What Works Clearinghouse™

Bright Beginnings

Program Description[1]

Bright Beginnings is an early childhood curriculum, based in part on the *High/Scope*® and *The Creative Curriculum*® models, with additional emphasis on building early language and literacy skills. The curriculum consists of nine thematic units designed to enhance cognitive, social, emotional, and physical development. Each unit includes concept maps, literacy lessons, center activities, and home activities. Parent involvement is also a key component of the program.

Research[2]

The What Works Clearinghouse (WWC) identified one study of *Bright Beginnings* that both falls within the scope of the Early Childhood Education topic area and meets WWC evidence standards.[3] This study meets WWC evidence standards with reservations and included 198 children in 14 public preschool classrooms in Tennessee.

The WWC considers the extent of evidence for *Bright Beginnings* on the school readiness of preschool children to be small for four outcome domains—oral language, print knowledge, phonological processing, and math. There were no studies that meet standards in two other domains, so we do not report on the effectiveness of *Bright Beginnings* for those domains in this intervention report. (See the Effectiveness Summary on p. 4 for further description of all domains.)

Effectiveness

Bright Beginnings was found to have no discernible effects on oral language, print knowledge, phonological processing, or math for preschool children.

Table 1. Summary of findings[4]

Outcome domain	Rating of effectiveness	Improvement index (percentile points)		Number of studies	Number of children	Extent of evidence
		Average	Range			
Oral language	No discernible effects	+6	+5 to +7	1	197	Small
Print knowledge	No discernible effects	+8	+4 to +13	1	198	Small
Phonological processing	No discernible effects	–3	na	1	198	Small
Math	No discernible effects	+3	–3 to + 7	1	198	Small

na = not applicable

Report Contents

Program Information

Background

Bright Beginnings was developed by the former superintendent of Charlotte–Mecklenburg Schools, Eric Smith, in conjunction with district staff and local businesses. The *Bright Beginnings* curriculum, as examined in PCER Consortium (2008), currently is not being used in preschool programs or supported by any organization. Charlotte–Mecklenburg Schools currently administers a preschool program called, "Bright Beginnings Pre-K Services," which is not the curriculum that is the focus of this intervention report (Bright Beginnings Pre-K Services, Family Application Center, 1600 Tyvola Road, Charlotte, NC 28210. Telephone: (980) 343-5950).

Program details

Bright Beginnings is a curriculum that integrates parts of the *High/Scope*® and *The Creative Curriculum*® models but places greater emphasis on the development of early literacy skills. The curriculum is designed to be a child-centered, literacy-focused program that is relevant to the developmental needs of young children and addresses their cognitive, social, emotional, and physical development. *Bright Beginnings* consists of nine curriculum units: language and literacy, mathematics, social and personal development, healthful living, scientific thinking, social studies, creative arts, physical development, and technology. Active exploration and interaction with other children, adults, and materials are important components of the *Bright Beginnings* curriculum. As children participate in a variety of activities described in the *Bright Beginnings* curriculum, they are continually monitored by teachers to assess their progress. In addition, the *Bright Beginnings* curriculum includes a Family–School Connection link designed to engage parents. Parents are required to sign a parent–school partnership agreement affirming their active participation in their child's education (PCER Consortium, 2008).

Cost

The cost of implementing the *Bright Beginnings* curriculum that was examined in PCER Consortium (2008) and is described there and in Smith et al. (2003) is not available, as the curriculum currently does not appear to be supported by any organization.

Research Summary

The WWC identified six studies that investigated the effects of *Bright Beginnings* on the school readiness of preschool children.

Table 2. Scope of reviewed research

Grade	PK
Delivery method	Whole class
Program type	Curriculum

The WWC reviewed two of those studies against group design evidence standards. No studies meet WWC evidence standards without reservations. One study (PCER Consortium, 2008) is a randomized controlled trial that meets WWC evidence standards with reservations. That study is summarized in this report. One study does not meet WWC evidence standards. The remaining four studies do not meet WWC eligibility screens for review in this topic area. Citations for all six studies are in the References section, which begins on p. 6.

Summary of studies meeting WWC evidence standards without reservations

No studies of *Bright Beginnings* met WWC evidence standards without reservations.

