition interaction.

Results

- Significant main effect of condition, F(2,17) = 28.06, p < 0.001
- Baseline latency longer than both latencies for both conditions
- No group differences
- No group X condition interaction

Discussion

- Differences between baseline and cognitive conditions indicate that top-down cognitive processing may affect the latency of the PLR. This is consistent with research showing alteration of the PLR by executive functions. (Cohen, et al., 2015).
- Baseline and group differences were not detected possibly due to sample size, but evidence has been reported for altered PLR in individuals with ASD (Fan, Mike, Takahashi, & Yao, 2009).
- Continued data collection and recruitment in this study will allow for a more sufficiently powered test of overall group differences in PLR and potential differential impact of cognitive load on PLR in individuals with ASD.

References

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