

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

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Introduction

- Many school-age boys with fragile X syndrome (FXS) demonstrated significant language weaknesses, including weaknesses complexity (Finestack & Abbeduto, 2010; Sterling, Rice, & Warren, 2012).
- One of the most commonly used indices of child language complexity is mean length of utterance (MLU), which provides a relatively gross estimate of a child's language complexity based on a language sample.
- MLU does not provide information about language skills related to specific syntactic and morphologic areas; however, both Developmental Sentence Scoring (DSS; Lee, 1974) and the Index of Productive Syntax (IPSyn; Scarborough, 1990), which are also language-sample based measures provide more fine-grained analyses.

Research Purpose - to compare treatment outcomes of language intervention for boys with FXS (McDuffie et al., 2016) using **MLU**, **DSS**, and **IPSyn** measures.

Participants

- 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.

Table 1. Participant Characteristics

	Dyad 1	Dyad 2	Dyad 3
Chronological Age	11-0	11-7	10-10
Nonverbal IQ¹	42	40	56
Receptive Vocabulary²	5-11	6-4	7-4
Expressive Vocabulary³	6-3	7-5	7-10
Expressive Syntax⁴	4-6	5-8	5-5
Autism Severity⁵	7	9	3

¹Leiter Brief IQ; ²PPVT AE; ³EVT AE; ⁴CASL SC AE; ⁵ADOS-2

Method

- 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.
- Research assistants transcribed the data collection sessions using Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2010) conventions. SALT was used to derive MLU measures for each sample.
- Trained research assistants manually scored child utterances in samples using DSS and IPSyn.
- Developmental Sentence Scoring (DSS; Lee, 1974)**
 - Evaluates language across eight grammatical categories using an 8-pt scale.
 - A Sentence Point is awarded to semantically and grammatically appropriate sentences.
 - Includes a summative score which is an average of DSS points awarded to each utterance.
- Index of Syntactic Production (IPSyn; Scarborough, 1990)**
 - Evaluates the emergence of 56 syntactic and morphological forms across four categories (Nouns Phrases, Verb Phrases, Questions & Negation, and Sentence Structure).
 - Each form assigned 0, 1, or 2 points.

