

WWC EVIDENCE REVIEW PROTOCOL FOR EARLY CHILDHOOD EDUCATION INTERVENTIONS FOR CHILDREN WITH DISABILITIES, VERSION 2.0

Topic Area Focus

The What Works Clearinghouse (WWC) review in this topic area focuses on interventions that have a primary focus on outcomes associated with the school readiness of children with disabilities, including outcomes in the areas of cognition, communication competencies, literacy, mathematics achievement, social-emotional development and behavior, functional abilities,¹ and motor development. The review focuses on early childhood education (ECE) interventions (curricula, practices, and therapies) designed for use with 3- to 5-year-old children who are not yet in kindergarten and older children who are attending a preschool program. These interventions must take place in a school or center-based preschool setting, or if they take place in other locations (such as clinical settings or family homes), they must be implemented under the direction of or in collaboration with a school, preschool, or program funded through the Individuals with Disabilities Education and Improvement Act (IDEA).

The review of evidence in this topic area addresses the following questions:

- Which early childhood education interventions improve outcomes associated with school readiness among children with disabilities?
- Does the effectiveness of early childhood education interventions for children with disabilities differ by type of outcome?
- Which types of early education interventions are particularly effective for which children with disabilities under which circumstances?

Individual intervention-level reports will be released on a periodic basis.

Key Definitions

Disabilities. This review bases the definition of disabilities on the educational classification categories identified in the **Individuals with Disabilities Education and Improvement Act of 2004** (IDEA 2004). IDEA is a federal law ensuring services to children with disabilities throughout the nation. IDEA governs how states and public agencies provide early intervention, special education, and related services to eligible infants, toddlers, children, and youth with

¹ Functional abilities include self-help skills and behaviors, such as dressing, feeding, toileting, and organizational skills that affect a child's ability to adapt to and manage his or her surroundings to participate effectively and meet social expectations.

disabilities. Children and youth (ages 3–21) receive special education and related services under IDEA Part B. Section 619 of IDEA relates specifically to preschool children with disabilities. IDEA includes 14 specific categories under which a child may be found eligible for special education and related services: (1) autism, (2) deaf-blindness, (3) deafness, (4) developmental delay, (5) emotional disturbance, (6) hearing impairment, (7) mental retardation, (8) multiple disabilities, (9) orthopedic impairment, (10) other health impairment, (11) specific learning disability, (12) speech or language impairment, (13) traumatic brain injury, and (14) visual impairment including blindness.

Consistent with the IDEA eligibility categories, developmental delays are considered disabilities for this review. The term *developmental delay* means a delay in one or more of the following areas: physical development, cognitive development, communication, social or emotional development, or adaptive (behavioral) development. Under IDEA, each state defines what constitutes a delay for purposes of determination of eligibility for special education services. For purposes of this review, children with a developmental delay have been determined to have a delay based on state-defined eligibility criteria for preschool special education (Section 619) under IDEA, have scores on norm-referenced tests that are at least 2 standard deviations below the mean in one developmental area or 1.5 standard deviations below the mean in two or more developmental areas, or have a delay of at least 25% in one developmental area or 20% in two or more developmental areas.²

This review focuses on studies of students eligible for preschool special education services because of an identified disability or developmental delay. Studies of interventions conducted with children at risk for a disability or delay because of their family or caregiving situation are not included in this review; studies of at-risk students are included as part of the broader Early Childhood Education WWC review area.

For this review, the disability may have been identified through evaluations conducted as part of IDEA eligibility determination processes, by a medical evaluation, or by the researchers through direct assessment of the child and/or through administration of a diagnostic protocol to a parent or teacher. It is not adequate for a child to be identified as having a disability based solely on a parent or teacher reporting that the child has a disability, unless the parent or teacher is reporting a medical diagnosis by a doctor, such as a diagnosis of Down syndrome or autism, or reporting

