Beyond Rates of Communication

Nancy Brady, Kandace Fleming, Rebecca Swinburne Romine, Connie Kasari & Alison Holbrook

University of Kansas

University of California at Los Angeles

Acknowledgements

- NICHD R01 HD076903
- NICHD U54 HD090216

Problem: How to measure change in prelinguistic communicators?

- Standardized measures often yield floor effects
- Parent report measures aren't always reliable
- Rates of communication indicate how much someone communicates, but not necessarily how they communicate
- Need to be able to show change in preverbal communication quality as well as quantity that reflects developmental benchmarks

Communication Complexity Scale (CCS)

- What is the CCS?
- A 12 point scale to measure expressive communication
  - Range from alerting responses to 2 word/symbol combinations
  - Used with individuals with intellectual and developmental disabilities, autism, Down syndrome, cerebral palsy, fragile X syndrome, typically developing infants….
  - Designed to measure current expressive communication level
  - Based on participant's behaviors toward objects, people, and events of interest (referents)
  - Based on well developed and researched theories of early communication development

CCS Scores

Number	Definition	Communication level
0	No response	
1	Alerting - a change in behavior, or stops doing a behavior	Preintentional
2	Single orientation only -- on an object, event or person; can be communicated through vision, body orientation, or other means.	Preintentional
3	Single orientation only + 1 other PCB (potentially communicative behavior)	Preintentional
4	Single orientation only + more than 1 PCB	Preintentional
5	Dual orientation - shift in focus between a person and an object, between a person and an event using vision, body orientation, etc. (without PCB)	Preintentional
6	Triadic orientation (e.g. eye gaze or touch from object to person and back)	Intentional Non-Symbolic
7	Dual orientation + 1 PCB (e.g., dual focus + gesture)	Intentional Non-Symbolic
8	Dual orientation + 2 or more PCB (e.g., dual focus + gesture + vocalization, switch closure)	Intentional Non-Symbolic
9	Triadic orientation + 1 PCB (e.g. triadic + vocalization)	Intentional Non-Symbolic
10	Triadic orientation plus more than 1 PCB (e.g. triadic plus vocalization and differential switch closure)	Intentional Non-Symbolic
11	One-word verbalization, sign or AAC symbol selection	Intentional Symbolic
12	Multi-word verbalization, sign or AAC symbol selection	Intentional Symbolic

CCS Scores

Number	Definition	Communication level
0	No response	
1	Alerting - a change in behavior, or stops doing a behavior	Preintentional
2	Single orientation only -- on an object, event or person; can be communicated through vision, body orientation, or other means.	Preintentional
3	Single orientation only + 1 other PCB (potentially communicative behavior)	Preintentional
4	Single orientation only + more than 1 PCB	Preintentional
5	Dual orientation - shift in focus between a person and an object, between a person and an event using vision, body orientation, etc. (without PCB)	Preintentional
6	Triadic orientation (e.g. eye gaze or touch from object to person and back)	Intentional Non-Symbolic
7	Dual orientation + 1 PCB (e.g., dual focus + gesture)	Intentional Non-Symbolic
8	Dual orientation + 2 or more PCB (e.g., dual focus + gesture + vocalization, switch closure)	Intentional Non-Symbolic
9	Triadic orientation + 1 PCB (e.g. triadic + vocalization)	Intentional Non-Symbolic
10	Triadic orientation plus more than 1 PCB (e.g. triadic plus vocalization and differential switch closure)	Intentional Non-Symbolic
11	One-word verbalization, sign or AAC symbol selection	Intentional Symbolic
12	Multi-word verbalization, sign or AAC symbol selection	Intentional Symbolic

