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# The effects of coaching on English teachers' reading instruction practices and adolescent students' reading comprehension

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## ABSTRACT

Although the use of literacy coaches is becoming more common, few research studies have shown positive effects of coaching on teacher practices and student achievement. In the current study, a cluster randomized design was used to evaluate usefulness of coaches for teachers of struggling high school students. High schools were randomly assigned across three experimental conditions: professional development workshops, workshops with written lesson materials, and workshops with lesson materials and coaching. Participants in this three-year study included 130 ninth-grade teachers and 3,160 ninth grade students. Recommended literacy practices included teacher modeling, student team discussions, and self-selected reading. Findings indicated that coaching improved teachers' use and quality of recommended literacy practices and increased student reading achievement over the period of a year.

## KEYWORDS

Literacy Coaching; Reading Comprehension; Collaboration; High School

Students who enter high school reading far below grade level need powerful interventions to close literacy gaps and achieve success (Cantrell, Almasi, Rintamaa, & Carter, 2016; Deshler, Hock, & Catts, 2006; Lovett et al., 2008). But weak implementation of effective instructional practices for adolescent literacy are often the reason promising reforms fail (Roberts et al., 2013). As research-based interventions that were successful in demonstration sites are scaled to more schools, many teachers fail to implement them robustly because they have not had enough training in literacy instruction or perhaps do not see improving literacy as part of their job as teachers (Deshler, Schumaker, & Woodruff, 2004).

In a typical high-poverty urban school, roughly half of incoming ninth grade students read at a sixth or seventh grade level (Balfanz, McPartland, & Shaw, 2002). Yet content-area teachers are often ill-equipped and reluctant to provide instruction to close literacy gaps in their subjects (Alliance for Excellent Education, 2006; Biancarosa & Snow, 2004; Heller & Greenleaf, 2007; Strickland & Alvermann, 2004). These teachers lack training to address students' content-area literacy problems and are constrained by other instructional obligations. English teachers may also focus on literature appreciation and writing for diverse audiences, rather than teaching reading skills and strategies for non-fiction texts (Biancarosa & Snow, 2004).

## Prior studies

Improving literacy for struggling adolescents can be challenging. High school students may be many years behind their peers and need more intensive, comprehension-based interventions (Cantrell et al., 2016). Even many yearlong, intensive interventions with struggling adolescents have found no significant changes in reading comprehension (Chamberlain, Daniels, Madden, & Slavin, 2007; Kim, Samson, Fitzgerald, & Hartry, 2010; Lang et al., 2009; Somers et al., 2010) or only moderate effects (Vaughn & Fletcher, 2012). A review of more than 7,100 studies covering 20 years of adolescent literacy research found no programs or practices with positive or potentially positive effects on reading outcomes at the high school level that met What Works Clearinghouse evidence standards (Herrera, Truckenmiller, & Foorman, 2016). Some suggest that many of these programs lose effectiveness when scaled to wider application (Roberts, Vaughn, Fletcher, Stuebing, & Barth, 2013). Small studies often focus on one or two strategies (reducing the complexity of the intervention), use research-developed outcome measures rather than standardized indexes, and can make it easier for researchers to maximize fidelity (Roberts et al., 2013).

A synthesis of 29 studies from 1994 to 2004 on reading interventions for adolescents found that explicit comprehension strategy instruction helps older struggling readers (Edmonds et al., 2009). Teacher modeling is one way to explicitly teach reading strategies; research confirms that students can learn a great deal about reading comprehension strategies by observing a mature reader interact mentally with a reading selection (Beck, McKeown, Sandora, & Kucan, 1996; Regan & Berkeley, 2012), demystifying reading by elucidating the complex thinking processes involved, including points where confusion or uncertainty is a normal part of the task (McKeown, Beck, & Worthy, 1993; Regan & Berkeley, 2012). Many studies show that reading aloud to students and modeling good reading strategies increases their reading comprehension abilities (Alfassi, 2004; Collins, 1991; Davey & McBride, 1986; Duffy, Roehler, Sivan, & Rackliffe, 1987) as well as motivation for reading (Albright, 2002).

A review of 132 programs for struggling middle and high school students found that programs with cooperative learning at their core and using both large and small group instruction were the most effective (Slavin, Cheung, Groff, & Lake, 2008). Research indicates that students can learn to draw correct meanings from complex text by discussing comprehension questions with other students (Fuchs, Fuchs, & Kazdan, 1999; McKinstery & Topping, 2003). Further, studies show students in collaborative learning settings do better in post-reading comprehension than those working alone (Judy, Alexander, Kulikowich, & Willson, 1988; Klingner, Vaughn, & Schumm, 1998; McKinstery & Topping, 2003; Stevens, 2003; Stevens, Slavin, & Farnish, 1991).

Finally, increasing personal reading improves students' reading fluency. More practice builds skills and attitudes students need to read carefully and fluently (Cunningham & Stanovich, 1998). The more a student reads, the more vocabulary recognition grows, familiarity with various literary formats increases, and confidence is strengthened (Allington, 2005). Providing high-interest reading materials improves time and attention to private reading (McLoyd, 1979).

