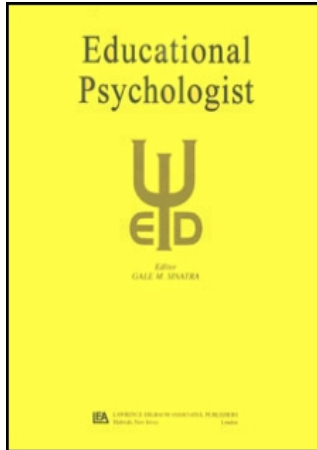


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Contributions of Concept-Oriented Reading Instruction to Knowledge About Interventions for Motivations in Reading

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We present a theoretical and empirical explication of the intervention of Concept-Oriented Reading Instruction (CORI) that is designed to increase students' reading comprehension and motivation for reading. The framework specifies a set of five motivational constructs that represent goals for the instructional intervention. Necessary cognitive goals in reading are also presented. For this intervention, the five instructional practices of relevance, choice, success, collaboration, and thematic unit that are prominent in CORI are portrayed as components that are aligned with motivational constructs. The impact of CORI on some of the motivational processes, cognitive competencies, and reading comprehension are presented in the form of a meta-analysis of 11 CORI studies with 75 effect sizes on 20 outcome variables. The CORI motivational intervention is compared to laboratory treatments and other field studies.

In this article, we asked, "To what extent does Concept-Oriented Reading Instruction [CORI] work to increase motivation?" The centerpiece of this synthesis is a meta-analysis of 11 studies that have been either published or presented at national conventions. We offer a rationale for why we should be concerned with increasing motivation in educational settings. Second, we offer a brief description of the instructional components of CORI that support students' motivational development.

RATIONALE FOR AN EMPHASIS ON MOTIVATION IN READING

From a practical educational perspective, there is a remarkable amount of evidence that children's motivation for reading is low in both absolute and relative terms. According to a 2005 nationally representative survey of fourth graders, 65% of students did not have reading as a favorite activity. In the same survey, 73% of students did not read frequently for enjoyment, and 59% of students stated that they did not believe that they learned very much when reading books. In our judgment, reading as a favorite activity and reading for enjoyment are indicators of intrinsic motivation for reading, which refers

to reading for its own sake (Wigfield & Guthrie, 1997). Thus, these statistics indicate that a substantial majority of Grade 4 students are not intrinsically motivated to read. Data from the National Assessment of Educational Progress (Perie, Grigg, & Donahue, 2005) further showed that students' intrinsic motivation, according to these indicators, decreased from 2002 to 2005.

Compared to students in other countries, U.S. fourth graders are ranked astonishingly low in intrinsic motivation for reading. A 2001 nationally representative sample of fourth graders from 35 countries ranked the United States 33rd in an index of students' motivation for reading (Mullis, Martin, Gonzalez, & Kennedy, 2003). In reading for their own interest outside of school, which is an indicator of intrinsic reading motivation, the U.S. students ranked 32nd. American students were equally unlikely to choose stories, novels, or reading for information outside of school. In a reanalysis of these data with a different coding scheme, U.S. students were found to be ranked 35th out of 35 countries in the revised index of attitudes toward reading (Twist, Gnaldi, Schagen, & Morrison, 2004). Although we should be cautious in interpreting the data from the lowest achievers because of unreliability in the measures (Gnaldi, Schagen, Twist, & Morrison, 2005), the apparent demotivation of U.S. students is nevertheless alarming.

Additional urgency regarding these statistics is derived from the fact that intrinsic motivation for reading (referring to reading for its own sake, and reading for enjoyment)

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predicts reading achievement relatively well. Using outcome variables such as standardized tests scores (Gottfried, 1990), grades (Sweet, Guthrie, & Ng, 1998), or experimental tests of reading comprehension (Guthrie, Wigfield, & Perencevich, 2004), intrinsic reading motivation predicts reading achievement for fourth- and fifth-grade students, even when background variables of socioeconomic status or gender are controlled (Baker & Wigfield, 1999). From a pragmatic educational view, the association of intrinsic motivation to achievement lends it a decisive urgency. Children's intrinsic motivation to read must be addressed in reading comprehension instructional programs. The major purpose of this article is to review evidence for one such program that addresses motivation directly in its instructional practices.

RATIONALE FOR THE COMPONENTS OF CORI

In designing CORI, we decided to depict our challenge as enhancing students' reading engagement to increase reading comprehension. We used the word *engagement* to represent reading in which motivational processes (such as interest) and cognitive strategies (such as self-monitoring) are simultaneously occurring. Consistent with other researchers (Fredricks, Blumenfeld, & Paris, 2004), we believe it is theoretically and practically useful to define reading engagement as a construct that fuses motivational, cognitive, and behavioral attributes of students. In brief, the engaged reader is internally motivated to read. These internal motivations include intrinsic motivation, self-efficacy, and social dispositions for interacting with other students in literacy activities. The engaged reader is cognitively active because she uses strategies and seeks to link her old knowledge to new information in texts. Finally, the engaged reader is behaviorally active as displayed in task participation, effort, persistence in the face of difficulty, and reading frequently for pleasure and learning. These motivational, cognitive, and behavioral variables are shown to correlate substantially in reading activities (Guthrie & Wigfield, 2000). Thus, we define our target as increasing engagement in reading.

Building from an engagement perspective, we constructed five instructional practices that promised to contribute to reading engagement of students in the later elementary grades. Each practice contains a motivational aspect and a cognitive element. Thus, we believe that the motivation for reading cannot easily be facilitated in isolation from cognitive functioning. For example, to increase a student's desire and interest that are inherent in intrinsic motivation for reading, the text content and the level of the student's knowledge and experience are essential ingredients. This may seem self-evident, but if it is neglected, then the motivational support system is underspecified and can easily fail.

We believe that the engagement-supporting practices are interconnected in an effective classroom. For example, a stu-

dent's autonomy in reading cannot be facilitated without accommodating a student's need for self-efficacy. A student cannot autonomously pursue a reading task and cannot be supported in such a pursuit if the student does not possess an adequate level of self-efficacy for success in task performance. Thus, autonomy support and efficacy support must be coordinated in an intervention program.

