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How Are Self-Determination Components Taught to Improve Reading Outcomes for Elementary Students With or At Risk for Learning Disabilities?

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Abstract

Research findings illustrate the strong connection between self-determined learning and reading performance for students with or at risk for disabilities. Students with or at risk for learning disabilities (LDs), who are at increased risk for academic failure, may benefit from instruction to promote self-determination skills. Causal Agency Theory has driven research on interventions to support the development of self-determination in people with disabilities since the 1990s; however, this work has most often focused on adolescents and young adults. Self-determination skills develop over the lifespan—and targeting the building blocks for these skills in the elementary years can lay a foundation for the development of self-determined learners in reading and beyond. As such, this systematic review sought to investigate to what extent self-determination skills were taught to improve reading outcomes for students with or at risk for LD in kindergarten through fifth grade. Twelve studies met criteria for inclusion; two randomized controlled trials (RCTs) and 10 single-case design studies. Results indicate self-determination for students with LD at the elementary level is limited; all interventions used a subcomponent related to self-regulation. Goal setting and positive attributions were also investigated but within intervention packages alongside self-regulation. Future researchers should study the effects of interventions that use other self-determination components for this population of students.

Keywords

reading, self-determination, self-monitoring, self-regulation, learning disabilities, elementary

Two decades of data indicate that two-thirds of upper elementary students are struggling with reading and performing below proficiency levels (National Assessment of Educational Progress, National Center for Education Statistics, 2019). For children with or at risk for a learning disability (LD), repeated failure in reading decreases their motivation to read (Aunola et al., 2002). Self-determination skills are needed to persevere through challenging texts, yet these skills are infrequently discussed as sources for reading inadequacies (Wehmeyer et al., 2017) despite research suggesting otherwise (see Konrad et al., 2007; Toste et al., 2020). Self-determined behavior is a set of volitional actions that drive a person to be the primary causal agent to improve their circumstances (Wehmeyer, 2005). A self-determined learner has an awareness of their strengths and weaknesses and makes choices and sets goals rooted in this perception (Wehmeyer & Metzler, 1995). There is a real need to study the extent to which teaching self-determination skills improves reading performance.

Students with or at risk for LD are at increased risk for negative school and postschool outcomes, including higher rates of course failure, school disciplinary actions, high school dropout, and involvement in the criminal justice system (Cortiella & Horowitz, 2014). There is promise in targeting self-determination learning to strengthen critical reading outcomes, leading to increased achievement and postschool success (Connor et al., 2016). Self-determination is shown to be associated with higher levels of community participation and employment opportunities (Shogren,

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Wehmeyer, Palmer, Rifenbark, & Little, 2015; Wehmeyer et al., 2012), establishing it as an important skill to acquire throughout the school years. Both educators and researchers agree that building an early foundation of self-determination is important for improved quality of life, particularly for students with or at risk for disabilities (Palmer et al., 2012; Stang et al., 2009). However, there remains limited focus on self-determination in the elementary grades and its potential to improve academic outcomes for students with or at risk for LD. Thus, we sought to systematically review the literature to examine the extent to which self-determination skills are taught to elementary students with or at risk for LD with the goal to improve students' reading outcomes.

Self-Determination

Self-determination, as operationalized by Causal Agency Theory, is a general psychological construct within the organizing structure of theories of human agentic behavior.

Casual Agency Theory integrates research and theory from multiple perspectives relevant to enhancing motivation, self-regulation, and goal setting and attainment (Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015) and has driven research on interventions to support the development of self-determination in people with disabilities since the 1990s. Social contexts are suggested to motivate human action to meet three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 1985, 2012). Meeting these needs contributes to intrinsic motivation. As such, Causal Agency Theory emphasizes the role of instruction enhances motivation processes but also focuses on the need to explicitly teach skills associated with causal action (i.e., self-regulated goal setting and attainment skills) to develop self-determination skills. These skills lead to enhanced self-directed actions for a range of situations (i.e., reading interventions; Papay et al., 2015). Based on operationalizations in the literature (Konrad et al., 2007; Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015; Wehmeyer et al., 1997), self-determination is generally focused on several connected component skills: (a) *decision-making*, the process of evaluating the appropriateness of various outcomes, which includes *choice making* based on individual preferences; (b) *problem solving*, identification of a problem, analysis of possible solutions based on preference or need, and resolution; (c) *goal setting*, identification of achievable goals, and *attainment* as the development of objectives, steps and actions necessary to bring the goal to fruition; (d) *self-awareness*, accurate identification of strengths and weaknesses; (e) *self-advocacy*, ability to acquire what is needed to reach goals; (f) *positive attributions of efficacy and expectancy*, understanding of ability to achieve a desired outcome through specific tasks; and (g) *self-regulation*, which includes *self-management* (i.e., *self-observation*, assessing the occurrence of a target behavior; *self-monitoring*, assessing and recording the occurrence of a target behavior; *self-evaluation*, process that uses graphs or charts to document progress of target behavior occurrence over time; *self-instruction*, providing verbal prompts for problem solving; *self-reinforcement*, self-administration of positive or negative consequences contingent on behavior).

Self-Determination and Elementary-Age Students

Accumulating evidence indicates that self-determination develops across the lifespan and supporting self-determination needs to begin in the elementary grades for children with a range of abilities if they are to enter the world as self-determined young people (Palmer et al., 2012; Wehmeyer et al., 2017). Self-determination skills develop and deepen during the course of childhood (Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015; Stang et al., 2009; Wehmeyer et al., 2012); however, it is currently an area of development primarily viewed as the domain of adolescence or adulthood (Hagiwara et al., 2017; Wehmeyer et al., 1997). As classrooms and schools can provide the context students need to learn how to be self-regulated learners, it is critical to explore opportunities to support self-determination for students in the elementary grades, particularly for those at increased risk of academic failure.

