EFFECTS OF THE INTERACTIVE STRATEGIES APPROACH—EXTENDED

A Responsive and Comprehensive Intervention for Intermediate-Grade Struggling Readers

ABSTRACT
To implement Response to Intervention with intermediate-grade struggling readers, there is a need for interventions that are responsive to individual student needs, and sufficiently comprehensive to support the many dimensions of the reading process. This research examined the efficacy of such an intervention, the Interactive Strategies Approach—Extended (ISA-X), which was provided by public school teachers in a daily, one-to-one format to grade 4 struggling readers with individualized education programs. Half the students received the intervention in the fall semester while the others served as a wait-list control group who received the intervention in the spring. After the fall intervention, struggling readers had significantly higher scores than control students on measures of reading comprehension and accuracy; effects on New York State’s high-stakes language arts assessment approached significance. Regression analyses showed significant intervention effects on measures of basic reading skills and social studies vocabulary; effects on a measure of fluency were not significant.

RESPONSE to Intervention (RTI) is predicated on the hypothesis that if struggling readers are provided with intervention that is research based and more intensive than traditional classroom instruction, they will show increased rates of growth in reading. RTI also reflects the hypothesis that interventions may have effects that are strong enough to overcome reading-related cognitive difficulties (Gresham, 2002). There is substantial support for these hypoth-
eses for primary-grade children; however, comparatively little is known about how to successfully implement RTI with older students with reading difficulties (Vaughn et al., 2008). Our study was designed to evaluate the efficacy of a comprehensive, responsive, teacher-provided intervention to improve the reading comprehension of grade 4 struggling readers. In this study, the intervention was provided to students who had not responded to classroom and small-group intervention and who required the most intensive and most individualized level of support.

RTI is one of several initiatives developed to address the finding that far too many students do not become adequate readers (National Reading Panel, 2000; Snow, 2002). Intermediate-grade struggling readers perform below expectation on measures of both comprehension and word-reading skills (e.g., Biancarosa & Snow, 2004; Riddle-Buly & Valencia, 2002). Moreover, by the time they reach high school, those struggling readers who have learning disabilities show severe deficits in comprehension, word reading, fluency, and vocabulary (Hock et al., 2009).

While the problems of intermediate-grade struggling readers have not been researched in an RTI context, useful guidance can be obtained from a recent meta-analysis of well-designed studies seeking to improve the reading abilities of older struggling readers (Scammacca et al., 2007). The authors of the meta-analysis report that when teachers provided researcher-designed intervention to older struggling readers, no effects were obtained on standardized comprehension measures. Similarly, in a large-scale study, James-Burdumy et al. (2009) found that when classroom teachers provided one of four carefully selected interventions for grade 5 students, the interventions were no more effective than the control condition as measured on standardized tests of comprehension. Further, there is evidence that the instruction offered in special education settings often fails to improve intermediate-grade reading achievement (Bentum & Aaron, 2003; Torgesen et al., 2001).

Intervention for intermediate-grade struggling readers is challenging because reading is complex and requires the integration and orchestration of a variety of literacy skills, knowledge sources, and dispositions. It must address multiple potential barriers to comprehension, including struggling readers’ limited background knowledge, limited vocabulary, and nonstrategic approaches to both word identification and comprehension (Perfetti, Landi, & Oakhill, 2005). At the same time, instruction must engage students who are typically not interested in reading and identify themselves as unable to learn to read (Guthrie et al., 2009). Moreover, intervention must enable students to independently read to develop knowledge.

Vaughn et al. (2008) noted that much of the extant RTI research has employed a “standard protocol” approach to intervention rather than differentiating instruction based on individual student needs. But since older struggling readers come from a heterogeneous population of individuals whose literacy skills, strategies, and background knowledge differ (Riddle-Buly & Valencia, 2002; Valencia et al., 2010), it is unlikely that a standardized and highly scripted intervention will be broadly successful. Instead, instruction needs to be responsive, that is, tailored to individual students’ needs, addressing word- and text-level skills as appropriate (Scammacca et al., 2007). However, there is little evidence regarding the effectiveness of responsive approaches for older struggling readers (Vaughn et al., 2008). At the primary grades, responsive intervention has been shown to be effective (Scanlon, Gelzheiser, Vellu-
tino, Schatschneider, & Sweeney, 2008; Scanlon, Vellutino, Small, Fanuele, & Sweeney, 2005; Vellutino et al., 1996) and to be more effective than a standard protocol approach (Simmons, Coyne, Kwok, Hagan-Burke, & Kim, 2010).

Current thinking on intervention for struggling readers suggests that such intervention must be comprehensive (Biancarosa & Snow, 2004); that is, it should address all aspects of literacy so as to address students’ needs in an integrated fashion. Moreover, comprehensive reading instruction requires ample instructional time. Indeed, Kamil et al. (2008) concluded that high-quality research supports the use of intensive—defined here as daily one-to-one instruction—intervention with those students who struggle the most.

The Current Study

For the present study, we developed and evaluated a responsive and comprehensive intervention, the Interactive Strategies Approach—Extended (ISA-X). The ISA-X was provided by public school teachers to struggling grade 4 readers in an intensive, one-to-one format. The ISA-X is an adaptation and integration of the Interactive Strategies Approach (ISA; Scanlon, Anderson, & Sweeney, 2010; Vellutino & Scanlon, 2002) and Reading Partners (Gelzheiser, Scanlon, & D’Angelo, 2001), both of which have been shown to accelerate the progress of struggling readers on measures of comprehension and foundational literacy skills (Gelzheiser, 2005; Gelzheiser et al., 2001; Scanlon et al., 2005, 2008; Vellutino et al., 1996).

The ISA is a comprehensive and highly responsive approach to instruction and intervention designed for use in the primary grades (Scanlon et al., 2010). The goals of the ISA include increased motivation, knowledge of the alphabetic code, vocabulary, and comprehension. A central feature of the ISA is teaching students to be independent users of code- and meaning-based strategies for word identification. Because it focuses on primary-level students, phonemic awareness and conventions of print are also goals of the ISA. Reading Partners used community volunteers to provide individualized intervention to grade 4 struggling readers. Reading Partners developed both reading and content knowledge by engaging students in reading trade books of varying difficulty levels that were related to their social studies curriculum (Gelzheiser et al., 2001). Like the ISA, the ISA-X addressed motivation, alphabetic knowledge, vocabulary, and comprehension. In comparison to the ISA, the ISA-X placed greater emphasis on the development of comprehension and included the reading of thematically related texts related to the students’ social studies curriculum. The ISA-X placed less emphasis on some components of the ISA (e.g., phonemic awareness, basic print concepts) that were not appropriate for the majority of grade 4 students receiving the ISA-X.

Our study examined the effects of the ISA-X on the word level and reading comprehension skills of struggling readers as well as on the development of content knowledge. Grade 4 students who had been identified by their schools as having disabilities and who had individualized education program (IEP) goals in reading served as subjects in the study. They were assigned to receive daily one-to-one intervention in either the fall or spring semester. Individual lessons were 40 minutes in length and followed a format of minilesson, reading and discussion, and writing. However, the instructional goals and specific instructional activities varied across
students and changed during intervention as a function of students’ entering skills and progress. Below we provide both the logic for and a description of the components of the intervention.