We further believe that engagement-supporting practices should be multifaceted. This is an essential condition of an effective intervention. The rationale for this multiplicity is that it is complex and challenging to increase both reading comprehension and reading motivation of students in the later elementary grades. Although a number of motivational constructs correlate with students' standardized test performance in reading, it is less likely that altering one motivation will increase comprehension than would altering several motivations. Therefore, we attempted to increase students' motivational attributes that included intrinsic motivation, self-efficacy, social disposition for reading, and mastery goals for reading. We designed instructional components to address each type of motivation in the expectation that addressing all of them may be sufficiently powerful to increase standardized reading test scores significantly. Ultimately, our instructional practices were designed with the criterion that they should increase both student motivations and student cognitive competencies in reading (e.g., strategies) sufficiently to increase their standardized reading comprehension performance.

SELECTED RESEARCH LITERATURE ON INTERVENTIONS TO INCREASE READING MOTIVATION

Intervention studies for motivation in reading are relatively rare. Although correlational investigations are plentiful, experimental studies in which students' motivation is increased by a treatment condition and compared to control conditions are unusual. These few studies can be grouped into either laboratory studies or field research and includes correlational investigations. Guthrie and Humenick (2004) reviewed the laboratory studies in a meta-analysis of 22 investigations with 131 comparisons that were experimental or quasi-experimental. In these studies, the motivation outcomes included interest, intrinsic motivation, enjoyment, and behavioral indicators such as time spent reading or studying. The comparisons could be classified into four types of treatment conditions: (a) affording students choice versus controls, (b) providing high-interest text versus controls, (c) providing meaningful conceptual goals for reading versus controls, and (d) providing social collaboration versus individual work. For each group of investigations, we observed substantial effect sizes (ESs) for motivational practices on reading motivation outcomes. Text interest had a mean ES of 1.2, affording students choice had a mean ES of .95, knowledge goals had a mean ES of .70, and social collaboration

had a mean ES of .50. All of these ESs are moderate to large (Hedges & Olkin, 1985), indicating that under laboratory conditions, motivation outcomes were clearly influenced by these treatment conditions.

Beyond these studies, experiments by Vansteenkiste, Simons, Lens, Soenens, and Matos (2005) showed that supporting students' intrinsic motivation goals (read to learn something of your own interest) facilitated deep conceptual learning from text more than the extrinsic motivation goals (read to achieve the highest score). However, the extrinsic motivation goals facilitated memorization of literal information from the passages more strongly than the intrinsic motivation goals. These findings were confirmed in multiple experiments for young adult students. Although all of the previously mentioned studies are intriguing, they are weakly related to instructional conditions in schooling because the adult to student ratio was usually 1:5, the texts were restricted, and student attention to them was monitored individually. The experimental tasks used as dependent variables were tightly tied to the intervention tasks and materials and thus were not highly generalizable outside of the experimental conditions. These were short-term interventions (1–5 sessions), and long-term data are not available to determine the durability of the motivational effects.

Field-based investigations that have attempted to increase motivation were less focused explicitly on reading but nevertheless provide promising implications for increasing reading motivation. For example, Reeve, Jang, Carrell, Jeon, and Barch (2004) conducted a study with 20 high school teachers who were trained to use autonomy supportive behaviors during instruction. Teachers attempted to initiate student activity based on interest (text matched student preference) and personal choices (students selected tasks to perform). Based on classroom ratings, highly engaged students showed focused attention, intense effort, and persistence, and this engagement was highly associated with teachers' autonomy support. Teachers who were trained to use autonomy supportive motivational practices had classrooms with higher student engagement than teachers not trained in these instructional approaches. Thus, the author concluded that these teachers were "able to motivate others in an autonomy supportive way" (p. 167).

A few investigators have examined the extent to which combining instructional practices that increase motivational support and cognitive support will be effective. For example, Souvignier and Mokhesgerami (2006) conducted an experiment with four treatment conditions in a hierarchical model. One condition consisted of cognitive strategies (i.e., summarizing) for text comprehension. The second condition consisted of cognitive strategies combined with self-regulation strategies. A third condition consisted of cognitive strategies, self-regulation, and motivational self-regulation that emphasized efficacy building through goal setting. The included control group was school as usual. Major outcomes were that the third condition that combined instruction with motiva-

tional support, self-regulation support, and strategy instruction produced higher reading comprehension scores than the other two treatments in the short term and long term. In addition, the third condition group showed an outcome consisting of the understanding of reading strategies that surpassed that of other groups. The intrinsic motivation for reading was higher for the third condition group than the strategy and self-regulation group. Although these findings are not unequivocal, they suggested that combining motivational and cognitive support will increase motivational outcomes and reading comprehension outcomes simultaneously.

For elementary and middle school students, Assor, Kaplan, and Roth (2002) reported a correlational study showing that teachers' use of autonomy enhancing practices were highly associated with students' engagement in schoolwork. Autonomy-enhancing practices included fostering relevance by teaching content that interested students and enabling students to see the connection between school reading and "real life" out of school. At the same time, the investigators showed that autonomy-suppressing behaviors also influenced students by disengaging them. Teachers' disengaging practices included "intruding," which was telling students what to do constantly; "interfering" with students' completion of meaningful tasks; and "limiting choices" for reading and writing activities. Students experiencing those autonomy-undermining practices stated that they preferred not to participate in class, did not attempt to understand material provided by that teacher, and felt angry or bored in classes taught by that teacher. Thus, instructional practices are double edged. Not only can they increase engagement and motivation, but they can decrease motivation by discouraging students from cognitive commitment and positive affect in the classroom.

Providing optimal challenge in instruction is motivational because it supports perceived competency (Ryan & Deci, 2000). Students' need for perceived competence is well met when tasks are at the threshold of ability and are difficult but attainable. Meece and Miller (1999) found that a language arts curriculum in the elementary grades that afforded students a large number of challenging tasks had advantages over a curriculum with closed, unchallenging tasks. Students in the challenging curriculum decreased in their adoption of performance goals during the course of instruction. However, students in the closed-tasks curriculum retained a high-level of performance goals throughout instruction. The measure of intrinsic motivation and use of mastery goals did not change for either group during the intervention. Thus, optimal challenge produced favorable motivational consequences.

