

What Works Clearinghouse™



Early Childhood Education

Updated March 2013

The Creative Curriculum® for Preschool, Fourth Edition

Program Description¹

The Creative Curriculum® for Preschool, Fourth Edition, is an early childhood curriculum that focuses on project-based investigations as a means for children to apply skills and addresses four areas of development: social/emotional, physical, cognitive, and language. The curriculum is designed to foster development of the whole child through teacher-led, small and large group activities centered around 11 interest areas (blocks, dramatic play, toys and games, art, library, discovery, sand and water, music and movement, cooking, computers, and outdoors). The curriculum provides teachers with details on child development, classroom organization, teaching strategies, and engaging families in the learning process. Child assessments are an important part of the curriculum, but must be purchased separately. Online record-keeping tools assist teachers with the maintenance and organization of child portfolios, individualized planning, and report production.

Research²

The What Works Clearinghouse (WWC) identified two studies of *The Creative Curriculum® for Preschool, Fourth Edition*, that both fall within the scope of the Early Childhood Education topic area and meet WWC evidence standards.³ One study meets standards without reservations and one study meets WWC evidence standards with reservations, and together, they included 364 children in 11 full-day preschools located in Georgia, North Carolina, and Tennessee.

The WWC considers the extent of evidence for *The Creative Curriculum® for Preschool, Fourth Edition*, on the school readiness of preschool children to be medium to large 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 *The Creative Curriculum® for Preschool* for those domains in this intervention report. (See the Effectiveness Summary on p. 6 for further description of all domains.)

Effectiveness

The Creative Curriculum® for Preschool, Fourth Edition, was found to have no discernible effects on oral language, print knowledge, phonological processing, or math for preschool children.

Report Contents	
Overview	p. 1
Program Information	p. 3
Research Summary	p. 4
Effectiveness Summary	p. 6
References	p. 9
Research Details for Each Study	p. 11
Outcome Measures for Each Domain	p. 16
Findings Included in the Rating for Each Outcome Domain	p. 17
Supplemental Findings for Each Outcome Domain	p. 21
Endnotes	p. 23
Rating Criteria	p. 24
Glossary of Terms	p. 25

Table 1. Summary of findings⁴

Outcome domain	Rating of effectiveness	Improvement index (<i>percentile points</i>)		Number of studies	Number of children	Extent of evidence
		Average	Range			
Oral language	No discernible effects	+2	-6 to +9	2	362	Medium to large
Print knowledge	No discernible effects	-2	-7 to +8	2	363	Medium to large
Phonological processing	No discernible effects	-2	-4 to +1	2	364	Medium to large
Math	No discernible effects	+2	-5 to +8	2	363	Medium to large

Program Information

Background

Developed by Diane Trister Dodge, Laura Colker, and Cate Heroman, *The Creative Curriculum® for Preschool, Fourth Edition*, is distributed by Teaching Strategies, Inc. Address: 7101 Wisconsin Ave., Suite 700, Bethesda, MD 20814. Email: CustomerRelations@TeachingStrategies.com. Web: <http://www.teachingstrategies.com/>. Telephone: (800) 637-3652.

The studies reviewed by the WWC are all evaluations of the Fourth Edition of *The Creative Curriculum® for Preschool*. In July 2011, the developer released *The Creative Curriculum® for Preschool, Fifth Edition*, as part of *The Creative Curriculum® System for Preschool*. No effectiveness studies of this updated, expanded curriculum have been completed. Therefore, this intervention report focuses on the Fourth Edition.

Program details

The Creative Curriculum® for Preschool, Fourth Edition, is an early childhood curriculum designed to foster social/emotional, physical, cognitive, and language development and to enhance learning in literacy, math, science, social studies, the arts, and technology. The program includes information on children's development and learning, classroom organization and structure, teaching strategies, instructional goals and objectives, and guidance on how to engage families in their children's learning. *The Creative Curriculum® for Preschool* provides direction for intentional, teacher-guided learning experiences in large and small group settings.

The program is centered around the following 11 interest areas: blocks, dramatic play, toys and games, art, library, discovery, sand and water, music and movement, cooking, computers, and outdoors. The curriculum describes the learning that occurs through play in each area, the ways in which children might engage with the materials in each area, and teacher interactions to promote and scaffold children's learning. The curriculum includes the use of project-based investigations, called "studies," that are focused on meaningful science and social studies topics and that aim to provide children with an opportunity to apply skills in literacy, math, the arts, and technology. Suggestions on how to adapt these activities for children with disabilities and English language learners are provided for each component of the curriculum.

The Creative Curriculum® for Preschool also emphasizes the use of observation-based child assessments to help guide instruction. In addition to the general curriculum guide, separate literacy, math, science, and social studies guides are available. Implementation, evaluation guidance, and professional development services are also available from the developer, both online and onsite.

Cost

The Creative Curriculum® for Preschool, Fourth Edition, is no longer available for purchase from the distributor.

