RESEARCH

The Effectiveness of Self-Management Interventions on the Nonacademic Behaviors of Students with Emotional Disturbance: A Review of the Literature

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Abstract

Previous research suggests that self-management interventions are effective across a variety of disabilities, behaviors, and settings to curb maladaptive classroom behaviors. However, based on a recent literature review, there is an overall lack of research focused specifically on interventions for the Emotionally Disturbed (ED) student population and an even greater void of research studies that intervened on non-academic behaviors with his population (Garwood et al., 2021). Thus, this current study sought to expand the 2021 review by 1) focusing on only on intervention studies and 2) going beyond flagship EBD journals to be more inclusive of published peer-review work. As a result, the current study reviewed 34 studies (1990-2021) that implemented self-management interventions on the behaviors of 97 students with ED. Each of these studies were carefully reviewed to investigate the effectiveness of the interventions on the participant's target behavior. Using percentage of nonoverlapping data (PND) and percentage of data exceeding the median (PEM) to calculate effectiveness, findings suggest that self-management interventions were moderately to highly effective across settings, including the general education setting, and across target behaviors. All findings are presented detailing the specific intervention's effectiveness based on behavior targeted. In addition, social validity and limitations are discussed to aid in the continuation of research that delves into strategies that help teachers address the unique behavioral characteristics associated with students with ED.

Keywords: self-management, emotional disturbance, social validity, percentage of nonoverlapping data, percentage of data exceeding the mean

Students with emotional disturbance (ED) are often reported to be among the most challenging groups to work with in the school setting (Stremel et al., 2021). Specifically, students with ED are more likely to have social skills deficits including difficulty developing positive interpersonal relationships.

They often engage in behaviors such as aggression and breaking rules and overall non-compliance which result in both peer and teacher rejection and often culminate with school discipline procedures of suspension and expulsion (Maggin et al., 2016; Smith et al., 2017) that are often not effective at reducing the unwanted classroom behaviors or negative social interaction with peers or teachers (Walker et al., 1996; Wheeler et al., 2012). Along with having some of the poorest academic outcomes, students with ED are the most at risk of school dropout, involvement with the legal system, substance abuse, unemployment, and experiencing mental health disorders (Garwood et al., 2021; Kumm et al., 2021; Lo et al., 2002; Maggin et al., 2016; Wagner, 2006; Wheeler et al., 2012).

Over the last several decades, students with disabilities participating in general education has increased to 65% in 2019; however, this only accounts for 50% of students with ED (Office of Special Education and Rehabilitative Services, 1995) with current estimates around 5–7% of students receiving special education being diagnosed with ED (U.S. Department of Education, 2022). It is worth noting that students with ED are an under identified population, with many students displaying ED characteristics often listed under other special education categories (e.g., other health impaired), or labeled as “at-risk” (Garwood et al., 2021), thus making it difficult to track true estimates of ED and potentially meaning that many students go undiagnosed but are still in need of behavioral support in the classroom.

It is also important to note that while special education law has increasingly stressed placing students with disabilities in their least restrictive environment (LRE), often the general education setting (IDEA, 2017), those with ED, when compared to other diagnoses, have been found to be placed in a more restrictive setting than their peers often due to interfering behaviors (Vance et al., 2012; Walker et al., 1996). Thus, regardless of the setting, the need to identify interventions for students with ED that work across settings, that are manageable for teachers to implement, and that meet criteria as being evidence-based to reduce maladaptive behavior is dire.

To provide support for students with ED, teachers must be able to manage both academic and behavioral needs not only for the students with ED but for the whole classroom. However, many teachers feel ill-prepared to implement universal class wide behavior supports that will work with all the students including the students with disabilities as well as feel ill-prepared to provide the additional effort to implement, monitor, and adjust individualized interventions for students with ED. Teachers also characterize many existing behavior reduction interventions as difficult to implement, time-consuming, unfeasible for the classroom setting, and/or ineffective (Rafferty, 2012; Walker et al., 1996; Wheeler et al., 2012). As a result, to mediate maladaptive behaviors, schools often leverage disciplinary measures to control behaviors rather than utilize evidence-based interventions to shape and reinforce desired behaviors (Rafferty, 2012). Thus, there is a need to identify and implement evidence-based interventions that are both effective and socially valid that are also manageable for the classroom teacher to oversee while also maintaining an academically appropriate and challenging environment for all students (Amato-Zech et al., 2006; Mitchem et al., 2001). As a result, the teachers report feeling overwhelmed (Garwood et al., 2021).