COMPONENTS OF CORI INTERVENTION

This section contains a theoretical framework addressed to instruction for motivational development in reading. The theory specifies five motivational processes related to reading. Each motivational process correlates with reading

comprehension for children in the later elementary grades and is associated with instructional practices in correlational or experimental investigations. These motivational processes consist of intrinsic motivation, perceived autonomy, self-efficacy, collaboration, and mastery goals. Drawn from self-determination theory (Ryan & Deci, 2000), social cognitive theory (Schunk, 2003), and goal theory (Pintrich, 2000), these motivations do not correlate perfectly with each other, and they all are associated with reading comprehension.

Included in the instructional framework is the inverse of these motivational processes: (a) avoidance, as the inverse of intrinsic motivation; (b) perceived control, as the inverse of perceived autonomy; (c) helplessness, as the inverse of self-efficacy; (d) isolation, as the inverse of collaboration; and (e) performance goals, as the inverse of mastery goals. Most important, these inverses are included because some instructional practices may explicitly undermine a motivational process. For example, very high levels of teacher control in the classroom are associated with students' negative affects and avoidance of schoolwork such as reading (Assor et al., 2002). Not only does excessive teacher control fail to increase students' perceived autonomy, but this practice actively undermines students to the extent that they experience negative affects. It is evident that the absence of a positive affect (i.e., perceived autonomy) is not the same as the presence of a negative affect (i.e., feeling manipulated). Thus, it is important not only to provide instruction that is autonomy supportive but to avoid instruction that is autonomy undermining.

Our instructional theory for motivational development in reading is centered on five instructional practices that are aligned with the five targeted motivational processes. Briefly, these instructional practices consist of (a) relevance—to foster intrinsic motivation, (b) student choice—to increase perceived autonomy, (c) success—to build self-efficacy, (d) collaborative structures—to enhance social motivation, and (e) thematic units—to improve mastery goals. Although it is likely that each instructional practice influences more than one motivational process, each practice also has a prominent benefit for its associated motivation.

Motivational Processes

Intrinsic motivation. Intrinsic motivation refers to students' reading for its own sake (Ryan & Deci, 2000), which can also be described as reading for enjoyment, or reading as a favorite activity. Correlations of intrinsic motivation with reading comprehension for students in the later elementary grades have been reported by Gottfried (1985, 1990). In her studies, intrinsic motivation for reading correlated with reading test scores but not with mathematical test scores showing important distinctions between subject-matter areas. Wigfield and Guthrie (1997) showed that intrinsic motivation was associated with standardized comprehension test scores and that constructs such as curiosity, preference for challenge, and involvement were differentiated from other motivational

processes such as self-efficacy. Intrinsic motivation was associated with instructional practices that focused on student interest and active participation in learning (Skinner & Belmont, 1993). Further, the educational framework of CORI was found to increase the intrinsic motivational processes of curiosity and involvement in reading (Guthrie, Wigfield, & Von Secker, 2000). Specifically, Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) showed that intrinsic goals for reading tasks surpassed extrinsic goals in facilitating conceptual learning from text, which was mediated by task involvement. These studies showed that instructional goals and classroom practices are associated with students' levels and changes in intrinsic motivation.

Perceived autonomy. The view that students' behavior is under their control and self-direction is referred to as perceived autonomy (Skinner, Wellborn, & Connell, 1990). Perceived autonomy in the form of liking to make choices in reading has been associated with academic grades in reading (Sweet et al., 1998). Perceived autonomy also has played a central role in a broad conceptual and empirical model for linking self-processes to instructional actions and academic outcomes (Connell & Wellborn, 1991). More recently, a range of autonomy-supportive instructional practices have been investigated, including (a) providing choices of tasks within the classroom, (b) affording students time to complete assignments, (c) allowing freedom of expression regarding academic topics, and (d) permitting students to make the microchoice of text during learning activities (Assor et al., 2002; Reeve et al., 2004). It is interesting that the positive form of these practices (e.g., autonomy support) increased perceived autonomy and intrinsic motivation, whereas the negative form of these practices (e.g., excessive teacher control) produced disengagement from classroom activities, negative affect, and avoidance of schoolwork (Assor et al., 2002), which potentially may decrease reading comprehension development.

Self-efficacy. Students' beliefs in their capacity to read successfully is referred to as self-efficacy (Schunk & Zimmerman, 1997). A review of the associations of self-efficacy in reading and reading comprehension are obtained across a range of ages and reading tasks in the elementary school years. Self-efficacy for reading is associated with realistic goal setting regarding the texts and tasks in reading instruction. Efficacy, however, is also dependent on frequent feedback regarding success and internalization of standards for performance (Schunk & Zimmerman, 1997).

Collaboration. Both students' prosocial goals for participating in school reading activities (Wentzel, 1996) and their social interactions in reading that entail group work and discussion about text (Applebee, Langer, Nystrand, & Gamoran, 2003) is referred to as collaboration. Social goals have been correlated with reading comprehension (Sweet

et al., 1998), and collaborative structures in reading have been observed to increase students' perceived social support for reading and performance on reading comprehension tasks (Ng, Guthrie, Van Meter, McCann, & Alao, 1998). Collaborative activities in reading instruction have also been reported to be enjoyable and may increase intrinsic motivation.

Mastery goal pursuit. A student's desire to understand text content deeply is referred to as mastery goal pursuit (Pintrich, 2000). The association of mastery goals with reading comprehension was reported by Meece and Miller (1999) for students in a second-grade language arts program, as well as by Meece, Anderman, and Anderman (2006) in a later elementary school and middle school reading program. Students' mastery goals have been frequently associated with classroom structures that emphasize understanding, learning, and risk taking for the purposes of self-improvement (Meece et al., 2006). Further, when teachers emphasize the relevance of reading activities and classroom tasks, students tend to rate the classroom activities as important and worthy of their best cognitive effort (Assor et al., 2002). In the instructional framework of CORI, we believe that mastery goals are partially facilitated by thematic units. In our thematic teaching, the content is integrated and cumulative across time, enabling students to gain higher order understandings, perceive their progress, and relate the academic content to their knowledge and experience frequently and effectively.

