What Works Clearinghouse

INSTITUTE OF EDUCATION SCIENCES

Adolescent Literacy August 2010

Fast ForWord®

Program Description[1]

Fast ForWord® is a computer-based reading program intended to help students develop and strengthen the cognitive skills necessary for successful reading and learning. The program, which is designed to be used 30 to 100 minutes a day, five days a week, for 4 to 16 weeks, includes two components. The first component, the *Fast ForWord® Language*[2] and *Literacy*[3] series, aims to build cognitive skills such as memory, attention, processing, and sequencing, as well as language and reading skills, including listening accuracy, phonological awareness, and knowledge of language structures. The second component, the *Fast ForWord® to Reading*[4] series (also known as the *Fast ForWord® Reading* series), aims to increase processing efficiency and further improve reading skills such as sound-letter associations, phonological awareness, word recognition, knowledge of English language conventions, vocabulary, and comprehension. The program, developed by scientists with expertise in the areas of brain plasticity, cognitive development, and reading instruction, is designed to adapt the nature and difficulty of the content based on individual students' responses.

1. The descriptive information for this program was obtained from a publicly available source: the program's website (http://www.scilearn.com, downloaded July 2009), as well as information provided to the WWC by the developer. 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. The literature search reflects documents publicly available through December 2008.
2. The *Fast ForWord® Language* series, designed for elementary school students, includes three products: (1) *Fast ForWord® Language Basics*, which focuses on sound sequencing, fine motor skills, hand–eye coordination, pattern recognition, and color–shape recognition; (2) *Fast ForWord® Language*, which focuses on listening accuracy, phonological awareness, and language structures; and (3) *Fast ForWord® Language to Reading*, which focuses on the link between spoken and written language.
3. The *Fast ForWord® Literacy* series, designed for secondary school students and adults, includes two products: (1) *Fast ForWord® Literacy*, which focuses on listening accuracy, phonological awareness, and language structures; and (2) *Fast ForWord® Literacy Advanced*, which focuses on processing efficiency, memory, concentration, comprehension, and sequencing. Students in at least two of the studies included in this review used *Fast ForWord® Middle and High School*, which was discontinued and replaced by the *Fast ForWord® Literacy* series.
4. The *Fast ForWord® Reading* series, designed for students at all reading levels, includes six products. *Fast ForWord® Reading Prep* focuses on letter recognition, phonological awareness, and letter-sound associations. *Fast ForWord® Reading Levels 1, 2, 3, 4,* and *5* focus on a variety of skills, depending on the level. For example, level 1 focuses on early reading skills such as phonemic awareness, early decoding skills, vocabulary knowledge, and motivation for reading, and level 5 focuses on skills suitable for more advanced readers in upper elementary, middle, or high school, such as reading comprehension and vocabulary skills.

Research[5]

Two studies of *Fast ForWord*® that fall within the scope of the Adolescent Literacy review protocol meet What Works Clearinghouse (WWC) evidence standards, and six studies meet WWC evidence standards with reservations. The eight studies included about 2,000 students, ranging in age from 5 to 17, who attended elementary, middle, and high schools[6] in Indiana, Maryland, North Carolina, Ohio, Pennsylvania, Virginia, an urban district in the northeastern United States, and Australia.[7]

Based on these eight studies, the WWC considers the extent of evidence for *Fast ForWord*® on adolescent learners to be small for the alphabetics and reading fluency domains and medium to large for the comprehension and general literacy achievement domains.

Effectiveness

Fast ForWord® was found to have no discernible effects on the alphabetics and general literacy achievement domains, and potentially positive effects on the reading fluency and comprehension domains for adolescent learners.

