

## **A Review of Self-Management Interventions Targeting Academic Outcomes for Students with Emotional and Behavioral Disorders**

**Paul Mooney,<sup>1</sup> Joseph B. Ryan,<sup>2,4</sup> Brad M. Uhing,<sup>3</sup> Robert Reid,<sup>3</sup> and Michael H. Epstein<sup>3</sup>**

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*The purpose of this review was to report on the effectiveness and focus of academic self-management interventions for children and adolescents with emotional and behavioral disorders. Twenty-two studies published in 20 articles and involving 78 participants met inclusionary criteria. The overall mean effect size (ES) across those studies was 1.80 (range -0.46 to 3.00), indicating effects were generally large in magnitude and educationally meaningful. Self-monitoring interventions were the predominant type of self-management technique used by researchers. The mean ES for intervention types were self-evaluation (1.13), self-monitoring (1.90), strategy instruction techniques (1.75), self-instruction techniques (2.71), and multiple-component interventions (2.11). Interventions targeted improvement in math calculation skills more than any other area. The mean ES by academic area were math interventions (1.97), writing (1.13), reading (2.28), and social studies (2.66). There was evidence to support a claim of the generalization and maintenance of findings. Implications, limitations, and areas for future research are discussed.*

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**KEY WORDS:** academic outcomes; self-management; emotional and behavioral disorders.

Students with emotional and behavioral disorders (EBD) generally struggle to succeed academically in school. Recent reviews of the academic status of students with EBD indicated that academic deficits occurred across academic subject areas including reading, math, and writing (Trout, Nordness, Pierce, &

<sup>1</sup>Louisiana State University.

<sup>2</sup>Clemson University.

<sup>3</sup>Wichita State University.

<sup>4</sup>Correspondence should be addressed to Joseph B. Ryan, Clemson University, 407 Tillman Hall, Clemson, SC 29634; e-mail: Joe\_ryan1@hotmail.com.

Epstein, 2003), and that the magnitude of deficits was approximately .60 standard deviations (Reid, Gonzalez, Nordness, Trout, & Epstein, 2004). Moreover, there is evidence to suggest that academic deficits tend to increase over time (Coutinho, 1986; Nelson, Benner, Lane, & Smith, 2004). Furthermore, longer-term (i.e., post-secondary) outcomes for this population demonstrate a continued lack of achievement in terms of employment and successful integration into society (U.S. Department of Education, 2001; Wagner, 1995).

In school, students with EBD have difficulties attending to instruction, relating new information to what is already known, and establishing productive work environments (Carr & Punzo, 1993). Many of these students struggle to act purposefully and strategically for their academic benefit in the school setting (Levendoski & Cartledge, 2000). That is, they do not manage their own academic behavior. Self-management interventions have been developed over the years to assist students in changing and/or maintaining appropriate behavior (Martella, Nelson, & Marchand-Martella, 2003). Since students with EBD often do not manage their own behavior, self-management skills need to be taught to them. Effective programs for developing self-management skills are those that offer systematic instruction (Schunk & Zimmerman, 2003).

There are five commonly used self-management interventions: self-monitoring, self-evaluation, self-instruction, goal-setting, and strategy instruction. Self-monitoring is a multistage process of observing and recording one's behavior (Mace, Belfiore, & Hutchinson, 2001). Two steps are involved. The individual initially must discriminate the occurrence of a target behavior; then, the individual must self-record some aspect of the target behavior (Mace et al., 2001). Self-evaluation refers to a process wherein students compare their performance to a previously established criterion set by themselves or a teacher (e.g., improvement of performance over time) and are awarded reinforcement based on achieving the criterion (Mace et al., 2001). Self-evaluation is similar to self-monitoring in that both typically require students to self-assess and self-record a behavior at set or cued intervals (Shapiro & Cole, 1994). Self-instruction refers to techniques that involve the use of self-statements to direct behavior (Graham, Harris, & Reid, 1992). Goal setting generally refers to a process of a student self-selecting behavioral targets (e.g., term paper completion), which serve to structure student effort, provide information on progress, and motivate performance (Schunk, 2001). Strategy instruction refers to teaching students a series of steps to follow independently in solving a problem or achieving an outcome (Coyne, Kame'enui, & Simmons, 2001). The reason that strategy instruction is considered a self-management technique is that researchers believe that strategy instruction may serve as a cue to help children self-manage behavior (Reid & Harris, 1993; Sawyer, Graham, & Harris, 1992).

