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Building Better Bridges: Teaching Adolescents Who Are Poor Readers in Eighth Grade to Comprehend History Text

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Abstract

Helping struggling readers to learn history content in middle school can be difficult due to heavy reading demands. In this study, researchers taught poor readers with and without disabilities in eighth grade to generate main idea statements; create, compare, and contrast paragraphs; and identify cause and effect relations, along with relevant multisyllabic word study and vocabulary, as they read history text. The 34 participating students included 14 with disabilities and 20 without disabilities, who scored below the 5th percentile in reading, on average. The results were compared across special education and English learner status and with 81 typical readers from the same classes who studied the same units of history. Treated students made significant gains in use of these strategies, and poor readers with and without disabilities performed similar to their typical reader classmates in two of the three strategies following instruction. The instructional routines for each strategy are described.

Keywords

reading intervention, U.S. history, middle school, learning disabilities, poor readers, English language learners, main idea, compare and contrast, cause and effect

Learning history in middle school can be difficult for students with learning disabilities (LD) because content courses have heavy reading demands. Reading expository text is especially problematic for poor readers (PRs) due to its frequent use of multisyllabic words, unfamiliar and content-specific vocabulary, and multiple text structures. Nevertheless, each of these problematic areas has been addressed successfully in studies that concentrated on just one of these skills.

For example, during a 6-week intervention, Lenz and Hughes (1990) improved the ability of adolescents with LD to decipher multisyllabic words by teaching them to recognize word parts they already know in long words. O'Connor, Beach, Sanchez, Bocian, and Flynn (2015) shortened Lenz and Hughes's seven-step procedure to four steps (i.e., by dropping the components of context, check with someone, and look it up) with significant decoding effects for eighth-grade students with LD in just 3 weeks. Once students are able to read the multisyllabic words in history texts, they need to understand what they mean; however, students with LD also have less developed vocabulary than their peers (Bryant, Goodwin, Bryant, & Higgins, 2003). Fortunately, Scammacca et al.'s (2007) review of vocabulary interventions for adolescents with LD revealed significant improvements on comprehension of text that included taught vocabulary, suggesting that vocabulary instruction should be another key component in content area intervention.

Beyond decoding words and understanding them, several additional components construct the processes of comprehension, including identifying main ideas, organizing information by comparing and contrasting people and events, and identifying cause and effect relations (Bakken, Mastropieri, & Scruggs, 1997; Bulgren, Graner, & Deshler, 2013). A key step in teaching students to comprehend is to ensure they attend to the main ideas in text. Research on teaching main ideas to help students acquire content is abundant (Jenkins,

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Heliotis, Stein, & Haynes, 1987; Jitendra, Hoppes, & Xin, 2000). Nevertheless, transfer to reading content area text is far from automatic (Jitendra et al., 2000) and may require teaching a variety of comprehension strategies (Hebert, Bohaty, Neson, & Brown, 2016).

The recent shift in reading intervention from single strategies toward multicomponent interventions has been dramatic. Scammacca et al.'s (2007) review of the effects of reading interventions found scarce research demonstrating gains in multiple reading comprehension strategies. However, 8 years later, a new meta-analysis of reading interventions showed that half of the more recent studies included multiple components (Scammacca et al., 2016). Given the evidence that reading interventions with more than one instructional component are also more effective for adolescents (Scammacca et al., 2016), the current study includes three comprehension strategies along with multisyllabic word decoding and vocabulary instruction to support reading and understanding history text.

Strategies such as identifying main ideas, comparing and contrasting, and finding causes of events have been taught successfully in middle school, most often by using graphic organizers to help students capture relevant information. For example, Klingner, Vaughn, and Schumm (1998) developed Collaborative Strategic Reading (CSR), which includes four strategies and a graphic note-taking procedure. After completing their reading, students wrote the main idea of the passage in their own words. CSR was not designed specifically for students with LD; however, studies of CSR have included students who were English learners (ELs), another group who may have difficulty comprehending text.

Gersten, Baker, Smith-Johnson, Dimino, and Peterson (2006) taught history of the Civil Rights Movement to students with and without LD using a graphic organizer for recording similarities and differences across people and events. Graphic organizers helped students to connect ideas and concepts and also encouraged students to record and use academic vocabulary and support student thinking during discussions and in writing. Moreover, both ELs and native English speakers (NESs) with reading difficulties have benefited from these opportunities to use new vocabulary and concepts (see also Vaughn et al., 2013).

Richgels, McGee, Lomax, and Sheard (1987) found cause/effect relations to be especially difficult for students to extract from school texts, perhaps because understanding these relations requires making inferences and judging sequences, which are rarely linked directly (Lederer, 2007). Using graphic organizers to help students link these concepts can improve their ability to identify cause/effect relations and also their understanding of history (O'Connor et al., 2015; Vaughn et al., 2013).

Graphic organizers provide a visual structure among ideas that students may be unable to identify independently. Even when students can read and understand the words, their comprehension is improved with consistent visual enhancements that help them anticipate the structure of what they read and organize and retain information (Bulgren, Deshler, & Lenz, 2007; DiCecco & Gleason, 2002). In Hebert et al.'s (2016) review of strategy instruction, 75% of the studies used graphic organizers for these purposes, which is similar to the use of graphic organizers in Swanson et al.'s (2014) meta-analysis of reading interventions.

Across strategy instruction in the current study, we used graphic organizers not only to analyze the text, but also as a tool for holding information in memory, which can create roadblocks for students with LD and other reading difficulties (Swanson & Deshler, 2003). Unfortunately, even with all of these procedures in place—decoding of multisyllabic words, meanings of academic vocabulary, and explicit strategies for organizing and interpreting meanings of what they read—many history texts are written many grade levels above the reading ability of adolescents with LD (Berkeley, King-Sears, Hott, & Bradley-Black, 2014).

