Title: Validation of the Expressive Communication Indicator as an Outcome Measure in Young Children with Neurodevelopmental Disorders

Authors: Cesar Hoyos Alvarez, Cynde Katherine Josol, Andrea McDuffie, and Angela John Thurman

Introduction: Communication delays are often observed in children with neurodevelopmental disorders (NDDs). Additionally, clinical trials for toddlers and preschoolers are being developed at a rapid rate to take advantage of the potential for neural plasticity during this time. In fact, a multimodal trial targeting spoken language development in toddlers and preschoolers with fragile X syndrome (FXS) is already underway (i.e., NINDS 1U01NS096767, Berry-Kravis). The validation of measures that capture the heterogeneity observed early in development is essential for the continued development and evaluation of treatment trials in NDDs. There are numerous limitations to using standardized language measures in young children with developmental delays (e.g., floor effects, considerable variation across individuals, high rates of noncompliance). Communication sampling procedures offer a viable alternative to the use of standardized tasks in this age group. In addition, these samples can be collected quickly and with minimal training of examiners, making it especially attractive for multi-site trials. In the present study, we evaluate the utility of the Expressive Communication Indicator (Luze et al., 2001) during a semi-structured play session with a parent as a communication measure in preschoolers with FXS. Although the ECI-WCS has been shown to be a measure that is sensitive to increasing proficiency/complexity in communication skills in typically developing children, this tool has yet to be validated for use in NDDs.

Method: Participants were 12 boys with FXS (M = 4.55; range: 3.17 – 5.50 yrs). The Communication Play Protocol (Adamson et al., 2009) was used as the communication sampling context. During this semi-structured observational context, play between the child and his parent is segmented into four 5-minute activities (Free Play, Turn Taking, I-Want, and Container). Following an initial Free Play session, the parent is provided strategies to use to engage the child in play for each of the remaining 5-minute activities. This session was coded for four key skill elements: Gestures, Vocalizations, Single-Word Utterances, and Multiple-Word Utterances. A weighted frequency score (ECI-WCS) is then calculated by multiplying each occurrence of a key skill element by the following weights: gesture = 1, vocalization = 2; single word utterance = 3; multiword utterance = 4. Measures of overall language ability (DAS Verbal SS), expressive vocabulary (EVT-2 SS), and grammatical complexity (CDI Complexity score) were used as validation measures.

Results: Analyses indicated a significant association between the overall ECI-WCS and all validation measures (rs = 62 - .85). Strong correlations (rs > .88) were observed between the ECI-WCS generated within each activity (Free Play, Turn Taking, I-Want, Container); ECI-WCSs from the four communication segments were also significantly associated (rs = .55 - .85) with the validation measures. Finally, analyses were conducted examining the data as a function of the four key skill elements (Gesture, Vocalizations, Single-Word Utterances, and Multiple-Word Utterances). Total frequency of Single-Word Utterances was associated with performance on the EVT-2 (r = .72) and total frequency of Multiple-Word Utterances was strongly associated with grammatical complexity measured by the CDI (r = .62). Some variation in the production of skill elements was observed as a function of activity.

Discussion: Considerable heterogeneity is observed in the early communication skills of children with NDDs making the identification of a valid assessment tool of primary importance. Such a tool must capture nuances in communicative behaviors that range from prelinguistic gestures to multiword utterances. Furthermore, because young children with NDDs have low task persistence and do not perform well when placed in high-demand situations (such as those associated with norm-referenced standardized tests) measuring communication skills during this developmental period is challenging. Results from the present study demonstrate the promise of using expressive communication sampling as an outcome measure in young children with NDDs. Not only did the ECI-WCS demonstrate strong correlations with standardized measures of language, but also our data demonstrates that sessions as short as 5 minutes can be used to obtain representative data. Data collection is ongoing; coding is currently underway to evaluate the utility of the ECI in boys with autism spectrum disorder.

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