Information on treatment outcomes related to the use of self-management techniques with students with EBD seems particularly apropos considering the nature of the situation in which these students often find themselves. That is,

these students' difficulties managing their own behaviors in school-based settings have likely contributed significantly to their referral to and placement in special education in the first place. Moreover, historically, researchers and educators have primarily focused intervention efforts on ameliorating these inappropriate social behaviors at the expense of interventions that target academic skill deficits (Vaughn, Levy, Coleman, & Bos, 2002).

There have been only two research reviews that include the use of self-management to enhance the academic functioning of students with EBD, and these reviews were published over a decade ago. Nelson, Smith, Young, and Dodd (1991) identified three studies that included academic independent variables, with only one of those three studies presenting sufficient data to allow for meta-analytic analysis of outcomes. Nonetheless, Nelson et al. (1991) concluded that self-management procedures were viable tools to promote the academic behaviors of students with EBD. At about the same time Hughes, Ruhl, and Misra (1989) reviewed six studies conducted on school-aged populations between 1970 and 1988 that included academic dependent variables. Hughes et al. used descriptive analyses to summarize outcomes research and indicated that all six studies reported positive findings regarding academic performance in the settings in which treatment variables were manipulated.

Because of the need to improve the academic performance of students with EBD and the potential for academic gains through the use of self-management techniques, the primary purpose of the present study was to provide an up-to-date review of treatment outcomes for academic interventions incorporating self-management treatments for students with EBD. The present research review addressed: (a) who the participants were, (b) the types of self-management techniques used, (c) academic areas targeted, (d) the efficacy of self-management treatments, and (e) generalization or maintenance of treatment effects.

## METHOD

### Definition of Database

A comprehensive search was conducted for all studies conducted with students with EBD investigating self-management interventions and their effect on academic achievement. The following procedures were used to locate articles. First, the Education Resource Information Center (ERIC), PsychINFO and Find-Articles databases were searched for relevant articles. Keywords used in the computer search included: behavior disorders, emotional disturbance, and conduct disorder, in combination with academic status, reading, math, science, social studies, testing, academics, special education, self monitoring, self instruction, goal setting, self evaluation, self management, self reinforcement, self regulated learning, and strategy instruction. Second, a hand search of studies published between

1970 and 2002 from the *Journal of Special Education*, *Journal of Emotional and Behavioral Disorders*, *Behavioral Disorders*, and *Exceptional Children* was conducted. Third, an ancestral search was performed by checking the citations from relevant studies to determine if any of the articles cited would qualify for inclusion in this review. Finally, references in prior literature reviews conducted with students with EBD were checked in an attempt to identify relevant articles not previously found.

Articles were included in the database if they met the following criteria: (a) participants were children or adolescents between the ages of 5 and 21 who either were verified with behavioral or emotional difficulties through formal special education or psychiatric identification procedures, or were served in classrooms for students with emotional or behavioral disorders; (b) articles were peer-reviewed, original reports of experimental research that had to include manipulation of an independent treatment variable and measurement of an academic dependent variable; and (c) only studies in which the intervention involved the use of self-management techniques that students were taught and expected to implement themselves were included. An initial pool of 564 possible studies was located. After applying inclusion criteria, 22 experimental studies from 20 published articles met criteria.

## Procedure

Operational definitions and a coding form were developed to record information contained in the articles. (Copies of each can be obtained from the first author). Two graduate students coded each of the studies. The operational definitions were as follows:

*Participant characteristics* referred to descriptions related to participants' age, grade, gender, ethnicity, socioeconomic status, intelligence, and EBD identification procedures.

*Intervention type* referred to the type of self-management intervention included in the study and categorized as the following (see Table I): (a) self-monitoring (also called self-assessment or self-recording); (b) self-instruction; (c) goal setting; (d) self-evaluation (also called self-management); and (e) strategy instruction.

