A question of calibration: A review of the self-efficacy beliefs of students with learning disabilities

Rob Klassen
Simon Fraser University

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e-mail: rmk@sfu.ca

Rob Klassen
13624 Blackburn Ave.
White Rock, B.C.
V4B 2Y8
Abstract

The purpose of this article is to review the literature investigating the self-efficacy beliefs of students with learning disabilities. To begin, motivational and metacognitive difficulties of students with LD are briefly discussed, followed by a synopsis of Bandura’s self-efficacy theory, with special attention paid to the issue of calibration. From the literature search, twenty-two studies met the criteria of (a) use of a measure of self-efficacy, and (b) inclusion of a sample of students identified as learning disabled. The resulting body of literature is summarized and analyzed in terms of the nature of the sample, the performance task or domain, the self-efficacy measure used, the research question and outcomes, and the accuracy of calibration between perceived self-efficacy and task outcome. The results from this review suggest that in specific contexts—in the writing performance of students with specific writing difficulties, in particular—students appear to optimistically mis-calibrate their self-efficacy. Some methodological problems found in some of the research, such as “conceptual blurring,” are next discussed. Finally, suggestions are made to improve the accuracy and validity of self-efficacy measurement.
Bandura claimed that “Among the mechanisms of personal agency, none is more central or pervasive than people’s beliefs about their capabilities to exercise control over events that affect their lives” (1989, p. 1175). Self-efficacy has been defined as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 2). These perceptions of self-capabilities or self-efficacy have been identified as key factors affecting thought patterns and performance in a wide variety of tasks. Self-efficacy perceptions influence choice of activity, task perseverance, level of effort expended, and ultimately, degree of success achieved. Inaccurate estimates of self-efficacy may develop from faulty task analysis or from a lack of self-knowledge (Bandura & Schunk, 1981)—two problems shown to be prevalent in students with learning disabilities (Butler, 1999; Meltzer, Roditi, Houser, & Perlman, 1998; Swanson, 1989). The issue of calibration of self-efficacy beliefs with ensuing performance has been described by self-efficacy researchers (e.g., Bandura, 1997; Pajares, 1996; Sawyer, Graham & Harris, 1992) who maintain that optimistic self-efficacy beliefs are instrumental to the successful completion of challenging tasks. If, as suggested by various researchers (e.g., Butler, 1998a; Meltzer et al., 1998), students with learning disabilities struggle with self-knowledge and task awareness, their ability to judge their efficacy—the way in which they calibrate their ability and performance—may be affected. Although a number of investigators have conducted research addressing the self-efficacy beliefs of students with learning disabilities, a synthesis of this work has not been completed, and the issue of calibration of efficacy beliefs has not been comprehensively addressed.

The past 20 years have seen considerable research of a variety of “self” constructs and their relation to students with learning disabilities (for example, see review of self-concept of children with LD by Chapman, 1988). A great deal of research investigating various aspects of
self-efficacy beliefs has also been conducted, with a number of studies including students with learning disabilities, but there has been no comprehensive and critical review of the role self-efficacy beliefs play in the academic functioning of individuals with learning disabilities. This current review examines the literature investigating the self-efficacy beliefs of students with learning disabilities. I begin by briefly addressing motivational and metacognitive problems of students with learning disabilities, and follow this by discussing the self-efficacy component of Bandura’s social cognitive theory. The significance of the issue of calibration—the degree of congruence between efficacy beliefs and actual performance—is then discussed. A certain degree of optimism or positive bias in one’s calibration is thought to be advantageous (Bandura, 1997) but students with LD struggle with self-knowledge and self-assessment (Butler, 1999), and these deficits may adversely influence the students’ accuracy of calibration. Following the discussion of calibration issues, I summarize and critically review the empirical studies which explore the self-efficacy beliefs of LD students. After summarizing general research findings, I approach the extant literature with the following questions: How accurately calibrated are the self-efficacy measurements of students with learning disabilities?, Why might some students with learning disabilities overestimate their beliefs?, What is the potential impact of mis-calibration of efficacy beliefs?, and What are some of the problems with the way in which self-efficacy is measured in these studies? Finally, implications for practice and suggestions for future research are presented based on the findings in this review.

Motivation, metacognition and learning disabilities

Motivational beliefs influence task approaches and affect the development of metacognitive skills. Well-developed skills in metacognition—awareness of one’s cognitive processes, cognitive strengths and weaknesses, and self-regulation (Flavell, 1976)—are necessary for successful academic functioning, but LD students have been shown to display deficiencies in evaluating their skills and progress (e.g., Swanson, 1989; Wong, 1987; Wong, 1991). Students with learning disabilities experience difficulties with analyzing task requirements, selecting and implementing strategies, and monitoring and adjusting performance (Butler, 1998a). Butler (1999) found 76% of postsecondary LD students to struggle with task analysis. In writing tasks, students with LD have been found to focus on lower-order processes, like spelling or grammar,
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while ignoring higher-order demands such as writing to an audience or organizing ideas (Wong, Butler, Ficzere, & Kuperis, 1996). In mathematics, students with LD struggle with persistent skill deficits which adversely affect their ability to decipher the demands of higher-level mathematics problems (Jones, Wilson, & Bhojwani, 1997). When compared with their normally-achieving peers, LD students are in general less metacognitively aware, and tend to focus on the concrete demands of tasks, rather than on the more obscure evaluative and self-awareness skills demanded by metacognitive processes (Butler, 1998a). An understanding of task demands—what Borkowski (1992) calls the “sizing up” of a task—is essential for successful academic performance. Students with LD may mis-analyze tasks because of misconceptions held about the nature of the task, or because of a lack of awareness that analyzing tasks is an important step in learning (Butler, 1996). The level of effort and persistence expended by a learner is at least partly the result of awareness of task demands and personal capabilities (Butler & Winne, 1995). To sum up, students with learning disabilities struggle with various aspects of metacognition, one component of which may be the assessment or evaluation of the nature of the task encountered.

Self-efficacy theory

Self-efficacy beliefs are context-specific evaluations of the capability to successfully complete a task, and are formed through mastery experiences, vicarious experiences (observation of others), social/verbal persuasion, and interpretations of physiological and emotional states (Bandura, 1995). These beliefs contribute to prediction of academic outcomes beyond the contributions offered by ability, previous attainments, knowledge and skill alone. Students need more than ability and skills in order to perform successfully; they also need the sense of efficacy to use them well and to regulate their learning (Bandura, 1993). Self-efficacy beliefs differ from related constructs such as competence beliefs and self-concept in that they are more task-specific, and are established through normative criteria rather than through comparison with others (Zimmerman, 1995). Perceptions of efficacy play a part in managing motivation in expectancy-value theory, which asserts that individuals evaluate courses of behavior for their value or potential to produce certain outcomes. Shell, Murphy, and Bruning (1989) found that adding a self-efficacy component significantly increased the predictiveness of expectancy-value.
Self-efficacy beliefs, then, consist of the degree to which individuals believe they can control their level of performance and their environment in specific contexts (Bandura, 1997).