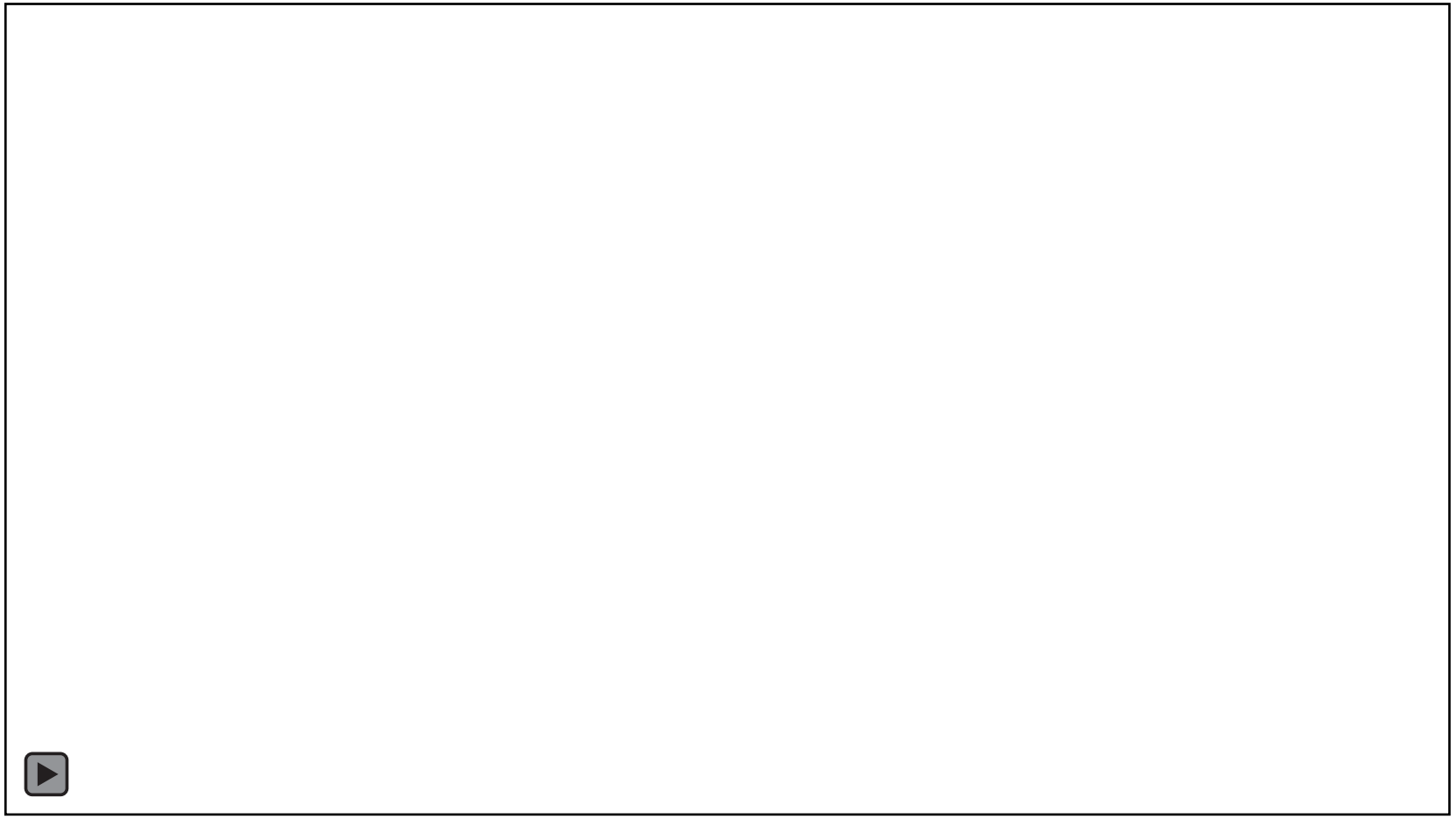
CCS Scores

Number	Definition	Communication level
0	No response	
1	Alerting - a change in behavior, or stops doing a behavior	Preintentional
2	Single orientation only -- on an object, event or person; can be communicated through vision, body orientation, or other means.	Preintentional
3	Single orientation only + 1 other PCB (potentially communicative behavior)	Preintentional
4	Single orientation only + more than 1 PCB	Preintentional
5	Dual orientation - shift in focus between a person and an object, between a person and an event using vision, body orientation, etc. (without PCB)	Preintentional
6	Triadic orientation (e.g. eye gaze or touch from object to person and back)	Intentional Non-Symbolic
7	Dual orientation + 1 PCB (e.g., dual focus + gesture)	Intentional Non-Symbolic
8	Dual orientation + 2 or more PCB (e.g., dual focus + gesture + vocalization, switch closure)	Intentional Non-Symbolic
9	Triadic orientation + 1 PCB (e.g. triadic + vocalization)	Intentional Non-Symbolic
10	Triadic orientation plus more than 1 PCB (e.g. triadic plus vocalization and differential switch closure)	Intentional Non-Symbolic
11	One-word verbalization, sign or AAC symbol selection	Intentional Symbolic
12	Multi-word verbalization, sign or AAC symbol selection	Intentional Symbolic

How was the CCS developed?

