Program description

The Auditory Discrimination in Depth (ADD) Program® (currently called the Lindamood Phonemic Sequencing (LiPS) Program®) is designed to teach students skills to successfully 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 with their mouths, 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 Auditory Discrimination in Depth Program® is individualized to meet students’ needs and is often used with students who have learning disabilities or difficulties. The version of the program tested here involved computer-supported activities.

Research

One study of Auditory Discrimination in Depth® met the What Works Clearinghouse (WWC) evidence standards. The study included 150 first grade students in five elementary schools.¹ The WWC considers the extent of evidence for Auditory Discrimination in Depth® to be small for alphabetics and comprehension. No studies that met WWC standards with or without reservations addressed fluency or general reading achievement.

Effectiveness

Based on one study, Auditory Discrimination in Depth® was found to have potentially positive effects on alphabetics and no discernible effects on comprehension. Findings on fluency and general reading achievement were not reported in the study.

<table>
<thead>
<tr>
<th>Alphabetics</th>
<th>Fluency</th>
<th>Comprehension</th>
<th>General reading achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially positive</td>
<td>na</td>
<td>No discernible effect</td>
<td>na</td>
</tr>
<tr>
<td>Average: +17 percentile points</td>
<td>na</td>
<td>Average: +6 percentile points</td>
<td>na</td>
</tr>
<tr>
<td>Range: –1 to +35 percentile points</td>
<td>na</td>
<td>Range: 0 to +20 percentile points</td>
<td>na</td>
</tr>
</tbody>
</table>

¹ The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
² These numbers show the average and range of improvement indices for all findings across the study.
Additional program information

Developer and contact
Developed by Patricia Lindamood and Phyllis Lindamood, *Auditory Discrimination in Depth*® is currently distributed as *Lindamood Phonemic Sequencing (LiPS) Program*®. It is published by Pro-Ed and is available through a number of professional distributors and publishers.

Scope of use
*Auditory Discrimination in Depth*® was developed in the late 1960s and early 1970s. It was revised and renamed *Lindamood Phonemic Sequencing (LiPS) Program*® in 1998. The program is frequently offered at 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 in rural and urban sites, but exact numbers were not available.

Teaching
The program is designed for emergent readers in kindergarten through grade 3 or for struggling, dyslexic readers. Teachers work with students in whole class and small group activities or in small groups and one-on-one 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.

Research
Twenty-five studies reviewed by the WWC investigated the effects of *Auditory Discrimination in Depth*®. One study (Torgesen, Wagner, Rashotte, & Herron, 2003) was a randomized controlled trial that met WWC evidence standards. The remaining studies did not meet WWC evidence screens.

Met evidence standards
Torgesen et al. (2003) included 150 low-achieving first grade students in five elementary schools. At two schools, students were randomly assigned to either *Auditory Discrimination in Depth*® or *Read, Write and Type*™ (RWT), a reading software program. At three additional schools, students were randomly assigned to either *Auditory Discrimination in Depth*®, *Read, Write and Type*™, or a regular instruction control group. The beginning reading review presents data relevant to comparisons of ADD with RWT and of ADD with a regular instruction control group.

Extent of evidence
The WWC categorizes the extent of evidence in each domain as small or moderate 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

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3. Description of the assignment procedure was based on personal communication with the first study author on September 7, 2006.
4. 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.
Research (continued)

The WWC considers the extent of evidence for Auditory Discrimination in Depth® to be small for alphabetsics and comprehension. No studies that met WWC standards with or without reservations addressed fluency or general reading achievement.

Effectiveness

Findings

The WWC review of interventions for beginning reading addresses student outcomes in four domains: alphabetsics, fluency, comprehension, and general reading achievement. The Torgesen et al. (2003) study addressed outcomes in the alphabetsics and comprehension domains. The findings below present the authors’ and the WWC-calculated estimates of the size and statistical significance of the effects of Auditory Discrimination in Depth® on students’ performance.

Alphabetsics. The Torgesen et al. (2003) study findings for alphabetsics are based on the performance of Auditory Discrimination in Depth® students and comparison students on three measures of phonological awareness and two measures of phonics.

