

# NONWORD REPETITION PERFORMANCE IN SECOND GRADERS WITH AND WITHOUT LANGUAGE IMPAIRMENT

Susan Ellis Weismer,<sup>1</sup> J. Bruce Tomblin,<sup>2</sup> Xuyang Zhang,<sup>2</sup> Jan Gaura,<sup>1</sup> Paula Buckwalter,<sup>2</sup> & Maura Jones<sup>1</sup>  
<sup>1</sup>University of Wisconsin-Madison, <sup>2</sup>University of Iowa

## ABSTRACT

This study examined nonword repetition performance in a population sample of school-age children. A total of 581 second graders who were participating in a longitudinal, epidemiologic investigation of specific language impairment (SLI) were administered the Nonword Repetition Task (NRT, Dollaghan & Campbell, 1998). Performance was examined according to second grade diagnostic category, presence/absence of language impairment, and treatment status. Results indicated that children with language impairment and those in intervention exhibited deficient nonword repetition skills compared to controls. Findings also confirmed that the NRT is a culturally non-biased measure of language processing and results from likelihood ratio analyses support the contention that NRT performance may provide a useful index to assist in ruling in or ruling out language disorder.

## INTRODUCTION

Various investigations have indicated that children with specific language impairment (SLI) exhibit deficits on nonword repetition tasks (e.g., Edwards & Lahey, 1998; Gathercole & Baddeley, 1990). Further, it has been suggested that these measures could have clinical utility in screening for language impairment within samples of children from diverse backgrounds (Dollaghan & Campbell, 1998). The purpose of the present investigation was to extend findings of prior studies with a large, population sample of school-age children.

## METHOD

### Participants

Participants consisted of 581 second grade children in a longitudinal, epidemiologic investigation of SLI. Second grade diagnosis criteria were similar to the EpiSLI kindergarten diagnosis criteria for this same sample (Tomblin et al., 1996). Five composite scores were obtained from the assessment measures.

	Receptive	Expressive	
Vocabulary	PPVT-R	CREVT	Vocabulary Composite
Sentence (Grammar)	CELF-3, Sentence Structure; Directions & Concepts	CELF-3, Word Structure; Sentence Repetition	Grammar Composite
Narrative	CELF-3, Listening to Paragraphs	Number of clauses in spoken narrative	Narrative Composite
	Receptive Composite	Expressive Composite	

A child was diagnosed as having a language impairment if 2/5 language composite scores fell below -1.25 SD. Diagnosis also included consideration of nonverbal cognition; performance IQ (PIQ) of 85 or above (within 1 SD) was defined as normal range. Thus, four diagnostic categories were established:

	Normal Nonverbal Cognition	Normal Language Composite
NL (Normal Language Controls)	YES	YES
SLI (Specific Language Impairment)	YES	NO
NLI (Nonspecific Language Impairment)	NO (70-84 PIQ)	NO
CF (Cognitive Failures)	NO (70-84 PIQ)	YES

	CA	PIQ2	PPVT-R	CREVT	CELE-3
<b>DIAG2</b>					
NL (n=359)	M (SD)	7.9 (11.3)	102.6 (11.3)	101.5 (11.8)	101.1 (11.8)
SLI (n=80)		7.9 (8.2)	95.7 (8.2)	80.9 (10.7)	84.8 (9.9)
NLI (n=84)		7.1 (4.1)	77.1 (4.1)	76.0 (11.5)	83.5 (10.2)
CF (n=58)		8.1 (4.1)	78.8 (4.1)	92.6 (12.2)	94.7 (10.4)
<b>LI GROUPS**</b>					
No LI (n=417)		8.0 (4.1)	99.3 (13.5)	100.2 (13.4)	100.2 (11.8)
LI (n=164)		7.9 (4.1)	86.2 (11.3)	78.4 (11.3)	84.1 (10.1)
<b>TREATMENT</b>					
No Rx (n=491)		8.0 (4.1)	96.3 (14.3)	95.6 (15.5)	96.6 (13.3)
Rx (n=90)		8.0 (4.1)	91.9 (13.0)	85.5 (16.9)	90.6 (13.4)

\*This sample included the following gender and racial/ethnic breakdowns: 329 males/252 females; 493 white, 74 African American, 8 Hispanic, 4 Asian and 2 American Indian children.  
 \*\* No LI = NL + CF  
 LI = SLI + NLI

### Procedures

Children were administered the Nonword Repetition Task (Dollaghan & Campbell, 1998), which consists of 16 nonsense words ranging from 1 to 4 syllables in length. The phonemes that comprise these nonwords are early developing, perceptually salient sounds and none of the syllables correspond to English lexical items. The same tape recorded stimuli and scoring procedures used by Dollaghan and Campbell were employed in this study.

