

EXAMINING THE FEASIBILITY AND OUTCOMES OF USING LENA IN PRESCHOOL CLASSROOMS FOR CHILDREN WITH AUTISM

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PROJECT DESCRIPTION

- The Comparison of Two Comprehensive Treatment Models (CTMs) study is a project designed to examine the efficacy of two existing classroom-based treatments for children with autism spectrum disorder (ASD).
- High quality TEACCH and LEAP preschool classrooms operating within the public school system will be compared to “business as usual” (BAU) classrooms.
- This is a 4-year, multi-site project that involves the states of CO, FL, MN, and NC.

TEACCH

Theoretical Foundation:
• Cognitive Social Learning Theory

Key Programmatic Features:
• Self-contained classrooms often are used
• Adult structured learning opportunities
• Classroom environment arranged to address characteristics of autism
• Special education teacher is the primary instructor
• Strong parent involvement component

LEAP

Theoretical Foundation:
• Applied Behavior Analysis

Key Programmatic Features:
• Typically developing children are full-time members of the classroom
• Naturalistic teaching strategies are used
• Classroom environment mirrors typical early childhood setting
• Co-teaching model of instruction
• Strong parent training component

BAU

Theoretical Foundation:
• No primary or guiding theoretical orientation

Key Programmatic Features:
• Eclectic approach to educating children with autism

RESEARCH QUESTIONS

- Are there significant, concurrent associations between the 3 LENA variables of interest (CV, CT, AWC) and standardized measures of children’s language development or symptom severity?
- Are baseline measures of children’s language development or symptom severity predictive of their LENA scores at time point 2?

DATA COLLECTION

- LENA data are collected at the NC and MN sites.
- In NC, there are only TEACCH and BAU classrooms.
- Children wear the LEAN device for 1 day in the fall and 1 day in the spring, occurring at least 6 months apart.
- Children wear the device for 3 hours due to the control classrooms being primarily ½ day programs.
- Data are only being reported for the NC site.

LENA VARIABLES

1. Child Vocalizations (CV) = Speech-related sounds including words, babbling, and single sounds; excludes crying, whining, and vegetative sounds
2. Adult Word Counts (AWC) = Adult words spoken to or near the child; excludes overlapping adult and child speech, TV, and radio
3. Child Turn-taking (CT) = Adult-child interaction based on either adult or child responding to the other within 5 seconds

DESCRIPTIVE STATISTICS

Child Demographics (N = 21)		
Age (months)	Sex	Race
M = 45.95	19 Males	12 White
Range = 36 – 53	2 Females	5 Black
		4 Asian

Child Measures			Baseline (Time 1)	
Variables	M	SD		
CARS_Total	33.17	4.95		
Mullen_VR_AE	29.57	12.07		
PLS_Total_AE	22.29	9.58		
PLS_EC_AE	22.80	8.11		

Note: CARS = Childhood Autism Rating Scale; VR = Visual Reception Subscale; PLS = Preschool Language Scale; EC = Expressive Communication Subscale; AE = Age Equivalent.

Teacher Demographics (N = 7)		
# of Years Teaching	Highest Education Level	
M = 10.64	3 = Bachelor’s degree	
Range = 4 - 20	3 = Master’s degree	
	1 = A degree above a master’s	

LENA Variable	Time 1 (N = 21)		Time 2 (N = 19)	
	M	SD	M	SD
Rates				
AWC	28.83	11.90	27.38	8.73
CT	1.01	0.54	1.12	0.47
CV	3.16	1.55	4.09	1.80

Note: The mean proportion of meaningful speech at Time 1 was 22% (SD = 12%) and at Time 2 was 25% (6%).

RESULTS: PEARSON CORRELATIONS

	CV	AWC	CT	PLS Total	PLS EC	Mullen VR	CARS Total
CV	1.0	0.35 0.1195	0.85 <0.0001	0.24 0.288	0.44 0.0499	0.18 0.4383	-0.26 0.2586
AWC		1.0	0.62 0.0026	-0.008 0.9718	0.34 0.1407	0.45 0.0409	-0.33 0.1458
CT			1.0	0.22 0.3328	0.47 0.0377	0.35 0.1155	-0.30 0.1831

Note: All LENA variables have been converted to rates (frequency/min) to account for differences in amount of time children wore the device. Values in bold indicate statistical significance.

RESULTS: REGRESSION ANALYSIS

- Time 2 LENA scores are the outcome variables.
- Separate regressions models were run because of the correlations between the LENA outcome variables and smaller sample size.
- Time 2 LENA scores were regressed on time 1 LENA scores, including one additional time 1 predictor variable.

Outcome	Predictor	β	SE	p	R ²
AWC	AWC time 1	0.320	0.166	0.071	0.154
	CARS	0.346	0.401	0.401	0.038
	CARS time 2	0.786	0.281	0.013	0.278
	Mullen	-0.105	0.183	0.574	0.017
CT	PLS EC	-0.118	0.277	0.677	0.111
	CTC time 1	0.268	0.205	0.209	0.116
	CARS	-0.006	0.022	0.785	0.004
	Mullen	0.006	0.009	0.544	0.021
CV	PLS EC	0.021	0.015	0.185	0.105
	CVC time 1	0.368	0.271	0.194	0.113
	CARS	-0.009	0.085	0.915	0.001
	Mullen	0.041	0.035	0.254	0.075
	PLS EC	0.081	0.058	0.179	0.105

CONCLUSIONS

- Concurrent associations were found between children’s scores on a standardized language assessment and their LENA word count scores.
- A concurrent association also was found between children’s baseline cognitive abilities and the number of adult words spoken in their proximity.
- Due to low power, primarily non-significant associations were found between Time 1 and Time 2 scores.
- The next step will be to examine group differences.