Prior Examination of Self-Determination

Multiple systematic reviews of the literature have analyzed self-determination from preschool to postsecondary, with the majority of included studies focused on adolescents. When reviews included younger students, findings were not disaggregated by school level (e.g., Algozzine et al., 2001; Joseph & Eveleigh, 2011; Konrad et al., 2007); the extent self-determination affects elementary students with or at risk for LD is unknown. Reviews have focused on multiple populations, including students with severe disabilities (Wood et al., 2005), behavior problems (Bruhn et al., 2015; Joseph & Eveleigh, 2011; Shogren et al., 2004; Webber et al., 1993), intellectual disability (Algozzine et al., 2001), LD (Algozzine et al., 2001; Joseph & Eveleigh, 2011; Konrad et al., 2007; Reid, 1996), and combined populations of students with or without disabilities (Guzman et al., 2018; McDougall, 1998). Multiple reviews focused exclusively on specific components of self-determination such as choice making (Algozzine et al., 2001; Shogren et al., 2004), self-management (Bruhn et al., 2015; Guzman et al., 2018; Joseph & Eveleigh, 2011; McDougall, 1998; Reid, 1996; Webber et al., 1993), and self-advocacy (Test et al.,

2005). Across studies, positive findings are reported on the influence of self-determination for social skills (McDougall, 1998; Webber et al., 1993), behavior (Reid, 1996; Shogren et al., 2004; Webber et al., 1993), and academic performance (Guzman et al., 2018; Joseph & Eveleigh, 2011; McDougall, 1998).

The most recent literature review examined the effects of interventions that incorporate self-determination components on academic skills (i.e., reading, mathematics, writing, spelling, and productivity) exclusively for students with LD and/or attention-deficit/hyperactivity disorder (ADHD) was conducted by Konrad et al. (2007). The authors examined 34 intervention studies that included participants from Pre-K to postsecondary published between 1972 and 2005. The majority of studies included elementary students; however, findings for academic skills were aggregated, and it is unknown how self-determination exclusively impacted reading outcomes for this population. Authors reported self-management skills (subcomponent of self-regulation) were most often studied, and sometimes included one or more of the other self-determination components. Upon review of study tables, of the 24 studies that included elementary-age students, the majority examined math outcomes ($k = 10$), followed by reading ($k = 6$), spelling ($k = 3$), writing ($k = 3$), and behavior ($k = 2$). Three studies investigating reading outcomes included elementary students exclusively (Chase & Clement, 1985; Edwards et al., 1995; Varni & Henker, 1979) while the other three studies aggregated findings with middle school students. All of the reading studies including elementary-age students investigated self-management, both with ($k = 2$) and without ($k = 4$) goal setting. For elementary students with or at risk for LD, none of the included studies targeted any other self-determination skills.

Konrad and colleagues (2007) calculated Hedge's *g* for RCTs and percentage of nonoverlapping data points (PND) for single-case designs (SCDs). The mean *g* statistic across the six group studies was −0.22. Upon closer examination, the majority of the outcomes contributing to the effects were in math, writing, and spelling. One study looked at reading outcomes (Johnson et al., 1997) and the average effect ($g = -0.59$) was based on researcher-created, unstandardized measures. Authors reported the median PND was 60%. The strongest effects were found for interventions that combined self-determination skills with a reported median PND of 81.5%. Since the publication of these findings (2007), advanced methods for calculating effect sizes in SCD (e.g., Tau-*U*, between-case standardized mean difference) provide information about magnitude of effect and trend (Shadish et al., 2014). Given the limitations of the synthesis completed by Konrad and colleagues, updating findings related to how self-determination is taught to elementary students with or at risk for LD is warranted.

Purpose of This Study

Teachers report they do not have time to teach self-determination skills due to other academic demands (Cho et al., 2011). Investigating instruction that improves reading outcomes via self-determined learning addresses this issue. Promoting self-determination skills presents a potential pathway to support the reading achievement of students with LD without sacrificing time dedicated to improving academic skills (Konrad et al., 2007). To date, most self-determination research has focused on older students with or without disabilities, and it is unknown how self-determination is taught to enhance reading outcomes exclusively for elementary-age students with or at risk for LD. We posed two research questions through this systematic review of the literature:

1. What self-determination skills are taught to improve reading outcomes for students with or at risk for LD in kindergarten through fifth grade?
2. What are the effects of interventions that teach self-determination skills on reading outcomes for elementary students with or at risk for LD?

Method

Operational Definitions

For the purposes of this systematic review, we focus on students *with or at risk for LD*. We operationalized this as an identification of LD or at risk for learning difficulties, determined by study authors' descriptions of students (a) receiving special education services for specific LD or reading disability or (b) exhibiting academic difficulty and risk of school failure with nomination by a teacher or administrator. An *intervention teaching self-determination skills* included a program or service designed purposefully to improve students' reading performance with instruction on one or more self-determination components previously defined: decision-making, choice-making, problem-solving, goal setting and attainment, self-awareness, self-advocacy, attribution training, and self-regulation (see Figure 1 in Supplemental Materials for a visual summary).

Search Procedures and Study Identification

An overview of search and screening procedures is presented in Figure 2 in the Supplemental Materials. Articles for this synthesis were identified through multiple procedures to ensure a comprehensive search. First, an electronic database search was conducted through EBSCO and included four indices: PsycINFO, ERIC, Academic Search Complete, and Education Source. Studies were published in peer-reviewed journals from the earliest possible publication

date identified (May 1924) and May 31, 2019. The search was completed within titles, keywords, and abstracts with the following terms: *self determin** OR *(choice n2 mak*)* OR *(problem n2 solv*)* OR *goal set** OR *self regulat** OR *self monitor** OR *self advoc** OR *self awar** OR *self-efficacy* OR *attribution* AND *"learning dis*"* OR *"learning diff*"* OR *"learning problems"* OR *"special education"* AND *elementary* OR *"primary school"* OR *"early childhood"* OR *"young children"* OR *kinder** OR *"grade 1"* OR *"1st grade"* OR *"grade 2"* OR *"2nd grade"* OR *"grade 3"* OR *"3rd grade"* OR *"grade 4"* OR *"4th grade"* OR *"grade 5"* OR *"5th grade"* AND *reading* OR *fluency* OR *comprehen** OR *phonic** OR *phonemic awareness* OR *literacy.* After duplicates were removed, the search yielded 2,612 studies whose abstracts were closely reviewed to identify studies that included elementary students with or at risk for LD, integrated self-determination components, and targeted reading outcomes (see inclusion criteria discussed below). Seventy-five of these studies were full-text reviewed, and eight met inclusion criteria.