	Alphabetics	*Reading fluency*	*Comprehension*	*General literacy achievement*
Rating of effectiveness	No discernible effects	Potentially positive effects	Potentially positive effects	No discernible effects
Improvement index[8]	Average: +2 percentile points	+17 percentile points	Average: +8 percentile points	Average: +3 percentile points
	Range: –8 to +9 percentile points	na	Range: –6 to +15 percentile points	Range: –1 to +9 percentile points

na = not applicable

Additional program information

Developer and contact

Fast ForWord® was designed by university-based scientists, Drs. Merzenich, Jenkins, Tallal, Miller, and Mann, all of whom have expertise in the areas of brain plasticity, cognitive development, and reading instruction. *Fast ForWord*® is produced and distributed by the Scientific Learning Corporation, 300 Frank H. Ogawa Plaza, Suite 600, Oakland, CA 94612-2040. Email: customerservices@scilearn.com. Web: http://www.scilearn.com. Telephone: (888) 665-9707. Fax: (510) 444-3580. The program can be purchased from local *Fast ForWord*® providers who are listed in the searchable database on the Scientific Learning Corporation website.

Scope of use

Fast ForWord® products entered the market with *Fast ForWord*® *Language* in 1997 and *Fast ForWord*® *to Reading* (also known as *Fast ForWord*® *Reading*) in 2000.[9] *Fast ForWord*® products have been used by students struggling with reading, language,

5. The studies in this report were reviewed using WWC Evidence Standards, Version 1.0 (see the WWC Standards), as described in protocol Version 1.0.
6. The Adolescent Literacy topic area reviews studies of interventions administered to students in grades 4–12 (or 9–18 years of age). For studies that include samples of students that span both the Adolescent Literacy (grades 4–12) and Beginning Reading (grades K–3) topic areas and cannot be disaggregated by grade level, the Adolescent Literacy topic area also reviews any studies that include 5th-grade students or higher. For example, this report includes a combined sample of students from grades 3–6 (Rouse & Krueger, 2004), grades 2–8 (Scientific Learning Corporation, 2004b), and students aged 5–14 years (Scientific Learning Corporation, 2007a).
7. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
8. These numbers show the average and range of student-level improvement indices for all findings across the studies.
9. The year that *Fast ForWord*® *Literacy* entered the market was unavailable.

Additional program information *(continued)*

and learning problems, as well as with the general K–12 student population across the United States. Overall, *Fast ForWord®* has been used by more than 570,000 students in more than 3,700 schools nationwide.

Teaching

The *Fast ForWord® Language*, *Fast ForWord® to Reading,* and *Fast ForWord® Literacy* computer software uses exercises that aim to develop the cognitive processes necessary for reading. *Fast ForWord® Language* intends to build cognitive skills of memory, attention, processing, and sequencing, as well as language and reading skills, such as listening accuracy, phonological awareness, and language structures. *Fast ForWord® to Reading* aims to further improve cognitive and reading skills through exercises focused on sound–letter associations, phonological awareness, word recognition, knowledge of English language conventions, vocabulary, and comprehension. *Fast ForWord® Literacy* intends to improve students' skills in the areas of listening accuracy, phonological awareness, language structures, processing efficiency, memory, concentration, comprehension, and sequencing. As students listen through headphones and respond using the mouse, the software adapts to individual students' responses, adjusting the content and difficulty of items presented so that the student responds correctly approximately 80% of the time. The developer suggests multiple options for using the program, ranging from 30 minutes a day, five days a week, for 12 to 16 weeks, to 90 to 100 minutes a day, five days a week, for 4 to 8 weeks. All children start at the same basic level and progress individually as they attain proficiency.

Cost

A single license for *Fast ForWord® Language* is $900, with discounts available for multiple licenses. Each license for *Fast ForWord® to Reading* is $500, with no quantity discount.

Research

A total of 305 studies reviewed by the WWC investigated the effects of *Fast ForWord®* on adolescent learners. Two studies (Rouse & Krueger, 2004; Scientific Learning Corporation, 2007a) are randomized controlled trials that meet WWC evidence standards. Six studies (Beattie, 2000; Borman & Benson, 2006; Overbay & Baenen, 2002; Scientific Learning Corporation 2004a, 2004b, 2007b) are randomized controlled trials or quasi-experimental designs that meet WWC evidence standards with reservations. The remaining 297 studies do not meet either WWC evidence standards or eligibility screens.