Addressing this point, Jitendra et al. (2001) found that content area texts were written 2 to 4 years above their intended audience, on average. Berkeley et al. (2014) updated this analysis and found that most texts were rated "fairly difficult" regarding ease of interpretation. Therefore, it is not surprising that Gajria, Jitendra, Sood, and Sacks's (2007) review of comprehension instruction found that effect sizes (ESs) for strategy instruction for students with reading difficulties were larger when students read text at easier reading levels.

Researchers have explored effects of using lower grade–level text to support content area learning. Beck, McKeown, Sinatra, and Loxterman (1991) compared comprehension of original and revised versions of history texts on complex events (see also Hiebert, & Mesmer, 2013). Students who read revised text recalled and situated historical knowledge more efficiently than students who read grade-level text, which suggested the importance of readable levels of text to link historical ideas coherently. The text used in schools in the current study had an average Flesch–Kincaid reading level of 8.6, and so rephrasing text to decrease the reading level was another component in the current intervention.

Background for the Current Study

In a previous study (O'Connor et al., 2015), we built components of an intervention for eighth-grade students who had failed seventh-grade history class (i.e., students eligible for special education, students who were ELs, and other PRs). Across three instructional waves, we (a) taught a multisyllabic word study strategy, (b) combined word study with instruction of academic vocabulary contained in the history text, and (c) combined these strategies with a graphic organizer to teach cause and effect relations. We demonstrated

Table 1. Descriptive Measures of Reading.

	Intervention			GenEd comparison
Assessment	Poor readers (*n* = 20)	SpEd (*n* = 14)	Total (*n* = 34)	No intervention (*n* = 81)
W-J				NA
Word identification	73.65 (15.59)	69.86 (12.07)		
Word attack	85.18 (8.2)	83.92 (7.7)	84.74 (7.9)	
Comprehension	72.64 (11.9)	64.00 (11.0)	69.59 (12.1)	
Picture vocabulary	78.05 (11.9)	75.25 (10.7)	77.06 (11.4)	
Total reading	73.65 (15.59)	69.86 (12.07)	72.09 (14.18)	
TOSCRF				
Pretest	82.50 (5.52)	73.92 (8.66)	79.47 (7.27)	98.27 (12.01)
Posttest	94.19 (7.62)	77.27 (8.66)	88.38 (11.33)	101.04 (9.93)

Note. All scores are standardized, with a mean of 100. GenEd comparison = Typical readers; Poor Readers = General Education Students who were poor readers and received intervention; SpEd Intervention = special education students who were poor readers and received intervention; W-J = *Woodcock–Johnson Tests of Achievement III*, administered only to Intervention students; NA = not administered; TOSCRF = *Test of Silent Contextualized Reading Fluency*.

that 5 min daily of focused multisyllabic decoding instruction significantly improved students' willingness and ability to tackle long words. Likewise, 5 min of daily instruction in academic vocabulary improved vocabulary knowledge and comprehension of passages. These two elements formed 10 min of the 47-min lessons formulated for the current study.

In this study, we concentrate on three comprehension strategies found in earlier studies to improve comprehension: generating a main idea from paragraphs (Jenkins et al., 1987; Vaughn et al., 2011), comparing and contrasting people or events (Bakken et al., 1997; Gersten et al., 2006), and finding causes and effects in events (Bakken et al., 1997; Williams, Stafford, Lauer, Hall, & Pollini, 2009). These strategies also have strong research evidence for "teachability" in eighth grade (Kamil et al., 2008), which framed our decision to use these strategies, alongside multisyllabic word study and academic vocabulary, to bridge students' reading and historical knowledge from lower level to grade-level text. Although other studies have taken a similar approach in intact general education history classrooms (e.g., Swanson et al., 2014; Vaughn et al., 2013), we focused on students who had a history of failing social studies or who were eligible for special education services, primarily under the category of LD. Our purpose was to investigate whether we could bring students who struggle with reading to the level of strategy use expected of eighth graders within a reasonable time frame (i.e., 3 weeks per strategy). We addressed the following research questions:

Research Question 1 (RQ1): Will students make significant gains in use of each comprehension strategy on taught and untaught passages?

Research Question 2 (RQ2): Will gains differ between students with and without disabilities, and between students who are English language learners or NESs?

Research Question 3 (RQ3): How do gains on use of reading strategies, history comprehension, and generalized reading of students with reading difficulties compare with the gains of their typical reader peers who studied the same historical content for the same length of time?

Method

Participants

Intervention students and teachers. The 34 participating students were eighth graders from the one special education (SpEd) and three general education (GenEd) classes in one middle school. Criteria for participation included (a) failing seventh-grade history in the previous year and scoring below basic on the state-administered language arts assessment or (b) receiving instruction through special education. Of these 34 students, 17 were female, and 14 received SpEd services, with designations of Specific Learning Disability (*n* = 11), Other Health Impairment (*n* = 2), and Speech/Language Impairment (*n* = 1). Eleven of the SpEd students took history routinely in a SpEd class and three in GenEd classes. Twenty-six students were ELs with their primary language indicated as Spanish, and 94.1% were of Latino/a descent. Their reading comprehension, measured with the *Woodcock–Johnson Tests of Achievement* (Woodcock, McGrew, & Mather, 2001), averaged two standard deviations below the test mean. Table 1 shows means and standard deviations for the descriptive reading measures.

Their classroom teachers, one each in SpEd and GenEd, had over 10 years of experience teaching history and both were male. The SpEd teacher taught one section of eighth-grade history that included 11 of the students with disabilities, and the GenEd teacher taught three sections of eighth-grade history that included three SpEd and 20 other

students eligible for participation with the criteria above. Both had credentials in their teaching area.

The intervention teachers were two postdoctoral scholars with experience teaching reading to students with LD. They implemented the intervention in groups of six to 12 students. They pulled participating students from their history classrooms for a full 47-min history period for a total of 36 lessons (12 each for main idea, compare–contrast, and cause–effect strategies).

