Teachers' rating on social cognition is a great early predictor of ASD diagnosis

Gabby McMunn[1], Gabby Vento[2], Kimberly Hunter, PhD[1], Elissar Andari, PhD[3]

[1]Department of Psychology, The University of Toledo, Toledo, OH 43614
[2]College of Medicine and Life Sciences, The University of Toledo, Toledo, OH 43614
[3]Department of Psychiatry, The University of Toledo, Toledo, OH 43614

*Corresponding author: elissar.andari@utoledo.edu

Introduction: Given the fact that the most recognizable signs of autism spectrum disorder (ASD) do not manifest themselves until approximately 3 to 4 years of age, there exists a question as to whatever parents or teachers are at predicting ASD diagnosis. While parents may be the first to recognize something is apparently "off" with their child, they may fall into a state of disbelief that it maybe autism or another disability due to their parental attachments. Teachers may also pick up on an apparent deviance in social presentation or behaviors and due to their lack of personal bias.

Objective: The aim was to determine if teachers' scores on social responsiveness along with parents' scores are accurate in predicting diagnosis. Our main hypothesis was that teacher's scores along with parents' scores are best predictive of ASD diagnosis.

Methods: Data was collected from 86 individuals between the years of 2012 to 2022 at University of Toledo Medical Center. Screening tests Social Responsive Score Edition 2, Gilliam Autism Rating Scale Edition 3, Autism Diagnostics Schedule Edition 2, and Social Communication Score (SCQ). Both teachers and parents filled out the Social Responsive Score survey. A professional psychologist recorded the ADOS-2 and GARS-3 scores. Total ADOS-2 scores were used to calculate apparent autism severity.

A retrospective analysis cross sectional analysis was conducted to detect statistically significant differences between ASD and neurotypicals. 80% of the data was set aside for training, with 20% of the data set aside for testing and validation. We then used Support Vector Machines with a linear kernel that were used to predict whatever an individual was classified as ASD or NT. The SVM model included SRS from Parent and Teacher, GARS3, and SCQ as predictors. Shapley Values were used to describe the feature contribution for the different factors. Probit Ordinal Logistic Regression Analysis was then conducted to access for differences in predicting severity in ASD.

Results: The Support Vector Machine Model had a total accuracy of 62%, indicating that the subjects were classified correctly as NT or ASD 62% of the time. The top five features were all from teachers, including Teacher Social Communication Score, Teacher Social Awareness Score, Total Score, Restricted and Repetitive Behavior, and Social

Cognition Score. The Social Cognition Score and Social Communication was shown to have an odds ratio of 0.951 and 0.959 respectively, indicating that a lower score would be more likely to result in an ASD classification.

Conclusion: The results suggest that teachers along with parents' scores serve as best predictor of ASD diagnosis. This is a promising line of research in early biomarkers tools for ASD.