Second, a search of gray literature was conducted using the above-listed search terms and databases and 149 dissertation abstracts were reviewed. Two dissertations were reviewed in full; however, neither were included due to inadequate descriptions of intervention and baseline conditions (e.g., did not meet inclusion criteria for research design). Next, we conducted a hand search of reference lists and relevant journals. We reviewed the full reference list in published reviews focused on self-determination (Algozzine et al., 2001; Burke et al., 2020; Guzman et al., 2018; Joseph & Eveleigh, 2011; Konrad et al., 2007; Luckner et al., 2020; McDougall, 1998) and determined three additional studies met inclusion criteria. Furthermore, based on the results of the literature review by Thoma et al. (2005), wherein they established which journals published articles on self-determination most frequently, we hand searched the table of contents of all available issues of *Learning Disability Quarterly, Journal of Learning Disabilities*, and *Remedial and Special Education*. One additional study was identified for inclusion. Finally, the 12 identified studies were used in a search through Google Scholar. Abstracts of all articles that cited the aforementioned studies were reviewed for inclusion; no additional studies were identified. During the screening process, unclear terms were operationalized and criteria for inclusion/exclusion were discussed until consensus was reached among the authors. In total, 12 studies met the following criteria:

1. The intervention included at least one self-determination component, as per the previous definitions provided.
2. Study utilized an experimental, quasi-experimental, or SCD.
3. Participants were students enrolled in the elementary grades (K–5).
4. Participants were students with or at risk for LD, as per operationalization definition above. Students could have comorbid disabilities (e.g., ADHD). Studies with additional participants were included if data for students identified with or at risk for LD were disaggregated.
5. Experimental and quasi-experimental design studies included at least one outcome measure related to reading performance. SCD studies included a dependent variable related to reading performance (e.g., accuracy, rate). Case study and qualitative research designs were excluded.
6. Study was published in English prior to May 31, 2019.

Coding Procedures

Studies were coded using an adapted protocol developed for syntheses of educational intervention research (Vaughn et al., 2014). Each study was summarized by research design, participant characteristics, setting, intervention characteristics, dependent variables, and effect sizes. The coding sheet used a combination of forced-choice items, open-ended items, and written descriptions of the intervention and visual analysis of data (when applicable). Participant information was coded by (a) age, (b) grade, (c) race/ethnicity, (d) gender, and (e) LD classification. Setting was coded for classroom- and school-type. Interventions were coded for features that included: (a) self-determination component skill, (b) reading skill, (c) procedural steps, (d) dosage, (e) comparison condition, and (f) visual analysis (when applicable). Dependent variables included measures of both reading performance and self-determination.

After initial coding, all studies were independently double-coded to ensure accuracy and interrater agreement was calculated. The number of cells agreed upon by the coders was divided by the total number of cells coded and multiplied by 100; interrater agreement was calculated at 97.32%. Any cells with coding discrepancies were discussed until consensus was reached.

Effect Size Calculation

Effect sizes for all studies are reported in Table 1. For experimental design studies, posttest means and standard deviations were used to calculate Cohen's *d* using an effect size calculator retrieved from the Campbell Collaboration (Wilson, 2017). For SCD studies, we calculated Tau-*U* (Tarlow, 2017) and between-case standardized mean difference effect sizes (Valentine et al., 2016). *Tau* is a statistic that takes into consideration both nonoverlap between phases and trend and corrects for baseline trend with values

Table 1. Effects of Interventions With Integrated Self-Determination Components.

Reference	Design	*SD* component	Independent variables	Results for dependent variables	Effect size
Albers & Hoffman (2012)	SCD	Self-regulation • self-monitoring	Baseline condition: BAU Intervention condition: Student read passage for 1 minute and afterward, the interventionist selected three unknown words and seven known words from the passage. Flashcards were created from these words. Definitions of unknown words were taught and the student was prompted to use the word in a sentence. Then, unknown words were "folded in" the known pile. After student reviewed all words, they reread the passage for 1 minute. The students were told their reading performance and independently graphed their scores on a bar graph.	Oral reading fluency and comprehension scores improved	Oral reading fluency Tau-*U* range = 0.56–0.71, $p < .01$ BCSMD ES = 0.53, $p < .001$, 95% CI [0.09, 1.49] Comprehension Maze Tau-*U* range = 0.57–0.71[a], $p < .01$ BCSMD ES = 0.99, $p < .001$, 95% CI [0.28, 1.84]
Billingsley (1977)	SCD	Goal setting (no attainment) Self-regulation • self-reinforcement	Baseline condition: Students read passage for 2 minutes. Each day they began where they left off the previous day. After reading, the interventionist told participants the number of correct and incorrect responses. Intervention condition: Student received chips for 1 minute of free time when reaching their goal. They were given a list of 10 possible goal options and the student circled the number of words needed to read correctly for each chip. Choices were determined by baseline rates so goals were attainable but did not allow more than five chips earned each session.	Data were variable and two students did not show an increase in the number of words read during intervention phases.	Words read per minute, trial 1 Tau-*U* range = −0.73 to 0.45, *p* range = .001–0.63 BCSMD *ES* = 0.73, $p < .001$, 95% CI [0.17, 1.37] Words read per minute, trial 2 Tau-*U* range = 0.10–0.71, *p* range = 0–0.62 BCSMD ES = 0.61, $p < .001$, 95% CI [0.12, 1.22]
Brown et al. (2014)	SCD	Self-regulation self-observation	Baseline condition: Participation in "story time" Intervention condition: (1) listen to recording of story, (2) recognize whether they in/correctly identified story element during read aloud, and (3) respond with corrective feedback across 5 story grammar components with corrective feedback.	All students demonstrated improved narrative retell	Narrative retell scores Tau-*U* range = 0.57 - 0.67, $p < .01$ BCSMD ES = 1.87, $p = .17$, 95% CI [1.08, 1.72]
Chase & Clement (1985)	SCD	Goal setting (no attainment) Self-regulation • Self-reinforcement • Self-observation	Baseline condition: No specific treatment. Students removed from psychoactive medication Intervention condition: Phases paired with or without psychoactive medication (a) set goal at beginning of week of how many reading questions they would answer each day, (b) signed contract with goal, (c) self-observed performance on multiple choice comprehension questions and self-recorded on a wrist counter after completing each question, (d) decided with tutor whether or not goal was met, (e) self-administered points were exchanged for reinforcers	Self-determination only phases, they performed higher than psychoactive medication only phases and more stable than baseline (no medicine.). Self-determination plus psychoactive medication levels were similar to self-determination only.	Unable to calculate from published graphs
Edwards et al. (1995)	SCD	Self-regulation • self-monitoring	Baseline condition: normal routine Intervention condition: (a) card taped to desk to record on/off task behavior, (b) when tone played students recorded if they were on (+) or off (−) task, (c) praise given for on-task behavior, (d) met with teacher assistant to compare and on-task of 60% or higher was rewarded with a happy face, (e) tone volumes gradually decreased/faded in the second baseline and intervention phases	Reading comprehension accuracy increased for two students. Questionable effects for third student with an initial increase when self-monitoring but experimental control is not demonstrated in second AB series	Comprehension accuracy Tau-*U* range = 0.55–0.75[a], $p < .01$ BCSMD ES = 1.39, $p < .001$, 95% CI [0.73, 2.38]