This particular set of five motivational attributes was selected for several reasons. First, each motivation shows variance in the domain of reading. For example, some students are highly intrinsically motivated to read, whereas others are not intrinsically motivated for reading. A second reason is that these motivations can be fostered in classrooms. To increase self-efficacy, for example, the teacher can select a specific text that a specific student can succeed in decoding. Some motivational processes, such as belief in the value of reading for one's future success, are not as easily influenced at this age level. Third, each of these motivational attributes is correlated with reading comprehension for this age group. Finally, many educators believe that classroom practices can benefit these motivations. For instance, most teachers think that giving appropriate text choices is a suitable motivation for students' reading. CORI does not attempt to introduce radically new practices to teachers, but rather CORI includes the systematic implementation, scaffolding, and sustenance of these practices in each lesson.

Overview of CORI

Purposes. CORI's primary aim is to increase students' reading comprehension in Grades 3 to 5 by increasing their reading engagement. As shown in Table 1 (see Appendix), the reading goals include the following comprehension strategies: understanding the main idea, making inferences, monitoring comprehension, and using fix-up strategies for infor-

mation and narrative texts. We included oral reading fluency and vocabulary as enabling competencies. Another CORI goal in Grades 3 to 5 is to increase students' knowledge of life science in the domain of environmental science. Central concepts to this domain are listed in Table 1. CORI also includes instruction in the science processes of observation and experimentation. CORI's third goal is to increase students' motivation to read, with an emphasis on intrinsic motivation, self-efficacy, perceived autonomy, social interaction, and mastery goals in reading. For some studies, the CORI intervention was 12 weeks, and for others it was 36 weeks. Daily instruction for both was 60 to 90 min during the language arts period.

Materials. For the CORI interventions, the most important materials are trade books. The 12-week intervention used class sets (one book for each student), and team sets (one for five students). The class sets used were 14 information books, 2 novels, and 1 poetry book. For team sets, there were 20 information books, 21 novels, and 3 poetry books. The books were selected to be appropriate to the students' reading levels. For example, in Grade 5, one third of the books were at on-grade or above-grade reading levels, one third of the books were 1 or 2 years below grade level, and one third of the books were 2 or more years below grade level. For struggling readers, 18 easy books (Grades 2–3) were provided. Hands-on science materials such as horseshoe crabs, terrariums, charts, and posters were provided. Three to six grade-level appropriate Web sites were selected, with guides for their use. Students accessed the Web sites two to three times per week for 30 min during the last intervention phase when they were composing their own books.

Daily lessons. Each CORI lesson was structured into five segments. First, for 10 min, students performed oral reading fluency activities with poems or information books. Approximately 2 days per week, instead of oral reading fluency, students studied science concepts and/or participated in a hands-on activity (such as drawing a horseshoe crab from observation). Second, the teacher spent 10 min giving a minilesson on comprehension to set the stage for organized guided reading. For the next three 15-min segments, students alternated among small-group guided reading, writing, and independent reading. Third, the teacher provided guided reading in three small groups of four or five students for 15 min each. For guided reading, appropriate-level texts were used for modeling, scaffolding, and guided practice of the reading comprehension strategies. During the writing segment, students made entries into their portfolios based on their information books used in the comprehension lesson, or they wrote reactions to their novels that were used in small-group discussions. During independent reading activity, students silently read their book club novels. When requested, students took notes and prepared reaction entries for their journals. These five segments totaled 65 min

TABLE 1
Components of Concept-Oriented Reading Instruction

<i>Goals</i>	<i>Materials</i>	<i>Lessons</i>	<i>Portfolios</i>	<i>Motivation Support</i>
Reading & comprehension: Oral reading fluency; vocabulary; self-monitoring; inferencing; fix-up strategies (reread, chunk, discuss, question, visualize, connect, look-up, read ahead, read aloud, use knowledge)	Class set: 14 information books; 2 novels; 1 poetry book Team sets: 20 information books; 21 novels; 3 story books Struggling readers: 18 information books	Fluency/science On alternate days, students read poems and information books expressively or learn science content (10 min) Guided reading Whole-class mini-lesson on reading comprehension (10 min) Small-group guided reading Teacher led session with each of three groups (15 min) Writing Students complete portfolios and book club responses (15 min) Independent reading Students read book club novel and discuss journal entries (15 min)	From portfolios, students complete book on communities	Relevance, student choices, success and goal setting, collaboration, thematic units
Science knowledge & processes: Plant-animal interactions: mutualism, commensalism, predation, amensalism.	Science materials: Horseshoe crabs; terrarium			
Survival processes: locomotion, feeding, defense, communication, reproduction, niche, respiration, predation, competition, adjustment to habitat				
Reading motivation: Intrinsic motivation, perceived autonomy, self-efficacy, social interaction, mastery goals				

of instruction. Some teachers added approximately 5 min to each activity to extend the instruction to 90 min.

Portfolios. Students' portfolios consisted of many writing tasks: composing background knowledge, posing questions, entering inferences, summarizing text passages, and composing brief personal narratives. Drawing upon their portfolios, students authored books on the theme of plant-animal communities with interactions and survival concepts. Books contained students' solutions to threatened habitats and personal narratives.

Motivational support. CORI instruction was infused with motivational practices that included (a) relevance (established by hands-on activities, relevant texts, and self-referencing during inferencing), (b) choice (i.e., student selection of subtopics for reading, specific texts on a topic, passages for inferencing, partners for oral reading fluency, book composition topics), (c) collaboration (i.e., partner oral reading, team poster making, summary exchanges, and peer editing), (d) self-efficacy support (i.e., helping students set realistic goals for book selection, reading passages orally, writing questions, and identifying texts at the appropriate level of difficulty for optimal comprehension development), and (e) thematic units (fostered mastery goals by placing knowledge goals prominently, and assuring conceptual coherence across texts and time). These motivation-supportive practices were prominent in the Teacher's Guide, with two or three practices emphasized each day.