In a review of 55 studies on interventions for students with ED from 2010–2019, Garwood et al. (2021) found a decrease in research focused on identifying and evaluating interventions for students

with ED. In addition, 40% of the 55 intervention-based studies reviewed did not meet What Works Clearinghouse research standards. However, findings noted that self-monitoring remained a prominent and effective strategy on the studies that did meet research standards. Specifically, self-monitoring was found effective for targeting non-academic outcomes, such as engagement and on-task behavior, which were the two most common behavioral variables studied in the synthesis of ED research.

Self-management interventions, which encompass various forms of self-monitoring/recording (i.e., Am I engaged in the target behavior?), self-modeling (i.e., What am I doing?), self-assessment/evaluation (i.e., How well did I do?), and self-reinforcement (i.e., Did I earn my reward?), are student-directed and focus on building self-control, goal-setting skills, and ownership of one's behaviors (King-Sears, 2008; Smith & Sugai, 2000; Smolkowski et al., 2021). Students implement the intervention, which shifts the teacher from a facilitatory to a supervisory role (Iris Center, 2020) and reduces reliance on support staff which frees time and effort to support other students and prioritize other daily responsibilities (Agran et al., 2005; Jackson et al., 2002; Rock & Thead, 2007; Smolkowski et al., 2023). Thus, self-management strategies have been found to be among the most effective and promising categories of interventions that also do not pull the teacher unnecessarily away for academic responsibilities or other students in the classroom.

However, with the small number of intervention studies found that focused on non-academic outcomes (e.g., on-task, etc. as opposed to increased math facts answered correctly) for students with ED located during the 2021 analysis and the reliance on two specific journals, Behavioral Disorders and the Journal of Emotional and Behavioral Disorders, the current study sought to expand by including more journals, narrowing the search to focus on intervention studies only, and excluding studies that did not target changing a maladaptive behavior with a non-academic outcome (e.g., increasing time on-task or decreasing talking out). Thus, the goal of this current literature review was to systematically review empirically sound interventions that were successful at reducing nonacademic behaviors with self-monitoring skills. This focus was intentionally selected to assist teachers with managing students with ED's negative behaviors that disrupt the classroom and impede their success by providing a review of evidence-based interventions that have been researched and documented as successful regardless of setting. By identifying evidence-based self-monitoring interventions that can be used during the developmental years, teachers could potentially help minimize the negative outcomes associated with this population (Rafferty, 2012; Walker et al., 1996; Wheeler et al., 2012), curb punitive practices such as suspensions and expulsions that have not historically been helpful, and reduce the time and stress teachers report dealing with non-constructive, maladaptive student behaviors that take away from the classroom environment.

Thus, based on the extant literature, there is a need to investigate and analyze the effectiveness of self-management strategies that have been published and deemed to have a successful impact on the nonacademic behaviors of students identified with ED. Further, given the concerns of teachers, it is important to also analyze the social validity, utility, and ease of the implementation of these interventions. The following primary research questions are as follows:

1. What are the effects of self-management interventions when applied to the

nonacademic behaviors of students with ED and how are studies evaluating effectiveness?
2. In what settings have self-management interventions been applied to the nonacademic behaviors of students with ED?
3. What variables may influence the effectiveness of self-management interventions?
4. What claims can be made regarding the social validity of self-management interventions for students with ED?

Method

A comprehensive electronic search was completed via the PsycINFO and ERIC databases using a combination of the following keywords: behavior disorders, emotional/behavioral disorder, EBD, emotional disturbance, conduct disorder, school, intervention, self-management, self-evaluation, self-monitoring, self-instruction, goal setting, and strategy instruction. The reviewed results included participants 0–21 years of age. Initial searches yielded 609 results; applying the inclusion and exclusion criteria narrowed the results to 24 studies. The second phase of the literature search included an ancestral search of qualifying studies and literature reviews identified an additional 10 studies, resulting in a total of 34 studies which met the criteria for this review.

Table 1 Target Behavior Operational Definitions

Behavior	Operational definition
On-task behavior	Actively or passively engaging in the assigned task (e.g., tracking the speaker, turning pages, looking at workbook), listening to and following instructions and behavioral expectations, verbally participating, asking on-topic questions, and/or staying on task
Off-task behavior	Not engaging in the assigned task or attending to the speaker or work, looking around the room, manipulating objects that are not related to the task, sleeping, and/or talking about unrelated content or questions
Appropriate verbal behavior	Asking for help or clarification, positive acknowledgment when assistance is received, using validating statements or gestures (e.g., “great job” or thumbs up), neutral statements or comments, speaking in an appropriate voice level, and/or attempting to resolve conflict
Inappropriate behavior	Use of profanity, yelling/screaming, singing, teasing, threatening, making noises, making derogatory or vulgar comments, interacting negatively with the teacher or peers, taunting, and/or nonverbal gestures (scowling, middle finger, sticking tongue out)
Aggressive behavior	Physical outbursts, including property destruction and striking or attempting to strike someone else, throwing or kicking objects or furniture, biting, pinching, hair pulling, and/or elopement

Included in this review were single-subject research studies that (a) included a self-management procedure; (b) included participants receiving special education services for ED (or equivalent, e.g., serious emotional disorder, emotional handicap); (c) intervened on nonacademic behaviors; and (d) took place between 1990 (IDEA) and 2021. Excluded were studies in which (a) the participants were only at-risk

of ED and/or were receiving services under another disability category; (b) individualized graphical data were omitted; or (c) the target behavior was academic.

