

# WWC EVIDENCE REVIEW PROTOCOL FOR ADOLESCENT LITERACY INTERVENTIONS (GRADES 4–12) VERSION 2.1<sup>1</sup>

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## Topic Area Focus

The What Works Clearinghouse (WWC) review in this topic area focuses on adolescent literacy interventions for students in grades 4–12 (or ages 9–18)<sup>2</sup> that are intended to increase literacy skills in **alphabetics** (phonemic awareness, phonological awareness, letter identification, print knowledge, and phonics), **reading fluency, comprehension** (vocabulary and reading comprehension), or **general literacy achievement** (general reading achievement; see definitions below). Systematic reviews of evidence in this topic area address the following questions:

- Among interventions intended to provide literacy instruction, which ones improve literacy skills among adolescents in grades 4–12 (or ages 9–18)?
- Are some interventions more effective than others for certain types of literacy skills?
- Are some interventions more effective for certain types of students, particularly students who have historically lagged behind in reading and/or literacy achievement?

## Key Definitions

### Alphabetics domain

**Phonemic awareness.** Phonemic awareness (or phoneme awareness) refers to the understanding that the sounds of spoken language—phonemes—work together to make words, and phonemes can be substituted and rearranged to create different words. Phonemic awareness includes the ability to identify, think about, and work with the individual sounds in spoken words. Phonemic awareness helps children learn how to read and spell by allowing them to combine or blend the separate sounds of a word to say the word (for example, “/c/ /a/ /t/—cat”).

**Phonological awareness.** Phonological awareness is a more encompassing term than phoneme/phonemic awareness. It refers to phoneme awareness *and* to awareness of larger spoken units such as syllables and rhyming words. Tasks of phonological awareness might require students to generate words that rhyme, to segment sentences into words, to segment polysyllabic words into syllables, or to delete syllables from words (e.g., what is “cowboy” without “cow”?).

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<sup>1</sup> This protocol is aligned with the *WWC Procedures and Standards Handbook* (version 2.1).

<sup>2</sup> The primary criterion for determining if a study is eligible for review is the grade range. Studies with students in grades 4–12 are eligible for review. Studies that include students who are older than 18 and younger than 9 are included as long as they are in grades 4–12. If authors do not provide the grade level of study students, we will use the age range of 9–18 to determine if the study is eligible for review within the Adolescent Literacy topic area.

**Letter identification.** Letter identification refers to knowledge of the names of the letters of the alphabet.

**Print awareness.** Print awareness refers to knowledge of concepts about print, such as (a) print carries a message; (b) there are conventions of print, such as directionality (left to right, top to bottom), differences between letters and words, distinctions between upper- and lowercase, punctuation; and (c) books have some common characteristics (e.g., author, title, front/back).

**Phonics.** Phonics<sup>3</sup> refers to (a) the knowledge that there is a predictable relationship between phonemes (the sounds in spoken language) and graphemes (the letters used to represent the sounds in written language), (b) the ability to associate letters and letter combinations with sounds and blending them into syllables and words, and (c) the understanding that this information can be used to read or decode words. Spelling is included in the review as an acceptable phonics outcome. Spelling skills also play an important role within writing; however, because spelling skills are necessarily subordinate to other issues of writing quality, the spelling outcomes are included together with decoding skills within the phonics construct in this review protocol.

### **Reading Fluency domain**

**Reading fluency.** Fluency is the ability to read text accurately, automatically, and with expression (including appropriate pausing, response to punctuation, and so on), while extracting meaning from it.

### **Comprehension domain**

**Vocabulary development.** Vocabulary development refers to the development of knowledge about the meanings and uses of words. The development of receptive vocabulary (words understood) and expressive vocabulary (words used) is critical for reading comprehension.

**Reading comprehension.** Reading comprehension refers to the understanding of the meaning of a passage. Reading comprehension depends on various underlying components including decoding (the ability to translate text into speech), knowledge of word meanings, fluency (the ability to read text accurately and automatically), and the ability to understand and interpret spoken language. Struggling readers may have difficulty with any of these components of reading or with multiple components. Reading comprehension outcomes may include tests of students' comprehension of passages from various content areas. For example, a test assessing students' comprehension of a social studies passage would be an acceptable outcome.<sup>4</sup>

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<sup>3</sup> *Phonics* also refers to an instructional approach that focuses on the correspondence between sounds and symbols and is often used in contrast to whole language instructional approaches. For the purposes of the Adolescent Literacy Review Protocol, we use the term *phonics* as defined above, not as an instructional approach.

