

Documenting the Effects of Cochlear Implants and Intervention Using LENA: Children Who Are Deaf-Blind

Kathleen Stremel Thomas
Western Oregon University/University of
Kansas



Outcomes of Project

1. To determine the outcomes of cochlear implantation on children who are deaf-blind
2. To identify factors (age at implant, hearing age, additional disabilities) related to positive outcomes
3. To determine the effects of intervention with the long-term outcome of improved communication and language



Participant Demographics

Status	Number of Assessments						Total
	1	2	3	4	5	6	
Post CI Only	20	28	14	5	--	--	67
Pre CI Only	14	2	--	--	--	--	16
Pre-Post CI	--	10	6	2	--	1	19
Total	34	40	20	7	--	1	102

- Participants with bilateral implants = 19

A decorative graphic on the left side of the slide. It features a vertical bar with a color gradient from blue at the bottom to orange at the top. At the top of the bar, there are three arrows: a grey arrow pointing left, a red arrow pointing right, and an orange arrow pointing up.

Participant Demographics

Additional Challenges

- 58.7% have physical challenges
- 55.9% have cognitive challenges
- 20.6% have behavior challenges
- 63.7% have complex health care needs



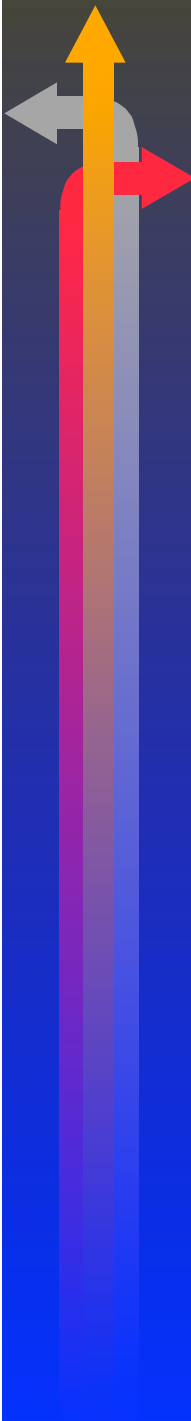
Research Studies

- Study A – What effect does age at implant and hearing age have on child outcomes?
- Study B – What are the differences in the caregiver's verbal interactions before and after implantation?
- Study C – What are the effects of individualized interventions carried out by the caregivers post implant in natural environments? (In Progress)



Repeated Assessments Used In the Research/Intervention Project

- Communication & Symbolic Behavior Scales
Developmental Profile
- MacArthur-Bates Communicative Developmental Inventories
(W&G;W&S)
- Reynell-Zinkin Scales
(7 sub-scales)
- Infant-Toddler Meaningful Auditory Integration Scale or
Meaningful Auditory Integration Scale
- Speech Intelligibility Measures



Study B - Research Question: Do caregivers increase their “talk” to the child after implantation compared to pre-implant?

- Use of the Language Environmental Analysis to record:
 - the audio environment
 - the adult’s verbalizations
 - the child’s vocalizations
 - the turns in conversation
 - male/female verbalizations
 - specific analysis of vocalizations & words