In contrast to short, one-shot professional development workshops, expert peer coaching is now being recommended to strengthen high school reform (Guinney, 2001; Gulamhussein, 2013; Russo, 2004), and help teachers improve classroom instruction (Neufeld & Roper, 2003; Sturtevant, 2002). For this article we define literacy coaches as trained master teachers who meet with teachers regularly to help them improve their classroom literacy instruction, by supporting use of either a specific instructional model or general instructional practices (Lockwood, McCombs, & Marsh, 2010). Literacy coaches usually do not provide direct instruction to students, as do reading specialists; however, they can model effective practices for the teacher.

Some practical guides for preparing and using literacy coaches exist (Brown, Reumann-Moore, Hugh, Du Plessis, & Christman, 2006; International Reading Association, 2004; Walpole & McKenna, 2012), but most research on impact focuses on preservice training or elementary grades (Hasbrouck, 1997; Kohler, Crilley, Shearer, & Good, 2001). This is unfortunate since struggling high school readers “often have difficulty understanding the increasingly complex narrative and expository texts that they encounter in high school and beyond” (Slavin et al., 2008, p. 291).

Moreover, only a few studies assess coaching’s impact on both teaching practices and student learning. Matsumura, Garnier, and Spybrook (2013) used a longitudinal group-randomized trial to examine the indirect effect of content-focused coaching on fourth and fifth grade students’ reading achievement, mediated by classroom text discussions, finding a positive effect on reading achievement, especially for English language learner students. Powell, Diamond, Burchinal, and Koehler (2010) investigated whether in-person professional development in Head Start centers (rather than via technology) had an impact on practices or student outcomes. Although they found no difference based on coaching delivery methods, they did find a positive impact of coaching on teacher practices, classroom environment, and student outcomes: letter knowledge, blending skills, writing, and concepts about print. Sailors and Price (2010) explored differences between teachers who only attended a two-day workshop on comprehension practices, and those who additionally received support from a literacy coach, in elementary and middle school classrooms. Teachers in the full intervention group both outperformed those in the workshop-only group in engaging students in comprehension instruction during class, and saw greater gains in students’ reading achievement. Garet et al. (2008) found coaching and workshops, as compared to workshops only, had impacts on teacher knowledge and practice, but saw no differences in the year following the study.

These studies suggest coaching may positively affect teachers’ knowledge and practices as well as student achievement, but were conducted in elementary or middle schools. No studies have examined coaches’ usefulness for teachers of struggling high school students. Perhaps literacy coaching in high schools faces challenges that hinder its effectiveness. For example, one qualitative case study of literacy coaching in two urban high schools found that implementing the program took a great deal of planning, buy-in from teachers, time to develop the coach’s role in the school, expert coaches, and administration support (Gross, 2012). These demands are challenging in any situation, but may pose particular problems in large urban high schools.

## Current study

Districts and schools have many options available to improve reading instruction. Although it is the most expensive, coaching is the preferred choice in many districts, because teaching the complex processes of reading for good understanding is demanding and requires ongoing, intensive support. The lack of significant evidence of interventions for struggling adolescent readers in scaled-up studies has been attributed to lower fidelity, which literacy coaches could alleviate by consistently monitoring fidelity and proposing timely corrective measures.

The current article describes a large randomized field experiment evaluating impacts of expert peer coaching, as compared to other teacher support systems, on high school teachers' use of recommended reading instructional practices and on student learning outcomes. Curriculum used in the study was developed by Talent Development Secondary (2017) at Johns Hopkins University. We hypothesized that providing supports (e.g., materials and coaching) throughout the year would be associated with larger effects on teacher practice and student achievement than the provision of workshops alone. The research questions were:

- (1) When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is frequency of use of recommended and traditional literacy approaches impacted?
- (2) When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is quality of recommended and traditional literacy approaches impacted?
- (3) When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is student engagement impacted?
- (4) When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is student achievement impacted?

## Method

### Participants

Data were collected from 64 high schools in 21 districts in 6 states and included 130 ninth grade teachers and 3,160 students. Different districts participated each year of the three-year study.

### Randomization

The superintendent of each participating district assigned schools to the study that were then randomized across the three conditions (workshop, workshop/materials, workshop/materials/coaching) with an average of two teachers at each school. In districts with six or more participating schools, randomization occurred within two strata of schools defined

by average poverty level (greatest free lunch participation level and next greatest free lunch level), so that experimental conditions were not confounded with school poverty level. If fewer than six schools in a district participated, one or two schools were matched by school size to schools from a neighboring district before schools were randomized across these districts. Because participation in a study randomizing schools to different conditions was new to most of the schools, recruiting multiple sites required attractive incentives and much preparatory work, including presentations at state high school leadership meetings, visits to prospective sites, and many discussions with individual school administrators and district literacy officials. As incentives, districts and schools received all training, curriculum materials, and coaching support at no cost to them from project resources, and a promise of future discounts on materials and services if the program was maintained after the study year. Awareness sessions held before the end of the previous school year included project personnel, assistant principals, teachers, testing coordinators, counselors, and English language arts (ELA) department chairpersons.

### **Teachers**

Teachers in the study were fully certified to teach grade nine English, were typical of ninth grade teachers in their school, and include a mix of novice and veteran teachers. They taught the same students both semesters, with each course meeting daily for 90 minutes. In each school, at least two ninth grade English teachers taught students at least two years below grade level. There were 21 schools and 38 teachers participating in condition 1, 20 schools and 43 teachers in condition 2, and 23 schools and 49 teachers in condition 3.