Instructional Components Defined

Relevance. We use *relevance* to refer to classroom practices in which the content of instruction is linked to students' direct or recalled experience and integrated with their background knowledge. One procedure for linking reading to an immediate experience is to connect text to a hands-on activity, such as science inquiry. For example, observational activities in science inquiry may include collecting data and sorting artifacts (bones from an owl pellet), which is intrinsically motivating. Reading books about these artifacts is motivating because the books are viewed as relevant (Guthrie et al., 2006). In contrast, when students must read texts on three totally diverse topics such as an octopus, a slave girl, and a new planet in the same reading lesson (which occurs frequently in basal programs), the relevance of texts is nearly impossible to establish. When teachers connect classroom lessons to "real life" outside the classroom, students report that the lessons seem purposeful and interesting (Assor et al., 2002).

Choices. The instructional practice of *choice* refers to providing autonomy support during teaching. In autonomy supportive classrooms, control of instruction and learning is shared between the teacher and the students. Although the teacher may set broad guidelines for curricula, the students have input into topics. Although the teacher may establish major objectives for a unit, the students can contribute to selections of subtopics or the sequence of topics (Flowerday & Schraw, 2000), enabling them to perceive themselves as

relatively autonomous (Skinner & Belmont, 1993). Autonomy support refers to affording students choices about texts, topics, partners, sequences of work, and demonstrations that they understand text. Obviously, excessive choice may be threatening or confusing, and autonomy support must be adjusted constantly. The main emphasis is on teachers' sharing control rather than micromanaging and excessively directing students' activities (Reeve & Jang, 2006).

Success. The instructional practice of *success* refers to assuring that students perform meaningful classroom tasks proficiently. Teachers facilitate students' self-efficacy through success when they enable students to set short-term and long-term goals and provide feedback on students' progress (Schunk & Zimmerman, 1997). This does not refer to success outside of the mainstream curriculum or success on academically trivial activities. If students gain accurate self-evaluation on reading tasks, they can select texts appropriately, identify books within their reading level, and self-construct tasks that will enable them to gain new knowledge from texts efficiently. CORI allows students to succeed by providing texts for fluency instruction that are easily repeated (i.e., poems), giving multiple opportunities to practice a reading strategy to a highly proficient level, and providing a variety of texts about a concept, such as animal defense, to secure knowledge about it. It is self-evident that self-efficacy must be aligned with reading competence. However, teaching actions that foster success enable students to form realistic optimism regarding their reading in the next month or the next year (Linnenbrink & Pintrich, 2003).

Instruction that fosters motivation by enabling students to be successful in reading includes a variety of features (Schunk, 2003). A high priority is selecting a text that is easily readable early in instruction. Teachers who foster self-efficacy by providing success assure that students can recognize more than 90% of the words in almost every text they read, especially early in an instructional course or unit. A simple prerequisite of reading comprehension is a high degree of oral reading fluency, which can most easily be optimized by selecting decodable and readable text that is at the students' reading level. Instruction that optimizes success permits students to set short-term goals in reading. This may include having students determine the number of pages they wish to read to explain a certain topic, or identifying the number of topics they wish to read in a given domain in a given time period. Teacher feedback is vitally important for success in attaining goals. To increase their self-efficacy, students need frequent feedback on whether content is understood, whether reading strategies are well used, and whether self-regulatory decisions are well made.

Success-promoting teachers also encourage students to make effort attributions for either success or failure in their comprehension tasks. Teachers reward successful story comprehension with compliments for effort, as well as for a reading skill such as predicting or inferring. Teachers who build

success into their instruction recognize perseverance in students' reading activities. After a long text is finished successfully, teachers comment on the value and benefits of sustained effort. They may prominently display products such as extensive summaries of long texts around the classroom, enabling students to perceive the value of cognitive perseverance and internalize it.

Collaboration. The instructional practice of *collaboration* refers to arranging for productive social interactions in reading activities. This practice enables students to build and internalize prosocial goals in the classroom. Collaboration includes such activities as pairing students to read aloud together, organizing literature circles (Almasi, 1995), or setting up idea circles for reading information texts in which students learn one concept by reading different textual sources and sharing them (Guthrie & McCann, 1997).

Optimal collaborative structures include team accountability (e.g., teams present a poster to other teams) as well as individual accountability for successful comprehension (e.g., individual students are graded on the excellence of their summaries of texts). When these social arrangements are successful, students perceive themselves as allies with their partners and team members. Feeling that they belong to a group enables students to undertake challenging tasks more confidently than if reading is a purely isolated endeavor (Wentzel, 2005).

Thematic units. The practice of *thematic units* refers to structuring the content of reading activities in organized and connected forms. For example, the pyramid structure contains an abstract theme or "big idea" at the top with major concepts supporting it and subconcepts or examples existing at the bottom. Instruction is multitiered with emphasis on how the levels are interconnected, and such thematic units have been described thoroughly (Wiske, 1998). CORI thematic practices include announcing a content theme for instruction (animal survival, human exploration of the Earth); having a prominent guiding question for several days of instruction; having students draw concept maps to represent a page or a chapter; finding examples of concepts, such as mutualisms or defense; and writing compare-contrast charts for characters in a story or animals in a specific habitat.

Thematic units contrast with fragmented instruction on discrete topics. When content is disconnected across time, students often do not recall what they learned yesterday in the classroom. Such fragmentation is demotivating because it inhibits students' disposition to understand text, conquer content, and succeed on tasks that show that they are learning from text. When students fail to perceive thematic structures in the classroom (perhaps because the themes are absent from instruction), they resort to local goals such as completing a homework assignment irrespective of its importance, or working to pass a quiz irrespective of deeply grasping the content. When focused on a theme, however, students

experience becoming experts on a topic. It becomes apparent that reading is related to gaining or expanding expertise in any given area.

Within this context, the role of instruction in “reading strategies” must be mentioned. Obviously, reading strategies are cognitive competencies that enable a student to be an efficient comprehender. Such strategies as inferencing, asking questions during reading, summarizing, and comprehension monitoring are the tools of comprehension. In CORI, reading strategies are the means to the end of understanding information books and literature on the theme. Strategies are taught explicitly with modeling, scaffolding, guided practice, and extended engaged reading. Instruction in these strategies is energized by teachers’ motivational practices. A teacher may directly explain to students that they are reading material that is relevant and should attempt to find connections between themselves and their texts. Students may be given choices about what to read and how to read it. Teachers should encourage effort, persistence, and careful book selection while emphasizing that these traits lead to competence. Students should be aware that opportunities to collaborate are privileges that enable them to understand content themes and major concepts in the curriculum, but such opportunities can be removed. Being explicit about motivational practices helps students to become metacognitive about their motivation as well as their cognitive strategies.