LENA Data

LENA Research

Client Manager

LENA Reports

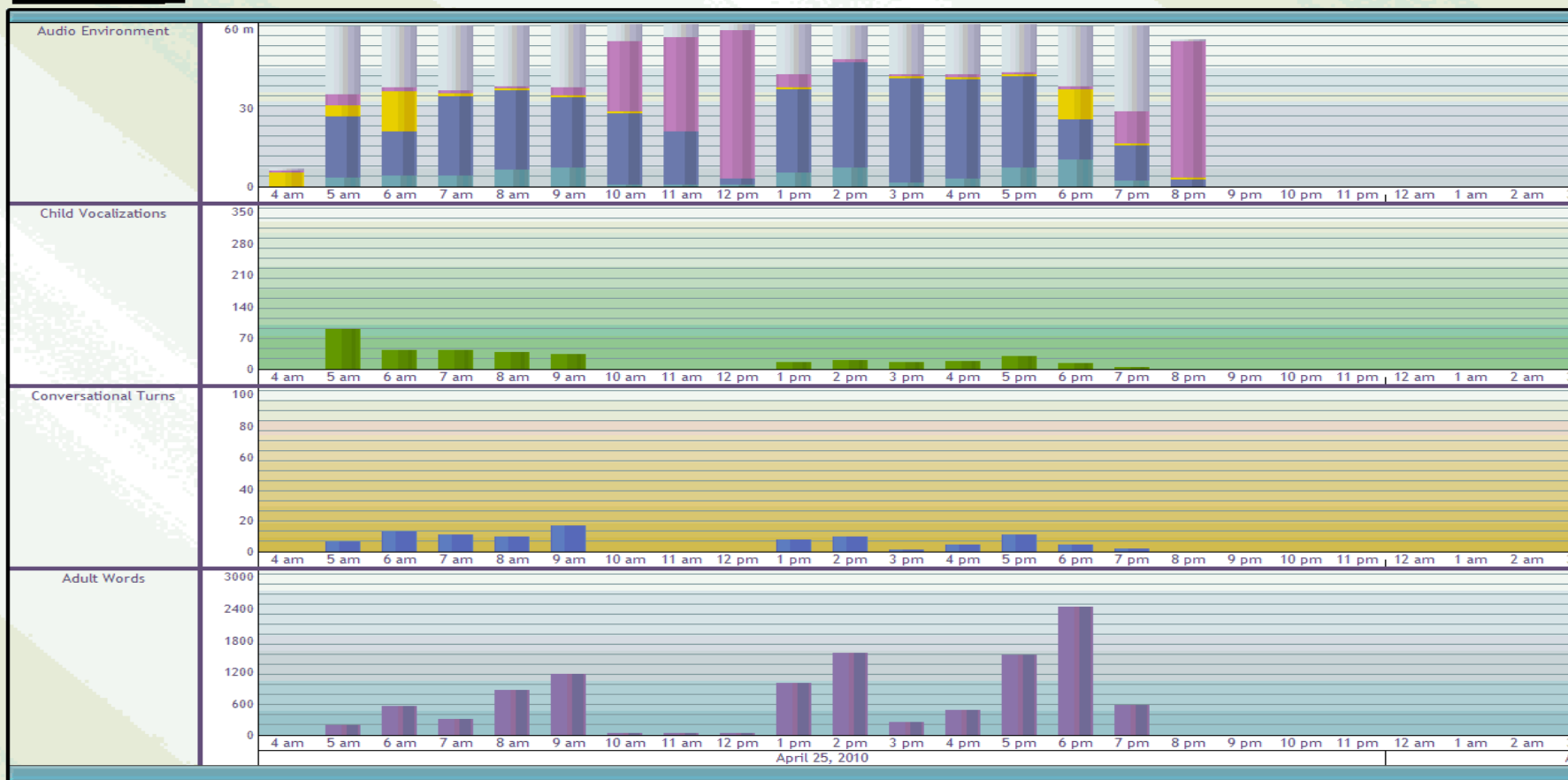
Developmental Snapshot

Digital Language Processor

Settings

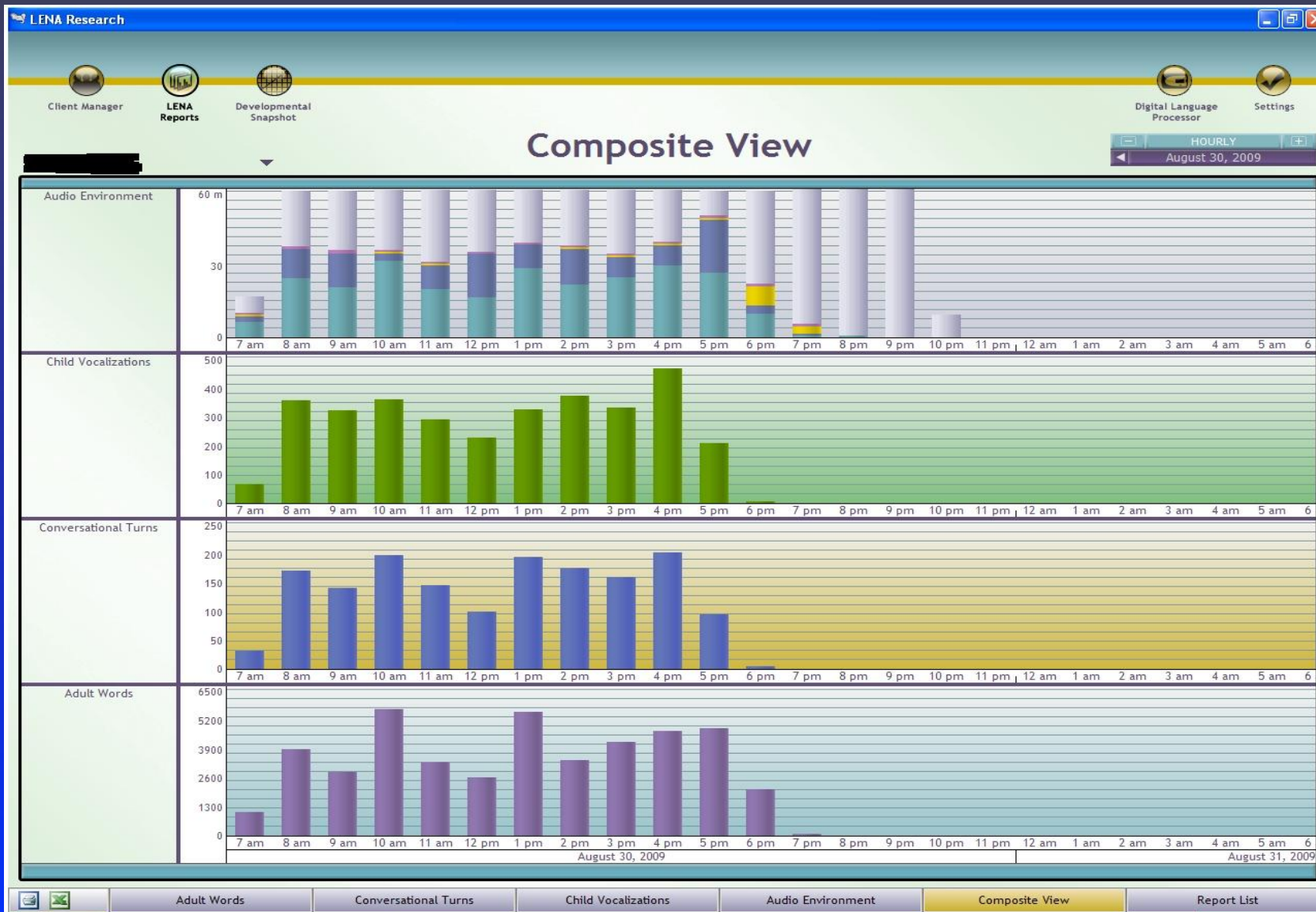
