Relative Contributions of Autistic Traits versus Alexithymic Traits
In the Neural Processing of Social Information

Aishani Desai, Adam Naples, Marika Coffman, Cora Mukerji, Rachael Tillman, Anna Kresse, Raphael Bernier, James McPartland
Yale Child Study Center, New Haven, CT, USA; University College London, London, UK

BACKGROUND

- ASD is a neurodevelopmental disorder characterized by impairments in social interaction.
- Face processing is a well-studied and focal domain of social behavior that is impacted in ASD.
  - Individuals with ASD display hypoactivation in regions associated with face processing, such as the fusiform gyrus.
  - Studies of event-related potentials (ERPs) reveal slowed processing for faces in ASD, evidenced by longer N170 latencies.
- Alexithymia is a trait characterized by difficulties in recognizing and describing emotions.
  - Alexithymia is present in ASD (50%) and typical development (10%).
  - Behavioral studies suggest that alexithymia accounts for anomalous face processing in ASD.
- The influence of alexithymic versus autistic traits on the neural bases of face processing remains unexplored.
- The current study used event-related potentials (ERPs) to examine the relative contributions of autistic traits versus alexithymic traits on emotional face perception.

Hypotheses:

- In line with previous studies, alexithymic traits rather than autistic traits will be more predictive of facial emotion processing.
- Alexithymic and autistic traits will differentially contribute to stages of perceptual processing.
  - Level of autistic traits will be more predictive of basic structural encoding of faces, indexed by the N170.
  - Level of alexithymic traits will be more predictive of higher-order emotion processing, indexed by the N250.

METHOD

Experimental Paradigm:

- 210 computer-generated faces presented in static and dynamic form.
- Conditions: 1. Affective movement (fear face); 2. Neutral movement (puffed cheeks); 3. Biologically Impossible movement (upward displacement of eyes and mouth).
- Each condition was presented in forward and reverse order (neutral static to affective movement and vice versa).

ERP data acquisition and collection:

- 128 electrode Geodesic Sensor net.
- Recorded continuously at a sampling rate of 500 Hz.
- Referenced to Cz.
- Re-referenced offline to average reference.
- Impedances < 40kΩ.

ERP analyses:

- Current analyses focused exclusively on ERPs evoked by static stimuli.

Statistical analyses:

- Bivariate correlations contrasted:
  - Measures assessing autistic traits (AQ, BAPQ, SRS-A) and alexithymic traits (TAS, BVAQ).
  - Amplitude/latencies of the ERP components and the behavioral measures.
- Multiple regression analyses were used to measure the relative contribution of alexithymic vs. autistic traits to any variability found in the ERP amplitude/latency.

RESULTS

- Significant main effect of right N170 amplitude (p < .001).
  - Fear > Puff = Neutral

Influence of autistic traits on face processing:

- AQ scores predicted right N170 amplitude for fear faces (β = .401, t(25) = -4.117, p < .01).
- Level of autistic traits accounted for 49.3% of the variance in the right N170 amplitude for face compared, autistic traits
  - BVAQ scores correlated positively with scores on the TAS (r = .493, t(25,20) = 3.883, p < .05).
- BVAQ scores predicted right N170 latency for fear faces (β = -.1479, t(25,20) = -2.557, p < .05).

Influence of alexithymic traits on face processing:

- BVAQ scores predicted N250 latency for fear faces (β = -.1024, t(25,20) = -2.196, p < .05).

CONCLUSIONS

- Autistic traits and alexithymic traits were highly correlated on the AQ, BAPQ, SRS-A and the TAS-20.
- In contrast, the BVAQ were not found to be correlated, indicating that they measure unique dimensions of social behavior.
- The temporal sensitivity of ERPs revealed distinct contributions of autistic and alexithymic traits at different stages of face processing.
  - Autistic traits predicted strength and efficiency at early stage processing of faces, representing structural encoding of faces (N170).
  - Autistic traits are associated with basic social perception.
  - Level of alexithymic traits was more predictive of a later component, marking emotion decoding (N250).
  - Alexithymic traits are associated with higher-order emotional perception.

Study results emphasize the importance of alexithymia in explaining phenotypic heterogeneity in ASD. While basic problems in social perception may be universal to ASD, specific difficulties with emotion perception may be evident in a specific subgroup of individuals with ASD and alexithymia. Future research investigating emotional perception in ASD should account for level of alexithymic traits.

References