Calibration

The issue of calibration addresses the accuracy of one’s beliefs about potential functioning. In the measurement of self-efficacy for academic functioning, students might be asked to rate how confident they are that they can perform a certain academic task. For example, Graham and Harris (1989b) measured students’ self-efficacy for writing essays using a 5-item, 10-point scale which asked about “perceived ability to write an essay with a ‘good’ beginning, that gave three reasons to support the premise, and had a ‘good’ ending” (p. 206). Students then responded on a scale which ranged from “not sure” (10) through “maybe” (40), “pretty sure” (70) to “real sure” (100) in 10-point increments. The calibration of beliefs with performance is assessed by comparing mean efficacy ratings with task performance. In this example, the students displayed a low level of essay-writing performance, although measured self-efficacy beliefs showed a mean of close to 70 or “pretty sure” (i.e., “pretty sure” that I can write a good essay). These assessments of self-efficacy can be viewed as a function of metacognitive knowledge, and are derived from the understandings that students build about themselves (Butler, 1998a).

Optimistic estimates of one’s efficacy are hypothesized to increase effort and persistence, and promote accomplishment in challenging circumstances (Bandura, 1986, 1997). In an academic setting, optimistic efficacy beliefs are necessary for attempting novel tasks or learning new material. There is evidence that most normally-achieving students are somewhat overconfident when asked to rate their academic abilities (e.g., Pajares & Kranzler, 1995; Pajares & Miller, 1994). Although moderate overconfidence is purported to promote achievement (Bandura, 1997), significant incongruence between efficacy beliefs and subsequent performance may not be so benign: naive optimism or “gross miscalculation (between efficacy judgments and performance) can create problems” (Bandura, 1989, p. 1177). One of the aims of this review is to examine how students with learning disabilities—who have been shown to display poor task analysis and metacognitive skills—calibrate their efficacy beliefs with criterial tasks.
Methods

The purpose of this review was to investigate the self-efficacy beliefs of students with learning disabilities. The decision was made to restrict inclusion to empirical studies that specifically used the terms “self-efficacy” and “learning disabilities”, resulting in the exclusion of studies that used comparable but differently-named constructs. For example, the term “learning disability” is typically operationally defined in research through the presence of an IQ-achievement discrepancy. Studies investigating “underachievement” (e.g., Carr, Borkowski, & Maxwell, 1991) use a similar operational definition, but the two terms are conceptually different with regard to hypothesized etiology. In a similar fashion, ability self-concept (e.g., Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991) is related to self-efficacy, but differs in its theoretical underpinnings. The present study is restricted to experimental and correlational research specifically investigating the perceived self-efficacy of students with learning disabilities in an educational context.

Search Procedure

To locate pertinent literature, the following procedure was followed. First, the time period searched (1977 - 2000) was restricted to the period following Bandura’s 1977 publication of “Self-efficacy: Toward a unifying theory of behavioral change,” which was thought to signal the advent of self-efficacy research. Next, two on-line databases—Educational Resources Information Center (ERIC) and PsycINFO—were searched using the following key words found in the abstracts: learning disab* and self-efficacy. The abstracts of the 28 “hits” from ERIC and the 37 hits from PsycINFO were scanned (there was some overlap between the two databases), and 22 studies were deemed to meet the stated criteria—the inclusion of students with learning disabilities, and the use of a measure of self-efficacy. Of the 22 studies included in this review, 13 were published after 1990, and 9 were published between 1985 and 1989.

Analysis

The 22 studies included in the review were summarized and analyzed in accordance with the following questions:
• What is the nature of the sample (participants) and what academic domains are included in the study?
• Are gender differences in efficacy beliefs addressed?
• What is the main research question in the study and what are the outcomes in terms of self-efficacy?
• Are the efficacy beliefs of students with learning disabilities compared with the beliefs of normally-achieving or low-achieving students, and if so, what are the differences?
• Is calibration addressed, and if so, what conclusions are drawn?

Results

The studies included in this review are listed and summarized in the Appendix. Columns 1 through 7 of the Appendix include the following: (1) Author and date published, (2) number of students included in the study, with age and grade span, (3) domain and nature of performance task, (4) brief description of the self-efficacy measure used, (5) primary research question or intervention used, (6) self-efficacy outcomes, (7) authors’ comments on calibration.

Participants and Domain

As can be seen in column 1 of the Appendix, the number of participants in each study ranged from 3, in the case of Graham and Harris (1989b), to 336, in the study conducted by Gresham, Evans, and Elliott (1988). The mean sample size was 66.8. The youngest students included were the 6 to 8 year-olds in the Omizo, Cubberly, and Cubberly (1985) study, whereas four of the studies included students in a college or university setting. In terms of educational setting, nine of the studies included students in elementary schools, five studies examined the efficacy beliefs of students in high schools, four studies were situated in college or university settings, and four studies included students from an age range spanning elementary and high school. In light of the fact that research on reading disabilities dominates the LD field (Shaywitz, Fletcher, Holahan, & Shaywitz, 1992), it might have been predicted that research situated in the field of learning disabilities would have predominantly focused on the reading efficacy beliefs of
students. This was not the case. Column 3 of the Appendix displays the domain(s) investigated in each study. The performance domains included in the studies ranged as follows: eight of the studies investigated writing as the area of interest; five examined efficacy for various math skills; one study examined reading; one study looked at career and vocational interests; and in seven studies the domain explored was either general academic functioning or “mixed” academic functioning. In this last category—mixed or general—some of the studies incorporated measures of global academic efficacy beliefs (Baum & Owen, 1988; Gresham et al., 1988; Hampton, 1998; Saracoglu, Minden, & Wilchesky, 1989). The two studies authored by Butler (1995, 1998b) investigated self-efficacy in a variety of academic domains, depending on student need. In the Slemon and Shafrir (1997) article, students estimated their efficacy for performance on standardized intelligence and academic achievement tests.

Gender

With non-LD populations, significant differences in self-efficacy beliefs due to gender have been found in several studies, in a variety of academic topics (e.g., Pajares & Johnson, 1996; Pintrich & DeGroot, 1990). Gender as a variable was included in a minority (5 of 22) of the studies in this review. In some cases, the low proportion of girls in the sample of children with learning disabilities made it difficult to perform meaningful statistical analyses of gender differences. Gresham et al. (1988) found no significant gender interaction in their multivariate analysis of variance. It should be noted that although their sample of 336 students included some students with learning disabilities, the majority of the students (287) were either gifted or “nonhandicapped”. Furthermore, the LD students were included in a mixed group of “Mildly Handicapped” students, which consisted of unspecified numbers of learning disabled, mildly mentally handicapped, and behavior disordered children. Panagos and DuBois (1999) included gender as a variable in their multiple regression investigating career interest, and found no significant contribution made by gender to career interest. They did not, however, investigate any gender differences in the students’ perceived self-efficacy. In the study investigating the social and academic self-efficacy beliefs of learning disabled university students, Saracoglu et al. (1989) found that female students reported lower self-esteem than males, but not significantly lower self-efficacy beliefs. In this study, post-secondary students were asked to rate their efficacy
beliefs on a scale which measured their “general and social self-efficacy expectancies” (p. 591). As will be discussed below, measurements of global self-efficacy have been criticized: “It is no more informative to speak of self-efficacy in global terms than to speak of nonspecific social behavior” (Bandura, 1986, p. 411). Schunk (1985) included sex as a variable in his study on goal setting in arithmetic. He found no significant differences or interactions involving sex of child. Likewise, Schunk and Cox (1986) found no significant effects for sex in their study on strategy training and attributional feedback.