(continued)

Table 1. (continued)

Reference	Design	*SD* component	Independent variables	Results for dependent variables	Effect size
Hagaman et al. (2012)	SCD	Goal setting and attainment Self-regulation • Self-evaluation Self-monitoring	Baseline condition: Read passage and answered questions with no feedback Intervention condition: (a) trained to use mnemonic for identifying main idea and details from paragraphs until able to independently use the mnemonic correctly, (b) set goals with conferencing and included instructions on how to improve performance, (c) graph and monitor progress, and (d) record whether steps of the mnemonic strategy were being followed	Reading comprehension increased as measured by text recall and short answer percentage of questions correct	Text recall Tau-*U* range = 0.73–0.77, $p < .05$ BCSMD ES = 3.67, $p < .001$, 95% CI [2.75, 4.74] Short answer accuracy Tau-*U* range = 0.29–0.82, p range = .01–.44 BCSMD ES = 1.29, $p < .001$ 95% CI [0.83, 1.78]
Jozwik & Douglas (2017)	SCD	Goal setting (no attainment) Self-regulation • Self-monitoring	Baseline condition: standard-practice vocabulary instruction Intervention condition: (a) students recorded goal of how many words they thought they would rate at a Level 4 (e.g., I know what the word means and can give example/ use it in a sentence), (b) state vocabulary word from card, provide definition with image, use graphic organizer, practice restating meaning in their own words, and independently record definition, (c) repeated practice defining all words and morpheme analysis, (d) at the end of each session, students rated their level of understanding for each vocabulary term, counted the number of words rated Level 4, and compared to the goal set at the beginning of each session	Vocabulary knowledge increased for all students	Word set 1 Tau-*U* range = 0.71–0.75, $p < .001$ BCSMD ES = 2.09, $p < .001$, 95% CI [1.35, 3.01] Word set 2 Tau-*U* range = 0.81–0.84, $p < .001$ BCSMD ES = 1.81, $p < .01$ 95% CI [1.14, 2.65] Word set 3 Tau-*U* range = 0.72–0.89[a], $p < .001$ BCSMD ES = 1.51, $p < .01$ 95% CI [0.91, 2.30]
Kim & Linan-Thompson (2013)	SCD	Goal setting (no attainment) Self-regulation • Self-monitoring	Baseline condition: Instructional routine related to vocabulary Intervention condition: (a) set goal for number of vocabulary words individual participants wanted to learn each lesson, (b) identify and record their understanding of each word (yes/ no), and (c) identify and record number of words understood	Participants performed slightly higher during intervention	Receptive definition accuracy Tau-*U* range = 0.60–0.77, p range = .009–.15 BCSMD ES= 2.0, $p < .001$, 95% CI [1.27, 2.79] Expressive definition accuracy Tau-*U* range = 0.71–0.74, p range = .003–.74 BCSMD ES = 2.49, $p < .001$, 95% CI [1.61, 3.47]
L. H. Mason (2004)	RCT	Goal setting (no attainment) Self-regulation • Self-instruction • Self-monitoring • Self-observation	Comparison condition: reciprocal questioning—(a) teacher and student silently read passage, (b) student asks teacher questions and teacher answers without looking at book, and (c) teacher asks student questions and student answer without using their book Treatment condition: expository reading comprehension strategy (mnemonic TWA)—(a) students think before reading and prompted to think about what they know and think about what they want to learn, (b) students think while reading, while considering speed, linking knowledge, and rereading passages and students prompted student to make connections to prior knowledge, (c) students think after reading about what the main idea, summarizing information, and (d) self-regulation embedded through a nine-step checklist to monitor the TWA strategy with a goal to reach the top of their chart (i.e., use all nine steps)	Students posttest scores indicated they improved on five oral comprehension measures. No differences were noted on measures of motivation.	Main Idea $d = 2.10$ Summary $d = 0.50$ Oral retell quality $d = 1.16$ Oral retell information units $d = 0.83$ Oral retell main ideas $d = 0.76$ Self-efficacy $d = 0.29$ Intrinsic motivation $d = 0.18$

(continued)

Table 1. (continued)

Reference	Design	*SD* component	Independent variables	Results for dependent variables	Effect size
Rouse et al. (2014)	SCD	Self-regulation • Self-instruction	Baseline condition: Passage reading and answering questions Intervention condition: (a) receive instruction on self-questioning procedures to use while reading silently and (b) prompts faded from visual to self-prompting of strategy use	Mean comprehension scores per each phase indicate students improved during intervention phases	Comprehension accuracy Tau-*U* = 0.60, 0.64, $p < .01$ BCSMD ES = 2.67, $p < .001$ 95% CI [1.84, 3.58]
Solís et al. (2017)	RCT	Goal setting with attainment Positive attributions Self-regulation • Self-monitoring	Comparison condition: typical instruction provided by schools Treatment condition: 10 instructional groups of two to three students; (a) set goal of how many vocabulary words they would learn prior to reading, (b) self-assessed their attribution statements and used a self-monitoring checklist to support use of attribution statements during reading (believe, evaluate what do I need to do, stay with it, think what can get in the way), (c) vocabulary instruction taught words and definitions with visual representation and discussion of word use in text, (d) three new vocabulary words taught each day and two previously taught words reviewed, (e) text-based approach taught students to support answers with context, and (f) students assessed on predetermined vocabulary goal (accurately using vocabulary in sentence) and self-assessed their use of attribution statements	Students in the treatment condition improved on measures of general reading and vocabulary assessments	Vocabulary posttest accuracy $d = .92$
Varni & Henker (1979)	SCD	Self-regulation • Self-observation • Self-instruction • Self-reinforcement	Baseline condition: Students had choice to work on their academic materials or play while prompted to work hard Intervention condition: (a) experimenter modeled behavior and student used self-instruction with prompts, (b) self-evaluated the time to complete academic task (no recording or observing specific behavior), and (c) when student reached pre-determined point total, student graphed number of problems attempted and percent correct and exchanged points for self-selected reinforcers	Behavior is variable throughout and effects of self-determination components are questionable	General reading Tau-*U* = 0.20–0.68, *p* range = 0–.18 BCSMD ES = 0.50, $p < .001$ 95% CI [−0.0094, 1.01]

