What Works Clearinghouse

Project CRISS® (CReating Independence through Student-owned Strategies)

Program Description[1]

Project CRISS® (CReating Independence through Student-owned Strategies) is a professional development program for teachers[2] that aims to improve reading, writing, and learning for 3rd- through 12th-grade students. The implementation of *Project CRISS®* does not require a change in the curriculum or materials being used in the classroom, but instead calls for a change in teaching style to focus on three primary concepts derived from cognitive psychology and brain research. These three concepts include students (1) monitoring their learning to assess when they have understood content, (2) integrating new information with prior knowledge, and (3) being actively involved in the learning process through discussing, writing, organizing information, and analyzing the structure of text to help improve comprehension.

In *Project CRISS®*, teachers incorporate these concepts into their regular classroom instruction through the use of comprehension strategies (such as using background knowledge, questioning, organizing graphically, and summarizing). *Project CRISS®* calls for students to apply these comprehension strategies to content they encounter, to gain an understanding of when and how it is most appropriate to use these strategies, and to learn to use the strategies that work best for them.

Research[3]

Two studies of *Project CRISS®* that fall within the scope of the Adolescent Literacy review protocol meet What Works Clearinghouse (WWC) evidence standards. The two studies included 2,569 students, ranging from grade 4 through grade

1. The descriptive information for this program was obtained from a publicly available source: the developer's website (http://www.projectcriss.com, downloaded October 2009). 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 by August 2009.
2. *Project CRISS®* also has several other training programs and support materials available, including: (1) *CRISS for Administrators*, which is designed to provide guidance to administrators on how to plan, implement, and maintain *Project CRISS®* in a school or district; (2) *CRISS for Students*, which is designed to teach *CRISS* principles and strategies directly to 6th- through 9th-grade students; (3) *CRISS for Parents*, which is designed to acquaint parents with *CRISS* principles and strategies; and (4) *CRISS for Homeschool Parents*, which is designed to help parents that are home schooling their children incorporate *CRISS* strategies and principles into their instruction.
3. The studies in this report were reviewed using WWC Evidence Standards, Version 2.0 (see the WWC Procedures and Standards Handbook, Chapter III), as described in protocol version 2.0.

Research *(continued)*

6, who attended public schools in Arizona, California, Florida, Georgia, Louisiana, Montana, Oregon, Texas, Virginia, and Wisconsin.[4]

Based on these two studies, the WWC considers the extent of evidence for *Project CRISS*® on adolescent learners to be medium to large for the comprehension domain. No studies that meet WWC evidence standards examined the effectiveness of *Project CRISS*® on adolescent learners in the alphabetics, reading fluency, or general literacy achievement domains.

Effectiveness

Project CRISS® was found to have potentially positive effects on comprehension for adolescent learners.

	Alphabetics	Reading fluency	Comprehension	General reading achievement
Rating of effectiveness	na	na	Potentially positive effects	na
Improvement index[5]	na	na	Average: +20 percentile points	na
	na	na	Range: –2 to +38 percentile points	na

na = not applicable

Absence of conflict of interest

One of the studies in this intervention report, James-Burdumy et al. (2009), was prepared, in-part, by staff of Mathematica Policy Research. For this reason, and because the principal investigator for the WWC review of adolescent literacy was also a lead author of this study, the study was rated by researchers unaffiliated with Mathematica, who also prepared the intervention report. The report was then reviewed by the principal investigator, a WWC Quality Assurance reviewer, and an external peer reviewer.

Additional program information

Developer and contact

Project CRISS® was originally developed in the late 1970s by Dr. Carol Santa and a team of school teachers from Kalispell School District #5 in Montana. More recently, the development of *Project CRISS*® has been led by Lynn Havens, former Kalispell secondary math and science teacher. Address: *Project CRISS*, 40 Second Street East, Suite 249, Kalispell, MT 59901. Email: info@projectcriss.com. Web: http://www.projectcriss.com/. Telephone: (877) 502-7477 (toll free), (406) 758-6440 (direct).