**Interventions and Outcomes**

Most of the studies—13 of 22—were designed to assess the effectiveness of various interventions in a wide variety of settings and domains. Column 5 of the Appendix summarizes the intervention being investigated, while column 6 examines the outcomes in terms of changes in self-efficacy beliefs. In general, these studies found that increases in performance skills following the intervention were mirrored by increases in measured self-efficacy beliefs. However, there were some anomalous findings and exceptions to this generalization. In Butler’s (1998b) study of her intervention method—Strategic Content Learning—task-specific self-efficacy beliefs increased along with academic skills, but global efficacy beliefs were not significantly improved. Graham, Macarthur, Schwartz, and Page-Voth (1992) found efficacy beliefs to decrease after the treatment in three of four cases—the authors remarked that pre-test efficacy beliefs were overestimated, and became more realistic after treatment. In the study investigating goal setting and strategy use in writing, Page-Voth and Graham (1999) found no significant increases in self-efficacy beliefs as a result of intervention. Wong, Butler, Ficzere, and Kuperis (1997) did not find increased self-efficacy beliefs in conjunction with their strategy intervention for writing compare-and-contrast essays, although self-efficacy did increase along with performance in their previous study (Wong et al., 1996) involving the writing of opinion essays.

**Students with LD compared to NA (normally-achieving) students**

Of the studies—9 of 22—not investigating a specific academic intervention, several were designed to explore differences in efficacy beliefs between learning disabled and normally-
achieving populations. None of the studies reviewed used low-achieving students as control groups. Column 2 of the Appendix lists the numbers of LD students included in each study, and makes note of the studies which included comparisons using control groups of normally-achieving (NA) students. Baum and Owen (1988) found that the efficacy beliefs of high ability/LD students were lower than those of either the LD/Average or High Ability (non-LD) groups. In answer to their research question “Why do bright, learning disabled students have such a poor sense of self-efficacy when they possess greater intellectual and creative potential? (p. 325), they suggest that bright LD students do not view their classroom accomplishments as meaningful or meeting their own elevated internal standards. In their comparison of LD and normally-achieving students in the domain of writing, Graham, Schwartz, and MacArthur (1993) found no differences in self-efficacy between the two groups, even though the LD students were reported to struggle with writing tasks. The authors conclude that more research is needed to explore why LD students tend to mis-calibrate and overestimate their writing abilities. (It should be noted that overestimation of efficacy beliefs can be defined as either average task performance coupled with overly-optimistic self-efficacy ratings, or as average efficacy ratings coupled with low task performance. In the Graham et al. (1993) study, the self-efficacy ratings of the two groups were not significantly different, but the level of performance was much lower for the LD students.)

Gresham et al. (1988) reported that the mainstreamed MH (Mildly Handicapped – including children with LD) students displayed lower levels of academic and social self-efficacy than did the nonhandicapped and gifted students. As previously mentioned, the results of this study need to be viewed in the light of the nature of the sample of the MH students: the proportion of LD students in the MH group was not known to the researchers, which makes generalization to specific groups difficult. Hampton’s study (1998) investigating sources of LD found that LD adolescents rated each of the four sources of academic self-efficacy—past performance, vicarious learning, social persuasion, and physical arousal—lower than did the non-LD control group. In the second section of this article, the results from a regression analysis showed that for LD students only past performance and vicarious learning contributed significantly to the predictive equation (non-LD students were not included in this analysis).
Pintrich, Anderman, and Klobucar (1994) compared students with and without learning disabilities on a number of motivation and cognitive variables. Although self-efficacy levels were not significantly different between the two groups, metacognition and reading comprehension were lower for the LD group. In other words, whereas both groups felt about the same in terms of reading confidence, the LD group performed at a significantly lower level on the reading task. University students with and without LD were compared in the study conducted by Saracoglu et al. (1989). On the global Self-Efficacy Scale used, no differences were found between the two groups in either of general or social self-efficacy.

Slemon and Shafrir (1997) included LD and normally achieving college students in their study investigating calibration of efficacy and performance and compared the two groups for accuracy of prediction (calibration) of standardized achievement (WRAT-R) and intelligence test (WAIS-R) subtest scores. The authors found the LD students to underestimate, overestimate, and accurately estimate their performance on the various subtests, but to generally show more accuracy or less optimism than the normally achieving students. For example, on the achievement test, the WRAT-R, the LD students accurately estimated their Reading score, underestimated their Spelling score, and overestimated their Arithmetic score. The NA (normally achieving students) also showed variation in the accuracy of their estimation, but displayed a different pattern: these students overestimated their Reading, and accurately estimated Spelling and Arithmetic. Little difference between the two groups was seen on the Performance subtests of the WAIS-R, whereas on the Verbal subtests, the LD group estimated three subtests accurately, underestimated one subtest, and overestimated another. The NA group overestimated four subtests on the Verbal Scale, and accurately estimated the remaining subtest. The authors concluded that “although students with LD are motivated... they nonetheless tend to lack the optimistic beliefs about ability of the NA students” (p.11).

Calibration

In eight of the studies reviewed in this article, the authors address the apparent mis-calibration of efficacy beliefs with the subsequent performance tasks (see Table 1 for scale used, degree of calibration, and self-efficacy ratings). In the eight studies addressing accuracy of self-
beliefs, the authors themselves determined whether or not the self-beliefs measured were underestimates, generally accurate, reasonably optimistic, or serious overestimates. It is certainly not always a clear thing to label self-efficacy beliefs as “accurate” or as “overestimates”; in most of the studies (for example, see the above description of Graham & Harris, 1989b study), the self-efficacy measures were not directly connected with the criterial task. As an example, a finding of a mean self-efficacy rating of 65 on a 10 to 100 point efficacy scale might be difficult to interpret in terms of accuracy of perceived efficacy for writing essays. In a few of the studies in the review (e.g., Alvarez & Adelman, 1986; Schunk, 1985; Schunk & Cox, 1986), the domain investigated—arithmetic—and the methodology used made the assessment of the accuracy of the judgments quite clear. In the domain of arithmetic, it is possible to briefly display the actual task to the student for purposes of efficacy measurement, and then follow up with the same task used as a performance measure. Of the eight studies in which overestimates of efficacy beliefs are discussed, five of the studies investigated the domain of writing, one explored efficacy for reading, one study examined arithmetic, and the final study looked at all three of these academic areas plus cognitive functioning in the context of a standardized achievement and intelligence tests.

