Adaptive Interventions and SMART Designs: Three Case Studies in Autism

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Due to the great heterogeneity of children with autism spectrum disorders (ASDs), effective treatment often requires individualized, sequential decision-making. To do this, each child’s treatment is dynamically tailored over time based on the child’s changing state, including response to prior treatment. Adaptive interventions (also known as dynamic treatment regimens) operationalize such individualized decision making using a sequence of decision rules that specify which intervention option to offer, for whom, and when. Intervention options correspond to varying doses, types or delivery modes of pharmacological or behavioral treatments. Adaptive interventions are intended to serve as a guide for sequential treatment decision-making in actual clinical practice. Currently, there is great interest in the use of sequential, multiple-assignment, randomized trials (SMART), a type of multi-stage randomized trial research design, to build high-quality adaptive interventions. This talk (i) provides a brief introduction to adaptive interventions and (ii) presents case studies of three SMART designs in autism. The first study was designed to develop an adaptive intervention for children with ASD who are minimally verbal using a speech-generating device in the context of a naturalistic intervention involving joint attention, symbolic play, engagement and regulation (JASPER) plus enhanced milieu training (EMT). The second study, again among children with ASD who are minimally verbal, was designed to develop an adaptive intervention involving JASPER+EMT, discrete trials training (DTT), parent training, combined JASPER+EMT+DTT and a clinician-rated clinical global impressions measure to monitor child’s progress. The third is a SMART pilot study, which aims to develop an adaptive intervention to improve social engagement outcomes in children with ASD in inclusive school settings. This novel study examines the feasibility and acceptability of adaptive interventions involving Remaking Recess (a school-level intervention), Classroom Supports (a classroom-level intervention), Parent- and Peer-mediated social skills interventions, and the use of paraprofessionals to monitor child progress on the playground and inform subsequent treatment decision-making. The second and third studies are in the field. For each study, we present the SMART design, its rationale, and the scientific questions.