Meets evidence standards

Rouse and Krueger (2004) conducted a randomized controlled trial of students in grades 3–6 in an urban district in the northeastern United States. Students scoring in the bottom 20% on the state's standardized reading test were randomly assigned within each grade and school to either the treatment group or the control group. The WWC based its effectiveness ratings on findings from comparisons of 237 students who received *Fast ForWord®* as a supplemental targeted pullout program during the regular school day and 217 control students who received regular reading instruction. The study reported students' outcomes after six to eight weeks of program implementation.

Scientific Learning Corporation (2007a) conducted a randomized controlled trial of 5- to 14-year-old students from four primary schools in the Perth metropolitan area in Western Australia. Students who had difficulties with language, literacy, auditory processing, attention, and/or behaviors were randomly assigned to the treatment and control groups. The WWC based its effectiveness rating on findings from comparisons of 68 students who received *Fast ForWord®* and 69 control group students who received regular classroom instruction. The study reported students' outcomes after three months of program implementation.

Meets evidence standards with reservations

Beattie (2000) conducted a randomized controlled trial of middle and high school students in suburban northern Virginia.

Research *(continued)*

Students with language deficits who ranged in age from 11 to 16 were randomly assigned by computer-generated procedures to one of five groups (Appendix 1.1 provides more details about these groups). The WWC based its effectiveness rating on findings from comparisons of 12 students who received *Fast ForWord*® and 12 control group students who received regular reading instruction. Although these analytic samples were shown to be equivalent at baseline, overall attrition of the study sample led to the study's rating of meets standards with reservations. The study reported students' outcomes after two months of program implementation.

Borman and Benson (2006) conducted a randomized controlled trial of 7th-grade students attending seven middle schools in Baltimore, Maryland. Students scoring below the 50th percentile on a district-administered reading test were randomly assigned within schools to either the treatment or the control group. Ninety students received the *Fast ForWord*® program as a supplemental targeted pullout program during the regular school day. Although post-attrition analytic samples were shown to be equivalent at baseline, overall and differential attrition of the study sample led to the study's rating of meets standards with reservations. The 98 students in the control group received nonliteracy instruction or participated in special activities and classes, such as art and gym, for their supplemental instruction. The study reported students' outcomes after two months of program implementation.

Overbay and Baenen (2002) conducted a quasi-experimental study that examined the effect of *Fast ForWord*® on students from the Wake County Public School System in Raleigh, North Carolina. The students participating in *Fast ForWord*® were matched to students from schools that were not using *Fast ForWord*® based on demographic factors and reading pretest scores. The WWC based its effectiveness rating on findings from comparisons of 355 students from grades 4–8 who used *Fast ForWord*® and 355 comparison group students who did not. The study reported students' outcomes after one academic year of program implementation.

Scientific Learning Corporation (2004a) conducted a quasi-experimental study that examined the effect of *Fast ForWord*® on 4th-grade students in four schools in Springfield, Ohio. Students who did not pass the Ohio Proficiency Test in 2002 constituted the study sample. The WWC based its effectiveness rating on findings from comparisons of 41 students who received *Fast ForWord*® and 50 comparison group students who attended schools that were not using *Fast ForWord*® and, like treatment group students, did not pass the Ohio Proficiency Test. The study reported students' outcomes after one semester of program implementation.

Scientific Learning Corporation (2004b) conducted a quasi-experimental study that examined the effect of *Fast ForWord*® on students from 16 public schools in Philadelphia, Pennsylvania. Students (primarily from 4th and 5th grades) were assigned to one of the three study groups. Group 1 received the *Fast ForWord*® intervention from September to November, group 2 received the *Fast ForWord*® intervention from December to February, and group 3 served as the control. The WWC based its effectiveness rating on findings from comparisons of 125 students in group 1 and 37 control group students, as well as comparisons of 131 students in group 2 and 37 control group students. The study reported students' outcomes after three months of program implementation.