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Alvarez and Adelman (1986) conducted a study which investigated the nature of miscalibrations in students with “psychoeducational problems” (including students with LD and dyslexia). The researchers showed students a page of pairs of increasingly difficult math items, and asked the students to judge their confidence to complete each pair of questions. After asking the students for efficacy judgments, the researchers asked the students to complete as many of the items as they could. Alvarez and Adelman found that 30% of judgments to complete specific math items were overestimates, with just 2% of the judgments underestimating ability to complete the item (Table 1); the remainder—68%—of the judgments were reasonably accurate. Perhaps most interestingly, the authors noted that the students apparently were capable of accurately judging their efficacy when the task items were judged as either obviously easy, or obviously difficult. They observed that students typically mis-calibrated on items that were
viewed as potentially within their capability. This phenomenon of overstatement of efficacy for realistically challenging tasks was attributed to a “self-protective” function, in which students erected a “facade of competence” to hide their academic difficulties. Graham and Harris (1989a), investigating self-instructional strategy training for LD students with writing deficiencies, found that “LD students consistently overestimated their composition abilities” (p. 360). They postulated that the unrealistic pretask expectancies of the students in their study might be due to “comprehension deficiencies, use of a self-protective coping strategy, or a developmental delay in the ability to match task demands to ability level” (p. 360). In their case study of three LD students exposed to strategy training, Graham and Harris (1989b) again found the students consistently overestimated their writing skills. Graham et al. (1992) found students with learning disabilities overestimated self-efficacy for writing at pre-test, but displayed more realistic confidence beliefs after goal setting instruction. The authors had predicted that the students’ efficacy beliefs would become more realistic because “the process of goal setting has been shown to facilitate self-evaluation” (p. 332). In other words, the students self-knowledge was enhanced by the intervention, resulting in more accurate self-appraisals. Again in the domain of writing, Graham et al. (1993) and Sawyer et al. (1992) found students with learning disabilities to express relatively high confidence for composition tasks despite poor performance on pretest writing measures.

In the only study reviewed which specifically examined perceived efficacy for reading tasks, Pintrich et al. (1994) found LD students to express levels of reading confidence that were the equal of the more capable readers without learning disabilities. The LD students averaged a rating of 5.37 on a 7-point scale, whereas the non-LD students displayed a mean of 5.71 on this same scale—a nonsignificant difference. In light of the LD students’ documented disability in reading, the authors commented that these students felt “rather efficacious” at reading; that is, the students with LD expressed about-equal confidence for reading, even though their skill level was considerably lower. The final study discussed in this section (Slemon & Shafrir, 1997) investigated efficacy beliefs for performance on the Reading, Spelling, and Arithmetic subtests of a standardized test—the WRAT-R—and for test performance on an intelligence test—the WAIS-R. Both the LD and NA groups showed overestimates, underestimates, and accurate
estimates for both achievement and intelligence test performance. Differences were most clearly seen on predictions of the Verbal Scale of the WAIS-R where the LD students were generally accurate (three of five subtests) and the NA students generally (four of five subtests) overestimated their level of performance. The authors interpreted the findings to show that LD students were lacking in the optimistic beliefs shown by the NA group.

One study included comments remarking on the relative accuracy of the LD students’ self-evaluations. Although the majority of the writing studies found LD students to overestimate self-efficacy beliefs, Page-Voth and Graham (1999) found pre-test self-efficacy estimates “generally neutral” with mean pre-test scores just above 3 on a 5-point Likert-type scale. Other studies appeared to show results of “neutral” efficacy beliefs, although the accuracy of calibration was not commented on by the authors. The two studies by Wong et al. (1996, 1997) found both pre-test and post-test efficacy measures at about 30 out of a possible 50; in other words, a mean efficacy response of about 3 on a 5-point Likert scale. The studies investigating goal setting, strategy training and attributional feedback in the domain of arithmetic (Schunk, 1985; Schunk & Cox, 1986) used efficacy measurement techniques that were similar to each other: students first received training in using the efficacy scale by estimating their capabilities to jump progressively longer distances. After teaching the students the properties of the scale, the researchers showed the students 25 pairs of arithmetic questions for about 2 seconds each. Students estimated their capability to solve each of the pairs of problems. Efficacy judgments in this case were moderate, with pre-test self-efficacy means about 50 (on a 10 to 100 scale with 10-unit intervals) in each of the studies. When this method of efficacy measurement is used—estimating confidence to perform the actual task being shown—increased accuracy appears to be the result in some cases. Similar methodology was used in the Slemon and Shafrir study (1997) in which some predictive beliefs were found to be accurate as well.

Discussion

In the preceding section it has been seen that for the most part, self-efficacy ratings are predictive of subsequent functioning and are raised in conjunction with intervention and
subsequent performance increases. Some of the areas explored—gender differences, and self-efficacy differences between LD and non-LD students—offer few obvious trends, while other areas, such as self-efficacy in the writing domain, offer more promising findings. In the following section, some of the most clear findings are discussed, with attention paid to two central questions pertaining to calibration and problems with self-efficacy measurement.

*Do students with learning disabilities mis-calibrate their efficacy beliefs?*

In 8 of 22 studies, the authors commented on students’ mis-calibrations of efficacy beliefs with the criterial task. For the most part, the mis-calibrations were errors of over-estimation, with only one study—that by Slemon and Shafrir (1997)—finding LD students underestimating their self-efficacy, in this case for spelling and a short-term memory task, although they overestimated their efficacy for arithmetic skills and a long-term memory task. Authors of the remaining 14 studies either did not comment on the accuracy or calibration of students’ self-efficacy beliefs or found them “neutral.” Interestingly, investigations into the domain of writing showed the most consistent problems with calibration: five of the eight studies investigating the writing of students with LD revealed that the students were overly optimistic about their writing abilities, even though in these five studies the students had previously-identified writing disabilities. Of the remaining three studies which did not find over-estimates of efficacy, only one study (Page-Voth & Graham, 1999) included students showing a previously-identified specific weakness in written language; the other two studies, conducted by Wong and her colleagues (1996, 1997) consisted of a mixed group of low-achievers and students identified as learning disabled because of low reading scores. In other words, in the studies investigating the writing skills of students identified as learning disabled specifically in the area of writing, five of six studies showed these students to over-estimate their writing capabilities. Similarly, in the lone study investigating the reading efficacy of students specifically identified as reading disabled (Pintrich et al., 1994), the ratings of self-efficacy overestimated actual level of performance. Graham and Harris (1989b) noted that there is “a growing body of literature that indicates that learning disabled students have difficulty accurately assessing or predicting their performance capabilities” (p. 212).