Single-subject research studies were selected so the researcher could evaluate effectiveness of the intervention on individual participants. If a study included both academic and nonacademic target behaviors, only the nonacademic target behavior data were analyzed. Similarly, in studies with multiple participants, the only participants reviewed were those receiving special education services for ED.

Each article was coded based on: (a) year published; (b) participant characteristics (number, age, grade, gender, race, disability); (c) setting of the study (general education, special education/self-contained, resource, alternative setting); (d) nonacademic dependent variable; (e) self-management interventions utilized; (f) treatment effect size using percentage of nonoverlapping data (PND) and percentage of data exceeding the median (PEM); (g) use of a social validity assessment; (h) implementation of a maintenance and/or generalization phase, and (i) article quality using the Quality Indicator Checklist (Horner et al., 2005; Kratochwill et al., 2013).

Nonacademic behaviors are those not directly measured through performance on academic tasks and align with the prevalent characteristics of individuals with ED, such as difficulty with interpersonal relationships and persistent problem behaviors (IDEA, 2007). The researcher coded each of the following target behaviors: on-task behavior, off-task behavior, appropriate verbal behavior, inappropriate behavior, and aggressive behavior using the following definitions (see Table 1).

For coding the different types of self-management interventions implemented across the studies, the following definitions were used for self-monitoring, self-evaluation, self-modeling. Self-monitoring (or self-recording) provides ongoing prompts to determine if a behavior is or is not occurring. Self-evaluation (or self-assessment) is a post assessment of the individual's behavior over a specified period. Self-modeling (or video feedback, self-instruction) requires the individual to review video footage of self that evokes preferred behaviors (Clare et al., 2000; Mooney et al., 2005). Although many self-management studies primarily utilize one of these interventions, there can be variations in the self-management intervention (e.g., self-monitoring using audio cues or goal setting). Instead of reviewing the effectiveness of each variation, the researcher coded each study as using self-evaluation, self-modeling, self-monitoring, or as using multiple self-management techniques. To calculate the effect size both PND and PEM were calculated for each study. PND is often used in single-subject research to calculate differences between baseline and intervention conditions (Manolov & Solanas, 2009; Meindl & Canella-Malone, 2011). The highest (for decreasing behavior) or lowest (for increasing behavior) data point in the baseline condition was identified. The number of data points in the intervention phase that do not overlap those in the baseline phase are counted, divided by the total data points in the intervention phase, and multiplied by 100 (Manolov & Solanas, 2009). The following scale was used: highly effective (HE; >90% PND), moderately effective (ME; 70–90% PND), questionably effective (QE; 50–69% PND), and ineffective (I; <50% PND; Scruggs & Mastropieri, 1998).

Because effect size cannot be calculated with outlier data points or if a baseline data point reaches the ceiling/floor using PND, PEM is used in these situations as it is less influenced by outlier data points and less likely to underestimate or overestimate the

effect size (Chen & Ma, 2007; Manolov & Solanas, 2009). Therefore, PEM was also calculated and evaluated for each participant and target behavior. A line was drawn through the median data point. The number of data points (on the desired side) was counted, divided by the total number of data points, and multiplied by 100. Following the criteria set forth by Ma (2006) each demonstration received categorization as highly effective (HE; ≥90%), moderately effective (ME; ≥70% but <90%), or questionably effective (QE)/ineffective (I; <70%).

In addition, the studies were coded for Social Validity, Generalization, Maintenance, and Quality. Self-management interventions are often identified as being socially valid and the self-management skills learned through such interventions can be maintained and generalized. Social validity was coded "yes" if the teacher and/or student completed a social validity assessment. The specific social validity assessment used was also noted. Maintenance was coded "yes" if the study described a maintenance phase, or the graph contained maintenance or follow-up data. Generalization was coded "yes" if data was collected in an untrained setting or on an untrained target behavior.