<sup>4</sup> These comprehension tests assess the student's ability to read a passage and answer questions based on the material in the text and require no prior knowledge of the material in order to complete the assessment successfully. Content area knowledge tests that assess an individual's preexisting understanding of the facts, theories, and other related materials in that area (e.g., science, social studies, math) are not eligible outcomes.

**General Literacy Achievement domain<sup>5</sup>**

***General literacy achievement.*** Outcomes that fall in the general literacy achievement domain combine separate measures of two or more of the previous domains (alphabetics, reading fluency, and comprehension) by providing some type of summary score across domains, such as a “total reading score” on a standardized reading test. Grades in reading or language arts classes are acceptable outcomes in this domain.

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<sup>5</sup> Writing outcomes are outside the scope of the Adolescent Literacy review, but they will be included in the WWC review of writing interventions.

## **ELIGIBILITY CRITERIA AND EVIDENCE STANDARDS**

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### **Populations to be Included**

The Adolescent Literacy topic area will review studies of interventions administered to students in grades 4–12 (or 9–18 years of age).<sup>6</sup>

Studies of reading interventions involving students in grades K–3 are reviewed under the WWC Beginning Reading topic area. For studies that include samples of students that span both the Adolescent Literacy and Beginning Reading topic areas and cannot be disaggregated by grade level, the Adolescent Literacy topic area will review any studies that include fifth-grade students or higher (for example, a combined sample of students from grades 3–5). Any such studies that do not include fifth-grade students or higher will be covered by the Beginning Reading topic area (for example, a combined sample of students from grades K–4).

When study authors include a longitudinal sample of students that receive the intervention in grades covered by both the Adolescent Literacy and Beginning Reading topic areas, any studies in which the students receive the intervention in grade 5 (or higher) will be reviewed by the Adolescent Literacy topic area (for example, a study in which receipt of the intervention spans grades 2–5). Any such studies that do not include receipt of the intervention in grade 5 or higher will be covered by the Beginning Reading topic area (for example, a study in which receipt of the intervention spans grades K–4).

Studies of adolescents who are typically developing, as well as those at risk for reading difficulties, including adolescents with learning disabilities and low-income minority adolescents, are considered for Adolescent Literacy reviews. To be included in our reviews, at least 50% of the students in each study must be general education students (which excludes students classified as English language learners [ELL] or limited English proficient [LEP] or receiving special education services, as these students are included in other WWC topic area reviews). For any studies that present analyses of subgroups of the study sample, the subgroup analyses also will be eligible for review in the Adolescent Literacy topic area.

These subgroups include the following:<sup>7</sup>

- Students of differing achievement levels (e.g., poor readers, underachievers)
- Students of different ages (e.g., different levels of cognitive development)

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<sup>6</sup> The primary criterion for determining if a study is eligible for review is the grade range. Studies with students in grades 4–12 are eligible for review. Studies that include students who are older than 18 and younger than 9 are included as long as they are in grades 4–12. If authors do not provide the grade level of study students, we will use the age range of 9–18 to determine if the study is eligible for review within the Adolescent Literacy topic area.

<sup>7</sup> Subgroup analyses of students classified as needing special education services will be included in the other WWC topic areas focusing on special education students. Subgroup analyses of English language learners (ELL) or students classified as limited English proficient (LEP) will be included in the WWC English Language Learner topic area.

- Students from different grades (e.g., primary versus secondary)
- Students from different socioeconomic backgrounds
- Students who are members of ethnic or racial minorities

Students living in high poverty and students from minority groups are of particular interest because these populations lag behind the population as a whole in reading achievement.

## **Types of Interventions to be Included**

The specific interventions considered for inclusion are determined after an exhaustive search of the published and unpublished literature by the Adolescent Literacy Team, as well as a review of nominations submitted to the WWC. Only research on interventions that are replicable (e.g., can be reproduced) are reviewed. The types of interventions included are as follows:

- Programs/products, such as<sup>8</sup>
  - Comprehensive, non-textbook-based programs—some are curriculum based, others focus on staff development—intended to serve as a school’s prime literacy instruction program for students in grades 4–12
  - Supplemental programs for students in grades 4–12 that are intended to enhance whole-school and/or whole-classroom literacy
  - Grades 4–12 reading or literacy textbooks intended for whole-school and/or whole-classroom use
  - Programs aimed at struggling readers in grades 4–12 and students who read behind their grade level, such as remedial curricula that aim to bring low-achieving students’ academic performance closer to the standards for their grade in school
  - Software designed to improve literacy skills
- Practices (e.g., semantic mapping, vocabulary instruction, questioning, summarizing)
- Policies (e.g., a schoolwide literacy initiative)
- Variations across programs, products, practices, and policies that include:
  - Targeting to specific populations (e.g., students below grade level, at-risk students)

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<sup>8</sup> Although the Adolescent Literacy topic area will focus on studies of interventions used during the regular school day, studies of interventions used during afterschool programs or in the context of dropout prevention programs also will be eligible for review. For example, a study of the use of *Read 180* in an afterschool program or a study of the use of *Accelerated Reader* as part of a dropout prevention program would be eligible for review.

## WWC Evidence Review Protocol for Adolescent Literacy Interventions

- The intention to be a school’s primary literacy instruction program versus a supplemental literacy program
- Relative emphasis on implementing a packaged curriculum versus provision of professional development
- Relative emphasis on approaches focused on the reading of literature versus content materials drawn from subject matters
- Different level of implementation (national, statewide, districtwide, schoolwide, individual grades, whole group, small group, one-on-one)
- Different medium/media through which program is implemented (e.g., computer software, textbooks)
- Relative emphasis on enhancing specific literacy outcomes (e.g., phonics skills versus text comprehension skills)
- “Branded” and “non-branded” interventions. Branded interventions are commercial programs and products that may possess any of the following characteristics:
  - An external developer who
    - Provides technical assistance (e.g., instructions/guidance on the implementation of the intervention)
    - Sells or distributes the intervention
  - Replicability: packaged or otherwise available for distribution/use beyond a single site
  - Trademark

### **Elements of Intervention Replicability**

The following characteristics of an intervention must be documented to reliably replicate the intervention with different participants, in other settings, at other times:

- Intervention description
  - Skill(s) being targeted
  - Approach to enhancing the skill(s)
  - Targeted population
  - Unit of delivery of the intervention (i.e., whole group, small group, or individual student)

## WWC Evidence Review Protocol for Adolescent Literacy Interventions

- Medium/media of delivery of the intervention (i.e., teacher-led instruction or software)
- Intervention duration: amount of time to implement the intervention
- Description of individuals delivering the intervention: characteristics of the individuals administering the intervention

An intervention's effectiveness may vary by location, and a study that claims to test the effectiveness of an intervention should attempt to examine the effects of the intervention across different settings, such as:

- Location types (urban, rural, suburban)
- School types (e.g., public, private, parochial)
- Classroom types (e.g., regular, inclusion)

### **Types of Research Studies to be Included**

The study must have been publicly released in 1989 or later and obtained by the WWC prior to drafting the intervention report. We believe this time frame adequately represents the current status of the field as well as allowing for a manageable project scope.

The adolescent literacy literature search focuses on studies involving programs/products, practices, and policies to improve the literacy skills of students in grades 4–12. To be included in the review, a study must meet several relevancy criteria:

- **Topic relevance.** The study has to be about adolescent literacy, focusing on alphabetics, reading fluency, comprehension, or general literacy achievement. The study is required to focus on the effects of interventions, and not on
  - Individual differences (e.g., correlational studies examining the association between reading speed and performance on a reading test or studies focusing on brain functions or structures)
  - Assessment (e.g., on properties of an instrument)
- **Language relevance.** The study should be written in English.
  - Studies that are written in English but focus on literacy in other languages are excluded from the review.
- **Time frame relevance.** The study has to have been published in 1989 or later.
- **Sample relevance.** The sample must include students in grades 4–12 (or ages 9–18) who read and write in English.
  - The intervention has to have taken place in grades 4–12; the outcome could be measured in grades 4–12 or later.

