

What Works Clearinghouse



Lindamood Phonemic Sequencing (LiPS)[®]

Program Description²

The *Lindamood Phonemic Sequencing (LiPS)*[®] program (formerly called the *Auditory Discrimination in Depth*[®] [ADD] program) is designed to teach students skills to decode words and to identify individual sounds and blends in words. Initial activities engage students in discovering the lip, tongue, and mouth actions needed to produce specific sounds. After students are able to produce, label, and organize the sounds, subsequent activities in

sequencing, reading, and spelling use the oral aspects of sounds to identify and order them within words. The program also offers direct instruction in letter patterns, sight words, and context clues in reading. The *LiPS*[®] program is individualized to meet students' needs and is often used with students who have learning disabilities or reading difficulties. The version of the program tested here involved computer-supported activities.

Research

One study of *LiPS*[®] meets What Works Clearinghouse (WWC) evidence standards. The study included 150 first-grade students in five elementary schools. The WWC considers the extent of

evidence for *LiPS*[®] to be small for alphabets and comprehension. No studies that meet WWC standards with or without reservations addressed fluency or general reading achievement.³

Effectiveness

Based on one study, *LiPS*[®] was found to have potentially positive effects on alphabets and no discernible effects on comprehension. Findings on fluency and general reading achievement were not reported in the study.

	Alphabets	Fluency	Comprehension	General reading achievement
Rating of effectiveness	Potentially positive	na	No discernible effect	na
Improvement index⁴	Average: +17 percentile points Range: -1 to +35 percentile points	na	Average: +6 percentile points Range: 0 to +20 percentile points	na

na = not applicable

1. This report has been updated to include reviews of 12 studies that have been released since 2005. Of the additional studies, all 12 were not within the scope of the protocol. A complete list and disposition of all studies reviewed are provided in the references.
2. The descriptive information for this program was obtained from a publicly available source: the program's website (<http://www.lindamoodbell.com/programs/lips.html>, downloaded October 2008). The WWC requests developers to review the program description sections for accuracy from their perspective. Further verification of the accuracy of the descriptive information for this program is beyond the scope of this review.
3. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
4. These numbers show the average and range of student-level improvement indices for all findings across the study.

Additional program information

Developer and contact

Developed by Patricia Lindamood and Phyllis Lindamood, the *LiPS*® program is published by Pro-Ed and is available through a number of professional distributors and publishers. Address: 416 Higuera Street, San Luis Obispo, CA 93401. Web: <http://www.lindamoodbell.com>. Telephone: (800) 233-1819.

Scope of use

Auditory Discrimination in Depth® was developed in the late 1960s and early 1970s. It was revised and renamed *LiPS*® in 1998. The program is frequently provided in centers or clinics, including program-endorsed Lindamood-Bell Learning Centers. The program is available for purchase by the public. According to the program authors, the program is used widely for remedial purposes but exact numbers were not available.

Teaching

The program is designed for readers in kindergarten through third grade or for struggling readers. Teachers work with students in whole classes or in small group and one-on-one

Research

Thirty-seven studies reviewed by the WWC investigated the effects of *LiPS*®. One study (Torgesen, Wagner, Rashotte, & Herron, 2003) is a randomized controlled trial that meets WWC evidence standards. No studies are randomized controlled trials or quasi-experimental designs that meet WWC evidence standards with reservations. The remaining 36 studies do not meet either WWC evidence standards or eligibility screens.

Torgesen et al. (2003) included 150 low-achieving first-grade students in five elementary schools. At two schools, students were randomly assigned to either *LiPS*® (formerly *Auditory Discrimination in Depth*®) or *Read, Write and Type*™ (*RWT*), a reading software program. At three additional schools, students were

5. Description of the assignment procedure was based on personal communication with the first study author on September 7, 2006.
6. The WWC review of beginning reading includes all comparison groups that meet evidence standards because all schools provide some type of reading instruction, and there is no typical comparison condition.
7. The Extent of Evidence Categorization was developed to tell readers how much evidence was used to determine the intervention rating, focusing on the number and size of studies. Additional factors associated with a related concept—external validity, such as the students' demographics and the types of settings in which studies took place—are not taken into account for the categorization. Information about how the extent of evidence rating was determined for *LiPS*® is in Appendix A5.

settings to help them become aware of the mouth actions that produce speech sounds. Instructors help students verify sounds within words and teach them to self-correct in reading, spelling, and speech. The program developer recommends that instruction last four to six months for one hour a day or four to six weeks for four hours a day. Computer-supported activities are available for the program. Lindamood-Bell offers *LiPS*® workshops to train teachers, but teachers can also learn to administer the program from the *Lindamood Phonemic Sequencing Teacher's Manual*.