² These are commonly used criteria among states that define developmental delay along these dimensions. According to Danaher (2007), 37 states use the term *developmental delay* or a variant of it as a disability category for preschool eligibility determination under IDEA. Seventeen states use terms other than developmental delay. Forty-four states use quantitative criteria. Thirty-six of the 39 states using norm-referenced criteria use 2 standard deviations (SD) below the mean in one developmental area or 1.5 SD below the mean in two or more developmental areas. Eighteen states define delay in percentages—16 of these specify a delay in the range of 20 to 33% (X month delay divided by chronological age in months) in one or more developmental areas. It is possible that children in a study will meet the threshold for a developmental delay according to the definition based on one measure but not according to another measure (e.g., children may be described on average as having a 25% delay according to one measure but have standardized test scores higher than 2 SD below the mean). For purposes of this review, if any data document that children have a developmental delay according to the definition described in this protocol, the children will be considered as having a developmental delay.

that the child has an individualized education program (IEP), which means he or she is eligible for special education and related services under IDEA.

A description of children’s disabilities and how disabilities were defined and identified is important for understanding a study’s findings; if such a description is not included in an article, it will be requested from the author.

Outcome Domains. Within the field of early childhood education, children’s school readiness is typically understood to encompass (1) cognitive and communication competencies associated with school readiness (language, literacy, math, cognition, reasoning, and problem solving); (2) social-emotional development and behavior (social relationships, self-concept, self-regulation, cooperation, engagement and persistence, initiative and curiosity); and (3) physical well-being and motor development (physical health, gross and fine motor skills, and functional abilities).³ There is a WWC General Education Early Childhood Education review that currently focuses on interventions targeting cognitive, language, literacy, or math outcomes. For this topic area, the WWC Early Childhood Education Interventions for Children with Disabilities review, a wider range of outcomes may be critical to children’s readiness to enter elementary school able to access and participate in regular classroom and curriculum activities. Thus, relevant classes of outcomes for this review include the following:

- Cognition
- Communication/language competencies
- Literacy
- Mathematics achievement
- Social-emotional development and behavior
- Functional abilities
- Physical well-being

GENERAL INCLUSION CRITERIA

Populations to be Included

This review includes interventions for 3- to 5-year-old children with disabilities who are not yet in kindergarten and older children with disabilities if they are in preschool. The children must reside in the United States or its territories or tribal entities. To be included, the children must speak English or be non-native speakers of English who are English language learners.

³ These outcome categories parallel those defined in the WWC Early Childhood Education review and are generally consistent with the child outcome categories used by the Office of Special Education Programs (OSEP) for program monitoring and accountability. The OSEP categories are (1) positive social-emotional skills (including positive social relationships), (2) acquisition and use of knowledge and skills (including early language/communication and early literacy skills), and (3) use of appropriate behaviors to meet needs.

This review focuses on the effectiveness of interventions for children with disabilities. In studies including children with disabilities and children without disabilities, priority will be given to findings for the subgroup of children with disabilities. If only aggregate findings are available, at least 50% of the study sample must be comprised of children with disabilities or, on average, the children must meet the definition for having disabilities in order for the study to be included in the review. The WWC General Education ECE review also includes studies with populations that consist of or include children with disabilities, so some studies may be included in both reviews.

If studies of an intervention have been conducted separately with children with different disabilities, the review will consider preparing separate intervention reports focusing on evidence for the effectiveness of the intervention for children with a given disability.

In studies that provide aggregated data for both preschool and kindergarten children who received the intervention, and disaggregated data are not available, the review will include the study if at least 50% of the children are in preschool.

When results are available for the subgroups of children defined by the following characteristics, they will be documented in the intervention report: age, gender, socioeconomic status, race/ethnicity, English language learners, type of disability, and severity of disability.

When results are available for the subgroups of settings based on the following characteristics, they will be documented in the intervention report: location (urban, suburban, rural), setting (preschool, clinical setting, home, other), type of setting (segregated setting or inclusive setting), and staff education/qualifications or training (e.g., certification or years of experience).

Types of Interventions to be Included

This review encompasses interventions that aim to improve the school readiness of preschool children with disabilities. These interventions must take place in a school or center-based preschool setting, or if they take place in other locations (such as clinical settings or family homes), they must be implemented under the direction of or in collaboration with a school, preschool, or program funded through IDEA.

The types of interventions that are eligible for the review include the following:

Curricula. A curriculum is a set of activities, materials, and/or guidance for working with children in classrooms that has a clearly identified name; includes a thorough write-up/description; and can be replicated by others based on written guidance, staff training, or technical assistance. Curricula may be inclusive (designed for use with all children) or targeted (designed for use with children with disabilities), comprehensive (the primary instructional tool used to guide instruction in multiple areas), or supplemental (a flexible tool for differentiated instruction).

