Title: Expressive communication growth trajectories of young children with autism: Exploring a novel progressing monitoring tool

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Introduction: Social-communication and language skills are important intervention targets for children with autism spectrum disorder (ASD) because they represent pivotal skills that affect children's developmental potential. The field has made progress in developing measures to characterize and diagnose the language and social-communication patterns of children with ASD. However, to date few standardized measures exist that are sensitive to change over time (Anagnostou et al, 2015; Bolte & Diehl, 2013) and can be used by early childhood practitioners to inform intervention decision making. The Early Communication Indicator (ECI) is one of the Individual Growth and Development Indicators (IGDIs) for Infant and Toddlers (Carta, Greenwood, Walker, & Buzhardt, 2010) developed to address the need for easily administered and scored measures to monitor children's growth and inform intervention decisions for children 6-42 months. Despite evidence that the ECI is sensitive to a child's general disability status, to date, there have been no formal investigations of the measure's sensitivity to specific diagnoses, such as ASD. In the current study, we sought to conduct exploratory analyses of ECI scores of children known to either have an ASD diagnosis at the time of administration or would receive a diagnosis in the future.

Method: We performed a secondary analysis with data drawn from two registries. One registry is from a university diagnostic center and the other registry is from the IGDI Online Data System. We matched participants from the IGDI registry with those in the diagnostic registry who received an ASD diagnosis, and this resulted in n=23 matches. We used multilevel growth modeling to estimate the trajectories of the ECI weighted total and four key skills (i.e., vocalizations, gestures, single words, multiple words) based on the ASD sample only. There were two levels in each growth model, observation-level and child-level. Next, to examine the differences in trajectories between the benchmark and ASD samples, we combined the two samples, and added a binary (i.e., 0 = benchmark, 1 = ASD) child-level predictor to the growth models.

Results: Children with ASD had significantly lower ECI total weighted scores than the benchmark sample (-11.66, se = 3.06, p < .01) at 42 months of age, but there was no significant difference in the linear or quadratic slopes between the two samples. For the key skill elements, the ASD sample demonstrated significantly higher rates of vocalizations than the benchmark sample at 42 months of age (1.63, se = 0.54, p < .01), as well as a faster growth rate (0.07, se = 0.03, p = .03). For gestures, the benchmark group had a significantly higher intercept at 42 months than the ASD sample, but no significant difference in slope. Conversely, for single words, the ASD sample used fewer single words at 42 months of age (-2.50, se =0.48, p < .01), and they had a lower linear growth rate than the benchmark sample. For multiple words, a similar pattern was observed whereby children with ASD demonstrated fewer multiple words at 42 months of age (-3.73, se = 0.78, p < .01) and had a slower rate of linear growth (-0.19, se = 0.06, p < .01).

Discussion: These exploratory findings suggest that the ECI can be used to characterize the communication profiles and trajectories of young children with ASD. We found that the magnitude of both prelinguistic (i.e., vocalizations, gestures) and linguistic (i.e., single and multiple words) communication skills, as well as the rate for growth differed between children with ASD when compared to a benchmark sample. In addition, we found that the key skill growth rates, with the exception of gestures, also differed from benchmark trajectories.

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