



Improving Literacy Outcomes for At-Risk Kindergartners through an Afterschool Tutoring Program: Results from a Feasibility Study

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Background: Students from low-income backgrounds are at-risk for academic difficulties. Although a considerable number of students from this population attend community-based afterschool programs, little is known about their effectiveness in promoting academic learning. The purpose of this feasibility study was to examine the impact of an afterschool tutoring program on the literacy skills of kindergartners and youth from low-income homes.

Method: This study incorporated a quasi-experimental pre–posttest design that included 10 kindergartners and 13 youth who participated in the program and a comparison group of 10 kindergartners. Following completion of an assessment battery, kindergartners and youth read in dyads for 10 weeks after which they were reassessed on the same measures.

Results: Kindergartners who participated in the program had significantly greater gains in phonological awareness as compared to the comparison group. Although participants described that the program was beneficial, no other comparisons on scores for kindergartners or youth reached statistical significance.

Conclusion: These results provide evidence that this brief, low-cost program may have a positive effect on aspects of participants' reading skills. This is one avenue that may narrow the achievement gap for at-risk students, although additional research is warranted. These findings support that providing students from at-risk backgrounds with experiences that target academic skills, specifically literacy, outside of the traditional school context may facilitate educationally relevant learning.

Keywords: literacy, tutoring, afterschool program, at-risk students, book reading

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INTRODUCTION

Students enter school with highly variable knowledge and skills (Christian et al., 1998; Chatterji, 2006; Justice et al., 2008; McWayne et al., 2012). Some young students have a myriad of rich learning experiences prior to the start of formal schooling in kindergarten while others lack these meaningful opportunities, which frequently results in less-developed skills and places them at-risk for academic

and learning difficulties (Torgesen et al., 1997; Cunningham and Stanovich, 1998). Put simply, students from low-income backgrounds are often at an immediate learning disadvantage when compared to their more advantaged peers (Lee and Burkam, 2002). Furthermore, students from low-income backgrounds typically do not catch up to their peers (Chatterji, 2006; Curby et al., 2009; Sektnan et al., 2010). Cabell et al. (2013), for example, found that preschoolers' emergent literacy profiles were relatively consistent over the preschool academic year. These authors found that 79% of children in the lowest achievement profile in the fall remained in that group in the spring. Unfortunately, this educational achievement gap persists during the academic years, and by the time students from low-income enter high school, they are less likely to pursue education beyond high school and are more likely to experience other negative outcomes, such as lower earning potential and incarceration (Reynolds et al., 2001).

In light of these discouraging facts, it is imperative that young students from low-income backgrounds have access to high-quality literacy experiences, such as shared book reading. This preventative approach may help to mitigate the educational gap during the early elementary school years by providing them with access to meaningful activities with books (e.g., National Early Literacy Panel, 2008; Mol et al., 2009; Swanson et al., 2011). Many studies have examined the impacts of a dialogic reading style on young children's oral language (i.e., vocabulary) and emergent literacy (i.e., print awareness) development. This interactive style of reading promotes children's active participation by asking open-ended questions, expanding children's utterances, labeling items in the book, and praising communicative attempts (Arnold and Whitehurst, 1994; Gupta and Lee, 2015).

Across many studies, parents (e.g., Arnold and Whitehurst, 1994), caregivers (e.g., Whitehurst et al., 1994), and teachers (e.g., Justice et al., 2010) have been successfully trained on how to incorporate specific, explicit strategies while reading with young children. Extant research on impacts of shared book reading on students' development supports that the following specific evidence-based targets should be included in the shared book reading: (1) print awareness (e.g., picture walk, title/author; Justice et al., 2006), (2) phonological awareness (e.g., rhyming, segmentation, deletion, and manipulation; Phillips et al., 2008), and (3) comprehension strategies (e.g., prediction, prior knowledge, summarizing, and open-ended questions; Fuchs et al., 2001). Print awareness and phonological awareness are both correlated and causally linked to literacy achievement (e.g., Wagner et al., 1997; National Early Literacy Panel, 2008). Likewise, instruction in phonological awareness may prevent later literacy difficulties (Torgesen et al., 1997; National Reading Panel, 2000). Comprehension was also an important target, given that this area is the ultimate purpose for reading, and research suggesting that even young children benefit from explicit attention to comprehension strategies and skills, including asking open-ended questions to encourage the kindergartner to talk, making predictions, previewing the book, activating background knowledge and prior experiences, summarizing, providing definitions, and using new vocabulary words in another sentence/context (Whitehurst et al., 1994; Fuchs et al., 2001). In summary, given this extant research on critical targets that support young children's literacy

development through shared book reading, a training for youth was developed to teach them how to incorporate these into shared reading activities with kindergartners.