Practices. A practice is a named approach to promoting children's development that the staff or researcher implements in interacting with children and materials in the classroom. The named approach must be clearly described and commonly understood in the field

and literature. Several terms may be used in the literature to refer to the same practice. It is also possible for a named practice to refer to an array of specific procedures.

Therapies. These include activities or exercises that are designed to promote function and prevent secondary disability and are administered by or under the supervision of a trained therapist who works directly with the child one-on-one, in a small group, or in a classroom or other authentic setting or provides consultation or support to others who work with the child one-on-one, in a small group, or in a classroom or other authentic setting.

Interventions that also include medication may be included, but interventions that consist only of medication are not eligible for the review.

Interventions in which parents implement a curriculum, practice, or therapy with their child, either at home or in an educational setting, are eligible for the review if the parents are implementing the intervention under the direction of a *school, preschool, or program funded through IDEA*. Interventions in which parents are implementing a curriculum, practice, or therapy with their child under the direction of *researchers* are eligible for the review if the intervention could be administered by a school, preschool, or program funded through IDEA.

Priority will be given to interventions that are curricula. Priority also will be given to interventions at least three weeks in duration.

Programs defined by funding streams or service delivery models are not considered interventions for this review. For example, Head Start programs are not considered interventions, although specific curricula, practices, or therapies used by these programs may be eligible for the review. Similarly, Response to Intervention (RtI) is not considered an intervention, but practices implemented in an RtI framework may be eligible.

To be reviewed, early childhood education interventions for children with disabilities must be replicable. That is, the intervention must be branded, or the following elements of the intervention must be documented: target population, characteristics of settings in which it was implemented, specification of key features or components of the intervention, characteristics of the intervention duration and intensity, and staff training required to implement the intervention.

Types of Research Studies to be Included

To be included in the review, a research study must meet the following relevancy criteria:

Topic relevance. The study has to be about outcomes associated with school readiness of young children with disabilities. The study must focus on the effects of an intervention, not on individual differences (e.g., correlational studies examining the relationship between individual attributes and performance on a test, or studies focusing on brain functions or structures) or assessment (e.g., properties of an instrument or approaches to identifying children with disabilities).

Time frame relevance. The study must have been publicly released in 1986 or later⁴ and obtained by the WWC prior to drafting the intervention report. This time frame was established in order to define a realistic scope of work for the review.

Sample relevance. The study has to satisfy several sample-related criteria:

- The sample must include children ages 3 to 5 or children who are attending a preschool program.
- The intervention must have taken place with children prior to kindergarten entry. (The outcome[s] may have been measured in kindergarten or later.)
- Studies based entirely on a sample of children with disabilities will be included. Studies based on a mix of children with disabilities and other children will be included using results for the subsample of children with disabilities if outcomes are reported separately *or* using the full sample results if at least 50% of the study sample is composed of children with disabilities. In these studies, the intervention and comparison groups must include an equivalent percentage of children with disabilities (the difference must be less than 0.25 of a standard deviation, based on the variation in the pooled sample).
- Studies that focus on outcomes for children with disabilities who also are English language learners will be included in the review (for all outcomes measured in English—see later section).
- Studies will be included in the review if they report that the study population is children with disabilities who were identified through evaluation by the preschool special education system (IDEA), by a medical evaluation, by the researchers through direct assessment of the child, or by administration of a diagnostic protocol to a parent or teacher. It is not adequate for children to be identified as having disabilities based solely on a parent or teacher reporting that a child has a disability, unless the parent or teacher is reporting a medical diagnosis by a doctor, such as a diagnosis of Down syndrome or autism, or reporting that the child has an individual education program.
- If an intervention is known to be designed for children with disabilities but the study does not identify the population as children with disabilities, information about the study population will be requested from the study author.