## WWC Evidence Review Protocol for Adolescent Literacy Interventions

- Studies that focus exclusively or primarily on students classified as needing special education services or on ELL or LEP students are excluded from consideration.<sup>9</sup>
- ***Study design relevance.*** The study design and focus are limited to studies that:
  - Are empirical and use quantitative methods and inferential statistical analysis
  - Take the form of a randomized controlled trial (RCT), a regression-discontinuity design (RDD), a quasi-experimental design (QED), or a single-case experimental design (SCD)
- ***Outcome relevance.*** The study is required to:
  - Focus on student outcomes (not teacher or other outcomes)
  - Focus on students’ literacy-related outcomes (not non-literacy-related outcomes, such as motivation or engagement)
  - Include at least one relevant outcome<sup>10</sup> that demonstrates adequate face validity or reliability

### **Outcomes Included and Reliability Standards**

Alphabetics (phonemic awareness, phonological awareness, letter identification, print knowledge, and phonics), reading fluency, comprehension (vocabulary or reading comprehension), and general literacy achievement (general reading achievement) are our primary outcomes of interest. Although we recognize the importance of motivation and attitudes toward reading, we have focused this review solely on student achievement outcomes.

These literacy skills may be measured by standardized achievement tests, by researcher- or teacher-developed assessments, and by post-intervention reading or language arts class grades.

Reliability of outcome measures (internal consistency, temporal stability/test-retest reliability, and inter-rater reliability) will be assessed using the following standards determined by the WWC Standards and Statistics, Technical, and Analysis Team (STAT):

For group design studies (RCT, RDD, or QED):

- Internal consistency score reliability: minimum of 0.60
- Temporal stability/test-retest score reliability: minimum of 0.40
- Inter-rater score reliability: minimum of 0.50 (percent agreement, correlation, Kappa)

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<sup>9</sup> Studies in which at least 50% of the sample is classified as needing special education services will be reviewed in other WWC topic areas focusing on special education students. Studies in which at least 50% of the sample is classified as ELL or LEP will be reviewed in the ELL topic area.

<sup>10</sup> A relevant outcome is an outcome that falls in one of the domains listed on pages 1, 2, and 3 of this document (in the “Key Definitions” section).

For single-case design research (SCD):

- The outcome variable must be measured systematically over time by more than one assessor, and the study needs to collect inter-assessor agreement in all phases and at least 20% of all sessions (total across phases) for a condition (e.g., baseline, intervention).

According to WWC standards, SCD studies must demonstrate reliability of outcomes through an inter-observer assessment (IOA; <http://ies.ed.gov/ncee/wwc/DocumentSum.aspx?sid=19>, Appendix F). Inter-observer reliability is particularly relevant for measures that require an observer to score another person's behavior or complete a rating or checklist describing the behavior observed. Reading outcomes that involve written responses need not meet the SCD IOA requirement if the principal investigator (PI) determines that the responses can be scored by a single coder with a high degree of reliability. An example of outcomes that would not require IOA is written responses to a reading test. An example that would require IOA is coding of a written paragraph intended to demonstrate the quality of the student's narrative writing.

In addition to the reliability with which an outcome is measured, the PI will determine whether an outcome measure is too closely aligned with an intervention to be considered for inclusion in the review. An outcome may be determined to be too closely aligned with an intervention if the group that received the intervention was directly exposed to the outcome, such as a particular passage of text or vocabulary words, and the comparison group was not.

## Reporting Outcomes in Intervention Reports

A reading intervention may have an immediate effect as well as a longer-term effect on student achievement. Thus, outcomes measured at the end of an intervention (posttest), as well as those measured any time thereafter (follow-ups), are relevant outcomes for review. As a rule, the end-of-intervention (posttest) outcome measure will be used to determine the WWC effectiveness rating and, therefore, will be reported in Appendix C of the intervention report. The follow-up outcome measures will generally be reported in Appendix D.

An effect can also be measured after different amounts of time of a reading intervention's implementation (for example, after 1, 2, or 3 years of intervention implementation). As a rule, the outcome measure that reflects the maximum exposure to the intervention (for example, after 3 years of the intervention's implementation) will be used to determine the WWC effectiveness rating (and, therefore, will be reported in Appendix C of the intervention report). The intermediate outcome measures (for example, after 1 and 2 years of implementation) will generally be reported in Appendix D. However, the PI may decide that intermediate outcome measures should contribute to the WWC effectiveness rating. The PI will consider factors such as the prevalence of findings across implementation levels and the design of the intervention when making this determination.

A study author can also report *both* a total test score *and* subtest scores (for example, the total CAT/5 reading score *and* the Vocabulary and Comprehension subtests). As a rule, the total score will be used to determine the WWC effectiveness rating (and, therefore, will be reported in Appendix C of the intervention report). The subtest scores will generally be reported in Appendix D. However, if the total score is not statistically significant and subtest findings are

significant (or some of them are), then we will report the *subtest* scores in Appendix C and the *total* scores in Appendix D, so the subtest scores will factor into the WWC effectiveness rating.