### **Students**

Students in the study tested at grade equivalents of approximately 4.5 to 7.5 on the Gates MacGinitie Reading Test (GRMT) at the end of eighth grade; if the GMRT was given earlier in the year, the grade equivalent range was reduced slightly. All students (conditions 1, 2, and 3) had the same teacher for both semesters. The study included special education students in inclusion classes if the students and class tested in the target range (4.5 to 7.5), and if students' Individual Education Plans did not require testing modifications, while limiting the number of special education students per classroom to one third of the class or less. Class size at schools was typical of each district's average but was almost always at least 15 students. There were 1,222 students participating in condition 1, 755 students in condition 2, and 1,183 students in condition 3. Percent of minority students at condition 1, 2, and 3 schools were 49.68%, 38.76%, and 45.21%, respectively. Percent of free or reduced lunch students at condition 1, 2, and 3 schools were 36.64%, 28.44% and 34.91%, respectively.

### **Support conditions**

Three different ways to support teachers for strong implementation were offered: workshops, lesson materials, and expert coaches. All three support conditions were associated with 90-minute extended instructional periods during two terms, to identify the effects of different teacher support conditions while keeping instructional time constant.

## Workshops

In all three conditions, reading specialists led workshops in adolescent literacy instruction for two full days at the start of the school year and two full days mid-year, during scheduled workdays or with stipends for extra time. School leaders were asked to train more teachers than were expected to be needed for the study, just in case of unexpected events, and to invite special education teachers or instructional assistants co-teaching with the teachers.

Day 1 of the fall workshop for all teachers involved reviewing four classroom approaches to strengthen reading fluency and comprehension. Each approach aligned to a lesson component:

- (1) Reading Showcase: Teachers read aloud and model a variety of reading strategies while students listen. (20 minutes)
- (2) Focus Lesson: Teachers target specific skills and strategies as needed by the students by modeling and conducting guided practices. (20 minutes)
- (3) Student Team Literature: Teachers circulate among student team groups that read anthologies or novels on their instructional levels, work together to discuss comprehension or inferential questions, or complete literature-related writing assignments or extension activities. (30 minutes)
- (4) Self-Selected Reading/Learning Centers: Students either select a text to read independently or work independently at a self-selected reading or learning center. (20 minutes)

Teachers model before-, during-, and after-reading strategies during the reading showcase and teach them directly in the focus lesson; students practice them in groups during student team literature discussions, and independently in silent and self-selected reading. While direct instruction in focus lessons is evocative of transactional strategy instruction (Pressley, 2000), student team literature elements recall text processing models (McKeown, Beck, & Blake, 2009).

Workshops also presented the learning theory and student motivation rationale for each approach and strategy. Demonstrations of best practice included simulations with participants playing the role of students. To demonstrate an effective text read-aloud, the facilitator showed *before* strategies (discussing the title, activating background knowledge, making predictions); paused strategically *during* reading to “think aloud,” share visualization, ask questions, identify literary elements, highlight vocabulary choices, and model use of context clues; and summarized *after* reading, verifying predictions and drawing out connections between the text and self, world, or other texts. Workshops also explored good classroom management and bulletin board displays related to effective instructional practices.

Day 2 varied depending on whether the participants would receive curricular materials or not. Those receiving materials were introduced to lessons and given time to plan their use. “Workshop only” participants learned how to use recommended pedagogies with the district syllabus. At the mid-year workshop, those receiving materials for the second half-year were introduced to new lessons and given time to plan with them; those in the “workshop only” group discussed applying recommended pedagogies using the district syllabus.



## Curriculum

Besides workshops, teachers in the “plus materials” and “plus materials and coaching” conditions received written daily lesson materials, class texts, student discussion guides, a teacher resource guide, magazines, and a classroom library. Most lesson plans and discussion guides focused on specific reading selections: a novel, short story or poetry collection, play, or non-fiction text, selected for high teenager interest and a low-frustration reading level.

Each teacher received a 418-page resource binder on the four components with sample focus lessons and learning centers, guidance on assessing student skills, and planning tools. Teachers also received lessons on each of the readings, including information on background, context, and author, followed by two- or three-day lessons on short segments (a chapter or several chapters, short story, or poem) that students read individually or in pairs. Each lesson followed a similar format: (a) identifying new vocabulary and using it in meaningful sentences; (b) exploring literary topics such as genre or writer’s craft elements through a mini-lesson or read-aloud passage with suggestions for teacher modeling; (c) providing student discussion questions at different levels (recall, comprehension, interpretation); and (d) outlining related enrichment activities (e.g., student projects or writing assignments based on the selection).

A class set of student Partner Discussion Guides (PDG) accompanied the teacher’s manual for each reading selection. Like the teacher’s manual, each PDG identified an excerpt for paired reading, listed new vocabulary, highlighted literacy topics, and provided team discussion questions, focusing on plot, character development, inferring meaning, and comparing interpretations. Teachers could also evaluate students’ written responses to discussion questions.

More than 50 teachers’ manuals and student PDGs are available. In the first term, books for struggling readers were recommended, with Lexile scores from 750 to 1070, corresponding to a fifth grade reading level (Lexile, 2017). During the second term, district-recommended books from the standard syllabus were used, although the number of selections covered varied to adapt reading pace and supporting lessons to students’ skill levels. In a few cases, where manuals and PDGs for some district selections were not available, a team of local teachers were trained to write teachers’ manuals and PDGs in the summer before district participation in the study.