Scientific Learning Corporation (2007b) conducted a quasi-experimental study that examined the effect of *Fast ForWord*® on students in grades 2–5 in Pendleton, Indiana. Students selected to receive the *Fast ForWord*® intervention were individually matched by school personnel, using grade-level and reading test scores, to students not using *Fast ForWord*®. The WWC based its effectiveness rating on findings from comparisons of 35 students in grades 4 and 5 who received *Fast ForWord*® and 35 comparison students who received the regular school curriculum. The study reported students' outcomes after four months of program implementation.

Research *(continued)*

Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or medium to large (see the WWC Procedures and Standards Handbook, Appendix G). 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.[10]

The WWC considers the extent of evidence for *Fast ForWord*® to be small for the alphabetics and reading fluency domains, and medium to large for the comprehension and general literacy achievement domains for adolescent learners.

Effectiveness

Findings

The WWC review of interventions for Adolescent Literacy addresses student outcomes in four domains: alphabetics, reading fluency, comprehension, and general literacy achievement. The studies included in this report cover all four domains. Alphabetics includes five constructs: phonemic awareness, phonological awareness, letter knowledge, print awareness, and phonics. Comprehension includes two constructs: reading comprehension and vocabulary development. General literacy achievement includes two constructs: general reading achievement and other literacy achievement. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *Fast ForWord*® on adolescent learners.[11]

Alphabetics. Two studies reviewed findings in the alphabetics domain. Scientific Learning Corporation (2007a) did not find a statistically significant effect of *Fast ForWord*® on the Queensland University Inventory of Literacy (QUIL), nor was the effect large enough to be considered substantively important according to the WWC criteria (that is, an effect size of at least 0.25). Beattie (2000) did not find statistically significant effects of *Fast ForWord*® on the Letter-Word Identification, Word Attack, and Auditory Processing subtests of the Woodcock-Johnson tests of cognitive ability, or on the Wide Range Achievement Spelling subtest. The effects also were not large enough to be considered substantively important according to WWC criteria.

For the alphabetics domain, both studies showed indeterminate effects.

Reading fluency. Beattie (2000) did not find a statistically significant effect of *Fast ForWord*® on the Gray Oral Reading Test, but the effect was large enough to be considered substantively important according to WWC criteria.

Comprehension. Six studies reviewed findings in the comprehension domain. Beattie (2000) did not find a statistically significant effect of *Fast ForWord*® on the Woodcock-Johnson Passage Comprehension subtest, but the effect was large enough to be considered substantively important according to WWC criteria. Borman and Benson (2006) did not find a statistically significant effect of *Fast ForWord*® on the Terra Nova Reading test, and the effect was not large enough to be considered substantively important according to WWC criteria. Overbay and Baenen (2002) did not find a statistically significant effect of *Fast ForWord*® on the North Carolina End of Grade Reading Test, and the effect was not large enough to be considered substantively

10. 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 *Fast ForWord*® is in Appendix A6.
11. The level of statistical significance was reported by the study authors or, when 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 WWC Procedures and Standards Handbook, Appendix C for clustering and WWC Procedures and Standards Handbook, Appendix D for multiple comparisons. In all studies except Borman and Benson (2002), Scientific Learning Corporation (2004a, 2004b), and Overbay and Baenen (2002), a correction for multiple comparisons was needed, so the significance levels may differ from those reported in the original studies.

Effectiveness *(continued)*

important according to the WWC criteria. Scientific Learning Corporation (2004a) did not find a statistically significant effect of *Fast ForWord*® on the Ohio Proficiency Test Reading score, but the effect was large enough to be considered substantively important according to WWC criteria. Scientific Learning Corporation (2004b) found, and the WWC confirmed, a statistically significant effect of *Fast ForWord*® on the Gates-MacGinitie Reading Test. Scientific Learning Corporation (2007b) did not find a statistically significant effect of *Fast ForWord*® on the Reading Measure of Academic Progress, and the effect was not large enough to be considered substantively important according to WWC criteria.

For the comprehension domain, one study showed statistically significant positive effects, two studies showed substantively important positive effects, and three studies showed indeterminate effects.