Study design relevance. Only empirical studies that use quantitative methods and inferential statistical analysis and that take the form of a randomized controlled trial (RCT), or use a regression-discontinuity design, a quasi-experimental design (QED), or a single-case experimental design are eligible for this review. The WWC is in the process of developing

⁴ Also, note that to be eligible, the intervention must have been implemented in 1986 (the year PL 99-457, which authorized Part C and preschool services for children with disabilities under Part B, was passed) or later.

standards for reviewing and reporting on regression-discontinuity and single-case design studies. Consequently, studies using these designs will be included in the review when the standards become available. Until then, they are included in the report references with a note indicating that standards are not yet available for that research design.

Outcome relevance. Studies in this topic area are required to focus on child outcomes, not teacher outcomes or other outcomes, and must include at least one relevant child outcome for which adequate content validity and reliability (as defined later) have been demonstrated. Studies that focus on outcomes measured in languages other than English are excluded (e.g., Spanish language skills).

SPECIFIC TOPIC PARAMETERS

The following parameters specify which studies are considered for analyses and which aspects of those studies are coded for the review.

Characteristics of eligible early childhood education interventions for children with disabilities

Eligible interventions have as their primary goal enhancing outcomes associated with the school readiness of preschool children. Eligible interventions

- Include comprehensive and supplemental curricula, such as *Creative Curriculum*, *Incredible Years*, and *Big Math for Little Kids*; practices, such as *Dialogic Reading* and time delay; and therapies designed to promote function and prevent secondary disabilities, such as sensory integration therapy.
- Must take place in a school or center-based preschool setting, or if in other locations (such as clinical settings or family homes), must be implemented under the direction of or in collaboration with a school, preschool, or program funded through IDEA.
- Must have been implemented in 1986 (the year PL 99-457, which authorized Part C and preschool services for children with disabilities under Part B, was passed) or later.
- Must be replicable and able to be disseminated.

Elements of intervention replicability

The important characteristics of an intervention that must be documented in a study so that it can be replicated reliably with different participants, in other settings, and at other times include the following:

- Whether the intervention is branded or not branded.

- If it is branded, information about how to obtain the intervention must be available. Branded interventions typically have an external developer who provides technical assistance or sells/distributes the intervention. Branded interventions can either be packaged or are otherwise available for distribution and use beyond a single site with sufficient documentation to allow the curriculum or practice to be implemented by individuals other than the developers (e.g., has a manual, curriculum guide, or other sufficiently detailed instructions for implementation). Also, branded interventions may be trademarked or copyrighted.
- Studies of interventions that are not branded must describe the intervention, including the skill(s) being targeted, the approach to enhancing the skill(s), the target population, components or features of the intervention that were implemented, characteristics of the settings in which it was implemented, the duration and intensity of the intervention, and the characteristics and training of the individuals administering the intervention.

Outcomes for children with disabilities

To be included in the review, a study must include at least one relevant child outcome that is intentionally targeted by the intervention and measured directly by administering an assessment to the child or conducting an observation of the child.

Relevant outcomes are those that fall into the following domains:

- Cognition
- Communication/language competencies
- Literacy
- Mathematics achievement
- Social-emotional development and behavior
- Functional abilities
- Physical well-being

The alignment between the outcome and the intervention is another factor considered in the review. Outcome measures that are closely aligned or tailored to the intervention are likely to demonstrate larger effect sizes than those that are less closely aligned with the intervention. When the outcome measure includes some of the same materials (such as books or passages) that are used in the intervention or is administered to the intervention group as part of the intervention, it is considered to be overaligned with the intervention. In these situations, the intervention group may have an unfair advantage over the comparison group, and the effect size is not a fair indication of the intervention's effects. Outcome measures that are overaligned with the intervention will not be included in determining an intervention's ratings for this review.

The benefits of early childhood education interventions for children with disabilities are intended to be retained well past the end of the intervention. Thus, measures at the end of an intervention, as well as any time thereafter, are admissible. Measures taken several months or years after the intervention may provide strong evidence for an intervention's effectiveness. This review, however, prioritizes immediate posttest findings for developing intervention ratings and improvement indices because these findings are most prevalent. The review includes additional follow-up findings, when available and appropriate, in appendices to the report.