Although a multitude of studies have described the positive impacts of parent, caregiver, and teacher trainings on young students' literacy, relatively few studies have examined the inclusion of teenage students as implementers of shared book reading. With this approach, older students are considered tutors while reading books with younger students, the tutees. By design, the tutoring provides individualized, contextualized discussions about a specific topic (e.g., book) in which the tutor encourages active participation with the tutee (Utley and Mortweet, 1997). In order for the tutoring to be effective, the tutor must be able to integrate different perspectives, ask relevant questions, monitor the tutee's responses, correct errors or misunderstandings, and elaborate on information. Through the tutoring process, the tutor facilitates positive literacy experiences with the tutee and may also develop his or her understanding of the content and specific strategies as the dyad jointly creates meaning about the text (Fuchs and Fuchs, 2005). In addition, the tutor and tutee both appear to benefit in the areas of social and emotional development, specifically attitudes toward reading, which requires increased effort, involvement, persistence, and overall achievement (Henk and Melnick, 1995).

Research on tutoring is conceptualized using two variations: cross-age design, which pairs younger (i.e., tutees) and older (i.e., tutors) students, and same-age design, which pairs two peers of the same age. Whereas empirical research incorporating the same-age design has yielded both positive and null effects (Mathes and Babyak, 2001; McMaster et al., 2005; Stein et al., 2008), data support the benefits of cross-age tutoring (Van Keer and Verhaeghe, 2005; Van Keer and Vanderlinde, 2010), the design incorporated in the present study. For example, Van Keer and Verhaeghe (2005) investigated a 50-minute per week classroom-based tutoring intervention aimed at boosting the reading comprehension skills and self-efficacy of second and fifth grade students. The results revealed benefits for both groups of students who participated in the cross-age tutoring program, although long-term impacts were not observed for the second graders. Similar positive impacts were found for third and sixth grade students who participated in a follow-up study (Van Keer and Vanderlinde, 2010). In a more recent study, Mitchell et al. (2015) integrated a cross-age tutoring design aimed at improving spelling abilities of second and fourth grade students who were paired together 30 min per week for 9 weeks. The results support that the tutoring program was beneficial for both groups of students. Notably, these studies have been conducted within the school context and focused primarily on conventional literacy skills, including reading comprehension (Van Keer and Verhaeghe, 2005; Van Keer and Vanderlinde, 2010) and spelling (Mitchell et al., 2015) with middle-grade students. Because few studies have examined the use of this type of program in community-based afterschool programs with young students, there is a need for additional research in this area.

Over 10 million students in the United States attend afterschool programs, and this number continues to increase. Notably, there is disproportionate representation of cultural groups for those who attend afterschool programs. For example, students from

low-income households and minority backgrounds (e.g., African American and Hispanic) are more likely to attend afterschool programs when compared to their more affluent, Caucasian peers (Afterschool Alliance, 2014). Likewise, there are documented benefits of participation in afterschool programs for young school-age children, which include higher engagement in school, intrinsic motivation, and reading achievement (Mahoney et al., 2005). In short, this context provides an ideal venue to capitalize on the benefits of participation in afterschool programs and also to highlight key academic knowledge and skills, particularly related to literacy (Fuchs and Fuchs, 2005; Van Keer and Verhaeghe, 2005). Only one study, to the best of our knowledge, has examined the impact of a literacy program in an afterschool context. Johnson et al. (2013) found that second and fifth grade students who participated in a 2-h, twice a week literacy program for the academic year improved on a standardized measure of reading comprehension. Notably, this study did not incorporate a cross-age tutoring design.

The purpose of this study is to improve the literacy knowledge and skills of kindergartners from low-income households and to assess the feasibility of an innovative literacy program conducted in a community-based afterschool context. Given the positive effects of cross-age tutoring on students' literacy skills and attitudes, a program conducted in afterschool programs may serve as a powerful influence on students' educational achievement and reduce the educational achievement gap between children from at-risk environments and their more affluent peers. However, there is an impending need to explore a cross-age tutoring design with kindergartners and youth such that the existing research has examined gains in conventional literacy skills for mid- (i.e., second grade) to late- (i.e., fifth grade) elementary school students. While the present study included aspects of reading comprehension, the focus was on code-based skills (print and phonological awareness) and reading attitudes.

The present feasibility study fills a gap in the research and provides preliminary data on an understudied, yet promising, program. In other words, the present study provides an incremental contribution to the research literature and has potential practical implications for professionals and parents. Although large-scale, randomized controlled trials (RCTs) are the "gold standard" in research (Rosen et al., 2006), this type of study requires a substantial financial and time investment (Stolberg et al., 2004). Prior to this sizeable commitment, it is wise for researchers to document the positive impacts of an intervention and to determine if it can be implemented with fidelity *via* small-scale, feasibility studies. Thus, the ultimate goal of this feasibility study is to determine the viability of a large-scale RCT.