*Experimental N* referred to the total number of participants for the self-management intervention study and included only members of the experimental group.

*Academic focus* referred to the academic target of intervention and was categorized using 11 descriptors: (a) basic reading skills, (b) reading comprehension, (c) reading not otherwise specified (NOS), (d) written expression, (e) math calculation, (f) math reasoning, (g) math not otherwise specified NOS, (h) other language, (i) history/social studies, (j) science, or (k) other.

Table I. Self-Management Procedures and Associated Definitions

Term	Definition
Self monitoring	A two-stage process of observing and recording one’s behavior wherein (a) the student discriminates occurrence/non-occurrence of a target behavior, and (b) s/he self-records some aspect of the target behavior (Mace, Belfiore, & Hutchinson, 2001).
Self evaluation	A process wherein a student compares her/his performance to a previously established criterion set by student or a teacher (e.g., improvement of performance over time) and is awarded reinforcement based on achieving the criterion (Mace et al., 2001).
Self instruction	A procedure wherein a student uses self-statements to direct behavior (Graham, Harris, & Reid, 1992).
Goal setting	A process wherein a student self-selects a behavioral target (e.g., term paper completion), which serves to structure student effort, provide information on progress, and motivate performance (Schunk, 2001).
Strategy instruction	A process wherein a student is taught a series of steps to independently follow in solving a problem or achieving an outcome (Coyne, Kame’enui, & Simmons, 2001).

*Outcomes* referred to the effects of treatment and were reported in one of two ways. If effect sizes could be calculated, then they were reported. If effect sizes could not be calculated, then results of the study as reported by the authors were summarized.

An effect size (ES) represents the strength of a treatment on outcome measures (Kromrey & Foster-Johnson, 1996). ESs are generally determined by subtracting the mean of the treatment condition from the mean of the baseline or control condition and then dividing that difference by a measure of variance (e.g., pooled standard deviation). The larger the ES value, the greater the change in the outcome measure used. ESs in the range of 0 to 0.3 are considered small, 0.3 to 0.8 are medium, and 0.8 and above are large (Cohen, 1988). We could only calculate ESs for the single-subject intervention studies, since the two group studies (i.e., McLaughlin, 1984; McLaughlin & Truhlicka, 1983) provided an incomplete reporting of results (i.e., standard deviation not provided).

The procedure used to calculate ESs was identical to that used by Swanson and Sachse-Lee (2000) in their meta-analysis of single-subject interventions for students with learning disabilities (LD). ES calculations were only completed on single-subject studies that included at least three data points for both the baseline and treatment conditions. Consistent with Swanson and Sachse-Lee, we corrected for the correlation between the baseline and treatment conditions by using Rosenthal’s (1994) formula. That is, the pooled standard deviation for the baseline and treatment conditions was calculated using the formula  $S_p = S_g / \text{square root of } 2(1 - r)$ , where  $S_g$  is the average standard deviation of baseline

and treatment conditions, and  $r$  is the correlation between baseline and treatment. Effect sizes were then transformed to a scale using the following multiplier: Adjusted ES = (ES baseline and treatment) times the square root of  $2(1-R)$ , where  $R$  is the baseline and treatment correlation and ES is the ES of the last three baseline and treatment sessions (Swanson & Sachse-Lee, 2000). To be conservative, the mean intercorrelation between the last three sessions of baseline and the last three sessions of treatment condition was set at .80. Finally, all adjusted ESs for either individual participants or dependent variables that were statistical outliers (i.e., ESs > 3.0) were capped at 3.0 to prevent them from disproportionately affecting the outcomes of studies when grouped. From the original 22 studies, we were able to calculate 85 ESs from 11 studies. The large number of ESs was made possible because many of the studies incorporated multiple dependent measures (e.g., number of math problems completed, percent of problems correct), and separate ESs could be calculated for each subject.

*Generalization and maintenance* data were categorized as either reported or not reported. Generalization is defined as the occurrence of a target behavior in a non-training setting after the completion of training, while maintenance is the continuation of a trained behavior after the completion of training (Miltenberger, 2001).

