

Title: A Multisite Randomized Controlled Trial of Descubriendo la Lectura (DLL):
A Within-Study Replication

Authors and Affiliations:

Trisha Borman, American Institutes for Research

Geoffrey Borman, University of Wisconsin—Madison

Bo Zhu, American Institutes for Research

So Jung Park, American Institutes for Research

Alejandra Martin, American Institutes for Research

Scott Houghton, American Institutes for Research

Sidney Wilkinson-Flicker, American Institutes for Research

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Background

Recent syntheses of research on bilingual education programs have concluded that, compared to immersing students in English, teaching them in their native language as well as in English produces superior results in English reading achievement (Francis, Lesaux, & August, 2006; Rolstad, Mahoney, & Glass, 2005; Slavin & Cheung, 2004). With 80 percent of ELs claiming Spanish as their home language (Calderon, Slavin, & Sanchez, 2011) and with the continued growth of bilingual programs across the United States, the number of students receiving initial literacy instruction in Spanish will increase, as will the need for a Spanish-language early intervention program for students at risk of literacy failure. One such program is the Spanish reconstruction of Reading Recovery known as Descubriendo la Lectura (DLL) (Reading Recovery Council of North America, 2014).

Purpose

Despite the growing representation of Latino students in U.S. schools, the education system continues to fail to identify reliable and replicable programs to serve Spanish-speaking ELs. This national, multisite trial investigates how supplemental Spanish-language literacy instruction, provided by DLL, can impact literacy achievement for first-grade ELs who are struggling readers. With both Spanish- and English-language assessments, this study is the first to investigate the impact of the widely replicated DLL program on both Spanish and English literacy outcomes.

Intervention

DLL offers one-on-one lessons in Spanish for a period of 12–20 weeks to first-grade Spanish-speaking students struggling with reading and writing. The program extends the successful Reading Recovery approach to ELs by first addressing literacy in their native Spanish language. Lesson activities include rereading familiar books, reading a recently assigned book while teachers take a running record, working with letters or words using magnetic letters, writing a story, assembling the child's cut-up story, and reading a new, strategically selected book (Reading Recovery Council of North America, 2014).

Research Design

This study is a multisite student-level RCT involving three cohorts of students (2016-17, 2017-18, 2018-19). Students are randomly assigned to an *immediate* treatment group or a *delayed* treatment group, with the latter serving as a control group for the former.

Setting/Sample

The combined Cohort 1 and 2 sample includes 29 teachers within 27 schools and approximately 317 first grade students assigned to either treatment or control conditions across three states: Texas, Illinois, and Arizona. Demographically, approximately 39% of the students are female, 97% are Hispanic, and 81% are economically disadvantaged.

Data Collection

Our test data include pretests (prior to randomization) and posttests (upon exiting DLL services) for first grade students. The tests include:

- 1) *Instrumento de Observación (IdO)*, a Spanish literacy assessment administered to all at-risk Spanish-speaking students who perform below grade level in DLL schools, measuring: Letter Identification, Ohio Word Test, Concepts About Print, Writing Vocabulary, Hearing and Recording Sounds in Words, and Text Reading,
- 2) *Iowa Test of Basic Skills (ITBS)* literacy assessment measuring: Vocabulary, Word Analysis, and Reading, and,
- 3) *Logramos* literacy assessment, the Spanish-language version of the *ITBS*.

We also collected demographic data (e.g., gender, socioeconomic status) and data that show whether students successfully completed the DLL program or were recommended for additional intervention services.

Implementation data include interviews with DLL teachers, DLL teacher leaders and principals, lesson observations, and teacher-completed activity logs.

Analysis

Student-level randomization, blocked within schools, produced statistically equivalent treatment and control samples across pretest and demographic measures. Overall and differential student attrition rates were low, ranging from 0.1% to 8% differential and 5% to 28% overall.

For each outcome, we fit the following model to assess impact of DLL on literacy achievement:

$$Y_{ij} = \alpha + \beta(DLL_{ij}) + \gamma(PRETEST_{ij}) + u_j + \varepsilon_{ij}$$

In this model, Y_{ij} represents the test score of students within schools, α represents the model intercept (the grand mean for the reference group), β is the coefficient representing the impact of DLL for student i in school j , γ is the coefficient representing the association between the pretest measure and the outcome, u_j is the school-specific error, and ε_{ij} is the student-specific error term.