Interactive Use of Word Identification Strategies

When readers are able to effortlessly identify most of the words in a text, they can devote cognitive energy to the text’s meaning (Perfetti et al., 2005). The vast majority of words that a proficient reader can read were not taught directly, but instead were learned as the reader effectively puzzled out the word’s identity in the context of reading connected text (we refer to this as word solving). Successful identification of unfamiliar words is viewed as the result of interactive processes that activate and integrate visual, orthographic, phonological, semantic, and syntactic information (Share, 1995).

The ISA (Scanlon et al., 2010; Vellutino & Scanlon, 2002) and the ISA-X teach struggling readers to flexibly and independently apply both meaning- and code-based strategies in identifying unfamiliar words in text. Meaning-based strategies (e.g., check the pictures, think of words that might make sense, read past the puzzling word, go back to the beginning of the sentence and start again) engage the reader with the meaning of the text and increase the likelihood that he or she will identify irregularly spelled and multisyllabic words, which are often challenging to identify using code-based strategies. Code-based strategies (e.g., think about the sounds in the word, break the word into smaller parts, look for known parts, and try different pronunciations for some of the letters, especially vowels) encourage the reader to fully analyze the orthographic and phonological features of printed words, thereby increasing the likelihood that those words will be recognized in subsequent encounters.

The ISA and ISA-X approaches are interactive because students are taught to use code- and meaning-based strategies in a mutually supportive way (Scanlon et al., 2010) to identify and confirm a word’s identity. For example, a reader might use a code-based strategy such as breaking a word into smaller parts by noticing and temporarily ignoring prefixes or suffixes while identifying the root word. The reader would then reassemble the parts and use a complementary strategy, such as going back to the beginning of the sentence and starting again to confirm that the word makes sense. To promote students’ independence in word solving, both the ISA and ISA-X recommend that teachers gradually release to students the responsibility for identifying and confirming words. To that end, once students can effectively use the strategies, teachers are encouraged to avoid confirming whether or not a word has been identified correctly, unless they suspect that the word is not in a student’s spoken vocabulary. The goal of interactive strategy use is for readers to learn to confirm correct word identification on their own. Interactive use of word-solving strategies has the potential, with each encounter with text, to enable students to independently increase their reading accuracy and the number of words that can be identified automatically (Clay, 1991; Share, 1995). With increased facility in word identification, more cognitive resources are available for meaning making.
Phonics Instruction

In an orthography based on an alphabet, the use of code-based strategies is dependent upon knowledge of letter sounds and combinations of letter sounds. Accordingly, research supports phonics instruction for older struggling readers if it is indicated by student need (Kamil et al., 2008). The ISA and ISA-X use a variety of word-building, reading, and spelling activities (Scanlon et al., 2010) to develop knowledge of letter sounds and orthographic patterns. The phonics skills taught are selected based on the joint consideration of the student’s current skills and the text that the student will be reading. The goal is that the student will have the opportunity to apply newly learned phonics skills in the context of reading.

The code-based strategies provide students with opportunities to efficiently apply their developing phonics knowledge. For example, the strategy of trying different pronunciations for some letters, especially the vowels, encourages students to use letter-sound knowledge flexibly (Scanlon et al., 2010). In words that follow the silent-e pattern or contain vowel digraphs, students are encouraged to systematically try the long and short sounds of the vowels if their first attempt at word identification does not yield a real word that fits the context. This strategy allows students to independently identify words that would otherwise be taught as irregular words (e.g., have, great) and reduces the need to teach rules that are helpful only some of the time (Clymer, 1963). As students develop knowledge of the sounds that letters make, this strategy can be applied to letter groups that make two sounds (e.g., oo) and silent letters (e.g., kn, mb).

Explicit Instruction for Comprehension and Monitoring

Much of what intermediate-grade struggling readers read probably does not make sense to them because they are often asked to read texts in which they cannot accurately and automatically identify enough of the words (Allington, 2009). From this experience, many struggling readers hold a view of reading that does not encompass meaning making; that is, they do not set a “high standard for coherence” as they read (Perfetti et al., 2005). This view of reading may inadvertently be reinforced by teachers who overemphasize reading accuracy and fluency in their instruction. In implementing the ISA-X in our study, students were given explicit modeling and guidance related to comprehension monitoring and the use of several “fix-up” strategies to enable them to recover from points of confusion (Almasi, 1991; Klingner & Vaughn, 1999). Instruction in these strategies, like the word-identification strategies, has the goal of providing students with tools that they can independently use to solve problems encountered while reading. The ultimate goal of this instruction was to foster the insight that reading is a purposeful, meaningful, meaning-generating, and enjoyable activity.

Collaborative Discussion to Promote Understanding and Engagement

In the traditional form of text discussion, the teacher asks questions, students respond, and the teacher evaluates the adequacy of students’ responses (Cazden, 1986). Teachers control the topic of discussion and make all of the decisions as to who is allowed to respond and what is considered correct. However, more recent research suggests that this approach to discussion fosters disengagement and reduced com-
prehension (Almasi & Garas-York, 2009), particularly with struggling readers who “remain passive to avoid making mistakes in public” (p. 470).

A more effective form of discussion, collaborative discussion, as summarized by Almasi and Garas-York (2009), encourages both teachers and students to initiate discussion topics, ask questions, and provide evidence to support an interpretation of a text, especially since more than one interpretation of the text may be constructed and supported. This form of discussion is promoted by the use of open-ended questions and teacher responses based on what students have said. Accordingly, McKeeown, Beck, and Blake (2009) found that content-focused discussion with fifth graders produced stronger effects on comprehension than explicit strategy instruction. Aligned with these findings, book discussions in the ISA-X occurred before, during, and after reading the text and were intended to be collaborative, engaging, and nonevaluative.

Thematic Organization of Texts

Opportunity to read is critical to the development of reading proficiency (Hiebert & Martin, 2009). The majority of instructional time in the ISA-X was used for reading and discussion of text, providing ample opportunity to read. The reading materials offered in the ISA-X were thematically organized such that students had the opportunity to read easier texts on a particular topic before reading more challenging texts on the same topic. The themes were related to the grade 4 social studies curriculum. There were several purposes for the reading of related texts. First, reading related texts provided the repeated encounters with words needed for the development of automatic word identification. Wide reading that is organized into narrow topics increases the likelihood that the same words will be encountered repeatedly (Adams, 2009). For example, in texts about the Statue of Liberty, students repeatedly encountered liberty and pedestal. Moreover, as hypothesized by Guthrie et al. (2009), thematic units foster word learning because students must “process multiple new words deeply” (p. 209) as they decode and discuss content related to these words. Finally, O’Connor, White, and Swanson (2007) reported positive effects when students read texts with a “high percentage of word redundancy” (p. 44).