The following research questions were asked: (a) Does participation in a community-based, cross-age tutoring program have an impact on kindergartners' literacy skills and attitudes? and (b) Do youth who participate in a community-based, cross-age tutoring program exhibit gains in literacy skills and attitudes? Given extant research, we hypothesize that kindergartners and youth will both benefit from participation in this program.

MATERIALS AND METHODS

Design

The present study incorporated a quasi-experimental pre-posttest design that included two groups (kindergartners and youth) who participated in the program and a grade-matched comparison group (kindergartners). Students who participated in the program attended the same community-based afterschool program, which was funded by a variety of local non-profits, foundations, and trusts and was run by a local non-profit organization and civic association that was situated within the neighborhood in which these children lived. Kindergartners in the comparison group attended the same elementary school as all of the kindergartners who participated in the program, but they did not attend the afterschool program. All caregivers provided written informed consent. In addition, youth provided written assent to participate in the study. This study was approved by The Ohio State University's Institutional Review Board.

Participants

All of the kindergartners who attended the afterschool program participated in the present study; all additional students enrolled in kindergarten at the school were recruited for participation in the comparison group. Ten kindergartners (seven girls) participated in the tutoring program, and 10 kindergartners (six girls) served as comparisons. Kindergartners who participated in the program were 5 years, 11 months of age on average (range: 5 years, 6 months to 6 years, and 4 months), and those in the comparison group were 5 years, 11 months of age (range: 5 years, 4 months to 6 years, and 10 months). As per caregiver's report, all of the kindergartners who participated in the program were black, and 70% of the comparison kindergartners were black (three were white). Caregivers of the group of kindergartners who participated in the program reported that the annual total family income was as follows: 70% earned less than \$10,000, 10% between \$10,001 and \$20,000, and 20% between \$20,001 and \$40,000. Similar income was reported for the kindergartners in the comparison group: 60% earned less than \$10,000, 20% between \$10,001 and \$20,000, and 20% between \$20,001 and \$40,000.

Thirteen youth (11 girls) with an average age of 15 years, 4 months (range: 14 years, 2 months to 18 years, and 2 months) participated in the program as implementers. The majority of the youth were black (one was white). According to caregiver report, 38% resided in a household with an annual income of less than \$10,000; 32% of households earned between \$10,001 and \$20,000, and 30% earned between \$20,001 and \$40,000.

Procedures Measures

Once informed consent was granted, kindergartners (those who participated in the program and those in the comparison group) and youth completed initial assessments; the same measures were administered immediately after the conclusion of the program (posttest). All measures were administered during a 5-week assessment window, and there was no overlap for the program participants between the assessment windows and intervention.

Kindergarten Measures

A variety of standardized and non-standardized measures were individually administered to kindergartners who participated in the program and those in the comparison group. Measures were selected to align with the learning objectives of the tutoring program.

The Preschool Word and Print Awareness (PWPA; Justice and Ezell, 2001) is a 14-item individually administered measure that assesses children's knowledge of print-related knowledge, including functions of print, letters, and words, book orientation, and directions of print, during an adult-child shared book reading of the picture book, *Nine Ducks Nine* (Hayes, 1990). Most items were deemed either incorrect (received a score of 0) or correct (received a score of 1); partial credit was possible on three questions. Responses were scored, summed, and raw scores were calculated (out of 17 points). Justice et al. (2006) reported an interrater reliability coefficient of 0.94 and partial credit model ranges from 0.7 to 1.3. Additionally, item response theory showed that the PWPA raw score represents a single trait that can be estimated with a reliability of 0.74 (Justice et al., 2006). Internal consistency as measured by Cronbach's alpha for a larger sample was 0.71 (Cabell et al., 2011).

Kindergartners' alphabet knowledge was assessed by the Letter Identification subtest of the Woodcock Reading Mastery Test—Third Edition (WRMT-III; Woodcock, 2011), a standardized measure that is frequently used to assess students' literacy skills. Kindergartners were asked to identify a variety of letters in isolation using a variety of fonts and texts. Correct responses were summed, and raw scores (out of 17) were calculated and used in the present analyses. Split-half reliability is reported to be 0.95 by the test developers, and scores correlate at 0.69 with scores on the Letter and Word Recognition subtest of the Kaufman Test of Education Achievement.

The Phonological Awareness subtest of the WRMT-III (Woodcock, 2011) was included to determine kindergartners' phonological awareness skills. Kindergartners' responses were summed to determine a raw score (out of 33), which was used in the present analyses. Split-half reliability is reported to be 0.94 by the test developers, and scores correlate at 0.82 with scores on the Phonological Awareness subtest of the Kaufman Test of Education Achievement.