- Years (and years!) of assessments and coding by Brady and colleagues
  - Beginning in 1990's with Jim and Lee McLean
    - Brady, Marquis, Fleming & McLean (2004); Brady, McLean, McLean Johnston, (1995); McLean, McLean, Brady, & Etter, 1991)."
  - Modified for use with deaf blind individuals
    - Brady, N. and S. Bashinski (2008).
  - Collaborations with colleagues led to current version of the CCS:
    - (Brady, Fleming, Thieman Bourque, Olswang, Dowden & Marquis, 2012)
  - Current coding based on developmental theories
    - Bates, et al., 1979; Bruner 1975; Crais et al., 2004; Iverson & Thal, 1997; Werner & Kaplan, 1984;Wetherby et al., 1988;

Coded from videos of scripted interactions



Research Questions

1. How do CCS scores compare to scores from the Communication Matrix and the Vineland Expressive Subscale?
2. Does the CCS reflect changes over time (e.g., after intervention)?
3. How does change measured with the CCS compare to other measures such as rate of communication?

Differences in Summary Scores

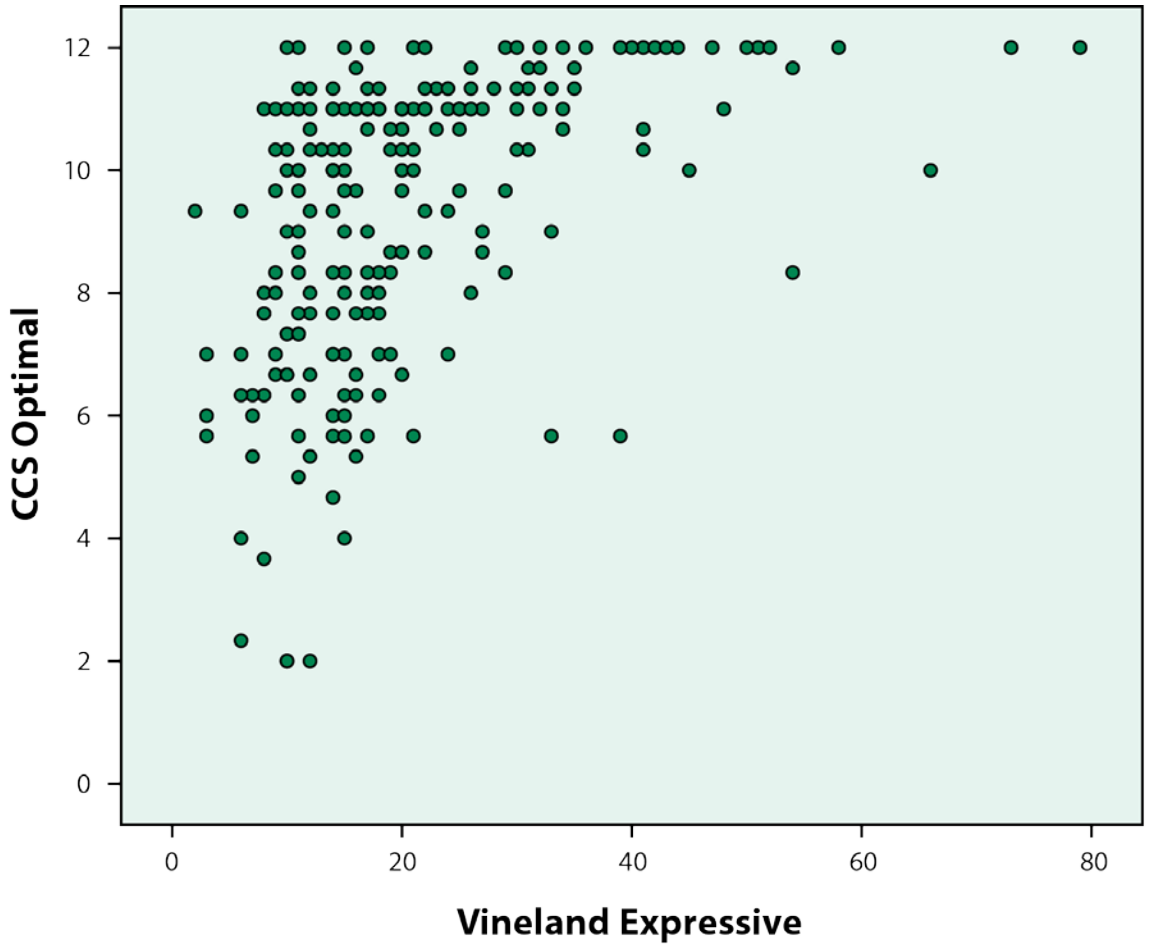
- Optimal = average of top three scores
- Typical = average of 6 middle scores