A second major purpose for the use of related text was to build students’ social studies content knowledge through reading in order to support comprehension (Cervetti, Jaynes, & Hiebert, 2009; Chall & Jacobs, 2003; Guthrie et al., 2009; Hirsch, 2003). Reading related texts offered repeated exposure to the ideas and vocabulary central to the social studies theme, thus increasing the likelihood that students would learn new vocabulary (Adams, 2009) and “gain higher order understandings” (Guthrie, McRae, & Klauda, 2007, p. 241). Increasing background knowledge related to the topic also enabled readers to more effectively monitor their comprehension in subsequent books dealing with similar topics. The third reason for the use of related reading was to foster rich discussion about the texts. Multiple texts on the same and related topics provided opportunities for extended discussions as the students developed their knowledge base and were able to make comparisons across texts.
Text Difficulty

Allington (2009) concluded that the question of “optimal text difficulty for promoting reading growth” (p. 41) remains largely unexplored. He noted that reading with a high level of accuracy was related to growth among beginning readers (e.g., Ehri, Dreyer, Flugman, & Gross, 2007). But if older struggling readers read only texts at their instructional level, they are not exposed to grade-appropriate vocabulary and their limitations in reading, language, and knowledge grow even larger (Cunningham & Stanovich, 1998). Thus, others (e.g., Kuhn & Stahl, 2003) have argued that reading more challenging texts is a critically important prerequisite for effecting continued reading growth and for increasing students’ content knowledge and expectations (Hirsch, 2003).

Note, however, that a thematic structure can include both texts that can be read with relative ease and more challenging text. For example, in Gelzheiser’s (2005) Reading Partners project, students began by reading easier texts on a topic in order to learn critical vocabulary and develop background knowledge. This was followed by reading more challenging texts, which was possible because students had increased their knowledge about the topic along with vocabulary related to the topic. Students who read instructional-level texts within a given theme and, thereafter, read more challenging texts within the same theme made greater reading gains than students who did not read a balance of easier and more challenging texts (Gelzheiser, 2005). This progression from easier to harder text was also a feature of the ISA-X.

Choice

In a review, Guthrie and Humenick (2004) reported that students given the opportunity to choose what they would read had substantially higher reading comprehension and motivation. Students who were given their choice of books to read tended to read more and were more likely to choose reading over other activities in a free-choice time period (McLoyd, 1979). Thus, in the present project, students were provided with choices regarding the social studies topics they would read about and/or the books to read within the topics.

Purposes

The research reported in this manuscript was designed to develop and conduct an initial test of the effect of a responsive, comprehensive intervention provided in an intensive format on the reading achievement and social studies vocabulary development of intermediate-grade struggling readers. Special emphasis was placed on developing reading comprehension. This research also examined the relative impact of the ISA-X on reading comprehension outcomes when performance on measures of intelligence, vocabulary, and basic reading skills assessed at the outset of the study were held constant.

Method

Design

Students received the ISA-X intervention in either the fall or the spring semester of grade 4. Half of the students received the ISA-X intervention in the fall semester,
while the remaining students served as a business-as-usual (BAU) wait-list control group. The wait-list control students then became the Spring Intervention group. Students in the Fall Intervention group were followed during the spring semester to determine whether any gains they might demonstrate during the intervention period were maintained when the experimental intervention was discontinued. During each intervention semester, schools were directed to provide the students with regularly scheduled general and special education reading instruction in addition to the ISA-X intervention. Thus, students participated in the BAU instruction both semesters and only in the BAU instruction during their nonintervention semester.

Assessments given at the end of the fall semester were used for the purposes of comparing the Fall Intervention and BAU wait-list control groups. Assessments given in September, January, and June were used to compare change during the treatment and control/maintenance semesters. Assessments prior to and after intervention were used to evaluate the extent of change during intervention.

Participants

**Districts.** Three school districts in the Albany, New York, area participated in the first year of data collection; during the second year, one of the original districts continued and a new district was recruited. In the districts, 25% to 60% of students received free and reduced-price lunch.

**Teachers.** From these four districts, three teachers participated in a first year of data collection, and two participated in the second. Grant funds were used to hire full-time substitutes so that teachers were released from their teaching responsibilities in order to participate in the research. Two participating teachers were certified in special education, two in reading, and one was an elementary-certified teacher who had worked as a district consultant in language arts for several years. One teacher was a first-year teacher; the others had moderate levels of experience ranging from 7 to 20 years. Because the number of eligible students (with IEPs and reading goals) in a building varied, two teachers taught only students in their building, two traveled between two buildings to have a sufficient number of students, and one traveled between two or four buildings, depending on the semester.

**Students.** District personnel were asked to identify potential student participants from the pool of grade 4 students with IEPs, using data in student files indicating intelligence in the average range (above 80) and reading needs (based on test scores or IEP goals). Across the 2 years of data collection, 50 students were successfully recruited for participation (five per teacher per semester). Most students were randomly assigned to the Fall or Spring Intervention conditions. The assignment of 11 students was made on the basis of the school they attended in order to minimize teacher travel. One teacher's caseload included eight students in one building, and one student in each of two other buildings. The eight students were randomly assigned to the Fall or Spring Intervention; then the other two from other buildings were assigned to either the Fall or Spring Intervention. Another teacher's caseload included four students in one building, two in another building, and one each in three additional buildings. The four students in one building and one of the students who was the only one in his building were assigned to the Fall Intervention condition. The remaining students were assigned to the Spring Intervention condition; one of
the students moved to a different building, leaving the teacher traveling between four buildings to see four students.

One student assigned to the Spring Intervention group left after pretesting and was not included in any analyses. Another Spring Intervention student was not included in the analyses because she was judged unable to benefit from the ISA-X because of cognitive limitations and extensive reading needs. She was provided another intervention, the ISA, which is more suitable for children whose reading skills are at the beginning stages of reading development. Two students in the Spring Intervention group left prior to beginning intervention but are included as BAU wait-list control group members, and three Fall Intervention students completed intervention but left during the spring semester and so had no maintenance data. Table 1 summarizes demographic information for the Fall and Spring Intervention groups. The table reveals that most participants had received special education services for several years prior to entering intervention, and roughly one-third had also been retained.

Assessments

Woodcock-Johnson III Basic Reading Skills Cluster (BRSC; Woodcock, McGrew, & Mather, 2001). The BRSC is a composite measure derived from scores on the Letter-Word Identification and Word Attack subtests. On the Letter-Word Identification measure, students read individual words presented in list form; on the Word Attack measure, students read pseudowords presented in list form. The test manual reports split half reliabilities of .95 for children age 10 on the BRSC. We report standard scores for this measure.

Woodcock-Johnson III Reading Fluency (WJ-III Fluency; Woodcock et al., 2001). This measure requires students to read sentences (e.g., “The color of milk is pink.”) and indicate whether each is true or not. Students respond to as many sentences as
possible in 3 minutes. A penalty is applied for guessing to avoid score inflation for students who opt to trade speed for accuracy. The test manual reports test-retest reliability of .94 for children ages 7–11.

