Cluster Randomized Design Investigation of a Multi-Component Vocabulary Intervention for At-Risk Preschoolers

Howard Goldstein, Elizabeth Kelley, Keri Madsen, Lindsey Peters-Sanders,
Yagmur Seven, Xigrid Soto, Wendy Olsen, & Robert M. Barker

USF UNIVERSITY OF SOUTH FLORIDA

Purpose

This cluster randomized design study evaluated the efficacy and feasibility of *Story Friends*, a supplemental vocabulary curriculum designed to prevent language and reading difficulties in at-risk preschool children.

Significance

Oral language is an early and reliable predictor of later reading proficiency.[1] **Yet, children exhibit wide differences in oral language abilities as they enter school, placing many children at risk for academic failure.**[2, 3] For children demonstrating high risk, carefully-planned and high-quality oral language instruction is imperative.

Explicit vocabulary instruction that is embedded during shared storybook reading has been effective at improving oral language skills in young children.[4, 5, 6] **Unfortunately, many preschool children receive little or no explicit language instruction during the school day.**[1, 7, 8] Preschool teachers find it challenging to provide explicit vocabulary instruction with fidelity, even when provided with training and instructional tools.[9, 10, 11] Thus, there is a need for vocabulary curriculum to be well-designed, highly effective, and easy for teachers and paraeducators to implement in preschools.

***Story Friends* (SF) was designed for ease of implementation to ensure instructional fidelity. The program delivers high-quality, explicit vocabulary instruction through the use of pre-recorded storybooks that are carefully designed for preschool children**. Pilot studies of previous iterations found SF to be effective at increasing vocabulary knowledge of preschoolers at risk for language and literacy difficulties.[5, 12, 13, 14]

Selected References

1. National Early Literacy Panel. (2008). *Developing early literacy: Report of the National Early Literacy Panel*. Washington, DC: National Institute for Literacy.
2. Hart, B., & Risley, T. (1995). Meaningful differences in the everyday experiences of young American children. Baltimore: Brookes.
3. Snow, C. E., Burns, M. S., & Griffin, P. (1998). Preventing reading difficulties in young children committee on the prevention of reading difficulties in young children. Washington, DC: National Research Council.
4. Coyne, M. D., McCoach, D. B., & Kapp, S. (2007). Vocabulary intervention for Kindergarten students: Comparing extended instruction to embedded instruction and incidental exposure. *Learning Disability Quarterly, 30*(2), 74-88.
5. Goldstein, H., Kelley, E., Greenwood, C., McCune, L., Carta, J., Atwater, J., . . . Spencer, T. (2016). Embedded Instruction Improves Vocabulary Learning During Automated Storybook Reading Among High-Risk Preschoolers. *Journal of Speech, Language, and Hearing Research, 59*(3), 484-500.
6. Justice, L. M., Meier, J., & Walpole, S. (2005). Learning new words from storybooks: an efficacy study with at-risk kindergartners. Lang Speech Hear Serv Sch, 36(1), 17-32.
7. Greenwood, C. R., Carta, J. J., Atwater, J., Goldstein, H., Kaminski, R., & McConnell, S. C. (2013). Is a response to intervention (RTI) approach to preschool language and early literacy instruction needed? *Topics in Early Childhood Special Education, 33*, 48-64.
8. NICHD. (2000). Report of the National Reading Panel. *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4769). Washington, DC: Government Printing Office.
9. Cabell, S., Justice, L., Piasta, S., Curenton, S., Wiggins, A., Turnbull, K., & Petscher, Y. (2011). The impact of teacher responsivity education on preschoolers' language and literacy skills. *American Journal of Speech Language Pathology, 20*, 315-330.
10. Dickinson, D. (2011). Teachers' language practices and academic outcomes of preschool children. *Science, 333*(6045), 964-967.
11. Justice, L. M., Mashburn, A., Pence, K. L., & Wiggins, A. (2008). Experimental evaluation of a preschool language curriculum: Influence on children's expressive language skills. *Journal of Speech, Language, and Hearing Research, 51*(4), 983-1001.
12. Kelley, E. S., & Goldstein, H. (2014). Building a Tier 2 intervention: A Glimpse behind the data. *Journal of Early Intervention, 36*(4), 292-312.
13. Kelley, E. S., Goldstein, H., Spencer, T. D., & Sherman, A. (2015). Effects of automated Tier 2 storybook intervention on vocabulary and comprehension learning in preschool children with limited oral language skills. *Early Childhood Research Quarterly, 31*, 47-61.
14. Goldstein, H., Ziolkowski, R., Bojczyk, K., Marty, A., Schneider, N., Harpring, J, & Haring, C. (2017). Academic vocabulary learning in first through third grade in low-income schools: Effects of automated supplemental instruction. *Journal of Speech, Language, and Hearing Research, 60*, 3237–3258.