*What is the evidence that students with LD accurately calibrate their efficacy beliefs?*
There is some evidence that in the area of mathematics functioning students are generally accurate in their calibrations of efficacy and performance. Of the five studies specifically targeting math and math-related self-efficacy, only one study (Alvarez & Adelman, 1986) commented on evidence of over-estimates of efficacy beliefs, but even in that study 68% of students were generally accurate in their efficacy estimates. It might be concluded, then, that students with learning difficulties are somewhat accurate in estimating their ability to complete specific math exercises. One possible factor contributing to this accuracy might be the methods used to measure efficacy beliefs. In this domain, it is possible (e.g., Schunk, 1985; Schunk & Cox, 1986) to briefly show the students the actual criterial task, have them rate their efficacy to complete that task, and then have them attempt the task. The task analysis component of self-efficacy beliefs is much clearer for students contemplating a specific arithmetic task in comparison to a writing task.

*Why might some students with learning disabilities overestimate their efficacy?*

The results from this review suggest that in some cases, students with learning disabilities overestimate their capabilities to perform certain tasks. The findings are somewhat tentative, and may not generalize to all subject matters, but in some circumstances—particularly in the writing performance of students with previously-identified writing difficulties—students with learning disabilities appear to be unrealistically optimistic about their capabilities. There are a number of possible factors underpinning the finding of optimistic efficacy beliefs in certain students with LD. Estimations of self-efficacy can be construed as a form of metacognition, and students with learning disabilities have been found to display significant metacognitive deficiencies (e.g., Butler, 1999; Wong, 1985; 1986). In this review, the study by Pintrich et al. (1994) found LD students to possess significantly lower metacognitive skills than did students without LD. Bandura and Schunk (1981) proposed that discrepancies between perceived efficacy and performance may be the result of task misunderstanding and deficiencies in self-evaluation.

Writing is a complex task, and self-assessment or reflection about challenging tasks like writing is a difficult process for many children with LD. Wong, Wong, and Blenkinsop (1989) found students with LD to focus on lower-order writing processes whereas normally-achieving students focused on higher-order processes. In this review, Graham et al. (1993) suggested that students...
with LD possess a less mature understanding of the process of writing composition in comparison with students without learning disabilities. Asking the question “How sure are you that you can write a good descriptive paragraph?” poses a challenging metacognitive task for the student with a specific learning disability. In a short period of time, the student needs to process the actual question, define and assess task demands, evaluate his or her capabilities to carry out the task, perhaps consider Bandura’s four sources of efficacy beliefs—past experience, vicarious experience, social persuasion, and physiological state—and finally come up with a numerical representation for the complete operation. All of this takes place while the researcher—probably a stranger—waits, tapping a pencil!

_What is the impact of mis-calibration of efficacy beliefs?_

In this review there have been several examples of inflated efficacy beliefs of students with learning disabilities. Pajares (1996) poses the question: “But how much confidence is too much confidence (and) when can overconfidence be described as excessive and maladaptive in an academic enterprise?” (p. 565). Social cognitive theory holds that optimistic self-efficacy beliefs typically foster increased perseverance and effort; however, in this review, it is suggested that for students with learning problems, positive efficacy beliefs—especially in the face of specific academic weaknesses—might not operate in the same way as for normally-achieving students. Bandura (1997) warns that “Deficient information leads to poor academic preparation” (p. 65). If self-evaluation can be seen as a reflection of self-knowledge or as metacognition, then gross misjudgments about one’s efficacy can be seen as misleading and potentially academically harmful. Butler (1998a) stresses the importance for LD students to construct accurate metacognitive understandings, and to mindfully reflect about learning processes. To a certain extent, cognitive strategy use depends on accurate self-awareness or self-knowledge; deficient self-knowledge may result in appropriate strategies not used, faulty task understanding, and difficulties with self-regulating and monitoring one’s progress. The overly-optimistic self-efficacy beliefs seen in LD students in some situations may, in fact, result in inferior academic functioning.
For those working with students with learning disabilities, the mis-calibration of efficacy beliefs might be seen as a naïve overconfidence for writing tasks. This overconfidence might be considered a warning sign of faulty task analysis or poor self-knowledge. Pajares (1996) suggests that the teacher’s response should focus on improving the student’s calibration skills through improved task understanding, rather than focusing on lowering the student’s efficacy beliefs. The findings from this review suggest that the domain of writing is particularly problematic for students with LD: training that develops both cognitive and metacognitive knowledge (Butler, 1998a) about writing tasks may lead to better understanding of the writing process, and eventually, to better writing performance.

What are some of the methodological problems found in these studies?

**Conceptual blurring.** The problem of “conceptual blurring” was seen in several of the reviewed studies. Some of the measures described strayed considerably from the basic definition of self-efficacy provided by social cognitive theory: a number of individual items purporting to measure self-efficacy in fact were measures of other related self-beliefs. For example, one of the studies included items such as “I like to write” and “I do writing on my own outside of school” as part of the measure of self-efficacy. Another efficacy measure included having the students rate their ability as “very below average” to “very above average” in a specific subject. Yet another self-efficacy measure asked students to use peer-comparisons as the basis of their self-efficacy measure (“1 = much worse than people my age, 10 = as well as people my age, 19 = much better than people my age.” Several of the studies included items such as “When my class is asked to write a report (or essay, or story), mine is one of the best”. The above items are perhaps meaningful, potentially useful measures of students’ beliefs about their capabilities—but they are not theory-grounded measures of self-efficacy. Pajares (1996) suggests researchers take “methodological precautions” when assessing unfamiliar motivation constructs, and to operationalize and use measures “in a manner consistent with the construct’s theoretical home” (p. 570). In other words, measures claiming to evaluate perceptions of self-efficacy need to be carefully constructed, and based on a careful reading of the relevant theoretical background.
Self-efficacy beliefs are perceptions of the capability to carry out certain types of performance and to achieve certain results: “How sure (or confident) are you that you can read a Dr. Seuss story out loud?” Efficacy beliefs may be related to perceptions of competence (“I’m a good reader”) and academic self-concept (“I feel that I’m pretty good at reading”, or “I’m a better reader than others in my class”) but they are conceptually distinct and are supported by different theoretical underpinnings. Suggestions have been made to ensure that the self-beliefs termed self-efficacy beliefs are, in fact, self-efficacy beliefs. Bandura (1997) and Pajares (1997) suggested that items be “phrased in terms of can do rather than will do. Can is a judgment of capability; will is a statement of intention” (p. 43). Klassen (in-press) proposed including the term “confidence” or another closely-related term in the measure (i.e., “How confident are you that you can...?” or “How sure are you...?”). Conceptual blurring of self-beliefs results in unclear findings which do not further understanding of the mechanisms of efficacy beliefs in the context of social cognitive theory.