The Creative Curriculum®: The Foundation, a teacher's guide to *The Creative Curriculum® for Preschool, Fifth Edition*, can be purchased for \$189.95. This guide provides the theory and research foundation of the curriculum and helps teachers decide how to set up their classrooms. Teaching Strategies, Inc., also offers *The Creative Curriculum® System for Preschool*, which provides all the resources necessary to implement the program in a classroom. The system costs \$2,149.00 and includes the following curriculum materials: *The Creative Curriculum®: The Foundation*, *The Guide to The Creative Curriculum® System for Preschool*, *Getting Started DVD*, 100 Mighty Minutes™ activity cards, 201 Bilingual Intentional Teaching Cards™, six teaching guides, 22 book discussion cards, *The Teaching Strategies® Children's Book Collection* featuring 75 books, *The Resource Organizer*, and *The Classroom and Family Resources CD-ROM*.

Additional implementation and evaluation guidance, as well as professional development services, can be purchased from the developer and delivered either onsite or online.

Research Summary

The WWC identified 14 studies that investigated the effects of *The Creative Curriculum® for Preschool, Fourth Edition*, on the school readiness of preschool children.

The WWC reviewed four of those studies against group design evidence standards. One study (PCER Consortium, 2008, Chapter 3) is a randomized controlled trial that meets WWC evidence standards without reservations and one study (PCER Consortium, 2008, Chapter 2) is a randomized controlled trial that meets WWC evidence standards with reservations. Those two studies are summarized in this report. Two studies do not meet WWC evidence standards. The remaining ten studies do not meet WWC eligibility screens for review in this topic area. Citations for all 14 studies are in the References section, which begins on p. 9.

Table 2. Scope of reviewed research

Grade	PK
Delivery method	Whole class
Program type	Curriculum

Summary of study meeting WWC evidence standards without reservations

The PCER Consortium (2008) study (Chapter 3) assessed the effects of *The Creative Curriculum® for Preschool* using a randomized controlled trial of teachers and children in five Head Start centers in Georgia and North Carolina.⁵ In the pilot year of the study (the 2002–03 school year), 20 teachers were grouped by education and teacher certification status and then randomly assigned within each group to either the intervention group or the comparison group. Eighteen of the classrooms that were randomly assigned in the pilot year continued to participate during the national PCER evaluation year (the 2003–04 school year), and 194 children were selected for the study. Children within a Head Start center were sorted into groups on the basis of gender, disability status, and ethnicity, and within groups, they were randomly assigned to either intervention or comparison classrooms. Each of the five participating Head Start centers included both intervention and comparison classrooms.

The authors investigated effects on oral language, print knowledge, phonological processing, and math. The WWC based its effectiveness ratings on findings from comparisons of 90 children who received *The Creative Curriculum® for Preschool* and 81 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. The authors reported on the effects of *The Creative Curriculum® for Preschool* in the spring of the preschool year and again at the end of kindergarten. The outcomes reported at the end of the kindergarten year are not included in the WWC's effectiveness calculations but are presented as supplemental findings in Appendix D. 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.

Summary of study meeting WWC evidence standards with reservations

The PCER Consortium (2008) study (Chapter 2) assessed the effects of *The Creative Curriculum® for Preschool* using a randomized controlled trial of classrooms in 28 preschools in Tennessee. 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 national PCER evaluation study in 2003–04 (seven *The Creative Curriculum® for Preschool* and seven comparison).

Although the PCER Consortium (2008) study (Chapter 2) used a randomized controlled trial design to assign classrooms to intervention or comparison conditions in the pilot study year, the study (Chapter 2) 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 sample of children used in the analyses of outcomes.

The authors investigated effects on oral language, print knowledge, phonological processing, and math. The WWC based its effectiveness ratings on findings from comparisons of 93 children who received *The Creative Curriculum® for Preschool* 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 samples of intervention and comparison group children at the end of the preschool year.⁶ The authors reported on the effects of *The Creative Curriculum® for Preschool* 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 Creative Curriculum® for Preschool, Fourth Edition*, 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 two studies of *The Creative Curriculum® for Preschool* that meet 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 statistical significance of the effects of *The Creative Curriculum® for Preschool* 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. 24.

Summary of effectiveness for the oral language domain

One study that meets WWC evidence standards without reservations and one study that meets WWC evidence standards with reservations reported findings in the oral language domain.

The PCER Consortium (2008, Chapter 3) analyzed the effectiveness of *The Creative Curriculum® for Preschool* on oral language outcomes using the Peabody Picture Vocabulary Test III (PPVT-III) and the Test of Language Development–Primary III (TOLD-P:3) Grammatic Understanding subtest. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* group and the comparison group are not statistically significant or substantively important (that is, an effect size of at least 0.25) on either of these measures. The WWC characterizes these study findings as an indeterminate effect.

The PCER Consortium (2008, Chapter 2) examined the effectiveness of *The Creative Curriculum® for Preschool* on oral language using the PPVT-III and the TOLD-P:3. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* group and the comparison group are not statistically significant or substantively important on either of these measures. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the oral language domain, both studies found indeterminate effects. This results in a rating of no discernible effects, with a medium to large 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 <i>No affirmative evidence of effects.</i>	In the two studies that reported findings, the estimated impact of the intervention on outcomes in the <i>oral language</i> domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	Criteria met
Medium to large	Two studies that included 362 children in 32 classrooms reported evidence of effectiveness in the <i>oral language</i> domain.

Summary of effectiveness for the print knowledge domain

One study that meets WWC evidence standards without reservations and one study that meets WWC evidence standards with reservations reported findings in the print knowledge domain.