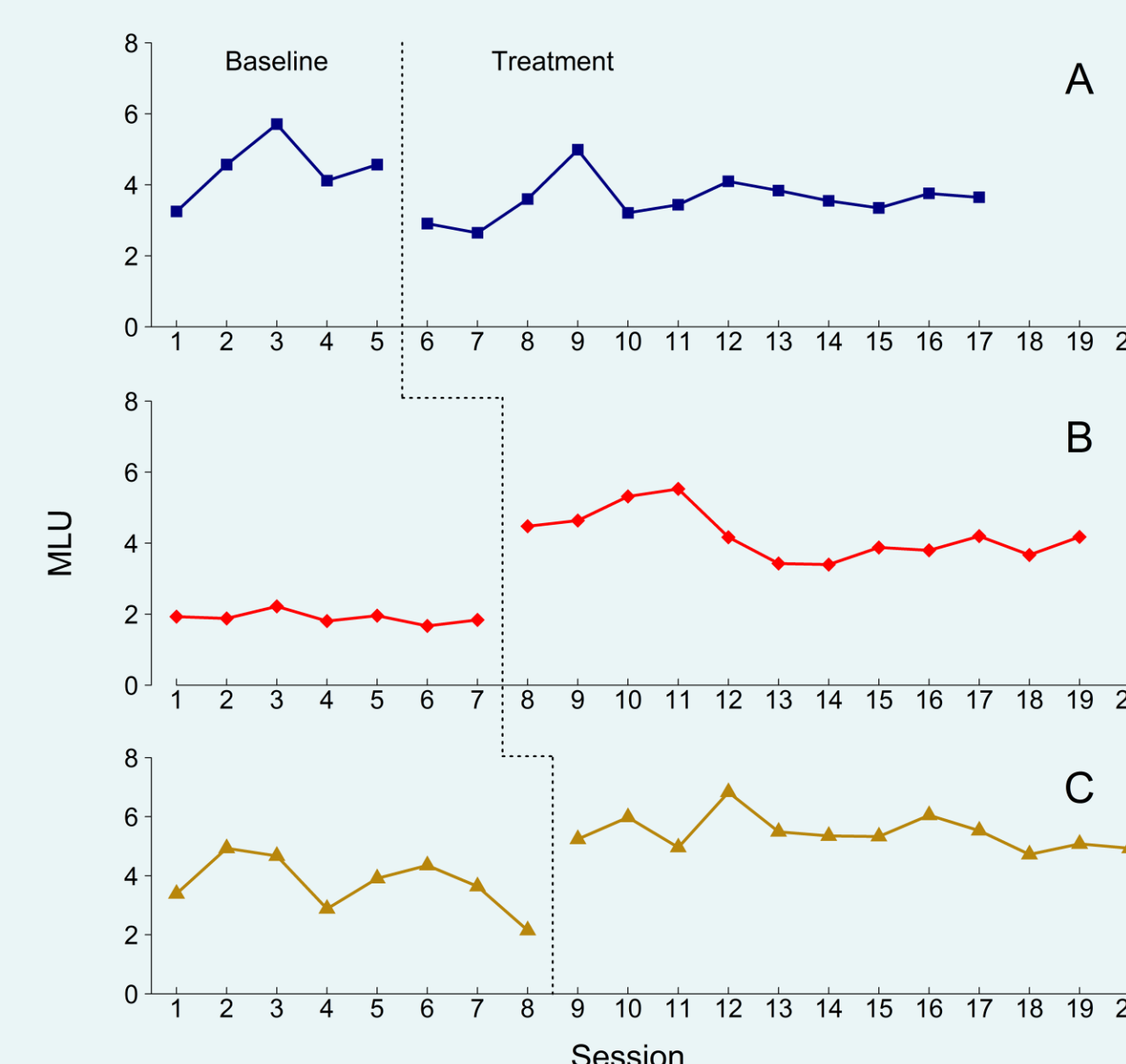
Results

Percentage of Non-overlapping Data (PND)

	A	B	C
MLU	0%	100%	83%
Average DSS	92%	17%	50%
IPSyn Total	33%	100%	83%
IPSyn Questions & Negation	33%	75%	25%

MLU

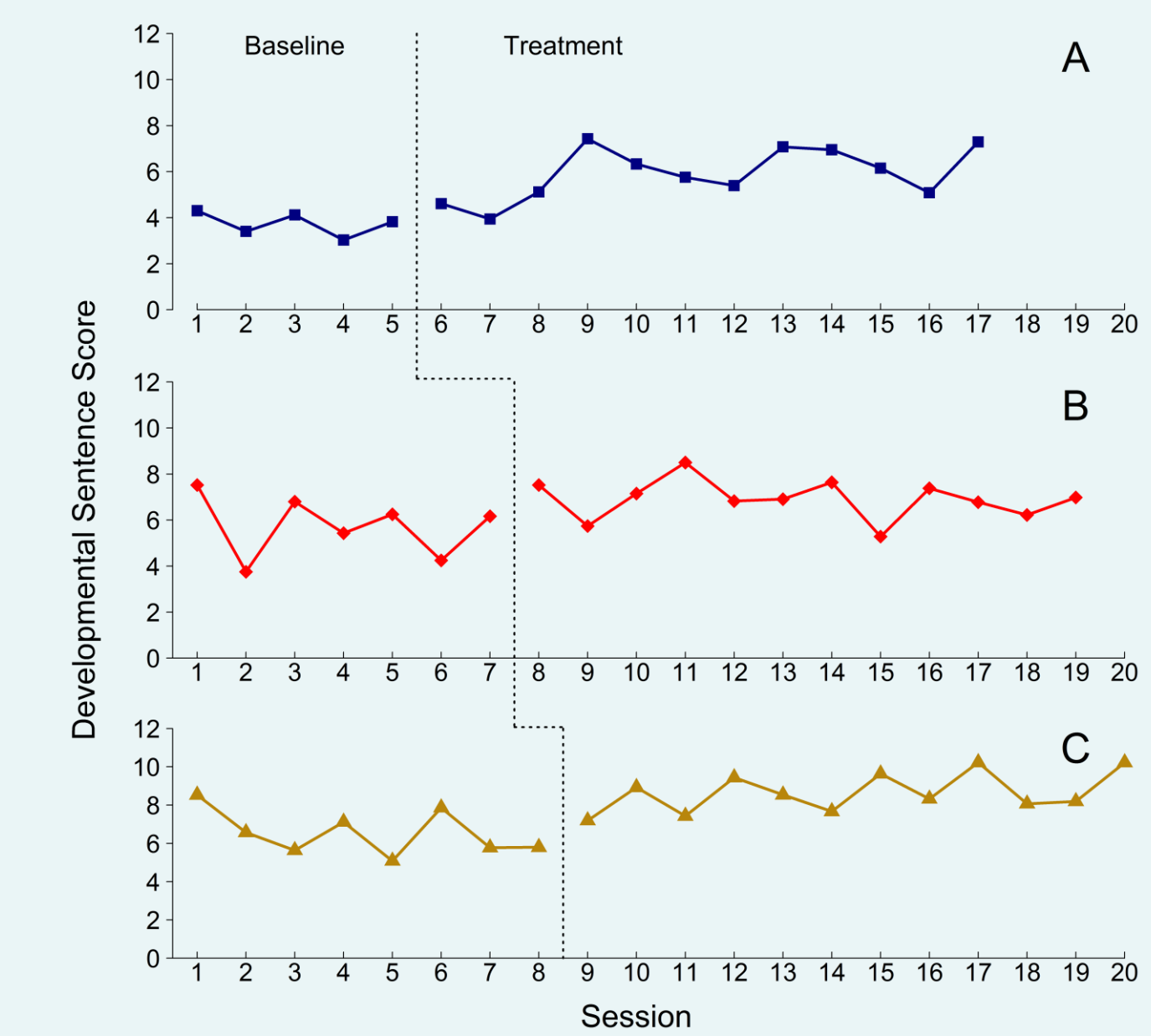
- Participants B and C demonstrate clear change in level with onset of intervention