Typical reader comparison students. Students who scored basic or proficient on the state-administered language arts assessment and received U.S. History instruction in the three GenEd classrooms comprised the comparison group: 45 female and 36 male. Of these 81, 88% were of Latino/a descent. Fifty-eight students were designated as ELs, with all but three students at intermediate or higher levels of proficiency in English. Their scores on the *Test of Silent Contextualized Reading Fluency* (TOSCRF; Hammill, Wiederholt, & Allen, 2006, described in Measures) are shown in Table 1 and indicate average reading ability.

Lesson Content and Instructional Procedures

We developed 3 weeks of history lessons to teach each of the three comprehension strategies: finding the main idea, comparing and contrasting, and cause and effect relations (i.e., three cycles of instruction, each lasting 12 days). To prepare students to use the strategies, we also needed to teach them to read the multisyllabic words that occur frequently in history text and the meanings of these words. To verify that words we selected were important for teaching the content of each cycle, we asked both classroom teachers to review these words prior to beginning intervention, and they agreed they would use them during their own instruction. All lessons included 5 min each of word study and vocabulary development, 15 min of comprehension strategy instruction, and about 20 min of reading and responding to history text that contained these words and text structures. Each of the three cycles used text written at a fourth-grade reading level for the first 2 weeks, and then eighth-grade text in the last week. These elements are described below.

Word study. To identify word patterns across multisyllabic words, we began with the rule "Every syllable has at least one vowel (ESHALOV)." ESHALOV required students to (a) underline vowels (e.g., unavoidable), (b) join vowel teams into one sound (i.e., oi), (c) identify known word parts (i.e., un-, able), (d) count the number of word parts to expect, (e) break the word into parts for decoding (i.e., un-a-void-able), and (f) try a pronunciation of the word. After 2 weeks, we shortened this procedure using the acronym BEST (O'Connor, 2007; O'Connor et al., 2015): Break the word apart, Examine the parts and find ones you know, Say each part, and Try the whole thing. Following use of the strategies on a set of four to 10 words, students read segments of history text that contained these words.

Academic vocabulary. We selected vocabulary words from history content selected for each cycle, which was the same across conditions. We considered the reading level, whether the word was critical to understanding the text, how frequently the word appeared, and contexts students could readily understand. We followed the recommendations of Beck, McKeown, and Kucan (2013) for teaching meanings in iterative and interactive ways that involved student-friendly definitions, guided practice opportunities to use words in varying contexts, and small group discussions in which students used the words with each other.

Main idea. Students read a paragraph of modified text to identify "who/what the paragraph was mostly about (Subject)" and "what was most important about the who/what (Action)." This information was transferred to a graphic organizer labeled "Subject" and "Actions." Students identified the subject first across the reading by circling the subject in each sentence (i.e., "What topic do you see consistently?"). Over 12 lessons, instructors modeled for students how to clarify inferential references ("Who do *they* refer to?") and identify relevant actions ("Let's list what's important about the Townsend Acts").

The final step was combining subjects with actions in a main idea sentence ("The Townsend Acts taxed goods from Britain like glass, paper, and tea"). Combining actions was difficult for some students, and sentence stems were used initially to provide a model.

Compare and contrast. Across the next 12 lessons (Cycle 2), students read and analyzed two sets of information about two different subjects to create a compare–contrast paragraph. The graphic organizer included three columns. Students labeled far left and far right columns with the name of the subjects (e.g., Ninth and Tenth Amendments). Students then used the main idea strategy from Cycle 1 to note characteristics or actions for each subject. Instructors modeled this process initially. Students reviewed each side of the organizer and noted similarities between the two subjects in the middle column. The modified texts were structured initially so that similarities and differences were in parallel sequence.

Instructors provided sentence stems to help students organize their paragraphs (e.g., The Ninth and Tenth Amendments had many differences, but they also had things in common. Both ___.). The use of sentence or paragraph frames helped to provide a clear model of expected writing. As the lessons increased in difficulty (abstract concepts, nonparallel listings of ideas, Grade 8 text), instructors went

back to modeling, and then allowed students to work independently and in groups.

Cause and effect relations. A key component in instructing students to identify cause–effect relations was the recognition of "signal words" (Williams et al., 2009). In authentic text, words and phrases are used (albeit not consistently) to "signal" the reader to cause–effect relations. These relations can be particularly important when students encounter text that identifies the effect first, then the cause, thereby confusing the temporal relationship, or has multiple causes and one effect, one cause and multiple effects, or multiple causes and multiple effects.

The text was modified during the first 2 weeks of the cycle to help students recognize the signal words (cause: because, since, due to; effect: therefore, consequently, as a result) and subsequent causes or effects. As students began reading their Grade 8 text in Week 3, scaffolding and additional modeling were provided, especially as cause/effect relations were sometimes inferred, rather than signaled directly. Throughout the cycle, instructors modeled using these notes to form a complete sentence of cause and effect.

Lesson Delivery

The specific history content in the intervention was determined by the GenEd teacher pacing of content, so that intervention students and the typical reader comparison group studied the same historical events during each cycle of intervention. Tasks were designed to increase student activity level, engagement with print, and oral and written responding. Just as each cycle incorporated a particular time period in U.S. history, each cycle also taught students a specific strategy for comprehending history text.

Texts were modified to reduce reading level to approximately fourth grade as students learned the strategy. Lessons gradually added difficulty by including use of pronouns, switching the position of subjects, including distractors, and introducing abstract or categorical subjects instead of concrete people or events. In addition, brief video clips, realia such as cotton hulls and quilts, and current events that paralleled the history topic were used. During the third week of each cycle, students returned to the Grade 8 history textbook that was used in the GenEd and SpEd classes. History content was the same for both conditions during each 3-week cycle. The difference was that intervention sessions included teaching reading skills for part of the history period and history materials were written at below grade levels for two thirds of the lessons.