The PCER Consortium (2008, Chapter 3) analyzed the effectiveness of *The Creative Curriculum® for Preschool* on 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. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* and comparison groups are not statistically significant or large enough to be substantively important on any of these measures. The WWC characterizes these study findings as an indeterminate effect.

The PCER Consortium (2008, Chapter 2) examined the effectiveness of *The Creative Curriculum® for Preschool* on the TERA-3, the WJ-III Letter-Word Identification subtest, and the WJ-III Spelling subtest. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* and comparison groups are not statistically significant or large enough to be substantively important on any of these measures. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the print knowledge domain, both studies found indeterminate effects. This results in a rating of no discernible effects, with a medium to large 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 <i>No affirmative evidence of effects.</i>	In the two studies that reported findings, the estimated impact of the intervention on outcomes in the <i>print knowledge</i> domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	Criteria met
Medium to large	Two studies that included 363 children in 32 classrooms reported evidence of effectiveness in the <i>print knowledge</i> domain.

Summary of effectiveness for the phonological processing domain

One study that meets WWC evidence standards without reservations and one study that meets WWC evidence standards with reservations reported findings in the phonological processing domain.

The PCER Consortium (2008, Chapter 3) analyzed the effectiveness of *The Creative Curriculum® for Preschool* on phonological processing using the Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* and comparison groups are not statistically significant or substantively important on this measure. The WWC characterizes these study findings as an indeterminate effect.

The PCER Consortium (2008, Chapter 2) also analyzed the effectiveness of *The Creative Curriculum® for Preschool* on phonological processing using the Pre-CTOPPP Elision subtest. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* and comparison groups are not statistically significant or substantively important on this measure. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the phonological processing domain, both studies found indeterminate effects. This results in a rating of no discernible effects, with a medium to large 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 <i>No affirmative evidence of effects.</i>	In the two studies that reported findings, the estimated impact of the intervention on outcomes in the <i>phonological processing</i> domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	Criteria met
Medium to large	Two studies that included 364 children in 32 classrooms reported evidence of effectiveness in the <i>phonological processing</i> domain.

Summary of effectiveness for the math domain

One study that meets WWC evidence standards without reservations and one study that meets WWC evidence standards with reservations reported findings in the math domain.

The PCER Consortium (2008, Chapter 3) analyzed the effectiveness of *The Creative Curriculum® for Preschool* on math using the WJ-III Applied Problems subtest, the Child Math Assessment–Abbreviated (CMA-A), and the Building Blocks Shape Composition task. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* and comparison groups are not statistically significant or large enough to be substantively important on any of these measures. The WWC characterizes these study findings as an indeterminate effect.

The PCER Consortium (2008, Chapter 2) also examined the effectiveness of *The Creative Curriculum® for Preschool* on math using the WJ-III Applied Problems subtest, the CMA-A, and the Building Blocks Shape Composition task. The authors report, and the WWC confirms, that differences between *The Creative Curriculum® for Preschool* and comparison groups are not statistically significant or large enough to be substantively important on any of these measures. The WWC characterizes these study findings as an indeterminate effect.

Thus, for the math domain, both studies found indeterminate effects. This results in a rating of no discernible effects, with a medium to large extent of evidence.

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

Rating of effectiveness	Criteria met
No discernible effects <i>No affirmative evidence of effects.</i>	In the two studies that reported findings, the estimated impact of the intervention on outcomes in the <i>math</i> domain was neither statistically significant nor large enough to be substantively important.
Extent of evidence	Criteria met
Medium to large	Two studies that included 363 children in 32 classrooms reported evidence of effectiveness in the <i>math</i> domain.

References

Study that meets WWC evidence standards without reservations

Preschool Curriculum Evaluation Research (PCER) Consortium. (2008, chapter 3). Creative Curriculum: University of North Carolina at Charlotte. In *Effects of preschool curriculum programs on school readiness* (pp. 55–64, Appendix C, and Appendix D). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Study that meets WWC evidence standards with reservations

Preschool Curriculum Evaluation Research (PCER) Consortium. (2008, chapter 2). Bright Beginnings and Creative Curriculum: Vanderbilt University. In *Effects of preschool curriculum programs on school readiness* (pp. 41–54, Appendix C, and Appendix D). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Studies that do not meet WWC evidence standards

Hartford Foundation for Public Giving. (2004). *Hartford children are learning by leaps and bounds: Achievements of children involved in Brighter Futures Child Care Enhancement Project*. Hartford, CT: Author. The study does not meet WWC evidence standards because the measures of effectiveness cannot be attributed solely to the intervention—the intervention was combined with another intervention.

Henry, G. T., Ponder, B. D., Rickman, D. K., Mashburn, A. J., Henderson, L. W., & Gordon, C. S. (2004). *An evaluation of the implementation of Georgia's pre-K program: Report of the findings from the Georgia early childhood study (2002-03)*. Atlanta: Georgia State University, Andrew Young School of Policy Studies. The study does not meet WWC evidence standards because it uses a quasi-experimental design in which the analytic intervention and comparison groups are not shown to be equivalent.

Additional source:

Henry, G. T., Henderson, L. W., Ponder, B. D., Gordon, C. S., Mashburn, A. J., & Rickman, D. K. (2003). *Report of the findings from the early childhood study: 2001–2001*. Atlanta: Georgia State University, Andrew Young School of Policy Studies.