The Preschool Reading Attitudes Survey (PRAS; Saracho, 1988) was individually administered to gauge kindergartners' beliefs about reading, in general. Although this measure was originally intended for use with children between the ages of three and five, it was included in the present study given the economic and educational background of these students. Research supports that students from low-income backgrounds are at-risk for difficulties with literacy (Craig and Washington, 2004; National Center for Education Statistics, 2011). During administration, kindergartners were asked to point to one of three corresponding faces (sad, neither happy nor sad, and happy) to indicate how each prompt made them feel. Responses were scored (0 for sad; 1 for neither happy nor sad; and 2 for happy) and summed, and this raw score was used in the present analyses. This measure was determined to be both reliable (e.g., test-retest correlation coefficients ranged from 0.92 to 0.98) and valid (e.g., construct validity was 0.95; Saracho, 1988).

The Clinical Evaluation of Language Fundamentals—Fourth Edition (CELF-4; Semel et al., 2003) is a widely used standardized clinical measure used to evaluate children's receptive and expressive language skills. For the purposes of the present study, the four Core Language subtests (Concepts and Following Directions, Word Structure, Recalling Sentences, and Formulated Sentences) were included as a means to control for the kindergartners' language abilities to ensure that differences with language were not present at pretest. Subtest raw scores were converted to scaled scores, and a Core Language standard score was determined and used in the present analyses. The Core Language subtests were only administered during the pretest. In addition, the Understanding Spoken Paragraphs subtest of the CELF-4 was administered at both pre- and posttest, and the scaled score was used in the present analyses. These subtests have high internal consistency (0.69–0.91) and test-retest reliability (0.81–0.93) and content validity with other language measures (Semel et al., 2003).

Youth Measures

As with the kindergartners, a battery of standardized and non-standardized measures was conducted to assess the reading skills and beliefs of youth; these assessments were administered immediately before (pretest) the tutoring training and after (posttest) the tutoring program.

Three subtests of the WRMT-III (Woodcock, 2011), Word Identification, Word Attack, and Passage Comprehension, were administered to assess youth's ability to identify single words in isolation, to decode nonsense words or infrequently used words using phonic and structural cues, and to provide a key missing word after reading a short paragraph, respectively. On each of these subtests, responses were determined to be either correct (score of 1) or incorrect (score of 0); raw scores were used in present analyses. Split-half reliability for these subtests ranges from 0.76 to 0.93 as reported by the test developers. Measures correlate with relevant subtest scores on the Kaufman Test of Education Achievement (between 0.65 and 0.77).

The Gates-MacGinitie Reading Test—Fourth Edition (GMRT-4; MacGinitie et al., 2000) is a widely used, self-administered clinical literacy assessment that includes two subtests: Vocabulary and Comprehension. On the Vocabulary subtest, youth were asked to respond to a variety of prompts related to vocabulary (e.g., synonyms and antonyms), and they read a passage and answered corresponding reading comprehension questions on the Comprehension subtest. Correct responses on each subtest were summed to create a raw score for that subtest, which were used in the present analyses. Reliability (KR-20) is reported to be 0.92 by the test developers, and validity is supported by correlations (0.77–0.79) with the Iowa Test of Basic Skills and California Test of Basic Skills.

The Elementary Reading Attitudes Survey (ERAS; McKenna and Kear, 1990) is a group-administered measure that is used to assess students' attitudes about reading. Although this measure was originally intended for students in grades 1–6, it was included in this study given the economic and educational background of the youth. Instead of Garfield pictures (as used in the original measure), the following words replaced the pictures to reflect the youth's attitudes: very upset (scored as a 1), a little upset (scored as a 2),

a little happy (scored as a 3), and very happy (scored as a 4). Youth's responses were summed to create a raw score, which was used in the present analyses. McKenna and Kear (1990) reported that the scale is reliable (internal consistency coefficients ranged from 0.74 to 0.89) and valid (average correlation coefficient was 0.64) for first through sixth grade students.

The Motivations for Reading Questionnaire (MRQ; Wigfield and Guthrie, 1997) is a group-administered assessment used to capture individual student's motivation to read. Youth were asked to respond to 53 items; responses were summed (1 = very different from me; 4 = a lot like me) to create a raw score, which was used in the present analyses. Use of this measure with students in grades 6 through 8 has been reported in the literature; this measure was included in the present study given the youth's educational and economic background. Reliability (coefficients range from 0.52 to 0.81; Wigfield and Guthrie, 1997) and validity (confirmatory fit index of 0.90; Unrau and Schlackman, 2006) were acceptable for sixth through eighth grade students.

Youth Training

Following the pretest assessments, youth attended four, 90-min training sessions that focused on key areas and explicit strategies that were to be embedded into each book-reading session with the kindergartners. See Appendix A for an outline of the training. Specifically, in the area of print and phonological awareness, youth discussed and practiced activities that included specific skills in the area of rhyming, identifying initial and final sounds of words, and adding and subtracting parts of words (Phillips et al., 2008). To target comprehension, youth were encouraged to ask open-ended questions to encourage the kindergartner to talk; specific techniques included making predictions, previewing the book, activating background knowledge and prior experiences, and summarizing (Fuchs et al., 1997). Also, with new, challenging vocabulary, youth were trained to repeat the word, provide a child-friendly definition, use the word in another sentence/context, and encourage the kindergartner to use the word (Whitehurst et al., 1994). In summary, the aforementioned research on evidence-based reading topics and strategies informed the youth training. The youth were provided with many examples of and opportunities to target these comprehension strategies.