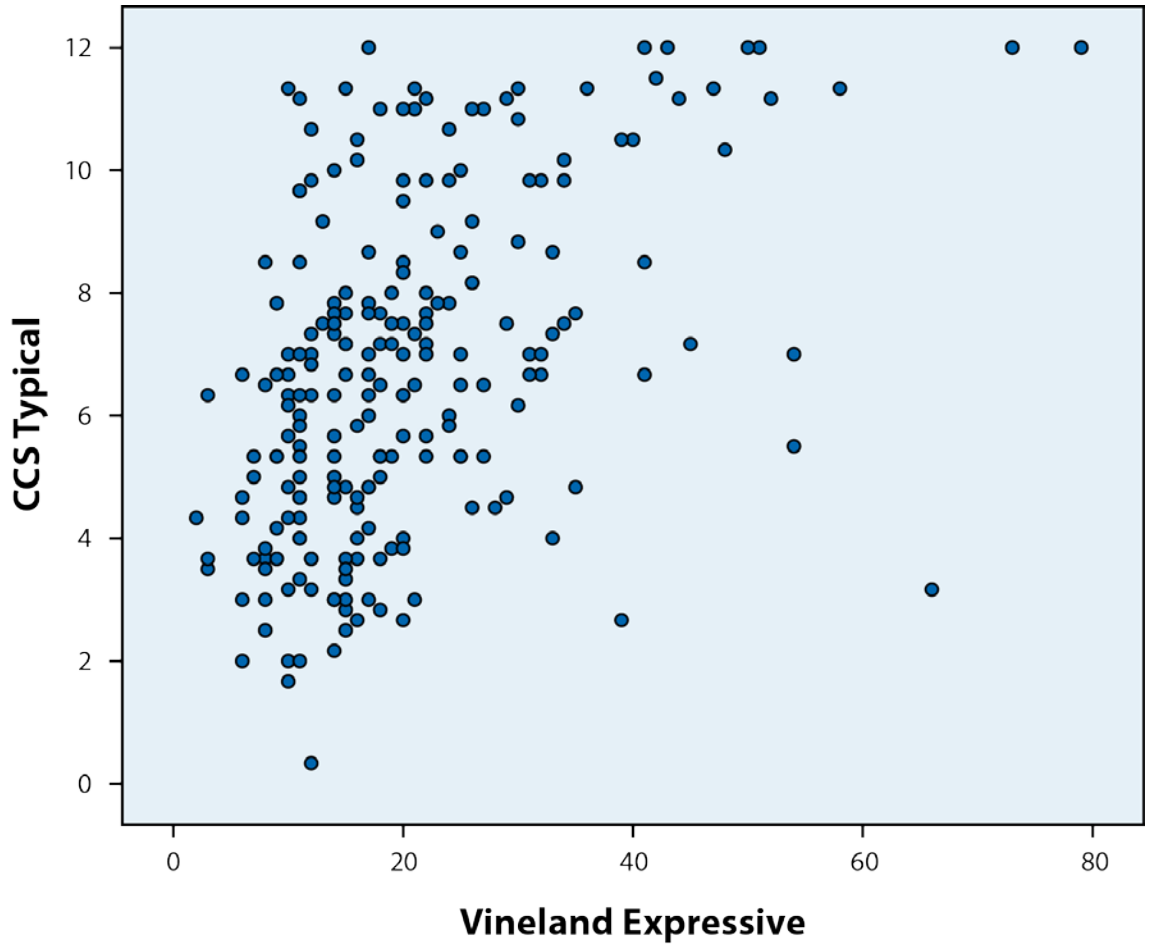
1. How do CCS scores compare to scores from the Communication Matrix and the Vineland Expressive Subscale?