Scope of use

According to the developers, *Project CRISS*® has been used across the curriculum in elementary classrooms and in middle and high school math, science, social studies, language arts, fine arts, technology, and physical education classes. It has been used with students of all abilities in both urban and rural settings.

Teaching

Project CRISS® employs a teaching and learning process in which teachers model strategies for students and provide time for guided practice, with the goals of helping students (1) understand their learning processes and content, and (2) transfer strategies to independent learning situations.

The *CRISS* training introduces teachers to the *CRISS* Strategic Learning Plan, which is intended to guide selection of content, setting of learning goals and objectives, assessment of student learning, and planning of instruction. The training is designed to instruct participants in ways to help their students interact with content, understand patterns and structures of

4. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
5. These numbers show the average and range of student-level improvement indices for all findings across the studies.

Additional program information *(continued)*

text, engage actively in the learning process, write reports and essays, and learn new vocabulary. The training also addresses ways teachers can help students become more reflective (metacognitive) about their learning processes. Participants in *Project CRISS®* workshops receive a teacher resource guide that is designed to assist them in incorporating *CRISS* principles into their classroom instruction.

Cost

Project CRISS® offers two levels of workshops for teachers. Level I training, which is 12 to 24 hours, is designed to prepare teachers to incorporate *CRISS* principles and strategies into the classroom. Costs for Level I training—which typically range from $50 to $200 per participant—depend on whether the training takes place in the teachers' own district or another district, and whether it is conducted by a national trainer, who receives a $1,000 per day honorarium.[6] Level II training, which is a minimum of 28 hours over a 4-day period, is designed to prepare experienced *CRISS* teachers to become *CRISS*-certified trainers who can take on more *CRISS*-related support and training responsibilities.[7] The cost for materials—which ranges from $250 to $700 per participant—depends on whether teachers are trained in their own district or another district.[6] The training is facilitated by a *CRISS* Master Trainer (additional costs include a $1,000 per day honorarium and travel expenses). Implementation support options are available, including administrator training, collaborative learning team tools, parent workshops, and tailor-made workshops.

Research

Thirty-one studies reviewed by the WWC investigated the effects of *Project CRISS®* on adolescent learners. Two studies (Horsfall & Santa, 1994, and James-Burdumy et al., 2009) are randomized controlled trials that meet WWC evidence standards. The remaining 29 studies do not meet either WWC evidence standards or eligibility screens.

Meets evidence standards

Horsfall and Santa (1994) conducted a random assignment study of *Project CRISS®* in 4th-, 6th-, 8th-, and 11th-grade classrooms across three school settings: (1) rural Montana, (2) a working class community in central Florida, and (3) suburban Virginia. Teachers within each school were randomly assigned either to *Project CRISS®* or to a regular instruction control condition. The WWC based its effectiveness ratings on comparisons of 120 students attending six *Project CRISS®* classrooms and 111 students attending six control classrooms.[8] The study measured changes in comprehension outcomes after one semester (approximately 18 weeks) of program participation.

James-Burdumy et al. (2009) conducted a randomized controlled trial that examined the effects of *Project CRISS®* (as well as three other reading comprehension curricula) on comprehension of 5th-grade students across the United States. Authors randomly assigned 89 schools in ten geographically diverse low income school districts either to one of four curricula: (1) *Project CRISS®*, (2) *ReadAbout*, (3) *Read for Real*, and (4) *Reading for Knowledge*, or to a control condition that had no access to these curricula. The WWC based its effectiveness ratings for the *Project CRISS®* portion of this analysis on 1,155 students attending 17 *Project CRISS®* schools and 1,183 students attending 21 comparison schools. The study measured reading comprehension outcomes after nine months of program implementation.