Tutoring research (e.g., Mastropieri et al., 2003; Van Keer and Vanderlinde, 2010) highlights the need for tutors (i.e., youth) to be trained prior to participation in the program (i.e., weekly book-reading sessions with kindergartners, described below). As a reminder throughout the program, youth were given a handout that included the strategies discussed during the training; they were encouraged to refer to this handout during book-reading sessions with kindergartners. Finally, the training included a discussion on how youth could individualize or modify their language input to best meet the needs of their reading partner.

Tutoring Literacy Program

Kindergartners were assigned a reading tutor (i.e., youth) by the professionals at the afterschool program; none of the students had previous experience with each other. During the 10 weekly book-reading sessions, kindergartners and youth participated in the program together for approximately 45 min. Previous studies

examining cross-age tutoring have included similar amounts of time. For example, Mitchell et al. (2015) included nine weekly sessions lasting approximately 30 min, and Paquette (2009) included 10 weekly sessions lasting about an hour. Dyads independently selected two to three age-appropriate children's books, and the youth completed weekly lesson plans that described the types and locations in the book (including specific examples) where they were to incorporate the strategies from the training into the reading sessions with the kindergartners. At the end of each reading session with the kindergartners, the youth completed a worksheet that documented strategies that they incorporated into the book-reading session and highlighted the positive aspects of the session and areas that they would consider revising in future book-reading sessions. See Appendix B for a copy of the worksheet. These details were discussed with the youth, and feedback and additional suggestions were provided to assist with program fidelity. Responses from each worksheet were coded to investigate the types of strategies (based on the training, as described above) that youth implemented into the reading sessions with kindergartners. Percentages of use per session were aggregated across the 10-week timeframe. All of the youth reported using at least one strategy per session. The most frequently used strategies included general questions about the kindergartners' favorite part of the book and overall enjoyment (75%), prediction (74%), rhyming (57%), and picture walk (35%). In addition, book-reading sessions were observed, and a checklist was completed by a professional who was familiar with the program as a method of providing additional feedback to the youth.

RESULTS

Prior to conducting analyses for the first research question, pretest scores on all measures were compared for initial equivalence between kindergartners who participated in the program and the comparison group *via* one-way analysis of variance (ANOVA). As shown in **Table 1**, kindergartners in the control group had higher scores on the measure of print awareness ($M = 13.90$, $SE = 0.43$) than kindergartners in the

TABLE 1 | Kindergartners' (program and control) pretest scores.

Measure	Program group		Control group		<i>t</i>	<i>p</i> -Value
	<i>M</i> (SD)	<i>SE</i>	<i>M</i> (SD)	<i>SE</i>		
PWPA	11.50 (3.17)	1.00	13.90 (1.37)	0.43	2.20	0.048
Letter Identification	16.60 (0.52)	0.16	16.50 (0.71)	0.22	-0.36	0.72
Phonological Awareness	15.50 (6.87)	2.17	20.00 (3.56)	1.13	1.84	0.08
PRAS	21.70 (10.78)	3.41	29.00 (7.53)	2.38	1.76	0.10
Understanding Spoken Paragraphs	5.80 (2.97)	0.94	7.50 (1.96)	0.62	1.51	0.15
CELF Core Language ^a	80.20 (18.71)	5.92	87.80 (11.43)	3.61	1.20	0.29

*Raw scores are reported unless otherwise noted. *df* = 18. *p*-Values comparing pretest scores for program and control groups.*

PWPA = Preschool Word and Print Awareness, PRAS = Preschool Reading Attitudes Survey, CELF = Clinical Evaluation of Language Fundamentals, Fourth Edition.

^aStandard scores.

program group ($M = 11.50$, $SE = 1.00$), $t(18) = 2.20$, $p < 0.05$. In addition, a trend favored kindergartners in the comparison group ($M = 20.00$, $SE = 1.13$) compared to the program group ($M = 15.50$, $SE = 2.17$) on the measure of phonological awareness, $t(18) = 1.84$, $p = 0.08$. To partially account for this, gains from pretest to posttest were analyzed when addressing the first research question.