For studies that also present analyses of subgroups of the study sample, the entire study sample findings will be used to determine the WWC effectiveness rating (and, therefore, will be reported in Appendix C of the intervention report). The subgroup analyses of interest for the Adolescent Literacy topic area will generally be reported in Appendix D.

## Design Ratings

Sample attrition is a key factor in determining the WWC rating for RCTs. Baseline equivalence on measures of the outcome variable or factors correlated with the outcome measure is a key factor in determining the WWC rating for QEDs and RCTs with high attrition.

**Attrition in RCTs.** The WWC considers both the overall sample attrition rate and the differential in sample attrition between the intervention and comparison groups, as both contribute to the potential bias of the estimated effect of an intervention. The WWC has established conservative and liberal standards for acceptable levels of attrition. The conservative standards are applied in cases where the PI has reason to believe that much of the attrition is endogenous to the intervention reviewed—for example, high school students choosing whether or not to participate in a drop-out prevention program. The liberal standards are applied in cases where the PI has reason to believe that much of the attrition is exogenous to the intervention reviewed (e.g., in cases where movement of young children in and out of school districts is due to family mobility). Attrition rates are based on the number of sample cases used in the analysis sample with measured, as opposed to imputed, values of the outcome measures.

The Adolescent Literacy review uses the liberal standard. Table 1 presents the maximum difference in the attrition rate for the intervention and comparison group that is acceptable for a given level of overall sample attrition. The empirical basis for these thresholds is described in Appendix A of the *WWC Procedures and Standards Handbook*, version 2.1.

Studies based on cluster random assignment designs must meet attrition standards for both the study sample units that were assigned to intervention or comparison group status (e.g., schools or districts) and the study sample units for analysis (e.g., typically, students). In applying the attrition standards to the subcluster level (e.g., students), the denominator for the attrition calculation includes only sample members in the clusters that remained in the study sample.

RCTs with combinations of overall and differential attrition rates that exceed the applicable threshold, based on the applicable standard, must demonstrate baseline equivalence of the analysis sample, or, if nonequivalence falls within the allowable range, statistically control for the nonequivalence, in order to receive the second-highest rating: *meets WWC evidence standards with reservations*. See the Baseline Equivalence section for more details.

**Table 1: Attrition Standards for Randomized Controlled Trials  
Highest Level of Differential Attrition Allowable to Meet the  
Attrition Standard Under the Liberal Attrition Standard**

Overall Attrition	Allowable Differential Attrition	Overall Attrition	Allowable Differential Attrition
0	10.0	34	7.4
1	10.1	35	7.2
2	10.2	36	7.0
3	10.3	37	6.7
4	10.4	38	6.5
5	10.5	39	6.3
6	10.7	40	6.0
7	10.8	41	5.8
8	10.9	42	5.6
9	10.9	43	5.3
10	10.9	44	5.1
11	10.9	45	4.9
12	10.9	46	4.6
13	10.8	47	4.4
14	10.8	48	4.2
15	10.7	49	3.9
16	10.6	50	3.7
17	10.5	51	3.5
18	10.3	52	3.2
19	10.2	53	3.0
20	10.0	54	2.8
21	9.9	55	2.6
22	9.7	56	2.3
23	9.5	57	2.1
24	9.4	58	1.9
25	9.2	59	1.6
26	9.0	60	1.4
27	8.8	61	1.1
28	8.6	62	0.9
29	8.4	63	0.7
30	8.2	64	0.5
31	8.0	65	0.3
32	7.8	66	0.0
33	7.6	67	—

**Baseline Equivalence.** RCTs with high attrition and all QEDs must demonstrate baseline (that is, pre-intervention) equivalence between the intervention and comparison groups in the analysis sample in order to receive the rating of *meets WWC evidence standards with reservations*. Baseline equivalence is examined on measures of the outcomes or baseline measures that are expected to be highly correlated with these outcomes. For the Adolescent Literacy review, these variables are a pretest of an acceptable outcome measure, which can come from any of the four outcome domains:

1. alphabetics (phonemic awareness, phonological awareness, letter identification, print knowledge, and phonics)
2. reading fluency
3. comprehension (vocabulary development and reading comprehension)
4. general literacy achievement (general reading and other related academic achievement)

Groups are considered equivalent if the reported differences in mean baseline characteristics of the groups are less than or equal to 5% of the pooled standard deviation in the sample. If this is the case, the equivalence standard is met, and the study can receive a rating of *meets WWC evidence standards with reservations*. Statistical significance of the difference in means is not considered.