6. For more detailed information on the costs of *CRISS* trainings and support materials, consult: http://www.projectcriss.com/costs.php#levelI.
7. The Level II trainings are designed to provide four levels of *CRISS* certification, ranging from Facilitator certification, which allows a teacher to provide follow-up support to *CRISS* teachers in their district, up to a Master Trainer certification, which allows one to conduct Level I and II trainings anywhere in the United States.
8. Only the 4th and 6th grade samples are included in the calculations the WWC used to rate the effectiveness of *Project CRISS®*. The 8th and 11th grade samples are excluded from the WWC ratings of effectiveness because the measures of effectiveness cannot be attributed solely to the intervention—there was only one teacher assigned to *Project CRISS®* and one teacher assigned to the control condition in the 8th and 11th grade samples.

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.[9]

The WWC considers the extent of evidence for *Project CRISS®* to be medium to large for the comprehension domain for adolescent learners. No studies that meet WWC evidence standards with or without reservations examined the effectiveness of *Project CRISS®* on adolescent learners in the alphabetics, reading fluency, or general literacy achievement domains.

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 one domain: comprehension (reading comprehension construct). The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *Project CRISS®* on adolescent learners.[10]

Comprehension. Two studies reviewed findings in the comprehension domain. Horsfall and Santa (1994) reported, and WWC calculations confirmed, that students in the *Project CRISS®* condition demonstrated significantly greater gains in a staff-developed *CRISS* free-recall assessment than comparison students in the 4th and 6th grades.[11] James-Burdumy et al. (2009) did not find any statistically significant effects of *Project CRISS®* on the passage comprehension subtest of the Group Reading Assessment and Diagnostic Evaluation or either the science or social studies reading comprehension assessments. The WWC-calculated average effect across measures was not statistically significant or large enough to be considered substantively important according to WWC criteria (that is, an effect size of at least 0.25).

In summary, for the comprehension domain, one study showed a statistically significant positive effect, and one study 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).

9. 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 *Project CRISS®* is in Appendix A5.
10. 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 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 the case of Horsfall and Santa (1994), corrections for clustering and multiple comparisons were needed, so the significance levels may differ from those reported in the original study. In the case of James-Burdumy et al. (2009), the authors adjusted for clustering and applied a correction for multiple comparisons.
11. The 8th- and 11th-grade samples are excluded from the WWC ratings of effectiveness because the measures of effectiveness cannot be attributed solely to the intervention—there was only one teacher assigned to *Project CRISS®* and one teacher assigned to the control condition at each grade level.

The WWC found *Project CRISS*® to have potentially positive effects on comprehension 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 comprehension is +20 percentile points across the two studies, with a range of –2 to +38 percentile points across findings.

Summary

The WWC reviewed 31 studies on *Project CRISS*® for adolescent learners. Two of these studies meet WWC evidence standards; the remaining twenty-nine studies do not meet either WWC evidence standards or eligibility screens. Based on the two studies, the WWC found potentially positive effects on comprehension for adolescent learners. The conclusions presented in this report may change as new research emerges.

References

Meets WWC evidence standards

Horsfall, S., & Santa, C. (1994). Project CRISS: *Validation report for the Program Effectiveness Panel*. Unpublished manuscript.

James-Burdumy, S., Mansfield, W., Deke, J., Carey, N., Lugo-Gil, J., Hershey, A., et al. (2009). *Effectiveness of selected supplemental reading comprehension interventions: Impacts on a first cohort of fifth-grade students* (NCEE 2009–4032). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

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

Alliance for Excellent Education. *Hialeah-Miami Lakes High School, Hialeah, FL Adolescent Literacy*. Retrieved March 25, 2009, from http://www.all4ed.org. The study is ineligible for review because it does not use a comparison group.