**Global or generalized measures.** It is important to strike the correct balance in deciding at what level of detail and in what way performance tasks should be represented on the efficacy measure. Bandura (1997) cautions against using efficacy measurements of decontextualized minute subskills to represent broader performance functioning. Conversely, Bandura also warns that measurement of an overly-broad domain, like efficacy for general academic functioning, results in poor prediction due to the fact that such a domain consists of distinct subdomains which may vary markedly within an individual. Many of the studies in this review included efficacy measures that gauged important subskills of discrete academic domains like writing or arithmetic. For example, the writing measure used by Graham and Harris (1989a) showed reasonable specificity (level of precision or detail of the subtask measured) and appropriate correspondence (congruence between measure and performance task). In the Graham and Harris study, the authors asked 10 questions probing efficacy beliefs to write a story. The items were preceded with the stem “Can you write a story that,” and included “(a) tells about the main character’s feelings? (b) clearly tells about the setting? (c) has a good beginning?” and so on (p. 356).
Other studies reviewed, however, included measures that assessed self-efficacy in much broader terms, and that might be considered decontextualized, global measures of self-efficacy. Pajares (1996) warned “Generalized self-efficacy instruments assess people’s general confidence that they can succeed at tasks and in situations without specifying what these tasks or situations are” (p. 547). One of the reasons for the problem of decontextualized self-efficacy measures is that some studies are designed to assess self-efficacy beliefs as if they were fixed personality traits, rather than context-based perceptions of abilities to perform certain tasks. For example, several of the studies reviewed (Baum & Owen, 1988; Gresham et al., 1988; Hampton, 1998; Saracoglu et al., 1989) measured general academic and social self-efficacy, without reference to a specific domain of functioning. Although it could be argued that the domain concerned is “academic functioning”, it remains unclear that people possess firmly rooted self-efficacy beliefs about domains that are made up of numerous distinct parts—individual subjects or courses in the case of academic functioning. The difficulty with measuring global domains of functioning is that respondents cannot assess their efficacy with a particular activity in mind. Students with specific learning disabilities especially may view their various school-related capabilities in quite contrasting ways: “Well, I’m not at all confident I can read very well, but I’m pretty certain I can do difficult math questions,” and the measurement of overall academic self-beliefs may not uncover this range of perceptions. Certainly, the strong predictive power of self-efficacy, as compared to other more global self-beliefs, is based on the very fact of its being placed in a meaningful context.

Implications for practice

For teachers, it is one thing to work at boosting the beliefs of students who are pessimistic about their self-efficacy (see Pajares & Johnson, 1996). Dealing with students’ excessive overconfidence in certain domains may not be so easily managed. Findings from this review suggest that some students with learning disabilities may over-estimate their efficacy to complete writing tasks. For students with LD, optimistic efficacy beliefs may not increase effort and persistence, but rather mask strategy and skill deficits. If these mis-calibrated beliefs are based on inadequate self-awareness (Butler, 1999) or deficient information (Bandura, 1997) then students’ approaches to some writing tasks may prove inadequate. Approaches which foster the self-
awareness and self-regulation functions associated with metacognition (e.g., Butler, 1998; Meltzer et al., 1998) may improve the accuracy of students’ calibration and subsequent performance. Attempting to lower over-estimates of efficacy is discouraged (Pajares, 1996) but promoting academic self-awareness may result in a more realistic self-appraisal.

Self-efficacy scales may prove to be of use to teachers of students with learning disabilities. In the classroom, the inclusion of a writing self-efficacy measure might form part of a pre-writing exercise. An assessment of efficacy beliefs would provide the teacher with insight into the perceptions held by students about their abilities, and help identify mis-calibrations. Self-efficacy measures for specific tasks can be brief and informative. A 5-item measure using the stem “How confident (or sure) are you that you can...?” (create an outline, use correct punctuation, write a story, etc.) with a 7-point response scale (as suggested by Bandura, 2001) could be completed by most students in a minute or two. Teachers would gain information that might help identify those students whose overconfidence is interfering with the development of appropriate skills and strategies.

Suggestions for future research

One important finding from this review is that in some domains, especially writing, students with learning disabilities appear to overestimate their capabilities. But the research investigating the self-efficacy beliefs of LD students in other domains is inconclusive and somewhat contradictory. The idea of self-evaluation as a form of metacognition has been discussed in this review, and LD students’ difficulties with metacognitive tasks have been documented. Accurate measurement of self-efficacy beliefs in students with LD, then, is more complex than indicated by previous practice. One of the studies included in this review (Alvarez & Adelman, 1986) issued this warning: “Findings of self-evaluative overstatement have serious implications for both researchers and practitioners. Self-evaluative overstatements obviously can confound efforts to study a variety of phenomena” (p. 570). Self-efficacy research and measurement with LD populations needs to be conducted in different ways than has heretofore been the case. A few researchers have made proposals to expand measurement techniques used in investigating self-efficacy (e.g., Hampton, 1998; Pajares, 1996). Pintrich and DeGroot (1990) for
example suggested that results of self-report instruments “need to be replicated with other measures, such as think-aloud protocols, stimulated recall procedures, (or) structured interviews” (p. 38). Using qualitative methodology to provide validation of quantitative self-efficacy measures seems called for in the measurement of self-efficacy beliefs. It may be the case that LD students’ metacognitive and self-evaluative deficits may be circumvented through in-depth qualitative assessment of self-efficacy beliefs. Clearly, more research efforts are needed to explore and validate methods with which to uncover accurate self-beliefs of students with learning disabilities.

Only one of the 22 studies reviewed examined self-efficacy beliefs in the domain of reading. This finding is unexpected in light of the preponderance of reading disabilities among all learning disabilities (Shaywitz et al., 1992), and in light of the fact that reading disabilities and dyslexia are the subject of much research. The one study (Pintrich et al., 1994) that did examine the efficacy beliefs of students with LD included a specifically reading disabled sample, a measure clearly assessing efficacy beliefs, and appropriate levels of specificity and correspondence between measure and criterial task. Their findings of mis-calibrated efficacy beliefs for reading bear replication and extension.

Gender differences in self-efficacy beliefs were seen in some studies, but most of the reviewed studies did not assess gender differences in efficacy beliefs. More research investigating gender differences in self-efficacy beliefs in LD populations would further understanding of how these self-beliefs may operate in different contexts. Also, developmental differences or changes in efficacy beliefs with LD students were not addressed in the studies reviewed here. Longitudinal or cross-sectional studies investigating changes in efficacy beliefs would help further understanding of the development of self-efficacy in special populations.

None of the reviewed studies included control groups made up of low-achieving students, but instead, when a control group was used, relied on the measured perceptions of normally-achieving students. It may be that low-achieving children not labelled as “learning disabled” display similar self-efficacy profiles, but no empirical evidence was found to support this
supposition. As suggested by Grolnick and Ryan (1990) “many of the motivational and self-evaluative problems that children with LD have may be nonspecific (i.e., they may be apparent in other children who have difficulties in learning)” (p. 183). Future research should investigate efficacy beliefs of low-achieving, as well as LD children, to determine if students with learning disabilities form self-beliefs in ways that are significantly different from other academically-struggling students.