### Interobserver Agreement

Interobserver agreement data were assessed for both the article coding and treatment outcomes (i.e., ES) processes. Interobserver agreement for coding articles was assessed by comparing the responses of both coders on all variables except treatment outcomes in the 22 studies. Agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Disagreements were reconciled through discussion, with the agreed upon answer then coded for purposes of this study. Agreement for categories was as follows: participant characteristics, 100%; intervention, 94%; experimental N, 94%; academic focus, 94%; and generalization and maintenance, 100%.

Interobserver agreement for outcomes involved a multi-step assessment procedure. Two graduate students independently recorded values for the final three data points in each of the baseline and treatment conditions. Values were then entered into a spreadsheet program by a third student, who also double-checked data entry for accuracy. Following data entry, an interobserver agreement rate was calculated for the independently calculated values using Kazdin's (1982) frequency ratio. The smaller of each observer's values was divided by the larger value, and then multiplied by 100. Interobserver agreement for the baseline and treatment conditions was 0.94.

## RESULTS

### Participants

Across the 22 studies, 78 participants were included in treatment. Participant ages were reported more frequently than participant grades. Students ages 5 to 11 were included in 12 of the studies ( $n = 40$ ), with 9 of the 12 studies including only students of that age group. Students 12 years of age and older were participants in 8 studies ( $n = 38$ ) by themselves and 3 studies with younger age students (i.e., 5 to 11 year olds). Students in grades K-6 and 7-12 were each involved in 5 and 6 studies, respectively, with 2 studies including a mixture of both groups and 9 studies not reporting grade levels.

Males were included in at least 18 of the 22 studies, with 12 studies including only male participants and 6 studies including males and females. Four studies did not report a gender breakdown. No studies involved only females. Racial and socioeconomic data were generally not reported. In terms of race, only 6 of the 22 studies included clearly delineated data, with 3 studies including Caucasians, 1 study including African Americans, and 2 studies including multiple racial groups. In terms of socioeconomic status, only 1 of the 22 studies reported data, with those participants reported to be of low income status. Participant information in 13 of the 22 studies included data on intelligence levels. Participants were identified as EBD by school-based procedures in 18 of the 22 studies. In four of the studies, researchers did not specify the methodology used to identify students as EBD.

### Placement Settings of EBD Studies

With respect to setting, 73% ( $n = 16$ ) were in public schools, 4.5% ( $n = 1$ ) in special day schools, 18% ( $n = 4$ ) in psychiatric or residential settings and 4.5% ( $n = 1$ ) in university affiliated school settings. For the studies set in the public schools, the instructional settings included self-contained (63%), resource (31%), and separate classrooms (6%). None of the studies were conducted in a regular education classroom.

### Treatment Types

Table II reports data related to treatment type. Self-monitoring interventions ( $n = 8$ ; 36%) were the most frequently used intervention. Others included self-instruction ( $n = 7$ , 32%), self-evaluation ( $n = 6$ , 27%), strategy instruction ( $n = 5$ , 23%), and goal setting ( $n = 1$ ; 5%). Multiple-element (i.e., more than one type) interventions comprised 14% of the 22 studies ( $n = 3$ ).