OVERVIEW OF META-ANALYSIS

To examine the experimental effects of CORI on motivational and cognitive variables, we assembled previous studies to conduct a meta-analysis (Hedges & Olkin, 1985; see Table 2 and Appendix). The corpus included 11 studies consisting of quasi-experimental designs in which CORI was compared to one or more control groups that were initially comparable to the CORI group. In some studies, covariates were used to assure comparability. In many of the studies, there was pretest–posttest data for CORI and comparison groups. From these studies, 75 ESs were computed to evaluate CORI’s impact on outcome variables. The number of ESs for each variable ranged from 1 to 9, and we computed means of the ESs for each outcome variable.

In most instances, the ES was the *d* statistic, which was based on the difference of the posttest scores of CORI and a comparison group, with the standard deviation of the comparison group as the denominator, as it represents the variance of the normal population most adequately (Hunter & Schmidt, 2004). A fixed effects model was used, which assumes that the population parameters do not vary substantially across the studies, which is realistic because the studies were all conducted with similar populations, in a similar section of the same state in the United States. In cases, where the pretest–posttest differences in the comparison group were

not statistically significant and the differences of CORI were significant, the ES was based on the pretest–posttest differences in CORI. To be conservative in these computations, we did not use the standard error of change, as this can be a small number and can underestimate the variance within groups. Data from both Grades 3 and 5 were included separately and were not aggregated. In all the studies, the numbers of participants in each treatment were comparable (e.g., 60–120), and none were large enough (e.g., 1,000) to warrant computation with weighting for sample size (Hunter & Schmidt, 2004). As stated in each study, the proportions of minority students ranged from 20% to 50% of the sample, and we did not disaggregate the ethnic groups due to relatively low numbers of students. Therefore, we did not subdivide the samples by ethnicity in the meta-analysis.

The outcome variables occasionally represented slightly different measured variables. For example, self-efficacy was measured on four to five items on the Self-Efficacy scale in the Motivation for Reading Questionnaire (Wigfield & Guthrie, 1997), but the scale was optimized for each study, with one to two items being added or subtracted based on their reliability. For the variable of reading strategies, most of the measures were a composite of questioning, activating background knowledge, and organizing constructed from a performance assessment in the original study. Some measures were students’ self-reports of their use of reading strategies. These were aggregated for this synthesis. Individual studies contain full descriptions of the psychometric characteristics of the measures.

Effects of CORI on Motivational Variables

To increase the intrinsic reading motivation of students in the later elementary grades is one major purpose of CORI; hence, we measured several aspects of this construct. In five comparisons, the mean effect size of CORI on curiosity was .47, showing a moderate effect of CORI on students’ self-reported curiosity in reading. This construct referred to learning new things from books, reading interesting books, and enjoying finding out new information by reading. Briefly, it meant enjoyment in learning from text. Another construct that indicated intrinsic motivation for reading was preference for challenge. In three comparisons, the mean ES was .31, showing that CORI students were higher than comparison students in this variable. Preference for challenge referred to being willing to try hard to understand difficult text if it was interesting and making effort attributions to reading behavior. The variable of task orientation referred to students’ self-reports of enthusiasm (enjoying reading tasks), involvement (reading for enjoyment for long periods), and being immersed in books. The mean of three ESs was .29, showing a moderate CORI impact. Complementary to these aspects of intrinsic reading motivation was avoidance of reading. The mean of two ESs was .12, indicating that CORI decreased students’ disposition to avoid reading. In one study, we used a

TABLE 2
Effect Sizes of CORI on Motivational, Reading Comprehension, and Cognitive Outcomes

Dependent Variables	Study Number										MES	NES	
	1	2	3	4	5	6	7	8	9	10			
<i>Reading Motivation (Self-Report)</i>													
Curiosity				G3 .85 G5 .87	.25		.17	.23				.47	5
Preference for Challenge					.35		.25	.32				.31	3
Task Orientation				G3 .63 G5 .04			.20					.29	3
Avoidance										LA .19 HA .05		.12	2
Self-efficacy					.27	S2 1.11		.24		LA .71 HA .10		.49	5
Perceived Difficulty										LA .39 HA .20		.29	2
Recognition				G3 .41 G5 .00			.30					.24	3
Competition				G3 .46 G5 .15			.36					.32	3
Intrinsic Motivation Composite						SI 1.20						1.20	1
Reading Motivation (teacher rating)						S2 1.35			.65			1.00	2
Amount of Reading					.53		.42	.52				.49	3
<i>Reading Comprehension</i>													
<i>Standardized Test</i>													
						S2-TI 1.28 S2-SI 1.89			.69	LA .10 HA .58		.91	5
Multiple Text Comprehension	G3 .93 G5 .40	G3 .67 G5 1.21	G3 .80 G5 .96			SI 1.53						.93	7
Info. Text Comprehension	G3 .77 G5 .75	G3 .21 G5 .04	G3 .43 G5 .57			SI 1.56 S2 1.48						.73	8
Narrative Text Comprehension	G3 1.18 G5 .53	G3 .33 G5 .85	G3 .27 G5 .72									.65	6
Reading Strategies	G3 1.03 G5 .57	G3 .76 G5 1.09	G3 .44 G5 .29	G3 .64 G5 .43		SI 2.95						.91	9
Science Processes									.57			.57	1
Knowledge of Content	G3 .46		G3 .17 G5 .68							LA 2.90 HA 2.50		1.34	5
Word Recognition Speed										LA .55 HA .95		.75	2
Oral Reading Fluency										LA .44 HA .74		.59	2
N students total	140	172	239	162	354	361/524	338	350	98	123			
Caucasian percent	NA	22*	22*	22*	85	74 / 57	60	NA	53	76			
African American percent	NA	55*	55*	55*	9	22 / 40	20	NA	24	24			
Other percent	NA	22*	22*	22*	5	4 / -	20	NA	23	0			
Boys percent	NA	50 ^a	50 ^a	53	50 ^a	48 / 57	46	NA	53	51			

Note. G3 = grade 3; G5 = grade 5; LA = low achievers; HA = high achievers; S1 = study 1; S2 = study 2; TI = in comparison to Traditional Instruction; SI = in comparison to Strategy Instruction. In the demographics, * refers to approximate percentages. For the populations of the schools involved in the study, ^a refers to estimates.

composite of the scales of intrinsic reading motivation, which showed an ES of 1.20. This confirms a large impact of CORI on the full construct of intrinsic motivation for reading.