General literacy achievement. Five studies reviewed findings in the general literacy achievement domain. Rouse and Krueger (2004) did not find statistically significant effects of *Fast ForWord*® on the Clinical Evaluation of Language Fundamentals, *Success for All* assessment, and a state standardized reading test, and none of the effects were large enough to be considered substantively important according to WWC criteria. Scientific Learning Corporation (2007a) did not find statistically significant effects of *Fast ForWord*® on the Clinical Evaluation of Language Fundamentals Receptive and Expressive subtests, and neither of the effects was large enough to be considered substantively important according to WWC criteria. Borman and Benson (2006) did not find a statistically significant effect of *Fast ForWord*® on the Terra Nova Language test, and the effect was not large enough to be considered substantively important according to WWC criteria. Beattie (2000) did not find a statistically significant effect of *Fast ForWord*® on the Clinical Evaluation of Language Fundamentals, nor was the effect large enough to be considered substantively important according to WWC criteria. Scientific Learning Corporation (2007b) did not find a statistically significant effect of *Fast ForWord*® on the Language Measure of Academic Progress, and the effect was not large enough to be considered substantively important according to WWC criteria.

For the general literacy achievement domain, all five studies showed indeterminate effects.

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 Procedures and Standards Handbook, Appendix E).

The WWC found *Fast ForWord*® to have no discernible effects for the alphabetics and general literacy achievement domains and potentially positive effects for the reading fluency and comprehension domains for adolescent learners

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 WWC Procedures and Standards Handbook, Appendix F). The improvement index represents the difference between the percentile rank of the average student in the intervention condition and 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 for the intervention group.

The average improvement index for alphabetics is +2 percentile points across two studies, with a range of –9 to +9 percentile points across findings. The improvement index for reading fluency is +17 percentile points for a single finding from one study. The average improvement index for comprehension

The WWC found *Fast ForWord*® to have no discernible effects for the alphabetics and general literacy achievement domains and potentially positive effects for the reading fluency and comprehension domains for adolescent learners *(continued)*

is +8 percentile points across six studies, with a range of –6 to +17 percentile points across findings. The average improvement index for general literacy achievement is +3 percentile points across five studies, with a range of –1 to +9 percentile points across findings.

Summary

The WWC reviewed 305 studies on *Fast ForWord*® for adolescent learners.[12] Two of these studies meet WWC evidence standards; six studies meet WWC evidence standards with reservations; the remaining 297 studies do not meet either WWC evidence standards or eligibility screens. Based on the eight studies, the WWC found no discernible effects in the alphabetics and general literacy achievement domains, and potentially positive effects in the reading fluency and comprehension domains for adolescent learners. The conclusions presented in this report may change as new research emerges.

References

Meets WWC evidence standards

Rouse, C. E., & Krueger, A. B. (2004). Putting computerized instruction to the test: A randomized evaluation of a "scientifically based" reading program. *Economics of Education Review, 23*(4), 323–338.

Additional source:

Rouse, C. E., Krueger, A. B., & Markman, L. (2004). *Putting computerized instruction to the test: A randomized evaluation of a "scientifically based" reading program*. Cambridge, MA: National Bureau of Economic Research.

Scientific Learning Corporation. (2007a). *Students in Western Australia improve language and literacy skills: Educator's briefing*. Oakland, CA: Author.

Meets WWC evidence standards with reservations

Beattie, K. K. (2000). The effects of intensive computer-based language intervention on language functioning and reading achievement in language-impaired adolescents (Doctoral dissertation, George Mason University, 2000). *Dissertation Abstracts International, 61*(08A), 194–3116.

Additional source:

Given, B. K., Wasserman, J. D., Chari, S. A., Beattie, K., & Eden, G. F. (2008). A randomized, controlled study of computer-based intervention in middle school struggling readers. *Brain and Language, 106*(2), 83–97.

Borman, G. D., & Benson, J. (2006). *Can brain research and computers improve literacy? A randomized field trial of the* Fast ForWord® Language *computer-based training program* (WCER working paper no. 2006-5). Madison, WI: University of Wisconsin–Madison, Wisconsin Center for Education Research.

