

**Title:** When word reading matches, do individuals with Down syndrome have reading comprehension comparable to typical readers?

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**Introduction:** A Down syndrome (DS) phenotypic characteristic related to reading outcomes is language and literacy deficits that are disproportionate to broader cognitive profiles (Byrne, Buckley, MacDonald, & Bird, 1995). Despite perpetuated beliefs that children with DS cannot learn to read and comprehend text, an emerging body of evidence challenges this assumption (e.g., Lemons et al., 2017). Many individuals with DS present with a relative strength in word reading; however, they often experience persistent difficulties with reading comprehension (RC), the ultimate goal of reading. Given that educators tend to focus almost exclusively on decoding in early literacy instruction, the question remains whether this relative strength in word reading leads individuals with DS to have comparable RC when compared to their word-reading matched peers with typical development (TD). We asked the research question: In a group of individuals with DS matched on word reading to a group of typical readers, do the groups have comparable RC? We hypothesized that the groups would not be the same and that this would hold across multiple RC measures. If this hypothesis held up, we asked a follow up question—Do the groups differ on listening comprehension (LC)?—to consider a source for RC differences.

**Method:** Nineteen individuals with DS ( $M = 206.63$  months,  $SD = 41.68$  months) and 19 word reading-matched TD children ( $M = 86.11$  months,  $SD = 6.54$  months) participated. They were matched on the WRMT-III Word Identification Subtest raw scores. Participants completed norm-referenced assessments for three parallel measures of RC and LC. The three parallel measurement methods were: (1) nonverbal response (WJIV Test of Oral Language Understanding Directions and K-ABC Reading/Understanding subtest), (2) cloze-procedure (WJIV Test of Oral Language Oral Comprehension subtest and WRMT-III Passage Comprehension subtest), and (3) passage-level with open-ended questions (WIAT-III LC and RC subtests). Raw scores were used in analyses. Participants also completed nonverbal cognition, oral language, and speech accuracy assessments for descriptive purposes.

**Results:** Based on independent-samples t-tests with Bonferroni adjusted alpha levels of .008, the two groups did not have comparable RC (Table 1). Despite comparable word reading ( $t(38) = .21, p = .83$ ), the mean RC raw score for the DS group was significantly lower than for the TD group for 2 of 3 RC measures; the effect size was large. Given that word reading matching yielded differences on RC, we examined LC. The mean raw LC score for the DS group was significantly lower on the 3 LC measures, with large effect sizes. Note that the between group effect sizes are larger for LC than RC.

Table 1  
*Participant Listening Comprehension and Reading Comprehension Raw Scores*

	DS Group (n = 19)			TD Group (n = 19)			<i>t</i>	<i>p</i>	<i>d</i>
	Mean	SD	Range	Mean	SD	Range			
<b>Reading Comprehension</b>									
K-ABC Reading/Understanding	8.58	5.32	0-18	10.58	5.64	2-19	1.125	.27	0.38
WRMT-III Passage Comprehension	8.68	4.41	2-17	13.32	3.73	9-22	3.50	.00	1.17
WIAT-3 Reading Comprehension	27.42	14.67	2-55	46.37	9.71	30-64	4.70	.00	1.57
<b>Language Comprehension</b>									
WJ-IV TOL Understanding Directions	17.74	9.89	2-37	35.47	6.53	22-50	6.35	.00	2.17
WJ-IV TOL Oral Comprehension	7.84	4.62	0-17	15.26	2.62	10-20	6.09	.00	2.03
WIAT-III Listening Comprehension	4.95	4.13	0-15	11.42	1.9	8-16	6.21	.00	2.07

*Note.* DS = Down syndrome; TD = typically developing; K-ABC = Kaufman Assessment Battery for Children; WRMT-III = Woodcock Reading Mastery Test—Third Edition; WJ-IV TOL = Woodcock Johnson IV Tests of Oral Language; WIAT-III = Wechsler Individual Achievement Test—Third Edition

**Discussion:** The DS group, despite being matched on word reading, demonstrated significantly lower RC scores compared to the group of typical readers. Thus, although individuals with DS often have a relative strength in word reading, they do not have RC comparable to word reading-matched peers. Additionally, the DS group demonstrated significantly lower LC scores compared to the TD group. The DS group demonstrated deficits in LC which likely presents a barrier to RC development and is a source for

discrepant RC when compared to typical readers. Across theoretical models, word reading and LC are widely recognized as the main competencies that underlie RC (Gough & Tunmer, 1986). However, our findings corroborate previous findings that individuals with DS, who despite demonstrating proficient word reading, do not engage in the task of learning to read with intact LC (e.g., Roch & Levorato, 2009). Given these findings, future research will evaluate LC as a potentially malleable factor to improve RC outcomes for individuals with DS. It is also essential to interpret these findings in terms of development, which elucidates the need to evaluate the discrepancy in these domains—word reading, LC, and RC—over time and across multiple developmental periods.

**References:**

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