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

Abbott-Shim, M. (2000). *Sure Start effectiveness study: Final report*. Atlanta, GA: Report for the U.S. Department of Defense Education Activity by Quality Assist, Inc. The study is ineligible for review because it does not use a comparison group design or a single-case design.

Additional source:

Zigler, E. F., & Bishop-Josef, S. J. (2006). The cognitive child versus the whole child: Lessons from 40 years of Head Start. In D. G. Singer, R. M. Golinkoff, & K. Hirsh-Pasek (Eds.), *Play=learning: How play motivates and enhances children's cognitive and social-emotional growth* (pp. 15–35). New York: Oxford University Press.

Cabell, S. Q., Justice, L. M., Konold, T. R., & McGinty, A. S. (2011). Profiles of emergent literacy skills among preschool children who are at risk for academic difficulties. *Early Childhood Research Quarterly*, 26(1), 1–14. The study is ineligible for review because it does not implement the intervention in a way that falls within the scope of the review—the intervention is bundled with other components.

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.

- Cordell, M. (2010). The impact of technical coaching in emergent literacy and language curriculum on a Head Start teacher, staff members, English language learners, and Hispanic family literacy practices. *Dissertation Abstracts International Section: A. Humanities and Social Sciences*, 71(4-A), 1180. The study is ineligible for review because it does not use a comparison group design or a single-case design.
- Dodge, D. T., Bickart, T. S., Heroman, C., & Boyle, K. (2009). Teaching Strategies' Creative Curriculum® for preschool: Opening doors for teachers, children, and families. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness*, 3(3), 263–280. 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.
- File, N., Mueller, J. J., & Wisneski, D. B. (2011). *Curriculum in early childhood education: Re-examined, rediscovered, renewed*. Florence, KY: Routledge, Taylor & Francis Group. 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.
- Florida Center for Reading Research. (2005). *Literacy: The Creative Curriculum approach*. Tallahassee, FL: Author. Retrieved from <http://www.plan4preschool.org/documents/CreativeCurriculum.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.
- Gomby, D., Spiker, D., Golan, S., Zercher, C., Daniels, M., & Quirk, K. (2005). Los Angeles County Vaughn Next Century Learning Center. Supporting literacy: Curriculum, technology, parents, and experts. In *Case studies of the First 5 School Readiness Initiative. Promising programs and practices: A focus on early literacy* (pp. 2-73–2-87). Santa Monica, CA: SRI International. The study is ineligible for review because it does not use a comparison group design or a single-case design.
- Kuamoo, M. (2008). *An evaluation of quality in early education: The role of curriculum and teacher-child outcomes* (Unpublished doctoral dissertation). Capella University, Minneapolis, MN. The study is ineligible for review because it does not use a comparison group design or a single-case design.
- Lambert, R. G., Abbott-Shim, M., & Kusherman, J. (2006). *The effect of Creative Curriculum training and technical assistance on Head Start classroom quality*. Paper presented at the annual meetings of the North Carolina Association for Research in Education, March 30, Hickory, NC and the American Educational Research Association, April 8, San Francisco, CA. The study is ineligible for review because it does not include a student outcome.

Appendix A.1: Research details for PCER Consortium (2008, Chapter 3)

Preschool Curriculum Evaluation Research (PCER) Consortium. (2008, chapter 3). *Creative Curriculum: University of North Carolina at Charlotte.* In *Effects of preschool curriculum programs on school readiness* (pp. 55–64). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education.

Table A1. Summary of findings

Outcome domain	Sample size	Meets WWC evidence standards without reservations	
		Average improvement index (percentile points)	Statistically significant
Oral language	18 classrooms/169 children	-2	No
Print knowledge	18 classrooms/170 children	-5	No
Phonological processing	18 classrooms/171 children	+1	No
Math	18 classrooms/170 children	+4	No

Setting The study was conducted in 18 full-day Head Start preschool classrooms in five Head Start centers (two centers with 10 classrooms in Georgia and three centers with eight classrooms in North Carolina).

Study sample This randomized controlled study, conducted during the 2003–04 and 2004–05 school years, included an intervention group that implemented *The Creative Curriculum® for Preschool* and a comparison group that used teacher-developed curricula with a focus on basic school readiness. The specific features of the comparison curricula are not described in the PCER Consortium (2008) study (Chapter 3). Both teachers and children were randomized within the centers. In 2002–03, the pilot year of the study, 20 teachers (10 in Georgia and 10 in North Carolina) were grouped by education and teacher certification status and then randomly assigned within each group to intervention or comparison conditions. Each of the five participating Head Start centers included both *The Creative Curriculum® for Preschool* and comparison classrooms. At the end of the pilot year, researchers dropped two North Carolina classrooms because they participated in the state's *More at Four* program, had degreed teachers, and had high rates of teacher attrition. In the following year, which was the national PCER evaluation year, children within each center were sorted into blocks on the basis of gender, disability status, and ethnicity, and then randomly assigned to either *The Creative Curriculum® for Preschool* or comparison classrooms. At baseline, the study included 18 classrooms (nine *The Creative Curriculum® for Preschool* and nine comparison) and 194 children (97 *The Creative Curriculum® for Preschool* and 97 comparison). The spring follow-up data collection included 171 children (90 *The Creative Curriculum® for Preschool* and 81 comparison). Overall attrition at the spring follow-up was 11.9%. At baseline, children in the study were 4.5 years of age on average; 46% were boys; and 85% were African American, 8% were Hispanic, and 3% were White.