Alvermann, D. E., & Rush, L. S. (2004). Literacy intervention programs at the middle and high school levels. In T. L. Jetton & J. A. Dole (Eds.), *Adolescent literacy research and practice* (pp. 210–227). New York: Guilford Press. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Duchnowski, A. E. A. (2006). Increasing the use of evidence-based strategies by special education teachers: A collaborative approach. *Teaching and Teacher Education, 22*(7), 838–847. The study is ineligible for review because it does not use a comparison group.

Hejny, L. L. (2005). *The effectiveness of* Project CRISS (CReating Independence through Student-owned Strategies) *among two child development classes at Downers Grove South High School.* Unpublished master's thesis, Benedictine University, Lisle, IL. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.

Holston, V., & Santa, C. (1985). RAFT: A method of writing across the curriculum that works. *Journal of Reading, 28*(5), 456–457. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

References *(continued)*

Horsfall, S., & Santa, C. (1985). Project CRISS: *Validation report for the Joint Review and Dissemination Panel.* Unpublished manuscript. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

Killion, J. (1999). *What works in the middle: Results-based staff development.* Oxford, OH: National Staff Development Council. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Killion, J. (2002). *What works in the elementary school: Results-based staff development.* Oxford, OH: National Staff Development Council. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Kutash, K., & Duchnowski, A. J. (2006). Creating environments that work for all youth: Increasing the use of evidence-based strategies by special education teachers. *Research to Practice Brief, 5*(1). The study is ineligible for review because it does not examine the effectiveness of an intervention.

Kutash, K., Duchnowski, A. J., & Lynn, N. (2009). The use of evidence-based instructional strategies in special education settings in secondary schools: Development, implementation and outcomes. *Teaching and Teacher Education, 25*(6), 917–923. The study is ineligible for review because it does not examine the effectiveness of an intervention.

Lewis, K., McColskey, W., Anderson, K., Bowling, T., Dufford-Melendez, K., & Wynn, L. (2007). *Evidence-based decisionmaking: Assessing reading across the curriculum interventions* (Issues & Answers Report, REL 2007-No.003). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Laboratory Southeast. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Ostrem, V., Santa, C., Streit, K., and Scalf, J. (1986). Writing to learn in social studies. *Reading-Canada-Lecture, 4*(1), 51–55. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

Pearson, J., & Santa, C. (1995). Students as researchers of their own learning. *Journal of Reading, 38*(6), 462. The study is ineligible for review because it does not use a comparison group.

Peterson, C. L., Caverly, D. C., Nicholson, S. A., O'Neal, S., & Cusenbary, S. (2001). *Building reading proficiency at the secondary level: A guide to resources*. Austin, TX: Southwest Educational Development Laboratory. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Project CRISS. (1995). *Evidence of effectiveness*. Kalispell, MT: Author. The study does not meet WWC evidence standards because the measures of effectiveness cannot be attributed solely to the intervention—there was only one unit assigned to one or both conditions.

Project CRISS. (n.d.). *The National Reading Panel Report supports* CRISS. Kalispell, MT: Author. The study is ineligible for review because it does not examine the effectiveness of an intervention.

Ricci, D. A. (1995). Effect of vocabulary journal writing on foreign language comprehension and vocabulary acquisition (Doctoral dissertation, University of Connecticut, 1995). *Dissertation Abstracts International, 56*(07A), 135–2548. The study is ineligible for review because it does not examine an intervention conducted in English.

Samuels, S. J., & Pearson, P. D. (Eds.). (1988). *Changing school reading programs: Principles and case studies.* Newark, DE: International Reading Association. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

Santa, C. (1986). Content reading in the secondary schools. In J. Orasanu (Ed.), *Reading comprehension: From research to practice.* Hillsdale, NJ: Lawrence Erlbaum Associates. The

References *(continued)*

study is ineligible for review because it does not examine the effectiveness of an intervention.

Santa, C. (1991). Cutting loose: A district's story of change. In D. Strickland & J. Feeley (Eds.), *Process reading and writing: A literature-based approach.* New York: Teacher's College Press. The study is ineligible for review because it does not use a comparison group.