Finally, to ensure content validity of the self-efficacy measures used, researchers are directed to Bandura’s most recent (2001) suggestions for constructing self-efficacy scales. In this thorough guide, the author addresses issues of domain specificity, content validity, phrasing of items, and most effective response scales.
References


### Table 1

**Calibration: Studies Identifying Initial Self-Efficacy Beliefs as Over-Estimates**

<table>
<thead>
<tr>
<th>Author</th>
<th>Domain</th>
<th>SE Scale</th>
<th>Calibration</th>
<th>Self-Efficacy Ratings</th>
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</thead>
<tbody>
<tr>
<td>Alvarez &amp; Adelman (1986)</td>
<td>Arithmetic</td>
<td>Two scales: (a) 20-item, 11-point scale (0-10) and (b) 2-items measuring global math efficacy</td>
<td>30% of judgments (to do specific math problems) were overestimates; 2% were underestimates</td>
<td>Mean global math efficacy ratings were 8.47 and 8.73 on a 1-10 scale, with 10 indicating “very sure” (that they would do well in their current and future math classes).</td>
</tr>
<tr>
<td>Graham &amp; Harris (1989a)</td>
<td>Writing</td>
<td>10 items (10-100 with 10 intervals) measuring stds’ confidence to write stories</td>
<td>“LD stds consistently over-estimated their composition abilities” (p.360).</td>
<td>Initial mean rating 75.2 (out of 100). The ‘70’ point was described as “pretty sure”. Posttest rating 88.8</td>
</tr>
<tr>
<td>Graham &amp; Harris (1989b)</td>
<td>Writing</td>
<td>5 items (10-pt. scale) assessing perceived ability to write a good essay</td>
<td>“The stds clearly overestimated their composition abilities” (p. 212).</td>
<td>Initial mean rating 68 (out of 100). The ‘70’ point was described as “pretty sure”. Posttest rating 79</td>
</tr>
<tr>
<td>Graham, MacArthur, Schwartz, &amp; Page-Voth (1992)</td>
<td>Writing</td>
<td>10 item 5-pt. scale measuring SE for writing tasks and cognitive strategies</td>
<td>3 of 4 stds overestimated their SE; SE est. became more realistic after treatment</td>
<td>“Initial ratings were 2.5 for writing tasks and 2.1 after treatment. Perceived competence for executing cognitive strategies was 3.75 (on a 5-point scale) pretest and 3.3 posttest.</td>
</tr>
<tr>
<td>Graham, Schwartz, &amp; MacArthur (1993)</td>
<td>Writing</td>
<td>10 item, 5-point scale measuring efficacy for composing process and writing tasks</td>
<td>“students with LD overestimate their writing capabilities” (p. 248).</td>
<td>The LD students’ self-efficacy beliefs showed a mean score of 3.21 on a 5-point scale with 1=strongly disagree and 5=strongly agree</td>
</tr>
<tr>
<td>Pintrich, Anderman, &amp; Klobocear (1994)</td>
<td>Reading</td>
<td>10-item, 7-point scale measuring reading efficacy beliefs</td>
<td>LD stds felt “rather efficacious” at reading</td>
<td>The mean rating given by LD students for self-efficacy for reading tasks was 5.37 on a 7-point scale.</td>
</tr>
<tr>
<td>Sawyer, Graham, &amp; Harris (1992)</td>
<td>Writing</td>
<td>10-item, 10-point scale measuring SE for writing a “made-up story”</td>
<td>Overestimate: “Stds with LD began with relatively high pretest self-efficacy scores, despite their relatively poor pretest writing performance” (p. 350)</td>
<td>Pretest mean score (across four groups) was 74.4. Posttest mean score across four groups was 83.6. On the 10-100 range scale, 10 was described as “not sure”, 40 as “maybe”, 70 as “pretty sure”, and 100 as “real sure”</td>
</tr>
<tr>
<td>Slemon &amp; Shafrir (1998)</td>
<td>Reading, Spelling, and Arithmetic tests of the WRAT-R; and 9 subtests of the WAIS-R</td>
<td>“Self-Estimate of Intellectual Functioning and Academic Achievement Test”</td>
<td>The LD group underest. their SE for Spelling and Digit Span; were accurate for Reading, all Performance subtests, and 3 of 5 Verbal subtests; and overest. for Information and WRAT arithmetic</td>
<td>For example, on the WRAT-R LD students predicted standard scores of 104, 98, and 102 for Reading, Spelling, and Arithmetic, respectively; whereas actual scores were 106, 102, and 96.</td>
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</tbody>
</table>

*Mean ratings not given in study, but calculated from data provided*
### Appendix