Summary of study meeting WWC evidence standards with reservations

The PCER Consortium (2008) study assessed the effectiveness of *Bright Beginnings* during the 2003–04 school year (the national PCER evaluation year) using a randomized controlled trial of classrooms in 28 preschools in Tennessee.[5] In the pilot year of the study (the 2002–03 school year), 36 full-day preschool classrooms were sorted into groups of three on the basis of demographic and achievement characteristics and then, within each group of three, randomly assigned to one of two intervention groups, *The Creative Curriculum® for Preschool* or *Bright Beginnings*, or to a comparison group. At the time of random assignment, 21 of the 36 classrooms (seven from each group) were randomly selected to become part of the national PCER evaluation study (during the 2003–04 school year). Eight of the 21 classrooms selected for the national PCER evaluation year dropped out at the end of the pilot year, but were replaced with eight classrooms randomly selected from the original 36 classrooms, bringing the total back to seven classrooms per group in the PCER evaluation study in 2003–04 (seven *Bright Beginnings* and seven comparison).

Although the PCER Consortium (2008) study used a randomized controlled trial design to assign classrooms to intervention or comparison conditions in the pilot study year, the study analyzed data from the national PCER evaluation year (2003–04 school year), when children who had been in the classrooms at the time of random assignment (the start of the 2002–03 school year) had moved on to kindergarten, and a new class of children had replaced them. Thus, the study has high attrition at the child level and, under WWC standards, must demonstrate baseline equivalence between the intervention and comparison group samples of children used in the analyses of outcomes.

The study investigated effects on oral language, print knowledge, phonological processing, and math. The WWC based its effectiveness ratings on findings from comparisons of 98 children who received *Bright Beginnings* and 100 comparison group children. The comparison condition was not a particular curriculum; rather, it consisted of teacher-developed curricula with a focus on basic school readiness. Fifty-one percent of the children were male, 82% were Caucasian, and 23% were reported to have a disability. The study demonstrated the baseline equivalence of the outcome measures in the oral language, print knowledge, phonological processing, and math domains for the analytic sample of intervention and comparison group children at the end of the preschool year.[6] The authors reported on the effects of *Bright Beginnings* in the spring of the preschool year and again at the end of kindergarten. The kindergarten findings are not reported here because information about the baseline equivalence of the outcome measures for the kindergarten sample was not provided in the report. The authors also reported findings on the Social Skills Rating Scale; however, these findings are not reported here because the current Early Childhood Education topic area protocol does not include sociobehavioral outcomes.

Effectiveness Summary

The WWC review of the *Bright Beginnings* curriculum for the Early Childhood Education topic area includes child outcomes in six domains: oral language, print knowledge, phonological processing, early reading and writing, cognition, and math. The one study of *Bright Beginnings* that meets WWC evidence standards reported findings in four of the six domains: (a) oral language, (b) print knowledge, (c) phonological processing, and (d) math. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *Bright Beginnings* on preschool children. For a more detailed description of the rating of effectiveness and extent of evidence criteria, see the WWC Rating Criteria on p. 14.

Summary of effectiveness for the oral language domain

One study that meets WWC evidence standards with reservations reported findings in the oral language domain.

The PCER Consortium (2008) analyzed the effectiveness of *Bright Beginnings* on children's outcomes in the oral language domain using the Peabody Picture Vocabulary Test (PPVT-III) and the Test of Language Development–Primary III (TOLD-P:3) Grammatic Understanding subtest. The authors did not find statistically significant differences between the *Bright Beginnings* group and the comparison group on either measure, and the effect sizes were not large enough to be considered substantively important according to WWC criteria. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the oral language domain, one study showed indeterminate effects. This results in a rating of no discernible effects, with a small extent of evidence.

Table 3. Rating of effectiveness and extent of evidence for the oral language domain

Rating of effectiveness	Criteria met
No discernible effects *No affirmative evidence of effects.*	In the one study that reported findings, the estimated impact of the intervention on outcomes in the *oral language* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Small	One study that included 197 children in 14 classrooms reported evidence of effectiveness in the *oral language* domain.

Summary of effectiveness for the print knowledge domain

One study that meets WWC evidence standards with reservations reported findings in the print knowledge domain.

