Fostering Independent Self-Regulation of Reading Comprehension Strategies by Students with Learning Disabilities: Insights from 30 Years of Intervention Research

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Rationale

More than 80% of students with learning disabilities (LD) experience reading problems, and these problems are more severe than those experienced by poor readers that are not identified as having LD (Fuchs, Fuchs, Mathes, & Lipsey, 2000). Research has shown that students with LD can be taught strategies that help them understand more of what they read, but that these students fail to continue using these strategies independently after instruction ends (Vaughn, Gersten, & Chard, 2000). For this reason, more work is needed to determine the type and intensity of instruction needed to "promote transfer and routine use [of strategies]—either through students' continued conscious use of strategies or by student's internalizing their use" (Gersten, Fuchs, Williams, & Baker, 2001, p. 312). Explicit instruction that teaches students to independently self-regulate learning, rather than instruction that remains under teacher control, has the potential to address this area of need. However, in the reading strategy literature, a distinction is generally not made between these disparate approaches (Dole, Nokes, & Drits, 2009). While previous reviews have provided important information about reading instruction (e.g., Berkeley, Scruggs, & Mastropieri; 2010; Swanson, 1999), no existing reviews have provided an in depth analysis of interventions that are designed to be under students' volitional control and that contain components that explicitly foster self-regulation of learning.

Methods

A systematic search was conducted to locate reading comprehension studies for students with LD published over the last 30 years (1985 to 2015). The PsychINFO, ERIC, Social Sciences Citation Index, Academic Search Complete, and Education Research Complete data bases were used to locate relevant literature in addition to ancestry, descendant, and hand searches. Studies were systematically screened to determine whether inclusion/exclusion criteria were met. Studies were then double coded by two trained researchers with discrepancies reconciled to 100% agreement.

For each study, an effect size was calculated to represent reading comprehension outcomes for immediate treatment effects and a second effect size was calculated to represent maintenance of reading comprehension outcomes (when applicable). For studies with multiple measures, effect sizes were aggregated to determine a single effect size for each study. To control for upward bias for samples sizes less than 20, an unbiased effect size estimate of the standardized mean difference was used: *Hedges d* (Hedges & Olkin, 1985).

Results

A total of 17 studies published in nine research journals were found that met the inclusion criteria. Studies included students in 4th through 9th grades. Across studies, there was a total of 663 participants with sample sizes ranging from 14 to 75.

The large table presents findings for each study including: self-regulated learning components of the intervention, self-regulation constructs measured, a description of the comparison condition, and respective effect sizes and confidence intervals. Additionally, ten quality indicators for group experimental research in special education identified by Gersten et al., 2005 were used to evaluate each study. The table at the right shows numbers of studies that met, or partially met, each quality indicator criteria.

Quality Indicator	N (out of 17)
1	16
2	12
3	5
4	11
5	7
6	15
7	17
8	17*
9	15
10	16

Discussion

➢ The current analysis resulted in overall effect size for immediate measures of comprehension (*ES*=1.00, *CI*=.78, 1.25) that would be considered large (Cohen, 1988), which is not surprising considering that it has been well established that students with LD can be taught reading comprehension strategies that help them understand more of what they read (Edmonds et al., 2009; Mastropieri, Scruggs, & Graetz, 2003).

➢ However, this finding is only part of the story--the conservative estimate of maintenance of comprehension performance was also large (*ES*=.92, *CI*=.61, 1.23), suggesting that instruction in reading comprehension strategies that contain self-regulation elements may have a long lasting impact on student performance. This finding also implies that strategy use may have been internalized and sustained by students. While this finding should be taken with caution as only a small subset of articles (*n* = 8) evaluated maintenance effects, this finding is promising.

➢ Findings revealed a lack of measurement of self-regulated learning components across studies. In order to inform theory, the impact on these constructs needs to be properly measured.

➢ Findings from the current analysis suggest that the rigor of this research base is generally robust; however, there is a need for more consistency in reporting information about both the interventionist(s) [QI 3] and the fidelity of treatment procedures [QI 5]. Although all studies included measures closely aligned to the intervention [QI 8], information about the reliability and validity of the instruments was rarely reported.