Cost

A kit of materials designed for one-on-one or small group instruction can be purchased for \$298. The classroom kit costs \$498. Kits include a trainer's manual and all student materials (tiles, blocks, colored felts, and picture cards). Some of these materials are also sold separately. Information is not available on the cost of training for instructors or on how much it costs for students to receive instruction at a licensed center.

randomly assigned to either *LiPS*®, *RWT*, or a regular instruction control group.⁵ The beginning reading review presents data relevant to comparisons of *LiPS*® with *RWT* and of *LiPS*® with a regular instruction control group.⁶

Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or medium to large (see the What Works Clearinghouse Extent of Evidence Categorization Scheme). The extent of evidence takes into account the number of studies and the total sample size across the studies that meet WWC evidence standards with or without reservations.⁷

Research (continued)

The WWC considers the extent of evidence for *LiPS*[®] to be small for alphabets and comprehension. No studies that meet WWC evidence standards with or without reservations examined

the effectiveness of *LiPS*[®] in the fluency or general reading achievement domains.

Effectiveness Findings

The WWC review of interventions for Beginning Reading addresses student outcomes in four domains: alphabets, fluency, comprehension, and general reading achievement. The study included in this report covers two domains: alphabets and comprehension. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *LiPS*[®] on students.⁸

Alphabets. The Torgesen et al. (2003) study findings for alphabets are based on the performance of *LiPS*[®] students and comparison students on three measures of phonological awareness and two measures of phonics.

- When the *LiPS*[®] group was compared with the *Read, Write and Type*[™] group, the study authors found that there were no statistically significant differences between the groups on the three phonological awareness measures (Phoneme Blending, Phoneme Elision, and Phoneme Segmenting subtests of the Comprehensive Test of Phonological Processes) and the two phonics measures (Word Identification and Word Attack subtests of the Woodcock Reading Mastery Test).

- When the *LiPS*[®] group was compared with the regular classroom instruction group, the authors reported, and the WWC confirmed, statistically significant positive effects for *LiPS*[®] on two of the phonological awareness measures (Phoneme Elision and Phoneme Segmenting), but the authors did not find statistically significant effects on the third phonological awareness measure—Phoneme Blending. The authors reported, and the WWC confirmed, statistically significant positive effects of

LiPS[®] on the two phonics measures (Word Identification and Word Attack).

Comprehension. The Torgesen et al. (2003) study findings for comprehension are based on the performance of *LiPS*[®] students and comparison students on the Passage Comprehension subtest of the Woodcock Reading Mastery Test and a Vocabulary subtest of the Stanford Binet Intelligence test (reported as a verbal IQ measure).

- When the *LiPS*[®] group was compared with the *Read, Write and Type*[™] group, the authors found that there was no statistically significant difference between the groups on the comprehension measures.

- When the *LiPS*[®] group was compared with the regular classroom instruction group, the authors found that *LiPS*[®] had no statistically significant effect on the Vocabulary subtest. The authors found a statistically significant positive effect on the Passage Comprehension subtest. In WWC computations, the effect was not statistically significant.

Rating of effectiveness

The WWC rates the effects of an intervention in a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings, the size of the difference between participants in the intervention condition and the comparison condition, and the consistency in findings across studies (see the WWC Intervention Rating Scheme).

8. The level of statistical significance was reported by the study authors or, where necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For an explanation, see the WWC Tutorial on Mismatch. For the formulas the WWC used to calculate the statistical significance, see Technical Details of WWC-Conducted Computations. In the case of Torgesen et al. (2003), a correction for multiple comparisons was needed, so the significance levels may differ from those reported in the original study.

The WWC found *LiPS*[®] to have potentially positive effects for alphabets and no discernible effects for comprehension

Improvement index

The WWC computes an improvement index for each individual finding. In addition, within each outcome domain, the WWC computes an average improvement index for each study and an average improvement index across studies (see Technical Details of WWC-Conducted Computations). The improvement index represents the difference between the percentile rank of the average student in the intervention condition versus the percentile rank of the average student in the comparison condition. Unlike the rating of effectiveness, the improvement index is entirely based on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analysis. The improvement index can take on values between -50 and +50, with positive numbers denoting favorable results.

The average improvement index for alphabets is +17 percentile points in the one study across two comparison groups, with a range of -1 to +35 percentile points across findings.

The average improvement index for comprehension is +6 percentile points in the one study across two comparison groups, with a range of 0 to +20 percentile points across findings.

Summary

The WWC reviewed 37 studies on *LiPS*[®]. One of these studies meets WWC evidence standards; no studies meet WWC evidence standards with reservations; the remaining 36 studies do not meet either WWC evidence standards or eligibility screens. Based on the one study, the WWC found potentially positive effects in alphabets and no discernible effects in comprehension. The conclusions presented in this report may change as new research emerges.