The PCER Consortium (2008) analyzed the effectiveness of *Bright Beginnings* on children's outcomes in the print knowledge domain using the Test of Early Reading Ability III (TERA-3), the Woodcock-Johnson III (WJ-III) Letter-Word Identification subtest, and the WJ-III Spelling subtest.[7] The authors reported a statistically significant positive effect of *Bright Beginnings* on the TERA-3 and no statistically significant effects on the WJ-III Letter-Word Identification subtest or on the WJ-III Spelling subtest. WWC calculations that were corrected for multiple comparisons do not confirm the statistical significance of the TERA-3 finding, but the effect size for the TERA-3 (0.32) is large enough to be considered substantively important according to WWC criteria (that is, at least 0.25). However, the mean effect for the print knowledge domain was neither statistically significant nor substantively important. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the print knowledge domain, one study showed indeterminate effects. This results in a rating of no discernible effects, with a small extent of evidence.

Table 4. Rating of effectiveness and extent of evidence for the print knowledge domain

Rating of effectiveness	Criteria met
No discernible effects *No affirmative evidence of effects.*	In the one study that reported findings, the estimated impact of the intervention on outcomes in the *print knowledge* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Small	One study that included 198 children in 14 classrooms reported evidence of effectiveness in the *print knowledge* domain.

Summary of effectiveness for the phonological processing domain

One study that meets WWC evidence standards with reservations reported findings in the phonological processing domain.

The PCER Consortium (2008) analyzed the effectiveness of *Bright Beginnings* on children's outcomes in the phonological processing domain using the Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest. The authors reported that differences between the *Bright Beginnings* group and the comparison group were not statistically significant on this measure. The effect size for the Pre-CTOPPP Elision subtest was not large enough to be considered substantively important according to WWC criteria. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the phonological processing domain, one study showed indeterminate effects. This results in a rating of no discernible effects, with a small extent of evidence.

Table 5. Rating of effectiveness and extent of evidence for the phonological processing domain

Rating of effectiveness	Criteria met
No discernible effects *No affirmative evidence of effects.*	In the one study that reported findings, the estimated impact of the intervention on outcomes in the *phonological processing* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Small	One study that included 198 children in 14 classrooms reported evidence of effectiveness in the *phonological processing* domain.

Summary of effectiveness for the math domain

One study that meets WWC evidence standards with reservations reported findings in the math domain.

The PCER Consortium (2008) analyzed the effectiveness of *Bright Beginnings* on children's outcomes in the math domain using the WJ-III Applied Problems subtest, the Composite Score from the Child Math Assessment–Abbreviated (CMA-A), and the Shape Composition task. The authors reported that differences between the *Bright Beginnings* group and the comparison group were not statistically significant, and according to WWC criteria, were not large enough to be considered substantively important. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the math domain, one study showed indeterminate effects. This results in a rating of no discernible effects, with a small extent of evidence.

Table 6. Rating of effectiveness and extent of evidence for the math domain

Rating of effectiveness	Criteria met
No discernible effects *No affirmative evidence of effects.*	In the one study that reported findings, the estimated impact of the intervention on outcomes in the *math* domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	**Criteria met**
Small	One study that included 198 children in 14 classrooms reported evidence of effectiveness in the *math* domain.

References

Studies that meet WWC evidence standards without reservations

None

Study that meets WWC evidence standards with reservations

Preschool Curriculum Evaluation Research (PCER) Consortium. (2008). Bright Beginnings and Creative Curriculum: Vanderbilt University. In *Effects of preschool curriculum programs on school readiness* (pp. 41–54). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Study that does not meet WWC evidence standards

Smith, E. J., Pellin, B. J., & Agruso, S. A. (2003). *Bright Beginnings: An effective literacy-focused PreK program for educationally disadvantaged four-year-old children*. Arlington, VA: Educational Research Service. The study does not meet WWC evidence standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Additional sources:

McClure, M. (2000). For K–12 success, North Carolina district starts early. *Curriculum Administrator, 36*(8), 24.

Neuman, S. B. (2009). Changing the odds through high-quality early care and education. In *Changing the odds for children at risk: Seven essential principles of educational programs that break the cycle of poverty* (pp. 97–126). Westport, CT: Praeger.

Smith, E. J. (2007). Weaving the gifted into the full fabric. *School Administrator, 64*(2), 10.

Tough, P. (2008). The conveyor belt. In Whatever it takes: *Geoffrey Canada's quest to change Harlem and America* (pp. 188–212). New York: Houghton Mifflin Harcourt.

Studies that are ineligible for review using the Early Childhood Education Evidence Review Protocol

Bucci, A. F. (2000). Using Title I and local funds to build quality preschool programs in Charlotte-Mecklenburg: A 'Bright Beginning'. In *Current state and local initiatives to support student learning: Early childhood programs and innovative programs to better address the needs of youth* (pp. 12–17). Selected presentations from an "Ensuring Student Success through Collaboration Network" conference (September 12–15, 1999), Louisville, KY. The study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.