The researcher evaluated the articles used in this review against the single-subject quality indicators identified by Horner et al. (2005). Twenty-one quality indicators describe high-quality single-subject research across multiple categories. The National Technical Assistance Center of Transition developed a checklist of 20 items that align with the research of Horner et al. (2005) and Kratochwill et al. (2013). Using this checklist, studies that met all 20 items were identified as high quality. Studies that met Criteria 1–16 and at least one of the four social validity criteria (17–20) were scored as having acceptable quality. Studies that did not meet these minimum criteria fail to meet the quality standards for single-subject research.

Results

Participants and Setting

The 34 studies had a total (N) of 97 participants (12 female, 79 male) ranging from 5 to 18 years old. One study (n = 6) did not provide a gender breakdown. Of the 97 participants, 30 were Caucasian, 22 were African American, and five were Hispanic, with the race of the remaining 40 participants not specified. Based on the ages and provided information, 15 of the studies (n = 36) took place in an elementary setting, 11 (n = 25) in a high school setting, and eight (n = 36) in a middle school setting.

Across grade levels, self-management interventions were implemented in the following instructional settings: general education (three studies; n = 7), resource classroom (two studies; n = 4), general education and resource classroom (two studies; n = 2), self-contained/special education classroom (19 studies; n = 50), self-contained and general education (one study; n = 2), non-classroom settings (hallways, cafeteria foyer; two studies; n = 7), or alternative settings (summer behavioral program, school for students with ED, hospital; five studies; n = 25).

Table 2. Overview of Reviewed Studies

Author	Setting	DV	IV	Average effectiveness		SV	Maint	Gen	Quality Score
				PND	PEM				
Amato-Zech et al. (2006)	Self-contained	On-task	Self-monitoring	ME	HE	Yes	No	Yes	High quality
Blood et al. (2011)	Self-contained	On-task Inappropriate	Self-monitoring, self-evaluation	HE	HE	Yes	No	No	Did not meet criteria
Chu & Baker (2015)	General education	Appropriate verbal Inappropriate	Self-modeling	HE	HE	Yes	Yes	Yes	Did not meet criteria
Clare et al. (2000)	Self-contained	On-task	Self-modeling	HE	HE	Yes	Yes	Yes	Did not meet criteria
Denune et al. (2015)	Alternative setting	Inappropriate Off-task On-task	Self-monitoring	HE	HE	Yes	Yes	No	Acceptable quality
DiGangi & Maag (1992)	Resource	Inappropriate Appropriate verbal	Self-monitoring Self-instruction Self-reinforcement Self-evaluation	ME*	HE	No	No	No	Did not meet criteria
Dunlap et al. (1995)	Self-contained	Inappropriate On-task	Self-monitoring	ME*	HE	No	No	No	Did not meet criteria
DuPaul et al. (1997)	Self-contained	Inappropriate On-task	Self-evaluation	I*	ME	Yes	No	No	Did not meet criteria
Glenn & Waller (2007)	Resource	Off-task	Self-monitoring	HE	HE	No	No	No	Did not meet criteria
Gulchak (2008)	Self-contained	On-task	Self-monitoring	NA	HE	No	No	No	Did not meet criteria
Hansen et al. (2013)	Multiple settings	Inappropriate On-task	Self-monitoring	I*	ME	Yes	No	No	Acceptable quality
Hogan & Prater (1993)	Multiple settings	Aggressive	Self-monitoring Self-instruction	NA	HE	No	No	No	Did not meet criteria

Howard et al. (2020)	General education	Off-task On-task	Self-monitoring Self-evaluation Self-reinforcement	ME*	ME	Yes	No	No	Acceptable quality
Hunter et al. (2017)	Self-contained	Off-task	Self-monitoring	HE	HE	Yes	No	No	Did not meet criteria
Kern-Dunlap et al. (1992)	Self-contained	Inappropriate Appropriate verbal	Self-modeling	QE*	ME	No	No	No	Did not meet criteria
Kern et al. (1994)	Self-contained	On-task Aggressive	Self-monitoring	QE*	HE	No	No	No	Did not meet criteria
Kern et al. (1995)	Alternative setting	Appropriate verbal Inappropriate	Self-evaluation	QE	HE	No	No	No	Did not meet criteria
Kern et al. (2001)	Alternative setting	Aggressive	Self-monitoring	NA	HE	No	No	No	Did not meet criteria
Kumm et al. (2021)	General education	Appropriate verbal On-task	Self-monitoring	HE	HE	Yes	No	No	Did not meet criteria
Levendoski & Cartledge (2000)	Self-contained	On-task	Self-monitoring	HE	HE	Yes	No	No	Did not meet criteria
McDougall & Brady (2001)	Alternative setting	On-task	Self-monitoring	I	ME	No	No	Yes	Did not meet criteria
McQuillan et al. (1996)	Self-contained	On-task	Self-evaluation	I	I	Yes	No	No	Did not meet criteria
Minner (1990)	Non-classroom setting	On-task	Self-monitoring	HE	HE	No	Yes	No	Did not meet criteria
Moore et al. (1995)	Self-contained	Inappropriate Aggressive Appropriate verbal	Self-monitoring	ME	HE	No	No	Yes	Did not meet criteria
Ninness, Ellis et al. (1995)	Non-classroom setting	Aggressive	Self-evaluation	HE	HE	No	No	No	Did not meet criteria
Ninness, Fuerst et al. (1995)	Self-contained	Inappropriate	Self-evaluation	HE	HE	No	No	No	Did not meet criteria