Intervention group	Teachers in the intervention group implemented <i>The Creative Curriculum® for Preschool</i> , a comprehensive preschool curriculum for children ages 3–5. The curriculum addresses four areas of development: social/emotional, physical, cognitive, and language. <i>The Creative Curriculum® for Preschool</i> requires the physical space of the classroom to be structured into 10 interest areas (blocks, dramatic play, toys and games, art, library, discovery, sand and water, music and movement, cooking, and computers). Curriculum content includes literacy, math, science, social studies, the arts, technology, and a focus on skills such as observing, exploring, and problem solving. Teachers conduct ongoing child assessments using a Developmental Checklist. In this 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 <i>The Creative Curriculum® for Preschool</i> classrooms was 2.11 on this measure.
Comparison group	Teachers in the comparison condition did not use a specific curriculum; rather, each teacher used a variety of teacher-developed curricula. The specific features of those curricula are not described in the PCER Consortium (2008) study (Chapter 3). Comparison classrooms were rated with the same four-point fidelity scale used in <i>The Creative Curriculum® for Preschool</i> classrooms, which ranged from 0 to 3. The average score for the comparison classrooms using this measure was 1.5.
Outcomes and measurement	The outcome domains assessed were children's 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	Teachers in the intervention group were in their second year of implementing the program at the time of the evaluation. The research team provided refresher training to the intervention group teachers. Four (North Carolina) or five (Georgia) training periods were provided to teachers in full- or half-day sessions so that teachers in both states received the same total amount of training. Training topics included choosing and planning in-depth study topics, providing materials and interactions for content learning, and observation-based assessment of children's learning. Training included a mix of lecture, small group projects, video viewing, and hands-on practical applications. Technical assistance was provided to teachers throughout the school year.

Appendix A.2: Research details for PCER Consortium (2008, Chapter 2)

Preschool Curriculum Evaluation Research (PCER) Consortium. (2008, chapter 2). *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 A2. Summary of findings**Meets WWC evidence standards with reservations**

Outcome domain	Sample size	Study findings	
		Average improvement index (percentile points)	Statistically significant
Oral language	14 classrooms/193 children	+6	No
Print knowledge	14 classrooms/193 children	+2	No
Phonological processing	14 classrooms/193 children	-2	No
Math	14 classrooms/193 children	0	No

Setting The study was conducted in 14 full-day preschool classes (7 *The Creative Curriculum® for Preschool*, 7 comparison) in public schools in 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: *The Creative Curriculum® for Preschool*, *Bright Beginnings*, and a comparison group. Study authors recruited 36 full-day preschool classrooms in 28 public schools. The authors then blocked the classrooms into groups of three with similar composite factors for demographic characteristics (urban/rural, percentages of races other than White) and achievement (percentage receiving free lunch, reading, language, math, and science achievement scores). Within each block, 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 classrooms from each of the three groups) were randomly selected to participate during the following year in the national PCER evaluation year of *The Creative Curriculum® for Preschool* and *Bright Beginnings*. Fifteen classrooms remained—these classrooms and the other 21 classrooms would participate in the local investigator's pilot-year study during the first year. Following the pilot year, eight of the 21 classrooms originally assigned to participate in the national PCER evaluation year dropped out, leaving four *The Creative Curriculum® for Preschool*, five *Bright Beginnings*, and four comparison classrooms (attrition of 43%, 29%, and 43%, respectively). These eight dropout classrooms were replaced by randomly selecting from the 15 classrooms that had not been selected to participate in the national PCER evaluation year, including two *Bright Beginnings*, three *The Creative Creative Curriculum® for Preschool*, and three comparison classrooms, restoring the sample of classrooms to seven in each of the three groups.

This study of *The Creative Curriculum® for Preschool* included 14 of the 21 classrooms (seven *The Creative Curriculum® for Preschool* and seven comparison), while the remaining seven were assigned to *Bright Beginnings*) and a total of 206 children at baseline (101 *The Creative Curriculum® for Preschool* and 105 comparison), while the analysis sample included 93 *The Creative Curriculum® for Preschool* 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.

In this study, *The Creative Curriculum® for Preschool* intervention had been in place for a full year (the pilot year) when the evaluation year started. Although this 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 (national PCER evaluation year), 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 must demonstrate baseline equivalence between the intervention and comparison group 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 (i.e., unadjusted means and standard deviations of the outcome measures for the intervention and comparison groups). The pretest data provided for each domain were used to establish baseline equivalence for the domain. Baseline equivalence was established from the data provided by the study authors. Baseline equivalence of the analytic sample of children in the two groups at the end of kindergarten was not available, so findings from the kindergarten follow-up are not reported.