Note. SCD = single-case design; BAU = business as usual; BCSMD ES = between-case standardized mean difference effect size; CI = confidence interval; RCT = randomized controlled trial; *d* = Cohen's *d*; TWA = Think Before Reading, Think While Reading, and Think After Reading.
[a]Baseline-corrected Tau was used.

ranging between –1 and +1 (Parker et al., 2011). Raw data were entered into a web-based calculator (Tarlow, 2016) and allowed for analysis of phase contrasts. For treatment-reversal designs, Tau-*U* was calculated for each series of replications (e.g., first baseline compared to first treatment phase only and second baseline compared to second treatment phase only). For comparison purposes, a second SCD effect size was calculated; between-case standardized mean difference effect sizes were calculated using a free web application powered by the statistical software *R, scdhlm*. For each study, restricted maximum likelihood was modeled. A fixed and random effect for level during baseline and a fixed effect for level during intervention phases (default hypothetical parameters) were modeled and results were not sensitive to altering parameters. Tau-*U* and between-case standardized mean difference effect sizes for each study are reported in Table 1.

Results

A total of 12 studies were identified for inclusion in this systematic review of the literature. We first describe study features (i.e., study design, sample characteristics, setting). Next, we present a synthesis of self-determination skills used to improve reading outcomes reported in these studies. Then, we conclude with a report of effect sizes from all studies. Table 1 summarizes the (a) research design, (b) specific self-determination component(s), (c) independent variables, (d) results for the dependent variables, and (e) effect sizes. Table 2 summarizes (a) participant characteristics, (b) setting, (c) dosage, and (d) measures for the dependent variable.

Study Features

Study design. Two of the studies included in this synthesis reported findings from RCTs. Ten of the included studies reported findings from SCDs: seven were multiple baseline, two were treatment-reversal, and one was a combined operant inverted design (Billingsley, 1977). Five studies compared self-determination skills to business as usual conditions (Albers & Hoffman, 2012; Chase & Clement, 1985; Edwards et al., 1995; Jozwik & Douglas, 2017; Solís et al., 2017). One study provided vocabulary instruction in baseline and embedded self-determination skills during treatment conditions (Kim & Linan Tompson, 2013). L. H. Mason (2004) compared a reciprocal questioning condition to a condition teaching an expository reading comprehension strategy embedded with self-instruction, self-monitoring, and self-observation. The remaining five studies used baseline conditions that required students to complete a reading task to gather data related to the dependent variable (e.g., read passage and answer questions). See Table 1 for further descriptions of study conditions.

Sample characteristics. Altogether, the 12 studies involved a total of 124 participants (60.48% male). The sample sizes were 32 and 50 in the two RCTs. In the SCDs ($k = 10$), sample sizes ranged between two and eight participants ($M = 4.2$, $SD = 1.87$). All participants were identified as either with or at risk for LD; four studies included students with LD, five included students at risk for reading disability, and three included English learners with or at risk for LD. Nine studies reported the race/ethnicity of participants, with the majority identified as Hispanic or Latinx ($n = 39$; 31.45%); followed by black ($n = 32$; 25.81%), and white ($n = 20$; 16.13%). Ethnicity was not reported for 33 participants (26.61%). Participants' ages ranged from 5.08 to 11 years ($M = 9.34$ years; $SD = 1.72$), and the participants were enrolled in kindergarten through fifth grades. One study was completed in kindergarten, five studies in third grade, three studies in fourth grade, three studies in fifth grade, and one study did not report grade level but specified elementary-age students. Most of the studies focused on students in a single grade-level; however, one study included students in third and fourth grades (Edwards et al., 1995).

Setting. Most studies took place in public schools in general education ($k = 6$), bilingual ($k = 1$), or resource/special education ($k = 1$) classrooms. Two studies were implemented in alternative school settings in self-contained classrooms and two studies took place in private education facilities in self-contained classrooms. Of studies that reported dosage, 10 studies (83%) reported the length of each session ranging from 15 to 35 minutes ($M = 26.6$, $SD = 5.89$), seven studies (58%) reported the duration ranging 2 to 15 weeks ($M = 6.71$, $SD = 4.39$), and six studies (50%) reported frequency of sessions ranging from 2 to 5 days per week ($M = 3.67$, $SD = 1.17$).

Synthesis of Findings

Self-determination skills taught to improve reading outcomes. Only one component was a primary focus of self-determination instruction within the interventions: self-regulation ($k = 12$). All five subcomponents of self-regulation were used either alone or in conjunction with other skills as part of an intervention package: self-observation ($k = 4$), self-monitoring ($k = 7$), self-evaluation ($k = 1$), self-instruction ($k = 3$), and self-reinforcement ($k = 3$). Goal setting was used in seven interventions and was always paired with one or more self-regulation components. Of these interventions, only two used goal setting with an established plan for attainment (Hagaman et al., 2012; Solís et al., 2017). Solís and colleagues (2017) implemented an intervention package and included goal setting with an attainment plan, self-monitoring, and positive attributions. In the sections below, we describe the self-determination intervention features.

Table 2. Summary of the Literature and Study Features.

