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Analyzing Facial Expression Data in Autism Research

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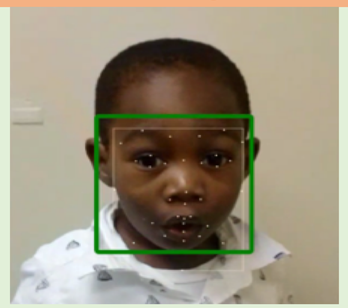
Background

- The Autism Diagnostic Observation Schedule, 2nd version (**ADOS-2**) is a 40-60 minute Autism Spectrum Disorder (**ASD**) diagnostic assessment in which a child's behavioral symptoms are observed.
- In the ADOS-2, the child's parent and examiner wear Pivothead® glasses with an embedded video camera while the child interacts with the parent and the examiner.
- The goal in this study is to utilize more objective measurements available through commercial software.

Face Detection during Assessment



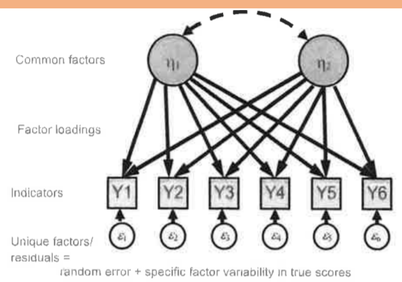
Objective

- To find the latent variables for facial expressions from commercial software.
- To examine correlations between the latent variables and ADOS-2 Calibrated Severity Score (**CSS**) Social Affect scores.

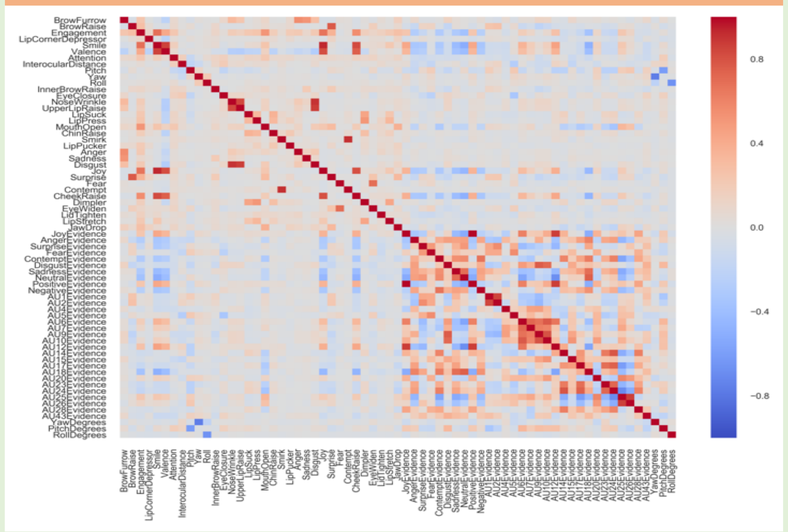
Methods

- Twenty-five children were examined.
- Affectiva® and Emotient® software are used to convert the video to a concatenated text file with probabilities of certain facial expressions in each frame.
- Exploratory factor analysis **(EFA)** was performed using MATLAB® to generate a correlation matrix, a scree plot, a pie chart of eigenvalues, and the groupings of variables to form latent factors.
- The latent variables were then correlated with Social Affect scores.