Composite View

HOURLY
April 25, 2010

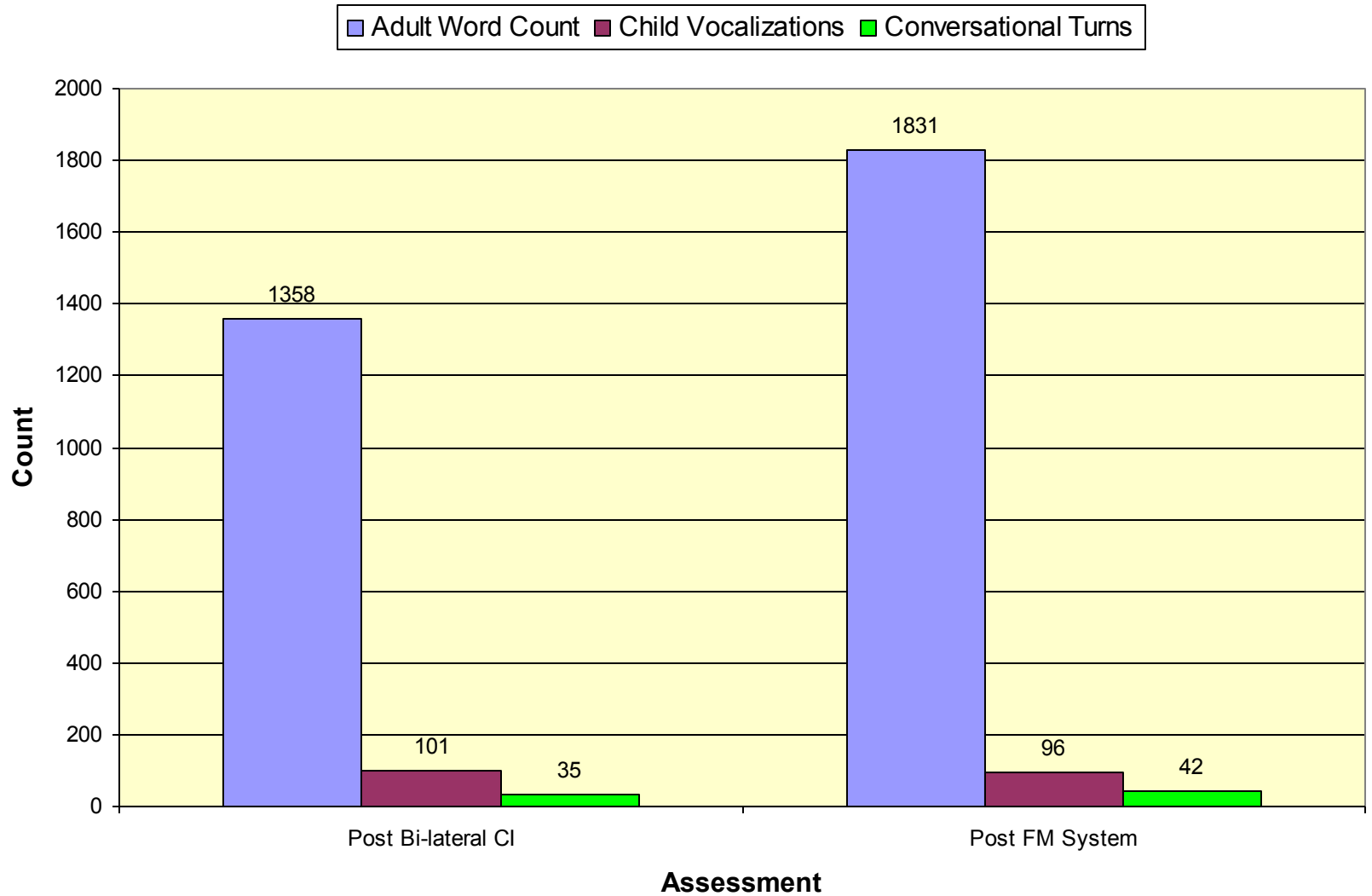


Adult Words Conversational Turns Child Vocalizations Audio Environment Composite View Report List