Results continued

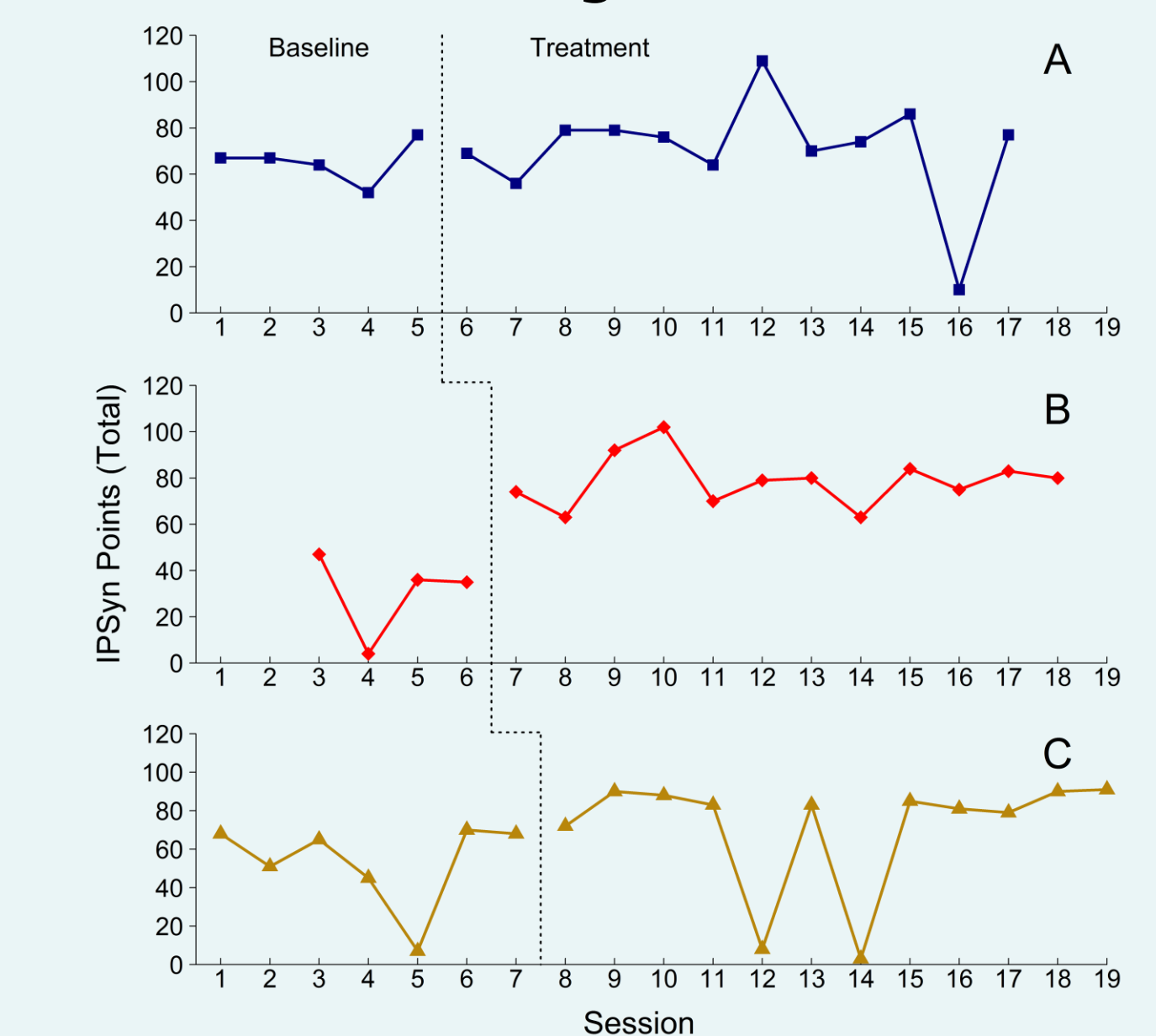
Average DSS

- Participants A and C have a slow rise in performance with intervention



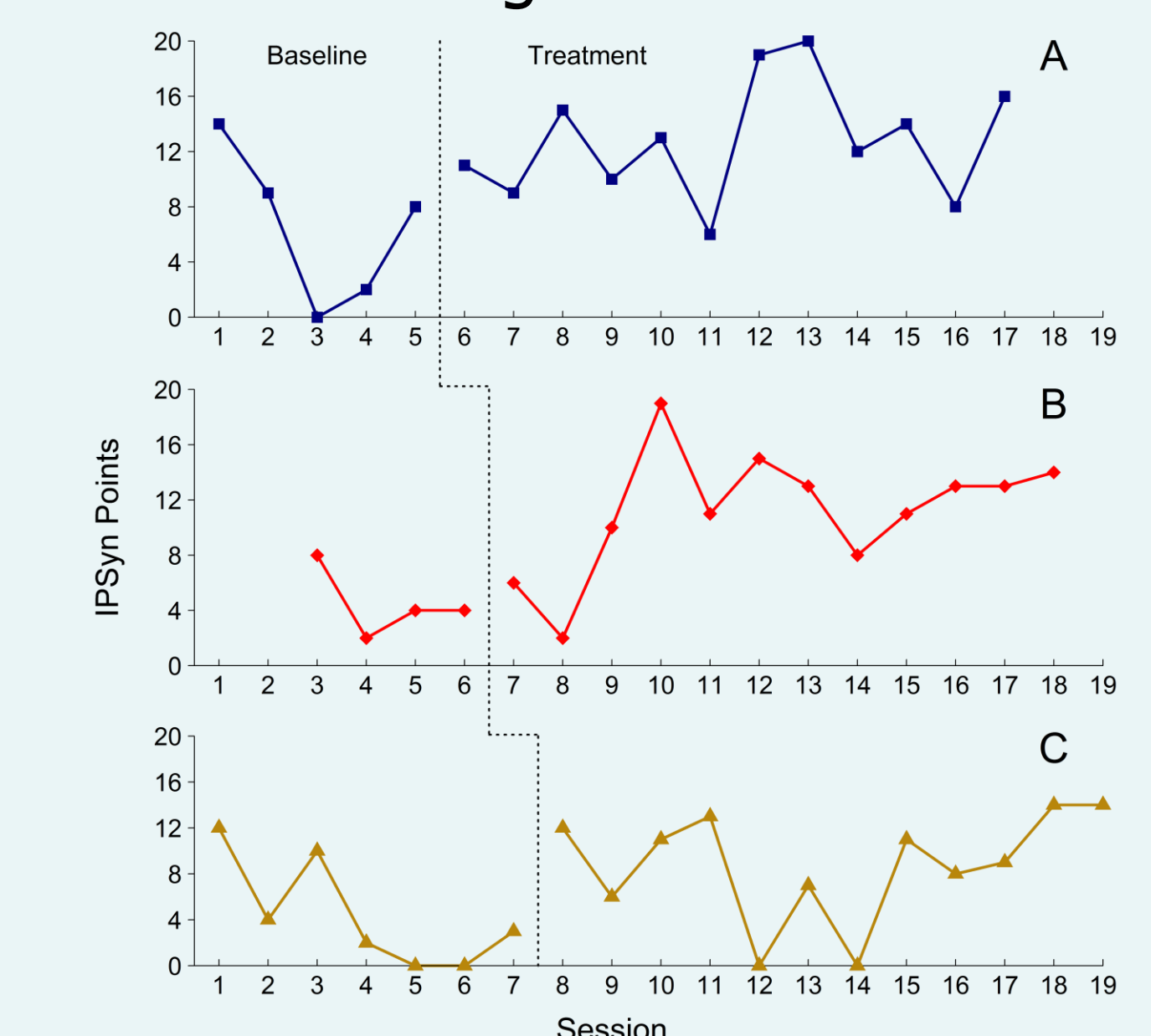
IPSyn Total

- Participants B & C show changes in level with intervention



IPSyn Questions and Negation

- Participant B shows a change in level with intervention



Conclusions

- Results suggest that MLU, DSS, and IPSyn measures are sensitive to treatment-induced language gains.
- Differences in performance across the measures suggest that the measures tap into different areas of language development.
- 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.

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