The *Story Friends* Curriculum

- ***Explicit vocabulary instruction*** provided during brief lessons embedded in prerecorded storybooks
- Children listen to stories in ***small-group listening centers through headphones***
- ***Four challenging, Tier 2 words targeted per book*** (e.g., *prepare*, *delighted, selfish*)
- Embedded lesson include ***child-friendly definitions***, ***supportive storybook and real-world contexts***, and ***multiple opportunities to respond***
- ***Classroom and Home Review Strategies*** provide additional supports for teachers and parents to review and discuss the words frequently throughout the day

Method

Participants

- 84 children from 24 preschool classrooms in Florida (17 classrooms) and Missouri (7 classrooms) participated
- Preschools predominantly served low SES communities

Procedures

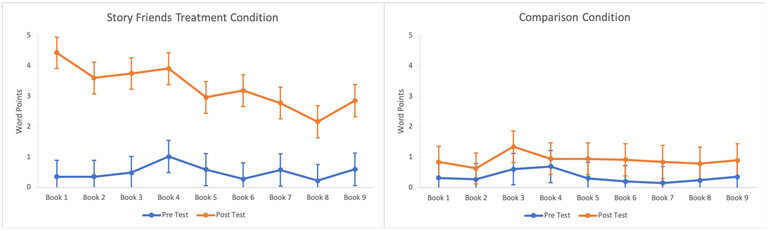
- All consented children were screened for eligibility using a multiple gating process:
  1) *Picture Naming Individual Growth & Development Indicators* (IDGI)
  2) *Peabody Picture Vocabulary Test* (PPVT) and *Clinical Evaluation of Language Fundamentals – Preschool 2* (CELF)
- 3 to 4 children with standard scores ranging from 78 to 92 on the PPVT and/or the CELF were selected from each classroom
- Classrooms were paired and randomly assigned to treatment (SF books with vocabulary instruction) or comparison (SF books without vocabulary instruction)
- One book series (*Forest Friends*) provided ***13 weeks of intervention*** (1 introductory book, 9 lesson books, and 3 review books) and ***taught 36 Tier 2 words***
- Children listened to each book 3 times
- Treatment teachers and parents were provided weekly materials and prompts to encourage vocabulary review and practice throughout the school day and at home
- Pre- and post-intervention word learning was assessed following every unit (3 instructional books and 1 review book) using a curriculum-based definitional measure of the target words (e.g., *"Tell me, what does selfish mean?"*)
- All words were assessed and scored 0 for incorrect response, 1 for partially correct, and 2 for correct response, yielding a maximum of 8 possible points per book

Analysis

- Two-level random effects model was conducted using JMP Pro 14.3 with restricted maximum likelihood estimation to account for between child and between classroom variation and to disentangle the impact of the SF treatment on vocabulary gains of preschool children
- Children's preexisting language differences were controlled by including vocabulary pre-test scores and pre-PPVT-4 scores in the model

Results

- The intraclass correlation coefficient (ICC) was 6.3% at the child level and 25.1% at classroom level



- A significant 3-way interaction of fixed effects, $F(8, 1279) = 2.88, p < .01$, revealed children in the SF Treatment condition had significantly higher word points following intervention across all books
- Children in the Comparison condition did not improve significantly
- Across the books, the SF Treatment showed large effect sizes compared to the control condition: Cohen's *d*s = 0.88 to 2.33, mean $d = 1.54$

Implications

- *Story Friends* treatment resulted in a large effect (mean $d = 1.54$)
- The current study replicated previous studies, but with double the words taught
- Mere exposure to words during storybook listening is largely insufficient for preschoolers to learn the meaning of challenging words
- The control group demonstrated little word learning (11%), whereas the treatment group learned about 41% of the words on average
- Explicit instruction has strong effects, but does not necessarily result in complete vocabulary learning
- Higher ICC for classrooms than previous studies, probably reflects greater variability in teachers offering practice opportunities across the day
- Although we could not capture how many opportunities to practice across the day in school and home, anecdotal information and observations indicated more practice resulted in better learning outcomes

Acknowledgments & Disclosure

This research was supported by IES grant R324A150132. Howard Goldstein and Elizabeth Kelley are authors of Story Friends and have a financial interest, as they receive royalties from sales through Paul Brookes Publishing. This interest has been reviewed by the University of South Florida and the University of Missouri in accordance with Individual Conflict of Interest policies, for the purpose of maintaining the objectivity and the integrity of research.