## Coaching

Besides workshops and lesson materials, teachers in the “plus coaching” condition received regular assistance during the school year from a coach with expertise in the instructional approaches and materials. Each of the 23 “plus coaching” schools was assigned a different coach, whom research staff helped recruit, interview, and select locally. Coaches had to have a reading education background (e.g., a reading specialist or retired English teacher), and be collegial and trustworthy, keeping confidential all teacher observations and interactions so that evaluations and promotions were not threatened. Newly identified coaches were extensively trained in recommended practices at a three-day conference before the previous school year ended and through continuing support from research staff.

Coaches had multiple duties throughout the project, including (a) observing one or two 90-minute classes weekly of each participating teacher; (b) spending an hour or



more per week with each teacher, consulting, reflecting, debriefing, and planning; (c) modeling or co-teaching as needed or on request; (d) offering assistance with classroom organization, materials procurement, learning center activities, and cooperative learning; (e) keeping a coaching log, using it in discussion with teachers and researchers, and submitting it bi-weekly; (f) collaborating with the district ELA specialist to ensure alignment with district and school policies, procedures, and practices; (g) collaborating with the research team to ensure implementation consistent with the study design; (h) assisting with pre- and posttest administration, (i) keeping detailed program records; and (j) meeting monthly with the research team at the school for review and planning.

The coaching log included sections for *great things I saw*, *ideas to consider*, *next steps*, and *noteworthy comments*. During observations, the coach noted high and low implementation of specific practices, identifying particular characteristics of each component; for example, for team discussions, whether the teacher formed teams effectively, using team names, roles, and group assignments, and whether the process was smooth and orderly. In reviewing observation notes with teachers, coaches could then advise them on ways to move students into teams and keep the teams engaged. Teachers were also encouraged to request help during debriefing with lesson planning or other teaching issues (e.g., classroom management).

Coaches submitted observation logs to a project facilitator for review every two weeks. Facilitators followed up with the coaches who missed a week. Because of this vigilance, 20 of the 23 coaches had consistent visits with teachers, missing only a week or two due to illness or school interruption such as a field trip or assembly. Three coaches were less consistent.

## Measures

Three different sources provided information on implementation of recommended literacy practices: observational ratings, a teacher survey, and a student survey. Each source of measurement modality assessed teachers' use of recommended literacy practices (teacher modeling, student team discussions, and self-selected reading). Besides recommended practices, traditional teaching models were also measured, such as whole class instruction and seatwork.

## Observation

Classroom observers were trained together using common examples of different levels of implementation and shared discussions of field rating reports aimed at high consistency and reliability ratings. Observers were blind to schools' treatment condition assignment; each visited study classrooms in a different set of schools (to distribute individual rating tendencies evenly across all schools) at visitation points well-spaced throughout the year.

Classroom observations examined how well teachers used the three recommended practices (teacher modeling, group work, and silent reading) and two traditional practices (whole class instruction and seatwork). Observers received rubrics (Tables 1 and 2) to rate teachers on a scale of 1 to 9 for each practice. Rubrics defined characteristics of low-, middle-, and high-quality instruction. Each time a characteristic was observed, the observer circled it on the rubric. Teachers received a low (1 to 3), medium (4 to 6), or high (7 to

**Table 1.** Observation rubrics for recommended practices.

Type of activity	Low (Minimum)	Medium (Good to Very Good)	High (Outstanding)
Read-aloud	(1) Teacher reads with-out pauses to share thinking (2) Reading is flat (–) (3) Reading is energetic (+) (4) Questions to students are for opinions not strategies	(1) Teacher reads and pauses to model thinking (2) Modeling covers only 1 or 2 strategies (–) (3) Modeling covers many different strategies (4) Modeling includes checking for understanding (+) (5) Modeling includes corrective strategies (+) (6) Reading strategies are named and discussed (+)	(1) Teacher pauses with multiple strategies (including checking and corrective strategies), names their strategies, and involves the students (2) Teacher also demonstrates a variety of strategies (3) Student responses or interpretations are discussed and compared
Student team literature (observe several individual teams)	(1) No teacher preparation for reading (2) Round robin reading with whole class (3) Team formation is disorderly or time-consuming (4) No guides for team discussions (5) One or two dominate team (6) Team discussions are low level (7) No feedback to class after discussion	(1) Teacher builds background for the reading (context, author) (2) Team formation is smooth (3) Silent reading or paired reading or both (+). May include round robin (4) Discussion guides are used for “chunks” (may be teacher-made forms) (5) All students involved in team (6) Team discussions are high level and based on reading strategies (7) Feedback to whole class for comparisons and reflection	(1) Teacher strongly motivates students with background for the reading (2) Team formation is smooth (3) Silent reading or paired reading or both (4) Teams are given discussion questions (5) Teacher circulates among teams (6) Student team discussions involve all members and reflect analytic thinking (reasons for answers, recognition of writer’s craft, etc.) (7) Feedback discussions involve all class members in mature comprehension topics
Student self-selected silent reading	(1) Classroom library is limited and poorly organized (2) Students are directed to readings by teacher rather than given real choice (3) Time is too short to get into the activity	(1) Classroom library available by reading categories and levels (2) Students can choose short or longer readings (3) Process is orderly, but accountability is weak or very limited (4) Occurs multiple times each week	(1) Students choose from extensive library organized by interest and difficulty level (2) Students can continue a reading over multiple days (3) Student accountability is high, with required forms and reflective reports, such as logs, journals, mini-reviews, or dated records (4) Occurs nearly every day