LENA Data

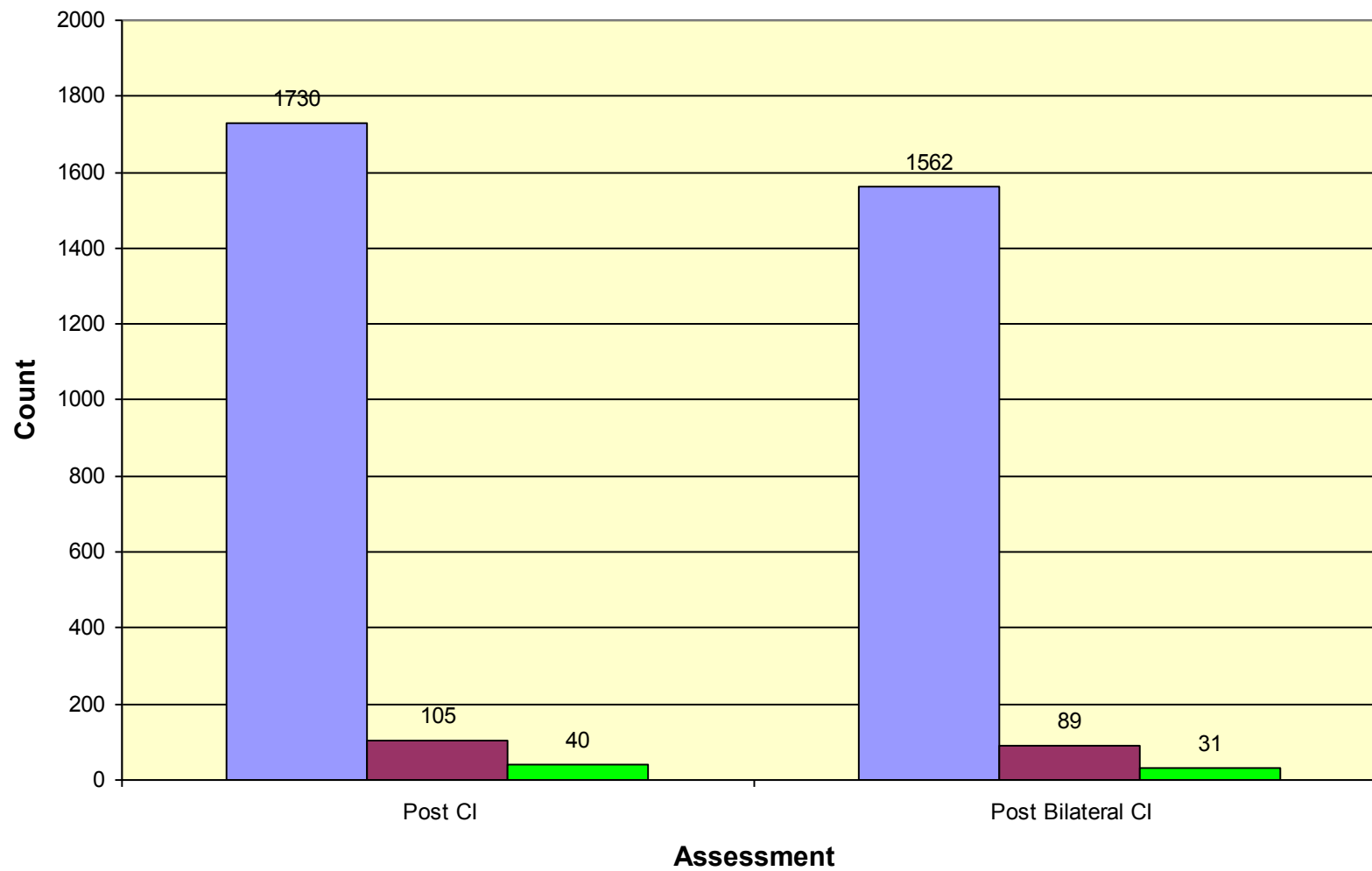


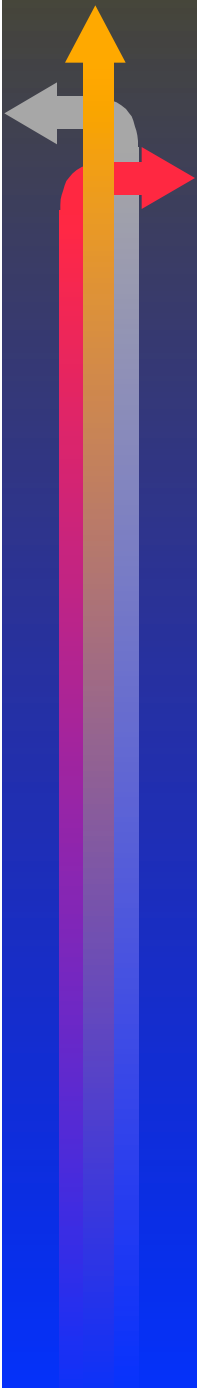
Mean Counts Per Hour: Child BB



Mean Counts Per Hour: Child CW

■ Adult Word Count ■ Child Vocalizations ■ Conversational Turns

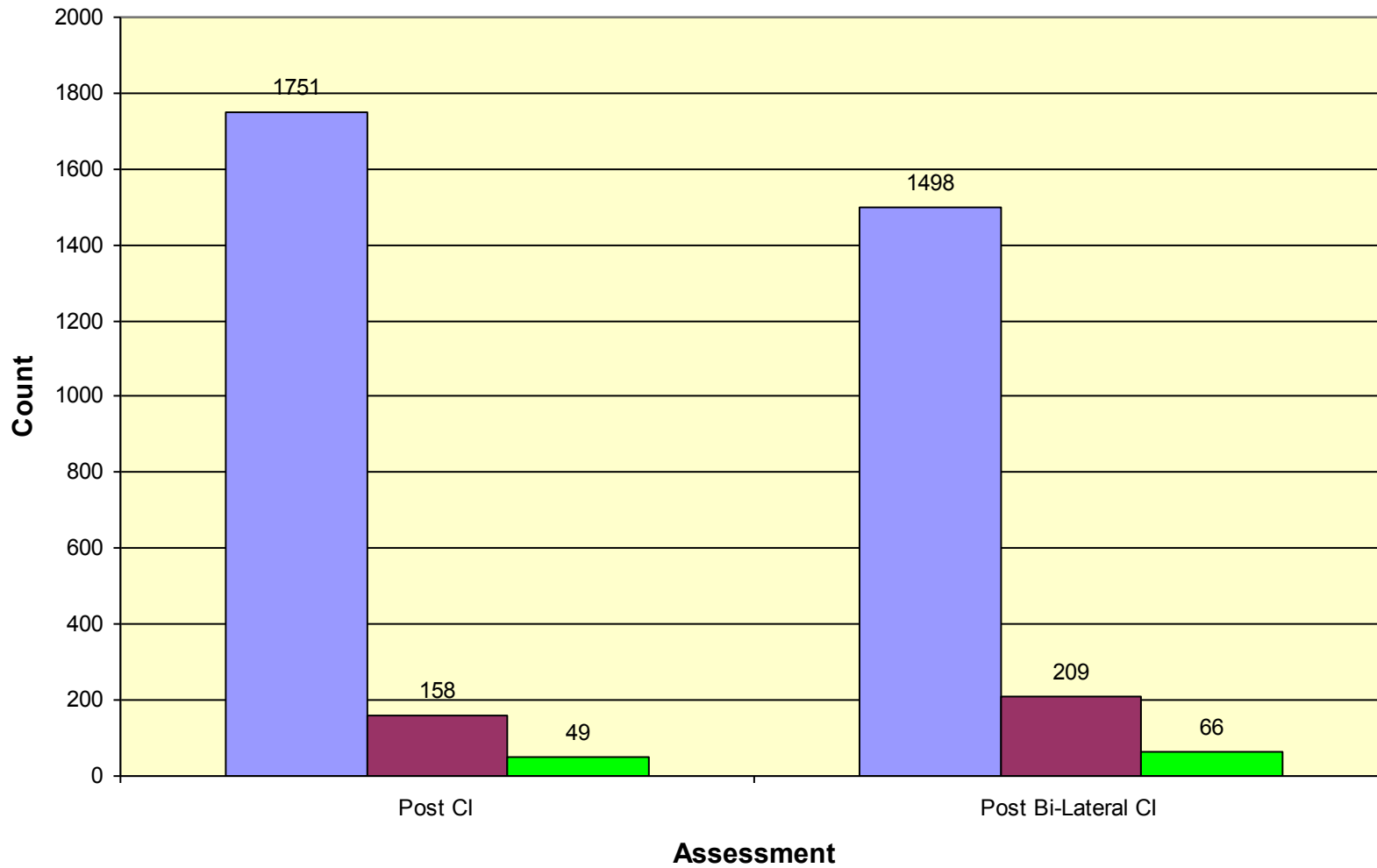




LEVEL	Behaviors	Assessment 1	Assessment 2	Assessment 3
Condition		Post 1/Pre 2 (4/2009)	Post 1/1 mo. Post 2 (11/2009)	Post 1/ 2 removed (8/2010) CI Intervention
Prelinguistic prelocutionary	Makes wants known by any communication	18%	18%	54%
	Responds to simple gestures (tactile)	0	0	71%
Illocutionary 1	Uses deictic gestures	3%0	3%	20%
Illocutionary 2	Uses representational gestures (Iconic signs)	0	0	0
Expressive Communication	Imitates vowel sounds/words	0	0	0
	Demonstrates ability to use a few words (3-5)	0	0	0
	Uses at least 50 words	0	0	0
	Joins 2-3 words together	0	0	0
Receptive Communication	Responds to words	0	1	19
	Responds to Simple Phrases	0	3%	22%%
	Demonstrates Object ID	0	0	16%