Reference	Participant	Setting	Dosage	Dependent variable measures
Albers & Hoffman (2012)	Three third-grade students Identified ELs with RD Age not reported Three males Three Latino	1 public school general education classroom	3 times per week for 7 weeks	Words read correct per minute on AIMSweb oral reading fluency and words circled correct per minute on AIMSweb Maze
Billingsley (1977)	Eight third-grade students (data provided for three students) At risk for RD *M* age = 10.49 Eight males Ethnicity not reported	Alternative setting Self-contained, 1:1 classroom	56 days	Words read correct per minute on passages from the Basic Reading series
Brown et al. (2014)	Three Kindergarten students At risk for RD and language disorders *M* age = 5.08 years Two males, one female Three African American	One private, urban, elementary school, classroom type not reported	15–20 minute, two to three times per week, for 19 sessions	Five story grammar elements measured by the TNR: character, initiating event, feeling, action, and consequences
Chase & Clement (1985)	Four fourth-grade students One fifth-grade student Identified LD and ADHD *M* age = 9.65 years Four males Four Caucasian	One center for students who are "emotionally and educationally handicapped" self-contained classroom	30 minute sessions for approximately 30 sessions	Comprehension accuracy measured by the Multiple Skills Seriers (Boring, 1979)
Edwards et al. (1995)	Two third-grade students and one fourth-grade student Identified LD and ADHD *M* age = 8.67 years Three males Ethnicity not reported	1 public elementary school general education classroom	20 min, 51 sessions, 6 weeks	Ten researcher created questions in the form of cloze passages, fill in the blanks, matching, or sequencing
Hagaman et al. (2012)	Six third-grade students At risk for RD, specifically comprehension delays *M* age = 9.50 Two males, four females Six Caucasian	1 public school general education classroom	20-30 min, 5-7 sessions, within 2 weeks	(1) Text recall assessed using procedures based on the QRI-3; (2) Comprehension questions measured by researcher developed assessment
Jozwik & Douglas (2017)	Six fifth grade students Two students identified EL and LD Four students EL and at risk for RD *M* age = 10.65 years Four males, two females Six Mexican American	1 public school general education classroom	25 min, 35 sessions, 5 days per week	Vocabulary word reading and definition accuracy measured by researcher developed assessment

(continued)

Table 2. (continued)

Reference	Participant	Setting	Dosage	Dependent variable measures
Kim & Linan-Thompson (2013)	Four third-grade students Identified ELs with RD *M* age = 8.50 years Two males, two females Four Latino	One public school bilingual classroom	30–35 minute, 17 sessions for 15 weeks	(a) Receptive vocabulary measured by researcher developed assessment; (b) Oral expressive vocabulary measured by researcher developed assessment
L. H. Mason (2004)	32 fifth-grade students At risk for RD, specifically comprehension *M* age = 10.53 15 males, 17 females 26 African American, three Caucasian, three Hispanic	One public school general education classroom	20 minute, 11–15 sessions	(a) Expository reading comprehension (main idea, summary, oral retell quality, oral retell information units, oral retell main ideas) measured by researcher developed assessment, (b) MRQ self-efficacy and intrinsic motivation
Rouse et al. (2014)	Two fifth-grade students Identified LD *M* age 11.00 years One male, one female One African American, one Hispanic	One public school special education resource room	30 minute, 2–3 days per week, approx. 33 sessions	Comprehension question accuracy on experimenter created assessments based on Common Core State Standards
Solís et al. (2017)	50 fourth-grade students At risk for RD, specifically comprehension Age not reported 28 males, 22 females 22 Hispanic, seven Caucasian, two African American, 18 Other	One public school general education classroom	30-minute sessions, eight sessions, over 2 weeks	Proximal measure of reading and vocabulary accuracy measured by researcher developed assessment
Varni & Henker (1979)	Three elementary-aged students (grade not reported) Identified LD and ADHD *M* age = 9.33 Three males Ethnicity not reported	Private clinic self-contained, 1:1 instruction	35 minute, 35–45 sessions	Sullivan programmed reading texts individually adapted and number completed correctly recorded as a general reading score

Note. EL = English Learner; RD = reading disability; TNR = Test of Narrative Retell School-Age: Kindergarten Stories (Petersen & Spencer, 2012); LD = learning disability; ADHD = attention deficit hyperactivity disorder; QRI-3 = Qualitative Reading Inventory-3 (Leslie & Caldwell, 2001); MRQ = Motivation for reading Questionnaire.

Self-observation. Self-observation was coded for intervention components when students were simply noting whether a predetermined behavior occurred. Self-observation was used as the sole intervention component in a study completed by Brown and colleagues (2014). In this study, students observed whether or not they correctly identified story elements during a read aloud. Self-observation was a part of three intervention packages (Chase & Clement, 1985; L. H. Mason, 2004; Varni & Henker, 1979). In the study by Chase and Clement (1985), students self-observed their performance on multiple choice comprehension questions and marked on a wrist watch when they completed a question. They compared their performance with a predetermined goal each session. Varni and Henker (1979) also asked students to use a wrist counter to mark engaged academic. L. H. Mason (2004) asked students to observe their performance with a checklist each session to monitor if they were following a mnemonic strategy correctly.

Self-monitoring. Any component where students recorded the presence of a target behavior was coded as self-monitoring. Self-monitoring was used in seven studies, exclusively (Albers & Hoffman, 2012; Edwards et al., 1995) and in conjunction with other self-determination components such as goal setting (Jozwik & Douglas, 2017; Kim & Linan-Thompson, 2013), self-evaluation and goal setting (Hagaman et al., 2012), self-instruction, self-observation, and goal setting (L. H. Mason, 2004), and positive attributions and goal setting (Solís et al., 2017). Albers and Hoffman (2012) used a bar graph to monitor the number of words read correct per minute on grade-level passages each day while Edwards and colleagues (1995) had students record their on-task behavior when a random tone sounded to improve their comprehension performance. In Jozwik and Douglas' study (2017), students set goals on how many vocabulary words they wanted to learn at the end of each session and then rated their level of understanding for each word and compared it to a set goal. Similarly, Kim and Linan-Thompson (2013) had students set goals on the number of vocabulary words they wanted to learn each session and then evaluated how many they knew at the end of the session.

Three interventions used self-monitoring with two or more self-determination components. For instance, Hagaman and colleagues (2012) used the self-regulated strategy development model (see Harris & Graham, 1996) to learn a paraphrasing strategy. They incorporated self-evaluation by showing a graph of previous performance of text recall and short answer accuracy. Students were then asked to set a goal related to how much information they thought they could retell after reading a passage and they self-monitored their progress toward this goal. L. H. Mason (2004) used self-monitoring alongside goal setting, self-instruction, and self-observation to teach a text retell strategy. In her study, students learned nine steps to prompt them to think before, while, and after reading. Students used a checklist to observe whether or not they were using the strategy, recorded the steps they were using, and set a goal to use all nine steps while reading. Finally, Solís and colleagues were the only researchers to pair self-regulation components (self-monitoring) and goal setting with another self-determination component, positive attributions. In their study, students set goals on how many vocabulary words they wanted to learn prior to reading. They self-monitored their use of attribution statements by self-assessing themselves prereading ("I can stay with it!") and after reading ("I did stay with it!"). Then they assessed their vocabulary knowledge and compared their performance with their predetermined vocabulary goal.