**Table 2.** Observation rubrics for traditional practice.

Type of Activity	Low (Minimum)	Medium (Good to Very Good)	High (Outstanding)
Whole class lesson	(1) Teacher-dominated (talking at students) (2) Weak demonstration or examples (3) Lesson too long (4) Objectives unclear (5) Limited student involvement	(1) Teacher models with good examples (2) Student involvement (discovery discussion) (3) Topic and objectives are clear (4) Lesson is connected to other activities during period (5) Teacher sets up guided practice for students, using overheads or flipcharts for demonstrations	(1) Topic is advanced (2) Teacher modeling is inventive and motivating (3) Student involvement is creative (4) Objective is obvious (5) Lesson is well paced and connected to other activities (6) Teacher sets up a challenging guided practice and discussion
Seat work (work sheets)	(1) Task is very simple or disconnected with lesson (2) Activity goes on too long (3) Objective is not clear (4) Student discussion is limited and low-level	(1) Seat work is “guided practice” on an important skill related to the broader lesson (2) Students may work together on reasons for answers (3) Students also work alone for individual demonstration of skill	(1) Guided practice exercises range in difficulty (2) Students’ discussions are at a high level (3) Individual demonstrations of skills are required (4) Practices are brief and well connected (5) Teacher follows with reflections on different answers

9) score based on the level of characteristics preponderantly circled. Numbers within each 3-point range reflected score span (e.g., a score of 6 for a teacher with mostly medium- but a few high-level characteristics). The highest score for each practice over three observations was taken as the maximum quality score. Teachers not using a particular practice in any observation were not included in quality analysis.

Observers also noted how many students were engaged when teachers used a practice, and then calculated the percentage of students engaged. For example, during whole-class instruction “on-task” meant listening to the teacher or taking notes; during silent reading “on-task” meant reading a book. The highest percentage for each practice over three observations was taken as the maximum engagement percentage. Teachers not using a given practice during an observation were not used in engagement analysis. Among 130 teachers, 12 were missing one or more of the three observations and were dropped from observational analyses. Two of the missing teachers were from condition 1, five from condition 2, and five from condition 3.

### **Teacher survey**

Administered in December, this survey measured teachers’ self-reported frequency of use of recommended and traditional practices, using a five-point scale (1 = Never or almost never, 2 = Once or twice per month, 3 = Once or twice per week, 4 = Several times per week, 5 = Every day). Seven items ( $\alpha = .57$ ) aligned with recommended practices (i.e., modeling reading, student team discussions, and self-selected reading). For example, teachers were asked, “How often do you: Have students work in small groups or with a

partner?” Several items measured activities occurring during a recommended practice, such as, “During student team discussions, students were encouraged to go over vocabulary words and write about what they read.” Scores from these seven items were added to get a teacher-survey recommended practice score; scores ranged from 7 to 35. Three items aligned to the recommended practices were also examined separately. Of the 130 teachers, 12 did not take the teacher survey, and 3 other teachers had missing data. These 15 teachers were excluded from teacher survey analyses.

### ***Student survey***

Students were also surveyed in December on the frequency with which their teacher used recommended and traditional practices, using a five-point scale (1 = Never or almost never, 2 = Once or twice per month, 3 = Once or twice per week, 4 = Several times per week, 5 = Every day). Ten items ( $\alpha = .69$ ) aligned with recommended practices, such as modeling reading, student team discussions, and self-selected reading. For example, students were asked, “How often has the following happened in your reading and English class during the past month: My teacher reads aloud from a book to the class and explains what he or she is thinking.” As in the teacher survey, several items measured activities occurring during a recommended practice (e.g., “In team discussions, students examined passages from complete novels or plays”). All 10 recommended practices were summed to give the recommended practice score. Average scores for recommended and traditional practices ranged from 10 to 50. Three items aligned to each of the three recommended practices were also examined separately. Student survey scores were aggregated by teacher. Student surveys were not collected from one condition 2 teacher, who was therefore dropped from student survey analyses. A total of 2,603 student responses were collected with response rates of 75% for condition 1, 94% for condition 2, and 83% for condition 3. On average, 20 surveys were collected per teacher and 41 per school.

### ***Reading comprehension scores***

The comprehension section of the Gates-MacGinitie ninth grade reading test was administered in September, December, and May: Form S (level 7 to 9) in the fall and spring and form T (level 7 to 9) in the winter. The analyses used the normal curve equivalents from the fall and spring administration; as the Gates-MacGinitie scoring and interpretation manual explains, “Like percentile ranks, normal curve equivalents (NCEs) describe a student’s level of achievement in relation to . . . other students in the same grade. The NCE scale is designed so that the NCEs of 1, 50, and 99 coincide with PRs of 1, 50, and 99. Except for NCEs of 1 and 99, each NCE unit is the same throughout the scale, so NCEs are suitable for computing averages” (MacGinitie, MacGinitie, Maria, Dreyer, & Hughes, 2007, p. 28). Comprehension scores were not collected from one condition 1 teacher and one condition 3 teacher; these teachers were dropped from student achievement analyses. Of the 3,160 students in the study, 2,354 students in 64 schools from all conditions took the Gates-MacGinitie in both fall and spring of their study year and were included in the achievement analysis.

