Title: A Multisite Randomized Controlled Trial of Descubriendo la Lectura (DLL)

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Background

As the Latino population continues to grow rapidly in the U.S., and the achievement gap between whites and Latinos remains large and stable, establishing educational programs that meet the needs of Latino students is imperative. Recent syntheses of research on bilingual education programs have concluded that, compared with 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; Greene, 1997; Rolstad, Mahoney, & Glass, 2005; Slavin & Cheung, 2004; Willig, 1985). And bilingualism has other potential benefits, including cognitive flexibility (Bialystock, 2001; Nagy, Berninger, & Abbott, 2003), improved family cohesion, and higher self-esteem (Portes & Hao, 2002; Vom Dorp, 2000). 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 two cohorts of students (2016-17 and 2017-18), and we present initial first-year impacts for the 2016-17 cohort. Students were randomly assigned to treatment or a no-treatment control condition within school blocks and all students participated in bilingual educational programs. Treatment students received 12-20 weeks of supplemental one-on-one DLL services for approximately 30 minutes per day and control students received bilingual instruction as usual, along with other non-DLL supports, including small-group instruction.

Setting/Sample

The intervention was studied in 22 elementary schools implementing DLL across three states: Texas, Illinois, and Arizona during the 2016-17 school year. Using the established DLL protocol, approximately 140 first-grade students were identified as the lowest-performing ELs and participated in the study. Of these, approximately 45% were female, 99% were Hispanic, and 82% were economically disadvantaged.

Data Collection

We collected both pretest data (prior to randomization) and posttest data for each test for both treatment and control students, as well as demographic data (e.g., gender, socioeconomic status). Test data included:

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*.

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 7% differential and 5% to 26% overall.

We hypothesized that the initial first-grade impacts of the intervention would be statistically significant on the two Spanish assessments, the *IdO* and *Logramos*, and further that analyses would reveal small, potentially non-statistically-significant, first-year impacts on the English-language assessment, *ITBS*, which are likely to grow in magnitude upon longitudinal follow-up. As such, we used the following multilevel model to estimate impact 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 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

Consistent with our hypotheses, the largest impacts were found for the two Spanish-literacy assessments (ranging from $d=.34$ to $d=1.0$), while the impacts for the English-literacy assessment were relatively smaller (ranging from $d=.22$ to $d=.37$). Analytic results are summarized in Tables 1, 2, and 3.

Conclusion

DLL demonstrates a clear benefit to students across many dimensions of literacy. Moreover, these observed effects are, in general, of considerable magnitude. For instance, when comparing the largest impact of 1.0 standard deviation units to benchmarks provided by Hill, Bloom, Black, and Lipsey (2008), we observe that the DLL effect is equivalent to a learning advantage relative to controls that is equivalent to nearly the same amount of reading achievement growth experienced by the typical first-grade student over a full school year. The mean effect size of d=.52 across the 14 literacy measures is equal to approximately half of the overall literacy growth that occurs across 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. The subsequent sustained impacts and transference to English-language outcomes will be important longitudinal outcomes to track in the remaining years of the project.

Appendix A. References

Bialystock, E. (2001). *Bilingualism in development: Language, literacy, and cognition.* New York, NY: Cambridge University Press.

Calderon, M., Slavin, R., & Sanchez, M. (2011). Effective instruction for English learners. *The Future of Children, 21*(1), 103–127.

Francis, D., Lesaux, N. K., & August, D. (2006). Language of instruction. In D. L. August & T. Shanahan (Eds.), *Developing literacy in a second language: Report of the National Literacy Panel* (pp. 365–410). Mahwah, NJ: Erlbaum.

Greene, J. (1997). A meta-analysis of the Rossell and Baker review of bilingual education research. *Bilingual Research Journal, 21*(3), 103–122.