If differences are greater than 5% and less than or equal to 25% of the pooled standard deviation in the sample, the study findings must be based on analytic models that control for the individual-level baseline characteristic(s) on which the groups differ in order to receive a rating of *meets WWC evidence standards with reservations*. Otherwise, the study is rated *does not meet WWC evidence standards*.

If baseline differences are greater than 25% of the pooled standard deviation for *any* of the measures of reading skills (in *any* of the four domains), the study does not meet the baseline equivalence standard, regardless of whether or not the impacts are estimated using models that control for baseline characteristics. Therefore, the study is rated *does not meet WWC evidence standards*.

Finally, when there is evidence that the populations being compared are drawn from very different settings (such as rural versus urban, or high-SES versus low-SES), these settings may be deemed too dissimilar to provide an adequate comparison. In these cases, the study is rated *does not meet WWC evidence standards*.<sup>11</sup>

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<sup>11</sup> The Adolescent Literacy review team also will examine other baseline characteristics (when available) to assess baseline equivalence of studies. These characteristics include, but are not limited to: gender, IQ scores, race/ethnicity, percentage of English-as-a-second-language students, measures of underserved population status, special education, school location, and average class size. The provision of all such information, however, is not a requirement of the review.

## Statistical and Analytical Issues

Statistical properties of the data that are important to obtain an accurate estimate of an effect size include the following:

- For most statistics (including d-indexes), normal distribution and homogeneous variances are important properties.
- Odds-ratios have no required desirable properties except the minimum of five observations per cell.

RCT studies with low attrition do not need to use statistical controls in the analysis, although statistical adjustment for well-implemented RCTs is permissible and can help generate more precise effect size estimates. For RCTs, the effect size estimates will be adjusted for differences in pre-intervention characteristics at baseline (if available) using a difference-in-differences method if the authors did not adjust for the pretest (see Appendix B of the *Handbook*). Beyond the pre-intervention characteristics required by the equivalence standard, statistical adjustment can be made for other measures in the analysis as well, although they are not required.

For the WWC review, the preference is to report on and calculate effect sizes for post-intervention means adjusted for the pre-intervention measure. If a study reports both unadjusted and adjusted post-intervention means, the WWC review will report the adjusted means and unadjusted standard deviations. If adjusted post-intervention means are not reported, they will be requested from the author(s).

The statistical significance of group differences will be recalculated if (a) the study authors did not calculate statistical significance, (b) the study authors did not account for clustering when there was a mismatch between the unit of assignment and the unit of analysis, and (c) the study authors did not account for multiple comparisons when appropriate. Otherwise, the review team will accept the calculations provided in the study.

When a misaligned analysis is reported (that is, the unit of analysis in the study is not the same as the unit of assignment), the effect sizes computed by the WWC will incorporate a statistical adjustment for clustering. The default intraclass correlation used for the Adolescent Literacy review is 0.20. For an explanation of the clustering correction, see Appendix C of the *Handbook*.

All standards apply to overall findings and analyses of subsamples of students.

## LITERATURE SEARCH METHODOLOGY

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### Collecting and Screening Studies

The WWC literature search is comprehensive and systematic. Detailed protocols guide the entire literature search process. At the beginning of the process, relevant journals, organizations, and experts are identified. The WWC searches core sources and additional topic-specific sources identified by the PI and the senior content advisor (for example, Deshler et al., 2007; Slavin et al., 2008). The process is fully and publicly documented.

### Sources for Studies

Trained WWC staff members use the following strategies in collecting studies:

#### Databases

This is the core list of electronic databases that are searched across topics:

- **ERIC.** Funded by the U.S. Department of Education (ED), ERIC is a nationwide information network that acquires, catalogs, summarizes, and provides access to education information from all sources. All ED publications are included in its inventory.
- **PsycINFO.** PsycINFO contains more than 1.8 million citations and summaries of journal articles, book chapters, books, dissertations, and technical reports, all in the field of psychology. Journal coverage, which dates back to the 1800s, includes international material selected from more than 1,700 periodicals in more than 30 languages. More than 60,000 records are added each year.
- **Campbell Collaboration.** C2-SPECTR (Social, Psychological, Educational, and Criminological Trials Register) is a registry of more than 10,000 randomized and possibly randomized trials in education, social work and welfare, and criminal justice.
- **Dissertation Abstracts.** As described by Dialog, Dissertation Abstracts is a definitive subject, title, and author guide to virtually every American dissertation accepted at an accredited institution since 1861. Selected master's theses have been included since 1962. In addition, since 1988, the database has included citations for dissertations from 50 British universities that have been collected by and filmed at the British Document Supply Centre. Beginning with DAIC (Dissertation Abstracts International, Section C) Volume 49, Number 2 (spring 1988), citations and abstracts from Section C, Worldwide Dissertations (formerly European Dissertations), have been included in the file. Abstracts are available for doctoral records from July 1980 (Dissertation Abstracts International, Volume 41, Number 1) to the present. Abstracts are included for master's theses from spring 1988 (Masters Abstracts, Volume 26, Number 1) to the present.
- **Academic Search Premier.** This multidisciplinary database provides full text for more than 4,500 journals, including full text for more than 3,700 peer-reviewed titles. PDF

backfiles to 1975 or further are available for well over 100 journals, and searchable cited references are provided for more than 1,000 titles.

- ***EconLit.*** EconLit, the American Economic Association’s electronic database, is the world’s foremost source of references to economic literature. The database contains more than 785,000 records from 1969–present. EconLit covers virtually every area related to economics.
- ***Business Source Corporate.*** This source contains full text from nearly 3,000 quality business and economics magazines and journals (including full text of many only abstracted in other sources we search). Information in this database dates as far back as 1965.
- ***SocINDEX with Full Text.*** SocINDEX with Full Text is the world’s most comprehensive and highest quality sociology research database. It features more than 1,986,000 records with subject headings from a 19,600+ term sociological thesaurus designed by subject experts and expert lexicographers. SocINDEX with Full Text contains full text for 708 journals dating back to 1908. This database also includes full text for more than 780 books and monographs, and full text for 9,333 conference papers.
- ***EJS E-Journals.*** E-Journals from EBSCO host<sup>®</sup> include article-level access for thousands of e-journals available through EBSCO’s Electronic Journal Service (EJS). This resource covers journals to which Mathematica subscribes.
- ***Education Research Complete.*** Education Research Complete is the definitive online resource for education research. Topics covered include all levels of education from early childhood to higher education, and all educational specialties, such as multilingual education, health education, and testing. Education Research Complete provides indexing and abstracts for more than 1,840 journals, as well as full text for more than 950 journals, and it includes full text for more than 81 books and monographs and for numerous education-related conference papers.
- ***WorldCat.*** WorldCat is the world’s largest network of library content and services. It allows users to simultaneously search the catalogs of more than 10,000 libraries, containing more than 1.2 billion books, dissertations, articles, CDs, and other media.
- ***Google Scholar.*** Google Scholar provides a simple way to broadly search for scholarly literature. From one place, users can search across many disciplines and sources: peer-reviewed papers, theses, books, and abstracts and articles from academic publishers, professional societies, preprint repositories, universities, and other scholarly organizations.

## Search Parameters

After the identification of the topics for review, the project coordinator and the librarians initiate the search using keywords and search terms for each database.

The senior content advisor reviews and supplements the list with additional keywords and search terms.

**Table 2. Examples of Adolescent Literacy Keywords Used for Electronic Searches<sup>12</sup>**

Keywords	Related Search Term(s) <sup>13</sup>
Literacy	Reading development, literacy programs, reading, literacy
Reading skills	Language skills, reading ability, reading speed, sight vocabulary, word recognition
Reading comprehension	Reading comprehension, comprehension, reading strategies, reading rate, verbal comprehension
Vocabulary development	Vocabulary development, lexicography, verbal development, vocabulary building, vocalization, communication, oral communication, verbal communication
Phonics	Phonics, phonetics, aural learning, word study skills
Reading fluency	Reading fluency, readability
Content area literacy	History, social sciences, sciences
Literacy instruction	Basal reading, remedial reading, reading instruction, literacy programs, reading education, literacy education
Educational strategies	Educational strategies, educational methods, instructional design, learning strategies, instructional strategies
Instructional materials	Courseware, learning modules, textbooks, workbooks, protocol materials, reading materials, educational games, educational resources, material development, instructional media
Intervention	Intervention, educational therapy, practice, curricul*, approach, program, technique, strateg*, train*, instruct*, teach*
Instructional effectiveness	Instructional improvement, program effectiveness, administrator effectiveness, curriculum evaluation, educational quality, outcomes of education, instructional media
Assignments	Homework, reading assignments, schoolwork
Reading achievement	Reading achievement, reading failure, achievement gains, academic achievement, reading improvement, speech improvement, improvement programs, success

<sup>12</sup> Based on reviews of research in the Beginning Reading topic area and the Adolescent Literacy practice guide, the Adolescent Literacy topic area began reviews on a substantial list of interventions. The team will use the keyword search to identify more interventions in the future as needed.