**Qualitative Reading Inventory—4 (QRI-4; Leslie & Caldwell, 2006).** Expository passages from this instrument were administered by the student’s intervention teacher at the beginning and end of the student’s intervention semester; the QRI-4 could not be given three times per year because it does not contain a sufficient number of alternate expository passages. It was used to measure oral reading accuracy and reading comprehension of expository, informational text and to provide the teacher and research staff with information about the students’ instructional needs. The instrument provides lengthy expository and narrative passages (with alternate-form reliabilities of at least .80) at each of 10 difficulty levels (pre-primer, primer, grades 1 through 6, upper middle school, and high school). According to the International Reading Association (2008), the QRI-4 provides the most complete evidence for reliability and validity of eight informal reading inventories reviewed. Passages place substantial demands on vocabulary knowledge and reasoning ability.

At the primer level to level 2, we used the two available expository passages at each reading level; for levels 3 to middle school, we selected two of the three expository passages. At each reading level, half of the students read passage A at pretest and passage B at posttest; the other half of the students read B at pretest and A at posttest. Multiple random orderings of passage “packets” were developed with each pretest packet containing a predetermined set of randomly selected A or B passages at each reading level; the posttest set contained the alternate (A or B) passage. Thus, no student read the same passage at pre- and posttest, and no two students were assigned the exact same sequence of passages.

Passage starting points were determined using the leveled word lists following the QRI-4 guidelines. Students read one passage at each level. The QRI-4 procedures for scoring total accuracy were used to determine the student’s reading accuracy level. Comprehension was assessed using the questions (not retelling) according to the specifications in the manual. If students performed at an instructional level for reading accuracy and comprehension, they advanced to the next level; if they performed at a frustration level for either, then they dropped down to the next easier reading level (if it had not already been administered). As recommended in the manual, assessment was discontinued if the student reached frustration for both reading accuracy and comprehension at a given level. However, we encountered students who performed at frustration level for either comprehension or accuracy, but not both. We continued to administer more challenging passages if a student was at an instructional level for either reading accuracy or comprehension. In order not to engage students in an activity that was highly frustrating, testing was discontinued if a student was at frustration level for reading accuracy or comprehension for two consecutive reading levels, even if a highest instructional level had not been reached for the other dimension of reading. There were two instances at pretest and four instances at posttest in which testing was discontinued before the student encountered a frustration level passage for comprehension. Discontinuation occurred because of the student’s limited oral reading accuracy.

Audio recordings were made of the passage reading and responses to comprehension questions in order to insure that miscue analyses and scoring were accurate and reliable. To increase reliability, one member of the research staff reviewed all audio
recordings and decided whether a student’s reading of a passage was at an independent, instructional, or frustration level using the manual’s criteria for oral reading accuracy and for scoring the comprehension questions. We report the highest instructional levels for oral reading accuracy and comprehension.

The QRI-4 includes three levels within grade 1: pre-primer, primer, and first grade. These levels are traditionally considered to represent performance typical of children’s reading toward the beginning, middle, and end of grade 1. To convert these levels to quantities that could be analyzed statistically, we coded them as follows: pre-primer = 1.2, primer = 1.5, and grade 1 = 1.8, using intervals of .3. There is only one level within the remaining grades; to be parallel with grade 1, we coded these as the grade level plus .8 (e.g., 2.8, 3.8, etc.).

**New York State English Language Arts Test (ELA).** This is a 3-day, group-administered measure that is administered to all students. It includes multiple choice, short answer, and extended response items to assess text comprehension, writing, and listening comprehension. Students received a total extended scale score on this measure; a standardized score of 650 is considered proficient.

**Social Studies Vocabulary Measure (SSV; Gelzheiser, Scanlon, & Hallgren-Flynn, 2007).** The SSV is a matching assessment in which students were asked to match words, typically taught in the grade 4 social studies curriculum, with definitions. Items were presented in sets of four or five, with two distracters in each set. Espin, Shin, and Busch (2005) found vocabulary matching to be a reliable and valid measure of student performance in social studies.

**Peabody Picture Vocabulary Test—4 (PPVT-4; Dunn & Dunn, 2007).** This measure of receptive vocabulary was given because knowledge of word meanings is strongly related to text comprehension (Wagner, Muse, & Tannenbaum, 2007). It was included as a control for individual differences in general vocabulary knowledge.

### Assessment Procedures

The Woodcock-Johnson subtests and the SSV were administered by research staff in September, January, and June; research staff also administered the PPVT-4 in September. Because it lacked a sufficient number of alternate expository passages to be administered three times per year, the QRI-4 was administered by the intervention teachers at the beginning and end of the intervention semester; all students were given the QRI-4 in January. Scoring of the QRI-4 was done by research staff. The ELA was given by school personnel in January. For this test, students were provided with the testing accommodations specified in their IEPs; for all but three students, this consisted of extended time and/or alternate location plus supports such as directions read (when allowed) or simplified language.

### Business-as-Usual Condition

Most of the student participants were placed in general education for the majority of their instruction. As noted in Table 1, about half of these students received their reading instruction in the general education classroom, and the other half from a special education teacher. The remaining students were placed in special class set-
settings for most of their instruction, including reading. In addition to their primary instruction, about half of the sample received 40 to 300 minutes per week of supplemental reading instruction. Table 1 also reports attendance data for participants; it should be noted that “absent from instruction” includes suspension. Attendance was highly variable, and 25% of the sample was absent from instruction once every 2 weeks, or 10% of the time.

Professional Development Procedures and Content

**Workshop.** Professional Development (PD) consisted of an initial 5-day workshop, a 3-day refresher workshop in January, and semimonthly, 2-hour after-school meetings. PD began with an overview of the program’s goals, and special emphasis was placed on the importance of responsive instruction. PD also focused teachers on the goal of student independence and on how strategies are tools that foster students’ independence as learners. Additionally, PD addressed aspects of the ISA-X intervention that teachers found to be challenging: (1) how to hold a collaborative discussion; (2) content knowledge regarding phonics skills, text difficulty, genre, and comprehension; and (3) how to scaffold students and to gradually release responsibility for strategy use to students. These concepts were presented through group discussions guided by PowerPoint presentations, video models of ISA-X instruction, and readings in an ISA-X teacher handbook (Gelzheiser, Scanlon, & Hallgren-Flynn, 2008). For each of the ISA-X instructional goals, the teacher handbook provided both a theoretical foundation and supportive teaching activities, including ideas for mini-lessons and sample teaching dialogues.

**Intervention teacher coaching.** A field supervisor and codeveloper of the intervention (Hallgren-Flynn) provided coaching to intervention teachers in the form of onsite observations and conversations (roughly 10 visits per year), shared discussion of video clips, video examples, modeling, and/or e-mail interchanges. The topics addressed in coaching were derived from the research staff’s monitoring of treatment integrity and intentional analysis of audio recordings of problematic students.

**Treatment integrity.** The ISA-X is a complex intervention with multiple components, many of which were initially unfamiliar to the participating teachers. The development of teachers’ ability to responsively implement these components was a gradual process. To document treatment integrity and to foster teacher development, each lesson was audio recorded, and five sessions with each student were video recorded. Teachers were also observed in their initial semester. The field supervisor and other members of the research team analyzed the video data on a regular basis; these data were the primary source of topics for ongoing professional development and for individual coaching sessions.