Study (Year)	Self-Regulated Learning (SRL) Components			SRL Construct Measured	Comparison(s)	Comprehension Findings ES [CI]	
	Forethought	Performance	Reflection			Immediate	Maintenance
Antoniou & Souvignier (2007)	• Strategy modeling (how) • Goal setting	• Self-monitoring of strategy use	• Comp. monitoring	• Strategy knowledge • Self-efficacy	**T:** Self-regulation strategies **C:** Typical instruction	• *ES* = .60 [.12, 1.08]	3 weeks • *ES* = .95 [.46, 1.45]
Berkeley et al. (2011)	• Strategy modeling (why, when, how) • Goal setting • Self-talk for strategy selection	• Strategy monitoring using self-talk • Self-monitoring of strategy use	• Comp. monitoring • Explicit attribution training • Instructor feedback & student self-feedback on positive attributions for strategy use	• Reading strategy knowledge • Reading attributions	**T1:** Comp. strategies plus attribution retraining **C:** Read Naturally **T2:** Comp. strategies **C:** Read Naturally	T1 • *ES* = 1.60 [-1.67, 4.86] T2 • *ES* = .36 [-2.60, 3.31]	T1: 6 weeks • *ES* = .66 [-2.29, 3.61] T2: 6 weeks • *ES* = .35 [-2.57, 3.27]
Berkeley & Riccomini (2011)	• Strategy modeling (why, when, how) • Mnemonic of strategy steps • Self-talk for strategy selection	• Self-monitoring of strategy use	• Comp. monitoring • Instructor feedback to reinforce strategy use	• Strategy awareness	**T:** Comp. monitoring **C:** Independent reading	• *ES* = .69 [-.09, 1.46]	
Borkowski et al. (1988)	• Strategy modeling (why)	• None	• Explicit attribution training • Instructor feedback & student self-feedback on positive attributions for strategy use	• Attribution beliefs	**T:** Reading strategies plus complex attribution training **C:** Reading strategies control	• *ES* = .54 [-.11, 1.19]	2 weeks • *ES* = 1.06 [.40, 1.77]
Boyle (1996)	• Strategy modeling (why, when, how) • Mnemonic of strategy steps	• None	• Comp. monitoring	• Metacognition • Reading attitudes • Strategy use	**T:** TRAVEL strategy **C:** Independent reading	• *ES* = 1.14 [-2.41, 4.68]	
Chan (1991)	• Strategy modeling (why, when, how)	• Self-monitoring of strategy use	• Comp. monitoring	• None	**T:** Self-questioning with self-instruction **C:** Self-questioning	• *ES* = 1.00 [-.21, 2.19]	
Ellis & Graves (1990)	• Strategy modeling (why, when, how) • Mnemonic & verbal rehearsal of strategy steps	• None	• None	• None	**T:** Paraphrasing strategy **C:** Typical instruction	• *ES* = 2.58 [1.26, 3.91]	2 weeks • *ES* = 3.15 [1.81, 4.85]
Fagella-Luby et al. (2007)	• Mnemonic of strategy steps	• Self-monitoring of strategy use	• Comp. monitoring	• Strategy use • Strategy satisfaction	**T:** Embedded story instruction **C:** Comp. skills instruction	• *ES* = .87 [-.23, 1.96]	
Gajria & Salvia (1992)	• Strategy modeling (why, when, how)	• Self-monitoring of strategy use	• None	• None	**T:** Summarization **C:** No instruction	• *ES* = 3.53 [-1.98, 9.04]	
Graves (1986)	• None	• Self-monitoring of strategy use	• Comp. monitoring • Instructor feedback & student self-feedback to reinforce strategy use	• None	**T:** Direct Instruction plus self-monitoring **C:** Direct Instruction	• *ES* = 4.13 [2.39, 5.86]	1 week • *ES* = 3.41 [2.02, 5.19]
Graves & Levin (1989)	• None	• Self-monitoring of strategy use	• Comp. monitoring	• None	**T:** Main idea strategy plus monitoring **C:** Main idea strategy	• *ES* = 1.13 [.19, 2.07]	
Jitendra et al. (2000)	• Strategy modeling (why, how)	• Self-monitoring of strategy use	• None	• None	**T:** Main idea strategy plus self-monitoring **C:** Typical reading instruction	• *ES* = 2.20 [1.38, 3.07]	6 weeks • *ES* = 1.00 [.28, 1.74]
Johnson et al. (1997)	• Strategy modeling (when, how) • Goal setting • Verbal rehearsal of strategy steps	• Self-monitoring of strategy use with self-statements	• Comp. monitoring • Instructor feedback to reinforce strategy use • Error correction coping, self-evaluation, self-reinforcement	• Strategy use	**T:** Story grammar plus goal setting & self-instruction **C:** Story grammar	• *ES* = -.68 [-1.34,-.02]	4 weeks • *ES* = -1.22 [-2.30, -.13]
Katims & Harris (1997)	• Strategy modeling (why, how) • Mnemonic & verbal rehearsal of strategy steps	• Self-monitoring of strategy use	• Instructor feedback to reinforce strategy use	• None	**T:** RAP strategy **C:** Readers workshop	• *ES* = .61 [-.13, 1.34]	
Malone & Mastropieri (1992)	• None	• Self-monitoring of strategy use	• Instructor feedback to reinforce strategy use	• Strategy knowledge • Strategy use	**T1:** Summarization plus monitoring **C:** Typical Instruction **T2:** Summarization **C:** Typical Instruction	T1 • *ES* = 1.85 [.76, 2.93] T2 • *ES* = 1.59 [.53, 2.66]	
Manset-Williamson & Nelson (2005)*	• Strategy modeling (why, how) • Goal setting • Mnemonic of strategy steps	• Self-monitoring of strategy use	• Comp. monitoring • Instructor feedback & student self-feedback to reinforce strategy use	• Reading self-efficacy • Reading attributions	**T:** Explicit comp. strategies **C:** Guided reading	• *ES* = .31 [-.81, 1.44]	
Miranda et al. (1997)	• Strategy modeling (why, when, how) • Goal setting • Self-efficacy for reading task	• Self-monitoring of strategy use	• Comp. monitoring • Explicit attribution training • Instructor feedback & student self-feedback on positive attributions for strategy use	• Meta-cognition • Strategy knowledge • Achievement responsibility-attributions	**T1:** Self-instruction plus attribution training **C:** Control **T2:** Self-instruction **C:** No instruction	T1 • *ES* = 1.45 [.51, 2.39] T2 • *ES* = 2.41 [1.35, 3.46]	T1: 8 weeks • *ES* = 1.69 [.77, 2.60] T2: 8 weeks • *ES* = 1.56 [.66, 2.46]