References

Meets WWC evidence standards

Torgesen, J., Wagner, R., Rashotte, C., & Herron, J. (2003). Summary of outcomes from first grade study with *Read, Write and Type* and *Auditory Discrimination in Depth* instruction and software with at-risk children (FCRR Tech. Rep. No. 2). Retrieved from Florida Center for Reading Research website: <http://www.fcrr.org/TechnicalReports/RWTfullrept.pdf>.

Studies that fall outside the Beginning Reading protocol or do not meet WWC evidence standards

Aaron, P. G., Joshi, R. M., Gooden, R., & Bentum, K. E. (2008). Diagnosis and treatment of reading disabilities based on the component model of reading. *Journal of Learning Disabilities, 41*(1), 67–84. The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—the intervention was combined with another intervention.

Adair, J., Nadeau, S., Conway, T., Gonzalez-Rothi, L., Heilman, P., Green, I., et al. (2000). Alterations in the functional anatomy of reading induced by rehabilitation of an alexic patient.

Neuropsychiatry, Neuropsychology and Behavioral Neurology, 13(4), 303–311. This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.

Alexander, A., Anderson, H., Heilman, P., Voeller, K., & Torgesen, J. (1991). Phonological awareness training and the remediation of analytic decoding deficits in a group of severe dyslexics. *Annals of Dyslexia, 41*, 193–206. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

Conway, T., Heilman, P., Gonzalez-Rothi, L., Alexander, A., Adair, J., Crosson, B., & Heilman, K. (1998). Treatment of a case of phonological alexia with agraphia using the *Auditory Discrimination in Depth (ADD)* program. *Journal of the International Neuropsychological Society, 4*, 608–620. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

Howard, M. P. (1986). Effects of pre-reading training in auditory conceptualization on subsequent reading achievement. *Dissertation Abstracts International, 47*(03), 847A. (UMI No. 8612677)

References *(continued)*

- (Study: Arco, Indiana, and Santa Maria, California) The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.
- Howard, M. P. (1986). Effects of pre-reading training in auditory conceptualization on subsequent reading achievement. *Dissertation Abstracts International*, 47(03), 847A. (UMI No. 8612677) (Study: Arco, Indiana, kindergarten) The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.
- Howard, M. P. (1986). Effects of pre-reading training in auditory conceptualization on subsequent reading achievement. *Dissertation Abstracts International*, 47(03), 847A. (UMI No. 8612677) (Study: Arco, Indiana, first-grade longitudinal) The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.
- Kennedy, K., & Backman, J. (1993). Effectiveness of the *Lindamood Auditory Discrimination in Depth* program with students with learning disabilities. *Learning Disabilities Research and Practice*, 8(4), 253–259. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.
- Leask, A. (2007). The effect of phonological awareness intervention on non-word spelling ability in school-aged children: An analysis of qualitative change. *Advances in Speech-Language Pathology*, 9(1), 1–16. The study is ineligible for review because it does not use a comparison group.
- Lindamood-Bell Learning Processes. (2003). Lindamood-Bell Learning Processes: Beginning reading submissions. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Intervention in kindergarten through 2nd grade) This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- Lindamood-Bell Learning Processes. (2003). Lindamood-Bell Learning Processes: Beginning reading submissions. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Kindergarten results from school project in Oregon) The study is ineligible for review because it does not use a comparison group.
- Lindamood-Bell Learning Processes. (2003). Lindamood-Bell Learning Processes: Beginning reading submissions. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Kindergarten through 3rd grade results from learning centers across the United States) The study is ineligible for review because it does not use a comparison group.
- Lindamood-Bell Learning Processes. (2003). Lindamood-Bell Learning Processes: Beginning reading submissions. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Kindergarten through 3rd grade results from school project in Colorado) The study is ineligible for review because it does not use a comparison group.
- Lindamood-Bell Learning Processes. (2004). Lindamood-Bell Learning Processes: Interventions for beginning reading evidence report—Report 1, Book I of II. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: K–3 Lindamood-Bell focus students 2002 summary) This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- Lindamood-Bell Learning Processes. (2004). Lindamood-Bell Learning Processes: Interventions for beginning reading evidence report—Report 1, Book I of II. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Kindergarten students in Oregon 2001–02) This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.