Ninness et al. (1991)	Self-contained	Inappropriate	Self-evaluation	ME	HE	No	No	No	Did not meet criteria
Prater et al. (1992)	Multiple settings	On-task	Self-monitoring	HE	HE	No	Yes	No	Did not meet criteria
Rafferty (2012)	Alternative setting	On-task	Self-monitoring	HE	HE	Yes	No	Yes	Acceptable quality
Rafferty & Raimondi (2009)	Self-contained	On-task	Self-monitoring	ME	ME	Yes	No	No	Acceptable quality
Rasheed et al. (2012)	Self-contained	Inappropriate	Self-monitoring	ME	HE	Yes	No	No	Did not meet criteria
Shear & Shapiro (1993)	Self-contained	Inappropriate	Self-modeling	I*	I	Yes	Yes	No	Did not meet criteria
Smith & Sugai (2000)	Self-contained	Off-task On-task	Self-monitoring	ME*	ME	No	No	No	Did not meet criteria
Walther & Beare (1991)	Self-contained	On-task	Self-evaluation	I	ME	No	No	No	Did not meet criteria

Note. This table presents relevant information from reviewed studies. DV = dependent variable; IV = independent variable; SM = self-management; SV = social validity; HE = highly effective; ME = moderately effective; QE = questionably effective; I = ineffective. Italicized SM IV indicates non-SM interventions were included in the treatment package. Non italicized IV indicates they did not include non-SM intervention components. *Indicates that the PND could not be calculated for at least one of the participants; NA indicates that the percentage of nonoverlapping data (PND) could not be calculated for all participants in the study. For social validity, yes = social validity data were submitted by either the staff, student, or both parties; no = social validity data were not collected. For maintenance and generalization, yes = at least one data point maintenance or generalization data point was collected; no = no maintenance or generalization data was collected.

Self-management interventions for students with ED do not appear to be limited to any grade level and self-management interventions in the general education setting were just as effective, if not more effective, than interventions in a more restricted setting. According to PEM calculations, most studies across all grade levels were effective, slightly favoring the application of self-management in the middle (HE = 5; ME = 3) or high school level (HE = 10; ME = 1) than in the elementary level (HE = 10, ME = 4, I = 1). PND calculations across grade levels were less aligned, but still resulted in the same average effectiveness range in the elementary (HE = 5; ME = 3; QE = 1, I = 4; NA = 2), middle (HE = 2; ME = 3; QE = 2, I = 1) and high school setting (HE = 6; ME = 3; I = 1; NA = 1). Using PEM calculations, most studies in the self-contained setting were HE (HE = 12; ME = 5; I = 2). In the general education setting, two studies were HE and one was ME. For the alternative setting, all but one of the studies was HE (HE = 4; ME = 1). In the resource setting and the non-classroom settings, all studies (N = 4) were HE. Finally, across multiple settings, two studies were HE and the other study was ME. Using PND calculations, effectiveness varied across settings. Effectiveness in the self-contained setting ranged from HE to I (HE = 5; ME 7; QE = 3; I =

4; NA = 1). For the alternative setting, the five studies varied from HE to I (HE = 1, QE = 1, I = 1, NA = 1). In the resource setting, one study was HE and the other was ME, but both studies in the non-classroom setting were HE. Finally, studies across multiple settings were either HE or I (HE = 1; I = 1; NA = 1). Table 3 provides the average effectiveness of self-management interventions across grade levels and instructional settings.

Table 3. Average Effectiveness by Instructional Setting and School Level

	PND	PEM
School level		
Elementary school	ME	ME
Middle school	ME	HE
High school	ME	HE
Instructional Setting		
General education, Resource, Common area	HE	HE
Self-contained	ME	ME
Alternative school	QE	HE
Hospital	Floor	HE

Note. Average percentage of nonoverlapping data (PND) and percentage of data exceeding the median (PEM) calculation by school level and instructional setting. HE = highly effective; ME = moderately effective; QE = questionably effective; I = ineffective.