Teachers’ implementation of six key components of the ISA-X (minilessons, time spent reading, discussion, thematic units, strategy instruction, and fostering student independence) were rated by the field supervisor and the first author. Teachers were rated at the midpoint of each semester, with lesson plans and video and audio recordings as sources for the ratings. All teachers demonstrated adequate or better levels of implementation of the ISA-X during both semesters.
Intervention Procedures

Planning. The goals of the ISA-X, which are derived from the ISA (Scanlon et al., 2010), are listed below. The relative importance of each goal was a function of individual student need.

• Motivation: The student will develop the belief that reading is an enjoyable and informative activity that is not beyond his or her capability.
• Alphabetics: The student will effectively use alphabetic information in word solving.
• Word learning: The student will build his or her sight vocabulary using word identification strategies to puzzle through unfamiliar words encountered while reading.
• High-frequency words: The student will effortlessly read high-frequency words in all contexts.
• Vocabulary and language: The student will learn the meanings of new words encountered in instructional interactions and will be able to use the words both in conversation and in reading and comprehending text. The student will become more proficient at understanding the syntax of literary English.
• Comprehension: The student will use information and ideas in the text and background knowledge to actively construct an understanding of the text and to independently solve comprehension problems.

At the start of the intervention semester, teachers assessed phonics knowledge using the Elementary Spelling Inventory (Bear, Invernizzi, Templeton, & Johnson, 2004), and some students were asked to read lists of words to identify high-frequency words that were not yet part of their sight vocabulary. During their initial sessions, teachers were encouraged to observe the word identification strategies that students were already using. Teachers recorded this initial description of the student on a student checklist (Gelzheiser, Scanlon, & Hallgren-Flynn, 2010). The field supervisor and the teacher reviewed these data and the assessment data to determine the reader profile that best described the student. Profile identification was intended to help teachers set initial instructional priorities and goals for individual students. Thereafter, instructional goals were determined by the students’ response to the instruction they received.

Fifteen students were identified as having a Word Learning Emphasis (WLE) profile; these students had not consolidated their knowledge of letter sounds, were not fluent in their ability to identify high-frequency words, and had limited strategies for identifying unfamiliar words. They entered intervention with similar pretest scores (BRSC standard scores of 59 to 79, and a QRI-4 word reading accuracy [instructional] score of grade 2 or less). Interestingly, about half of these students showed higher comprehension than accuracy. Instruction for them emphasized the goals of increased facility with phonics, high-frequency words, and word identification strategies, while still addressing comprehension of the major ideas in a text and, of course, motivation to read.

Nine students had adequate word reading abilities (pretest BRSC scores of 89 or higher) and accuracy scores that approximated grade level (3.8 or better). All but two of these students had comprehension levels on the QRI-4 that were one to two levels
below their word reading accuracy. These students were identified as having a Meaning Emphasis (ME) reader profile. For these students, the focus of instruction was on developing an understanding that reading was a meaning-making endeavor and on promoting comprehension monitoring, literal and inferential comprehension, and motivation to read.

The largest group of the students \((n = 22)\) were identified as having both word learning and comprehension needs, which we described as a Dual Emphasis (DE) profile. This group included students \((n = 7)\) who needed instruction in high-frequency words and word identification strategies as well as targeted phonics instruction, and, most critically, to learn to apply the phonics knowledge they had to the reading of continuous text. In addition, these students had comprehension needs. They all began intervention with scores slightly higher than the WLE students (BRSC of 77–84 and QRI-4 accuracy scores of 1.2–3.8) and comprehension less than or equal to their accuracy performance. Other DE students \((n = 15)\) needed to develop accuracy through reading, as well as comprehension. These students began intervention with BRSC standard scores of 80–92 and QRI-4 accuracy scores of 2.8 or 3.8, and comprehension that was less than or equal to their accuracy. Intervention for these students typically included specific word identification strategies, support for decoding of multisyllabic words, and ample time spent reading. For all DE students, comprehension (literal and inferential) and motivation were addressed in every lesson. Teachers wrote daily lesson plans for each student, using a template provided by the project. Student progress toward the goals was recorded monthly on the student checklist (Gelzheiser et al., 2010).

**Daily lesson implementation.** Participating students engaged in daily sessions during their intervention semester. For all but four students (who were absent for or suspended for extended periods), 50–65 sessions of 35–45 minutes of one-to-one reading instruction were provided for one semester. Sessions included a 5–10 minute minilesson, 25–30 minutes of reading, and 3–5 minutes of reflection and/or writing.

**Minilesson.** Each session started with one or more brief lessons and/or practice activities selected on the basis of student needs. The focus of these lessons and practice activities included meanings of a few useful vocabulary words to be encountered, interactive use of both code- and meaning-based word identification strategies, relevant phonics knowledge, high-frequency words, and strategies that students could use when meaning broke down. Word identification strategy instruction reflected the students’ level of knowledge about orthography. For example, if the teacher was sure that the student knew both sounds of a vowel letter, the student might be encouraged to try another sound for the letter \(a\) when encountering words such as *have* or *gave* if the initial decoding attempt was inaccurate. Intervention teachers were encouraged to use the same phonics keywords in intervention that the student had been taught in previous instruction, assuming that the keyword was instructionally useful. The most frequent phonics task was “word building” with letter tiles (“make rat”; “now make rate”) to consolidate and build flexibility with the vowel sounds (Scanlon et al., 2010). Teachers were encouraged to create opportunities for students to apply these skills and strategies during reading of text.

**Reading and discussion.** Following the minilesson, students read text that allowed them to utilize the vocabulary, strategies, and/or phonics skills that had been taught. The majority of the intervention session (20–30 minutes) consisted of reading and discussing books from the social studies thematic units described below.
Teachers offered students choices from a selection of topics and/or books. Students typically began a unit by choosing a “culminating” text which they would read at the end of the unit. The culminating text might be a chapter book, posing challenges because of its length, or a picture book that posed decoding, knowledge, and/or vocabulary challenges in relation to the student’s initial skills and knowledge. Students then read texts that developed the knowledge and vocabulary needed for this more challenging text. Teachers were encouraged to sequence the books about a topic from easiest to more challenging and to provide more support as needed in more challenging texts.

Most reading was done aloud so that the teacher had the opportunity to observe and guide word identification problem solving and to engage the student in informal discussion of the text. As a student read, depending on student need, the teacher provided guidance on strategies for identifying unfamiliar words in context. Students were encouraged to use code- and meaning-based strategies interactively to identify and confirm unknown words. For each thematic unit addressed, the students began by reading texts at their instructional level to develop independent word-solving skills and to build knowledge and vocabulary related to the topic. Later, they read more challenging texts, which provided more frequent opportunities for solving unfamiliar words but were made accessible because the students had already developed some knowledge related to the concepts and events encountered in the text.

To promote comprehension, teachers were encouraged to engage students in discussions as they read. Student participation was fostered by the knowledge that students developed during the thematic unit. Teachers used open-ended questions with more than one possible answer to elicit discussion and encouraged students to make comments about what they noticed in the text, ask questions, or make personal connections to the text. Teachers were directed to frequently share their own thinking about the text. The goal was for discussion to have a collaborative rather than interrogatory tone. Teachers were encouraged to conclude a discussion by celebrating the student’s ideas and interpretation of the text. Rather than confirming for students the accuracy or inaccuracy of their interpretation, teachers’ comments might provide feedback about strategy use or direct the reader back to the author’s ideas and the text for clarification. Teachers briefly explained the meanings of unknown words as they were encountered in context.

