Atypical conjunctive visual processing in ASD: Domain general or face specific?

F. Shafai¹, M. D. Barense², S. Ferber², R. A. Stevenson¹

¹ University of Western Ontario, ² University of Toronto

**Background**

Individuals with ASD have difficulty identifying faces.

Face recognition typically utilizes conjunctive processing, meaning seeing a face as a single, unified whole.

Eye-tracking studies suggest individuals with ASD process faces atypically.

It is unknown if face recognition difficulties in ASD are limited to processing of faces -or- if issues with face recognition are a consequence of atypical conjunctive processing in general.

Is atypical conjunctive processing in ASD face specific, or is it more broadly observed across all visual stimuli?

**Methods**

<table>
<thead>
<tr>
<th>Age</th>
<th>Performance</th>
<th>Sex</th>
<th>IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
<td>17.9 (6.6)</td>
<td>80% M</td>
<td>52.4 (9.0)</td>
</tr>
<tr>
<td>TD</td>
<td>14.1 (5.1)</td>
<td>53% M</td>
<td>47.7 (14.6)</td>
</tr>
</tbody>
</table>

Stimuli:

- **Objects**
  - LA: Low-ambiguity objects
  - HA: High-ambiguity objects

- **Faces**
  - LA: Low-ambiguity faces
  - HA: High-ambiguity faces

**Eye-tracking task:** Match or non-match?

Ambiguity manipulation: Stimuli that share more individual features induce conjunctive processing for discrimination tasks.

**Trials:** 72 trials per condition, pseudorandom block order.

**Analysis & Hypotheses**

Eye-tracking data: Compare the number of saccades made within an object/face vs. the number of saccades between objects/faces.

**Hypothesis:**

A. Predicted TD Performance

B. Face-Specific Hypothesis

C. Domain General: Absolute Decrease Hypothesis

D. Domain General: Perceptual Specialization Hypothesis

Results support a domain general difficulty with visual conjunctive processing in ASD, reflecting a perceptual specialization explanation in particular.

**Results**

Using a match/non-match eye-tracking task with high- vs. low-ambiguity objects and faces, we probed reported differences in conjunctive visual processing.

**Discussion**

Our results suggest issues with visual conjunctive processing in ASD are not specific to faces, but are the result of a lack of perceptual specialization that impacts processing of all visual stimuli.

We show that ASD diagnosis influences eye gaze for low- and high-ambiguity faces and objects alike.

These data provide evidence that issues with visual conjunctive processing in ASD are the result of a domain general issue that impacts processing of visual stimuli across stimulus types.

Contact: fshafai@uwo.ca