Classroom Teacher-Delivered Instruction

After each 12-day intervention cycle taught by researchers, intervention students returned to their U.S. history classes in GenEd or SpEd settings. Their teachers were trained to implement the comprehension strategy (i.e., main idea, compare and contrast, or cause and effect) with their intact classes for 4 consecutive days, using the content they intended to teach during those days. Note that the strategies we taught during the intervention were expected to be incorporated in typical middle school assignments (i.e., statewide English language arts standards included main idea in Grade 5, compare and contrast in Grade 6, and cause and effect in Grade 7). Although the purpose for the classroom teachers' 4-day implementation was to estimate feasibility, teachers' implementation also reinforced the process and terms used in each strategy and ensured comparison students would understand the tasks in assessments. Following the 4 days of classroom teacher instruction, all students took the posttest on strategy use.

Treatment Fidelity

Daily observations of student interactions in their small instructional groups, frequent videotaping, and data on student learning captured adherence to the scripts and led to ongoing improvement of each routine during the researcher-provided instruction. During the first week of each cycle, each tutor was observed daily with the goals of improving student engagement and lesson delivery, pacing, and record keeping. Fidelity to implementation was documented in Weeks 2 and 3 (see the "Results" section).

During the 4-day whole class implementation of the comprehension strategies, classroom teachers were observed twice and fidelity documented with a checklist derived from the script of each strategy, along with time allocations for engagement of students. Researchers took notes on aspects of instruction that could be improved and met briefly with teachers following observations to comment on practices implemented well, along with one instructional feature teachers might adjust to improve student participation or learning.

Measures

The reading portion of the Woodcock–Johnson Tests of Achievement III (WJ-III; Woodcock et al., 2001) was administered individually to students prior to intervention to describe reading ability and confirm that participants had severe reading difficulties. Word Identification requires students to read aloud words that increase in difficulty. Word Attack measures decoding of nonwords. Picture Vocabulary requires students to point to pictures and name objects. Passage Comprehension requires students to read sentences and provide an appropriate word to fill a deletion. Across subtests, reliabilities ranged from .81 to .94.

The TOSCRF (Hammill et al., 2006) is a norm-referenced group-administered test to measure silent reading. It

was administered as pre- and posttests to Intervention and Comparison students to compare samples descriptively and assess growth over time. Students read passages arranged in rows of contextually related words without spaces or punctuation and draw a line between the boundaries of as many words as possible in 3 min. Reliability ranges from .82 to .99 and validity from .61 to .89. Means and standard deviations are shown in Table 1.

Experimenter-Designed Measures

We administered the decoding and vocabulary measures individually to students in Intervention as pre- and posttests for each of the three instructional cycles. We administered the measures of comprehension strategy use to Intervention and Comparison students before and after each instructional cycle to assess whether students could apply the comprehension strategies independently to historical content that was studied in both Intervention and GenEd classes. The specific paragraphs to prompt strategy use were not used in either condition. Reliabilities are reported in the "Results" section.

Decoding. The decoding quiz consisted of a sample of words and word patterns taught during the lessons. Cycle 1 words included -y endings, and the affixes -tion/-sion, con-, -ive. Cycles 2 and 3 added words with the affixes -ish, -ive, dis-, and intra-. Across lists, 30% of words comprised two syllables, 29% comprised three syllables, 30% comprised four syllables, and 11% comprised five syllables. Student responses were tape recorded for accuracy of scoring. Correctly reading the word earned 2 points; reading the word with inappropriate inflection or dropping a suffix earned 1 point.

Vocabulary. Vocabulary words were selected from the content of the history texts used in Intervention and Comparison conditions. Similar to others (van Daalen-Kapteijns, Elshout-Mohr, & de Glopper, 2001), we developed a 3-point scale (0 = *incorrect*, 1 = *partially correct*, 2 = *correct*) to describe the quality of student-generated definitions for target words.

Main idea. This assessment was given pre- and post-Cycle 1 and covered the unit of instruction leading up to the Revolutionary War. Students were asked to silently read one paragraph related to the Townsend Acts written at a 7.3 Flesch-Kincaid grade level, and to generate a main idea sentence in their own words. Main idea statements were scored on two dimensions: Content and Quality. Main idea content was based on the correctly identified subject of the passage and what was most important about the subject. Main idea quality was based on clarity, completeness, and whether the student used his or her own words. The content and quality scores were combined for the total main idea score (max = 13 points).

Compare and contrast. This assessment, administered pre- and post-Cycle 2, covered instruction on the early republic of the United States. Students read two paragraphs on Jefferson and Hamilton written at a 6.2 Flesch-Kincaid grade level and wrote a paragraph comparing and contrasting these subjects. Students received 1 point each for including subjects, 1 point for including a comparison signal word (e.g., *both, and, also, too*), 1 point for including a contrast signal word or phrase (*but, however, on the other hand*), 1 point each for mentioning that the subjects had similarities and differences, and 1 point for each similarity and difference stated. Quality was assessed on organization, structure, clarity, and completeness. The total score summed the content and quality scores for 22 possible points.

Cause and effect. This assessment, administered pre- and post-Cycle 3, covered instruction on economy, abolition, and slavery. Students read one paragraph about runaway slaves derived from the student's grade-level history textbook and rewritten at a lower grade level (5.3 Flesch-Kincaid) and were asked to identify causes and effects by responding to two questions: "What caused the slaves to run away? List all causes" and "Slave holders would sometimes kill runaway slaves if they were caught. What are the effects of this?" Responses were scored Content (i.e., correctly identified causes and effects) and Quality (i.e., clarity, completeness, and whether the student used his or her own words). These scores were combined for a total of 10 possible points.