## **Results**

This study was a randomized experiment to contrast three different ways of supporting teachers to implement recommended literacy approaches, with quantitative outcome

**Table 3.** Means and standard deviations of the literacy practices measured with surveys and observations by condition.

	Workshop	Plus materials	Plus coaching	Total participants
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Frequency of practices				
Teacher Survey	24.56 (3.97)	25.69 (3.31)	26.95 (3.06)	25.81 (3.56)
Group Work item	3.62 (0.95)	4.14 (0.87)	4.23 (0.743)	4.01 (.89)
Modeling item	4.03 (1.13)	4.47 (0.85)	4.71 (0.63)	4.43 (.91)
Silent Read item	3.65 (1.18)	3.50 (0.94)	3.58 (0.97)	3.58 (1.02)
Student Survey	29.94 (3.42)	32.57 (4.58)	33.77 (3.01)	32.25 (4.00)
Group Work item	2.92 (0.67)	3.25 (0.77)	3.35 (0.70)	3.19 (.73)
Modeling item	3.63 (0.70)	3.96 (0.79)	4.31 (0.47)	3.99 (.71)
Silent Read item	2.91 (1.00)	3.10 (0.90)	3.08 (0.95)	3.04 (.95)
Observation Quality Score				
Groupwork/STL	5.38 (1.78)	5.68 (1.92)	6.62 (1.66)	5.95 (1.85)
Modeling	6.12 (2.13)	5.65 (2.15)	6.57 (1.76)	6.15 (2.02)
Silent Reading	5.09 (2.00)	5.82 (2.13)	5.96 (1.62)	5.64 (1.92)
Whole Classroom	6.04 (1.78)	6.03 (2.38)	6.88 (1.42)	6.35 (1.91)
Seatwork	4.76 (2.16)	4.82 (2.01)	5.81 (1.82)	5.16 (2.03)
Observation Engagement Score				
Groupwork/STL	0.91 (0.13)	0.86 (0.19)	0.90 (0.18)	0.89 (0.17)
Modeling	0.91 (0.14)	0.93 (0.13)	0.97 (0.06)	0.94 (0.11)
Silent Reading	0.79 (0.26)	0.92 (0.11)	0.93 (0.09)	0.88 (0.18)
Whole Classroom	0.90 (0.14)	0.90 (0.15)	0.94 (0.09)	0.92 (0.12)
Seatwork	0.90 (0.15)	0.86 (0.18)	0.87 (0.14)	0.88 (0.16)
Classrooms Surveyed	38	42	49	129
Teachers Surveyed	35	36	44	130
Teachers Observed	36	38	44	118

Note. STL = Student Team Literature

**Table 4.** Effects of level of teacher support on use, quality, and student engagement of recommended instructional practices of modeling, group work, and silent reading as reported by teachers, students, and “Blind” observers.

Dependent variable	Plus materials		Plus coaching		$R^2$
	<i>b</i> (effect size)	<i>SE b</i>	<i>b</i> (effect size)	<i>SE b</i>	
(A) Teacher Survey	1.130	.817	2.398** (.720)	.778	.079*
Group Work item	.517* (.615)	.199	.606** (.733)	.333	.091**
Modeling item	.444* (.505)	.206	.683** (.812)	.196	.098**
Silent Read item	-.149	-.067	-.071	-.310	.003
Student Survey	2.626** (.700)	.872	3.826** (1.10)	.836	.156**
Group Work item	.334* (.472)	.160	.433** (.622)	.155	.062*
Modeling item	.327* (.479)	.147	.677** (1.096)	.142	.155**
Silent Read item	.193	.213	.170	.087	.008
(B) Highest Observation Quality Score					
Groupwork/STL	.303	.454	1.239** (.716)	.440	.085*
Modeling	-.470	.492	.450	.465	.018
Silent Reading	.727	.577	.869	.560	.039
Whole Classroom	-.014	.449	.837† (.452)	.433	.029†
Seatwork	.064	.516	1.050* (.540)	.513	.059†
(C) Highest Observation Engagement Score					
Groupwork/STL	-.049	.043	-.003	.042	.018
Modeling	.018	.027	.057* (.540)	.026	.046†
Silent Reading	.136* (.827)	.052	.140** (.855)	.050	.132*
Whole Classroom	.005	.030	.040	.029	.004
Seatwork	-.040	.041	-.031	.041	-.011

Note. † $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , STL = Student Team Literature, standard practice for interpreting effect sizes is 0.20 for a small effect, 0.50 for a medium effect, and 0.80 for a large effect (Cohen, 1988)

measures of the quality of classroom implementations and students' reading comprehension skills across the comparison conditions. As explained above, three compounding experimental conditions to support high school literacy teachers were (a) workshops, (b) workshops and materials, and (c) workshops, materials, and coaching. Hierarchical linear modeling was used to examine student reading achievement to account for the nested effect of students in schools. Because there were too few districts for stable estimates, linear regression was used to analyze the other sources of information: teacher survey scores, aggregated student survey scores, and observations.