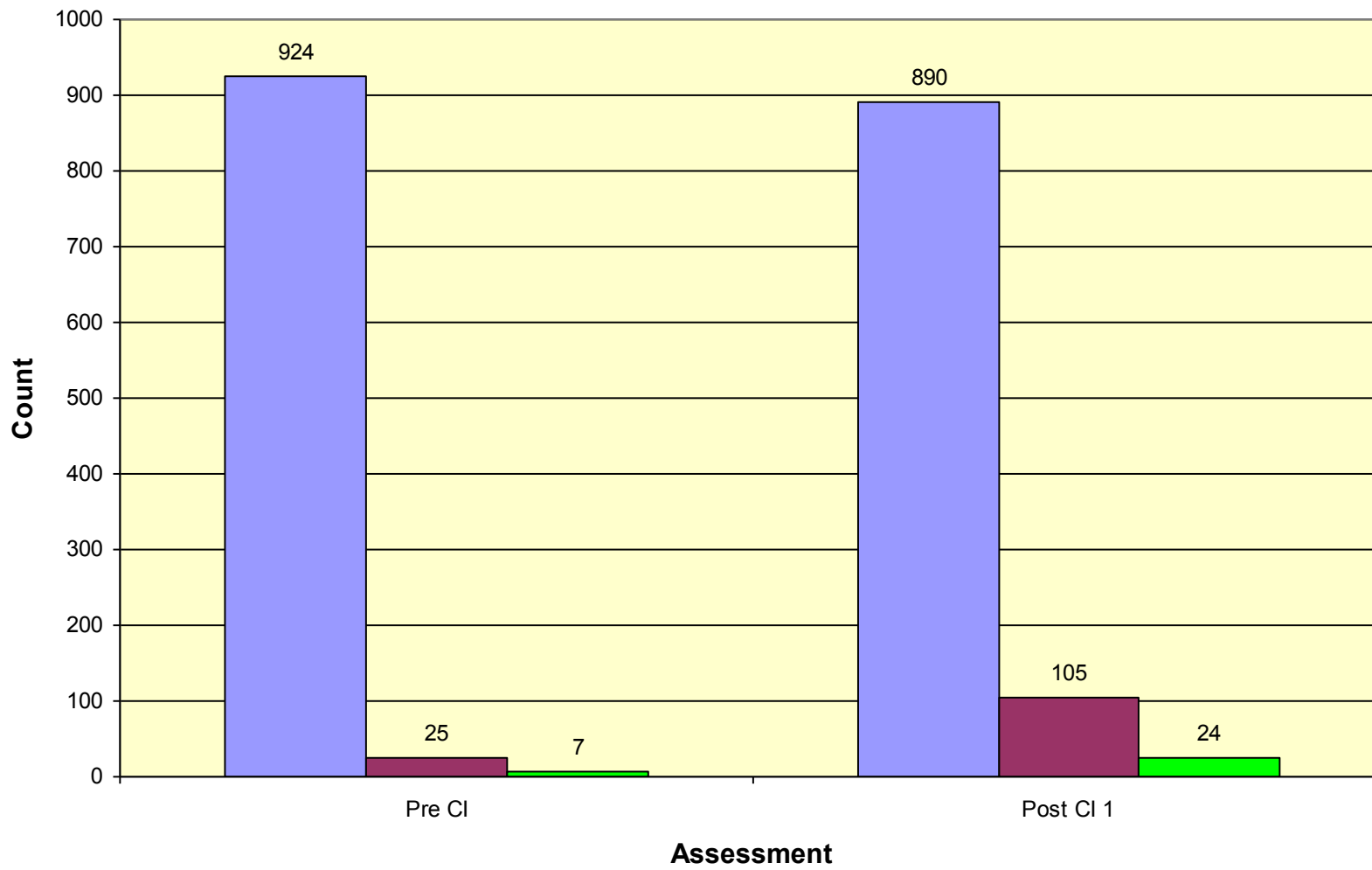
Mean Counts Per Hour: Child CC

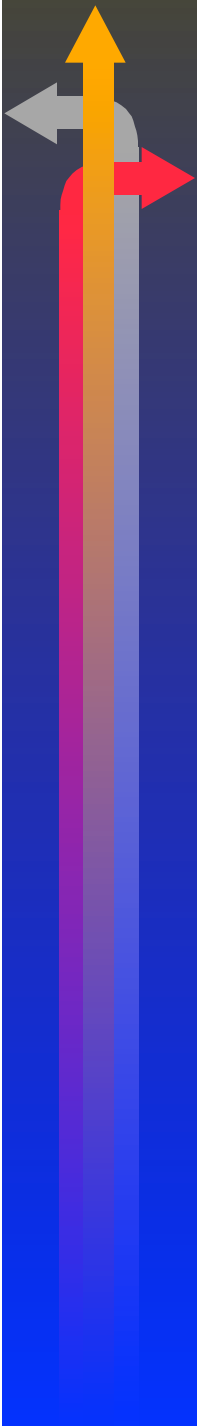
■ Adult Word Count ■ Child Vocalizations ■ Conversational Turns