<sup>13</sup> The asterisk (\*) in the keyword list allows the truncation of the term and will return any word that begins with the specified letters.

Keywords	Related Search Term(s) <sup>13</sup>
Grades 4–12	Grade 4, grade 5, grade 6, grade 7, grade 8, grade 9, grade 10, grade 11, grade 12, elementary school students, secondary school students, middle school students, high school students
Adolescent	Adolescents, adolescence
Study design	Control group, random, simultaneous treatment, comparison group, regression discontinuity, matched group, baseline, ABAB design, treatment, experiment, meta analysis/meta-analysis, evaluation, impact, effectiveness, causal, posttest/post-test, pretest/pre-test, QED, single case, RCT, alternating treatment, single subject

### “Fugitive” or “Grey” Literature

Our search for fugitive or grey literature encompasses five strategies:

1. Public submissions:

- Materials submitted via the WWC website
- Materials submitted directly to WWC staff

2. Solicitations made to key researchers by the Evidence Report Team

3. Searches of websites summarizing research on programs for children and youth (i.e., Best Evidence Encyclopedia [BEE]), prior reviews, and research syntheses (i.e., using the reference lists of prior reviews and research syntheses to make sure we have not omitted key studies)

4. Searches of the websites of all the developers of literacy-related programs/products and interventions for any research or implementation reports.

5. Searches of websites of the following organizations:

- ABT Associates
- Alliance for Excellent Education
- American Enterprise Institute
- American Institutes for Research (AIR)
- Appalachian Education Laboratory (Edvantia)
- Best Evidence Encyclopedia (BEE)
- Brookings Institution
- Carnegie Corporation
- Center for Comprehensive School Reform and Improvement
- Center for Data-Driven Reform in Education (CDDRE) at Johns Hopkins University
- Center for Research and Reform in Education (CRRE) at Johns Hopkins University
- Center for Research in Educational Policy (CREP)
- Center for Social Organization of Schools at Johns Hopkins University
- Chapin Hall Center for Children

Congressional Research Service  
Florida Center for Reading Research (FCCR)  
Government Accountability Office  
Harvard University  
Heritage Foundation  
Institute for Public Policy and Social Research (IPPSR)  
Learning Point Associates  
MDRC  
Mid-Continent Research for Education and Learning  
National Center on Secondary Education and Transition  
National Dropout Prevention Centers  
National Governors' Association  
National Reading Panel  
Pacific Resources for Education and Learning (PREL)  
Public Education Network  
Public Policy Research Institute at Texas A&M University  
Public/Private Ventures (PPV)  
Rand Corporation  
Southwest Educational Development Laboratory (SEDL)  
SRI  
Thomas B. Fordham Institute  
Urban Institute

References resulting from these searches will be screened and sorted by intervention.

## **Intervention Search**

The primary objective of the intervention search is to identify *all* effectiveness studies conducted for a specific intervention identified in the keyword search and by other search strategies.

The strategies for the search are as follows:

- Conduct standard library searches of the intervention name.<sup>14</sup>
- Scan references to identify possible synonyms for the intervention in the literature and conduct standard library searches of these terms.
- Once some potentially eligible studies are identified, request full text and review the reference lists to cross-check search results. Similarly, review relevant literature reviews. Revise search terms as needed.
- Identify seminal researchers associated with the intervention. Conduct full-text searches of the researcher name combined with the intervention name.
- Identify seminal studies of the intervention and conduct searches of the associated citations.
- Contact the intervention's developer for a list of known research on the intervention.

All references resulting from these searches will be screened for eligibility.

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<sup>14</sup> A standard library search consists of searching titles and abstracts in each of the databases described earlier.

## REFERENCES

- Deshler, D., Palinscar, A., Biancarosa, G., & Nair, M. (2007). *Informed choices for struggling adolescent readers: A research-based guide to instructional programs and practices*. Newark, DE: International Reading Association.
- Slavin, R., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly*, 43(3), 290–322.