## ***Effects of condition on instructional practices***

### ***Descriptive statistics***

Table 3 shows means and standard deviations for frequency of use of literacy practices from teacher and students surveys, quality of literacy practices based on observations, and highest percent of students engaged for each practice. There was an upward trend across the three conditions for total scores from teacher and student surveys; the “plus coaching” condition had the highest mean for both surveys. Items related to group work and teacher modeling showed a similar trend. The “plus coaching” condition also had the highest means for quality on all recommended and traditional practices, and the highest means for student engagement for modeling, silent reading, and whole classroom instruction.

### ***Frequency***

The first study question was, “When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is frequency of use of recommended and traditional literacy approaches impacted?” Table 4(a) shows findings from regression analyses on the effect of teacher support conditions on use of recommended literacy practices from teacher and student surveys, using Cohen’s *d* (Cohen, 1988) to calculate effect sizes. When materials were added to professional development, significant differences on group work and teacher modeling items were seen on both teacher and student surveys. A significant difference was also observed between conditions on total student survey score. When both coaching and materials were added to professional development, significant differences were found in both teacher and student surveys on extent of group work and teacher modeling. A significant difference also existed between conditions on total student and teacher survey scores. The silent reading item did not show a significant difference among the conditions on either survey.

### ***Quality***

The second study question was, “When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is quality of recommended and traditional literacy approaches impacted?” Table 4(b) shows findings from regression analyses on the impact of teacher support conditions on the quality of literacy practices based on observation notes. Adding materials to professional development had no significant effect on the quality of these practices; but adding both coaching and materials to professional

**Table 5.** Impacts of teacher supports: Results from HLM model predicting students' spring reading comprehension achievement based upon the experimental conditions and baseline achievement.

	<i>Coefficient (effect size)</i>	<i>SE</i>
Schools' experimental conditions		
Intercept	33.26**	.62
Condition #2 plus materials	0.80(.05)	1.66
Condition #3 plus materials and coaching	2.89(.19)*	1.42
Students' baseline characteristics		
Fall reading comprehension achievement	0.70**	.02

Note. The counterfactual condition was "workshops alone" † $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , standard practice for interpreting effect sizes is 0.20 for a small effect, 0.50 for a medium effect, and 0.80 for a large effect (Cohen, 1988)

development led to significantly improved quality of group work and seatwork, and marginal improvement in whole classroom instruction.

### Engagement

The third study question was, "When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is student engagement impacted?" Table 4(c) shows findings from regression analyses on the impact of teacher support conditions on student engagement during specific literacy practices, based on observation notes. Adding materials to professional development produced a significant difference in percent of students engaged during silent reading. Adding both coaching and materials to professional development yielded significant differences in engagement during silent reading and during teacher modeling.

### Effects of coaching and materials on reading comprehension

The fourth study question was, "When teachers are provided with different types of professional development (workshops, workshops with materials, or workshops with materials and coaching), how is student achievement impacted?" This question was addressed using the spring Gates-MacGinitie comprehension scores in a two-level HLM analysis while controlling for baseline (fall) scores. To calculate effect sizes, we divided treatment effect by the standard deviation of reading comprehension before treatment. There were 823 students tested in condition 1, 623 in condition 2, and 908 in condition 3. On average, students started ninth grade below seventh grade comprehension level with grade equivalent scores of 6.26 ( $SD = 2.38$ ), 6.23 ( $SD = 2.17$ ), and 6.28 ( $SD = 2.25$ ) for conditions 1, 2, and 3. At the end of ninth grade the average grade equivalent scores were 6.98 ( $SD = 2.84$ ), 7.07 ( $SD = 2.90$ ), and 7.34 ( $SD = 2.72$ ) for conditions 1, 2, and 3. All continuous variables in each model were grand-mean centered. To examine potential differences among treatments prior to the study, HLM analysis was conducted predicting fall Gates-MacGinitie scores. Students in the two materials conditions (materials-added: coefficient = 1.91,  $ES = .08$ ; coaching-added: coefficient = .52,  $ES = .03$ ) did not have higher achievement pre-scores than those in the workshops alone condition.

Table 5 shows findings from HLM analyses of post-scores. An interclass coefficient correlation of the unconditioned model for the post-scores was calculated as .11,



suggesting that multilevel modeling would be appropriate. The comprehensive supports condition (materials and coaching added to workshops) had a statistically significant effect on reading comprehension achievement ( $ES = .19$ ), but the materials-added condition did not produce significantly higher achievement than workshops alone ( $ES = .05$ ). Thus, the plus-coaching condition's impact was .14 standard deviations larger than the plus-materials impact.

## Discussion

Research shows that reading interventions at high school level produce smaller effects than those for middle and elementary school (Cantrell, Almasi, Carter, Rintamaa, & Madden, 2010; Wanzek, Wexler, Vaughn, & Ciullo, 2010). Review of more than 7,100 studies found no studies on high school programs or practices that both met What Works Clearinghouse evidence standards and indicated positive or potentially positive effects on reading outcomes (Herrera et al., 2016). Although smaller studies show the effectiveness of teaching comprehension strategies to adolescent students (Edmonds et al., 2009), scaling these studies up could decrease effectiveness, due to researcher inability to monitor and manage fidelity (Roberts et al., 2013).