Chambers, B., Cheung, A., Slavin, R. E., Smith, D., & Laurenzano, M. (2010). *Effective early childhood education programs: A systematic review*. Baltimore, MD: Johns Hopkins University, Center for Research and Reform in Education. Retrieved from http://www.bestevidence.org/word/early_child_ed_Sep_22_2010.pdf The study is ineligible for review because it is a secondary analysis of the effectiveness of an intervention, such as a meta-analysis or research literature review.

Charlotte–Mecklenburg Schools. (n.d.) *Comparison study of 1997–98 Bright Beginning participants percent at or above grade level on end-of-year assessment*. Retrieved from http://www.cms.k12.nc.us/cmsdepartments/ci/pre-kservices/Pages/ComparisonStudy.aspx The study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.

Charlotte–Mecklenburg Schools. (2004). *Charlotte-Mecklenburg Schools Bright Beginnings program cost-benefit analysis project report*. Retrieved from http://www.cms.k12.nc.us/cmsdepartments/ci/pre-kservices/Documents/Cost%20Benefit%20Analysis.pdf The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.

Appendix A: Research details for PCER Consortium (2008)

Preschool Curriculum Evaluation Research (PCER) Consortium. (2008). Bright Beginnings and Creative Curriculum: Vanderbilt University. In *Effects of preschool curriculum programs on school readiness* (pp. 41–54). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Table A. Summary of findings

Meets WWC evidence standards with reservations

		Study findings	
Outcome domain	Sample size	Average improvement index *(percentile points)*	Statistically significant
Oral language	14 classrooms/197 children	+6	No
Print knowledge	14 classrooms/198 children	+8	No
Phonological processing	14 classrooms/198 children	–3	No
Math	14 classrooms/198 children	+3	No

Setting

The study was conducted in 14 full-day preschool classrooms (seven *Bright Beginnings* and seven comparison) in public schools from seven county school districts in Tennessee.

Study sample

This randomized controlled study, conducted during the 2003–04 and 2004–05 school years, included three groups: *Bright Beginnings*, *The Creative Curriculum® for Preschool*, and a comparison group. Study authors recruited 36 full-day preschool classrooms in 28 public schools. The authors then grouped classrooms into sets of three classrooms with similar demographic characteristics (urban/rural, percentages of races other than White, percentage receiving free lunch) and achievement (reading, language, math, and science achievement scores). Within each triplet, one classroom was randomly assigned to *The Creative Curriculum® for Preschool*, one to *Bright Beginnings*, and one to the comparison group. In cases where a preschool had multiple classrooms, all classrooms in a preschool were assigned to the same study condition. (Three of the preschools each included two classrooms; the remaining preschools each had one classroom.)

After randomization, 21 of the 36 classrooms (seven from each of the three groups) were randomly selected to participate during the following year in the national PCER study of *Bright Beginnings* and *The Creative Curriculum® for Preschool*. All 36 classrooms participated in the local investigator's pilot study during the first year. Following the pilot year, and prior to starting the national PCER study, eight of the 21 originally assigned classrooms dropped out of the study, leaving five *Bright Beginnings*, four *The Creative Curriculum® for Preschool*, and four comparison classrooms (attrition of 29%, 43%, and 43%, respectively). The eight dropout classrooms were replaced by randomly selecting eight of the 15 classrooms that had not been selected to participate in the national PCER study, including two *Bright Beginnings*, three *The Creative Curriculum® for Preschool*, and three comparison classrooms, restoring the sample of classrooms to seven in each of the three intervention groups.

This study of *Bright Beginnings* included 14 of the 21 classrooms (seven *Bright Beginnings* and seven comparison, while the remaining seven were assigned to *The Creative Curriculum® for Preschool*) and a total of 208 children at baseline (103 *Bright Beginnings* and 105 comparison), while the analysis sample included 98 *Bright Beginnings* children and 100 comparison children.

At baseline, children in the study averaged 4.5 years of age; 52% were male; and 80% were White, 11% were Hispanic, and 7% were African American. A higher percentage of parents in the comparison group reported that their child had an Individualized Education Plan (IEP) relative to those assigned to *Bright Beginnings* (33% vs. 13%), a difference that was statistically significant, but did not exceed the 25% upper limit on acceptable baseline differences between groups that is indicated in the WWC Early Childhood Education review protocol.