Overbay, A., & Baenen, N. (2002). Fast ForWord *Evaluation, 2002–03* (Evaluation and Research Report no. 03.24). Raleigh, NC: Wake County Public School System.

Scientific Learning Corporation. (2004a). Improved Ohio Reading Proficiency Test scores by students in the Springfield City School District who used *Fast ForWord*® products. *MAPS for Learning: Educator Reports, 8*(8), 1–6.

Scientific Learning Corporation. (2004b). Improved reading achievement by students in the school district of Philadelphia who used *Fast ForWord*® products. *MAPS for Learning: Educator Reports, 8*(21), 1–6.

Scientific Learning Corporation. (2007b). Improved reading skills by students in the South Madison Community School Corporation who used *Fast ForWord*® products. *MAPS for Learning: Educator Reports, 11*(34), 1–7.

12. Three single-case design studies were identified but are not included in this review because the WWC does not yet have standards for reviewing regression discontinuity or single-case design studies.

References *(continued)*

Studies that fall outside the Adolescent Literacy review protocol or do not meet WWC evidence standards

Agnew, J. A., Dorn, C., & Eden, G. F. (2004). Effect of intensive training on auditory processing and reading skills. *Brain and Language, 88*(1), 21–25. The study is ineligible for review because it does not use a comparison group.

Agocs, M. M., Burns, M. S., Ley, L. E., Miller, S. L., & Calhoun, B. M. (2006). *Fast ForWord Language*. In R. J. McCauley & M. E. Fey (Eds.), *Treatment of language disorders in children* (pp. 471–508). Baltimore, MD: Paul H. Brookes Publishing. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Arendal, L., & Mann, V. (2000). Fast ForWord Reading: *Why it works*. Berkeley, CA: Scientific Learning Corporation. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Bailey, R. (2007). *Study offers help for dyslexic children*. Hanover, NH: Dartmouth College Office of Public Affairs. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Battin, R. R., Young, M., & Burns, M. (2000). Use of *Fast ForWord* in remediation of central auditory processing disorders. *Audiology Today, 12*(2), 13–15. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.

Bishop, D., Adams, C., Lehtonen, A., & Rosen, S. (2005). Effectiveness of computerized spelling training in children with language impairments: A comparison of modified and unmodified speech input. *Journal of Research in Reading, 28*(2), 144–157. The study is ineligible for review because it does not use a comparison group.

Bluth, T. L. (2002). Fast ForWord Language *intervention: Does it really improve language and reading skills?* Unpublished master's thesis, St. Cloud State University, MN. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Camarata, S. M. (2008). *Fast ForWord*® does not significantly improve language skills in children with language disorders. *Evidence-Based Communication Assessment and Intervention, 2*(2), 96–98. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Carpenter, Z. A. (2005). *Effects of* Fast ForWord *on reading comprehension for elementary students*. Unpublished master's thesis, Eastern Washington University, Cheney. The study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

Children's Hospital Boston. (2007). *Sound training rewires dyslexic children's brains for reading*. Boston, MA: Author. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Ciacera, K. B. (2007). *Will instruction using a computer-based cognitive skills development program, with audio and visual stimulation, increase the reading levels of male students in grades three through eight?* Unpublished research paper, Salem State College, MA. The study is ineligible for review because it does not use a comparison group.

Cohen, W., Hodson, A., O'Hare, A., Boyle, J., Durrani, T., McCartney, E., et al. (2005). Effects of computer-based intervention through acoustically modified speech (*Fast ForWord*) in severe mixed receptive-expressive language impairment: Outcomes from a randomized controlled trial. *Journal of Speech, Language, and Hearing Research, 48*(3), 715. The study is ineligible for review because it does not disaggregate findings for the age or grade range specified in the protocol.[13]

De Anda, I. (2000). Glasses for the ears: Technology provides a critical link to literacy. *Multimedia Schools: A Practical Journal of Technology, Including Multimedia, CD-ROM, Online, Internet, & Hardware in K–12, 7*(2). The study is ineligible for review because it does not use a comparison group.