Mean Counts Per Hour: Child WD

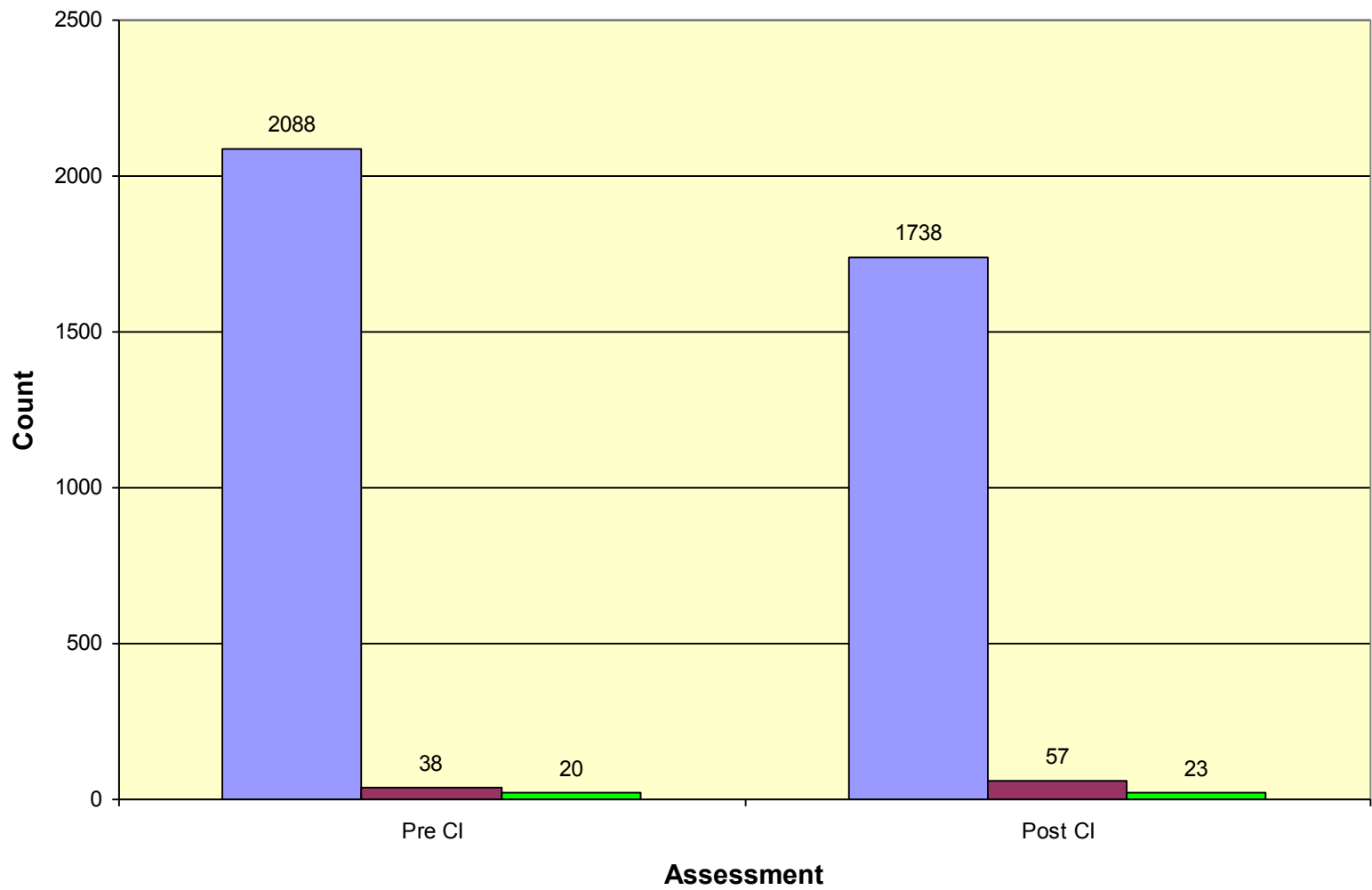
■ Adult Word Count ■ Child Vocalizations ■ Conversational Turns





Mean Counts Per Hour: Child AS

■ Adult Word Count ■ Child Vocalizations ■ Conversational Turns





Intervention

- Intervention within the natural environment
- Parents/nurses served as interventionists
- Target skills embedded within routines
- Systematic teaching (introduction, demonstration, practice w/feedback-coaching, evaluation, reflection: 16-20 sessions/2hrs)
- Social validation with families