Self-evaluation. Self-evaluation was similar to self-monitoring in terms of recording but was coded for studies that described progress over time was reviewed. As previously noted, Hagaman and colleagues (2012) used self-evaluation using past and current performance data to set and monitor progress. No other studies asked students to evaluate behavior over time.

Self-instruction. Self-instruction included intervention components wherein the student walked themselves through steps of a process. Self-instruction was used in three studies (L. H. Mason, 2004; Rouse et al., 2014; Varni & Henker, 1979). Each of these studies taught students how to use a strategy. For instance, L. H. Mason (2004) taught students how to use the TWA strategy (Think Before Reading, Think While Reading, and Think After Reading) to improve text recall. Varni and Henker (1979) modeled for students how to self-instruct and asked the students to self-instruct on their own with prompts to improve general reading ability. Rouse and colleagues (2014) used the self-instruction component alone to teach self-questioning procedures while reading silently to improve comprehension performance.

Self-reinforcement. When students administered a reward (or consequence) due to the presence (or absence) of a target behavior, self-reinforcement was coded. Self-reinforcement was used in three studies (Billingsley, 1977; Chase & Clement, 1985; Varni & Henker, 1979). Billingsley (1977) had students exchange chips earned for reaching their daily words read correct per minute goal for 1-minute of free time per chip. Chase and Clement (1985) allowed students to self-administer points for on-task behavior in exchange for reinforcers to improve comprehension accuracy. Finally, Varni and Henker (1979) also provided students an opportunity to exchange points for the number of problems attempted and correct for reinforcers.

Effects of interventions that teach self-determination skills. Each of the studies included in this synthesis reported reading outcomes for interventions that taught self-determination skills (i.e., self-regulation). Reported outcomes included comprehension (ES, $n = 13$), vocabulary (ES, $n = 4$), fluency (ES, $n = 2$), and general reading (ES, $n = 1$). All studies reported participants had improved on reading measures (see Table 1). The RCTs indicated treatment groups showed statistically significant improvements compared to comparison conditions. The majority of SCDs demonstrated a functional relation between the independent variable and the dependent variable. Visual analysis for one study had questionable effects on reading outcomes (Billingsley, 1977) in the context of oral reading fluency. Only one study reported outcomes related to self-determination (L. H. Mason, 2004) using the Motivation for Reading Questionnaire (MRQ; Wigfiled & Guthrie, 1997) to determine posttest levels of self-efficacy and intrinsic motivation; no significant mean effects were found.

Two group design studies used RCTs to test the effects of interventions that incorporated self-determination components on reading outcomes. Six effect sizes were calculated and ranged from 0.50 to 2.10 ($M = 1.04$, $SD = 0.51$). It was considered that effect sizes of $d = 0.2$ are interpreted as small, $d = 0.5$ as medium, and $d = 0.8$ as large (Cohen, 1992); therefore, findings indicate medium to large effects on reading outcomes.

Data were available to calculate effect sizes for nine of the 10 SCDs for a total of 64 effect sizes. Tau-*U* effect sizes ranged from −0.73 to 0.89 with an average effect of 0.63 ($SD = 0.26$). The median effect size was 0.71. Negative effects were found in one study (Billingsley, 1977). Significant effects were noted in 52 of the 64 effect sizes. Interpretation benchmarks (Vannest & Ninci, 2015) suggest Tau-*U* below 0.20 is considered small, 0.20 to 0.60 is considered moderate, 0.60 to 0.80 is considered large, and above 0.80 is considered very large. For comparison purposes only, between-case standardized mean difference effect sizes were calculated and are reported in Table 1. The range of effect sizes was 0.5 to 3.67, the average effect size was 1.61 ($SD = 0.9$), and the median effect size was 1.51. Effect size statistics were aligned to visual analyses. In sum, findings from the current synthesis indicate that interventions that teach self-determination components have relatively large effects on reading outcomes.

Effects of self-determination skills taught in isolation. Seven studies taught students one or more reading strategies alongside self-regulation skills (Albers & Hoffman, 2012; Brown et al., 2014; Hagaman et al., 2012; Jozwik & Douglas, 2017; L. H. Mason, 2004; Rouse et al., 2014; Solís et al., 2017). The average effect size for the two RCTs was 1.04 ($SD = 0.51$). For the five SCDs, the average Tau-*U* was 0.69 ($SD = 0.13$) and the median was 0.72. Six studies taught self-regulation skills only (Billingsley, 1977; Chase & Clement, 1985; Edwards et al., 1995; Kim & Linan-Thompson, 2013; Varni & Henker, 1979). For these SCDs, the average Tau-*U* was 0.51 ($SD = 0.68$) and the median was 0.68.

Discussion

The purpose of this systematic review was twofold: (a) to identify how self-determination is taught to improve reading outcomes for students with or at risk for LD in elementary school and (b) whether interventions with components related to self-determination improve the reading outcomes for this population. In previous literature reviews (e.g., Algozzine et al., 2001; Konrad et al., 2007), the focus was on self-determination components and their effects on academic skills of students with disabilities from elementary through secondary and, as such, it was unknown how self-determination differentially impacts reading outcomes for elementary students with or at risk for LD. Although self-determination is a continual process in human development, it is imperative that foundational self-determination skills are taught in the elementary grades so that individuals with LD will develop skills that will empower them as adults (Palmer et al., 2012).

Investigations of Self-Determination to Improve Reading Outcomes

Our findings highlight that application of self-determination at the elementary level for students with or at risk for LD is limited, in that the primary component taught was self-regulation. While goal setting was observed in several studies, it was always paired with self-regulation components as part of the intervention package. Only one study (Solís et al., 2017) investigated another self-determination component, positive attributions, albeit alongside goal setting and self-regulation. As such, the evidence reviewed pertains only to the effects of instruction that include subcomponents of self-regulation (i.e., self-observation, self-monitoring, self-instruction, self-evaluation, self-reinforcement), and not self-determination as a whole. The current synthesis provides evidence that interventions that teach subcomponents related to self-regulation improve reading outcomes for elementary-age students with or at risk for LD. Evidence from the current synthesis highlights that although positive results are associated with self-regulation, there is a large gap in the literature to teach other self-determination skills to elementary students with or at risk for LD.