Santa, C. (2006). Teaching for executive functioning. *Journal of Therapeutic Schools & Programs, 1*(1), 32–42. The study is ineligible for review because it does not examine the effectiveness of an intervention.

Santa, C. (2007). Immaturity and the struggling teen. In J. Lewis & G. Moorman (Eds.), *Adolescent literacy instruction: Policies and promising practices*. Newark, DE: International Reading Association. The study is ineligible for review because it does not examine the effectiveness of an intervention.

Santa, C., & Santa, J. (1995). Teacher as researcher. *Journal of Reading Behavior, 27*(3), 439–451. The study is ineligible for review because it does not examine the effectiveness of an intervention.

Santa, C., & Vick, L. (2004). Project CRISS: *Las Vegas study*. Unpublished manuscript. The study does not meet WWC evidence standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Additional source:

Santa, C. (2004). Project CRISS: *Evidence of effectiveness*. Unpublished manuscript.

Santa, C., Dailey, S., & Nelson, M. (1985). Free response and opinion proof: A reading and writing strategy for middle and secondary teachers. *Journal of Reading, 28*(4), 346–352. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

Santa, C., Isaacson, L., & Manning, G. (1987). Changing content instruction through action research. *The Reading Teacher, 40*(4), 434–438. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

Santa, C., Ostsrem, V., & Scalf, J. (1986). Writing to learn in social studies. *Wisconsin State Reading Journal, 30*(3), 61–66. The study is ineligible for review because it does not occur within the time frame specified in the protocol.

Shanahan, C. (2005). *Adolescent literacy intervention programs: Chart and program review guide.* Naperville, IL: Learning Point Associates/North Central Regional Educational Laboratory. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Slavin, R. E., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly, 43*(3), 290–322. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Appendix

Appendix A1.1 Study characteristics: Horsfall & Santa, 1994 (random assignment study)

Characteristic	Description
Study citation	Horsfall, S., & Santa, C. (1994). Project CRISS: *Validation report for the Program Effectiveness Panel*. Unpublished manuscript.
Participants	Sixteen intact classrooms of students in grades 4, 6, 8, and 11 participated in the study during the 1991–92 school year; however, only analysis of grades 4 and 6 were included in this review.[1] Teachers within each of three schools were randomly assigned either to *Project CRISS*® or to the control condition. Teachers assigned to the intervention received *CRISS* training; control group teachers did not. Within each grade level, 4 and 6, there were three classrooms assigned to *Project CRISS*® and three classrooms assigned to the control group. Four or five students in each class were excluded from analyses due to attrition; there was no attrition of teachers. In all, the analysis sample consisted of 120 students attending six *Project CRISS*® classrooms and 111 students attending six control group classrooms.
Setting	The study took place across three different settings: (1) Kalispell School District, MT, a rural district in northwestern Montana that serves primarily white students; (2) Putnam County School District, FL, a district in central Florida that serves a population composed of white (77%), black (20%), and Hispanic students; and (3) Stafford School District, VA, a district in suburban Washington, DC that serves primarily white students.
Intervention	Intervention group students received *Project CRISS*® strategies as part of their regular instruction for approximately 18 weeks during one semester.
Comparison	Control group students received regular instruction and were not given *Project CRISS*® strategies.
Primary outcomes and measurement	For both the pretest and posttest, students took the staff-developed "free recall" tests that require students to remember details from a passage read the day before. For a more detailed description of this outcome measure, see Appendix A2.
Staff/teacher training	Teachers assigned to the intervention received *Project CRISS*® training. Districts selected a local facilitator to coordinate the program. The facilitator organized a 12-hour training conducted over two consecutive days. During this training, trainers modeled *Project CRISS*® strategies, and teachers were given the opportunity to apply each of the *Project CRISS*® strategies to their own curriculum materials. After teachers completed the training, the facilitator worked with project staff to set up a follow-up session three to six months after the completion of the final training session. Teachers frequently met to share *Project CRISS*® ideas before or after school or during duty-free periods. In addition, *Project CRISS*® trainers provided follow-up assistance for teachers through on-site visits, demonstration lessons, newsletters, and a computer network.