Intervention group

The Creative Curriculum® for Preschool is a comprehensive preschool curriculum for children ages 3–5. The curriculum addresses four areas of development: social/emotional, physical, cognitive, and language. *The Creative Curriculum® for Preschool* requires the physical space of the classroom to be structured into 10 interest areas (blocks, dramatic play, toys and games, art, library, discovery, sand and water, music and movement, cooking, and computers). Curriculum content includes literacy, math, science, social studies, the arts, technology, and a focus on skills such as observing, exploring, and problem solving. Teachers conduct ongoing child assessments employing a Developmental Checklist. In this study, each classroom's fidelity to the curriculum was rated on a four-point scale ranging from 0 (not at all) to 3 (high). The average score for *The Creative Curriculum® for Preschool* classrooms was 2.14 on this measure.

Comparison group

Teachers in the comparison condition did not use a specific curriculum; rather, each teacher used a variety of teacher-developed curricula. The specific features of those curricula are not described in the PCER Consortium (2008) study (Chapter 2). The classrooms in the comparison group were rated with the same fidelity measure used in *The Creative Curriculum® for Preschool* classrooms, which was a four-point scale ranging 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 children's 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

The Creative Curriculum® for Preschool was implemented in intervention schools in fall 2002 (pilot-study year) and in fall 2003 for additional teachers participating in the intervention 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	
<i>Peabody Picture Vocabulary Test III (PPVT-III)</i>	A nationally-standardized, individually-administered assessment of children's receptive vocabulary. Children show understanding of a spoken word by pointing to a picture that best represents the meaning (as cited in PCER Consortium, 2008).
<i>Test of Language Development–Primary III (TOLD-P:3) Grammatic Understanding subtest</i>	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	
<i>Test of Early Reading Ability III (TERA-3)</i>	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). ⁷
<i>Woodcock-Johnson III (WJ-III) Letter-Word Identification subtest</i>	A nationally-standardized, individually-administered assessment of identification of letters and reading of words (as cited in PCER Consortium, 2008).
<i>WJ-III Spelling subtest</i>	A standardized measure that assesses children's prewriting skills, such as drawing lines, tracing, and writing letters (as cited in PCER Consortium, 2008).
Phonological processing	
<i>Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest</i>	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	
<i>Building Blocks Shape Composition task</i>	An individually-administered assessment of early math 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).
<i>Child Math Assessment—Abbreviated (CMA-A) composite score</i>	An individually-administered assessment of early math achievement, this measure is the average of four subscales: (a) solving addition and subtraction problems using visible objects; (b) constructing a set of objects equal in number to a given set; (c) recognizing shapes; and (d) 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 math assessment by Klein and Starkey (2002), who also developed the PreK math curriculum and participated in one of the research teams for PCER (as cited in PCER Consortium, 2008). ⁸
<i>WJ-III Applied Problems subtest</i>	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			
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	p-value
PCER Consortium, 2008, Chapter 3^a								
Peabody Picture Vocabulary Test III (PPVT-III)	Preschool children	18 classrooms/ 165 children	86.64 (14.43)	85.42 (13.40)	1.22	0.08	3	> 0.05
Test of Language Development–Primary III (TOLD-P:3) Grammatical Understanding subtest	Preschool children	18 classrooms/ 169 children	7.70 (2.58)	8.44 (2.68)	-0.74	-0.16	-6	> 0.05
Domain average for oral language (PCER Consortium, 2008, Chapter 3)						-0.04	-2	Not statistically significant
PCER Consortium, 2008, Chapter 2^b								
PPVT-III	Preschool children	14 classrooms/ 192 children	98.06 (13.27)	93.93 (15.37)	4.13	0.23	+9	> 0.05
TOLD-P:3 Grammatical Understanding subtest	Preschool children	14 classrooms/ 193 children	9.44 (2.55)	9.11 (2.73)	0.33	0.07	+3	> 0.05
Domain average for oral language (PCER Consortium, 2008, Chapter 2)						0.15	+6	Not statistically significant
Domain average for oral language across all studies						0.06	+2	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 each study's domain average was determined by the WWC. na = not applicable.

^a For PCER Consortium (2008, Chapter 3), the effect sizes, mean differences, and p-values presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). Unadjusted posttest means and standard deviations were reported in the original study in Table C-3a. A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. 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 (in Table C-3a). Please see the WWC Procedures and Standards Handbook, version 2.1, p. 96 for more information. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

^b For PCER Consortium (2008, Chapter 2), the effect sizes, mean differences, and p-values presented here were reported in the original study (in Table 2.5, Table D-2a, and Table 2.5, respectively). A correction for clustering and 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; therefore, the unadjusted means (and standard deviations) reported in the study (in Table C-2a) are presented. 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				<i>p</i> -value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index		
PCER Consortium, 2008, Chapter 3^a									
<i>Test of Early Reading Ability III (TERA-3)</i>	Preschool children	18 classrooms/ 170 children	85.81 (13.97)	86.39 (13.88)	-0.58	-0.08	-3	> 0.05	
<i>Woodcock-Johnson III (WJ-III) Letter-Word Identification subtest</i>	Preschool children	18 classrooms/ 169 children	99.87 (12.11)	101.74 (13.08)	-1.87	-0.08	-3	> 0.05	
<i>WJ-III Spelling subtest</i>	Preschool children	18 classrooms/ 169 children	87.39 (14.38)	91.95 (13.23)	-4.56	-0.18	-7	> 0.05	
Domain average for print knowledge (PCER Consortium, 2008, Chapter 3)							-0.11	-5	Not statistically significant
PCER Consortium, 2008, Chapter 2^b									
<i>TERA-3</i>	Preschool children	14 classrooms/ 193 children	nr	nr	nr	0.06	+2	> 0.05	
<i>WJ-III Letter-Word Identification subtest</i>	Preschool children	14 classrooms/ 193 children	nr	nr	nr	-0.11	-4	> 0.05	
<i>WJ-III Spelling subtest</i>	Preschool children	14 classrooms/ 193 children	nr	nr	nr	0.20	+8	> 0.05	
Domain average for print knowledge (PCER Consortium, 2008, Chapter 2)							0.05	+2	Not statistically significant
Domain average for print knowledge across all studies							-0.03	-2	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 each study's domain average was determined by the WWC. na = not applicable. nr = not reported.