Dependent Variables

Most studies contained multiple participants with multiple target behaviors. Each participant and individual target behavior was identified as a single demonstration of self-management interventions. In total, there was a total (N) of 128 demonstrations of self-management interventions. The most-identified target behaviors were on-task behavior (n = 41) and inappropriate behavior (n = 40). Other dependent variables included off-task behavior (n = 8), appropriate verbal behavior (n = 23), and aggressive behavior (n = 16). Table 4 provides the average effectiveness of self-management interventions by target behaviors. Across all target behaviors, the average PEM calculation was one effectiveness band higher than the PND calculation. PEM calculations indicated that the use of self-management interventions for on-task, off-task, appropriate verbal behavior, and aggressive behavior were highly effective. PND indicated they were moderately effective. Inappropriate behavior was less responsive to self-management interventions, falling in the questionably effective (PND) to moderately effective (PEM) range.

Independent Variables

Of the included studies, 15 (n = 46) used only a self-monitoring intervention. Four studies (n = 21) used self-modeling alone and one study (n = 1) used self-evaluation alone. Four studies (n = 14) used multiple self-management techniques (i.e., component analysis design comparing goal setting, self-monitoring, self-evaluation, and self-reinforcement, or

a combination of these interventions). The remaining 10 studies (n = 46) combined self-management interventions with various other treatment components (e.g., interdependent group contingency, token economy, prompt cards, reinforcement schedules, and social skills training). Effectiveness was further evaluated by treatment components. PEM calculations favored the use of self-monitoring only (HE = 12; ME = 3) and interventions that combined self-management strategies with other components (HE = 7; ME = 2, I = 1).

Table 4. Average Effectiveness by Target Behaviors

	PND	PEM
On-task	ME	HE
Off-task	ME	HE
Appropriate verbal behavior	ME	HE
Inappropriate behavior	QE	ME
Aggressive behavior	ME	HE

Note. Average percentage of nonoverlapping data (PND) and percentage of data exceeding the median (PEM) calculation by target behavior. HE = highly effective; ME = moderately effective; QE = questionably effective; I = ineffective.

The effectiveness of multiple self-management components (HE = 3; ME = 1), self-modeling only (HE = 2, ME = 2, I = 1) and self-evaluation only (ME = 1) treatments were moderately effective. PND calculations were lower across the various treatment packages. Self-monitoring alone (HE = 6; ME = 5; Q = 1; I = 1; NA = 2), multiple self-management components (HE = 1; ME = 2; NA = 1), and a combination of interventions (HE = 4; ME = 2, Q = 1, I = 3) were moderately effective on average. Self-modeling alone (HE = 2; Q = 1, I = 1) interventions were questionably effective and self-evaluation alone (I = 1) was scored as ineffective.

Social Validity, Generalization, and Maintenance Data

Across the 34 studies, 16 studies gathered social validity data from the staff and/or students. The remaining 18 studies did not include any information about the intervention's social validity. Of the studies that included a social validity assessment, five studies used the Intervention Rating Profile-20 (IRP-20) (Witt & Martens, 1983) and four studies used the Children's Intervention Rating Profile (CIRP) (Turco & Elliot, 1986). One study used the User Profile Rating – Intervention Revised (URP-IR) (Chafouleas et al., 2011) and the Children's Usage Profile Rating (CURP) (Briesch & Chafouleas, 2009). The remaining 11 studies used a non-specified questionnaire to gather social validity data. Given the variety of social validity assessments, it was difficult to compare the data across studies because each questionnaire had unique questions and point systems. However, most social validity assessments supported the use of self-management interventions with teachers frequently identifying they would continue to use the interventions given the effectiveness (increasing/decreasing target behaviors), feasibility, and ease of implementation. Students also had positive reactions to the self-management

interventions noting them to be helpful, effective, and enjoyable to use.

Table 5. Average Effectiveness by Self-Management Treatment Components

	PND	PEM
Self-evaluation only	I	ME
Self-modeling only	QE	ME
Self-monitoring only	ME	HE
Multiple self-management interventions	ME	ME
Combination of self-management and other treatment components	ME	HE

Note. Average percentage of nonoverlapping data (PND) and percentage of data exceeding the median (PEM) calculation by self-management treatment components. HE = highly effective; ME = moderately effective; QE = questionably effective; I = ineffective.