**Table II.** Child-Mediated Academic Intervention Studies for Students with Emotional and Behavioral Disorders

Study	Intervention	N	Academic focus	Outcomes
Carr & Punzo (1993)	Self-monitoring	3	English class	Mean ES = 2.20 (Range 1.29 to 2.68) on % accuracy in English Mean ES = 2.17 (Range 0.53 to 3.00) in % productivity* ES = 2.26 for % accuracy in math* ES = -0.46 for % productivity in math* Mean ES 0.73 (Range 0.43 to 0.99) for % accuracy in spelling Mean ES = 0.91 (Range 0.79 to 1.05) for % productivity in spelling Mean ES = 2.12, Range (0.17 to 3.0)
Davis & Hájicek (1985)	Multiple components (Strategy instruction + Self-instruction)	7	Math calculation	
Fish & Mendola (1986)	Self-instruction	3	Math calculation; Reading vocabulary; Language arts	Increases on mean % of completed homework assignments handed in per week from 34.5% during baseline to 75 % during treatment Mean ES = 1.79 (Range 0.57 to 3.00) on % words completed Mean ES = 0.71 (Range 0.59 to 0.92) on % sentences completed Mean ES = 0.89 (Range 0.87 to 0.92) on % neat words
Glomb & West (1990)	Self-evaluation	2	Creative writing	
Hughes, Deshler, Ruhl, & Schumaker (1993)	Strategy instruction (test-taking skills)	6	Social studies class  Science class	Increase in % of points available for strategy performance on probe tests from a mean of 32% during baseline to 88% during treatment Increase in test score % from a mean of 57% during baseline to a mean of 68% during treatment



Table II. Continued

Study	Intervention	N	Academic focus	Outcomes
Levendoski & Cartledge (2000)	Self-monitoring	4	Math calculation	Mean ES = 2.15 (Range 0.05 to 3.00) for % academic productivity on individualized math worksheet
Lloyd, Bateman, Landrum, & Hallahan (1989)	Self-monitoring	3	Math calculation	Mean ES = 3.00 (Range 3.00 to 3.00)
McDougall & Brady (1995)	Self-monitoring	3	Spelling	Increases in % words spelled correctly on oral quiz from 34.4% during baseline to 44.4% during treatment
McLaughlin (1984)	Self-monitoring/Self-evaluation	4 exp 4 con	Reading NOS; Spelling	Significant differences ( $p < .05$ ) on % correct on workbook performance for experimental conditions over control; No statistical differences between self-monitoring & self-evaluation
McLaughlin, Burgess, & Sackville-West (1981)	Multiple Components (Self-monitoring + Self-evaluation)	6	Reading NOS	Mean ES = 2.1 (Range 0.8 to 3.0) % correct on reading workbook higher for self-evaluation than for self-monitoring
McLaughlin & Truhlicka (1983)	Self-monitoring/Self-evaluation	4 exp 4 con	Reading NOS	Significant differences ( $p < .05$ ) on % correct on workbook performance for experimental conditions over control; % correct significantly higher for self-evaluation than for self-monitoring ( $p < .05$ )

**Table II.** Continued

Study	Intervention	N	Academic Focus	Outcomes
Miller, Miller, Wheeler, & Selinger (1989)(2 studies)	Self-instruction;	1	Math calculation;	Increases in % correct on subtraction worksheets from mean of 39.5% during baseline to 98% during treatment; ES = 2.71* number of words read correctly
Osborne, Kosiewicz, Crumley, & Lee (1987)	Self-instruction Self-monitoring	1 1	Oral reading Math calculation	Increases in the number of math problems worksheet correctly completed in the treatment conditions over baseline conditions
Prater, Hogan, & Miller (1992)	Self-instruction	1	Spelling;Math calculation	Increase in test scores from a mean of 55% to 95%; Increase in test scores from a mean of 78% during baseline to 94% during treatment
Skinner, Belfiore, & Pierce (1992)	Strategy instruction(CCC: cover, copy, compare)	7	Social studies	ES = 3.0 on % states correctly labeled with postal abbreviations
Skinner, Ford, & Yunker (1991)	Strategy instruction (variations of CCC)	2	Math calculation	Mean ES = 1.77 (Range 1.23 to 2.31) worksheet on verbal multiplication digits correct per minute;Mean ES = 0.99 (Range 0.92 to 1.05) worksheet on written multiplication digits correct per minute; Mean ES = 1.44 (Range 0.09 to 3.00) % correct math worksheet
Skinner, Turco, Beatty, & Rasavage (1989)	Strategy instruction(CCC)	3	Math calculation	