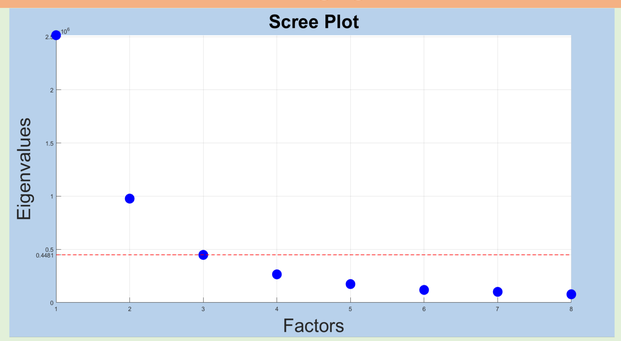
EFA Model



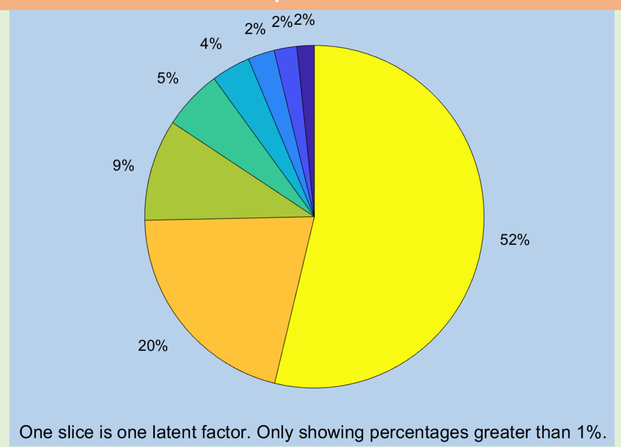
Correlation Coefficient Heatmap (all 25 subjects)



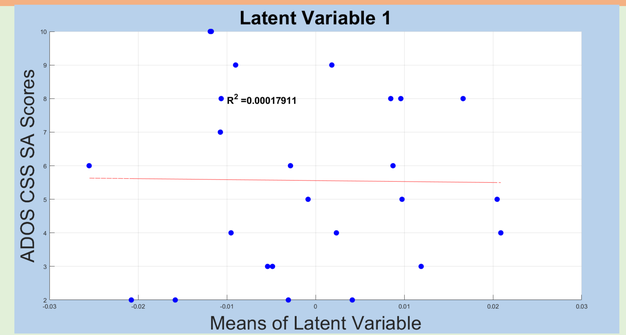
Scree Plot using Eigenvalues

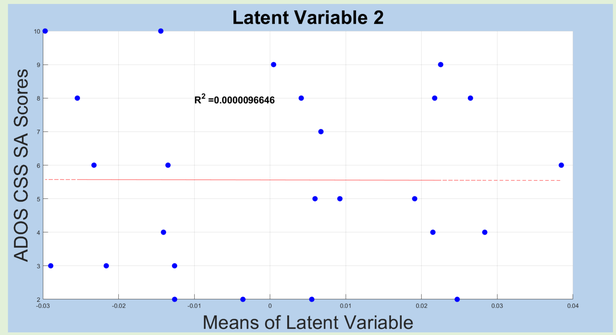


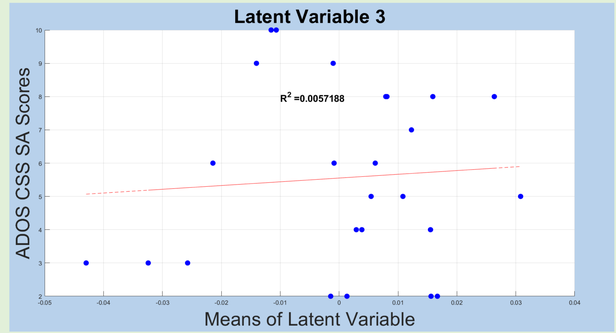
Variance per Latent Factor



Correlation between Latent Variables and ADOS CSS Social Affect Scores







Conclusion

- The variable with the highest loading on the factors were as follows: Factor 1, "Surprise" = .61; Factor 2, "PositiveEvidence" = -.79, Factor 3, "Disgust" = -.53.
- A confirmatory factor analysis could be conducted to test the hypotheses of what these latent variables are.
- One potential explanation for the low associations between latent factors and CSS Social Affect scores is that the software also detects adult faces. Once those appropriately filtered out, the correlations may become stronger.

Acknowledgements

This work was funded by the Miami Clinical and Translational Science Institute, Autism Science Foundation, and the National Science Foundation (CNS-1659144). A special thank you to Prof. Burt Rosenberg for organizing this REU: Computing for Structure program.