13. The study is included in the *Fast ForWord*® intervention report released by the WWC Beginning Reading topic area.

References *(continued)*

DeLarco, A., & Wagonblott, A. (2003). *The effects of* Fast ForWord *intervention on the language performance*. Unpublished master's thesis, Buffalo State College, NY. The study is ineligible for review because it does not use a comparison group.

Divine, K. P., & Botkin, D. (2008). *A study of the longitudinal effects of* Fast ForWord *on student performance in Duval County*. Jacksonville, FL: Duval County Public Schools. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.

Eady, S. (2006). *Effects of* Fast ForWord *on reading skills of students who speak Spanish and English*. Unpublished master's thesis, Texas Tech University Health Sciences Center, Lubbock. The study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

Education Commission of the States. (1999). Fast ForWord®. Denver, CO: Author. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Education Commission of the States. (2002). Fast ForWord®. Denver, CO: Author. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Friel-Patti, S., DesBarres, K., & Thibodeau, L. (2001). Case studies of children using *Fast ForWord. American Journal of Speech-Language Pathology, 10*(3), 203. The study is ineligible for review because it does not use a comparison group.

Friel-Patti, S., Frome Loeb, D., & Gillam, R. B. (2001). Looking ahead: An introduction to five exploratory studies of *Fast ForWord. American Journal of Speech-Language Pathology, 10*(3), 195–202. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Gillam, R. B. (1999). Computer-assisted language intervention using *Fast ForWord*®: Theoretical and empirical considerations for clinical decision-making. *Language, Speech, and Hearing Services in Schools, 30*(4), 363–370. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Gillam, R. B., Crofford, J. A., Gale, M. A., & Hoffman, L. M. (2001). Language change following computer-assisted language instruction with *Fast ForWord* or *Laureate Learning Systems* software. *American Journal of Speech-Language Pathology, 10*(3), 231. The study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

Gillam, R. B., Loeb, D. F., & Friel-Patti, S. (2001). Looking back: A summary of five exploratory studies of *Fast ForWord. American Journal of Speech-Language Pathology, 10*(3), 269–273. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Gillam, R. B., Loeb, D. F., Hoffman, L. M., Bohman, T., Champlin, C. A., Thibodeau, L., et al. (2008). The efficacy of *Fast ForWord Language* intervention in school-age children with language impairment: A randomized controlled trial. *Journal of Speech, Language, and Hearing Research, 51*, 97–119. The study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.

Gillingham, G. G. (2001). Differential diagnosis and treatment of attention deficit hyperactivity disorder and central auditory processing disorders (Doctoral dissertation, United States International University, 2001). *Dissertation Abstracts International, 62*(04B), 97–2057. The study is ineligible for review because it does not use a comparison group.

Habib, M., Rey, V., Daffaure, V., Camps, R., Espesser, R., Joly-Pottuz, B., et al. (2002). Phonological training in children with dyslexia using temporally modified speech: A three-step pilot investigation. *International Journal of Language and Communication Disorders, 37*(3), 289–308. The study is ineligible for review because it does not examine an intervention conducted in English.

Hall, L. S. (2002). *Final report of the 2001–2002 Scientific Learning*/Fast ForWord *program*, REIS02-168-2. Dallas, TX: Dallas Independent School District, Division of Evaluation and Accountability. The study is ineligible for review because it does not use a comparison group.

References *(continued)*

Harrison, S., & Gimbel, J. F. (1998, March). *A collaborative computerized language training project between Gonzaga University and St. Luke's Rehabilitation Institute*. Paper presented at the annual conference of the American Council on Rural Special Education, Charleston, SC. The study is ineligible for review because it does not use a comparison group.

Ho, C. (2004). *An examination of* Fast ForWord Language *intervention for children with poor reading abilities*. Unpublished honors thesis, University of Western Australia, Perth. The study is ineligible for review because it does not use a comparison group.

Additional source:

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14. The study compared student self-ratings on reading performance survey items for three groups of students: (1) students exposed to *Fast ForWord*®, (2) students exposed to *SuccessMaker,* and (3) students in a control group. A total of 18 students completed the rating survey. Students were participating in the study described in Beattie (2000).