Title: Identifying a Mid-Treatment Tailoring Variable in a Pilot Smart for Improving Social Skills Interaction for Elementary School Aged Children with ASD

Authors: Wendy Shih, Stephanie Shire, Daniel Almirall, and Connie Kasari

Introduction: Students with an autism spectrum disorder (ASD) in school settings are notably heterogeneous with varying educational needs. Current practice encourages the implementation of a single evidence-based intervention package based on the students’ presenting problems, sometimes changing course only after non-response. However, researchers are becoming more sensitive to the idea that most students require a sequence of interventions that may vary on type, approach and dose, and that evidence-based interventions should be applied flexibly in order to maximize student response. One approach for systematically applying a sequence of interventions is the adaptive intervention. An adaptive intervention uses individually tailored treatment decision rules to operationalize the sequence of interventions (Murphy & Bingham, 2009). One critical element for developing the adaptive intervention is to define a good versus non response to treatment and this can be particularly difficult in autism intervention where individual heterogeneity is the norm rather than the exception. This study aims to 1) describe how response was determined for improving social interaction outcomes of students with ASD and 2) describe a research design using a Sequential Multiple Assignment Randomized Trial (SMART) for testing responses in authentic school settings.

Methods: 1) Study 1: Using the Classification and Regression Tree (CART) method (Breiman, Friedman, Stone, & Olshen, 1984), we determined the optimal response at midpoint (4 weeks) in a randomized trial of a social skills intervention that predicted optimal outcome in elementary aged students with ASD (Shih, Shire, & Kasari, 2016). 2) Study 2: Using this response cutoff, we determined responders and slow responders in a separate SMART study of sequential interventions.

Results: 1) Using CART, a midpoint change of about 14% over baseline indicated students were on track to make progress. 2) In a SMART pilot trial with an ethnically diverse population of elementary school age students with ASD (n=24) which a playground intervention was applied, students who made at least 14% over baseline in engagement by week 6 continued to have better response at week 12 compared to students who did not (p=0.02). Hence, overall response to treatment can be identified early in treatment.

Discussions: Adaptive interventions have potential to improve outcomes in students with ASD by capitalizing on individual heterogeneity in response to treatment. Data suggest that measurements of students’ behavior midtrial can be used as a tailoring variable and to predict end treatment outcomes. Such data may inform decisions to augment programming early on to tailor intervention to best fit each child.

References/Citations