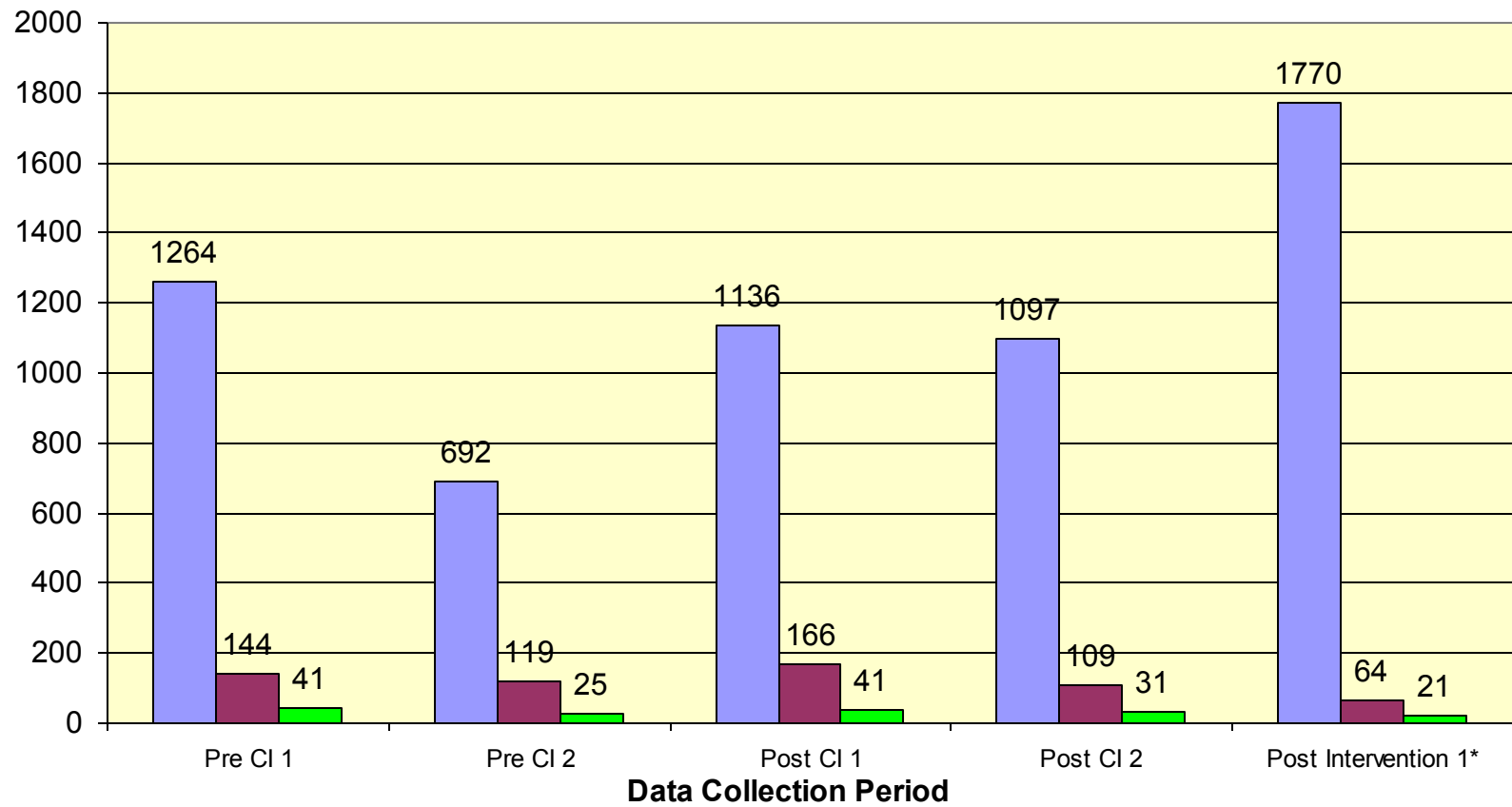


Intervention Targets for Caregiver

- Phase I – Descriptive Talking*; Opportunities for Partial Participation; Following Child’s Lead, Responsiveness
 - Phase II – Opportunities to Follow 1-2 word directives*; Opportunities to Identify of Objects*
 - Phase III – Opportunities for Verbal Imitation; Opportunities for Gestural and Verbal Communication*
- * Use of “Auditory Sandwich” with individualized prompts

Mean Counts Per Hour: Child EB

■ Adult Word Count ■ Child Vocalizations ■ Conversational Turns



* CI Wire Broken during data collection period



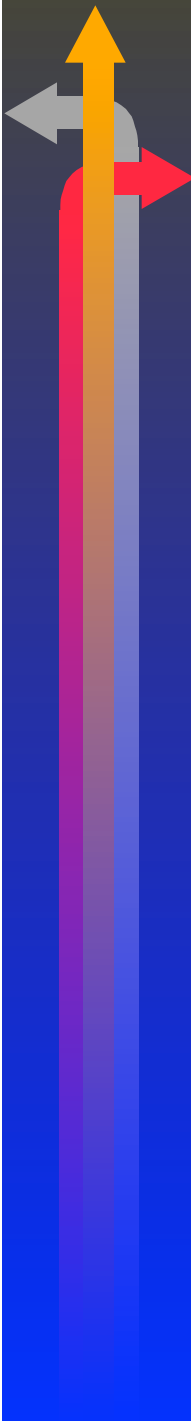
Overall Findings to Date: Study B

- Delay in 4 children receiving implants has extended research timelines (medical issues; hold on AB manufacturer)
- Overall, caregivers do not increase their verbalizations to their child after implant
- Impact of caregiver speech on gestural communication needs to be examined
- Very few children currently using words in Study B
- Increases seen in prelinguistic communication
- Parental verbal interactions varies considerably over time and locations.
- Cognitive delays have negative impact on outcomes



Variability in Outcomes....

- Indicates the need for individualized and adaptive approaches (Moeller, 2006)
- Indicates the need to integrate perception/receptive and production/expressive outcomes
- Need to incorporate more cognitive skills into intervention (Pisoni, et al., 2010)
- Indicates a need to do a better job of teaching parents how to implement strategies and embed them in caregiving, play, and family activities.



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