Reliability and validity of outcome measures

The study must include at least one child outcome measure with evidence of face validity and for outcomes that are tests or scales, sufficient score reliability assessed using the standards listed here as determined by the WWC. If the score reliability of each outcome measure is not specified in the research article, data from the test's or scale's publisher or other sources may be used to establish the score reliability of an outcome measure for the study population. If studies did not analyze the score reliability of outcome measures using study data, and analyses by test publishers or other researchers did not include children with disabilities, any other available evidence of score reliability and validity of the measure for the study population will be considered and a decision about the adequacy of the outcome measure will be made on a case-by-case basis in consultation with experts. The standards are

- 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)

If an outcome measure is composed of different tests for different children in the sample, it will be considered a valid outcome if the following criteria are met:

- The tests purport to measure a similar construct and were standardized on a similar population, as reflected in the test manual or empirical studies focused on the test.
- The tests must meet the thresholds for reliability described above.
- There must be clear rules for which test is administered to which child, and the rules must be applied in the same way to the treatment and control groups.
- The distribution of tests administered at baseline and followup to the treatment and control groups must be similar.

If information necessary to apply these criteria is not available in the article, an author query will be initiated to obtain the information.

Time interval in which studies should have been conducted to be appropriate for the intervention report

Studies must have been published in 1986 or later.

Defining characteristics of the study population

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To be included in the review, a study's population must include

- ***Children between the ages of 3 and 5 who are not yet enrolled in kindergarten or older children attending a preschool program.*** When the authors provide aggregated data for both preschool and kindergarten children and disaggregated data are unavailable, the review will include the study if at least 50% of the children are in preschool.
- ***Children with disabilities,*** as defined earlier. In studies of children with and without disabilities, priority will be given to results for the subgroup of children with disabilities. However, if at least 50% of the study sample is composed of children with disabilities, the overall results may be included in the review.
- ***Children who speak English or are non-native English speakers who are English language learners.***
- ***Children residing in the United States*** (including U.S. territories and tribal entities).

Effectiveness of the intervention across subgroups of children

An intervention's effectiveness is likely to vary among children with different characteristics, and a study that tests the effectiveness of an intervention may examine the effects of the intervention for important subgroups of children. For studies of early childhood education interventions for children with disabilities, important subgroup characteristics include

- Age (3 to 4 and 4 to 5)
- Gender
- Socioeconomic status
- Race/ethnicity
- English language learner status
- Type of disability
- Severity of disability

When a study that meets WWC evidence standards reports intervention effects for these subgroup types and the subgroup analyses meet all of the WWC standards required for the full sample results, these effects and analyses will be included in an appendix to the intervention report.

Effectiveness of the intervention across settings

A study that seeks to test the effectiveness of an intervention might examine effects across different settings. For studies of early childhood education interventions for preschool children with disabilities, these settings might be defined by

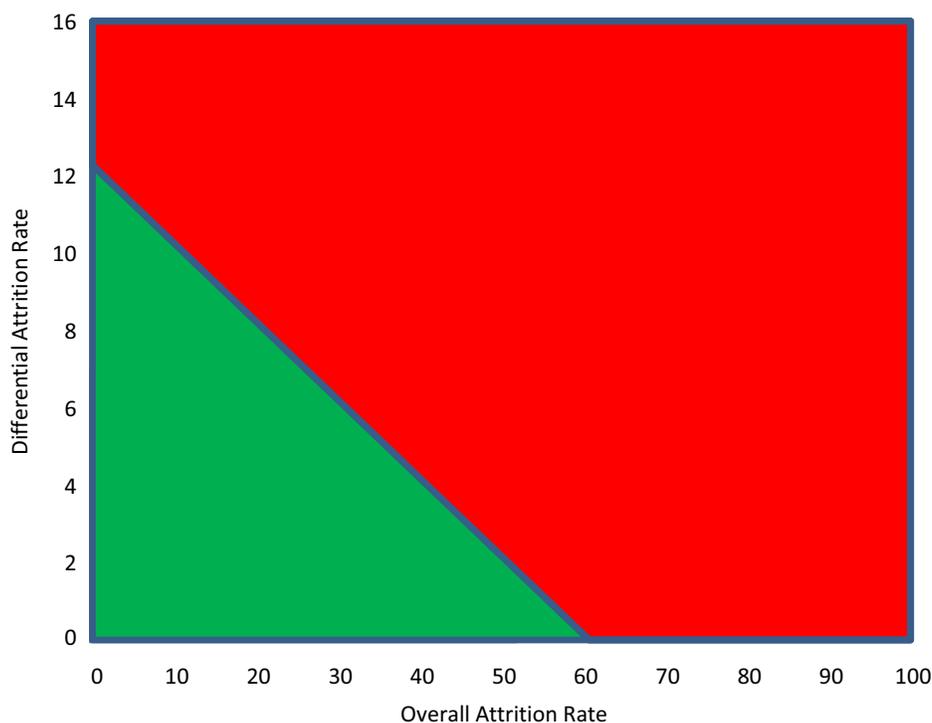
- Location (urban, suburban, or rural)
- Setting (child care center, school-based prekindergarten, Head Start, other)
- Type of setting (segregated, inclusive)
- Staff education, qualifications, or training (e.g., certification, years of experience)