• When the Auditory Discrimination in Depth® group was compared with the Read, Write and Type™ group, the study authors and the WWC found that there were no statistically significant differences between the groups on any of three phonological awareness measures (phoneme blending, phoneme elision, and phoneme segmenting subtests of the Comprehensive Test of Phonological Processes) or on two phonics measures (word identification and word attack subtests of the Woodcock Reading Mastery Test).

• When the Auditory Discrimination in Depth® group was compared with the regular classroom instruction/support group, the authors reported and the WWC confirmed statistically significant positive effects of ADD on two of the phonological awareness measures (phoneme elision and segmenting), but the authors did not find statistically significant effects on the third phonological awareness measure—phoneme blending.

Comprehension. The Torgesen et al. (2003) study findings for comprehension are based on the performance of Auditory Discrimination in Depth® students and comparison students on the passage comprehension subtest of the Woodcock Reading Mastery Test and an estimated verbal IQ measure (based on the vocabulary subtest of the Stanford Binet Intelligence test).

• When the Auditory Discrimination in Depth® group was compared with the Read, Write and Type™ group, the authors and the WWC found that there was no statistically significant difference between the groups on the comprehension measures.

• When the Auditory Discrimination in Depth® group was compared with the regular classroom instruction/support group, the authors found statistically significant positive effects on the passage comprehension subtest. In WWC computations, the effect was not statistically significant. On the vocabulary subtest, the authors found that Auditory Discrimination in Depth® had no statistically significant effect.

In the alphabetsics domain, one study with a strong design met WWC evidence standards and showed statistically significant positive effects for one comparison group and no effect for the other.

In the comprehension domain, one study with a strong design met WWC evidence standards and showed statistically significant positive effects for one comparison group and no effect for the other.

5. 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 students’ demographics and the types of settings in which studies took place, are not taken into account for the categorization.

6. For definitions of the domains, see the Beginning Reading Protocol.
Effectiveness (continued)

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 and the comparison conditions, and the consistency in findings across studies (see the WWC Intervention Rating Scheme).

The WWC found Auditory Discrimination in Depth® to have potentially positive effects for alphabetics 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 based entirely on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analyses. The improvement index can take on values between −50 and +50, with positive numbers denoting results favorable to the intervention group.

The average improvement index for alphabetics is +17 percentile points in 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 one study across two comparison groups, with a range of 0 to +20 percentile points across findings.

Summary
The WWC reviewed 25 studies on Auditory Discrimination in Depth®. One of these studies met WWC evidence standards; the remaining studies did not meet WWC evidence screens. Based on the study that met WWC evidence standards, the WWC found potentially positive effects on alphabetics and no discernible effect on comprehension. The evidence presented in this report is limited and may change as new research emerges.

References
Met WWC evidence standards

Did not meet WWC evidence screens

7. 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. See Technical Details of WWC-Conducted Computations for the formulas the WWC used to calculate the statistical significance. In the case of Auditory Discrimination in Depth®, corrections for multiple comparisons were needed.
8. The sample is not appropriate to this review: the parameters for this WWC review specified that students should be in grades kindergarten through 3 during the time of the intervention; this study did not focus on the targeted grades.

9. Does not use a strong causal design: there was only one intervention and/or one comparison unit, so the analysis could not separate the effects of the intervention from other factors.  
10. Complete data were not reported: the WWC could not evaluate the design or data because complete study details were not reported.  
11. Does not use a strong causal design: this study did not use a comparison group.
References (continued)


Additional citation for this study:


For more information about specific studies and WWC calculations, please see the WWC Auditory Discrimination in Depth® Technical Appendices.

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12. The sample is not appropriate to this review: this study does not disaggregate data for students in other grades from students in grades kindergarten through third grade, the focus of this WWC review.

13. Does not use a strong causal design: this study, which used a quasi-experimental design, had a confounding factor. The ADD/LiPS intervention was combined with other interventions, making it difficult to attribute study outcomes to ADD/LiPS.

14. The outcome measures are not relevant to this review: this study did not focus on one of the domains specified for this WWC review.

15. Does not use a strong causal design: this study, which used a randomized control trial design, had a confounding factor. The ADD/LiPS intervention was combined with other interventions, making it difficult to attribute study outcomes to ADD/LiPS.