Table II. Continued

Study	Intervention	N	Academic Focus	Outcomes
Smith, Nelson, Young, & West (1992)	Multiple components(Self-evaluation + Goal setting)	4	Unidentified assigned seatwork in special education classroom;	Increase from a mean of 46.3% during baseline to 78.5% during treatment for work performed correctly; Increase from a mean of 51 % during baseline to a mean of 87.3% during treatment of assignments completed
Swanson & Scarpati (1984) (2 studies)	Self-instruction;	2	English classwork in general education class	Increase from a mean of 53.5% during baseline to 78% during treatment for work performed correctly on Eng assignments; Increase from a mean of 65.8% during baseline to 86% during treatment in % of assignments completed ES = 1.06* written responses to reading ES = 1.60* % correct
Sweeney, Salva, Cooper, & Talbert-Johnson (1993)	Self-instruction Self-evaluation	1 2	Math NOS Handwriting	ES = 1.09* % correct responses worksheet Mean ES = 1.14 (Range 0.16 to 3.00) on legibility*

NOS = Not otherwise specified.

\*Only one ES was calculated for the study.

### Academic Focus

Table II also reports data related to academic focus. One-half of the intervention studies ( $n = 11$ ) focused on math as a dependent variable, with 10 of the 11 studies specifically targeting math calculation skills. Reading and writing (e.g., spelling, handwriting, creative writing) areas were targeted in 36% and 32% of the studies, respectively. Social studies or science content areas were targeted in 9% of the studies ( $n = 2$ ). Nearly one-third of the studies ( $n = 7$ , 32%) included multiple academic dependent variables.

### Treatment Outcomes

A total of 85 effect sizes (ESs) were calculated from 11 studies. The ESs ranged from  $-0.46$  to  $3.00$  (see Table II) with a mean of  $1.80$ . This suggests that overall effects of self-management procedures were large. The mean and total number of ESs calculated for intervention types were self monitoring  $1.90$  ( $n = 24$ ); self evaluation  $1.13$  ( $n = 16$ ); strategy instruction,  $1.75$  ( $n = 20$ ); self instruction,  $2.71$  ( $n = 3$ ); and multiple-component interventions,  $2.11$  ( $n = 22$ ). The mean and total number of ESs calculated for academics were writing,  $1.13$  ( $n = 22$ ); math,  $1.97$  ( $n = 45$ ); reading,  $2.28$  ( $n = 8$ ); and social studies,  $2.66$  ( $n = 5$ ).

### Generalization and Maintenance

Of the 22 studies, 15 studies reported data with respect to the generalizability or maintenance of findings, with all 15 demonstrating positive findings. Thirteen reported evidence of maintenance of results, while two reported favorable response generalization data. While maintenance was the primary area of generalization investigated, researchers also examined stimulus (i.e., across settings) and response (i.e., across tasks) generalization in two studies. McDougall and Brady (1995) demonstrated that the percentage of words spelled correctly generalized from oral spelling to written spelling for three boys of elementary age using a self-monitoring technique. In separate experiments, Swanson and Scarpati (1984) demonstrated generalization across individuals for two secondary-age participants and generalization across task for a third participant using self-instruction techniques.

## DISCUSSION

In a recent article urging school counselors to empower their students, Lapan, Kardash, and Turner (2002) stated that research supports the notion that students

who apply self-management strategies to academics “achieve more and are more satisfied with their work” (p. 257). The primary purpose of the present study was to report on the effectiveness and focus of academic self-management learning interventions for students with EBD, a group of public school students who generally has difficulty managing its behavior in academic settings (Levendoski & Cartledge, 2000). Overall, results from this literature review indicated that students with EBD demonstrated improvements in discrete academic skills when self-management interventions were introduced when compared to baseline conditions.

The review produced six major findings. First, the evidence suggests that self-management interventions for students with EBD produced large positive effects on academic outcomes. Second, there were a variety of self-management procedures implemented with students with EBD. Third, the range of academic outcomes was limited. Fourth, studies were conducted in settings that were not reflective of actual student placement. Fifth, there was a lack of group design studies. Finally, there was evidence to support a claim of the generalization and maintenance of findings.