Generalized multiple-choice reading comprehension of history. We administered this transfer task after the last cycle of instruction. Students read three expository passages on history content not included in the instructional cycles and answered multiple-choice comprehension questions. The topics were Early Leaders for African American Rights, Germany Sinks the Lusitania, and The Great Depression. Passages were drawn from U.S. History texts and ranged from 179 to 238 words with an average Flesch-Kincaid reading level of 9.3, which approximated reading levels across the eighth-grade history text. Students silently read each passage and responded to five to six questions that asked students to identify main ideas, comparisons and contrasts, and causes and effects. The total possible points was 17.

Results

Interrater Agreement for Experimenter-Designed Measures

A scoring rubric was developed and practiced on each comprehension assessment. We determined reliability by scoring the tests without the raters knowing whether the tests were collected as pre- or posttests, and whether students were in Intervention or typical reader peer conditions. The

Table 2. Experimenter-Designed Measures.

	Poor readers		Special education		All intervention		GenEd comparison	
Measures	*M* (*SD*)	%	*M* (*SD*)	%	*M* (*SD*)	%	*M* (*SD*)	%
Decoding							NA	
Pre	41.71 (8.68)		33.83 (12.20)		38.85 (10.63)			
Post	53.05 (3.66)		51.00 (3.72)		52.28 (3.76)			
Vocabulary							NA	
Pre	11.38 (4.75)		7.33 (5.79)		9.91 (5.43)			
Post	29.00 (8.77)		17.75 (8.92)		24.78 (10.29)			
Main idea								
Pre	4.81 (3.5)	37.0	4.08 (3.4)	31.4	4.55 (3.4)	35.0	7.95 (3.1)	61.2
Post	8.57 (2.9)	65.9	8.00 (3.6)	61.5	8.36 (3.1)	64.3	8.00 (3.2)	61.5
Compare and contrast								
Pre	9.32 (4.0)	42.4	6.09 (4.4)	27.7	8.06 (4.4)	37.5	11.62 (4.1)	53.5
Post	16.91 (3.7)	76.9	15.82 (3.6)	71.9	16.55 (3.7)	75.2	11.78 (4.3)	53.5
Cause and effect								
Pre	4.50 (2.4)	45.0	3.36 (2.7)	33.6	4.12 (2.6)	41.2	7.74 (2.4)	77.4
Post	6.68 (2.2)	66.8	3.91 (2.7)	39.1	5.75 (2.7)	57.5	7.88 (1.9)	78.8
Reading comprehension of history								
Pre	5.94 (2.6)	35.1	5.56 (2.1)	32.7	5.82 (2.4)	34.2	12.47 (2.9)	73.4
Post	8.18 (3.2)	48.1	7.56 (3.2)	44.5	7.78 (3.0)	45.8	12.65 (3.6)	74.4

Note. GenEd Comparison = Typical readers; % = percent of total possible. NA = not administered.

fourth author randomly scored 20% of the tests. Interrater agreement was calculated using the intraclass correlation (ICC). The ICCs for main idea, compare and contrast, and cause and effect were excellent (ICC = .96. 98, and .94, respectively).

Standardized Reading Measures to Describe the Sample

Table 1 shows scores of the intervention students on the reading assessments by PR (students who read poorly but do not have identified disabilities) and SpEd status. Scores on the W-J III were similar for treated students with and without disabilities, with most scores falling more than 1.5 standard deviations below the mean of the test norming sample and reading comprehension 2 standard deviations below average, placing intervention students below the 5th percentile, on average. Only reading comprehension differed by SpEd status, with students with disabilities scoring significantly lower than those without disabilities, $F(1, 32) = 4.33$, $p < .05$, $\eta^2 = .12$.

TOSCRF scores differed significantly between Intervention and Comparison groups at pretest, $F(1, 110) = 30.21$, $p < .01$, $\eta^2 = .22$, and posttest, $F(1, 109) = 33.65$, $p < .01$, $\eta^2 = .24$, with the Comparison group scoring higher, as expected. Between intervention students with and without disabilities, TOSCRF scores also differed significantly at both time points, pretest: $F(1, 33) = 15.59$, $p < .01$, $\eta^2 = .33$; posttest: $F(1, 33) = 32.43$, $p < .01$, $\eta^2 = .52$, with treated students without disabilities scoring higher.

Comprehension Performance on Experimenter-Designed Assessments

A series of repeated-measures ANOVAs with time as the within- and SpEd status (SpEd or PR), EL status (EL or NES), and Intervention versus Comparison students as the between-subject factors were calculated. Partial eta-squared was used as the measure of ES. Students were taught in clusters (small groups by researchers and whole class groups by their teachers); however, these clusters changed within each cycle and so data were analyzed by conditions without nesting. For analysis of results for each strategy, we begin with answering RQ1 (growth in strategy use, shown by the main effect for time), then RQ2 (differences due to disability or EL status, shown by the interaction), and then RQ3; Intervention vs. Comparison students in the GenEd classes).

Table 2 shows scores on the experimental measures of strategy use for Intervention and Comparison groups (their general education classmates who did not participate in the intervention, but were taught the same history content). Recall also that Comparison students received 4 days of instruction in each of the strategies from their classroom