The first research question concerned the extent to which the community-based, cross-age tutoring program impacted kindergartners' gains on literacy skills and attitudes. Descriptive statistics showing gains on all outcomes for kindergartners who participated in the program and those in the comparison group are presented in **Table 2**. Gains tended to be greater for kindergartners who participated in the program. To test this using inferential statistics, we ran two-by-two (condition—between subjects; time—within subjects) ANOVA. Cohen's d was used to determine the impact of the intervention. Specifically, effect sizes were calculated using gain scores and pooled variance of gains across pretest/posttest. See **Table 2** for details. Notably, results were the same regardless of whether the CELF-4 Core Language standard score was included as a covariate. Kindergartners who participated in the program made statistically significant gains in the phonological awareness skills from pre- to posttest ($M = 3.90$, $SD = 2.88$) compared to kindergartners who did not participate in the afterschool tutoring program ($M = 0.06$, $SD = 3.53$; $t = 0.03$; $p < 0.05$). A similar trend existed for kindergartners' reading attitudes ($M = 8.10$, $SD = 11.00$ for the program group;

$M = -0.30$, $SD = 6.77$ for comparison; $t = -2.06$), but it did not meet traditional levels of statistical significance ($p = 0.054$). Very large effect sizes were noted for phonological awareness and reading attitudes (1.19 and 0.92, respectively; Cohen, 1988). Despite descriptive trends, no other comparisons were statistically significant. Effect sizes for the other outcome variables were small to medium (0.25–0.53).

The second research question was to investigate whether the youth participating in the tutoring program would exhibit gains in their literacy skills and attitudes. To address this question, a repeated measures ANOVA with time (pretest and posttest) as the repeated measure was conducted. Descriptive and inferential results are presented in **Table 3**. On each of the outcome measures with the exception of the Vocabulary and Comprehension raw scores of the GMRT-4, youth displayed higher raw scores at posttest. Although none of these gains were statistically significant with the exception of vocabulary, $F(1, 11) = 7.21$, $p = 0.02$, small effect sizes were noted (0.13–0.31). Notably, the difference in vocabulary was in the opposite direction than expected (i.e., lower scores at posttest).

DISCUSSION

The purpose of this feasibility study was to explore the potential and feasibility of a community-based, cross-age tutoring program conducted in the afterschool context as it might benefit kindergartners and youth from low-income backgrounds. Although previous research suggests benefits to both groups of participants in the cross-age variation of a tutoring program, our design was particularly motivated by the potential to bolster kindergartners' literacy skills to ensure that they are prepared for future academic success. Specifically, our logic model posited that the combination of weekly tutoring book-reading sessions, which incorporated evidence-based strategies to facilitate learning, and opportunities for kindergartners to practice reading and foster positive literacy experiences, would in turn boost literacy skills and attitudes and serve as a powerful influence in the students' lives. The mechanism ("active ingredients") by which the program might also result in gains in youth skills was less apparent, but such gains were also anticipated given extant literature suggesting that participation in cross-age tutoring design is beneficial to the tutor's literacy, social, and emotional development (Henk and Melnick, 1995; Van Keer and Verhaeghe, 2005; Van Keer and Vanderlinde, 2010).

TABLE 2 | Kindergartners' mean gain scores^a (pre- to posttest) on outcomes.

Outcome measure	Program group		Control group		t	p -Value	d
	M (SD)	SE	M (SD)	SE			
PWPA	2.40 (3.20)	1.01	1.00 (2.11)	0.67	-1.15	0.26	0.52
Letter Identification	0.20 (0.42)	0.13	0.00 (1.05)	0.33	-0.56	0.58	0.25
Phonological Awareness	3.90 (2.88)	0.91	0.06 (3.53)	1.12	0.03	0.03	1.19
PRAS	8.10 (11.00)	3.48	-0.30 (6.77)	2.14	-2.06	0.054	0.92
Understanding Spoken Paragraphs	2.40 (3.03)	0.96	1.20 (1.87)	0.59	-1.07	0.30	0.48

$df = 18$. p -values for analysis of variance comparing program and control group gains. Effect size calculated using Cohen's d .

PWPA = Preschool Word and Print Awareness, PRAS = Preschool Reading Attitudes Survey.

^aRaw scores were used to compute gain scores.

TABLE 3 | Youth's average raw scores on the outcome measures.

Outcome measure	Pretest		Posttest		$F(1, 11)$	p -Value	d
	M (SD)	SE	M (SD)	SE			
Word Identification	33.42 (4.23)	1.22	34.50 (4.76)	1.37	2.32	0.16	0.24
Word Attack	18.42 (6.27)	1.81	20.08 (4.46)	1.29	1.19	0.30	0.31
Passage Comprehension	22.33 (4.64)	1.34	22.42 (5.65)	1.63	0.01	0.93	0.02
Vocabulary	23.91 (8.28)	2.50	20.55 (9.87)	2.98	7.21	0.02	0.34
Reading Comprehension	17.83 (6.06)	1.75	16.33 (6.04)	1.74	0.88	0.37	0.25
ERAS	31.83 (12.58)	3.63	33.67 (8.71)	2.52	0.26	0.62	0.17
MRQ	31.02 (5.11)	1.54	31.77 (6.26)	1.89	0.33	0.58	0.13

p -Values for repeated-measure analysis of variance comparing pretest to posttest scores. Effect size calculated using Cohen's d .