In this study, the *Bright Beginnings* intervention had been in place for a full (pilot) year when the evaluation year started. Although the PCER Consortium (2008) study used a randomized controlled trial design to assign classrooms to intervention or comparison conditions in the pilot year, the authors analyzed data from the second year of implementation, when children who had been in the classrooms at random assignment had moved to kindergarten, and a new class of children had replaced them. Thus, the study has high attrition at the child level, and for that reason, must demonstrate baseline equivalence between the intervention and comparison samples of children used in the analyses of outcomes. An author query was conducted to obtain the study data necessary to establish equivalence at baseline for one outcome measure in each domain. Study authors provided data to establish baseline equivalence of the analytic sample of children in the two groups at the end of the preschool year, but data to establish baseline equivalence at the end of kindergarten were not available. Thus, findings from the kindergarten follow-up are not reported.

Intervention group

Teachers in the intervention group used the *Bright Beginnings* curriculum with their students. *Bright Beginnings* is an integrated curriculum with a focus on language and early literacy, based in part on the *High/Scope*® and *The Creative Curriculum*® models, with an added focus on skills designed to promote school literacy. *Bright Beginnings* includes nine curriculum units: language and literacy, mathematics, social and personal development, healthful living, scientific thinking, social studies, creative arts, physical development, and technology. In the PCER study, each classroom's fidelity to the curriculum was rated on a four-point scale, ranging from "not at all" (0) to "high" (3). The average score for the *Bright Beginnings* classrooms was 1.88 on the measure.

Comparison group

Teachers in the comparison condition did not use a specific curriculum; rather, each teacher used a variety of teacher-developed curricula with a focus on basic school readiness. The specific features of those curricula are not described in this study. Their classrooms were rated with the same fidelity measure used in the *Bright Beginnings* classrooms, which ranged from 0 to 3. The average score for the comparison classrooms using this measure was 2.0.

Outcomes and measurement

The outcome domains assessed were oral language, print knowledge, phonological processing, and math. Oral language was assessed with the PPVT-III and the TOLD-P:3 Grammatic Understanding subtest. Print knowledge was assessed with the TERA-3, the WJ-III Letter-Word Identification subtest, and the WJ-III Spelling subtest. Phonological processing was assessed with the Pre-CTOPPP Elision subtest. Math was assessed with the WJ-III Applied Problems subtest, the CMA-A, and the Building Blocks Shape Composition task. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

Bright Beginnings was implemented in intervention schools in fall 2002 (pilot-study year) and in fall 2003 for additional teachers participating in the national PCER evaluation year. Intervention group teachers received 2.5 full days of curriculum training prior to the start of the preschool year and had access to ongoing curriculum implementation support throughout the school year. Onsite consultation to teachers was provided four times during the school year, twice by trained Tennessee staff members and twice by curriculum trainers. Consultation visits typically included a classroom observation, an opportunity for teachers to ask questions about the curriculum, and implementation feedback from the trainer. No specific additional professional development activities for comparison group teachers are described.

Appendix B: Outcome measures for each domain

Oral language	
Peabody Picture Vocabulary Test III (PPVT-III)	A nationally-standardized, individually-administered assessment of children's receptive vocabulary. Children demonstrate understanding of a spoken word by pointing to a picture that best represents the meaning (as cited in PCER Consortium, 2008).
Test of Language Development–Primary III (TOLD-P:3) Grammatic Understanding subtest	A nationally-standardized, individually-administered assessment of children's ability to comprehend the meaning of sentences by selecting pictures that most accurately represent the sentence (as cited in PCER Consortium, 2008).
Print knowledge	
Test of Early Reading Ability III (TERA-3)	A nationally-standardized, individually-administered assessment of children's developing reading skills with three subtests: alphabet, conventions, and meaning (as cited in PCER Consortium, 2008).
Woodcock-Johnson III (WJ-III) Letter-Word Identification subtest	A nationally-standardized, individually-administered assessment of identification of letters and reading of words (as cited in PCER Consortium, 2008).
WJ-III Spelling subtest	A nationally-standardized, individually-administered assessment of children's prewriting skills, such as drawing lines, tracing, and writing letters (as cited in PCER Consortium, 2008).
Phonological processing	
Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest	An individually-administered assessment of children's ability to identify and manipulate sounds in spoken words, using word prompts and picture plates for the first nine items and word prompts only for later items (as cited in PCER Consortium, 2008).
Math	
Building Blocks, Shape Composition task	An individually-administered assessment of early mathematics achievement, this measure was modified for PCER from the Early Maths Assessment, developed by Clements, Sarama, and Liu (2008).[9] Children use blocks to fill in a puzzle and are assessed on whether they fill the puzzle without gaps or hangovers (as cited in PCER Consortium, 2008).
Child Math Assessment–Abbreviated (CMA-A) Composite Score	An individually-administered assessment of early mathematics achievement, this measure is the average of four subscales: (1) solving addition and subtraction problems using visible objects, (2) constructing a set of objects equal in number to a given set, (3) recognizing shapes, and (4) copying a pattern using objects that vary in color and identity from the model pattern. This assessment was adapted for PCER from a more comprehensive early mathematics assessment by Klein and Starkey (2002), who also developed the pre-K mathematics curriculum and participated in one of the research teams for PCER (as cited in PCER Consortium, 2008).[8]
WJ-III Applied Problems subtest	A nationally-standardized, individually-administered assessment of children's ability to solve numerical and spatial problems, presented verbally with accompanying pictures of objects (as cited in PCER Consortium, 2008).