- N= 225
- Age range 3-60 years
- Diagnoses include intellectual disability, autism, Down syndrome, Rett syndrome
- Results: Significant correlations for CCS scores, Matrix and Vineland
  - Optimal scores more highly correlated than typical or mode

	CCS Average Top 3	CCS Typical
Matrix Highest Emerging	.35 *, n=219	.41*, n=219
Vineland Expressive Raw	.47*, n=225	.48*, n=225

*p< .001


CCS Optimal
Vineland Expressive
0
2
4
6
8
10
12
0
20
40
60
80

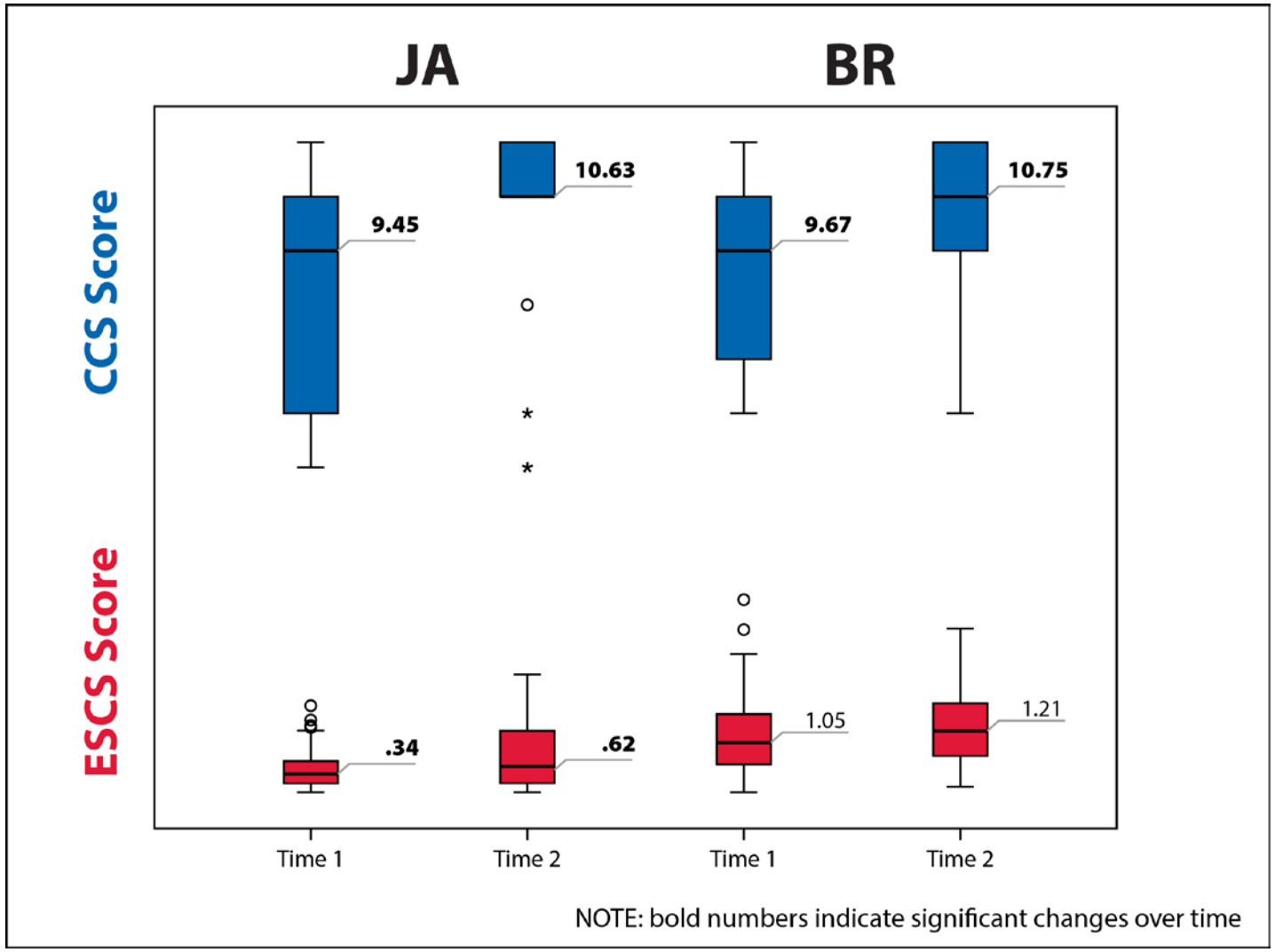

CCS Typical
Vineland Expressive
0
2
4
6
8
10
12
0
20
40
60
80

2. Does the CCS reflect changes over time (e.g., after intervention)?

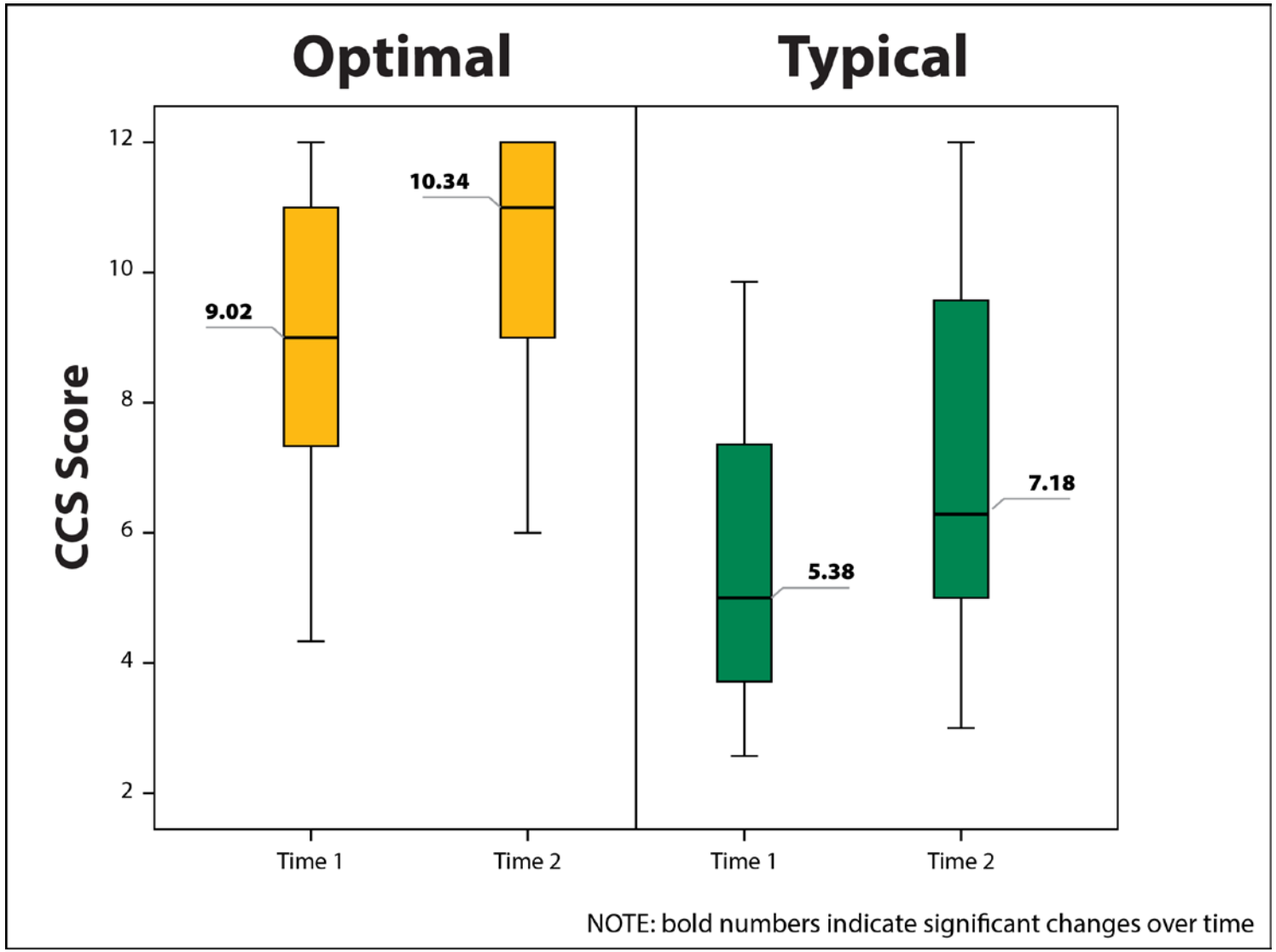
- N = 60 children with autism participating in interventions in Kasari lab at UCLA
- ESCS context used to assess children pre and post intervention
- Results: Significant changes detected for CCS optimal, typical and modal scores for longer interventions

How does change measured with the CCS compare to other measures such as rate of communication?

- Signficant changes in rates of BR detected with ESCS rates
- Significant changes in JA and BR detected with CCS
- Changes in CCS scores reflect changes in complexity as well as quantity



Significant changes detected with both **Optimal** and **Typical** scores.



Summary

- CCS scores compare favorably to existing measures of early communication
- CCS scores reflected change over time and in some cases appeared more sensitive than changes in rates
- Changes in CCS scores reflect meaningful differences in types of prelinguistic communication