The first important finding of this review was that the effects of self-management techniques were generally large in magnitude and educationally meaningful. The mean effect size (ES) across all self-management intervention types and academic domains was 1.80. That is to say, on average, student increases would be nearly two standard deviations. Considering that Cohen (1988) defined 0.80 as evidence of a “large” effect, this suggests that the types of self-management interventions used in these studies have a significant beneficial effect for children and adolescents with EBD. Findings from the present review add to those of previous reviews (e.g., Hughes et al., 1989; Nelson et al., 1991) indicating self-management interventions aimed at fostering academic skills have promise for improving academic achievement in this population. Furthermore, results add to an evidence base reporting favorable effects of self management on academics for students with and without disabilities (e.g., Fantuzzo, Polite, Cook, & Quinn, 1988; Graham et al., 1992; Reid, 1996; Shapiro Durnan, Post, & Levinson, 2002; Skinner & Smith, 1992; Swanson & Sachse-Lee, 2000).

A second finding of interest is that there were a variety of self-management techniques implemented with students with EBD. Researchers investigated the use of self monitoring, self-evaluation, self-instruction, strategy instruction, and multi-component interventions. All of these types of self-management interventions produced mean effect sizes that were large in magnitude. These findings speak to the broad application potential for self-management interventions for students with EBD.

Self-monitoring interventions were the most widely implemented self-management technique for students with EBD. The mean ES (1.90) and the majority of individual ESs (20 of 24) for self-monitoring interventions were large

in magnitude. Self-monitoring interventions for students with EBD crossed academic content areas (e.g., reading, math). The frequent use of self-monitoring techniques makes sense considering that self-monitoring is one of the most thoroughly researched self-management techniques (Reid, 1996).

While self-monitoring interventions were the most implemented self-management techniques, goal setting interventions were among the least used, along with studies using multiple elements. Goal setting was used in only one study (i.e., Smith, Nelson, Young, & West, 1992); however, goal setting was a component of multiple-element interventions in three studies (i.e., Davis & Hajicek, 1985; McLaughlin, Burgess, & Sackville-West, 1981; Smith et al., 1992).

A third important finding was the range of academic outcomes assessed was quite narrow. Nearly 50% of the self-management interventions targeted math computation skills, with largely positive effects on performance (mean ES = 1.97). Self-management techniques demonstrating success in improving math computation included self-monitoring, self-instruction, and strategy instruction. We can have some confidence that self-management interventions will benefit students with EBD in the areas of math calculation, work productivity, and developing fluency with newly learned mathematical concepts. However, other academic areas have not been thoroughly investigated.

The fourth finding was that studies were conducted in settings that were not reflective of actual student placement. Despite the Individuals with Disabilities Education Act's emphasis on including children with special needs in the general education classroom, no studies were conducted in this environment. The majority of studies reviewed (68%) were conducted in either a self-contained or resource classroom, with the remaining studies taking place in even more restrictive environments including residential and special day schools. These findings are in direct contrast to actual student placement, where only a third (33%) of students with EBD receive greater than 60% of their education outside the general education classroom, and virtually all students (96%) with EBD are placed in regular school buildings (U.S. Department of Education, 2001).

Another important educational setting neglected by these studies has been the vocational classroom. Researchers have shown the majority (58%) of high school students with EBD were enrolled in some type of vocational education program while in school (Bullis, Walker, & Sprague, 2001). The lack of research conducted in this area is troubling as high schools are responsible for ensuring students with EBD have access to the full range of curricular options and learning experiences, as well as ensuring full participation in postsecondary education, employment, and independent living opportunities (U.S. Department of Education, 2001).

The fifth finding of interest indicated there was a lack of group studies being conducted. The present review included only two group design studies, neither of which was conducted in the last 20 years. The majority (90%) of studies used a single subject design, including: multiple baseline ( $n = 14$ ), withdrawal

( $n = 3$ ), and alternating treatments ( $n = 1$ ). While single subject research is a powerful tool for answering some intervention questions, there is a limit to the types of research questions that can be addressed. Comprehensive lines of research should incorporate both single subject and group designs (Hoagwood, Burns, & Weisz, 2002; Walker, 2000). In today's educational environment, the call for practices grounded in randomized treatment control group designs is strong. Not surprisingly, the call for increased group design research in the field of EBD (e.g., Mooney, Epstein, Reid, & Nelson, 2003) is evident as well.