Appendix C.1: Findings included in the rating for the oral language domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
PCER Consortium (2008)[a]								
Peabody Picture Vocabulary Test III (PPVT-III)	Preschool children	14 classrooms/ 195 children	96.31 (14.71)	93.93 (15.37)	2.38	0.12	+5	> 0.05
Test of Language Development–Primary III (TOLD-P:3) Grammatic Understanding subtest	Preschool children	14 classrooms/ 197 children	9.60 (2.95)	9.11 (2.73)	0.49	0.18	+7	> 0.05
Domain average for oral language (PCER Consortium, 2008)						**0.15**	**+6**	**Not statistically significant**
Domain average for oral language across all studies						**0.15**	**+6**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on child outcomes, representing the average change expected for all children who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average child's percentile rank that can be expected if the child is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of the study's domain average was determined by the WWC. na = not applicable.

[a] For PCER Consortium (2008), the effect sizes, mean differences, and *p*-values presented here were reported in the original study (in Table 2.4, Table D-1a, and Table 2.4, respectively). A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. Adjustment for the baseline pretest scores was not required for this domain. The WWC calculated the intervention group mean by adding the difference-in-differences adjusted estimate of the average impact of the program (i.e., difference in mean gains between the intervention and comparison groups) to the unadjusted comparison group posttest means. Please see the WWC Handbook for more information. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

Appendix C.2: Findings included in the rating for the print knowledge domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
PCER Consortium (2008)[a]								
Test of Early Reading Ability III (TERA-3)	Preschool children	14 classrooms/ 198 children	nr	nr	nr	0.32	+13	> 0.05
Woodcock-Johnson III (WJ-III) Letter-Word Identification subtest	Preschool children	14 classrooms/ 198 children	nr	nr	nr	0.11	+4	> 0.05
WJ-III Spelling subtest	Preschool children	14 classrooms/ 198 children	nr	nr	nr	0.20	+8	> 0.05
Domain average for print knowledge (PCER Consortium, 2008)						**0.21**	**+8**	**Not statistically significant**
Domain average for print knowledge across all studies						**0.21**	**+8**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on child outcomes, representing the average change expected for all children who are given the intervention (measured in standard deviations of the outcome measures). The improvement index is an alternate presentation of the effect size, reflecting the change in an average child's percentile rank that can be expected if the child is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of the study's domain average was determined by the WWC. na = not applicable. nr = not reported.

[a] For PCER Consortium (2008), the effect sizes and *p*-values presented here were reported in the original study (in Table A-7, based on an alternative estimation approach, ANCOVA, that included the baseline pretest). A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. Mean scores and differences are not reported in this table because the study-reported group means and differences were not adjusted for the baseline pretest scores. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

Appendix C.3: Findings included in the rating for the phonological processing domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
PCER Consortium (2008)[a]								
Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest	Preschool children	14 classrooms/ 198 children	nr	nr	nr	–0.08	–3	> 0.05
Domain average for phonological processing across all studies						**–0.08**	**–3**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on child outcomes, representing the average change expected for all children who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average child's percentile rank that can be expected if the child is given the intervention. The statistical significance of the study's domain average was determined by the WWC. na = not applicable. nr = not reported.