In the final 20 sessions of intervention, teachers phased in silent reading. Initially, silent reading was brief (e.g., one paragraph) and in texts where students could be successful. Over time and with increasing skill, silent reading was done in more challenging texts.

**Reflection.** After each text or at the end of each session, students wrote or dictated a brief response to the text as a starting point for further thinking about the text. The purpose of this activity was to encourage the reader to reflect on the text as a whole.

**Intervention Materials**

**Student texts.** The ISA-X used trade books organized into content-rich themes aligned with the New York State grade 4 social studies standards (Gelzheiser & D’Angelo, 2000). Unit topics included geography of New York State, Native Americans, the Revolutionary War, and the new nation. For each unit, teachers were
provided with two copies of each of 25 or more trade books related to the theme and varying in difficulty. Units included both fictional and informational texts. For each unit there were one or two focal genres, with multiple exemplars of that genre. Minilessons for WLE students included reading of Ready Readers (Englebretson, Hiebert, & Juel, 2000) to provide practice with specific phonics skills and to provide the students with the opportunity to read easy texts in which they could learn and apply word-solving skills.

Other materials. For each of the ISA-X thematic units, teachers could rely on the ISA-X curriculum guide (Gelzheiser, Scanlon, & Hallgren-Flynn, 2009). This guide presented ways that texts could be organized and matched to student reading abilities and information about how to introduce focal genre. Teachers were also provided with laminated copies of the Word Identification Strategies list (Scanlon et al., 2010) for students to use as a resource when identifying unfamiliar words, and the Mixed Up? Fix Up! strategies list (Gelzheiser et al., 2010), which students could use when they encountered text that was difficult to understand.

Results

Pretest

Table 2 reports descriptive statistics for the Fall and Spring Intervention groups on all measures. The groups differed significantly at pretest on the BRSC ($t = 2.8$, $p < .05$), and differences on the WJ-III Reading Fluency measure approached significance ($t = 1.9$, $p = .07$). In both instances, the Fall Intervention group had weaker skills.

Teacher and Cohort Effects

It should be noted that this research was a “development project” in which the intervention and supporting professional development were both developed and tested. Under these circumstances, cohort effects in addition to teacher effects, which are always likely, might be anticipated, since the second cohort used a more fully developed intervention. However, when data were examined by teacher or cohort, no differences were observed; thus teachers and cohorts were aggregated to provide the strongest comparison of the intervention groups.

Treatment-Control and Treatment-Maintenance Comparisons

Because of preexisting differences between the groups on measures of basic reading skills, a regression approach was used to analyze data that were collected in September, January, and June. Two sets of analyses were conducted, one using September pretest performance and treatment condition to predict performance in January, and a second using January performance and condition to predict June performance. The first set of analyses was done to (1) control for preexisting differences between the treatment groups in September and (2) detect effects of the intervention on the outcome for the Fall Intervention versus the wait-list/control (Spring Intervention) group. The second set of analyses was done to (1) control for group differences in January that were the result of the Fall Intervention and (2) to detect effects of the Spring Intervention as compared to a maintenance semester for the Fall In-
<table>
<thead>
<tr>
<th>Measure</th>
<th>Fall Intervention</th>
<th>Spring Intervention</th>
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<td></td>
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<tr>
<td>Sept. (n = 26)</td>
<td>79.2 6.6</td>
<td>84.7 8.5</td>
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<tr>
<td>Jan. (n = 26)</td>
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<td>74.1 14.3</td>
<td>82.9 6.8</td>
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<td>Sept. (n = 26)</td>
<td>14.4 4.3</td>
<td>13.0 3.3</td>
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<tr>
<td>Jan. (n = 26)</td>
<td>14.1 4.3</td>
<td>13.8 4.7</td>
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<td>June (n = 22)</td>
<td>13.7 5.4</td>
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<td>2.0 1.0</td>
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<tr>
<td>Jan. (n = 26)</td>
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<td>QRI-4 instruction level for comprehension</td>
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<td>Jan. (n = 26)</td>
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<td>QRI-4 instruction level for accuracy</td>
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<td>2.2 1.0</td>
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<td>New York State ELA extended scale score</td>
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<td>623 26.1</td>
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<tr>
<td>Jan. (n = 26)</td>
<td>620 26.1</td>
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tervention group. This approach was selected based on research that found a residu-
alized change model (defined here as a regression that uses the pretest as a covariate
in the same model as group membership) to be a more powerful approach to analysis
than repeated-measures ANOVA (Bonate, 2000).

**Basic Reading Skills Cluster.** A regression approach was used to examine the
effect of the condition (intervention vs. BAU) on the January BRSC. The analysis
found both pretest (September) BRSC ($B = .9, t = 10.1, p < .001$) and intervention
condition ($B = 3.6, t = 2.2, p < .05$) to be significant predictors of BRSC score in
January, indicating that the treatment condition accounted for a significant propor-
tion of postintervention BRSC score. Regression was also used to test the effect of
intervention in the spring semester. In this analysis, both pretest (January) BRSC
($B = .9, t = 13.2, p < .001$) and intervention condition ($B = 2.6, t = 2.3, p < .05$) were
significant predictors of BRSC score in June, indicating that the intervention ac-
counted for a significant proportion of variance on the postintervention BRSC.

**Fluency.** These effects were not replicated on the WJ-III Reading Fluency mea-
sure. In two regression analyses examining the effects of the Fall and the Spring
Interventions, only the preintervention fluency scores were significantly related to
the postintervention fluency; the intervention condition was not. In an effort to
understand these findings, we computed words correct per minute (WCPM) for
same-level QRI-4 passages given at pre- and posttest to the 15 WLE students, as this
group of students represented those for whom fluency gains might be expected. Six
students showed clear gains during intervention; that is, all met or exceeded the
average weekly improvement rates of 20 WCPM in 20 weeks reported by Hasbrouck
and Tindal (2006) for low-achieving grade 2–4 readers, with a mean gain of 31.3
WCPM. Four others made smaller gains (range of 11.6–16.5 WCPM). Four students
showed no growth in WCPM (range of −7.2–4.7), but their posttests were charac-
terized by increased rates of self-correction and re-reading to support comprehen-
sion, and one student showed no change in fluency or self-correction.

For these 15 WLE students, fluency gains on the QRI-4 were not correlated with
gains on the WJ-III Fluency measures, $r = .04$, but were significantly correlated with
gains in BRSC ($r = .63, p < .05$). Correlations between gains on the QRI-4 fluency
and comprehension measures approached significance ($r = .40, p = .14$). In contrast,
gains on the WJ-III Fluency measure were not correlated with gains on the BRSC, $r =
.03$, or with gains on the QRI-4 comprehension measure, $r = .30$. This pattern of
results suggests that although the QRI-4 and WJ-III Fluency measures both
tapped factors related to reading comprehension, the QRI-4 more directly as-
sessed fluency in word recognition than did the WJ-III in this subgroup of strug-
gling readers, who were especially deficient in basic word-level skills at the outset.