1. For the 8th and 11th grade samples, there was only one teacher assigned to the treatment group and one teacher assigned to the control group for each grade level. For this reason, the results from the 8th and 11th grade analyses could be confounded with factors unrelated to the *CRISS* treatment and thus are not included in the WWC's rating of effectiveness.

Appendix A1.2 Study characteristics: James-Burdumy et al., 2009 (randomized controlled trial)

Characteristic	Description
Study citation	James-Burdumy, S., Mansfield, W., Deke, J., Carey, N., Lugo-Gil, J., Hershey, A., et al. (2009). *Effectiveness of selected supplemental reading comprehension interventions: Impacts on a first cohort of fifth-grade students* (NCEE 2009–4032). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
Participants	The study, which explored the impact of *Project CRISS®* as well as three other reading comprehension curricula (*ReadAbout*, *Read for Real*, and *Reading for Knowledge*), included 6,350 5th-grade students from 89 schools in ten school districts. Districts that had at least 12 Title I schools and who were not implementing any of the four selected curricula were recruited into the study. Within each school district, schools were randomly assigned either to one of the four intervention conditions or to the control group. Eligible students attended study schools and were enrolled in grade 5 when baseline tests were administered or transferred in after baseline and before January 1, 2007. Multiage grade levels and non-mainstreamed special education students were excluded from the sample. The analysis that is included in this review focused on the effect of *Project CRISS®* and examined a sample of 1,155 students attending 17 *Project CRISS®* schools and 1,183 students attending 21 control schools.
Setting	The study took place in ten geographically diverse school districts in eight states (Arizona, California, Florida, Georgia, Louisiana, Oregon, Texas, and Wisconsin). To be eligible for the study, school districts needed to have (1) at least 12 schools that received Title I funds, (2) at least 40% of students eligible for the federal free or reduced-price lunch program, and (3) at least 60 5th-grade students per school. The school districts in the study were significantly larger, more disadvantaged, and more urban than the average U.S. school district.
Intervention	Intervention group students received *Project CRISS®* strategies as part of their regular instruction. Instructional components included: (1) use of student and teacher editions of *Learning How to Learn*, which provided detailed lesson plans, learning, and practice through use of *Tough Terminators*, a science trade book; (2) use of a variety of graphic organizers and note-taking, discussion, vocabulary, and writing strategies; and (3) application of strategies to regular science and social studies texts. *Project CRISS®* teachers, on average, were observed engaging in 78% of teaching practices important to intervention implementation. The study reported students' reading comprehension outcomes after nine months of program implementation.
Comparison	Control group schools did not have access to any of the four curricula being tested. Control group teachers could, however, use other supplemental reading programs.
Primary outcomes and measurement	For the pretest, students took the passage comprehension subtest of the Group Reading Assessment and Diagnostic Evaluation (GRADE) and the Test of Silent Contextual Reading Fluency (TOSCRF). For the posttest, all students took the passage comprehension subtest of the GRADE. Students were also randomly assigned to take one of two reading comprehension assessments developed by the Educational Testing Service (ETS) for this study; these tests focused on either science or social studies. For a more detailed description of these outcome measures, see Appendix A2.
Staff/teacher training	*Project CRISS®* teachers received 18 hours of initial training, including 12 hours on using the strategies in the teacher's guide and six hours on using the student text and workbook. Teachers received a training manual, a teacher's guide, a student text, and a wrap-around edition of the student workbook. In addition, teachers received six hours of follow-up training. Trainers also visited schools monthly to observe teachers and provide feedback. The developer also encouraged teachers to use bi-weekly study teams in which teachers review and discuss their use of *CRISS* strategies.