[a] For PCER Consortium (2008), the effect size and *p*-value presented here were reported in the original study (in Table A-7, based on an alternative estimation approach, ANCOVA, that included the baseline pretest). Mean scores and differences are not reported in this table because the study-reported group means and differences were not adjusted for the baseline pretest scores. This study is characterized as having an indeterminate effect because the effect is neither statistically significant nor substantively important.

Appendix C.4: Findings included in the rating for the math domain

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
PCER Consortium (2008)[a]								
Building Blocks, Shape Composition task	Preschool children	14 classrooms/ 198 children	nr	nr	nr	–0.07	–3	> 0.05
Child Math Assessment–Abbreviated (CMA-A) Composite Score	Preschool children	14 classrooms/ 198 children	nr	nr	nr	0.10	+4	> 0.05
Woodcock-Johnson III (WJ-III) Applied Problems subtest	Preschool children	14 classrooms/ 198 children	nr	nr	nr	0.18	+7	> 0.05
Domain average for math (PCER Consortium, 2008)						**0.07**	**+3**	**Not statistically significant**
Domain average for math across all studies						**0.07**	**+3**	**na**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on child outcomes, representing the average change expected for all children who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average child's percentile rank that can be expected if the child is given the intervention. The WWC-computed average effect size is a simple average rounded to two decimal places; the average improvement index is calculated from the average effect size. The statistical significance of the study's domain average was determined by the WWC. na = not applicable. nr = not reported.

[a] For PCER Consortium (2008), the effect sizes and *p*-values presented here were reported in the original study (in Table A-7, based on an alternative estimation approach, ANCOVA, that included the baseline pretest). A correction for multiple comparisons was needed but did not affect significance levels. Mean scores and differences are not reported in this table because the study-reported group means and differences were not adjusted for the baseline pretest scores. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

Endnotes

[1] The descriptive information for this program was obtained from a publicly available source: the program's website (http://www.cms.k12.nc.us/cmsdepartments/ci/pre-kservices/Pages/default.aspx, downloaded February 2012). The WWC requests developers review the program description sections for accuracy from their perspective. The program description was provided to the developer in February 2012; however, the WWC received no response. Further verification of the accuracy of the descriptive information for this program is beyond the scope of this review. The literature search reflects documents publicly available by December 2012.

[2] The previous report was released in June 2009. This report has been updated to include a review of one study that has been released since 2009. The one study was not within the scope of the review protocol for the Early Childhood Education topic area. A complete list and disposition of all studies reviewed are provided in the references. The report includes reviews of all previous studies that meet WWC evidence standards with or without reservations and confirmed the study disposition of meets standards with reservations for the PCER Consortium (2008) study. The studies in this report were reviewed using the Evidence Standards from the WWC Procedures and Standards Handbook (version 2.1), along with those described in the Early Childhood Education review protocol (version 2.0). The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.

[3] The national PCER Consortium (2008) study summarized in this intervention report was prepared by staff of one of the WWC's contractors. Because the principal investigator for the WWC review of early childhood education is also a staff member of that contractor, the study was rated by staff members from a different organization, who also prepared this intervention report. The report was then reviewed by the principal investigator, a WWC Quality Assurance reviewer, and an external peer reviewer.

[4] For criteria used in the determination of the rating of effectiveness and extent of evidence, see the WWC Rating Criteria on p. 14. These improvement index numbers show the average and range of child-level improvement indices for all findings across the studies. Two other domains in the protocol—early reading and writing and cognition—were not examined by the study that met standards.

[5] The national PCER Consortium (2008) study conducted a rigorous efficacy evaluation of 14 preschool curricula. Twelve research teams implemented one or two curricula in preschool settings serving predominantly low-income children using an experimental design. For each team, preschools or classrooms were randomly assigned to the intervention curricula or comparison curricula, and the children were followed from preschool through kindergarten. The studies each used a common set of measures with the cohort of children beginning preschool in the summer-fall of 2003. PCER Consortium (2008) summarized the details and results of each curriculum study.

[6] An author query was conducted to obtain the study data necessary to establish equivalence at baseline for one outcome measure in each domain (i.e., unadjusted means and standard deviations of the outcome measures for the intervention and comparison groups). The pretest data provided for each domain was used to establish baseline equivalence for the domain.