The motivational construct of self-efficacy was measured in five studies and showed a mean ES of .49. This occurred across Grades 3 and 5, across low achievers and high achievers, and across time in the research program. Self-efficacy referred to the students' belief in their capacity to read well now, to read better than classmates, and to read proficiently in the future. As a complement to self-efficacy, we recently measured students' perceived difficulty in reading, which refers to students' view that reading words and passages is problematic. The mean of two ESs was .29, showing that CORI reduced students' level of perceived difficulty in reading.

Related to intrinsic reading motivation is students' amount and breadth of reading. We composed a self-report questionnaire (Reading Activity Inventory) of reading for enjoyment and reading for school. The reading for enjoyment section is a behavioral indicator of intrinsic motivation, as it refers to reading for its own sake. This included fiction and non-fiction book reading across a variety of contents. Comics, magazines, and Internet reading were not included. This section correlated well (about .50) with standardized reading comprehension test scores. The reading for school section contains texts that are assigned by the teacher and thus correlated lower and not significantly with standardized test scores. The impact of CORI on amount of reading for enjoyment computed from a mean of three comparisons was .49. This indicates that CORI had a positive influence on students' amount and breadth of reading.

In two studies we used the Reading Engagement Index in which we asked teachers to rate individual students' levels of reading engagement. This included seven items encompassing the following: behavioral engagement in reading (this student reads often), enjoyment in reading (this student has favorite topics), self-efficacy (this student is a confident reader), concentration (this student is easily distracted [reversed]); cognitive engagement (this student thinks deeply about text; this student uses strategies to comprehend), and social interaction (this student talks to peers about books). Reliability of the Reading Engagement Index exceeded .93. The mean of two ESs was 1.00, showing a substantial impact of CORI on this measure in reading engagement in comparison to control groups.

Effects of CORI on Reading Comprehension and Cognitive Variables

As indicated previously, we believe it is theoretically useful and pragmatically necessary in school-based research on reading motivation to target reading comprehension and cognitive variables that are currently prominent to policymakers and educators. For reading comprehension, we computed the impact of CORI on standardized tests of reading comprehension (most often the Gates-MacGinitie Reading

Comprehension Tests) from five ESs. The mean ES was .91, showing that CORI had a relatively substantial impact on standardized tests of reading comprehension. We believe this is relatively rare. Most reading intervention programs have shown effects with experimenter-designed tests but not with standardized tests.

We used three types of experimenter-constructed reading comprehension measures. First, we used the multiple text comprehension performance assessment, in which students read several passages, take notes, and then write their answers to three general questions. The answers are judged on a six-level rubric. On multiple text comprehension the mean of seven ESs was .93, showing that CORI impacted this complex literacy measure highly. Second, we found that CORI students read information text relatively well, with a mean of seven ESs of .73, showing a CORI advantage. Third, on story comprehension, which was included but not emphasized in CORI, the mean over six ESs was .65, indicating that CORI students gained in narrative comprehension as well as information text comprehension.

We examined the effects of CORI on reading strategies in nine comparisons. This variable aggregates several composites drawn from a performance assessment consisting of questioning, searching, using background knowledge, and organizing knowledge from text. The variable in the meta-analysis also includes two measures of student self-report. The mean ES was .91, indicating a relatively strong benefit of CORI on reading comprehension strategies. The effect holds for Grades 3 and 5. Although these strategies were explicitly taught in CORI, they were also explicitly taught in the comparison group that focused on strategy instruction (strategy instruction without the explicit motivation support), included in several ES comparisons. In one study, we quantified students' capabilities to perform science inquiry (hypothesis formation, data collection, drawing, representing in tables, making inferences from data). Compared to a control group studying the same life science unit, CORI students had an ES of .57, showing that the science-reading integration of CORI was valuable for students' science process skill development.

In five comparisons, we observed students' knowledge acquisition in life science topics. In earlier studies, we measured this with conceptual knowledge transfer tasks, in which students solved a conceptual problem for which they had gained knowledge from text. In later studies, we measured ecological knowledge with a multiple-choice test that was validated against a more classroom-like "read-write-explain" task. The mean ES was 1.34, indicating a large CORI effect. In all cases, the control groups were studying to learn the same life-science objectives, with similar inquiry-based science materials.

Reading fluency is a strong indicator of reading proficiency at Grade 5. Fifth-grade CORI students' reading fluency was evaluated using two measures. For word recognition speed, which measured isolated word recognition speed and accuracy, the ES for CORI was .55 for low achievers (LA =

below the median in reading comprehension) and .95 for high achievers (HA = above the median in reading comprehension), with a mean of .75. In oral reading fluency, the ES for CORI was .44 for low achievers, and .74 for high achievers, with a mean of .59.

Conclusions From Meta-Analyses

To what extent does CORI “work” as an intervention for later elementary students’ motivation? In examining the individual scales of curiosity, self-efficacy, and others, we computed 26 ESs from six studies. The midpoint of these ESs was .30, showing that CORI has positive effects, moderate in magnitude, on a range of internal motivations for reading. Of interest is that when several of these individual scales are aggregated, we observed higher ESs. For student self-report, a composite of intrinsic motivation showed an ES of 1.20, indicating relatively high benefit for CORI in comparison to other instructional groups. For teacher ratings on the Reading Engagement Index, which included indicators of motivation and cognitive engagement, we observed an ES of 1.00, favoring CORI substantially. Students’ amount of reading, a behavioral measure of reading motivation, revealed an ES of .49, indicating that CORI students read significantly more for their own interest than comparison group students.