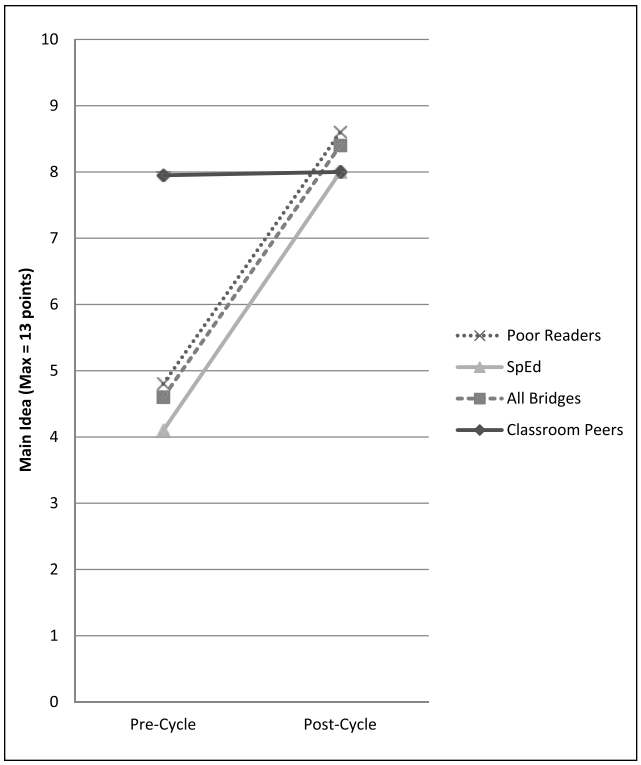

Figure 1. Main idea performance pre- and postcycle across student groups.

teacher, so they were familiar with the strategy being assessed.

Main idea, Cycle 1. Repeated-measures ANOVA demonstrated a significant main effect for time, $F(1, 31) = 33.655$, $p < .001$, ES = 0.52, demonstrating that intervention students gained in their ability to generate main ideas (RQ1). The main effect of SpEd status and the time by SpEd interaction were nonsignificant. Therefore, SpEd and PR improved similarly from pre to post intervention (RQ2). Next, repeated-measures ANOVA for time and EL status demonstrated a main effect for time, $F(1, 32) = 41.424$, $p < .001$, ES = 0.57, but not for EL status or time by EL interaction. Therefore, EL and NES students improved similarly from pre to post intervention (RQ2). Finally, we compared Intervention student performance with the comparison group. The interaction effect for intervention status and time was significant, $F(1, 113) = 19.965$, $p < .001$, ES = 0.16. Intervention students scored fewer points at pretest ($p < .001$) and similar to their classroom peers at posttest ($p = .357$). Intervention students made stronger growth than Comparison students during our instructional cycle, meeting the same level of performance as their typical peers (RQ3; see Figure 1).

Compare and contrast, Cycle 2. The repeated-measures ANOVA demonstrated a significant main effect for time, $F(1, 31) = 118.887$, $p < .001$, ES = 0.79 (RQ1). The main effect for SpEd status and the time by SpEd interaction were nonsignificant (RQ2). Likewise, the ANOVA for time and EL status demonstrated a main effect for time, $F(1, 31) = 97.824$, $p < .001$, ES = 0.76; however, main effects of EL status and time by EL interaction were nonsignificant (RQ2). Next, we compared Intervention student performance with the Comparison group. The interaction effect for intervention status and time was significant, $F(1, 111) = 19.965$, $p < .001$, ES = 0.16. As with main idea, Intervention students scored fewer points at pretest, $F(1, 111) = 10.14$, $p < .001$, ES = 0.16. At posttest, intervention students scored significantly higher than the comparison group, $F(1, 111) = 10.14$, $p < .001$, ES = 0.68 (RQ3; see Figure 2).

Cause and effect, Cycle 3. The repeated-measures ANOVA indicated a significant main effect for time, $F(1, 31) = 5.954$, $p = .02$, ES = 0.16 (RQ1), and for SpEd status, $F(1, 31) = 7.496$, $p = .010$, ES = 0.20, but a nonsignificant interaction (RQ2). At pretest, there were no differences in performance between PR and SpEd students; however, at posttest, PRs outperformed SpEd students ($p = .003$). Next, we compared EL students with NES students. The repeated-measures ANOVA indicated a main effect for time, $F(1, 31) = 6.947$, $p = .013$, ES = 0.18. The tests for main effect of EL status and time by EL interaction were nonsignificant, indicating that both groups grew significantly in this strategy (RQ2). Finally, we compared Intervention with Comparison groups. The interaction effect for intervention status and time was significant, $F(1, 110) = 7.916$, $p = .006$, ES = .07. Intervention students improved significantly from pre- to posttest, whereas the Comparison scores did not change significantly (RQ3; see Figure 3).

Generalized comprehension of history and reading. Results from the repeated-measures ANOVA on the history test failed to indicate a main effect for time, $F(1, 111) = 8.40$, $p = .005$, ES = 0.08. The tests for main effect for SpEd status and the interaction were nonsignificant (RQ2). Results were similar when comparing EL and NES students, with no main effects for EL status or interaction (RQ2). Comparing scores at pre and posttest for Intervention and Comparison groups, we found an interaction, $F(1, 111) = 5.725$, $p = .019$, ES = 0.05. Intervention students demonstrated improvement from pre- to postinstruction, whereas scores of Comparison students did not change (RQ3; see Table 2).

Generalized reading change was estimated with repeated-measures ANOVA on TOSCRF scores between Intervention and Comparison groups. The main effect for time was significant, $F(1, 113) = 101.87$, $p < .01$, ES = 0.47, suggesting that students across conditions grew in reading from October to March. The main effect for condition was also significant, $F(1, 113) = 55.90$, $p < .01$, ES = 0.33. Comparison students, who did not have reading difficulties,