When a study that meets WWC evidence standards reports intervention effects separately for these settings and the analyses of results by setting meet all of the WWC standards required for the full sample results, these effects and analyses will be included in an appendix to the intervention report.

Attrition

As described in the *WWC Procedures and Standards Handbook (version 2.0)*, the WWC is concerned about overall and differential attrition from the intervention and comparison groups for RCTs, as both contribute to the potential bias of the estimated effect of an intervention. The attrition bias model developed by the WWC will be used in determining whether a study meets WWC evidence standards (see Appendix A of the handbook).

When the combination of overall and differential attrition rates causes an RCT study to fall in the green area on the diagram shown below, the attrition will be considered “low” and the level of bias acceptable. This reflects the assumption that most attrition in studies of early childhood education interventions for children with disabilities is due to exogenous factors, such as parent mobility and absences on the days that assessments are conducted. However, for RCTs with combinations of overall and differential attrition rates in the red area, the attrition will be considered “high” and potentially have high levels of bias and therefore must demonstrate equivalence.



Many studies reviewed by the WWC are based on designs with multiple levels. Bias can be generated not only from the loss of clusters (such as schools), but also from sample members within the clusters (such as students), if those sample members attrit as a result of their treatment status. The attrition standard applies to both levels. To meet the standard, a study must first pass at the cluster level, using the attrition boundary set above. Second, the study must pass at the subcluster level, again using the attrition boundary set above, *with attrition based only on the clusters still in the sample*. That is, the denominator for the subcluster attrition calculation includes only sample members at schools or classrooms that remain in the study after cluster attrition.

Group equivalence

If the study design is an RCT with high levels of attrition or a QED, the study must demonstrate baseline equivalence of the intervention and comparison groups for the analytic sample. The onus for demonstrating equivalence in these studies rests with the author. Sufficient reporting of pre-intervention data should be included in the study report (or obtained from the study author) to allow the review team to draw conclusions about the equivalence of the intervention and comparison groups. Pre-intervention characteristics can include the outcome measure(s) administered prior to the intervention or other measures that are not the same as, but are highly related to, the outcome measure(s).

For this topic area, it is possible for a study to meet evidence standards in one or more domains and not in others. Thus, rules for establishing baseline equivalence should be applied *within each domain*.

Groups are considered equivalent if the reported differences in pre-intervention characteristics of the groups are less than or equal to one-quarter of the pooled standard deviation in the sample, regardless of statistical significance. However, if differences are greater than 0.05 standard deviations and less than or equal to one-quarter of the pooled standard deviation in the sample, the analysis must control analytically for the individual-level pre-intervention characteristic(s) on which the groups differ. If pre-intervention differences are greater than 0.25 for *any* of the listed characteristics, the study does not meet standards.

Given the potential for selection bias in QEDs, the possibility that the intervention and comparison groups were drawn from different populations is also a concern. Fundamental differences in the settings from which the intervention and comparison groups in a QED study were drawn and baseline differences in the characteristics of the intervention and comparison groups may indicate that the children in the two groups were drawn from different populations, even if they were equivalent on pretest measures. Statistically significant or large (half a standard deviation or more) differences in the characteristics and settings of children in the intervention and comparison groups are evidence that the groups were drawn from different populations, and the study does not meet WWC Evidence Standards. Important characteristics and settings to consider when they are reported include

- Percentage of children with a disability or delay
- Percentage of children with a specific type or severity of disability
- Percentage of children with an IEP
- Percentage of children from specific program settings, such as Head Start and school-based preschool programs
- Percentage of children from low socioeconomic status (SES) families

Statistical and analytical issues

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 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 authors.