ERAS = Elementary Reading Attitudes Survey, MRQ = Motivation for Reading Questionnaire.

Overall, the results of this feasibility study must be interpreted in light of the exploratory nature. With this, data suggest that participation in a community-based tutoring program may boost aspects of at-risk kindergartners' literacy skills, specifically phonological awareness. This finding is encouraging given that the extant research clearly shows that the increasingly complex skills of phonological awareness are both predictive of and causally linked to students' future literacy (Snow et al., 1998; Storch and Whitehurst, 2002; National Early Literacy Panel, 2008). As an example, the majority of older students with literacy difficulties demonstrate a core deficit in the area of phonological awareness and phonological processing skills (Share and Stanovich, 1995; Wagner et al., 1997). We were also encouraged by the trend that kindergartners receiving the tutoring program demonstrated more positive attitudes toward literacy (on the PRAS). Young students' reading attitudes play an important role in the reading process; students who demonstrate positive attitudes are more likely to read, which further develops their skills and expands their knowledge (Saracho, 1987). In addition, because the program incorporated reading dyads, the youth (tutor) was able to provide individualized attention and adapted instruction to best meet the learning needs of the kindergartner. This, in turn, may have not only facilitated kindergartners' literacy skills but may have also improved other proximal skills, including the kindergartner's confidence and self-esteem although these constructs were not measured in this study (Johnson et al., 2013).

Comparisons for other outcomes were not statistically significant but must be interpreted in light of the exploratory nature of the study and small sample size. The overall pattern of the results, in which gains were consistently greater for the group of students who participated in the program, demonstrates the potential promise of this tutoring program. Results must also be interpreted in light of the quasi-experimental design, which does not guarantee the initial equivalence of groups, and, when viewed conservatively, our data indicated the possibility of selection biases between the two groups. Given that this was a feasibility study, the initial development of the program and implementation with a small group of students was a necessary important first step in which we capitalized on the existence of a small afterschool program that was willing to partner with us to trial the program. Future studies should further develop the tutoring program to better support the other key skills unaffected in this feasibility study and also move toward experimental designs with larger sample sizes and greater statistical power.

Youth who participated in the tutoring program reported that they enjoyed the program and felt like they made a positive contribution to the kindergartners' overall literacy experiences; however, no statistically significant gains in literacy skills, motivation, or attitudes were observed for this group. Because this general finding is at odds with the extant research on the topic, we provide several explanations. First, the tutoring book-reading program occurred over 10 sessions, each of which lasted less than an hour. Given this relatively short time period, we hypothesize that the youth may make considerable gains with more sessions that lasted for a longer time, and the same could be true for other outcomes for the kindergartners. This would allow the youth to incorporate a greater variety of strategies that target a multiple

reading areas, including comprehension. As an example, Johnson et al. (2013) included reading intervention for 2 h, two times per week that resulted in positive changes in reading comprehension. Second, a fairly sizeable age range was noted for the youth (14 years, 2 months to 18 years, and 2 months); thus, it is possible that the youth's age limited the results given that previous studies included a smaller age range with younger students (Van Keer and Vanderlinde, 2010; Mitchell et al., 2015). Finally, our outcome measures included only quantitative data that were collected *via* standardized and non-standardized measures. Given that the youth were in high school, it is possible that our measures did not adequately capture any potential changes in the constructs that were assessed or that the types of change were not reflected by these measures. With regard to the lower vocabulary scores at posttest, it is hypothesized that youth completed this measure, which was quite lengthy, as quickly as possible. Thus, it is possible that they did not read the individual prompts. A next step is to analyze the qualitative interview data for a more thorough explanation and insights into any potential benefits for the youth. In future studies, a different vocabulary measure should be selected, and should gains for youth be documented, a relevant counterfactual (i.e., youth comparison group) will be included in order to attribute gains to participation in the literacy program and rule out alternative explanations such as maturation.

Limitations and Future Directions

Although all of the youth completed the expected aspects of the training, a complete picture about how and to what extent the youth incorporated specific evidence-based strategies from the training into the weekly book-reading sessions with their tutee was not available due to parents' reluctance to allow video- or audiotaping of sessions. Extant research investigating tutoring programs emphasizes the need for adequate training for the tutors (Mastropieri et al., 2003; Van Keer and Vanderlinde, 2010). Additional information on the extent to which the training was sufficient for supporting their abilities to embed the selected evidence-based strategies into shared book reading is needed. Youth provided some insight into the specifics of the sessions by completing a worksheet after each reading session. While these data support that each youth included at least one strategy into every reading session with kindergartners, the full extent is unknown and suggests that additional strategies can be included. For example, most youth included discussion about kindergartners' favorite aspect and overall enjoyment of the book, prediction, and rhyming. Few youth included strategies that support vocabulary development and reading comprehension. In future research, additional measures of fidelity (e.g., collection and analysis of videotaped observations of book-reading sessions) should be included and aspects of the youth training may be modified to highlight full inclusion of strategies and reading targets.