The last major finding related to generalization and maintenance of findings. Generalization and maintenance of self-management treatment effects is a particularly important area for research in the field of EBD (Epstein & Cullinan, 1985; O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2002). As a rule, students with EBD struggle to demonstrate academic self management in school settings. The findings with respect to generalization and maintenance of results are largely positive. All 15 studies reporting results indicated that findings either generalized or maintained. The mean number of days between the end of treatment and the start of follow up was 46 days (median = 20; range = 1 to 180). For example, McLaughlin (1984) reported maintenance over 180 days in his comparison of self-monitoring and self-evaluation interventions for elementary age students across the areas of reading and spelling workbook performance. Sweeney, Salva, Cooper, and Talbert-Johnson (1993) also demonstrated maintenance effects for secondary students' handwriting skills at 8 and 12 days following the cessation of treatment. While more evidence of the generalizability of findings is warranted, particularly in the areas of stimulus and response generalization, these results add to the utility of self-management interventions for students with EBD.

There are several implications that arise from the present summary of findings related to self-management interventions for students with EBD. Of great importance to multiple audiences is the finding that self-management procedures such as self-monitoring, self-evaluation, self-instruction, and strategy instruction have all produced educationally meaningful effects in terms of improving discrete academic skills of students with EBD. Equally relevant, however, in tempering the previous statement is the finding that the case for use of self-management techniques appears to be most effective in the areas of math computation and writing skills. Additionally, there is reason to believe that academic improvements that arise from the implementation of self-management interventions in school settings do maintain over time.

There are four limitations in the present review. First, ESs are generally considered in the context of group design studies. ESs from single-subject studies may be inflated when compared to ESs from group studies. However, our approach to the use of ES was conservative and a replication of statistical techniques used

in previous research (i.e., Swanson & Sachse-Lee, 2000). Still, the interpretation of the magnitude of the ESs should be cautious. As yet there are no established, empirically supported guidelines for interpretation of the magnitude of ESs for single-subject studies. However, we would note that even if we doubled Cohen's criteria of .80 (i.e., used 1.60 as the criterion for a large effect), many of the ESs would still fall in the large range. Second, findings were based on the collective participation of 78, a relatively small number of students with EBD. Similar findings with a larger group of students and additional studies would add a greater degree of confidence in our conclusions. Third, the settings in which the studies were conducted were not representative of the typical placement of students with EBD. Therefore we cannot address effectiveness of self-management procedures for students with EBD in the general education classroom. Finally, because of the nature of single subject studies which, in some cases, included multi-element interventions and/or multiple dependent measures, the possibility of interactive effects must be considered. Therefore, results from studies in which the intervention included multiple elements and/or multiple dependent variables must be interpreted with caution.

Areas for future research have already been discussed and include the need to (a) increase the number of participants, (b) expand the types of self-management procedures beyond self-monitoring and self-evaluation and the academic areas beyond math calculation and written expression, (c) devote more attention to generalization and maintenance of findings, and (d) conduct research in settings that accurately reflect student placement. With respect to academic areas, the development of reading skills in students with EBD is in particular need of a greater evidence base. It is widely accepted that students with EBD have reading delays (O'Shaughnessy et al., 2002). Only a handful of studies in the present review (e.g., Fish & Mendola, 1986; Miller, Miller, Wheeler, & Selinger, 1989; Swanson & Scarpati, 1984) targeted reading improvement. More research is needed applying self-management techniques to the area of reading. Especially critical will be targeted intervention research across the areas of phonological awareness, vocabulary instruction, fluency, and text comprehension for students with EBD. Instruction in self management might be combined with an evidence-based supplemental reading program such as *Peer-Assisted Learning Strategies* (Fuchs, Fuchs, Mathes, & Simmons, 1997).

Despite the need for additional research and the limitations to the current research, self-management interventions appear promising for increasing the academic achievement of students with EBD. Given the favorable findings reported here and research indicating that those who use self-management procedures achieve more and are more satisfied with their work (Lapan et al., 2002), it seems logical to suggest that researchers and practitioners incorporate self-management interventions into their instructional efforts to improve the academic success of students with EBD.



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