Appendix A2 Outcome measures for the comprehension domain

Outcome measure	Description
Reading comprehension construct	
Staff-developed (*CRISS*) free recall assessment	The outcome is a staff-developed "free recall" measure that requires students to read a passage (2–4 pages, depending on grade level) over a 40-minute period; then, 24 hours later, students write down from memory as much as they can remember from the passage. Students are scored based on the number of idea units (one point per idea) they remember. The topics varied across grade levels, and care was taken to choose readings that had a content base similar to what students would experience in their regular coursework but with actual topics that would not normally have been covered in those courses. The Grade 4 assessment covered *The Western Movement* (770 words, 2 single-spaced pages), and the Grade 6 assessment covered *The Mystery of Thirst* (920 words, 3 single-spaced pages). Inter-rater reliability ranged from 0.93 to 0.95 (as cited in Horsfall & Santa, 1994).
Group Reading Assessment and Diagnostic Evaluation (GRADE)–Passage Comprehension subtest	This standardized measure is a norm-referenced diagnostic test for all reading abilities. The Passage Comprehension subtest measures a student's understanding of an extended text through explicit and implicit multiple choice questions requiring questioning, predicting, summarizing, and clarifying information from several paragraphs (as cited in James-Burdumy et al., 2009).
Educational Testing Service (ETS) science reading comprehension assessment	This assessment, designed by the ETS, focuses on students' reading comprehension of science text. The test measures the ability to comprehend five science-related expository text passages based on responses to six multiple choice questions per passage. Internal consistency was reported as 0.85 (as cited in James-Burdumy et al., 2009).
ETS social studies reading comprehension assessment	This assessment, designed by the ETS, focuses on students' reading comprehension of social studies text. The test measures the ability to comprehend five social studies-related expository text passages based on responses to six multiple choice questions per passage. Internal consistency was reported as 0.84 (as cited in James-Burdumy et al., 2009).

Appendix A3 Summary of study findings included in the rating for the comprehension domain[1]

Outcome measure	Study sample	Sample size (classrooms or schools/students)	Authors' findings from the study: Mean outcome (standard deviation)[2] — *Project CRISS®* group	Authors' findings from the study: Mean outcome (standard deviation)[2] — Comparison group	WWC calculations: Mean difference[3] (*Project CRISS®*–comparison)	WWC calculations: Effect size[4]	WWC calculations: Statistical significance[5] (at $\alpha = 0.05$)	WWC calculations: Improvement index[6]
Horsfall & Santa, 1994[7, 8]								
Free recall assessment	Grade 4	6 classrooms/ 118 students	8.97 (3.38)	5.32 (2.73)	3.65	1.17	Statistically significant	+38
Free recall assessment	Grade 6	6 classrooms/ 113 students	12.54 (5.35)	7.93 (4.07)	4.61	0.96	Statistically significant	+33
Average for comprehension (Horsfall & Santa, 1994)[9]						**1.07**	**na**	**+36**
James-Burdumy et al., 2009[10]								
GRADE–Passage comprehension	Grade 5	38 schools/ 2,332 students	100.48 (14.20)	101.06 (13.69)	–0.57	–0.04	ns	–2
ETS science comprehension	Grade 5	38 schools/ 1,153 students	501.44 (29.51)	500.76 (27.59)	0.69	0.02	ns	+1
ETS social studies comprehension	Grade 5	38 schools/ 1,140 students	499.64 (30.57)	500.61 (29.68)	–0.96	–0.03	ns	–1
Average for comprehension (James-Burdumy et al., 2009)[9]						**–0.02**	**na**	**–1**
Domain average for comprehension across all studies[9]						**0.53**	**na**	**+20**

ns = not statistically significant
na = not applicable
GRADE = Group Reading Assessment and Diagnostic Evaluation
ETS = Educational Testing Service

1. This appendix reports findings considered for the effectiveness rating and the average improvement indices for the comprehension domain.
2. The standard deviation across all students in each group shows how dispersed the participants' outcomes are: a smaller standard deviation on a given measure would indicate that participants had more similar outcomes.
3. Positive differences and effect sizes favor the intervention group; negative differences and effect sizes favor the comparison group.
4. For an explanation of the effect size calculation, see WWC Procedures and Standards Handbook, Appendix B.
5. Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups.

(continued)

Appendix A3 Summary of study findings included in the rating for the comprehension domain[1] *(continued)*

6. The improvement index represents the difference between the percentile rank of the average student in the intervention condition and that of the average student in the comparison condition. The improvement index can take on values between –50 and +50, with positive numbers denoting favorable results for the intervention group.
7. 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 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 the case of Horsfall and Santa (1994), corrections for clustering and multiple comparisons were needed, so the significance levels may differ from those reported in the original study. In the case of James-Burdumy et al. (2009), the authors adjusted for clustering and applied a correction for multiple comparisons.
8. The *Project CRISS*® group mean outcome values for Horsfall and Santa (1994) are the unadjusted control group posttest means plus the difference in mean gains between the intervention and control groups. Control group means are unadjusted.
9. The WWC-computed average effect sizes for each study and for the domain across studies are simple averages rounded to two decimal places. The average improvement indices are calculated from the average effect sizes.
10. Sample sizes, regression-adjusted means, and standard deviations were provided to the WWC by the study authors and thus differ slightly from the information presented in the original study.

Appendix A4 *Project CRISS®* rating for the comprehension domain

The WWC rates an intervention's effects for a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative.[1]

For the comprehension outcome domain, the WWC rated *Project CRISS®* as having potentially positive effects for adolescent learners. The remaining ratings (mixed effects, no discernible effects, potentially negative effects, or negative effects) were not considered, as *Project CRISS®* was assigned the highest applicable rating.

Rating received

Potentially positive effects: Evidence of a positive effect with no overriding contrary evidence.

- Criterion 1: At least one study showing a statistically significant or substantively important *positive* effect.

  Met. One study showed statistically significant positive effects.

AND

- Criterion 2: No studies showing a statistically significant or substantively important *negative* effect and fewer or the same number of studies showing *indeterminate* effects than showing statistically significant or substantively important *positive* effects.

  Met. No studies showed statistically significant or substantively important negative effects, and one study showed indeterminate effects.

Other ratings considered

Positive effects: Strong evidence of a positive effect with no overriding contrary evidence.

- Criterion 1: Two or more studies showing statistically significant *positive* effects, at least one of which met WWC evidence standards for a *strong* design.

  Not met. Only one study showed statistically significant positive effects.

AND

- Criterion 2: No studies showing statistically significant or substantively important *negative* effects.

  Met. No studies showed statistically significant or substantively important negative effects.

1. For rating purposes, the WWC considers the statistical significance of individual outcomes and the domain-level effect. The WWC also considers the size of the domain-level effect for ratings of potentially positive or potentially negative effects. For a complete description, see the WWC Procedures and Standards Handbook, Appendix E.

Appendix A5 Extent of evidence by domain

Outcome domain	Number of studies	Sample size		Extent of evidence[1]
		Schools	Students	
Alphabetics	na	na	na	na
Reading fluency	na	na	na	na
Comprehension	2	41	2,569[2]	Medium to large
General literacy achievement	na	na	na	na

na = not applicable/not studied

1. A rating of "medium to large" requires at least two studies and two schools across studies in one domain and a total sample size across studies of at least 350 students or 14 classrooms. Otherwise, the rating is "small." For more details on the extent of evidence categorization, see the WWC Procedures and Standards Handbook, Appendix G.
2. This sample size varies slightly from the sample sizes presented in Appendix A3 because in James-Burdumy et al. (2009), the total sample size includes students who had outcomes for at least one of the three tests.