The statistical significance of group differences will be recalculated if (1) the study authors did not calculate statistical significance, (2) the study authors did not account for clustering when there was a mismatch between the unit of assignment and the unit of analysis, or (3) 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 (i.e., unit of analysis is not the same as the unit of assignment) and the authors are not able to provide a corrected analysis, the effect sizes computed by the WWC will incorporate a statistical adjustment for clustering. The default intra-class correlations used for this review are 0.20 for cognitive, language, literacy, and math outcomes, and 0.10 for social-emotional development and behavior, functional abilities, and motor development outcomes. For an explanation about the clustering correction, see Appendix C of the *WWC Procedures and Standards Handbook*.

When multiple comparisons are made (i.e., multiple outcome measures are assessed within an outcome domain in one study) and not accounted for by the authors, the WWC accounts for this multiplicity by adjusting the reported statistical significance of the effect using the Benjamini-Hochberg correction. See Appendix D of the handbook for the formulas the WWC uses to adjust for multiple comparisons.

All standards apply to overall findings as well as analyses of subsamples.

METHODOLOGY

The literature search strategy for the WWC Early Childhood Education Interventions for Children with Disabilities review is two-pronged. First, the review team will conduct a keyword search to identify interventions with studies that may be eligible for review. Then, the team will conduct focused intervention searches to ensure that all potentially eligible studies of the identified interventions are identified. Each type of search is described next.

Keyword Search

Primary Objective. The primary objective is to identify interventions with potentially eligible studies and assess the likely extent of studies on each intervention, so that interventions can be prioritized for review. The focus will be on breadth rather than depth. Subsequent searches will focus on the selected interventions and be designed to capture *all* potentially eligible studies, including any that the keyword search did not identify.

Search Strategy. The following keywords are meant to capture literature that falls within the scope of the protocol. Given the objective stated above, targeted outcomes and study design terms are included to focus the search on identifying literature that will support an intervention report. The keyword list is followed by a list of databases that are searched.

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Keyword List⁵

Target Ages:

Preschool* OR pre-school* OR
Prekindergarten* OR pre-kindergarten* OR pre-k OR
Early childhood OR
Young child* OR
Head Start OR
Early intervention

AND

Disabilities:

Disab* OR
Development* delay* OR
Impair* OR
Disorder* OR
Early Intervention OR
Individual* Education Program* OR Individual Education Plan OR IEP OR
Individual* Family Service Plan* OR Individual* Family Service Program* OR IFSP OR
Special Education OR
Special Needs OR
Handicapped OR
Delay* OR
Early childhood special education OR
Deaf* OR
Blind* OR
Emotional disturbance OR
Mental retardation OR
Traumatic brain injury OR
Syndrome OR
Autism OR
Attention deficit hyperactivity disorder OR ADHD OR
Learning disability OR
Loss

AND

Target Outcomes:

Communication OR
Comprehension OR
Language OR

⁵ An asterisk in the list below is a wildcard character that may be substituted for by any set of possible characters.

Phonem* OR
Phonological OR
Vocabulary OR
Listening OR
Speech OR
Learning OR
Memory OR
Perception OR
Rhyming OR
Segmentation OR
Fluency OR
Reading OR
Writing OR
Decoding OR
Literacy OR
Math* OR
Counting OR
Coordination OR
Strength OR
Motor control OR
Gross motor development OR
Mobility OR
Physical development OR
Sensory processing OR
Self-help OR self-care OR
Personal care OR
Behavior OR
Social OR
Emotional OR
Self-regulation OR
Attention OR
Function* OR
Executive function OR
Social relationships OR
Self-concept OR
Self-regulation OR
Cooperation OR co-operation OR
Engagement OR
Persistence OR
Initiative OR
Curiosity OR
Adaptive OR
Behavior problems OR
Social skills OR
Social-emotional OR socio-emotional OR
Cognitive OR
Problem solving OR
Reasoning OR
Early literacy OR
Emergent literacy OR