The degree to which an individual maintains or generalizes a behavior change to other target behaviors or across settings without training can indicate a highly successful intervention. However, few of the studies included either component. Five of the studies collected generalization data in an alternative setting and the remaining studies, targeting on-task behavior, collected generalization data on a different behavior (e.g., percentage of correctly written spelling words). Most generalization data were collected once or twice during each treatment phase, with only one study collecting daily generalization data (Chu & Baker, 2015). Visual analysis and study narratives indicate that generalization data from each study typically aligned with data collected on the target behavior or in the trained setting. Six studies gathered at least one maintenance data point (Chu & Baker, 2015; Clare et al., 2000; Denune et al., 2015; Minner, 1990; Prater et al., 1992; Shear & Shapiro, 1993). Maintenance data collection timelines varied across studies. Three studies (Chu & Baker, 2015; Denune et al., 2015; Minner, 1990) conducted maintenance probes immediately after the final intervention phase. The remaining studies (Clare et al., 2000; Prater et al., 1992; Shear & Shapiro, 1993) collected maintenance data three to four weeks post intervention. The number of maintenance data points also varied with two studies (Denune et al., 2015; Minner, 1990) collecting one data point, one study (Clare et al., 2000) collecting two data points across 8 weeks, two studies (Chu & Baker, 2015; Shear & Shapiro, 1993) collected three weekly data points, and one study (Prater et al., 1992) collected 5-12 weekly data points across settings. Visual analysis and study narratives implied that the desired behaviors were maintained for varying lengths of time after the intervention was withdrawn for all but one study (Shear & Shapiro, 1993).

Quantity and Quality of Studies

Over the years, that rate of publication of studies focused on students with ED has decreased (Garwood, Peltier, et al., 2021). This decrease in publication rate is evident across studies included in this review and most of the studies identified for this review do not meet the quality standards for single-subject research. From the initial implementation of IDEA in 1990 to its reauthorization in 2001, the rate of publication was 1.7 published articles/year. After 2001, the rate of publication decreased to 0.75 published articles/year. Additionally, out of the 34 studies, one met the criteria for high quality, five qualified as acceptable quality, and the remaining 28 did not meet quality standards. Most of the studies (n = 18) failed to meet quality criteria due in part to the absence of social validity assessments.

Discussion

The primary focus of this study was to systematically review the literature to evaluate the general effectiveness of self-management interventions on curbing maladaptive behaviors exhibited by students with ED. To achieve this a comprehensive literature review was conducted to explore the quantity and quality of self-management studies that met the inclusion criteria. Within each study, PND and PEM were used to determine if the intervention was deemed successful. In general, when comparing the PND and PEM data across a variety of categories and questions (e.g., the impact of self-management on specific target behaviors), PND calculations were typically one effectiveness category below those of PEM calculations. The initial goal of using both calculations was to obtain a more accurate and straightforward measurement of general effectiveness. However, this finding suggests that using PEM to determine the effectiveness of interventions is a more accurate approach, as PND is likelier to undervalue the effectiveness of an intervention.

In the studies analyzed, researchers used either a self-management intervention package consisting of multiple strategies or a singular self-management intervention. Average effectiveness data revealed that the use of self-monitoring only interventions are just as effective as combining self-monitoring with other treatment components (e.g., group contingency, social skills training, token economy). These preliminary findings suggest that a simplified intervention package is just as effective, if not more effective, than combining multiple treatment components due to simplicity. Although these findings lean towards using minimal treatment components, the variations across intervention plans that were used across studies make it difficult to draw definitive comparisons or conclusions about the most effective and economical intervention plan. Of the studies in this review that did use a multi-component package, only two (DiGangi & Maag, 1992; Howard et al., 2020) used a component analysis to examine the impact of various self-management components. DiGangi and Maag (1992) noted that a combination of self-instruction and self-monitoring was more effective than self-monitoring alone or the combination of self-evaluation and self-reinforcement. In Howard et al.'s (2020) study, the most effective treatment for one student was a combination of goal setting, self-monitoring, and self-evaluation, while the other participant had better results with self-reinforcement added to the plan. Additional component analyses and exploration of treatment components (e.g., is there a difference in effectiveness when using a tactile or audio cue when self-monitoring?) would provide more input on how best to design and simplify self-management interventions.

Information gathered from component analyses may also directly impact the social validity outcomes as interventions that are streamlined, less intrusive, and viewed as effective are more likely to be used by staff and students with fidelity (Rafferty, 2012). Social validity data is an especially important consideration when selecting interventions for students with ED. By design, self-management interventions place ownership on the student, thereby reducing the responsibility placed on staff. Practitioners present self-management as easy to implement, less distracting, low-cost, and easy to manage (Amato-Zech et al., 2006; Mitchem & Young, 2001). However, there was an overall lack of social validity findings across the included studies. As noted, less than half of the studies gathered social validity data. Although the social validity data were generally positive across staff and students (e.g., continued use of intervention, effective in increasing/decreasing target behavior, feasible), the general lack of and the variance in social validity assessments does raise questions about the overall social validity findings of self-management interventions. It would be beneficial to use a common social validity assessment (e.g., Intervention Rating Profile-20; Children's Intervention Rating Profile) to gather reliable information on self-management interventions for this population.