Hill, C. J., Bloom, H. S., Black, A. R., & Lipsey, M. W. (2008). Empirical benchmarks for interpreting effect sizes in research. *Child Development Perspectives, 2*(3), 172–177.

Nagy, W., Berninger, V., Abbott, R., Vaughan, K., & Vermeulen, K. (2003). Relationship of morphology and other language skills to literacy skills in at-risk second graders and at-risk fourth grade writers. *Journal of Educational Psychology, 95*(4), 730–742.

Portes, A., & Hao, L. (2002). The price of uniformity: Language, family and personality adjustment in the immigrant second generation. *Ethnic and Racial Studies, 25*(6), 889–912.

Reading Recovery Council of North America. (2014). *Descubriendo la Lectura* [Web page]. Retrieved from http://readingrecovery.org/descubriendo-la-lectura

Rolstad, K., Mahoney, K., & Glass, G. (2005). The big picture: A meta-analysis of program effectiveness research on English language learners. *Educational Policy, 19*(4), 572–594.

Slavin, R., & Cheung, A. (2004). How do English language learners learn to read? *Educational Leadership, 61*(6), 52–57.

Vom Dorp, I. E. (2000). *Biliteracy, monoliteracy and self-concept in native Spanish-dominant and native English-dominant fifth graders.* Unpublished doctoral dissertation, University of New Mexico, Albuquerque, NM.

Willig, A. (1985). A meta-analysis of selected studies on the effectiveness of bilingual education. *Review of Educational Research, 55*(3), 269–317.

Appendix B. Analytic Results

Table 1. Impacts of DLL Assignment on IDO Outcomes.

	Letter Identification	Sounds in Words	Writing Vocabulary	Concepts about Print	Ohio Word Test	Total
(Intercept)	-0.316 ** (0.095)	-0.177 (0.101)	-0.505 *** (0.118)	-0.439 *** (0.112)	-0.271 ** (0.097)	-0.474 *** (0.091)
Treatment	**0.602 *** (0.116)**	**0.337 * (0.132)**	**0.995 *** (0.116)**	**0.883 *** (0.126)**	**0.528 *** (0.133)**	**0.939 *** (0.099)**
Pretest_LI	0.637 *** (0.065)					
Pretest_SiW		0.572 *** (0.069)				
Pretest_WV			0.377 *** (0.069)			
Pretest_CAP				0.353 *** (0.068)		
Pretest_OWT					0.534 *** (0.067)	
Pretest_Total_Score						0.565 *** (0.057)

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

Table 2. Impacts of DLL Assignment on Logramos Outcomes.

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                Reading    Language    Vocabulary    ELA_Total
---------------------------------------------------------------
(Intercept)     -0.272 *   -0.206      -0.240        -0.293 *
                (0.112)    (0.132)     (0.122)       (0.122)

Treatment        0.532 *** 0.409 *      0.474 **      0.552 ***
                (0.155)    (0.163)     (0.156)       (0.158)

READINGSS        0.454 ***
                (0.078)
LANGUAGESS                 0.155
                           (0.084)
VOCABULARYSS                            0.247 **
                                       (0.082)
LATOTALSS                                             0.431 ***
                                                      (0.081)
===============================================================
*** p < 0.001, ** p < 0.01, * p < 0.05
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Table 3. Impacts of DLL Assignment on ITBS Outcomes.

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                Reading    Language    Vocabulary    ELA_Total
--------------------------------------------------------------
(Intercept)     -0.131     -0.104      -0.169        -0.059
                (0.130)    (0.140)     (0.128)       (0.131)

Treatment        0.225      0.235       0.369 *       0.211
                (0.171)    (0.172)     (0.162)       (0.164)

READINGSS        0.187
                (0.112)
LANGUAGESS                 0.100
                           (0.098)
VOCABULARYSS                            0.018
                                       (0.087)
ELATOTALSS                                            0.170
                                                      (0.088)
==============================================================
*** p < 0.001, ** p < 0.01, * p < 0.05
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