Title: A Comparison of Language Measures to Evaluate Treatment Outcomes for School-age Boys with Fragile X Syndrome

Authors: Lizbeth H. Finestack, Andrea McDuffie, Amy Banasik, Sarah Nelson, Lauren Bullard & Leonard Abbeduto

Introduction: Many boys with fragile X syndrome (FXS) experience significant deficits in expressive language. Language areas that school-age boys with FXS often demonstrate significant weaknesses in are morphology and syntax (Finestack & Abbeduto, 2010; Sterling, Rice, & Warren, 2012), which relate to overall language complexity. One of the most commonly used indices of child language complexity is mean length of utterance (MLU). MLU is calculated using a child’s language sample and provides a relatively gross estimate of a child’s language complexity. MLU does not provide information about language skills related to specific syntactic and morphologic areas. Two alternate measures of language complexity that are also derived from language samples, but that provide more fine-grained information of syntactic and morphologic development are Developmental Sentence Scoring (DSS; Lee, 1974) and the Index of Productive Syntax (IPSyn; Scarborough, 1990). To determine if treatment outcomes vary base on whether gross or fine-grained dependent measures are analyzed, we compared the performance of school-age boys participating in a language intervention study on MLU, DSS, and IPSyn measures.

Method: Three 10- to 11-year-old boys with FXS and their biological mothers participated in a parent-implemented language intervention targeting spoken language in the context of shared story-telling interactions between parent and child (McDuffie et al. 2016). All participants used spoken language as their primary means of communication. The study used a multiple probe design across the three parent/child dyads. The 12 weekly intervention sessions included a clinician coaching session, a homework session, a feedback session, and a data collection session during which the dyad independently completed a shared story-telling activity. The outcome variables of interest in the present study were derived from each weekly data collection session. Research assistants transcribed these sessions using SALT (CITE) conventions. Assistants then scored the samples using DSS and IPSyn. We compared performance across these three measures.

Results: The MLU analysis indicated that intervention quickly boosted the language performance of Participants B and C. The DSS analysis revealed inconsistent gains. Participant B had significant increases on the DSS Indefinite Pronoun and Secondary Verb measures, while Participant C had significant gains on the Main Verb, Secondary Verb, and Conjunction measures. For the IPSyn analyses, Participant B made gains on each measure (Noun Phrase, Verb Phrase, Questions/Negation, and Sentence Structure). Participant C’s gains were isolated to measures of Questions/Negation and Sentence Structure.

Discussion: These results suggest that all three measures can be sensitive to treatment-induced language gains. Additionally, due to differences in performance across the three measures, there is evidence that the measures tap into different areas of language development. Thus, by examining the fine-grained measures, we are better able to understand specific areas of language gains in the study participants. We recommend that future studies continue to examine the sensitivity of all three measures as tools for measuring treatment outcomes in boys with FXS as well as other populations of children with developmental disabilities.

References: