What's Known

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Summary of 20 years of research on the effectiveness of adolescent literacy programs and practices

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Key findings

Thirty-three studies of adolescent literacy programs and practices published over the last 20 years were identified as having a rigorous research design from which causal implications could be drawn.

- Of these 33 studies, 12 were identified as having positive or potentially positive effects on reading comprehension, vocabulary, or general literacy.
- Most of the 12 identified programs and practices demonstrating positive or potentially positive effects included explicit instruction in reading comprehension, explicit instruction in vocabulary, instructional routines, cooperative learning, feedback, fluency building, or writing.
- None of the 12 identified programs and practices was conducted in a high school setting.

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Summary

The importance of adolescent literacy is well established, and the topic continues to be of both local and national interest. Practitioners need to know not only which programs and practices appear effective, but which have the scientific evidence to support that claim.

To identify effective programs and practices for general education students in grades 6–12, this review examined studies published over the past 20 years using What Works Clearinghouse (WWC) standards (version 3.0; U.S. Department of Education, 2014) to evaluate the scientific rigor of their research design. A review of the literature on adolescent literacy identified 7,144 studies. Of these, 111 met the criteria that made them eligible for further review using the WWC standards. Thirty-three of the 111 were determined by the review team to have met WWC evidence standards with or without reservations. Twelve of the 33 studies—each representing a different program or practice—were identified as having positive or potentially positive effects on reading comprehension, vocabulary, or general literacy.

The following are key findings from the 12 programs and practices demonstrating such effects:

- Most of the identified programs and practices included instructional elements such as explicit instruction in reading comprehension or use of instructional routines.
- These programs and practices can be implemented within the structure of a typical middle-school language arts or content-area classroom. In most cases implementation involved ongoing support for teachers.
- None of the 12 identified programs and practices was conducted in a high school setting.
- Some of the programs and practices were identified as having potentially positive effects on high-stakes outcome assessments such as state accountability reading assessments.

Continuing rigorous research on currently available programs and practices is needed to expand understanding of their effectiveness. Additional research is also needed in adolescent literacy to expand the number and types of programs and practices available.

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Why this review?

Despite increased public attention to low reading proficiency rates and minimal improvement, adolescent literacy continues to be a topic of local and national interest because the problem persists. The 2013 National Assessment of Educational Progress report shows that in 2013 only about 36 percent of students in grades 8 and 12 scored at or above the proficient level in reading. In addition, the report reveals only a three-point increase in reading proficiency for students in grade 8 since 2011 and no significant change for students in grade 12 since 2009 (National Center for Education Statistics, 2013). To improve these trends, more evidence is needed on effective literacy instruction for adolescents.

There is already a large body of research on adolescent literacy instruction, ranging from specific, targeted one-on-one interventions to small-group pullout instruction, and from classroom-based content-area reading to broad, whole-school approaches. But it is important for practitioners to know what programs and practices have rigorous scientific evidence to support their effectiveness. That can be determined only through research studies that demonstrate rigorous research designs.

How well a study can prove the effectiveness of a program or practice depends on how well each research design component is executed

The rigor of a research design can be evaluated by focusing on several key components. They include the way students are assigned to treatment and comparison groups, the number of students from each group who do not complete the study, the equivalence of treatment and comparison groups before treatment was implemented, and the presence of other variables that may help explain differences between groups (such as an outcome assessment that is collected in different ways for different groups). How well a study can prove the effectiveness of a program or practice depends on how well each research design component is executed.

The What Works Clearinghouse (WWC) provides standards for assessing the rigor of research design (U.S. Department of Education, 2014). Studies that meet these standards can offer scientific evidence of the effectiveness of a given program or practice.

What this review examined

The current review used a systematic process modeled after the WWC Adolescent Literacy Protocol Version 3.0 (see appendix A) to answer the following research question:

- Among programs and practices studied in the past 20 years that are intended to improve reading comprehension, vocabulary, or general literacy, which are effective for adolescents in grades 6–12 (ages 11–18)?

Grades 6–12 were included because they are the grade levels typically associated with middle and high school configurations. See appendix A for information on the search procedures.

Studies identified in this review include those determined by the review team to have met WWC standards with or without reservations.[1] Programs and practices described in these studies are categorized as demonstrating positive effects, potentially positive effects, mixed effects, no discernible effects, potentially negative effects, or negative effects (table 1). The current review summarizes considerations for implementation and common instructional

Table 1. What Works Clearinghouse terminology used for rating study and intervention effects

Effect rating	Definition
Study effect ratings	
Statistically significant positive effect	The treatment group performed better than the comparison group by a statistically significant margin.
Substantively important positive effect	The treatment group performed better than the comparison group by a margin that is important for practical application but did not reach statistical significance. Practical importance is determined by an effect size of .25 or higher.
Indeterminate effect	The treatment group and the comparison group performed at about the same level. The difference between the two groups was neither statistically significant nor practically important.
Substantively important negative effect	The comparison group performed better than the treatment group by a margin that is important for practical applications but did not reach statistical significance. Practical importance is determined by an effect size of .25 or higher.
Statistically important negative effect	The comparison group performed better than the treatment group by a statistically significant margin.
Intervention effect ratings	
Positive effects	Two or more studies show statistically significant positive effects, with at least one meeting What Works Clearinghouse standards without reservations.
Potentially positive effects	At least one study shows statistically significant or substantively important positive effects. AND The same number of studies or fewer show indeterminate effects than show statistically significant or substantively important positive effects.
Mixed effects	At least one study shows statistically significant or substantively important positive effects. BUT More studies show indeterminate effects than show statistically significant or substantively important positive effects.
No discernible effects	None of the studies shows statistically significant or substantively important effects in either the positive or negative direction.
Potentially negative effects	One study shows statistically significant or substantively important negative effects, AND no studies show statistically significant or substantively important positive effects. OR Two or more studies show statistically or substantively important negative effects, with at least one displaying statistically significant or substantively important positive effects, AND more studies show statistically significant or substantively important negative effects than show statistically significant or substantively important positive effects.
Negative effects	Two or more studies show statistically significant negative effects, with at least one meeting What Works Clearinghouse standards without reservations. AND No studies show statistically significant or substantively important positive effects.

Source: U.S. Department of Education, 2014.

elements across the programs and practices identified as demonstrating positive or potentially positive effects on reading comprehension, vocabulary, or general literacy outcome assessments.

What this review found

More than 7,100 studies were identified by the search procedures. Of these, 111 used a research design that examined the effectiveness of programs and practices on reading comprehension, vocabulary, or general literacy for general education students in grades 6–12 residing in the United States and were reviewed by the review team (see appendix B for a list of the 111 studies). Eighteen of these 111 studies had been reviewed by WWC but were re-reviewed by the review team following the review protocol outlined in appendix A. This review found that 33 of these studies had met WWC version 3.0 evidence standards either with or without reservations (figure 1; see appendixes C and D for descriptions of the 33 studies).

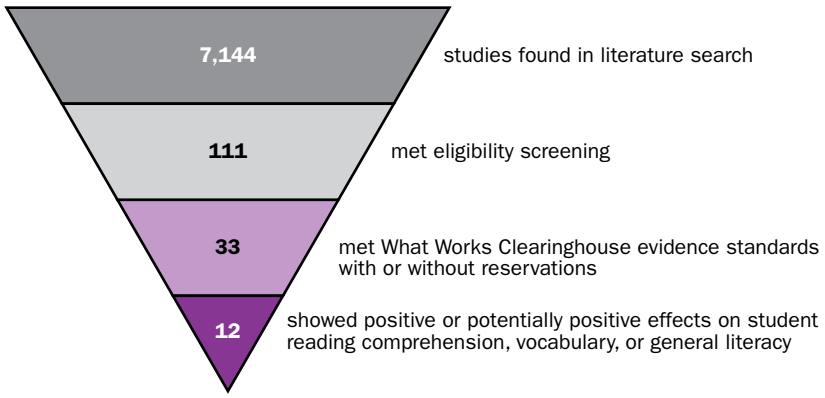
This review found 33 studies that examined the effectiveness of programs and practices on reading comprehension, vocabulary, or general literacy for general education students in grades 6–12 residing in the United States and that met WWC version 3.0 evidence standards either with or without reservations

These 33 studies represent 29 programs and practices (see box 1 for definitions of key terms). Of these 29 interventions 1 was identified as having a positive effect, 11 as having potentially positive effects, 2 as having mixed effects, 15 as having no discernible effects, and none as having potentially negative or negative effects (table 2).

The rest of this section focuses on the 12 programs and practices demonstrating positive or potentially positive effects.[2] Considerations for implementation of the 12 programs and practices are followed by summaries of the instructional elements common among them.

The discussion of common instructional elements cannot provide scientific evidence of the effectiveness of any one element. Studies that reviewers determined had met WWC standards for research design can only offer scientific evidence of the program or practice as implemented in the study; this includes the specific combination of instructional elements

Figure 1. Screening funnel for adolescent literacy studies reviewed



Note: The 12 studies that identified programs and practices as having positive or potentially positive effects assessed 12 programs and practices. One of these studies included two studies of the same intervention, both of which demonstrated statistically significant positive effects (Vaughn et al., 2009). Therefore, this practice was classified as having positive effects because it met the criteria described in table 1.

Source: Authors' compilation.

Box 1. Key terms

Type of program or practice

- ***Curriculum.*** A program that includes all materials (text, lessons, and supporting material) for a full course.
- ***Lesson package.*** A set of lessons that may be implemented by a teacher in addition to or within another curriculum.
- ***Instructional method.*** A specific set of practices employed by the teacher that provides a predictable structure for daily instruction. An instructional method does not necessarily need to be associated with specific text or content.

Support for implementation

- ***Implementer certification.*** Educators who fulfill a set of training requirements are designated by the program as certified.
- ***Training prior to implementation.*** One or more workshops were conducted before the start of the school year or during a teacher professional development session during the school year.
- ***Booster sessions.*** Regularly scheduled meetings (weekly or monthly) conducted to reinforce parts of the training conducted before implementation.
- ***Coaching.*** The availability of an expert educator to provide feedback to teachers and problem-solve with them.
- ***School leadership support.*** A consultant for the program who is available to the school's curriculum administrator or coach to make structural recommendations or problem-solve.

Common Instructional element

- ***Explicit instruction in reading comprehension.*** Instruction that includes activities or explanations of what to do when students don't understand a text.
- ***Explicit instruction in vocabulary.*** Instruction that includes activities or explanations that illustrate the meaning of individual words.
- ***Instructional routine.*** A prescribed, detailed, step-by-step, predictable sequence of instruction delivery.
- ***Cooperative learning.*** Students are placed in groups or pairs and assigned a learning task.
- ***Feedback.*** Students are provided with explicit information regarding their performance.
- ***Fluency building.*** Activities designed to promote increasing automatic recognition of words in connected text.
- ***Writing.*** Students compose a paragraph or more, which is implemented as an additional activity for comprehending text.

Outcome assessment. An assessment that is administered after the intervention is completed. It assesses the skill or ability that the intervention is designed to address (e.g., vocabulary, reading comprehension, general literacy).

General literacy outcome assessment. An assessment that incorporates two or more of any reading-related constructs by providing some type of summary score, such as total reading. State outcome assessments or other standardized assessments in which reading comprehension is not the only component would be considered a general literacy outcome assessment.

Source: Authors' creation based on similarities across the descriptions of the programs and practices reported in the 12 studies that were identified as having positive or potentially positive effects.

Table 2. Summary of effects for the 33 studies of adolescent literacy programs and practices identified as having met What Works Clearinghouse evidence standards with or without reservations

Findings of the effectiveness study	Program or practice
Positive effects[a]	• Multicomponent social studies instruction (Vaughn et al., 2009)[d]
Potentially positive effects[a]	• CareerStart (Woolley, Rose, Orthner, Akos, & Jones-Sanpei, 2013) • Dramatic Impact (Walker, Tabone, & Weltsek, 2011) • Embedded Story Structure (Faggella-Luby, Schumaker, & Deshler, 2007) • GeoLiteracy (Hinde et al., 2007) • Promoting Acceleration of Comprehension and Content through Text (Vaughn, Swanson, et al., 2013) • Read 180 Enterprise (Kim, Capotosto, Harty, & Fitzgerald, 2011) • Reading Edge (Chamberlain, Daniels, Madden, & Slavin, 2007) • Read Now (Algozzine, 2004) • Story Impressions (Denner, Rickards, & Albanese, 2003) • Student Team Reading and Writing (Stevens, 2003) • Tutoring (Rothman & Henderson, 2011)
Mixed effects[b]	• Content Literacy Continuum (Corrin et al., 2012) • Reading Apprenticeship (Corrin, Somers, Kemple, Nelson, & Sepanik, 2008; Greenleaf, Hanson, et al., 2011; Greenleaf, Litman, et al., 2011; Kemple et al., 2008)
No discernible effect[c]	• ClassWide Peer Tutoring (Neddenriep, Skinner, Wallace, & McCallum, 2009) • Collaborative Strategic Reading (Vaughn et al., 2011; Vaughn, Roberts, et al., 2013) • Components of Intelligent Tutoring of the Structure Strategy (Meyer et al., 2010) • Comprehension Circuit Training (Fogarty et al., 2014) • Early Start to Emancipation Preparation one-on-one tutoring (Zinn & Courtney, 2014) • Fast ForWord Language (Borman, Benson, & Overman, 2009)[e] • Fluency building (Allinder, Dunse, Brunken, & Obermiller-Krolikowski, 2001) • Renzulli Learning (Field, 2010) • Schoolwide Enrichment Model Reading Framework (Little, McCoach, & Reis, 2014) • Single-sex classrooms (Belcher, Frey, & Yankeelov, 2006) • Structured homework assignment (Alber, Nelson, & Brennan, 2002) • Thinking Reader (Drummond et al., 2011) • Tier II instruction emphasizing word recognition, vocabulary, fluency, and comprehension (Vaughn, Cirino, et al., 2010; Vaughn, Wanzek, et al., 2010). • Title, Examine, Look, Look, and Setting program (Ridge & Skinner, 2011) • Xtreme Reading (Corrin et al., 2008; Kemple et al., 2008)

a. Indicates confidence that there is a real, causal relationship between the program or practice and any subsequent changes in student performance and that the probability of observing such a result by chance is very slim. For more information, see U.S. Department of Education (2014), WWC Glossary of Terms (http://ies.ed.gov/ncee/wwc/Glossary.aspx), and Resources (http://ies.ed.gov/ncee/wwc/Resources.aspx).

b. Indicates that the evidence of a program's or practice's effect on student performance in reading comprehension, vocabulary, or general literacy is inconsistent (that is, some results were positive and some were indeterminate).

c. Indicates that there was no evidence that the program or practice had an effect on student performance in reading comprehension, vocabulary, or general literacy. For more information, see U.S. Department of Education (2014), WWC Glossary of Terms (http://ies.ed.gov/ncee/wwc/Glossary.aspx), and WWC Resources (http://ies.ed.gov/ncee/wwc/Resources.aspx).

d. This study reported findings from two studies, both of which demonstrated statistically significant positive effects. Therefore, this practice was classified as having positive effects because it met the criteria described in table 1.

e. The effects for this study were not able to be calculated according to WWC procedures based on the information provided by the authors in the article.

Source: Authors' literature review (see appendix A).

used, the participant sample used, the setting in which the intervention was delivered, and the level of implementation. Although this review relied heavily on WWC protocols, procedures, and standards and the reviews were conducted by WWC-certified reviewers, this review is not a WWC product.

In addition to the effectiveness of a program or practice, educators must consider other practical aspects to implement the program or practice effectively, such as the type of program or practice, personnel requirements, setting in which implementation will occur (for example, content-area classroom, after-school, and instructional group size), intensity and duration of the implementation, and professional development required. This section describes such practical considerations in the context of the 12 programs and practices identified as demonstrating positive or potentially positive effects.

The 12 programs and practices identified as having positive or potentially positive effects included instructional methods, curricula, and lesson packages

Three of the 12 programs and practices identified as having positive or potentially positive effects were considered curricula, and all were commercially available

All 12 programs and practices identified as having positive or potentially positive effects included instructional methods, curricula, or lesson packages (table 3). Three of the 12 programs and practices were considered curricula, and all were commercially available. Two of the curricula required access to a computer. Four of the 12 programs and practices contained a package of lessons, and three of these lesson packages (for all but Tutoring) were commercially available.

Seven of the 12 programs and practices identified were considered instructional methods. They were adapted as a framework for the text or topics used by the school. Availability of these instructional methods varies. For methods not commercially available, additional information is provided in appendix D.

Nine of the 12 programs and practices were implemented in an English language arts classroom or content-area classroom (such as social studies). The rest were implemented either after school or during summer school.

None of the programs and practices identified as having positive or potentially positive effects has been examined in a high school setting, suggesting a clear gap in the literature

All but one of the programs and practices included students in grades 6–8, a middle school setting (see table 3). Only one study demonstrating potentially positive effects was conducted with students representing a high school population. However, this study took place in a summer school program before the start of grade 9—not a typical high school setting. The lack of studies demonstrating a positive or potentially positive effect in a high school setting suggests a gap in the adolescent literacy literature.

A majority of the programs and practices identified as having positive or potentially positive effects used primarily whole-class grouping during instruction

Whole-class instruction was featured in nine of the programs and practices identified as having positive or potentially positive effects (see table 3). This grouping preference spanned all three program or practice types: curriculum, lesson package, and instructional method. Across programs and practices using primarily whole-class instruction, four had

Table 3. Implementation considerations for the 12 programs and practices identified as having positive and potentially positive effects

		Type of program or practice				Location							Support for implementation				
Intervention	Citation	Commercially available	Curriculum	Instructional method	Lesson package	Language arts classroom	Content area classroom	Extended instruction	Grade	Duration/intensity	Total instructional time (hours)	Grouping[a]	Implementer certification	Training prior to implementation	Booster sessions	Coaching	School leadership support
Career Start	Woolley et al., 2013	✔		✔	✔	✔	✔		6–8	50–140 minutes per lesson, 40 lessons a year, 3 years	>100	Whole class		✔		✔	✔
Dramatic Impact	Walker et al., 2011	✔		✔	✔	✔			6–7	Approximately 60 minutes per lesson, 40 lessons	<50	Whole class		✔		✔	
Embedded Story Structure	Faggella et al., 2007			✔				✔	9	90–120 minutes a day, 9 days	<50	Small group					
GeoLiteracy	Hinde et al., 2007	✔			✔		✔		6	90 minutes a day, 6–12 days	<50	Whole class	✔	✔			
Multicomponent social studies instruction	Vaughn et al., 2009			✔			✔		7	50 minutes a day, 5 days a week, 9–12 weeks	<50	Whole class		✔	✔	✔	
Promoting Acceleration of Comprehension and Content through Text	Vaughn, Swanson, et al., 2013			✔			✔		8	50–54 minutes per session, 30 sessions over 6–8 weeks	<50	Whole class		✔	✔	✔	
Read 180 Enterprise	Kim et al., 2011	✔	✔					✔	6	60 minutes a day, 4 days a week, 23 weeks	50–100	Whole class/ Small group	✔	✔			
Reading Edge	Chamberlain et al., 2007	✔	✔			✔			8	50 minutes a day, 9 months	>100	Whole class/ Small group		✔		✔	
Read Now	Algozzine, 2004	✔	✔			✔			6–8	90 minutes a day, 5 days a week, 10 weeks	50–100	Whole class		✔[b]		✔	
Story Impressions	Denner et al., 2003			✔			✔		8	One 20-minute session	<50	Large group		✔[c]			
Student Team Reading and Writing	Stevens, 2003			✔		✔	✔		6–8	Daily for school year	>100	Whole class		✔		✔	✔
Tutoring	Rothman & Henderson, 2011				✔			✔	7–8	90 minutes a day, 2 days a week, 6 months	<50	Small group		✔		✔	

a. A small group has a student–teacher ratio of less than 4:1; a large group has a student–teacher ratio of at least 12:1.

b. The study authors specified that implementers were provided with coaching during implementation; therefore, it is assumed that implementers also participated in training before implementation.

c. Teachers were provided with a script to deliver instruction. But ongoing support was not provided to teachers because implementation occurred in one, 20-minute session.

Source: Authors' summary based on studies reviewed.

less than 50 hours of instruction, two had 50–100 hours, and three offered more than 100 hours.

Four of the programs and practices identified as having positive or potentially positive effects used small-group configurations for instruction. Two of them were conducted after school, and one was held in the summer. The remaining program incorporated both whole-class and small-group configurations within a single class period.

A majority of the programs and practices identified as having positive or potentially positive effects included ongoing support to implementers

All 12 programs and practices identified as having positive or potentially positive effects were implemented by a certified teacher. Three of them specified additional qualifications for implementers: two required certification in the program being used, and one selected only teachers identified by the district as being effective. For one program identified as having a potentially positive effect the certified teacher who implemented the practice was also the lead researcher.

All 12 programs and practices identified as having positive or potentially positive effects were implemented by a certified teacher. Three of them specified additional qualifications for implementers: two required certification in the program being used, and one selected only teachers identified by the district as being effective

All but one of the programs and practices identified as having positive or potentially positive effects included an initial professional development session ranging from 2 to 10 hours. While the opportunity for professional development varied, ongoing support in implementation was common: eight of the programs and practices identified as having positive or potentially positive effects received ongoing support. This often included in-class support consisting of observation and feedback, regular booster sessions, or consultation with school leadership.

Several common instructional elements were identified by the review team across the 12 programs and practices identified as having positive or potentially positive effects. They are described below and summarized in table 4. These instructional elements were not evaluated individually, so it is not possible to isolate the effectiveness of individual instructional elements in the current review.

More than half of the programs and practices identified as having positive or potentially positive effects included an instructional routine, and two-thirds also included explicit instruction in reading comprehension

Seven of the 12 programs and practices identified as having positive or potentially positive effects incorporated their instruction within a predictable instructional routine (see table 4). The activities and focus of content varied, but most instructional routines began with teacher-led instruction followed by teacher-guided practice and independent or group practice. These programs and practices used routines to organize the activities that could be implemented with texts associated with an English language arts classroom or a content-area classroom.

Each routine contained multiple instructional elements. Some instructional elements—including explicit instruction in reading comprehension strategies, cooperative learning, and writing—were common across multiple programs and practices.

Table 4. Common instructional elements and outcome assessments of the 12 programs and practices identified as having positive and potentially positive effects

		Common instructional element								Outcome assessment		
Intervention	Citation	Cooperative learning	Explicit instruction: reading comprehension	Explicit instruction: vocabulary	Feedback	Fluency building	Instructional routine	Writing	Nationally normed	Researcher developed	State accountability
Career Start[a]	Woolley et al., 2013										Reading comprehension
Dramatic Impact	Walker et al., 2011							✔			General literacy
Embedded Story Structure	Faggella-Luby et al., 2007		✔				✔	✔		Reading comprehension	
GeoLiteracy	Hinde et al., 2007		✔							Reading comprehension	
Multicomponent social studies instruction	Vaughn et al., 2009	✔		✔			✔	✔		Vocabulary	
Promoting Acceleration of Comprehension and Content through Text	Vaughn, Swanson, et al., 2013	✔			✔		✔		Reading comprehension	Reading comprehension	
Read 180 Enterprise	Kim et al., 2011		✔	✔		✔	✔		Reading comprehension Vocabulary		
Reading Edge	Chamberlain et al., 2007	✔	✔		✔		✔		Vocabulary		
Read Now	Algozzine, 2004		✔		✔	✔	✔		General literacy		
Story Impressions	Denner et al., 2003							✔		Reading comprehension	
Student Team Reading and Writing	Stevens, 2003	✔	✔	✔			✔	✔			Reading comprehension Vocabulary
Tutoring[a]	Rothman & Henderson, 2011										General literacy

a. These two programs do not include any common instructional elements with the other programs. Career Start provides examples of careers related to content-area topics, and Tutoring is an afterschool program focused on practicing and acquiring strategies for taking the state accountability test.

Source: Authors' summary based on studies reviewed.

In six of the programs and practices identified as having positive or potentially positive effects, teachers taught students reading comprehension strategies and methods to use before, during, or after reading to facilitate comprehension. This explicit instruction was often repeated, and students were given varied texts and numerous opportunities to apply the strategies in whole-class and small-group activities with the teacher, with peers, and independently.

Cooperative learning was implemented in 4 of the 12 programs and practices. All of them provided explicit structure and directions to guide student interactions, although the specific activities during cooperative learning varied.

Five of the 12 identified programs and practices integrated writing instruction with reading instruction. The writing component was typically used in response to texts the student had received and was included in both English language arts classes and content-area classes.

Among the programs and practices identified as having positive or potentially positive effects, the researcher-developed outcome assessments had the largest effect sizes

Studies of the 12 programs and practices identified as having positive or potentially positive effects reported small to moderate impacts on state accountability, nationally normed, and researcher-developed outcome assessments of reading comprehension, vocabulary, or general literacy

The programs and practices identified as having positive or potentially positive effects had one of three types of outcome assessments: state accountability, nationally normed, and researcher developed. Researcher-developed outcome assessments are considered to directly reflect the skills targeted by the program or practice. In the 12 programs and practices identified as having positive or potentially positive effects, these outcome assessments were similar to unit tests commonly used by classroom teachers. None of the researcher-developed measures reported here was considered overaligned with the intervention, meaning that the assessment items had not been directly taught.

Eight of the 12 identified studies included state accountability or nationally normed outcome assessments (see table 4). The other four included only researcher-developed measures.

The review team followed the WWC procedures for reporting study findings on all types of outcome assessments using an effect size and an improvement index. An effect size is a standardized measure of the effect of an intervention on student outcome assessments; it represents the change (measured in standard deviations) in an average student's outcome that can be expected if that student is given the intervention. The effect size here is Hedges' *g*. Effect sizes around .20 are considered to be small, .50 to be moderate, and .80 and greater to be large (Cohen, 1988). The improvement index (II), an alternate presentation of the effect size that may be more familiar to educators, reflects the expected change in percentile rank of an average student who receives the intervention.

Four programs and practices included results for the state accountability outcome assessment, with effect sizes for reading comprehension ranging from $g = .21$ to .36 (II = 8–14), those for vocabulary equal to $g = .46$ (II = 18), and those for general literacy ranging from $g = .32$ to .40 (II = 12–16). In addition, four programs and practices included results on nationally normed outcome assessments, such as assessments of reading comprehension (effect sizes ranged from $g = .21$ to .49; II = 8–15), vocabulary ($g = .15$ to .46; II = 6–15), and general literacy ($g = .36$; II = 14).

Among the programs and practices identified as having positive or potentially positive effects, the researcher-developed outcome assessments had the largest effect sizes, ranging from *g* = .27 to 1.28 (II = 11–40) for reading comprehension and *g* = .33 to .50 (II = 12–18) for vocabulary (see table C1 in appendix C). Previous research has shown that effect sizes tend to be higher on researcher-developed outcome assessments than on assessments that measure a more generalized skill set, such as state accountability or nationally normed assessments (Swanson, Hoskyn, & Lee, 1999).

Implications of the review findings

Of the 33 studies of adolescent literacy programs and practices conducted in the past 20 years that the review team determined had met WWC standards, only 12—representing 12 programs and practices—were identified as having positive or potentially positive effects on reading comprehension, vocabulary, or general literacy outcome assessments. Several conclusions can be drawn about these 12 programs and practices. Six of the 12 included explicit instruction in reading comprehension and seven included instructional routines. Nine of the 12 programs and practices were implemented by typical English language arts or content-area teachers and often included ongoing support for the implementers. None of the 12 programs and practices was conducted in a high school setting. Eight of the 12 programs and practices were identified as having small to moderate effects on high-stakes outcome assessments, such as state accountability and nationally normed assessments.

This review highlights several common instructional elements, such as explicit instruction in comprehension, writing, and cooperative learning, that could be explored in future research

The largest increases in student performance were seen for researcher-developed outcome assessments, such as a unit test. Although these outcome assessments do not represent more generalized skills, they do provide evidence that the implemented program or practice improved the targeted skills.

Statistically significant and substantively important effects also were found on two outcome assessments of interest to many educators: state accountability and nationally normed assessments. The students participating in the eight studies identified as having potentially positive effects on a state accountability or nationally normed assessment improved their performance by 6–19 percentile points. Although this is a solid improvement, educators should not assume that implementing these programs and practices in different settings will result in the same improvements, because these effects may be due to a number of other student, environment, or implementation variables (Scammacca et al., 2007).

This review highlights several common instructional elements, such as explicit instruction in comprehension, writing, and cooperative learning, that could be explored in future research. Common instructional elements can help inform increasingly effective practices. Systematic combinations of these elements and organizational components (such as extended instruction or professional development) could continue to be investigated to determine which elements are necessary and how many are sufficient to demonstrate positive effects (Biancarosa & Snow, 2006).

Adolescent literacy instruction remains an active and important area of inquiry. However, additional studies are needed to build the knowledge base on the implementation of effective programs and practices for a broader population of adolescents. Only one of the studies that were identified as having positive or potentially positive effects included students beyond middle school. And two programs show mixed effects for students in grade

9 (see table C2 in appendix C). Each of these programs was implemented in at least two studies in which statistically significant positive effects were found in one study and indeterminate effects were found in the other studies. Additional rigorous research is needed to help practitioners with students in grades 9–12.

Currently available programs and practices could undergo continuing rigorous research to expand the understanding of how effective they are. Research is also needed in adolescent literacy to expand the number and types of programs and practices available while providing scientific evidence of their effectiveness.

Limitations of this review

This review used a systematic process for conducting the literature search and study reviews to avoid bias. Nonetheless, this review has some limitations. First, the findings are based on a small number of studies (in most cases, only one study supported each instructional program or practice). This may be due, in part, to the fact that non-peer-reviewed literature, such as dissertations and reports from commercial publishers, were excluded from the review. Similarly, the common instructional elements discussed in this review were determined by the review team and were based on interpretations of the program or practice description provided in each of the 12 studies identified as having positive or potentially positive effects. Therefore, this review may include instructional elements that may not fully capture the instructional elements the study author would have identified.

Currently available programs and practices could undergo continuing rigorous research to expand the understanding of how effective they are

Second, the outcome assessments of interest in the current review are reading comprehension, vocabulary, and general literacy. Discussions of effects on other literacy outcome assessments, such as alphabetics or reading fluency, were beyond the scope of this review. In addition, this review included only programs and practices that had been studied in a general education population. Programs and practices could also be studied exclusively among students with learning disabilities or English learner students, and these studies might also have had positive effects for general education students.

Appendix A. The search, screening, and review process

This appendix describes the literature search, screening, and review processes used in this review. The protocol was adapted from the What Works Clearinghouse (WWC) Adolescent Literacy Protocol Version 3.0 (http://ies.ed.gov/ncee/wwc/documentsum.aspx?sid=29) for use by the Regional Educational Laboratory (REL) Southeast. Some key differences in protocols as adapted for this review include:

- Grade range of participants was restricted to students in grades 6–12 (ages 11–18).
- Participants had to reside in the United States.
- Eligible outcome domains were restricted to reading comprehension, vocabulary, and general literacy.
- Sample attrition boundary was changed from liberal to conservative.

This review includes 18 studies previously reviewed by WWC (Alfassi, 1998; Alfassi, 2004; Chamberlain et al., 2007; Corrin et al., 2008; Evans-Andris & Usui, 2008; Given et al., 2008; Graves et al., 2011; Grossen, 2004; Hasselbring & Goin, 2004; Kemple et al., 2008; Lang et al., 2009; Nunnery & Ross, 2007; Nunnery, Ross, & McDonald, 2006; Rasinski, et al., 2011; Ross et al., 2004; Sandora, Beck, & Mckeown, 1999; Shippen et al., 2005; Stevens, 2003). In all cases the review team re-reviewed these studies using the protocol outlined below. Four of these studies were determined to have a rating that differed from the WWC rating (Corrin et al., 2008; Given et al., 2008; Lang et al., 2009; Nunnery & Ross, 2007). Differences in study ratings between this review and the WWC stem from differences between the two review protocols.

The following research question guided the systematic review of evidence outlined below:

- Among programs and practices studied in the past 20 years that are intended to improve reading comprehension, vocabulary, or general literacy, which are effective for adolescents in grades 6–12 (ages 11–18)?

Literature search

The literature search involved a search of databases (see table A1 for keywords), by checking the references of meta-analyses and literature reviews focused on adolescent literacy and by reviewing WWC intervention reports on the subject. This review cast a wide net to ensure that the review included all relevant research on adolescent instructional programs and practices. Together, these three approaches resulted in the identification of 7,144 unique reports.

Six categories of search strings were used to search the following databases (see table A1 for keywords):

- ERIC.
- PsychINFO.
- EconLit.
- Child Development and Adolescent Studies.

The references of 19 meta-analyses and literature reviews were examined and cross-referenced with the results of the literature search to identify any additional studies that may not have been captured in the search. The references included Berkeley, Scruggs,

& Mastropieri, 2010; Bowers, Kirby, & Deacon, 2010; Deshler, Palincsar, Biancarosa, & Nair, 2007; Dignath & Buttner, 2008; Edmonds et al., 2009; Elbaum, Vaughn, Hughes, & Moody, 2000; Faggella-Luby, Ware, & Capozzoli, 2009; Flynn, Zheng, & Swanson, 2012; Guthrie, Schafer, Secker, & Alban, 2000; Joseph & Schisler, 2009; Kamil et al., 2008; Kim & Quinn, 2013; Ma, Adesope, Nesbit, & Liu, 2014; Pearson, Ferdig, Blomeyer, & Moran, 2005; Scammacca et al., 2007; Slavin, Cheung, Groff, & Lake, 2008; Strong, Torgerson, Torgerson, & Hulme, 2011; Suggate, 2010; Wanzek, Wexler, Vaughn, & Ciullo, 2010, and 24 WWC intervention reports (U.S. Department of Education, 2009a, 2009b, 2010a, 2010b, 2010c, 2010d, 2010e, 2010f, 2010g, 2010h, 2010i, 2010j, 2010k, 2011a, 2011b, 2012a,

Table A1. Keywords used in database search

Topic	Curricula and practice names	Intervention	Evaluation
Literacy	Corrective Reading	Intervention*	Control group*
Reading development	Directed reading activity	Curricul*	Random*
Reading	Accelerated Reader	Program*	Simultaneous treatment
Critical literacy	Book Club	Strateg*	Comparison group*
Functional literacy	Fast Forward	Instruct*	Regression discontinuity
Literacy	Great Books	Teach*	Matched group*
Information literacy	High School Puente Program	Train*	Baseline
Literacy education	Language!	Educational therapy	ABAB design
Scientific literacy	Open Court Reading	Practice	Treatment
Critical reading	Peer-Assisted Learning Strategies	Approach	Experiment
Grades 6–12	Project CRISS (Creating Independence through Student-oriented Strategies)	Technique*	Meta-analysis
Grade 6	READ 180	Literacy instruction	Meta-analysis
Grade 7	Read Naturally	Basal reading	Evaluation
Grade 8	Reading Apprenticeship	Remedial reading	Assignment
Grade 9	Reading Edge	Reading instruction	Impact
Grade 10	Reading Plus	Literacy program*	Effectiveness
Grade 11	Reading Mastery	Reading education	Causal
Grade 12	Reciprocal Teaching	Literacy education	Post-test
Middle school student	The Spaulding Method	Educational strateg*	Pretest
High school student	SpellRead	Educational method*	Randomized Control Trial
Secondary school student	Student Team Reading and Writing	Instructional design	RCT
Adolescent*	SuccessMaker	Learning strategies	Quasi-experimental design
Adolescence	Talent Development Middle Grades Program	Instructional strategies	QED
	ReadAbout	Instructional materials	Changing criterion design
	Read for Real	Courseware	Intra-subject replication design
	Reading for Knowledge	Learning modules	Multiple baseline design

(continued)

Table A1. Keywords used in database search *(continued)*

Topic	Curricula and practice names	Intervention	Evaluation
		Textbooks	Multi-element design
		Workbooks	Multi-element design
		Protocol materials	Single-case design
		Reading materials	Single-subject design
		Educational games	Alternating treatment
		Educational resources	Reversal design
		Material development	Withdrawal design
		Instructional media	Post-test
		Instructional effectiveness	Pretest
		Instructional improvement	Quasi-experimental design
		Program effectiveness	
		Administrator effectiveness	
		Curriculum evaluation	
		Educational quality	
		Outcomes of education	
		Assignments	
		Homework	
		Reading assignments	
		Schoolwork	

* is a wildcard symbol used in the literature search engine to retrieve variations of the word stem.

Source: Authors' compilation.

2012b, 2012c, 2012d, 2012e, 2013a, 2013b, 2013c, and 2013d). This process resulted in the identification of some 150 additional studies.

Screening process and study eligibility criteria

The abstracts and full reports of the 7,144 studies identified through the literature search were screened to determine whether they were eligible for review. To be eligible, studies had to meet the following relevancy criteria:

- *Topic*. The study had to be about adolescent literacy and focused on the effects of interventions and not on individual differences (such as correlational studies) or assessment. Following were the types of interventions that could be included:
  - Programs/products (such as comprehensive non-textbook-based programs, supplemental programs, programs aimed at struggling readers, or software).
  - Practices (such as vocabulary instruction, questioning, or summarizing).
  - Policies (such as a schoolwide literacy initiative).
  - Variations across programs, products, practices, and policies.
  - Commercial programs.
- *Time*. The study had to be publicly released between 1994 and 2014.
- *Publication status*. The study had to be published in a journal or the work supported by federal funds that required the study to be peer-reviewed by external reviewers.

- *Sample*. The study needed to satisfy three sample-specific criteria:
  - *Grade levels*. The study had to address outcomes of students in grades 6–12 (ages 11–18). If a study included a sample of students spanning grades 6–12 and K–5 and the reported results could not be disaggregated by grade level, the study would still be reviewed as long as it included grade 7 students or higher. And when study authors included a longitudinal sample of students who received the intervention in grades 6–12 or K–5, any studies in which the students received the intervention in grade 7 or higher were eligible for review.
  - *Achievement level*. At least 50 percent of the students in each study had to be general education students and not English learner students.
  - *Location of the intervention*. The students in the sample had to reside in the United States or in one of its territories.
- *Outcomes*. The study needed to include at least one student-level outcome in any of the following domains:
  - *Reading comprehension*. Reading comprehension depends on various underlying components, including knowledge of word meanings along with the ability to translate text into speech (decoding), to read text accurately and automatically (fluency), and to understand and interpret the spoken language. Struggling readers may have difficulty with one or more of these components of reading. Reading comprehension outcomes may include tests of students' comprehension of text from various content areas—such as a social studies passage.[3] State outcome assessments or standardized assessments are included as a measure of reading comprehension as long as the score is based solely on students answering questions about text.
  - *Vocabulary*. Critical to improving reading comprehension is building knowledge of the meanings and uses of words. This includes developing both receptive vocabulary (words understood) and expressive vocabulary (words used).
  - *General literacy*. Outcomes here incorporate measurement of two or more of any reading-related domains by providing some type of summary score, such as a "total reading score" on a standardized reading test across domains. Grades in reading, English, or language arts classes are not acceptable outcomes. If reading comprehension is one component of the task, along with tasks that require separate reading or writing activities, state outcome assessments or standardized assessments will be included as a measure of general literacy.
- *Study design*. Studies that used a randomized controlled trial, quasi-experimental design, or a single-case design were included.

This process screened out 7,033 studies, leaving 111 to be reviewed by a WWC-certified reviewer.[4]

Reviewing studies using What Works Clearinghouse evidence standards

Studies were reviewed using the *WWC Procedures and Standards Handbook* (version 3.0) for group design and single-case design studies (U.S. Department of Education, 2014). Studies that the first reviewer determined had met standards were independently reviewed by a second reviewer. A senior reviewer then double-checked the first and second reviews to ensure accuracy and reconcile any differences between the two. The summary of programs and practices described in this report includes only instructional programs and practices

that two reviewers determined had met WWC evidence standards (version 3.0) with or without reservations.

Of the 111 studies reviewed, 78 were rated by the review team as not meeting the WWC evidence standards; table A2 lists the primary reasons. Of these, 60 percent were not able to establish baseline equivalence for the treatment and comparison groups used for the statistical analysis, 21 percent included a confound, and 15 percent did not include a valid and reliable outcome. A confound can occur when only one unit is assigned to one or all conditions or the intervention was always used in combination with another intervention. The presence of a confound means that the study findings cannot be attributed solely to the intervention.

The remaining 33 studies that the review team identified as having met WWC standards represented 29 different interventions and classroom practices. Of these interventions, 1 was identified as having a positive effect, 11 as having potentially positive effects, 2 as having mixed effects, 15 as having no discernible effects, and none as having potentially negative or negative effects.

Table A2. Reasons for not meeting What Works Clearinghouse evidence standards rating, as determined by the review team

Primary reason for the rating indicating a failure to meet WWC evidence standards	Number of studies with rating	Share of total (percent)
The outcome assessments were not shown to be valid and reliable	12	15
There was only one unit assigned to one or both conditions (confound)	16	21
Baseline equivalence was not demonstrated[a]	47	60
No graphical representation of evidence was provided[b]	1	1
There were insufficient data points[b]	2	3
Total	78	100

WWC is What Works Clearinghouse.

Note: Percentages may not sum to 100 because of rounding.

a. According to WWC standards for group design, baseline equivalence should be demonstrated for quasi-experimental design studies as well as for randomized controlled trials with high attrition based on a conservative boundary or randomization problems.

b. According WWC pilot standards for single-case design studies, graphical representation of data points, and a sufficient number of data points are required to receive a rating of meeting standards.

Source: Authors' compilation.

Appendix B. The 111 studies reviewed using What Works Clearinghouse standards

Of the 7,144 studies identified in the literature search, the 111 studies included in this appendix used a research design for examining the effectiveness of interventions on reading comprehension, vocabulary, or general literacy for students in grades 6–12 residing in the United States. An asterisk indicates the 33 of those 111 studies that the review team determined met What Works Clearinghouse evidence standards (version 3.0) with or without reservations. A dagger indicates the 18 of those 111 studies that had been previously reviewed by the What Works Clearinghouse using the Adolescent Literacy Protocol Version 3.0 and were re-reviewed by the review team using the modified protocol described in appendix A.

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Appendix C. Details of the 33 studies that the review team found had met What Works Clearinghouse evidence standards

This appendix reports the research design, analysis sample, intervention implementation, nature of the comparison group, student outcome assessments, effect size, and improvement index for the 33 studies that the review team determined had met What Works Clearinghouse evidence standards with or without reservations. Tables are organized based on whether the study showed positive or potentially positive effects (table C1), mixed effects (table C2), or indeterminate effects (table C3).

Table C1. Adolescent literacy programs and practices identified by the review team as having positive and potentially positive effects

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Algozzine, B. (2004). Effects of Read Now on adolescents at risk for school failure. *Journal of At-Risk Issues, 10*(2), 1–8.	Read Now	Quasi-experimental	238 grade 6–8 students in 10 schools in four states	90-minute block of Read Now daily for 10 weeks (*n* = 122)	Schools' typical remedial reading assistance (*n* = 116)	STAR Reading (assessment of comprehension, vocabulary, and fluency; nationally normed)	.36*	+14
Chamberlain, A., Daniels, C., Madden, N. A., & Slavin, R. E. (2007). A randomized evaluation of the Success for All middle school reading program. *Middle Grades Research Journal, 2*(1), 1–21.	Reading Edge	Randomized controlled trial	405 grade 6 students in two rural high-poverty schools in West Virginia and Florida	Reading Edge, implemented for 60 minutes daily for a full year (*n* = 203)	Schools' typical instruction (*n* = 202)	GMRT Vocabulary (nationally normed)	.15*	+6
						GMRT Reading Comprehension (nationally normed)	.11[c]	+4
Denner, P. R., Rickards, J. P., & Albanese, A. J. (2003). The effect of Story Impressions preview on learning from narrative text. *The Journal of Experimental Education, 71*(4), 313–332.	Story Impressions	Randomized controlled trial	74 grade 8 students assigned to Story Impressions group, content preview group, or control group[d]	Story Impressions (*n* = 24)	Content preview (*n* = 25)	A historical biography passage with 45 fill-in-the-blank facts from the passage (researcher developed)	1.28*	+40
Faggella-Luby, M., Schumaker, J. S., & Deshler, D. D. (2007). Embedded learning strategy instruction: Story-structure pedagogy in heterogeneous secondary literature classes. *Learning Disability Quarterly, 30*(2), 131–147.	Embedded Story Structure Routine	Randomized controlled trial	79 at-risk students entering grade 9, including 14 students with learning disabilities	Embedded Story Structure (*n* = 39)	Comprehension skill instruction (*n* = 40)	A unit reading comprehension test with 40 short- answer and fill-in-the-blank questions related to the eight stories read by both groups (researcher developed)	.83*	+30
Hinde, E. R., Popp, S. E. O., Dorn, R. I., Ekiss, G. O., Mater, M., Smith, C. B., et al. (2007). The integration of literacy and geography: The Arizona GeoLiteracy program's effect on reading comprehension. *Theory & Research in Social Education, 35*(3), 343–365.	GeoLiteracy	Quasi-experimental	487 grade 6 students	GeoLiteracy lessons (*n* = 317)	Teachers' standard social studies curriculum (*n* = 170)	A reading comprehension test with 10 multiple-choice questions about text (researcher developed)	.27*	+11
			247 grade 8 students	GeoLiteracy lessons (*n* = 164)	Teachers' standard social studies curriculum (*n* = 83)		.38*	+15

(continued)

Table C1. Adolescent literacy programs and practices identified by the review team as having positive and potentially positive effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Kim, J. S., Capotosto, L., Harty, A., & Fitzgerald, R. (2011). Can a mixed-method literacy intervention improve the reading achievement of low-performing elementary school students in an after-school program? Results from a randomized controlled trial of READ 180 Enterprise. *Educational Evaluation and Policy Analysis, 33*(2), 183–201.	Read 180 Enterprise	Randomized controlled trial	56 grade 6 students who failed to meet standards on the Massachusetts Comprehensive Assessment System in English language arts	Read 180 Enterprise (*n* = 29)	Teacher-created reading instruction in the same after-school program location (*n* = 27)	SAT-10 Reading Comprehension (nationally normed)	.49†	+19
						SAT-10 Vocabulary (nationally normed)	.40†	+15
Rothman, T., & Henderson, M. (2011). Do school-based tutoring programs significantly improve student performance on standardized tests? *Research in Middle Level Education Online, 34*(6), 1–10.	Tutoring	Quasi-experimental	60 grade 8 students from one school that were designated as "borderline" based on their grade 7 scores on the state accountability assessment	Tutoring using Preparing for the New Jersey Grade Eight Proficiency Assessment and Standard Solutions (*n* = 23)	Participants received the same small-group tutoring for the same duration as in the intervention group but focused on math (*n* = 37)	Proficiency on NJASK English language arts subtest (state accountability)	.40*	+16
Stevens, R. J. (2003). Student team reading and writing. A cooperative learning approach to middle school literacy instruction. *Educational Research and Evaluation, 9*(2), 137–160.	Student Team Reading and Writing	Quasi-experimental	3,916 grade 6–8 students in five large urban middle schools	Student Team Reading and Writing (*n* = 1,798 students in 72 classes in two schools)	Typical classroom instruction (*n* = 2,188 students in 88 classes in three schools)	CST reading comprehension subtest (state accountability)	.36†	+14
						CST vocabulary subtest (state accountability)	.46†	+18
Vaughn, S., Martinez, L. R., Linan-Thompson, S., Reutebuch, C. K., Carlson, C. D., & Francis, D. J. (2009). Enhancing social studies vocabulary and comprehension for seventh-grade English language learners: Findings from two experimental studies. *Journal of Research on Educational Effectiveness, 2*(4), 297–324.	Multicomponent social studies instruction	Cluster randomized controlled trial	Study 1: 381 grade 7 students in 15 classrooms with 25 percent English learners	Multicomponent social studies instruction (*n* = 7 classrooms)	Typical classroom instruction (*n* = 8 classrooms)	Social studies unit vocabulary test (researcher developed)	.50*	+18
			Study 2: 507 grade 7 students in 17 classrooms with 21 percent English learners	Multicomponent social studies instruction (*n* = 8 classrooms)	Typical classroom instruction (*n* = 9 classrooms)		.33*	+12

(continued)

Table C1. Adolescent literacy programs and practices identified by the review team as having positive and potentially positive effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' *g*)	Improvement index[b]
Vaughn, S., Swanson, E. A., Roberts, G., Wanzek, J., Stillman-Spisak, S. J., Solis, M., et al. (2013). Improving reading comprehension and social studies knowledge in middle school. *Reading Research Quarterly, 48*(1), 77–93.	Promoting Acceleration of Comprehension and Content Through Text	Randomized controlled trial	344 grade 8 students from 27 classes in two schools	Promoting Acceleration of Comprehension and Content Through Text (*n* = 203 students in 16 classes)	Typical classroom instruction (*n* = 199 students in 11 classes)	GMRT Comprehension (nationally normed)	.21*	+8
						Assessment of Social Studies Knowledge Reading comprehension subtest (researcher developed)	.35*	+14
Walker, E., Tabone, C., & Weltsek, G. (2011). When achievement data meet drama and arts integration. *Language Arts*, *88*(5), 365–372.	Dramatic Impact	Randomized controlled trial	699 grade 6 and 7 students from 28 classrooms and 8 schools	Dramatic Impact implemented in English language arts classrooms over the course of the academic year (*n* = 390)	Teachers' standard English language arts curriculum using the same literary texts (*n* = 309)	Proficiency on NJ ASK English language arts subtest (state accountability)	.32†	+12
Woolley, M. E., Rose, R. A., Orthner, D. K., Akos, P. T., & Jones-Sanpei, H. (2013). Advancing academic achievement through career relevance in the middle grades: A longitudinal evaluation of CareerStart. *American Educational Research Journal, 50*(6), 1309–1335.	CareerStart	Cluster randomized controlled trial with schools assigned to condition	3,295 students from 14 schools were followed from grade 6 through grade 8	Students participated in CareerStart (*n* = 7 schools)	Typical instructional practices (*n* = 7 schools)	North Carolina end-of-grade reading test (state accountability)	.46†	+18

* Effect size was statistically significant at $p < .05$.

† Effect size was substantively important; effect sizes of .25 or greater are considered substantively important, regardless of the statistical significance, according to What Works Clearinghouse (WWC) evidence standards (version 3.0).

GMRT is Gates McGinitie Reading Test; SAT-10 is Stanford Achievement Test, Tenth Edition; NJASK is New Jersey Assessment of Skills and Knowledge; CST is California Standards Test.

a. A standardized measure of the effect of an intervention on student outcomes representing the change (measured in standard deviations) in an average student's outcome that can be expected if that student is given the intervention.

b. An alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention.

c. This effect is neither statistically significant nor substantively important.

d. Only the comparison between the two intervention groups met WWC group design standards. The comparison to the control group did not meet standards.

Source: Authors' summary of studies.

Table C2. Adolescent literacy programs and practices identified by the review team as having mixed effects

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessments	Effect size[a] (Hedges' g)	Improvement index[b]
Corrin, W., Lindsay, J. J., Somers, M. A., Myers, N. E., Meyers, V., Condon, C. A., et al. (2012). *Evaluation of the content literacy continuum: Report on program impacts, program fidelity, and contrast* (NCEE No. 2013–4001). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.	Content Literacy Continuum	Cluster randomized controlled trial	28 schools of grade 9 students, cohort 1	Content Literacy Continuum (*n* = 15 schools)	Typical instructional practices (*n* = 13 schools)	GRADE Reading Comprehension (nationally normed)	.13	+5
						GRADE Vocabulary (nationally normed)	.13*	+5
			33 schools of grade 9 students, cohort 2	Content Literacy Continuum (*n* = 17 schools)	Typical instructional practices *n* = 16 schools)	GRADE Reading Comprehension (nationally normed)	.06	+2
						GRADE Vocabulary (nationally normed)	.09	+4
			28 schools of grade 10 students, cohort 1			GRADE Reading Comprehension (nationally normed)		+4
						GRADE Vocabulary (nationally normed)	.10	+4
Corrin, W., Somers, M. A., Kemple, J. J., Nelson, E., & Sepanik, S. (2008). *The enhanced reading opportunities study: Findings from the second year of implementation* (NCEE No. 2009–4036). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.	Reading Apprenticeship	Randomized controlled trial	2,171 grade 9 students from 34 high schools performing at least two years below grade level	Reading Apprenticeship elective or Xtreme Reading elective (*n* = 1,264)	Other elective course (*n* = 907)	GRADE Reading Comprehension (nationally normed)	.08*	+3
						GRADE Vocabulary (nationally normed)	0	0
			1,115 grade 9 students from 34 high schools performing at least two years below grade level	Reading Apprenticeship (*n* = 645)	Other elective course (*n* = 470)	GRADE Reading Comprehension (nationally normed)	.14*	+5
						GRADE Vocabulary (nationally normed)	–.04	–2
			1,056 grade 9 students from 34 high schools performing at least two years below grade level	Xtreme Reading (*n* = 619)	Other elective course (*n* = 437)	GRADE Reading Comprehension (nationally normed)	.02	+1
						GRADE Vocabulary (nationally normed)	.04	+2

(continued)

Table C2. Adolescent literacy programs and practices identified by the review team as having mixed effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessments	Effect size[a] (Hedges' *g*)	Improvement index[b]
Greenleaf, C., Hanson, T., Herman, J., Litman, C., Rosen, R., Schneider, S., et al. (2011). *A study of the efficacy of Reading Apprenticeship professional development for high school history and science teaching and learning.* Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Research.	Reading Apprenticeship	Cluster randomized controlled trial	668 grade 9 and 10 students in biology classes in 33 high schools serving underrepresented students in California	Reading Apprenticeship professional development provided to biology teachers (*n* = 13 teachers)	Biology teachers were provided with curricular materials but no professional development (*n* = 27 teachers)	CST English language arts subtest (state accountability)	0	0
						CST reading comprehension subtest (state accountability)	.14	+6
						DRP Comprehension (nationally normed)	–.03	–1
Greenleaf, C. L., Litman, C., Hanson, T. L., Rosen, R., Boscardin, C. K., Herman, et al. (2011). Integrating literacy and science in biology: Teaching and learning impacts of reading apprenticeship professional development. *American Educational Research Journal, 48*(3), 647–717.	Reading Apprenticeship	Cluster randomized controlled trial with schools assigned to condition	45 schools with 54 teachers serving 1,111 grade 9 and 10 students	Reading Apprenticeship (*n* = 23 schools)	Typical instructional practices (*n* = 22 schools)	CST reading comprehension subtest (state accountability)	.04	+2
						CST English language arts subtest (state accountability)	.03	+1

(continued)

Table C2. Adolescent literacy programs and practices identified by the review team as having mixed effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessments	Effect size[a] (Hedges' *g*)	Improvement index[b]
Kemple, J. J., Corrin, W., Nelson, E., Salinger, T., Herrmann. S., Drummond, K., et al. (2008). *The enhanced reading opportunities study: Early impact and implementation findings* (NCEE No. 2008–4015). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.	Reading Apprenticeship	Randomized controlled trial	2,413 grade 9 students from 34 high schools performing at least two years below grade level	Reading Apprenticeship elective or Xtreme Reading elective (*n* = 1,408)	Other elective course (*n* = 1,005)	GRADE Reading Comprehension (nationally normed)	.09*	+4
						GRADE Vocabulary (nationally normed)	.03	+1
			1,140 grade 9 students from 34 high schools performing at least two years below grade level	Reading Apprenticeship (*n* = 686)	Other elective course (*n* = 454)	GRADE Reading Comprehension (nationally normed)	.09	+4
						GRADE Vocabulary (nationally normed)	.05	+2
			1,273 grade 9 students from 34 high schools performing at least two years below grade level	Xtreme Reading (*n* = 722)	Other elective course (*n* = 551)	GRADE Reading Comprehension (nationally normed)	.08	+3
						GRADE Vocabulary (nationally normed)	.01	0

* Effect size was statistically significant at $p < .05$.

GRADE is Group Reading Assessment and Diagnostic Evaluation; CST is California Standards Test; DRP is Degrees of Reading Power.

a. A standardized measure of the effect of an intervention on student outcomes representing the change (measured in standard deviations) in an average student's outcome that can be expected if that student is given the intervention.

b. An alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention.

Source: Authors' summary of studies.

Table C3. Adolescent literacy programs and practices identified by the review team as having indeterminate effects

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Alber, S. R., Nelson, J. S., & Brennan, K. B. (2002). A comparative analysis of two homework study methods on elementary and secondary school students' acquisition and maintenance of social studies content. *Education and Treatment of Children, 25(*2), 172–196.	Structured homework assignment	Single-case design: reversal/ withdrawal	12 grade 9 students in general and special education[c]	Standard review questions study method and structured reading worksheet method for homework (*n* = 1 student with a learning disability)	Typical homework assignment (same student)	Quiz of reading comprehension (researcher developed)	No evidence[d]	
Allinder, R., Dunse, L., Brunken, C. D., & Obermiller-Krolikowski, H. J. (2001). Improving fluency in at-risk readers and students with learning disabilities. *Remedial and Special Education, 22*(1), 48–54.	Fluency building	Randomized controlled trial	49 grade 7 students in three classes who were considered to be struggling readers	Students practiced and were told to use an oral reading fluency strategy (*n* = 33)	Students were instructed to "do your best" (n = 16)	WRMT-R Passage Comprehension (nationally normed)	–.02	–1
Belcher, C., Frey, A., & Yankeelov, P. (2006). The effects of single-sex classrooms on classroom environment, self-esteem, and standardized test scores. *School Social Work Journal, 31*(1), 61–75.	Single-sex classrooms	Randomized controlled trial	98 grade 6 students in general education	Classrooms consisted of all males or all females (*n* = 48)	Co-educational classrooms (*n* = 50)	Commonwealth Accountability Testing System–Comprehension (state accountability)	–.07	–3
Borman, G. D., Benson, J. G., & Overman, L. (2009). A randomized field trial of the Fast ForWord Language computer-based training program. *Educational Evaluation and Policy Analysis, 31*(1), 82–106.	Fast ForWord Language	Randomized controlled trial	201 grade 7 at-risk students in three urban middle schools	Fast ForWord Language computer program implemented in a pullout classroom (*n* = 98)	Students participated in nonliteracy classes (*n* = 103)	CTBS/5 Reading Comprehension (nationally normed)	.01	0

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Table C3. Adolescent literacy programs and practices identified by the review team as having indeterminate effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Drummond, K., Chinen, M., Duncan, T. G., Miller, H. R., Fryer, L., Zmach, C., et al. (2011). *Impact of the Thinking Reader software program on grade 6 reading vocabulary, comprehension, strategies, and motivation* (NCEE 2010–4035). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.	Thinking Reader	Cluster randomized controlled trial	2,156 grade 6 students in 90 language arts classrooms	Thinking Reader computer program (*n* = 48 classrooms)	Typical classroom practices (*n* = 42 classrooms)	GMRT Comprehension (nationally normed)	.03	+1
						GMRT Vocabulary (nationally normed)	–.04	–2
Field, G. B. (2010). From quantitative results to qualitative meaning: A look at Renzulli Learning through the eyes of students, teachers, and administrators at Oak Hills Elementary School and Inman Middle School. *Gifted Education International, 26*(2–3), 285–301.	Renzulli Learning	Cluster randomized controlled trial	383 students in 23 classrooms in one middle school and one elementary school (grades 3–8)	Renzulli Learning online educational learning system and profiler implemented in Technology Connections course (*n* = 11 classrooms)	Typical classroom practices (*n* = 12 classrooms)	ITBS Reading Comprehension (nationally normed)	–.06	–2

(continued)

Table C3. Adolescent literacy programs and practices identified by the review team as having indeterminate effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Fogarty, M., Oslund, E., Simmons, D., Davis, J., Simmons, L., Anderson, L., et al. (2014). Examining the effectiveness of a multicomponent reading comprehension intervention in middle schools: A focus on treatment fidelity. *Educational Psychology Review, 26*(3), 425–449.	Comprehension circuit training	Randomized controlled trial	736 grade 6–8 students in 61 classrooms	Comprehension Circuit Training (*n* = 411 students)	Typical classroom practices (*n* = 448 students)	GMRT Reading Comprehension (nationally normed)	.07	3
						Reading comprehension of expository text (researcher created)	–.15	–6
						Reading comprehension of narrative text (researcher created)	.04	1
Little, C. A., McCoach, D. B., & Reis, S. (2014). Effects of differentiated reading instruction on student achievement in middle school. *Journal of Advanced Academics, 25*(4), 384–402.	Schoolwide Enrichment Model reading framework	Cluster randomized controlled trial	2,150 students with 47 teachers in four middle schools (grades 6–8)	Schoolwide Enrichment Model reading framework (*n* = 27 teachers)	Typical classroom practices (*n* = 20 teachers)	GMRT Reading Comprehension (nationally normed)	.07	3
Meyer, B. J. F., Wijekumar, K., Middlemiss, W., Higley, K., Lei, P.-W., Meier, C., et al. (2010). Web-based tutoring of the structure strategy with or without elaborated feedback of choice for fifth- and seventh-grade readers. *Reading Research Quarterly, 45*(1), 62–92.	Components of Intelligent Tutoring of the Structure Strategy	Randomized controlled trial	111 grade 5 and 7 students participating in a computer software program titled Intelligent Tutoring of the Structure Strategy	Feedback (*n* = 59 students)	No feedback (*n* = 52 students)	Reading Comprehension Domain[e]	–.02	–1
				Choice of reading passage (*n* = 56 students)	No choice of reading passage (*n* = 55 students)	Reading Comprehension Domain[e]	–.09	–4
				Simple feedback with choice of reading passage (*n* = 25 students)	Simple feedback with no choice of reading passage (*n* = 27 students)	Reading Comprehension Domain[e]	–.05	–2
				Elaborate feedback with choice of reading passage (*n* = 31 students)	Elaborate feedback with no choice of reading passage (*n* = 28 students)	Reading Comprehension Domain[e]	–.09	–4

(continued)

Table C3. Adolescent literacy programs and practices identified by the review team as having indeterminate effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Neddenriep, C. E., Skinner, C. H., Wallace, M. A., & McCallum, E. (2009). ClassWide Peer Tutoring: Two experiments investigating the generalized relationship between increased oral reading fluency and reading comprehension. *Journal of Applied School Psychology, 25*(3), 244–269.	ClassWide Peer Tutoring	Single-case design: alternating treatment	Four grade 6 students with poor reading skills as measured by the state accountability assessment	Peer tutoring (*n* = 2 cases)	Reading aloud (same students)	Rate of reading comprehension (researcher developed)	Strong evidence[b]	
						Number of reading comprehension questions answered correctly (researcher developed)	Moderate evidence[b]	
				Peer tutoring (*n* = 2 cases)	Reading aloud (same students)	Number of reading comprehension questions answered correctly and rate of comprehension (researcher developed)	No evidence[b]	
Ridge, A. D., & Skinner, C. H. (2011). Using the TELLS prereading procedure to enhance comprehension levels and rates in secondary students. *Psychology in the Schools, 48*(1), 46–58	Title, Examine, Look, Look, and Setting program	Single-case design: multiple baseline	Three grade 9 students nominated by teachers as having difficulties in reading	Title, Examine, Look, Look, and Setting pre-reading strategy (*n* = 3 cases)	Reading aloud (same students)	Number of reading comprehension questions answered correctly and rate of comprehension (researcher developed)	No evidence[b]	
Vaughn, S., Cirino, P. T., Wanzek, J., Wexler, J., Fletcher, J. M., Denton, C. D., et al. (2010). Response to intervention for middle school students with reading difficulties: Effects of a primary and secondary intervention. *School Psychology Review*, 39(1), 3–21.	Tier II instruction emphasizing word recognition, vocabulary, fluency, and comprehension	Randomized controlled trial	301 grade 6 students, more than half of the sample was designated as struggling based on state accountability test scores	Tier II intervention (*n* = 212 students)	Typical instructional practices (*n* = 114 students)	TAKS (state accountability)	.14	+6
						GRADE Reading Comprehension (nationally normed)	–.06	–2
						WJ Passage Comprehension (nationally normed)	.11	+4

(continued)

Table C3. Adolescent literacy programs and practices identified by the review team as having indeterminate effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Vaughn, S., Wanzek, J., Wexler, J., Barth, A., Cirino, P. T., Fletcher, J., et al. (2010). The relative effects of group size on reading progress of older students with reading difficulties. *Reading & Writing*, *23*(8), 931–956.	Tier II instruction emphasizing word recognition, vocabulary, fluency, and comprehension	Randomized controlled trial with students assigned to one of three conditions	421 grade 7 and 8 struggling readers	Large-group Tier II instruction (*n* = 203 students)	Typical instructional practices (*n* = 218 students)	TAKS (state accountability)	–.18	–7
						GRADE Reading Comprehension (nationally normed)	.05	+2
						WJ Passage Comprehension (nationally normed)	.03	+1
			273 grade 7 and 8 struggling readers	Small-group Tier II instruction (*n* = 55 students)	Typical instructional practices (*n* = 218 students)	TAKS (state accountability)	–.22	–9
						GRADE Reading Comprehension (nationally normed)	.13	+5
						WJ Passage Comprehension (nationally normed)	.13	+5
Vaughn, S., Klingner, J. K., Swanson, E. A., Boardman, A. G., Roberts, G., Mohammed, S. S., et al. (2011). Efficacy of Collaborative Strategic Reading with middle school students. *American Educational Research Journal*, *48*(4), 938–964.	Collaborative Strategic Reading	Cluster randomized controlled trial	866 grade 7 and 8 students in 61 classes across three school districts	Collaborative Strategic Reading (*n* = 34 classes)	Typical instructional practices (*n* = 27 classes)	GMRT Comprehension (nationally normed)	.09	+3
						Test of Silent Reading and Comprehension (nationally normed)	.07	+3
Vaughn, S., Roberts, G., Klingner, J. K., Swanson, E. A., Boardman, A., Stillman-Spisak, S. J., et al. (2013). Collaborative strategic reading: Findings from experienced implementers. *Journal of Research on Educational Effectiveness*, 6(2), 137–163.	Collaborative Strategic Reading	Cluster randomized controlled trial	528 grade 7 and 8 students in 48 classes across three school districts	Collaborative Strategic Reading (*n* = 26 classes)	Typical instructional practices (*n* = 22 classes)	GMRT – Comprehension (nationally normed)	.10	+4
						Test of Silent Reading and Comprehension (nationally normed)	0	0

(continued)

Table C3. Adolescent literacy programs and practices identified by the review team as having indeterminate effects *(continued)*

Full citation	Program or practice	Research design	Analysis sample	Intervention implementation	Nature of the comparison group	Student outcome assessment	Effect size[a] (Hedges' g)	Improvement index[b]
Zinn, A., & Courtney, M.E. 2014. Context matters: Experimental evaluation of home-based tutoring for youth in foster care. *Children and Youth Services Review*, *47*(3), 198–204.	Early State to Emancipation Preparation one-on-one tutoring	Randomized controlled trial	402 children ages 14–18 in foster care in Los Angeles	Early Start to Emancipation Preparation tutoring program for children in foster care, which included SRA Reading (*n* = 212 students)	Counselors conducted typical practices (*n* = 190 students)	WJ Passage Comprehension (nationally normed)	–.01	0

CTBS/5 is Comprehensive Test of Basic Skills (version 5); ITBS is Iowa Test of Basic Skills; TAKS is Texas Assessment of Knowledge and Skills; WJ is Woodcock Johnson Tests of Achievement, GMRT is Gates McGinitie Reading Test; GRADE is Group Reading Assessment and Diagnostic Evaluation.

a. The effect size is a standardized measure of the effect of an intervention on student outcomes representing the change (measured in standard deviations) in an average student's outcome that can be expected if that student is given the intervention.

b. The improvement index is an alternate presentation of the effect size reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention

c. One of the 12 cases analyzed in this study met standards.

d. The What Works Clearinghouse (WWC) rates the effects of single-case design studies as demonstrating strong evidence of an effect, moderate evidence of one, or no evidence of one. However, rating the effects of an intervention from a single-case design requires the following: a minimum of five single-case design studies must meet WWC standards, the single-case design studies must be conducted by at least three different research teams with no overlapping authorship at three different institutions, and the combined number of cases has to be at least 20 (U.S. Department of Education, 2014).

e. The effect size for reading comprehension domain reported in this table reflects the average effects size for the reading comprehension domain. This domain consists of a nationally normed assessment of reading comprehension (the Gray Silent Reading Test) and a researcher-developed outcome assessment of reading comprehension.

Source: Authors' summary of studies.

Appendix D. Description of the interventions used in the 33 studies that the review team found had met What Works Clearinghouse evidence standards

This appendix provides a detailed description of the interventions as described in the published manuscript for the 33 studies that meet What Works Clearinghouse (WWC) evidence standards with or without reservations, according to the review team.

Programs and practices demonstrating positive and potentially positive effects

This section describes interventions that were shown to have positive or potentially positive effects on reading comprehension, vocabulary, or general literacy.

Read Now (Algozzine, 2004). Read Now is an intensive, structured reading intervention that combines software; a teacher's guide with lessons, tips, and activities; and ongoing, one-on-one consultant support. It was created to address the five essential components of reading identified by the National Reading Panel and includes four key activities: Read To, Fluency Practice, Guided Independent Reading, and Small Group or Individual Lessons. In the study, Read Now was implemented daily in a 90-minute block for 10 weeks. (Professional development associated with the program was not described in the study.)

Reading Edge (Chamberlain, Daniels, Madden, & Slavin, 2007). Reading Edge, a component of the Success for All whole-school reform model, combines four key instructional elements: explicit instruction in metacognitive strategy use, cooperative learning, goal setting with feedback, and classroom management techniques. All lessons follow a set structure: Setting the Stage, Active Instruction, Teamwork, and Time for Reflection. To implement Reading Edge, emphasis is placed on grouping students and specific classroom management techniques. Students are grouped by their reading level, with each group utilizing appropriate text. Students are assessed and regrouped quarterly. Classroom management for effective implementation of cooperative learning includes brisk pacing, direct instruction of conflict resolution, and academic problem solving. It also includes setting cooperation goals; providing extra credit for active listening, encouraging peers, or 100 percent team participation; randomly selecting team members to provide answers; and using discussion routines like Think-Pair-Share and Numbered Heads.

Teachers using Reading Edge in this study received extensive training and ongoing coaching, although the study did not specifically describe the amount and type of training. The authors noted that participating teachers did not receive the amount of implementation support typical in most schools using Reading Edge: a full-time school-based facilitator and the support of the other teachers in the school who are all implementing Reading Edge at the same time.

Story Impressions (Denner, Rickards, & Albanese, 2003). Here, two different types of reading preview methods, Story Impressions and Content Preview, were implemented in a grade 8 general education history course. Story Impressions consisted of a preview sheet for the reading comprehension passage (a historical biography) in which the teacher chose 18 pausal units from the passage that represented the highest level of structural importance. The pausal units were reduced to a phrase by retaining only the essential cue words. A copy of the pausal unit list is available in the published article.

Students read the phrases and wrote a history connecting all the clues in the same order to formulate a written guess about what might happen in the passage. Students took some 20 minutes to complete their written responses. The Content Preview method used the same 18 preview units, adding vocabulary definitions and questions to promote interest and activate prior knowledge. Professional development consisted of scripted instructions and a two-hour discussion of procedures with the researchers.

Embedded Story Structure Routine (Faggella-Luby, Schumaker, & Deschler, 2007). The Embedded Story Structure Routine consists of three strategies: self-questioning at pre-reading, story structure analysis during reading, and summary writing after reading. The three strategies are implemented using a graphic organizer to facilitate collaboration between the teacher and students and between students and peers. The self-questioning strategy involves seven questions (who, what, when, where, which, how, and why) related to the critical components of narrative story structure. (This study was conducted in a summer school program for rising grade 9 students who were found, based on their grade 8 test scores, to be at risk.) After answering the questions, students complete a story structure diagram and draw picture cues. Finally, they write a four-sentence summary that includes the critical elements of the story. Students are given mnemonic devices to remember the strategies. An illustration of the Embedded Story Structure Routine is available in the publication.

In this study, instruction was delivered for a total of eight stories over nine days during a summer program, with daily instruction ranging from 90 minutes to 120 minutes for a total of 17 hours of instruction. Students were in groups of 12–14. The teacher was a doctoral student in special education and one of the authors of the study, so no additional training was provided.

GeoLiteracy (Hinde, Popp, Dorn, Ekiss, Mater, Smith, et al., 2007). GeoLiteracy is a package of 85 lessons (drawn from Kindergarten through grade 8) that teaches geography in the context of practicing reading and writing skills. GeoLiteracy lessons emphasize the following reading skills: cause and effect, sequencing, main idea, summarizing, drawing conclusions or inferences, following directions, and reading/interpreting graphic displays. In this study three to five GeoLiteracy lessons were selected from a predetermined set of lessons and implemented during language arts or social studies sessions. Each lesson spanned from one to three class periods. Many of the intervention teachers participating in this study were teacher consultants for GeoLiteracy, and many other intervention teachers received consultation from the teacher consultants at their schools.

Read 180 Enterprise (Kim, Capotosto, Hartry, & Fitzgerald, 2011). Read 180 consists of three rotations in a 90-minute session: whole-group teacher-directed instruction to build background and model fluency and comprehension strategies; individualized computer-assisted instruction on decoding, fluency, vocabulary, and comprehension; independent reading practice with high-interest text; and teacher-directed instruction in small homogeneous groups. In this study, the typical Read 180 program was adapted to a 60-minute session and implemented four days per week for 23 weeks in an after-school program for students who performed poorly on the state outcome assessment. The adaptation of Read 180 in this study included only two of the three rotations at each session. The teachers implementing Read 180 received preservice and in-service training and were certified Read 180 instructors.

Tutoring (Rothman & Henderson, 2011). This tutoring program was created by staff at a New Jersey school in which two test-taking programs were combined and provided to small groups of students (student–teacher ratio of 4:1). They met twice a week after school in 90-minute sessions for some 16 weeks, resulting in a total of 48 hours of tutoring. Students completed one chapter from the Preparing for the New Jersey GEPA book per week. In addition, tutors were instructed to reinforce the strategies found in the Standard Solutions program. The Standard Solutions test-taking strategies program includes instruction on identifying and eliminating options on multiple-choice tests, on properly completing open-ended questions, and on time management. During the program, tutors attended four meetings with the researchers to discuss tutoring content and any potential problems. In addition, the tutors provided weekly reports to the students' classroom teacher.

Student Team Reading and Writing (Stevens, 2003). The components of the Student Team Reading and Writing program included cooperative-learning classroom processes; a literature anthology for high-interest reading material; explicit instruction in reading comprehension; integrated reading, writing, and language arts instruction; and a writing process approach to language arts. The reading part of the program included three core elements: literature-related activities, direct instruction in reading comprehension strategies, and selection-related writing. All activities were conducted in heterogeneous student teams and followed the same cycle: teacher presentation, team practice, independent practice, peer pre-assessment, and individual accountability. This program was implemented for nine months to students in grades 6–8 attending two middle schools in a large urban school district.

Multicomponent social studies instruction (Vaughn, Martinez, Linan-Thompson, Reutebuch, Carlson, & Francis, 2009). Multicomponent social studies instruction is composed of explicit vocabulary and concept instruction, the use of brief videos and purposeful discussion to build concepts, the use of graphic organizers and other writing activities to build comprehension and vocabulary through writing, and structured paired grouping.

During group activities, students with limited English proficiency were paired with fluent English speakers. Structured pairing was incorporated to improve instruction: It increased students' access to and practice with the language associated with content-area instruction, providing an interactive and motivating structure for reading and discussing ideas and concepts; it also engaged English learners in discussions by providing a scaffold and practice. Vocabulary instruction included selecting words to improve students' academic language, providing students with opportunities to encounter new words in texts or video clips, and using graphic organizers to reinforce word meanings and show associations between Spanish and English words. In this study grade 7 students received instruction during their regular social studies class. It was implemented for 50 minutes per day, five days per week, for some 9–12 weeks.

Teachers received a one-day professional development workshop on implementing the treatment practices. Each teacher also got all the necessary materials to implement the instruction, in-class support from the researchers, and one-on-one coaching.

Promoting Acceleration of Comprehension and Content Through Text (PACT; Vaughn, Swanson, Roberts, Wanzek, Stillman-Spisak, Solis, et al., 2013). PACT is an instructional practice delivered by teachers that includes five components focusing on improving

understanding during text reading and providing opportunities for students to integrate newly learned information with previously learned information. The five components include a comprehension canopy that contains motivational and background-building components. For background building, new learning is consistently tied back to previous learning; introduction and review of key terms; teacher-led discussions to help students' focus on key information in the text; team-based learning that includes completion of comprehension checks and discussions within heterogeneous groups; and team-based learning debates requiring students to use textual evidence, critical thinking, synthesis of group perspectives, and presentation of final written product to the class. In this study, teachers implemented PACT in 50–54 minute sessions in three 10-day session blocks over a six- to eight-week period in their grade 8 social studies classes. Beforehand, to facilitate implementation, teachers received some 10 hours of training, subsequent in-class visits, and teacher planning sessions.

Dramatic Impact (Walker, Tabone, & Weltsek, 2011). Teachers worked with teaching artists to infuse aspects of theater arts, such as theater games, scenery design, process drama, improvisation, script writing, and enactment, into their language arts instruction around the core novels used in the district curricula. In this approach, 40 drama-based lesson plans linked to the mandated literary texts for students in grades 6 and 7 were implemented in language arts classrooms over the academic year. Professional development was not needed because the teaching artist worked directly in the classroom alongside the teacher.

CareerStart (Woolley, Rose, Orthner, Akos, & Jones-Sanpei, 2013). CareerStart is a program that advances the relevance of instructional content through the use of occupational examples infused into the standard curriculum across math, science, social studies, and language arts. The program includes 10 lessons for each core subject that content-area teachers can use to illustrate important concepts and lessons in their courses. In addition, teachers are encouraged to infuse career examples and problems across their teaching. Students received this intervention during all three years of middle school (grades 6–8). Professional development was available for participating teachers but was not explicitly described in the study.

Programs and practices demonstrating mixed effects

This section describes interventions with studies that found mixed effects on reading comprehension, vocabulary, or general literacy outcomes.

Reading Apprenticeship (Corrin, Somers, Kemple, Nelson, & Sepanik, 2008; Greenleaf, Hanson, et al., 2011; Greenleaf, Litman, et al., 2011; Kemple, Corrin, Nelson, Salinger, Herrmann, Drummond, et al., 2008). Four studies investigated the impact of Reading Apprenticeship on reading comprehension and vocabulary. This section describes the four and any differences in implementation that occurred between them.

Corrin et al. (2008) and Kemple et al. (2008) implemented Reading Apprenticeship, an established supplemental literacy intervention that was developed for grade 9 students whose reading skills were below or far below grade level. Reading Apprenticeship, distributed by WestEd, focuses on student motivation and engagement, reading fluency, vocabulary, comprehension, phonics and phonemic awareness (for students who could still benefit

from instruction in these areas), and writing. Teachers demonstrate the skills of master readers and incorporate five aspects of comprehension instruction: metacognitive conversation, silent sustained reading, language study, content/themes, and writing. Instructional routines include thinking aloud, talking to text, metacognitive journals, and daily warmups. In these studies the programs were slightly modified and implemented as a supplemental class that replaced another elective class. This elective was taken in addition to students' regular English language arts classes. The course was scheduled for a minimum of 225 minutes per week for a full school year in classes of 12 to 15 students.

The programs' developers tailored professional development and coaching strategies to high school teachers who lacked reading instruction credentials. Professional development workshops were conducted for the teachers before the school year began and in booster sessions throughout the year. Coaches made three two-day visits to each participating teacher during the year.

In one study (Greenleaf, Hanson, et al., 2011) teachers received a total of 10 days of professional development before the start of the school year, mid-year, and at year-end. Experiential training methods were used during professional development so teachers could experience Reading Apprenticeship's instructional methods in the same way students do. The instructors collected information through interviews and emails to plan the mid-year and year-end professional development sessions. The study paid for teacher travel to the sessions, along with an honorarium, provision of substitute teachers, and up to $500 for purchasing additional instructional reading materials. In addition, a listserv was available to facilitate interactions among implementing teachers.

The report also included several outcomes that did not meet WWC group design standards: those for the U.S. history classes, those on the California Standards Test for biology, and all subgroup analyses.

Content Literacy Continuum (Corrin, Lindsay, Somers, Myers, Meyers, Condon, et al., 2012). This intervention combines instructional routines with learning strategies developed and tested by the University of Kansas Center for Research on Learning. The Content Literacy Continuum's (CLC) levels of support range from schoolwide backing to promoting student literacy and content learning (analogous to the tiered response to intervention practices). First, all core content teachers (English language arts, science, social studies, math) use instructional routines and model learning strategies with content-area text. The instruction is intended to be sequenced, scaffolded, and include multiple modalities. Second, trained reading teachers provide more intensive instruction targeted to each struggling adolescent reader using a curriculum called Fusion Reading, which incorporates explicit instruction in foundational decoding, fluency, and comprehension skills (Hock, Brasseur, & Deshler, 2008). In this study, CLC was given to the same students in grades 9 and 10.

Each school had an external CLC site coordinator who was trained at the University of Kansas Center for Research on Learning and was responsible for conducting professional development, setting up Reading Fusion classes, and consulting with the school's Literacy Leadership Team. There were 1.6–1.9 days of professional development per month for six to seven months.

Programs and practices demonstrating an indeterminate effect

This section describes interventions with studies that found indeterminate effects on reading comprehension, vocabulary, or general literacy.

Homework methods (Alber, Nelson, & Brennan, 2002). Instead of a typical homework assignment, students in a grade 9 general education social studies class got a standard review questions study method and a structured worksheet to accompany their homework reading text. The standard review questions study method consisted of four to six summary questions. The structured reading worksheet was made up of 12 to 24 fill-in-the-blank questions paraphrased from the text. The social studies teacher assigned the homework four days per week for three weeks. Because of the nature of the instruction, professional development for the teachers was not needed.

Fluency building (Allinder, Dunse, Brunken, & Obermiller-Krolikowski, 2001). Students met with a teacher to select a reading strategy for them to focus on for a 10-week period. Strategies included using morphological strategies to understand word roots and affixes, pausing at punctuation, reading with expression, correcting errors by self-monitoring, and tracing print with a forefinger. Teachers selected each student's intervention based on observation and input from the students themselves. Students received a bookmark with their selected strategy written on it for use while reading text. Professional development was not described in detail in this study.

Single-sex classrooms (Belcher, Frey, & Yankeelov, 2006). Students participating in single-sex classrooms for one school year were compared with those participating in co-educational classes in the same school. No professional development was needed for this study.

Fast ForWord Language (Borman, Benson, & Overman, 2009). The Fast ForWord Language computer software program provides exercises on phonological awareness, language processing speed, sequencing, vocabulary, and language comprehension. The program requires 100 minutes of training per day, five days a week, for four to eight weeks under the supervision of Fast ForWord–trained clinicians or educators. Students participated in the study as a pullout/supplemental program. More than half of the students attended for the recommended minimum standard of 20 days, and 43 percent met all three of the developers' criteria for successful completion. The program was implemented by trained educators, and no further professional development was needed.

Xtreme Reading (Corrin, Somers, Kemple, Nelson, & Sepanik, 2008; Kemple, Corrin, Nelson, Salinger, Herrmann, Drummond, et al., 2008). Both studies investigated Xtreme Reading, an established supplemental literacy intervention developed for grade 9 students whose reading skills were either below or far below grade level. Xtreme Reading, which was developed by the University of Kansas Center for Research on Learning, focuses instruction on student motivation and engagement, reading fluency, vocabulary, comprehension, phonics and phonemic awareness (for students who could still benefit from instruction in these areas), and writing. This program also helps students adopt the strategies and routines used by proficient readers. Xtreme Reading utilizes detailed daily lesson plans with explicit instruction in seven reading strategies using a prescribed eight-stage instructional routine. The strategies are LINCS Vocabulary Routine, Word Mapping, Word Identification, Self-Questioning, Visual Imagery, Paraphrasing, and Inferencing. The

teachers use such methods as describe, model, verbal practice, guided practice, paired practice, independent practice, differentiated instruction, and integration and generalization.

The programs' developers tailored professional development and coaching strategies to high school teachers who lacked reading instruction credentials. Professional development workshops were conducted for the teachers before the school year and in booster sessions throughout the year. Coaches made three two-day visits to each participating teacher throughout the year.

Thinking Reader (Drummond, Chinen, Duncan, Miller, Fryer, Zmach, et al., 2011). Thinking Reader employs reciprocal teaching in three phases: teacher-directed pre-reading discussion, use of the software, and teacher-directed post-reading activities. Pre-reading activities include modeling strategy use and summarizing previous sessions. The software provides the text, a dictionary, and opportunities for the student to use one of seven strategies to think about the text: summarize, predict, question, clarify, visualize, feel, or reflect. The teacher monitors students' performance and can customize the level of support provided to each student. Post-reading activities consist of student–teacher discussion or an activity to demonstrate comprehension. Program publishers recommended that teachers use the Thinking Reader program for 110–165 minutes per week for three different novels, with each novel spanning four to six weeks and breaks included in between. Student participation in each novel was less than recommended ranges. Teachers participated in two training sessions lasting six hours each. They also received individual coaching sessions totaling 7.5–8.5 hours apiece.

Renzulli Learning (Field, 2010). Renzulli Learning is an online educational learning system and profiler designed to match student interests, learning styles, and expression styles with challenging enrichment resources. In this study classes of students in an elementary and a middle school used Renzulli Learning for two to three hours per week for 16 weeks. In the middle school this took place in the Technology Connections class. Each student completed the Renzulli Learning Profiler, an online questionnaire about students' interests, abilities, learning styles, and modes of expression. Upon completing the Profiler, students had access to their own Enrichment Database on Renzulli Learning, as well as a database of more than 30,000 education resources and activities such as virtual field trips, real field trips, creativity training, independent projects and studies, contests and competitions, websites, fiction books and e-books, nonfiction books and e-books, how-to books and e-books, summer programs, online activities and classes, research sites, and videos and DVDs.

The study also examined the effects for a subgroup—gifted students. Substantively important but not statistically significant effects were found for gifted students on the reading comprehension and reading fluency outcomes.

Comprehension Circuit Training Intervention (Fogarty, Oslund, Simmons, Davis, Simmons, Anderson, et al., 2014). Comprehension Circuit Training (CCT) is a multicomponent framework of instructional practices to facilitate adolescents' comprehension of complex text. It was developed around an exercise theme, with students progressing through stations—the way people move through circuit training when they exercise. CCT was organized in two phases: short fiction and expository. In phase one, practices and strategies were introduced using two short fiction texts. The routine and instructional practices

were then transferred to five teacher-selected short fiction texts. In phase two, the routine and practices were transferred to three teacher-selected expository texts. Recommended language was provided for the first two texts in both phases. After two full days of professional development, teachers were asked to implement, over the course of 12 weeks, 36 lessons lasting 50 minutes each. The researchers also provided additional individual and group professional development.

School-wide Enrichment Model reading framework (Little, McCoach, & Reis, 2014). The School-wide Enrichment Model reading framework study was completed within a reading class: students read independently while teachers conducted individual conferences. During the conference, the teacher determined if the student's self-selected book was appropriately challenging, provided differentiated instruction in reading skills and strategies, and discussed higher level questions about the text. Implementation consisted of three phases. Phase 1 included read-alouds and a brief discussion on a large variety of text. Phase 2 included independent reading and five- to seven-minute individual conferences: each student would meet with the teacher at least once every two weeks. Phase 3, implemented during the second half of the school year, included project-based activities chosen based on students' interest. Reading and language arts teachers implementing the School-wide Enrichment Model reading framework were expected to conduct the program for 40 to 45 minutes per day, every day. Teachers participated in a one-day professional development session, one follow-up session mid-year, and support from project staff who visited classrooms once every two to three weeks.

Components of Intelligent Tutoring of the Structure Strategy (Meyer, Wijekumar, Middlemiss, Higley, Lei, Meier, et al., 2010). All students in this study were participating in the Intelligent Tutoring of the Structure Strategy online program. Its system allows students to interact with an animated agent/tutor to learn and practice the strategy and receive immediate feedback. Each tutor–tutee interaction is unique and adapts to the student's performance. There are 95 lessons (65 regular plus 30 alternative-choice lessons) that were designed through consultation with teachers, motivation experts, and students.

The study evaluated two features of the Intelligent Tutoring of the Structure Strategy system: feedback and choice of passage. Students were provided with simple or elaborated feedback and were given either a choice or no choice in reading passage. Intelligent Tutor is administered via the computer, and professional development was not needed to implement the study.

ClassWide Peer Tutoring (Neddenriep, Skinner, Wallace, & McCallum, 2009). In this study, ClassWide Peer Tutoring was implemented with pairs of students reading to each other using passages from the Timed Readings series. Tutoring sessions occurred in a pullout setting in the middle school and were implemented by the researchers. The tutee would begin by reading the first half of a passage aloud while the tutor provided feedback, corrected errors, and awarded points to the tutee. The tutor and tutee then switched roles and the new tutee read the same first half of a passage. Each reading lasted five minutes and students were assessed on a researcher-developed test of reading comprehension on a different passage.

Title, Examine, Look, Look, and Setting (TELLS; Ridge & Skinner, 2011). The Title, Examine, Look, Look, and Setting (TELLS) procedure is a comprehension strategy taught

to students for use before reading a text. The student first looks at the title to form clues about what will be covered, then examines the passage for clues about the content, looks for important, often-used words, looks for unknown words and finds their meaning, and skims the passage for clues about the setting. In the study the TELLS strategy was taught to students in a one-on-one setting by the experimenter. Sessions, lasting 10 to 30 minutes, were held three days per week for some two and a half weeks. The worksheet used to guide the TELLS sessions is included in the publication.

Tier II intervention (Vaughn, Cirino, Wanzek, Wexler, Fletcher, Denton, et al., 2010). The teachers of all students in both the treatment and comparison groups of this study participated in professional development designed to enhance the quality of the core reading instruction (also called Tier I instruction). The research team provided professional development on evidence-based practices for teaching vocabulary and comprehension to the content-area teachers of all grade 6 students. Teachers attended a six-hour professional development session at the beginning of the school year and then met in study groups at their respective schools roughly once a month throughout the year. Study groups consisted of interdisciplinary teams in six of the schools, though one school framed study groups by department area. In-classroom coaching was provided on request. During the monthly study group sessions, teachers worked with a facilitator to apply these strategies while planning lessons in their own content areas.

The Tier II intervention was an extensive yearlong intervention, with students placed in homogeneous groups to the extent class schedules allowed. The researcher-provided intervention included three phases: partner reading to build fluency, word study using lessons from REWARDS Intermediate, explicit vocabulary and reading comprehension instruction, and comprehension lessons from REWARDS Plus. Phase 1 consisted of some 25 lessons taught over seven to eight weeks and emphasized word study and fluency skills. In Phase II, instruction stressed vocabulary and comprehension, with additional instruction and practice provided for applying the word study and fluency skills and strategies learned in Phase I. Phase II lessons occurred over 17 to 18 weeks, depending on students' progress. Phase III, which continued over some 8 to 10 weeks, kept the emphasis on vocabulary and comprehension.

Collaborative Strategic Reading (Vaughn, Klingner, Swanson, Boardman, Roberts, Mohammed, et al., 2011; Vaughn, Roberts, Klingner, Swanson, Boardman, Stillman-Spisak, et al., 2013). Collaborative strategic reading is an instructional method for reading comprehension structured around the narrative and expository text already used by a school. Students learn a variety of comprehension strategies, including main idea, questioning, previewing, "click and clunk," "get the gist," and wrap-up. Students practice strategies independently and as a leader in a collaborative peer group. Among the elements are explicit instruction by the teacher, implementing procedural strategies, using interactive groups or partners, and providing opportunities for interactive dialogue among students and between teachers and students. Additional details for the intervention are available in the publication and at www.meadowscenter.org.

Researchers in Vaughn et al. (2011) provided teachers with initial training in collaborative strategic reading over three days. Each teacher received all necessary materials to implement the treatment, including sample lessons, examples of reading materials, and overheads. The researchers also provided subsequent professional development on three

occasions over the implementation year (about 90 minutes per meeting) to enhance and refine implementation and use of collaborative strategic reading in their classrooms. Each participating teacher was assigned a coach who was initially present one to two times per month during a treatment class and then less so over the course of the intervention. Students in grades 7 and 9 in the treatment classes received the intervention during their regularly scheduled English language arts class. Teachers were asked to implement the intervention for 50 minutes a day, two days per week, for approximately 18 weeks. Teachers said the number of sessions they implemented ranged from 24 to 48.

The next study conducted by Vaughn et al. (2013) reports the findings of the second year of implementation of collaborative strategic reading by the same English language arts or reading teachers who participated in the previous study by Vaughn et al. (2011). Teachers not only received professional development and implementation support during the first year of implementation, but also a full day of professional development as a refresher, discussion of the previous year's results with suggestions for greater effectiveness, and three 90-minute follow-up professional development sessions throughout the year. Each teacher also had a coach available who provided modeling, side-by-side teaching, and observation with feedback. Teachers implemented collaborative strategic reading 50 minutes per day, two days per week, for 18 weeks.

Large-group and small-group intervention in middle schools (Vaughn, Wanzek, Wexler, Barth, Cirino, Fletcher, et al., 2010). The same Tier I and Tier II instructional practices conducted with another sample (see Vaughn, Cirino, Wanzek, Wexler, Fletcher, Denton, et al., 2010) were used in this study. Here, some students participated in the Tier II instruction as part of the small-group condition consisting of some five students. Students participating in the large-group condition received the same Tier II instructional practices—but in a group of 12 to 15 students. Both the small-group and large-group conditions were compared with students who participated in the Tier I instruction and any other supplemental instruction provided by the school. Instruction in both Tier II conditions was delivered by certified teachers hired by the researchers, and instruction occurred daily for 45 to 50 minutes during a regular class period. The Tier II teachers participated in about 60 hours of professional development before teaching students and received nine hours of professional development throughout the year. The researchers also provided ongoing feedback through coaching and conducted biweekly meetings.

Early Start to Emancipation Preparation tutoring (Zinn & Courtney, 2014). Early Start to Emancipation Preparation is a one-on-one at-home tutoring program provided to foster children ages 14–18. Tutors met with students twice per week for a total of 17 hours of reading instruction, which consisted of the SRA Reading 3A curriculum and Houghton-Mifflin curricula for spelling and vocabulary. Tutors were undergraduate or graduate students who received one day of training before tutoring and follow-up trainings twice per year. However, researchers noted that 12 percent of control students mistakenly received the tutoring, while 38 percent of the students assigned to the treatment group did not actually get the tutoring.

Notes

1. Although this review relied heavily on WWC protocols, procedures, and standards and the reviews were conducted by WWC-certified reviewers, this is not a WWC product. To be a WWC product, the reviews must have been conducted by WWC contractors.
2. Each of the 12 programs and practices identified as demonstrating positive or potentially positive effects is represented by one study citation. However, one of the study citations (Vaughn et al., 2009) includes findings from two studies that both demonstrated statistically significant effects, so the program was assigned a positive effect rating.
3. Reading comprehension tests assess the student's ability to read a passage and answer questions based on the material in the text. Prior knowledge of the material is not required to complete the assessment successfully. Content-area knowledge tests that assess an individual's preexisting understanding of the facts, theories, and related materials in that area (such as math, science, or social studies) are not eligible outcomes.
4. Although the reviewers were certified to conduct WWC reviews, this project was not sponsored by WWC.

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