This review identified 12 intervention studies that taught self-regulation skills to elementary-age students. Within the larger construct of self-regulation, self-monitoring components were most frequently investigated. This is not surprising, as self-monitoring is a prominent focus in the

self-determination literature, with several reviews exclusively focused on the topic (e.g., Bruhn et al., 2015; Guzman et al., 2018; Joseph & Eveleigh, 2011). Guzman and colleagues (2018) indicated that studies that used self-monitoring components for elementary students had large effect sizes (Tau-U = 0.87) as well as for students in special education (Tau-U = 0.96). Similarly, our findings from studies that taught self-monitoring indicated large effects (M Tau-U = 0.71; M d = 1.05) for elementary students with or at risk for LD. These self-monitoring interventions taught students how to assess and record their comprehension (k = 3), vocabulary (k = 3), and oral reading fluency (k = 1) performance.

Goal setting was always packaged within interventions with a self-regulation component. This is because the participants had to monitor whether they had met their predetermined goal. For example, the intervention package used by Hagaman et al. (2012) required students to first set goals related to past performance (i.e., goal setting based on self-evaluation data). Then, at the end of each session, students were required to assess whether they had met their goal (i.e., self-monitoring). Billingsley (1977) incorporated daily self-observation and goal setting to improve the number of words read correct and effects were questionable. Visual analyses of two of the three included graphs did not indicate experimental control. In fact, Tau-U effect sizes were negative for these two students with significant negative trends during intervention phases. Self-observation without self-monitoring or self-evaluation may attribute to the notion that students with LD are not doing as well as they think they are since they are not monitoring their progress. Students, specifically those with ADHD, have a tendency to overestimate their perceived capabilities as compared to typically developing peers (Hoza et al., 2012). Future studies that incorporate goal setting should consider providing students with a visual, through self-monitoring, rather than just noting behaviors, as with self-observation.

Effect Sizes

Findings from the current synthesis suggest that self-regulation instruction has a positive effect on reading outcomes. The average Cohen's d for RCTs was 1.04 and the average Tau-U estimate for SCDs was 0.63. Interpretation parameters for these statistics indicate effects were relatively large (Cohen, 1992; Vannest & Ninci, 2015). It should be noted two third-grade students in one study produced negative effects (Tau-U = −0.74, −0.18; Billingsley, 1977). In this self-observation and goal setting study, the negative effect may be attributed to the lack of monitoring discussed previously. Another possible reason may be related to procedures. Students selected reading fluency goals from a list based on baseline performance. For these two students, their highest reading fluency score (i.e., words read correct per minute) across the study was in baseline. Performance on reading fluency may be affected by pre-exposure to topics or familiarity with vocabulary, resulting in higher or lower performance. Attaining goals based on the highest baseline score appeared challenging. In the present synthesis, no other negative effects were observed, and the next three lowest effect sizes were 0.20 (Varni & Henker, 1979), 0.29, and 0.39 (Hagaman et al., 2012). In fact, the median Tau-U (0.71) is higher than the mean (0.63), indicating the data are skewed to the left. While considering the negative effects, we cautiously conclude teaching self-determination skills positively impacts reading performance for elementary students with or at risk for LD.

Furthermore, we compared effect sizes for studies that taught self-regulation skills alone (M Tau-U = 0.51; M d = 1.04) and studies that taught self-regulation skills alongside reading instruction (M = 0.69; no RCTs included). Moderate to large effects were found in both scenarios. Targeting self-regulation may support students' academic growth. By definition, students with or at risk for LD have more experiences of failure in reading. A history of reading failure results in weakened persistence (Valås, 2001). Directly teaching self-regulation skills to persevere through difficult reading tasks is an important part of the solution to impact reading proficiency (Fuchs et al., 2017) and results from this synthesis support this position.

Limitations

This study has several limitations that must be noted. First, there are inconsistencies in the literature in the terminology used to define self-determination components. Therefore, the authors made judgments to categorize interventions as being included or excluded from the synthesis using prior research on self-determination literature as the basis of their decision-making (Konrad et al., 2007; Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015; Wehmeyer et al., 1997). Also, authors made judgments to classify interventions based on recommended components of self-determination in the research (Wehmeyer et al., 1997). The descriptions reflecting self-determination used within interventions were carefully analyzed to accurately categorize components. Interventions that focused on self-determination components that did not use terms related to the components examined in this study may have been overlooked. As a field, we must carefully define our independent variables so that comparisons can be made across studies.

Simple average effect sizes are reported, and these estimates were not meta-analyzed. They do not take into account sample sizes or correlated effects from multiple studies contributing more than one effect size over multiple reading measures. The decision to not meta-analyze the effect sizes was based on the lack of measurement comparability. The majority of measures used were researcher

created and very few were standardized. Therefore, true variation in magnitude would have been confounded by differences in measurement scales. The findings, as they stand, are important to the field of education, most notably that more research is needed at the elementary level to understand the effects of self-determination for students with or at risk for LD. Once more, studies have investigated reading outcomes using standardized measurement, a meta-analysis of effects may be warranted.

Implications for Practice

Although there are promising findings related to teaching self-determination, teachers have reported receiving little training or professional development related to self-determination (Carter et al., 2011). Elementary teachers reported feeling unprepared to teach self-determination skills, and they were unlikely to provide formal or informal self-determination instruction (C. Mason et al., 2004). Nevertheless, elementary educators report they find value in self-determination skills, which suggests the need for a more concentrated effort on teaching self-determination skills at the elementary level (Stang et al., 2009). Furthermore, only one study (L. H. Mason, 2004) measured skills related to self-determination (i.e., intrinsic motivation and self-efficacy). There currently is no standardized tool for assessing self-determination at the elementary level, leaving a large gap in our knowledge of how self-determination is impacted for this population. Developing a self-determination measure for elementary students would be a valuable contribution to the field of special education.

Conclusion

The aim of the present synthesis was to investigate the effectiveness of interventions that taught self-determination components to improve the reading achievement for elementary-age students with or at risk for LD. Evidence documents all existing interventions included self-regulation and result in moderate to large effects on reading skills for this population of students. However, this synthesis highlights the large gap in the literature in regards to what we know about other self-determination components' effect on the reading achievement of elementary students with or at risk for LD. There are still questions with regard to the effects of other self-determination components and measuring self-determination for this population.

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Supplemental Material

Supplemental material for this article is available on the LDQ website along with the online version of this article.

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