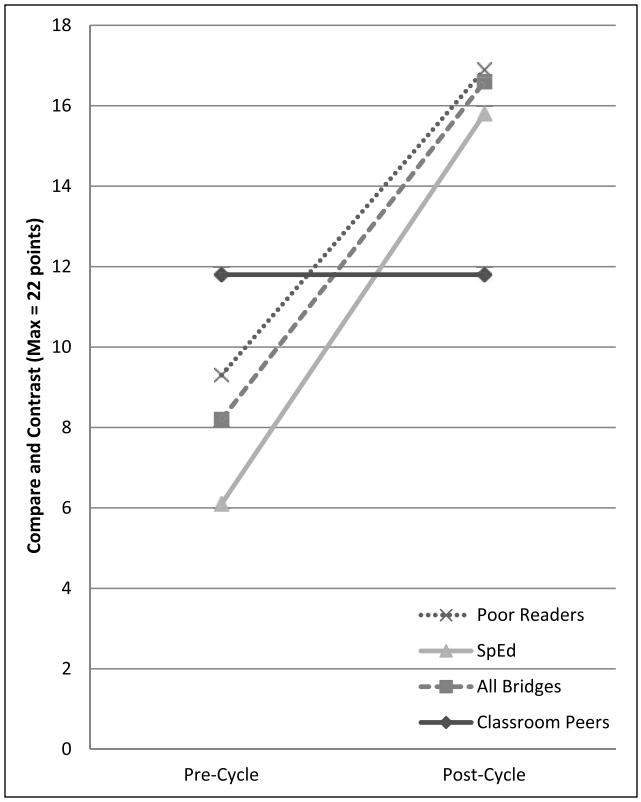

Figure 2. Compare and contrast performance pre- and postcycle across student groups.

scored higher than Intervention students before and after the intervention. We also found an interaction for group, $F(1, 113) = 12.01$, $p < .01$, ES = 0.097, in which Intervention students improved their standard scores from pre- to posttest significantly more than did the Comparison group (RQ3; see Table 1).

Researcher and Classroom Teachers' Fidelity of Implementation

Observations of researcher-implementers were conducted twice weekly during Weeks 2 and 3 of each instructional cycle. Because these researchers also participated in the script and materials development for this study, fidelity was uniformly high and above 92% in all observations.

SpEd and GenEd teachers were observed twice during each of the 4-day feasibility trials, primarily by the fourth author. Two other research team members observed across the three strategies to establish interrater reliability, which was calculated at 96.67% over six shared observations. The observation instrument noted specific characteristics of the teaching that were integral to lesson fidelity. We did not rate the quality of implementation of these specific behaviors, but only the presence of the teaching behaviors because we wanted to determine the feasibility of these lessons for teachers in real-world settings. Fidelity was consistently high for introducing the strategy (100%), providing the historical context for the content (77.8%), and providing guided practice for their students (range = 88.9%–100%). The weakest areas were encouraging student discussion of passage meaning (44.4%) and asking students to justify their selections (22.2%).

Discussion

The results of this study suggest that middle school students with reading difficulties can make significant gains in learning and applying reading comprehension strategies appropriate for expository text with 3 weeks of focused instruction. These gains were consistent across strategies for generating main ideas, comparing and contrasting people and events, and identifying cause and effect relations. These gains were also consistent for students with and without disabilities and students who were English language learners. For the strategies of main idea and compare and contrast, students who received the intervention performed as well on measures of these skills as students who were typical readers and who studied the same history content. Moreover, Intervention students were able to transfer their use of comprehension strategies to untaught history content.

Gains in Strategy Use and Transfer

Beginning our strategy instruction with finding main ideas was a deliberate decision: Our goal was to translate the internal sensemaking we do as we read into explicit instruction for students (Kennedy & Ihle, 2012). McMaster, Espin, and van den Broek (2014) suggested that the ability to generate the main idea of text is central to reading comprehension. Sensemaking begins with attending to what we read, which students who are very poor readers often neglect. Struggling readers find it difficult initially to respond to the question, "So what is happening in this paragraph, this page?"

To break this pattern, we first taught students to locate information in text and use their notes on a graphic organizer to construct a main idea. Students began to select the correct subject of a paragraph reliably about 4 days into the instructional cycle, and they maintained this ability as the subjects of paragraphs were referenced by pronouns. Using the subject as a sentence starter provided the marker they needed to read the sentences closely and identify series of actions, which then made generating a main idea statement relatively straightforward.

To maintain the main idea strategy in Cycle 2, we taught compare and contrast as both a new strategy important to understanding history and as maintenance because it essentially required comparing and contrasting main ideas across descriptions of people, places, and events. With these strategies in place, students were able to try to analyze more

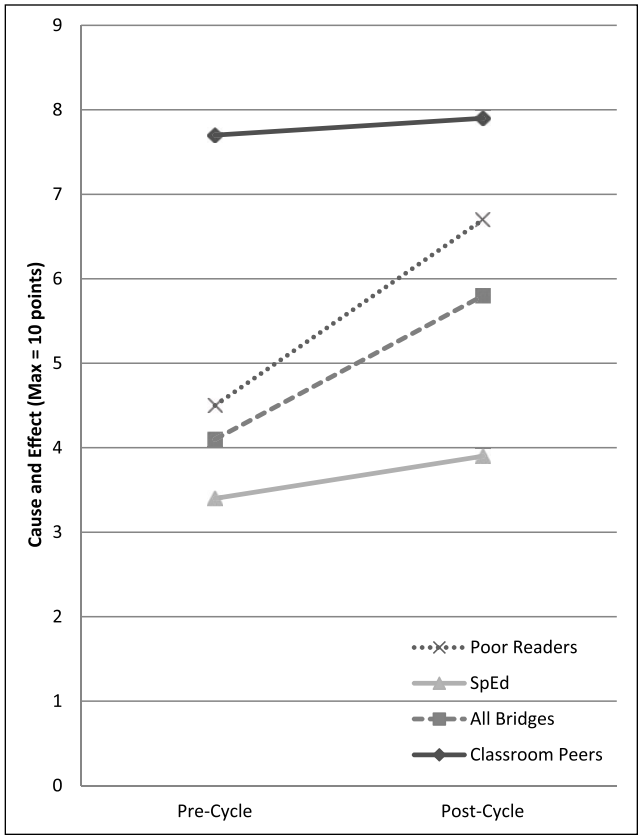

Figure 3. Cause and effect performance pre- and postcycle across student groups.

difficult passages by pairing causes and effects, which also relied on identifying main ideas in paragraphs.