[7] By name, the TERA-3 sounds like it should be captured under the early reading and writing domain; however, the description of the measure identifies constructs that are pertinent to print knowledge, such as knowing the alphabet, understanding print conventions, and environmental print. More detailed explanations of the measures in each domain can be found in Appendix B.

[8] Klein, A., & Starkey, P. (2002). *Child math assessment–abbreviated*. Berkeley, CA: Author.

[9] Clements, D. H., Sarama, J., & Liu, X. (2008). Development of a measure of early mathematics achievement using the Rasch model: The Research-based Early Maths Assessment. *Educational Psychology, 28*(4), 457–482.

Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2013, March). *Early Childhood Education intervention report: Bright Beginnings*. Retrieved from http://whatworks.ed.gov.

WWC Rating Criteria

Criteria used to determine the rating of a study

Study rating	Criteria
Meets WWC evidence standards without reservations	A study that provides strong evidence for an intervention's effectiveness, such as a well-implemented RCT.
Meets WWC evidence standards with reservations	A study that provides weaker evidence for an intervention's effectiveness, such as a QED or an RCT with high attrition that has established equivalence of the analytic samples.

Criteria used to determine the rating of effectiveness for an intervention

Rating of effectiveness	Criteria
Positive effects	Two or more studies show statistically significant positive effects, at least one of which met WWC evidence standards for a strong design, AND No studies show statistically significant or substantively important negative effects.
Potentially positive effects	At least one study shows a statistically significant or substantively important positive effect, AND No studies show a statistically significant or substantively important negative effect AND fewer or the same number of studies show indeterminate effects than show statistically significant or substantively important positive effects.
Mixed effects	At least one study shows a statistically significant or substantively important positive effect AND at least one study shows a statistically significant or substantively important negative effect, but no more such studies than the number showing a statistically significant or substantively important positive effect, OR At least one study shows a statistically significant or substantively important effect AND more studies show an indeterminate effect than show a statistically significant or substantively important effect.
Potentially negative effects	One study shows a statistically significant or substantively important negative effect and no studies show a statistically significant or substantively important positive effect, OR Two or more studies show statistically significant or substantively important negative effects, at least one study shows a statistically significant or substantively important positive effect, and more studies show statistically significant or substantively important negative effects than show statistically significant or substantively important positive effects.
Negative effects	Two or more studies show statistically significant negative effects, at least one of which met WWC evidence standards for a strong design, AND No studies show statistically significant or substantively important positive effects.
No discernible effects	None of the studies shows a statistically significant or substantively important effect, either positive or negative.

Criteria used to determine the extent of evidence for an intervention

Extent of evidence	Criteria
Medium to large	The domain includes more than one study, AND The domain includes more than one school, AND The domain findings are based on a total sample size of at least 350 students, OR, assuming 25 students in a class, a total of at least 14 classrooms across studies.
Small	The domain includes only one study, OR The domain includes only one school, OR The domain findings are based on a total sample size of fewer than 350 students, AND, assuming 25 students in a class, a total of fewer than 14 classrooms across studies.

Glossary of Terms

Attrition Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.

Clustering adjustment If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.

Confounding factor A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.

Design The design of a study is the method by which intervention and comparison groups were assigned.

Domain A domain is a group of closely related outcomes.

Effect size The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.

Eligibility A study is eligible for review and inclusion in this report if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.

Equivalence A demonstration that the analysis sample groups are similar on observed characteristics defined in the review area protocol.

Extent of evidence An indication of how much evidence supports the findings. The criteria for the extent of evidence levels are given in the WWC Rating Criteria on p. 14.

Improvement index Along a percentile distribution of students, the improvement index represents the gain or loss of the average student due to the intervention. As the average student starts at the 50th percentile, the measure ranges from –50 to +50.

Multiple comparison adjustment When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.

Quasi-experimental design (QED) A quasi-experimental design (QED) is a research design in which subjects are assigned to intervention and comparison groups through a process that is not random.

Randomized controlled trial (RCT) A randomized controlled trial (RCT) is an experiment in which investigators randomly assign eligible participants into intervention and comparison groups.

Rating of effectiveness The WWC rates the effects of an intervention in each domain based on the quality of the research design and the magnitude, statistical significance, and consistency in findings. The criteria for the ratings of effectiveness are given in the WWC Rating Criteria on p. 14.

Single-case design A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.

Standard deviation The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample tend to be spread out over a large range of values.

Statistical significance Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ($p < 0.05$).

Substantively important A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the WWC Procedures and Standards Handbook (version 2.1) for additional details.