**Social studies.** Regression was also used to examine the effects of the condition on
social studies vocabulary in order to determine whether reading texts related to social
studies themes increased social studies content vocabulary. For the fall semester, the
analysis included only the treatment condition as a predictor, since there were no
preexisting group differences in social studies. For the fall semester, the treatment
condition approached significance as a predictor of January SSV ($B = 3.4, t = 1.9,
p = .07$). When the September PPVT-4 score was added as a predictor of January
SSV, it was found to be predictive of January SSV ($B = 0.2, t = 2.8, p < .01$) and the
intervention condition was also a significant predictor of January SSV ($B = 3.9, t =

2.3, \( p < .05 \)), suggesting that the vocabulary measure may have removed unexplained variance in January SSV that was not attributable to treatment group membership (Tabachnick & Fidell, 2001).

Because the Fall Intervention resulted in intervention group differences in January, the effects of the Spring Intervention were assessed using the January SSV and intervention condition as predictors. The regression results indicated that both January SSV (\( B = 1.0, t = 8.1, p < .001 \)) and intervention condition (\( B = 3.3, t = 2.0, p = .05 \)) were significant predictors of SSV scores in June, indicating that intervention resulted in significantly greater SSV scores than did the BAU condition.

**QRI-4 Expository Comprehension, Accuracy, and New York State ELA.** There were two measures (QRI-4 and New York State ELA) that were given to all students only in January, when the Fall Intervention group had completed intervention and the Spring Intervention group had not yet begun the intervention. Because the Fall and Spring Intervention groups demonstrated large differences in September on the BRSC, this measure was used as a covariate to control for preexisting group differences. A multivariate analysis of covariance, with September BRSC as the covariate, was used to compare the treatment groups in January on the two QRI-4 outcomes and the ELA. BRSC was a significant covariate, \( F(3, 41) = 7.8, p < .001 \). The multivariate effect for intervention was significant, Wilks’s lambda \( F(3, 41) = 7.6, p < .001 \). In January there were significant univariate differences between the Fall Intervention group and the Spring Intervention (wait-list control) group in QRI-4 Instructional Level for Expository Reading Comprehension, \( F(1, 46) = 23.8, p < .001 \) and QRI-4 Instructional Level for Expository Text Reading Accuracy, \( F(1, 46) = 12.8, p = .001 \). Effects on the New York State Test of English Language Arts approached statistical significance, \( F(1, 46) = 2.6, p = .11 \), and were of a moderate level of educational importance, Glass’s \( d = .62 \).

**Comparing the Effects of Student Characteristics and Intervention**

The premise of RTI is that instruction is powerful, even in relation to entering student characteristics. To examine this premise, a stepwise regression analysis was conducted to examine the relative contribution of the intervention and factors known to predict reading comprehension: vocabulary, decoding ability, and word identification. The analysis also included intelligence, because the traditional definition of learning disabilities was predicated on the assumption that reading ability and intelligence should be correlated. This regression equation used January QRI-4 Instructional Level for Expository Comprehension as the outcome, and September BRSC, PPVT-4, IQ, and intervention condition as predictors. September BRSC (\( B = .06, t = 2.7, p = .01 \)), September Vocabulary (\( B = .05, t = 2.7, p = .01 \)), and intervention condition (\( B = 1.9, t = 4.9, p < .001 \)) were each predictive of reading comprehension; intelligence did not enter the equation. Intervention accounted for 22% of the variance in QRI-4 Instructional Level for Expository Comprehension; PPVT-4 scores added 14% and BSRC added 11%. Together, these predictors accounted for 47% of the variance in the QRI-4 Instructional Level for Expository Comprehension scores.
Each group spent one semester in intervention and one semester receiving school-based instruction only. To further evaluate the effects of intervention, effect sizes (Cohen’s $d$) were computed to evaluate change during the nonintervention semester and during the intervention semester, collapsing across groups. These effect sizes are reported in Table 3. During the intervention semester, effect sizes were large on the QRI-4 Instructional Level for Expository Text Reading Accuracy and Comprehension and for the social studies vocabulary measure, while smaller effect sizes were found on the BRSC and the fluency measures. For both the BRSC and the SSV, the effect sizes during the intervention semester were larger than during the nonintervention semester.

### Discussion

There is ample evidence to support the common observation that the instructional needs of struggling readers are multifaceted and challenging to address by the time such students reach the intermediate grades. As school personnel begin to implement RTI approaches in these grades, they will require research-based interventions that can improve the achievement of students who are not successful in the general education classroom (Vaughn et al., 2008). The present research was designed to evaluate the effects of the ISA-X, a responsive and comprehensive intervention for intermediate-grade struggling readers. The struggling readers in the study could be described as challenging to remediate, as they typically had received several years of special education support prior to receiving the ISA-X intervention. Further, about half received both primary and supplemental reading instruction, and about one-third had received additional general education instruction through retention. The primary question we addressed was whether challenging-to-remediate students would show greater reading and social studies achievement than control students after receiving a comprehensive and responsive intervention, the ISA-X, provided in an individualized, daily format. A second, closely related question concerned the relative importance of the intervention and entering-student abilities, given that RTI is predicated on the assumption that intervention is powerful even in the presence of limited student skills and abilities (Gresham, 2002).
Summary of Findings

The findings extend the growing body of evidence generated by RTI research by documenting the importance of targeted and appropriate interventions for heterogeneous populations of struggling readers. In this study, it was found that the ISA-X produced statistically significant effects on several dimensions of reading proficiency: basic reading skills, reading accuracy, and reading comprehension. For the whole group, no effects were observed on a timed measure of reading fluency. There was also evidence that the ISA-X had measurable effects that extended beyond reading. After reading books related to social studies themes, there was strong indication that the intervention had a positive effect on knowledge of social studies vocabulary. Although not statistically significant, meaningful group differences were observed on a high-stakes state assessment that measured reading, writing, and listening comprehension, the New York State ELA. Thus, given the intensive form implemented in the present project, it appears that the type of responsive and comprehensive intervention provided by the ISA-X can improve the academic performance of even challenging-to-remediate intermediate-grade struggling readers. Further, when the factors that might explain the effects on comprehension were examined, intervention was found to have the largest effect; entry-level vocabulary and basic reading skills were less important though still significant predictors, and intelligence test scores were not related to comprehension once the other explanatory factors entered the equation.

The most important finding in this research was that effects on comprehension were large in contrast to other interventions that have been studied with similar populations. Our effect size for comprehension of 1.68 is notable in view of Scammacca et al.’s (2007) meta-analysis, which reported an average effect size of only .06 on standardized measures of reading comprehension in well-designed studies that included teacher-provided reading interventions and intermediate-grade struggling readers. Thus, an important contribution of this research is that it documents that teacher-provided intervention can have large effects on both the basic reading and comprehension skills of intermediate-grade struggling readers.