The graphs of student progress (see Figures 1–3) show clearly that Intervention students improved in each strategy with 12 days of instruction. For main idea, students with LD improved to the level of their general education classmates in using the strategy by posttest. For compare and contrast, Intervention students identified at posttest more similar and different elements in paragraphs than their typical reader peers in the Comparison group. That students with LD, ELs, and other PRs made these gains within 12 instructional days we find compelling.

Most importantly, Intervention students were able to transfer use of the taught strategies to improved understanding of untaught historical events on our test of reading comprehension of history. Although it may not seem surprising that typical readers in history classes would fail to grow in historical interpretation of events they had not been taught, students in the intervention improved their scores significantly on the test of strategy transfer. Because neither Intervention nor Comparison classmates had been exposed to the tested events or associated concepts, growth of Intervention students suggests they improved in their ability to analyze difficult text using the taught strategies.

Differences Between Students With Varying Characteristics

For two of the taught strategies (i.e., main idea and compare/contrast), students with LD grew similar to other students with reading difficulties and to the level of classmates without reading difficulties. The most difficult strategy for the students with LD to master was cause and effect relations, and although their improvement was significant, their scores still lagged behind their nondisabled classmates. The multiple steps and increasing complexity of the task may have made it difficult for PRs to master in 3 weeks, and other studies (Jitendra et al., 2000; Williams et al., 2009) used longer time frames. Learning specific words that signal a cause or effect added two sets of memorization not required in the other strategies. Not only do students need to recognize the words related to causes and effects, but they also need to know which words signal causes and which signal effects. Moreover, recognizing these relations in naturally occurring accounts of events often requires inferences beyond the text and considerable background knowledge, which are known difficulties for students with LD (McMaster et al., 2014). As relations became more complex (e.g., a cause that led to multiple effects, with effects that became causes of further effects), students had difficulty keeping events in interpretable chains.

Although time per session in our study (i.e., 47 min) was similar to many strategy studies (see Gajria et al., 2007, for a review), the research base is unclear on optimal duration of instruction. Gajria reports a range in duration from 1 session to 4 months for strategy interventions they reviewed. Similar to Jitendra et al. (2000), Intervention students made strong gains on main idea and compare and contrast with 3 weeks of instruction; however, our data suggest that either more weeks of instruction or a more effective instructional procedure will be needed for mastering cause and effect relations, especially as reading level of text increases.

We expected students who were classified as ELs to have more difficulty than NESs learning these strategies; however, we found no interactions in learning for EL status. Because we used a multicomponent intervention that included decoding and vocabulary development as well as strategy use, we cannot isolate whether any of these features were responsible for their comparable gains in strategy use and transfer.

Comparing Typical Readers With Intervention Students

Recall that the same history content was taught in both types of history classes for the same amount of time. Even though the strategies we taught were also state-mandated

instructional goals for Grades 5, 6, and 7, we saw little use of strategy instruction during our observations in general education history (O'Connor et al., 2015). Swanson et al. (2016) observed English and social studies classes in middle schools and found that fewer than 20% of observations included any comprehension instruction.

One explanation in the current study is that these goals had already been mastered by typical readers in earlier grades, and in fact, the figures show that Comparison students had considerable ability to apply them on the pretests. Nevertheless, these figures also show that students who were PRs initially lacked these skills although they were able to learn them efficiently with instruction. The two transfer tasks (i.e., reading unstudied history content and the TOSCRF) suggest that Intervention students were better able to extract history content from difficult reading material following instruction, and that their reading skills also improved over the course of instruction. They accomplished these gains without more instruction, but rather with instruction that incorporated reading skills within the time allotted to learning history.

Limitations

Intervention students received 12 days of instruction in each strategy compared with only 4 days for their typical reader classmates. Comparing equal amounts of strategy instruction would be one way to design this experiment; however, many typical readers had already mastered these strategies (i.e., pretest scores for the comparison students averaged 54%–77% across strategies). Moreover, the motivation for this study was to investigate whether we could bring students who struggle with reading to the level of strategy use expected of typical eighth graders in history classes within a reasonable time frame. Future studies could explore a three-group comparison to include equal amounts of instruction for a typical reader group.

Although Intervention students made significant gains in strategy use, the only standardized pre–post measure of reading was the TOSCRF, which was a far transfer reading measure that taps silent reading fluency and comprehension. Future studies could employ other standardized tests of reading comprehension to assess reading improvement and transfer more reliably. Other reading intervention studies in middle school have shown that outside of intervention, students tend to lose ground on standardized tests (e.g., Vaughn et al., 2013). Our design did not include a control group of untreated struggling readers, and doing so would clearly be another next step.

Implications and Conclusions

We found it encouraging that adolescents reading near the 5th percentile could learn to generate main ideas and write comparison/contrast paragraphs with only 3 weeks of instruction per strategy. Although the 36 lessons they received improved students' strategic use of these strategies, it was clearly insufficient for bringing these students to average reading ability, which may be the minimum level required for tackling middle school history text. Students with LD and others with reading difficulties face considerable and continuing challenge in mastering history and other content areas in secondary classrooms. The 4-day instructional trial their teachers undertook at the close of each cycle suggests that these strategies might be feasible for use in special and general education environments; however, further study will be needed to test this possibility.

We interpret these results as support for integrating reading instruction with history instruction for students with reading difficulties in middle school. Not only did students improve their ability to understand difficult history text; they also improved their reading scores over half a standard deviation, and did so without adding instructional time to their school day. As part of a growing body of research that integrates reading with content area instruction (e.g., O'Connor et al., 2015; Swanson et al., 2014; Vaughn et al., 2013), this study demonstrates a process for teaching essential reading skills without sacrificing learning of the content needed for high school graduation. With continual refinement of such approaches, teachers may be better able to solve the dilemma of limited instructional time for meeting multiple instructional goals.

Authors' Note

Opinions expressed are those of the authors and do not represent those of the Institute of Education Sciences or U.S. Department of Education.

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