To what extent does CORI “work” to increase reading comprehension and reading strategies? The cognitive outcomes of CORI generally showed slightly higher benefits for students than the motivational outcomes. With standard reading comprehension tests, where the rubber hits the road in reading education, the CORI advantage was a mean ES of .91. Likewise for multiple-text comprehension (experimenter designed) the mean ES was .93, and for reading strategy measures (experimenter designed), the mean ES was .91. These are all remarkably similar. Also, based on two to eight ESs, comparisons on more specific comprehension measures (e.g., information text passage comprehension) and basic skill measures (e.g., oral reading fluency) showed ESs of about .70, which illustrates a strong CORI advantage.

Limits of This Knowledge Base

There are several limitations to the information generated from this meta-analysis of CORI with respect to the theme of this special issue. One is related to the finding that the impacts of CORI on students are both motivational and cognitive. In the CORI intervention, we explicitly teach reading competencies as well as support internal motivation for reading. In this context, it is possible that the motivational and cognitive processes are synergistic. For instance, as students’ self-efficacy increases, their reading strategies and reading comprehension also improve. Similarly, students’ intrinsic motivation for reading may be more likely to increase if they gain content knowledge on a conceptual theme, as taught in CORI. It is more likely students will read for enjoyment and

interest if they possess (and are increasing) in content understanding and a sense of expertise in a topical domain (such as ecology). Partly because of synergy, we prefer to use the construct of “engagement” as a fusion of cognition and motivation in reading to represent the target of the instruction.

The findings of this meta-analysis on CORI relate to the existing literature on interventions to increase reading motivation in several ways. In comparison to laboratory studies summarized in a meta-analysis (Guthrie & Humenick, 2004), this research has not attempted to isolate single independent variables that impact motivation. On the other hand, in these studies CORI has been the sole form of reading/language arts instruction for periods of 3 to 8 months. Thus, the findings are generalizable to school practice, in the sense that implementing CORI in a school is likely to increase students’ outcomes. In contrast, the laboratory studies are suggestive but not immediately applicable.

In comparison to other school-based interventions targeted to increase motivation and comprehension, CORI bears important similarities. For example, in Souvignier and Mkhlesgerami (2006), the intervention merged motivational support (especially self-efficacy) with meta-cognitive support for self-regulated learning that increased reading motivation and reading comprehension more than comparison interventions that used only one form of instructional support. Further, in their observational study, Taylor, Pearson, Peterson, and Rodriguez (2003) found that the strongest correlate of reading achievement was high-level teacher questioning that embedded emphasis on story theme, student choices, collaborative activity, and strategy instruction (predicting). Multiple practices were merged to foster comprehension (although motivation was not measured here). In the study of “authenticity” in reading instruction, Purcell-Gates, Duke, and Martineau (2007) reported that the most effective instruction combined “real-world” purposes for reading, interesting texts, students’ self-selections, peer conferencing, and expressions of text-based learning that reflected thematic understanding. Unfortunately, motivation was not measured. Regardless, these instructional practices all bear resemblance to the CORI practices, although different language is used to represent them.

Next Steps

The research strategy in the CORI program of investigation has been *analysis by synthesis*. We started with a synthesis of instructional practices of motivational and cognitive elements. The motivational practices were, briefly, relevance, choice, success, collaboration, and thematic units. The cognitive practices consisted of explicit reading strategy instruction, including activating background knowledge, questioning, summarizing, organizing graphically, and learning story structures. When we found, in four quasi-experiments, that CORI surpassed control groups of traditional instruction (a basal supplemented by trade books) and

strategy instruction (strategy support only), we conducted the first “analysis” by partitioning the CORI intervention into two segments. We conducted quasi-experiments with CORI (motivation and cognitive support) compared to strategy instruction and traditional instruction (Guthrie et al., 2004). From the CORI advantage over strategy instruction and traditional instruction, we inferred that the motivational practices provided “value added.” When the motivational practices were removed from CORI, serious reductions in achievement were observed. The next step in this analysis by synthesis is to partition the motivational practices. In one treatment, we will provide support for perceived autonomy and social motivation but not support for intrinsic motivation (interest), self-efficacy, or mastery goals. In another treatment, all five motivations will be supported. The experimental question is whether the instructional practices supporting perceived autonomy and social motivation increase motivation (and reading comprehension) as much as CORI using all five practices.

One emphasis of this special issue is the nature of successful interventions for minority students. As noted earlier, a number of the studies of CORI’s effectiveness were done in schools with a high minority population, and given the positive results of those studies, it appears CORI is an effective instructional approach with minority children. However, much more work in this area needs to be done, both intervention work and research looking at the characteristics of motivation in different groups of minority children. Limited evidence suggests that intrinsic motivation does not correlate with reading achievement as highly for African American as White students. However, avoidance motivation for reading correlates with achievement relatively highly for African American students (Baker & Wigfield, 1999; Guthrie & Coddington, 2007; Smith & Wilhelm, 2002), suggesting that these students are less favorably disposed to reading. If so, we expect that the CORI practices of relevance and success will be relatively more important for low-achieving African American students than low-achieving White students. Our rationale is that relevance and success in the classroom will reduce the sources of avoidant motivation (consisting of “I don’t read because the text is not related to me” and “I don’t read because I can’t do it well”) that appear to be relatively more important to reading achievement for low-achieving African American than White students.

To advance research in this area we suggest that multiple research methods are needed. First, it is vitally important to employ grounded-theory research methods to identify the attributes of intrinsic reading motivation and reading interest among African American students. Extant questionnaires measuring intrinsic motivation are insufficiently validated against open interviews/observations with African American, and perhaps, other minority populations. Consequently, for African American students, intrinsic motivation and possibly other constructs, such as self-efficacy, may not be adequately represented in current motivation questionnaires and

interview protocols. To build a scientific knowledge base about instructional support of motivation for low-achieving minority students, the field needs a synthesis of qualitative studies of minority reading motivations, sharply defined quantitative measures of motivation that predict achievement, and experimental studies that test intervention hypotheses for African American and other minority populations. Once the motivational characteristics of these students are understood better, effective instructional programs to foster their motivation for reading can be designed. As previously noted we believe the CORI practices of relevance and success are particularly important for African American students who struggle with reading. Other practices may be needed for other groups.

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APPENDIX

Numbers for References in Meta-analysis of Table 2

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