Implications for Practice

The disparity between the present findings and those reported by Scammacca et al. (2007) raises a justifiable question: What factors might account for the positive effects produced by the ISA-X in the present study? We hypothesize that the reasons for the success of the ISA-X are as varied as the students who received the intervention (Riddle-Buly & Valencia, 2002; Valencia et al., 2010) and reflect the different types of reader profiles; that is, it is likely that students with a WLE reader profile made gains because they were taught word identification strategies and provided with targeted phonics instruction in a fashion that was not divorced from the process of constructing meaning from text. Many of the word identification strategies were meaning-emphasis strategies, and the majority of instructional time was spent practicing the phonics skills and word identification strategies needed for successful word identification while reading and discussing text. One can hypothesize that these readers displayed greater comprehension because their word reading accuracy improved as they spent a great deal of time reading and thinking about text.
Conversely, students with an ME reader profile spent very little instructional time on the word identification strategies or activities specifically designed to improve their phonics skills. Instead, their instructional program emphasized the “things readers do” to construct meaning from text and provided ample opportunity to read and think about text. For the largest group in our sample, the DE group, instruction balanced the word- and text-level skills and strategies that each individual student needed to learn with ample time to read and think about text. Thus, we found that intervention that is responsive to student needs can result in improved reading comprehension, even for challenging-to-remediate students.

We did not compare responsive instruction to a more standardized approach. However, recent research has found responsive instruction to be more effective than the standard protocol (Simmons et al., 2010) for primary-grade readers. Other studies with primary-grade readers have also shown improved student performance with responsive instruction (Scanlon et al., 2005, 2008; Vellutino et al., 1996). This pattern of findings suggests that as practitioners adopt the practice of RTI in the intermediate grades, they are more likely to be effective if they implement responsive instruction rather than a scripted or prepackaged intervention.

Another central feature of the ISA-X was the emphasis on the development of content knowledge (Adams, 2009; Cervetti et al., 2009). Students read and discussed texts organized into themes designed to build content knowledge; the development of such knowledge supported student engagement, the depth and quality of discussion, and a connection to the general education classroom. The development of content knowledge also allowed students to progress toward reading more challenging texts in order to prepare them for what they would read on the New York State ELA or the higher levels of the QRI-4. This finding is consistent with those of other studies that used interventions that included the use of thematic units, such as Content-Oriented Reading Instruction (CORI; Guthrie et al., 2009) and Reading Partners (Gelzheiser, 2005), and resulted in improved comprehension. This pattern of findings suggests that as practitioners adopt the practice of RTI in the intermediate grades, they are likely to have effects on students’ reading comprehension if students read and discuss thematically organized text.

For many students, an essential feature of the ISA-X was learning to use both code- and meaning-based word identification strategies, which we hypothesize to be related to gains in both foundational reading skills and text reading accuracy. Other intervention studies with primary-grade students that have taught these strategies have reported similar effects (Scanlon et al., 2005, 2008; Vellutino et al., 1996). Anderson (2009) found that professional development for teachers related to strategic word solving had a larger impact on the oral reading accuracy performance of grade 1 struggling readers than did professional development related to phonics instruction. This pattern of results suggests that intermediate-grade RTI programs are more likely to be successful if the intervention includes word learning strategies for students who lack them.

Limitations

Of course, numerous questions and caveats remain. For one, the intervention had mixed effects on fluency, which was surprising given the well-documented relationship between fluency and comprehension (National Reading Panel, 2000). A more
fine-grained analysis of targeted individual student protocols suggested that the intervention’s focus on comprehension led to increased fluency for some students but increased self-correction and re-reading for other students, which resulted in no measured increase in fluency. Interestingly, for the WLE students, gains on the two fluency measures were not correlated. For these students, only gains on the QRI-4 measure correlated with gains in basic reading skills, suggesting that the WJ-III measure of fluency was not sensitive to factors critical to fluency growth in this narrow sample of struggling readers. Further, the WJ-III measure had a comprehension dimension that may have interfered with the measurement of fluency in this study. To illustrate, when faced with an item like “the color of milk is pink,” a thoughtful reader may choose to respond yes while thinking about all kinds of milk, including strawberry-flavored milk. Stopping to ponder types of milk would not enhance performance on the fluency task but might result in improved reading comprehension. Our findings are consistent with other studies that characterize the relationship between fluency and comprehension as complex and changing as students become more proficient readers (Paris, Carpenter, Paris, & Hamilton, 2005; Valencia et al., 2010). Our mixed findings may reflect differences in the dimensions of fluency tapped by the different measures, and/or the differential importance of different dimensions of fluency at different levels of reading proficiency (Valencia et al., 2010).

A second concern is the challenge of measuring comprehension. At present, our understanding of what comprises reading comprehension is not fully reflected in any assessment (Pearson & Hamm, 2005). We selected the QRI-4 because it resembled the reading and comprehension activities utilized in the intervention: the reading of extended text and both explicit and inferential comprehension questions. It served two purposes: helping to determine a student’s reader profile and measuring progress during the intervention. However, we acknowledge that measures like the QRI-4 are less technically adequate than some other comprehension measures, typically report only broad categories of student performance (e.g., grade level), and may be influenced by students’ prior knowledge (Keenan & Betjemann, 2006). Nevertheless, in this study we opted to use the QRI-4 instead of other more technically sound instruments because the alternatives typically capture only limited aspects of the comprehension process. For example, cloze tasks measure sentence-level comprehension (Shanahan, Kamil, & Tobin, 1983), and factor analyses suggest that such measures are better characterized as measures of reading accuracy (Keenan, Betjemann, & Olson, 2008). Certainly the findings of this study would be more convincing if the QRI-4 had greater technical adequacy. In the absence of a better measure, the utility of the QRI-4 comprehension was supported with evidence that effects on the QRI-4 were consistent with those obtained on other measures, including basic reading skills—an important component of reading comprehension—and meaningful effects on the New York State ELA, which included reading comprehension as well as writing and listening.

Future Directions

This research, designed to develop and test the ISA-X as an intervention for intermediate-grade struggling readers with IEPs, provides initial evidence for the efficacy of the ISA-X. The findings are promising and suggest that struggling readers with IEPs can make gains in reading accuracy and comprehension when they are
provided with responsive and comprehensive intervention. As an initial study, there is a clear need for replication on a larger scale to provide additional support for the efficacy of the intervention. Future research needs to investigate the impact of the ISA-X implemented in the context of a tiered approach to intervention with gradual increases in intensity. RTI models suggest that improvements in classroom and small-group instruction are the most economical and sustainable approaches to meeting the needs of struggling readers. Many of the instructional strategies utilized in the current study would likely be effective in classroom and small-group contexts. Some of the children in the current study showed rapid and large increases in performance, suggesting that they might have profited if they had been provided with the ISA-X in a less intensive format. We are currently piloting a small-group version of the intervention to evaluate this possibility.

Notes

1. For the purpose of analysis, we have treated the reading levels as interval data, assuming that the levels represent equal intervals.

2. This research was supported by grant number R324A07223 from the Institute for Education Sciences, U.S. Department of Education. The authors would like to acknowledge the generous support provided by the participating administrators and students and, most particularly, the numerous contributions of five intrepid, devoted, and creative teachers.

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