This study examined literacy coaching as a means to improve fidelity of scaled-up interventions for struggling high school readers. Multiple studies in elementary or middle schools show that literacy coaching can improve teaching practices and student learning gains (Garet et al., 2008; Matsumura et al., 2013; Powell et al., 2010; Sailors & Price, 2010). While no studies have focused on literacy coaching in high school settings, we hypothesized that it could increase teachers' use of recommended teaching practices and thus improve fidelity to the model.

## Overview of findings

Three main findings emerged on implementation and quality of instructional practices. First, the current study shows positive effects of coaching on the use of recommended practices, especially modeling reading and group work, based on teacher and student surveys. However, coaching did not impact frequency of silent reading. Second, coaching increased the quality with which teachers used certain instructional practices: the recommended practice of group work and the traditional practice of seatwork. Although seatwork was not a recommended practice, high level seatwork on the rubric included high level discussions and teacher reflections. Finally, students in the coaching condition were more engaged than the workshop-only group when teachers used specific instructional practices (modeling and sustained silent reading).

The need for coaching to implement these instructional practices was clear in classroom observations. Both coaches and classroom observers confirmed that implementing the recommended practices was challenging in classes of struggling readers. For example, observers noted frequent cases where teachers practiced reading aloud to students without modeling thinking or strategy use. These teachers captured students' attention with oral readings using appropriate voice inflections and gestures to highlight the theatric or rhythmic appeal of good writing, but never paused to reveal their active thinking processes as mature readers. Even when teachers did pause for reflection, they often demonstrated

just a few strategies during the entire reading. The least-observed and perhaps hardest strategies to verbalize were the metacognitive processes of checking for understanding and deciding when corrective actions were needed. Observation notes showed great variability in the quality, depth, and selection of literacy strategies even among coached teachers.

Observers and coaches in our study were also frustrated with student team discussions, especially with new or inexperienced teachers. Novice teachers lacking classroom management skills were often hesitant to try student group discussions because they had not developed orderly ways to move students into groups or control student behavior. Coaching improved teacher confidence in implementing team discussions and the quality of modeling while reading aloud.

There was no significant difference between teachers in the workshop-only group and those in the other two conditions on measures of silent reading, except for student engagement. Observers reported that teachers sometimes used silent reading to fill empty class time at the end of a day, rather than as a serious lesson component. In these cases, teachers directed students to pick something from the classroom library for the time left, with no motivation to read for pleasure, no continuity with previous self-selected readings, and no accountability.

### ***Coaching effects on reading comprehension***

Findings also showed coaching had a statistically significant positive effect on reading comprehension, compared to workshops only. This is consistent with past research showing a positive effect of coaching on reading achievement for elementary and middle school students (Matsumura et al., 2013; Powell et al., 2010; Sailors & Price, 2010). However, this study shows positive effects of literacy coaching on comprehension for older struggling readers in high schools, not previously studied. It may be that coaching increases achievement only when specific research-based practices, such as modeling and student team discussions, are explicitly coached, as in this study. The specific literacy practices stressed by the coach may significantly affect whether coaching will make a difference in achievement. In a review of professional development research, Wei, Darling-Hammond, Andree, Richardson, and Orphanos (2009) reported that, “Studies find strong effects of professional development on practice when it focuses on enhancing teachers’ knowledge of how to engage in *specific pedagogical skills* and how to teach specific *kinds of content*” (p. 3, emphasis added).

### ***Limitations***

This study had its limitations. First, each school participated in the study for one year. Coaching over two to three years may prove more effective; or it may be that after teachers become comfortable with new practices in the first year, they no longer need weekly coaching. A longer study is needed to clarify this. Second, participants in the materials-added and coaching-added conditions had access to a materials and class sets of texts not available to those in the workshop-only condition. There was no “coaching without materials” condition, so the impact on teacher practices and student comprehension of coaching *without* materials is unclear.

## **Implications**

Lack of implementation fidelity may explain the lack of evidence for effective results in scaled-up studies of interventions for struggling adolescent readers (Roberts et al., 2013). The current study shows that an adolescent literacy program, such as the Talent Development Secondary model, can be scaled up using literacy coaching to ensure fidelity. Coaching was related to an increase in teachers' frequency and quality of use of recommended instructional practices, as well as struggling students' comprehension. This adds to the research both on instructional practices for struggling adolescent readers and on the use of coaching in high school settings. Administrators and district leaders seeking to institute new interventions for struggling readers in high schools must ensure that programs are implemented with fidelity and could draw from this study evidence of the need for literacy coaching in the schools. Coaching, while costly at the start of new interventions, may prove cost-effective by significantly improving fidelity.

## **Future research**

This is one of the first randomized coaching studies at the high school level for struggling readers. Yet reading is critical for other major content courses, such as math, science, and social studies (Heller & Greenleaf, 2007). Each content area has discipline-specific literacy demands across subjects (Collin, 2014; Fang & Coatoam, 2013; Heller & Greenleaf, 2007; Shanahan & Shanahan, 2012). High school teachers in content areas are seldom trained in reading instruction and are reluctant to take on this task (Draper, 2008). Literacy coaching in other content areas could be a next focus in exploring the effectiveness of high school literacy coaching.

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