#### Summary of Reviewed Studies

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td><strong>Author (date)</strong></td>
<td><strong># of stds</strong></td>
<td><strong>Performance task or domain</strong></td>
<td><strong>Self-efficacy measure</strong></td>
<td><strong>Intervention or research question</strong></td>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>Alvarez &amp; Adelman (1986)</td>
<td>19 stds (some LD) aged 9.6 to 15.2</td>
<td>Arithmetic</td>
<td>20-item 11-point scale (0 to 10)</td>
<td>Why do students with learning problems (including LD) overstate their capabilities?</td>
<td>“students’ positive self-evaluations represent a selective tendency and are due to an inability to make accurate self-evaluative judgments.”</td>
</tr>
<tr>
<td>Baum &amp; Owen (1988)</td>
<td>112 Grade 4, 5, and 6</td>
<td>General academic functioning (no performance task given)</td>
<td>SEAT - 34 items measuring general academic self-efficacy</td>
<td>What are self-efficacy differences between high and avg. ability LD students?</td>
<td>High ability LD students displayed lower efficacy beliefs than did high ability non-LD, or avg. ability LD students</td>
</tr>
<tr>
<td>Bryan &amp; Bryan (1991)</td>
<td>18 Junior high and high school</td>
<td>(Math) 50 addition and subtraction questions</td>
<td>Estimated number (/50) of accurately completed arithmetic items in 5 minutes</td>
<td>Positive mood induction: thinking of happiest day of their lives</td>
<td>Positive affect increased in performance. However, it was not changed with a control group of younger, non-LD “at-risk” stds.</td>
</tr>
<tr>
<td>Butler, 1995</td>
<td>6 college students with LD</td>
<td>Student-chosen task—writing, reading, math—depending on need</td>
<td>16-item SE questionnaire; also 1 item asking stds. to rate their ability on task</td>
<td>SCL: Std-generated strategies guided by instructor</td>
<td>The stated components of the SE measure—perceptions of competence, task preference, and general SE; 8-item “across-tasks” SE showed significant increase</td>
</tr>
<tr>
<td>Butler, 1998b</td>
<td>30 (over 3 studies) college and university stds. with LD</td>
<td>Student-chosen task—writing, reading, math—depending on need</td>
<td>1 item rating task ability; measure judging task competence, task preference, and general SE; 8-item ‘across-tasks’ SE</td>
<td>SCL: Std-generated strategies guided by instructor</td>
<td>Task-specific SE increased in all studies; global SE not changed in post-test; SE for ‘non-instructed’ tasks increased in one study, but not in other</td>
</tr>
<tr>
<td>Graham &amp; Harris (1989a)</td>
<td>22 LD and 11 NA (control); grades 5-6</td>
<td>Writing</td>
<td>10 items measuring stds’ confidence to write stories</td>
<td>Self-instructional strategy training; added self-reg. training</td>
<td>SE increased in both treatment groups (strategy training with/without self-reg. training). No difference between treatment groups</td>
</tr>
<tr>
<td>Graham &amp; Harris (1989b)</td>
<td>3 sixth-grade stds</td>
<td>Writing</td>
<td>5 items assessing perceived ability to write a good essay</td>
<td>Strategy instruction for planning and writing essays</td>
<td>Two of three stds showed increases with intervention</td>
</tr>
<tr>
<td>Graham, MacArthur, Schwartz, &amp; Page-Voth (1992)</td>
<td>4 5th-grade LD stds</td>
<td>Writing</td>
<td>10 item 5-pt. scale measuring SE for writing tasks and cognitive strats</td>
<td>Planning and writing strategies</td>
<td>Confidence for writing dropped for 3 stds (all male) and rose slightly for 1 std (female) after treatment</td>
</tr>
<tr>
<td>Graham, Schwartz, &amp; MacArthur (1993)</td>
<td>39 LD and 29 control in grades 4, 5, 7 &amp; 8</td>
<td>Domain is writing - no performance task</td>
<td>10 items measuring efficacy for composing process and writing tasks</td>
<td>(Study measured stds’ knowledge and attitudes - no intervention)</td>
<td>No difference found in SE either composing process writing tasks between LD NA groups or between older and younger students</td>
</tr>
<tr>
<td>Study Authors</td>
<td>Participants</td>
<td>Measures</td>
<td>Purpose</td>
<td>Findings/Results</td>
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<tr>
<td>Gresham, Evans &amp; Elliott (1988)</td>
<td>336 stds. incl. mildly handicapped (incl. LD), gifted, and NA in grds. 3-5</td>
<td>Social and academic functioning (no performance task)</td>
<td>Group-administered 28 item, 5-point scale assessing academic and social efficacy (ASSESS)</td>
<td>MH stds. (LD, MR, and BD) reported lower academic and social SE than NA and gifted stds. Also, MH stds. were reported by teachers as lower in academic and social SE.</td>
<td></td>
</tr>
<tr>
<td>Hampton (1998)</td>
<td>109 high school and vocational rehab stds. with LD; 87 people without LD</td>
<td>Academic functioning</td>
<td>Sources of Academic Self-Efficacy Scale (SASES) - 46 items</td>
<td>To devise an instrument to explore the sources of SE beliefs and to explore differences between LD and NA students</td>
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<tr>
<td>Omizo, Cubberly, &amp; Cubberly (1985)</td>
<td>60 6-8 year old LD stds - 20 in each of 3 groups</td>
<td>Arithmetic achievement</td>
<td>20-item scale modelled after Bandura &amp; Schunk (1981)</td>
<td>Three groups: control, teacher- and participant- modelling</td>
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<tr>
<td>Page-Voth &amp; Graham (1999)</td>
<td>30 grade 7 and 8 stds</td>
<td>Writing (essays)</td>
<td>6-item scale measuring efficacy to write essays</td>
<td>Goal-setting; goal-setting and strategy instruction; control group</td>
<td></td>
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<tr>
<td>Panagos &amp; DuBois (1999)</td>
<td>96 high school stds</td>
<td>Career interest: A career interest inventory (14 areas) was administered</td>
<td>14 item (1 for each career area) Career Self-Efficacy Scale; Four item, 5-point Sources of Efficacy Information Scale</td>
<td>Ratings of SE beliefs were significant predictor of career interest. Also, Bandura’s four sources of efficacy beliefs contribute to the development of career SE beliefs.</td>
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<tr>
<td>Pintrich, Anderman, &amp; Klobucar (1994)</td>
<td>19 LD, 20 NA grade 5 students</td>
<td>Reading: two reading comprehension tasks were given</td>
<td>10-item, 7-point scale measuring reading efficacy beliefs</td>
<td>LD stds did not show sig. different SE beliefs than NA stds, in spite of lower performance levels</td>
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</tr>
<tr>
<td>Saracoglu, Minden &amp; Wilchesky (1989)</td>
<td>34 LD and 31 NA university students</td>
<td>General and social self-efficacy</td>
<td>23-item Self-Efficacy Scale</td>
<td>LD and NA stds showed diff. in social and general SE correlated positively with adjustment to university</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Group/Control</td>
<td>Task/Intervention</td>
<td>SE Measure</td>
<td>Result/Findings</td>
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<tr>
<td>Sawyer, Graham, &amp; Harris (1992)</td>
<td>5th and 6th LD stds; 10 LD control</td>
<td>10-item scale measuring SE for writing a “made-up story”</td>
<td>Writing a story</td>
<td>Three types of Self-Regulated Strategy Development plus control group; SE levels increased in all groups; post-test SE levels did not differ among the four intervention groups</td>
<td></td>
</tr>
<tr>
<td>Schunk (1985)</td>
<td>6th-grade LD stds</td>
<td>Sds were briefly shown 25 pairs of subtraction q’s and asked to rate on 10-point scale</td>
<td>Mathematics: subtraction</td>
<td>Goal-setting: self-set goals, assigned goals, and no goals; Participation in goal-setting resulted in sig. higher SE judgments than other 2 groups</td>
<td></td>
</tr>
<tr>
<td>Schunk &amp; Cox (1986)</td>
<td>6th-grade LD stds</td>
<td>Sds were briefly shown 25 pairs of subtraction q’s and asked to rate on 10-point scale</td>
<td>Mathematics: subtraction</td>
<td>Verbalization and effort feedback</td>
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<tr>
<td>Slenon &amp; Shafrir (1997)</td>
<td>6th-grade LD stds</td>
<td>Students estimated their score (1-19) on the WAIS-R (9 subtests) and the WRAT-R (3 subtests)</td>
<td>Verbal and nonverbal cognitive functioning on WAIS-R and 3 achievement areas on the WRAT-R</td>
<td>What are the SE beliefs (predicted scores) for LD and NA post-secondary students? (No intervention)</td>
<td></td>
</tr>
<tr>
<td>Wong, Butler, Ficzere, &amp; Kuperis (1996)</td>
<td>9th and 10th LD and LA stds in gr. 8 &amp; 9</td>
<td>Questionnaire on attitudes towards writing and SE</td>
<td>Writing: opinion essays</td>
<td>Planning, drafting, and revising strategies</td>
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<tr>
<td>Wong, Butler, Ficzere, &amp; Kuperis (1997)</td>
<td>9th and 10th LD and LA stds in gr. 9 &amp; 10</td>
<td>10-item, 5-point scale</td>
<td>Writing: compare and contrast essays</td>
<td>Writing strategies</td>
<td></td>
</tr>
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</table>

\(^a\) NA = Normally Achieving
\(^b\) Not all studies (correlational studies, for example) offered posttest self-efficacy ratings