## RESULTS

### Group Differences on the NRT

Results of ANOVAs revealed significant group effects ( $p < .05$ ) for total percentage phonemes correct (TOTPPC) for each of the groupings.

- \* Children diagnosed as having SLI or NLI performed significantly worse than NL controls.
- \* Children with LI had significantly lower TOTPPC scores than those without LI.
- \* Children in therapy performed significantly worse than those not receiving intervention.

Repeated measures ANOVAs indicated a significant group x syllable interaction ( $p < .05$ ), such that children with LI (SLI, NLI) or in therapy performed worse on 3- and 4-syllable nonwords than controls.

### Use of NRT to Rule In/Rule Out Language Disorder

Likelihood (LH) ratio analyses were conducted using second grade diagnosis, presence/absence of LI, or treatment status as the gold standard.

In one set of analyses, the same performance criteria employed by Dollaghan and Campbell were used: A positive test result (rule in disorder) was defined as TOTPPC of 70% or lower and a negative test result (rule out disorder) was set at 81% or higher. In another set of analyses, more extreme cut-off scores that maximized the ability to rule in or out disorder were used.

Results indicated that children with SLI, NLI or LI were roughly 3 to 4 1/2 times more likely to obtain low TOTPPC scores than NL controls. In terms of ruling out the disorder, LH ratios of less than 1 indicated that high scores were more likely to come from controls.

TOT PPC	Dollaghan & Campbell Cut-points									
	SLI		NL		LH Ratio	NLI		NL		LH Ratio
	No.	Prop.	No.	Prop.		No.	Prop.	No.	Prop.	
<=70	20	.25	34	.09	2.78	22	.26	34	.09	2.89
71-74	12	.15	22	.06	2.50	11	.13	22	.06	2.17
75-80	13	.16	64	.18	.89	25	.30	64	.18	1.67
>=81	35	.44	239	.67	.66	26	.31	239	.67	.46

TOT PPC	Extreme Cut-points									
	SLI		NL		LH Ratio	NLI		NL		LH Ratio
	No.	Prop.	No.	Prop.		No.	Prop.	No.	Prop.	
<=60	7	.09	8	.02	4.50	7	.08	8	.02	4.00
61-90	63	.79	250	.70	1.13	72	.86	250	.70	1.23
>=91	10	.12	101	.28	.43	5	.06	101	.285	.21

TOT PPC	Dollaghan & Campbell Cut-points				
	LI		NL		LH Ratio
	No.	Prop.	No.	Prop.	
<=70	42	.26	41	.10	2.60
71-74	23	.14	24	.06	2.33
75-80	38	.23	79	.19	1.21
>=81	61	.37	272	.65	.57

TOT PPC	Extreme Cut-points				
	LI		NL		LH Ratio
	No.	Prop.	No.	Prop.	
<=60	14	.09	9	.02	4.50
61-90	135	.82	295	.71	1.15
>=91	15	.09	112	.27	.33

The LH analyses for treatment status revealed that children in therapy were about 6 1/2 to 10 times more likely to obtain low TOTPPC scores than those not receiving treatment and that none of the scores of 91 or better came from children in treatment.

TOT PPC	Dollaghan & Campbell Cut-points				
	LI		NL		LH Ratio
	No.	Prop.	No.	Prop.	
<=70	21	.47	26	.07	6.71
71-74	4	.09	20	.05	1.80
75-80	11	.24	68	.18	1.33
>=81	9	.20	257	.69	.29

TOT PPC	Extreme Cut-points				
	LI		NL		LH Ratio
	No.	Prop.	No.	Prop.	
<=60	9	.20	6	.02	10.0
61-90	36	.80	257	.69	1.16
>=91	0	0	108	.29	0.0

### Assessment of Cultural Bias

In a final analysis, Language Composite scores and NRT scores were examined by assessing top and bottom quartiles broken down by race.

Although Language Composite scores for children of color were shifted toward the lower range (9% upper quartile, 40% lower quartile), distribution of NRT scores revealed no cultural bias.

Freq. Row%	High 25%	Low 25%	Mid 50%	Total
Children of Color	9 10.23	40 45.45	39 44.32	88 (15%)
White Children	136 27.59	105 21.30	252 51.11	493 (85%)
Total	145	145	291	581

Freq. Row%	High 25%	Low 25%	Mid 50%	Total
Children of Color	20 22.73	20 22.73	48 54.55	88 (15%)
White Children	129 26.22	130 26.42	233 47.35	492 (85%)
Total	149	150	281	580

## CONCLUSIONS

- \* Children with language impairment (broadly defined) exhibit deficits in nonword repetition.
- \* Performance on the Nonword Repetition Task can serve as a useful measure to assist in the identification of children with language disorder.
- \* The Nonword Repetition Task is a culturally non-biased measure of language processing.

## REFERENCES

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