^a For PCER Consortium (2008, Chapter 3), the effect sizes, mean differences, and *p*-values presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). Unadjusted posttest means and standard deviations were reported in the original study in Table C-3a. A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

^b For PCER Consortium (2008, Chapter 2), the effect sizes and *p*-values presented here were reported in the original study (in Table A-8, based on an alternative estimation approach, analysis of covariance [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				<i>p</i> -value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index		
PCER Consortium, 2008, Chapter 3^a									
<i>Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest</i>	Preschool children	18 classrooms/ 171 children	8.38 (4.08)	8.19 (4.03)	0.19	0.02	+1	> 0.05	
Domain average for phonological processing (PCER Consortium, 2008, Chapter 3)						0.02	+1	Not statistically significant	
PCER Consortium, 2008, Chapter 2^b									
<i>Pre-CTOPPP Elision subtest</i>	Preschool children	14 classrooms/ 193 children	10.34 (3.60)	10.38 (4.78)	-0.04	-0.10	-4	> 0.05	
Domain average for phonological processing (PCER Consortium, 2008, Chapter 2)						-0.10	-4	Not statistically significant	
Domain average for phonological processing across all studies						-0.04	-2	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 each study's domain average was determined by the WWC. na = not applicable.

^a For PCER Consortium (2008, Chapter 3), the effect size, mean difference, and *p*-value presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). Unadjusted posttest means and standard deviations were reported in the original study in Table C-3a. 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

^b For PCER Consortium (2008, Chapter 2), the effect size, mean difference, and *p*-value presented here were reported in the original study (in Table 2.5, Table D-2a, and Table 2.5, respectively). A correction for clustering and 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; therefore, the unadjusted means (and standard deviations) reported in the study (in Table C-2a) are presented. 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				<i>p</i> -value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index		
PCER Consortium, 2008, Chapter 3^a									
<i>Building Blocks Shape Composition task</i>	Preschool children	18 classrooms/ 169 children	1.42 (0.89)	1.25 (0.83)	0.17	0.19	+8	> 0.05	
<i>Child Math Assessment—Abbreviated (CMA-A) Composite score</i>	Preschool children	18 classrooms/ 170 children	0.42 (0.27)	0.44 (0.29)	-0.02	-0.10	-4	> 0.05	
<i>Woodcock-Johnson III (WJ-III) Applied Problems subtest</i>	Preschool children	18 classrooms/ 169 children	94.07 (12.26)	89.45 (13.75)	4.62	0.20	+8	> 0.05	
Domain average for math (PCER Consortium, 2008, Chapter 3)							0.10	+4	Not statistically significant
PCER Consortium, 2008, Chapter 2^b									
<i>Building Blocks Shape Composition task</i>	Preschool children	14 classrooms/ 193 children	nr	nr	nr	-0.13	-5	> 0.05	
<i>CMA-A Composite score</i>	Preschool children	14 classrooms/ 193 children	nr	nr	nr	0.03	+1	> 0.05	
<i>WJ-III Applied Problems subtest</i>	Preschool children	14 classrooms/ 193 children	nr	nr	nr	0.07	+3	> 0.05	
Domain average for math (PCER Consortium, 2008, Chapter 2)							-0.01	0	Not statistically significant
Domain average for math across all studies							0.04	+2	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 each study's domain average was determined by the WWC. na = not applicable. nr = not reported.

^a For PCER Consortium (2008, Chapter 3), the effect sizes, mean differences, and *p*-values presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). Unadjusted posttest means and standard deviations were reported in the original study in Table C-3a. A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information. This study is characterized as having an indeterminate effect because the mean effect is neither statistically significant nor substantively important.

^b For PCER Consortium (2008, Chapter 2), the effect sizes and *p*-values presented here were reported in the original study (in Table A-8, 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 D.1: Description of supplemental findings for the oral language domain, kindergarten follow-up

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations				<i>p</i> -value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index		
PCER Consortium, 2008, Chapter 3^a									
Peabody Picture Vocabulary Test III (PPVT-III)	Kindergarten children	18 classrooms/160 children	90.44 (11.94)	88.09 (13.60)	2.35	0.15	+6	> 0.05	
Test of Language Development-Primary III (TOLD-P:3) Grammatic Understanding subtest	Kindergarten children	18 classrooms/161 children	8.81 (2.67)	9.63 (2.88)	-0.82	-0.17	-7	> 0.05	

Table Notes: The supplemental findings presented in this table are additional findings from the studies in this report that do not factor into the determination of the intervention rating. 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.