Another factor that may influence effectiveness outcomes and social validity of self-management interventions is how well self-management skills are generalized and maintained over time. Self-management interventions provide individuals with the skills needed to self-regulate, a skill set that is critical both personally and within an instructional classroom setting (Davies & Witte, 2000; Mooney et al., 2005). However, only six studies collected generalization data and only six studies collected follow-up or maintenance data. Despite the implied positive generalization and maintenance data presented from these studies, the degree to which students can maintain or generalize behavior change after the implementation of a self-management intervention is inconclusive. Across literature reviews that delve into self-management (Bruhn et al., 2015; McDougall et al., 2006; Mooney et al., 2005; Sheffield & Waller, 2010), generalization and maintenance of interventions are not often the focal points, indicating a recurringly identified gap in the literature. Including maintenance and generalization phases would not only improve the quality of the studies but would provide further evidence to support the use of self-management interventions with this population.

As education continues to shift to a more inclusive model and students with ED are increasingly placed in less restrictive settings, conducting studies for students with ED in the general education setting is imperative. Of the included studies in this review, only five of the 34 studies (Hansen et al., 2013; Hogan & Prater, 1993; Howard et al., 2020; Kumm et al., 2021; Prater et al., 1992) took place in a general education setting. This could be due to several reasons including school discipline that results in poor attendance or temporary removal from the general education setting, fewer students with ED placed in a general education setting, or difficulty implementing an intervention with fidelity in a less structured classroom setting. However, based on the findings from this study, self-management interventions in the general education setting were just as effective, if not more effective, than interventions in a more restricted environment (resource, self-contained, alternative school) and do not appear to be limited to any grade level. Within the general education setting, self-management interventions were successfully applied to the following target behaviors: aggressive behavior, on-task behavior, off-task behavior, inappropriate

behavior, and appropriate behavior. These findings should serve as encouragement for future studies to further explore the implementation of self-management interventions in general education.

Future Research

Although the number of studies looking at self-management on the non-academic behaviors of students with ED is limited, the information gathered provides direction for additional research on this topic. With most of the studies up to this point omitting key criteria identified in the Quality Indicator Checklist: Single Subject Studies (Horner et al., 2005), future research should aim to include all quality indicators. New, quality research aligned with the direction of special education policies is imperative and would yield more confidence in the outcomes of studies and the use of self-management interventions on the nonacademic behaviors of students with ED. To further the effectiveness and social validity of self-management interventions, research needs to pinpoint factors that directly impact outcomes of self-management interventions and its reception by consumers. However, the extensive range of applications across many target behaviors and many settings creates some limitations in analyzing the data.

Limitations

There are several limitations of this review that should be acknowledged. There was also a broad range of dependent variables used across studies. Although many dependent variables were similar, each study provided a unique operational definition. As a result, some dependent variables may have been miscategorized or could fit the operational definition of multiple dependent variables. For example, using the operational definition for "inappropriate peer reactive behavior" provided by Moore et al., (1995), this dependent variable was categorized as "aggressive behavior." However, "inappropriate peer interactions" as operationally defined in the study by Kern et al. (1995) was categorized as "inappropriate behavior" for this review. These varying definitions could shift the results of effectiveness across target behaviors. Also, expansion on the current inclusion criteria may broaden the number of studies identified. Studies were excluded if they were published prior to 1990 and if they did not explicitly describe the participant as receiving special education services for ED. Additionally, search criteria may have missed studies using other interventions that could be categorized as self-management.

As discussed, the effectiveness of self-management interventions was measured using both PND and PEM calculations. Despite guidelines to ensure accurate measurement, the variety of treatment plans and research designs could have impacted some calculations. The use of PND and PEM is primarily for research with a reversal design, and there were no specific guidelines for other designs (component analysis, multiple baselines across settings, alternating treatments). Although one may choose to approach these numbers with caution, the use of interobserver agreements for the PND and PEM calculations should provide readers with confidence in the consistency of the data and findings.

As special education policies continue to push towards increased inclusivity for all disabilities, increased quality research needs to also reflect these changes. Students with ED present a unique combination of academic, behavioral, and social challenges that often lead to poor school and postsecondary outcomes. Intervening early on nonacademic behaviors that can further isolate and detract from academic progress is essential. However, to support the transition to a less restrictive setting

and to address the inherent challenges of working with this population, socially valid and effective interventions are needed. Studies implementing self-management interventions with this demographic provide encouraging results and bring a possible solution to schools, teachers, and students with ED. With more concerted effort to study the use of self-management interventions on the nonacademic behaviors of students with ED, especially in a general education setting, researchers could positively impact the trajectory of students with ED.

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