References *(continued)*

- Lindamood-Bell Learning Processes. (2004). Lindamood-Bell Learning Processes: Interventions for beginning reading evidence report—Report 1, Book I of II. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Pueblo, Colorado, 2001–02 summary) This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- Lindamood-Bell Learning Processes. (2004). Lindamood-Bell Learning Processes: Interventions for beginning reading evidence report—Report 1, Book I of II. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Longitudinal Florida study summary) This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- Lindamood-Bell Learning Processes. (2004). Lindamood-Bell Learning Processes: Interventions for beginning reading evidence report—Report 1, Book I of II. (Available from the Lindamood-Bell Learning Processes, 416 Higuera Street, San Luis Obispo, CA 93401) (Study: Second grade students in Idaho) This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- Lindamood-Bell Learning Processes. 2004 clinical statistics. Retrieved from <http://www.lindamoodbell.com/downloads/pdf/research/2004%20Clinical%20Stats.pdf> The study is ineligible for review because it does not use a comparison group.
- Lindamood-Bell Learning Processes. 2005 clinical statistics. Retrieved from <http://www.lindamoodbell.com/downloads/pdf/research/clinical%20stats%202005.pdf> The study is ineligible for review because it does not use a comparison group.
- Lindamood-Bell Learning Processes. 2006 learning centers' results. Retrieved from <http://www.lindamoodbell.com/downloads/pdf/research/2006%20Center%20results.pdf> The study is ineligible for review because it does not use a comparison group.
- Matson, A. E. (2005). Central auditory processing: A current literature review and summary of interviews with researchers on controversial issues related to auditory processing disorders. St. Louis, MO: Washington University School of Medicine, Program in Audiology and Communication Sciences. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.
- McBride, N. (2005). The effectiveness of second shot and/or Lindamood-Bell on reading achievement of elementary students. University of Nevada, Reno: Dept. of Counseling and Educational Psychology. (UMI No. 3209120) The study is ineligible for review because it does not disaggregate findings for the age or grade range specified in the protocol.
- McGuinness, C., McGuinness, D., & Donohue, J. (1995). Phonological training and the alphabet principle: Evidence for reciprocal causality. *Reading Research Quarterly*, 30(4), 830–852. The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.
- Nelson, R. L., & Damico, J. S. (2006). Qualitative research in literacy acquisition: A framework for investigating reading in children with language impairment. *Clinical Linguistics & Phonetics*, 20(7–8), 631–639. The study is ineligible for review because it does not use a comparison group.
- Olson, R. K., & Wise, B. (2006). Computer-based remediation for reading and related phonological disabilities. In Michael C. McKenna, Linda D. Labbo, Ronald D. Kiefer, and David Rein-king, (Eds.), *International handbook of literacy and technology* (pp. 57–74). Mahwah, NJ: Erlbaum. The study is ineligible for review because it does not examine the effectiveness of an intervention.
- Olson, R. K., Wise, B. W., Ring, J., & Johnson, M. (1997). Computer-based remedial training in phoneme awareness and phonological decoding: Effects on the post-training development of word recognition. *Scientific Studies of Reading*, 1(3), 235–253. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

References (continued)

- Pokorni, J. L., Worthington, C. K., & Jamison, P. J. (2004). Phonological awareness intervention: Comparison of *Fast ForWord*, *Earobics*, and *LiPS*[®]. *The Journal of Educational Research*, 97(3), 147–157. This study is ineligible for review because it does not disaggregate findings for the age or grade range specified in the protocol.
- Sadoski, M., & Willson, V. L. (2006). Effects of a theoretically based large-scale reading intervention in a multicultural urban school district. *American Educational Research Journal*, 43(1), 137–154. The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—the intervention was combined with another intervention.
- Simos, P., Fletcher, J., Bergman, E., Breier, J., Foorman, B., Castillo, E., et al. (2002). Dyslexia-specific brain activation profile becomes normal following successful remedial training. *Neurology*, 58, 1203–1212. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.
- Torgerson, C., Brooks, G., & Hall, J. (2006). A systematic review of the research literature on the use of phonics in the teaching of reading and spelling. Research Report No. RR711. University of Sheffield, UK: Department for Education Skills Publications. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.
- Torgesen, J. K., Alexander, P. A., Wagner, R. K., Rashotte, C. A., Voeller, K. K. S., Conway, T., & Rose, E. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities*, 34(1), 33–58. This study is ineligible for review because it does not disaggregate findings for the age or grade range specified in the protocol.
- Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., et al. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology*, 91(4), 579–593. The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—the intervention was combined with another intervention.
- Truch, S. (1994). Stimulating basic reading processes using *Auditory Discrimination in Depth*. *Annals of Dyslexia*, 44, 60–80. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.
- Wise, B. W., Ring, J., & Olson, R. K. (2000). Individual differences in gains from computer-assisted remedial reading. *Journal of Experimental Child Psychology*, 77(3), 197–235. The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—the intervention was combined with another intervention.