Fine motor OR
Self-regulation OR
Academic OR
Science OR
School readiness

AND

Interventions:

Intervention* OR
Curricul* OR
Program* OR
Strateg* OR
Instruct* OR
Teach* OR
Train* OR
Technique* OR
Therap* OR
Approach*

AND

Study Design:

Control group OR
Comparison group OR
Matched groups OR
Treatment OR
Random* OR
Assignment OR
Baseline OR
Experiment OR
Evaluation OR
Impact OR
Effectiveness OR
Causal OR
Posttest OR post-test OR
Pretest OR pre-test OR
Randomized Control Trial OR RCT OR
Quasi-experimental design OR QED OR
Regression discontinuity design OR
Single case design OR
Single subject design OR
ABAB design OR
Alternating treatment* OR
Simultaneous treatment OR
Meta analysis

Databases

The core list of electronic databases that are searched across topics includes
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Version 2.0

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 Center. Beginning with DAIC, 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 included 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 back files 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 to the present. EconLit covers virtually every area related to economics.

Business Source Corporate. This database 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. The database 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.

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EJS E-Journals. E-Journals from EBSCO host® provide article-level access for thousands of e-journals available through EBSCO’s Electronic Journal Service (EJS). This resource covers journals that Mathematica Policy Research subscribes to.

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 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 and 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.

Cochrane Central Register of Controlled Trials. Cochrane Controlled Trials Register is a bibliography of controlled trials identified by contributors to the Cochrane Collaboration and others, as part of an international effort to hand-search the world’s journals and create an unbiased source of data for systematic reviews.

Cochrane Database of Systematic Reviews. Cochrane Database of Systematic Reviews contains full-text articles, as well as protocols focusing on the effects of health care. Data are evidence-based medicine and are often combined statistically (with meta-analysis) to increase the power of the findings of numerous studies, each too small to produce reliable results individually.

Database of Abstracts of Reviews of Effects. Database of Abstracts of Reviews of Effects (DARE) includes abstracts of published systematic reviews on the effects of health care from around the world that have been critically analyzed according to a high standard of criteria. This database provides access to quality reviews in subjects for which a Cochrane review may not yet exist.

Cochrane Methodology Register. The Cochrane Methodology Register (CMR) is a bibliography of publications that report on methods used in the conduct of controlled trials. It includes journal articles, books, and conference proceedings; these articles are taken from the MEDLINE database and from hand searches. The database contains studies of methods used in reviews and more general methodological studies that could be relevant to anyone preparing systematic reviews. CMR records contain the title of the article, information on where it was published (bibliographic details), and in some cases, a summary of the article. CMR is produced by the UK Cochrane Center, on behalf of the Cochrane Methodology Review Group.

“Fugitive” or “Grey” Literature

In addition to the keyword search, the review team seeks to identify other relevant studies through the following approaches:

- Public submissions:

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1. Materials submitted via the WWC website
 2. Materials submitted directly to WWC staff
- Solicitations made to key researchers by the review team
 - Checking websites summarizing research on programs for children and youth, prior reviews, and research syntheses (i.e., using the reference lists of prior reviews and research syntheses to make sure key studies have not been omitted)
 - Searches of the websites of all the developers of relevant interventions or practices for any research or implementation reports
 - Searches of the websites of more than 50 think tanks, research centers, and associations that conduct research in this topic area.

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

Intervention Search

Primary Objective. The primary objective is to identify *all* effectiveness studies conducted for a specific intervention identified in the keyword search.

Search Strategy

- If the intervention was reviewed under the WWC General Education Early Childhood Education review (or another topic area), all references will be re-reviewed against the protocol for this topic area.
- Conduct standard library searches of the intervention name (e.g., *Dialogic Reading*).⁶
- Scan references to identify possible synonyms for the intervention in the literature (e.g., shared book reading). 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 (e.g., Whitehurst AND dialogic reading).
- Identify seminal studies of the intervention and conduct searches of the associated citation.

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

⁶ A standard library search consists of searching titles and abstracts in each of the databases described earlier.

References

Danaher, J. (2007). *Eligibility policies and practices for young children under Part B of IDEA*. NECTAC Notes, Issue No. 24. Chapel Hill, NC: Frank Porter Graham Child Development Institute.