The timing of kindergarten assessments also constituted a limitation in the present study. Specifically, although all kindergartners were assessed during a 5-week window and the same amount of time passed between pretest and posttest, those in the comparison group were assessed at the latter end of the windows due to scheduling challenges. We attempted to address this by

examining initial equivalence at pretest and comparing gains made by each group over the same span of time. Given that the comparison group started higher (although not significantly so) than the group who participated in the program, selection biases and regression to the mean are potential threats to the validity of results. Future studies should make every effort to ensure that pre- and posttest data are collected during a narrower assessment window and, as indicated above, random assignment will be used to minimize selection biases.

CONCLUSION

This feasibility study provides preliminary evidence that a relatively brief, low-cost program may have a positive effect on the phonological awareness skills and reading attitudes of kindergartners. As all of the participants were at-risk (i.e., due to their low income and ethnic minority backgrounds) for later academic difficulties, this study indicated that this program may be one avenue for narrowing the achievement gap between at-risk students and their peers from more affluent backgrounds. Additional research investigating this topic, including longer intervention, fidelity of implementation, and follow-up to examine the long-term benefits of the program, is warranted before the effects may be generalized to a larger population. Nonetheless,

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- this initial study suggests potential benefits of incorporating a tutoring literacy program in an afterschool context.

ETHICS STATEMENT

This research was approved by the IRB committees at The Ohio State University and Towson University.

AUTHOR CONTRIBUTIONS

CP led and managed all aspects of the research study, including data oversight and analysis; she led efforts for writing the manuscript. SP provided general support and scientific guidance of the research study; she assisted with the writing of the manuscript.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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APPENDIX A

Overview of Youth Shared Book Reading

Goal: To provide youth with specific strategies and knowledge that they can implement while participating in shared book reading experiences with kindergartners.

**Youth were encouraged to ask questions; modeling and hands-on interactions were provided throughout training.

Day 1: General Book Reading and Print Awareness

- Reasons why reading is important
 - Highlight that reading is important for everyone (regardless of age, background, etc.)
 - Reading is fun!
 - It teaches students about their environment and the world
 - It teaches students new words and skills
 - It models new concepts and ideas
 - It encourages students to talk about books
 - It provides special bonding time
 - It builds young students' attention span
- General Book Reading Strategies
 - Have FUN!
 - Find a quiet location
 - Read with animation/expression
 - Eye contact
 - Slow down—don't read too fast
 - Pause—allow for time to ask questions & make comments
 - Allow kindergarten students to take the lead
 - Ask questions—be sure to provide specific examples (not y/n; variety of open-ended)
- Overview of print awareness
 - Brief definition
 - Reasons why it's important
 - Different types of skills
 - Read title and author
 - *The author writes the XX.*
 - *The illustrator draws the XX.*
 - Talk about the pictures vs. print
 - Use your pointer finger to track print while reading
 - Talk about where to start reading
 - Point to and talk about letters
 - Big vs. little
 - Practice in pairs

Day 2: Phonological Awareness

- Review of Day 1 discussion
- Overview of phonological awareness
 - Brief definition
 - Reasons why it's important
 - Different types of skills
 - Concepts of sounds/phonemes and syllables
 - Rhyme—match and generate rhymes
 - Alliteration (initial sound matching)
 - Final sound matching

- Syllable segmentation (words)
- Comprehension vs. production
- Practice

Day 3: Comprehension

- Review of Days 1 and 2
- Overview of questioning
 - Brief definitions
 - Reasons why questions are important
 - Types of questions and when to use each; ample examples provided
 - Yes/no
 - Closed vs. open
 - Prediction
 - Preview
 - Prior experience
 - Retell/summarization
 - Extension
 - Comprehension vs. production
- Overview of vocabulary
 - Brief definition
 - Reasons why vocabulary is important
 - What are rare/difficult words
 - Give examples
 - Strategies
 - Point to word in print
 - Repeat word
 - Provide definition (in child-friendly language)
 - Use word in other contexts
 - Encourage younger student to use
 - Practice selecting difficult vocabulary in books

Day 4: Practice

- Trainer models entire book reading session
 - Before, during, and after reading
- Youth practice book reading
 - Follow book reading structure
 - Explicit feedback provided

APPENDIX B

Completion Worksheet

Name: _____ Date: _____

Reading Partners Name: _____

Book: _____

What did you talk about before reading the book?

What did you talk about while reading the book?

What did you talk about after reading the book?

What phonological awareness activity did you do? Describe.

How much would you rate that you reading partner participated while reading the book?

0 1 2 3 4

None A lot

What worked well during your reading session.

What will you do differently next time?