^a For PCER Consortium (2008, Chapter 3), the effect sizes, mean differences, and *p*-values presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information.

Appendix D.2: Description of supplemental findings for the print knowledge domain, kindergarten follow-up

Outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations				<i>p</i> -value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index		
PCER Consortium, 2008, Chapter 3^a									
Test of Early Reading Ability III (TERA-3)	Kindergarten children	18 classrooms/161 children	92.21 (17.62)	92.51 (15.30)	-0.30	-0.04	-2	> 0.05	
Woodcock-Johnson III (WJ-III) Letter-Word Identification subtest	Kindergarten children	18 classrooms/161 children	105.21 (15.25)	105.28 (12.95)	-0.07	0.0	0	> 0.05	
WJ-III Spelling subtest	Kindergarten children	18 classrooms/161 children	100.99 (17.90)	102.28 (16.25)	-1.29	-0.05	-2	> 0.05	

Table Notes: The supplemental findings presented in this table are additional findings from the studies in this report that do not factor into the determination of the intervention rating. 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.

^a For PCER Consortium (2008, Chapter 3), the effect sizes, mean differences, and *p*-values presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information.

Appendix D.3: Description of supplemental findings for the phonological processing domain, kindergarten follow-up

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, Chapter 3^a									
<i>Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) Elision subtest</i>	Kindergarten children	18 classrooms/ 161 children	2.68 (3.03)	2.51 (2.83)	0.17	0.06	+2	> 0.05	

Table Notes: The supplemental findings presented in this table are additional findings from the studies in this report that do not factor into the determination of the intervention rating. 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.

^a For PCER Consortium (2008, Chapter 3), the effect size, mean difference, and p-value presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information.

Appendix D.4: Description of supplemental findings for the math domain, kindergarten follow-up

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, Chapter 3^a									
<i>Building Block Shape Composition task</i>	Kindergarten children	18 classrooms/ 161 children	2.05 (0.80)	2.05 (0.92)	0.00	-0.01	0	> 0.05	
<i>Child Math Assessment—Abbreviated (CMA-A) composite score</i>	Kindergarten children	18 classrooms/ 161 children	0.66 (0.18)	0.63 (0.20)	0.03	0.14	+6	> 0.05	
<i>Woodcock-Johnson III (WJ-III) Applied Problems subtest</i>	Kindergarten children	18 classrooms/ 161 children	95.58 (14.29)	93.46 (13.21)	2.12	0.09	+4	> 0.05	

Table Notes: The supplemental findings presented in this table are additional findings from the studies in this report that do not factor into the determination of the intervention rating. 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.

^a For PCER Consortium (2008, Chapter 3), the effect sizes, mean differences, and p-values presented here were reported in the original study (in Table 3.4, Table D-3a, and Table 3.4, respectively). A correction for multiple comparisons was needed but did not affect whether any of the contrasts were found to be statistically significant. 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 Procedures and Standards Handbook, version 2.1, p. 96 for more information.

Endnotes

¹ The descriptive information for this program was obtained from publicly available sources: the program's website (<https://www.teachingstrategies.com/page/73756-creative-curriculum-system-preschool.cfm>, downloaded February 2012), and the program's online catalog (<https://www.teachingstrategies.com/content/pageDocs/Teaching-Strategies-Catalog-2011.pdf>, 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 and we incorporated feedback from the developer. 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 intervention report for *The Creative Curriculum® for Preschool* was released in August 2009. This report has been updated to include reviews of five studies that have been released since 2009. Of the additional studies, none were within the scope of the review protocol for Early Childhood Education topic area. A complete list and disposition of all studies reviewed are provided in the references. The report confirmed the study disposition of *meets WWC evidence standards without reservations* for the PCER Consortium (2008) study, Chapter 3, Creative Curriculum: University of North Carolina at Charlotte and confirmed the study disposition of *meets WWC evidence standards with reservations* for PCER Consortium (2008) study, Chapter 2, Bright Beginnings and Creative Curriculum: Vanderbilt University, which were included in the earlier report. One study that was included in the 2009 report—Henry et al. (2004)—received a revised disposition in this report of *does not meet WWC evidence standards*. The revised disposition is due to a change in the review protocol, particularly in baseline equivalence standards. 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. The studies reviewed by the WWC are all evaluations of the Fourth Edition of *The Creative Curriculum® for Preschool*. In July 2011, the developer released *The Creative Curriculum® for Preschool, Fifth Edition*, as part of *The Creative Curriculum® System for Preschool*. No effectiveness studies of this updated, expanded curriculum have been completed. Therefore, this intervention report focuses on the Fourth Edition.

³ The national PCER Consortium (2008) study (Chapters 2 and 3) summarized in this intervention report was prepared by staff of one of the WWC 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. 24. 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 studies 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 the comparison groups). The pretest data provided for each domain was used to establish baseline equivalence for the domain.

⁷ By name, this measure sounds as if 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.

⁸ Klein, A., & Starkey, P. (2002). *Child Math Assessment—Abbreviated*. Berkeley, CA: Author.

⁹ Clements, D. H., Sarema, 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.

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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. 24.
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. 24.
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.