Results

Results from the first two years were positive and, for the Spanish assessment, statistically significant. There were some differences by cohort in the impacts, which do not align with available implementation fidelity data. Impacts for Cohort 1 on Logramos¹ range from $d=.43$ to $d=.64$; however, for Cohort 2 they range from $d=.19$ to $d=.28$. A similar pattern is observed for Cohort 1 and 2 for the English assessment impacts with Cohort 1 estimates ranging from $d=.11$ to $d=.22$ and Cohort 2 estimates ranging from $d=.00$ to $d=.06$ (see Tables 1-4).

Implementation fidelity was measured via interviews, lesson observations, and teacher-completed activity logs. Generally, for both Cohort 1 and Cohort 2, DLL lessons were

¹ Results from the program-derived assessment *IdO* were not available at the time of writing this abstract.

implemented daily, lessons were deliberate, and activities followed the intervention's established standards and guidelines. Though implementation data suggest no clear differences in fidelity across cohorts, we are currently analyzing routinely collected program data, which indicate whether students successfully completed DLL or were referred for additional services. We plan to estimate and compare treatment-on-the-treated (TOT) impact estimates for both Cohort 2 and Cohort 1.

Conclusion

Though there was variability across cohorts, we found that DLL produces a clear benefit to students across many dimensions of literacy. Comparing the mean effect size of $d=.37$ found across the 8 Spanish literacy measures to benchmarks provided by Hill, Bloom, Black, and Lipsey (2008), the DLL is equal to approximately 40% of the overall literacy growth that occurs during the first-grade year. Indeed, as a supplemental intervention spanning only 12-20 weeks, DLL produces impressive impacts of a magnitude rarely seen for educational programs of any type. Subsequent analyses of sustained impacts across second and third grade and transference to later English-language outcomes will be important longitudinal outcomes to track in the remaining years of the project.

Appendix A. References

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Appendix B. Results Tables

Table 1. Cohort 1, Logramos, Effect Size Impacts

	READING	LANGUAGE	VOCABULARY	ELA TOTAL
INTERCEPT	-0.351 (0.225)	-0.245 (0.208)	-0.253 (0.161)	-0.362 (0.252)
TREATMENT	0.635* (0.296)	0.434* (0.220)	0.482* (0.194)	0.616* (0.274)
PRE-READING	0.364 *** (0.071)			
PRE-LANGUAGE		0.129 (0.076)		
PRE-VOCAB			0.238** (0.080)	
PRE-ELA TOTAL				0.376*** (0.074)

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 2. Cohort 1, ITBS, Effect Size Impacts

	READING	LANGUAGE	VOCABULARY	ELA TOTAL
INTERCEPT	-0.129 (0.126)	-0.031 (0.158)	-0.128 (0.177)	-0.076 (0.167)
TREATMENT	0.216 (0.192)	0.114 (0.187)	0.341 (0.220)	0.159 (0.214)
PRE-READING	0.153 (0.093)			
PRE-LANGUAGE		0.116 (0.091)		
PRE-VOCAB			0.030 (0.085)	
PRE-ELA TOTAL				0.192* (0.094)

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 3. Cohort 2, Logramos, Effect Size Impacts

	READING	LANGUAGE	VOCABULARY	ELA TOTAL
INTERCEPT	-0.159 (0.145)	-0.044 (0.158)	-0.028 (0.184)	-0.126 (0.090)
TREATMENT	0.275* (0.137)	0.184* (0.079)	0.130 (0.169)	.230* (0.094)
PRE-READING	0.380*** (0.089)			
PRE-LANGUAGE		0.067 (0.043)		
PRE-VOCAB			-0.002 (0.064)	
PRE-ELA TOTAL				0.701*** (0.062)

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 4. Cohort 2, ITBS, Effect Size Impacts

	READING	LANGUAGE	VOCABULARY	ELA TOTAL
INTERCEPT	-0.038 (0.154)	0.038 (0.177)	0.035 (0.183)	0.001 (0.139)
TREATMENT	0.054 (0.112)	0.056 (0.091)	-0.001 (0.164)	0.016 (0.105)
PRE-READING	0.362*** (.089)			
PRE-LANGUAGE		0.019 (0.048)		
PRE-VOCAB			-0.038 (0.073)	
PRE-ELA TOTAL				0.401 (0.082)

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$