

Reading, Writing, Math, and Content-Area Interventions for Improving Behavioral and Academic Outcomes of Students with Emotional and Behavioral Disorders

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There is a strong connection between emotional and behavioral problems and academic outcomes across multiple domains for students with or at-risk of emotional and behavioral disorders (EBD). There is a growing body of research investigating this area within the field of special education. This article summarized findings from seven systematic reviews and five meta-analyses focused on academic, curricular, and instructional interventions for students with or at-risk for EBD. The reviews specifically focused on the domains of reading, writing, math, and content area instruction. A total of 3,366 students with or at-risk for EBD in grades K-12 were participants across all 12 reviews. Implications are provided for improving applied practice for students with or at-risk of EBD.

Keywords: EBD, Emotional Disorders, Behavior Problems, Academic Instruction, Academic Curriculum, K-12

INTRODUCTION

Academic failure is one of the most powerful predictors of problem behavior and social failure (Algozzine, Wang, & Violette, 2011). Students with or at-risk of emotional and behavioral disorders (EBD) are often especially challenged with dual social-emotional and academic difficulties that work together to have a negative impact on educational performance (Gunter, Denny, & Venn, 2000). The Individuals with Disabilities Education Act (IDEA, 2004) acknowledges this connection between problem behavior and academic outcomes by explicitly indicating that social-emotional and behavioral characteristics must adversely impact educational performance in order to qualify for special education services. According to IDEA (2004),

- (i) Emotional disturbance (ED) means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree, that adversely affects a child's educational performance:
 - (A) An inability to learn that cannot be explained by intellectual, sensory, or health factors,
 - (B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers,

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- (C) Inappropriate types of behavior or feelings under normal circumstances,
 - (D) A general pervasive mood of unhappiness or depression,
 - (E) A tendency to develop physical symptoms or fears associated with personal or school problems.
- (ii) Emotional disturbance includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (c)(4)(i) of this section.

Current criteria for identification of emotional disturbance under IDEA requires that social-emotional and behavioral characteristics must adversely impact educational outcomes (300.8 (c)(4)).

Social-emotional and behavioral factors are associated with poor academic and learning outcomes (e.g., Darney, Reinke, Herman, Stormont, & Jalongo, 2013). Likewise, poor academic outcomes are associated with emotional and behavioral problems (Becker & Luthar, 2002). Whether an academic and learning problem directly causes social-emotional and behavioral issues or vice versa is not clear. However, there is mounting evidence of a reciprocal connection between emotional, social, and behavioral problems and academic achievement. That is, deficits in either the social-emotional or academic domain exacerbate the odds of affecting the other (Luiselli, Putman, Handler, & Freinberg, 2005; Saeki, Jimerson, Earhart, Hart, Renshaw, Singh, & Stewart, 2011).

Descriptive research indicates strong negative associations between social, emotional, and behavioral difficulties and educational performance across multiple academic and behavioral domains (Lane, Barton-Arwood, Nelson, & Wehby, 2008). In general, students with or at-risk of EBD are behind academically, especially when compared to their peers without disabilities (Coutinho, 1986; Epstein, Kinder, & Bursuck, 1989). Gage, Adamson, MacSuga-Gage and Lewis (2017) reported that most students with EBD performed at or below the 25th percentile in general academic functioning. Reid, Gonzales, Nordness, Trout and Epstein (2004) reported a significant negative effect (-0.64) related to the academic achievement of students with EBD compared to students without disabilities. Likewise, Adamson and Lewis (2017) reported the academic performance of elementary students with behavior problems is up to 1.5 to 2 grade levels behind their peers, and the gap widens to 3.5 grade levels by secondary school.

Externalizing problems are particularly problematic. Kauffman (2001) pointed out that students with EBD are so disruptive that they often alienate schoolmates and adults. Ultimately, they often rob themselves of the benefits of learning opportunities. This, in turn, impairs their ability to succeed in school.

Associations have been established between low achievement, antisocial behavior, and disciplinary actions (Brown, 2007; Christle, Jolivet, & Nelson, 2005; Gregory, Skiba, & Noguera, 2010). Barriga, Doran, Newell, Morrison, Barbetti and Robbins (2002) addressed this connection, noting that from a methodical point of view, negative behavior and academic problems have a corresponding influence on the other. Their correlational analyses of antisocial behaviors identified by teachers supported the relationship between behavior problems and academic performance.

Associations have been documented between low school engagement, poor attendance, conflicts with adults and peers, disruptive behavior, mental health issues, high dropout rates, and increased risk for school suspension (Blackorby et al., 2007; Lane, Carter, Pierson, & Glaeser, 2006). Unsurprisingly, task engagement and on-task behaviors also tend to be lower for students demonstrating behavioral challenges. King, Radley, Jenson, and O'Neill (2017) estimated that students who experience academic or behavioral problems are on-task about 50% of the time compared with 77% to 89% for students not experiencing academic and behavioral problems. The differences in task engagement noted by King et al. (2017) between students with academic and behavioral problems and their peers suggests a substantial loss of classroom instruction that compounds already problematic academic difficulties. Likewise, students with EBD experience several negative outcomes that have serious implications such as low grades, course failures, grade retention, higher rates of dropping out of school, and graduating without a regular high school diploma (Dunn, Shelnut, Ryan, & Katsiyannis, 2017; Wagner & Cameto, 2004). Trout, Nordness, Pierce, and Epstein (2003) found that students with EBD scored significantly lower than their peers without disabilities across all subject areas and are behind their same-age general education peers in reading, writing, and mathematics.

Reading

Reading is a critical skill area that serves as a foundation to students' learning and success across subject areas. Maughan, Pickles, Hagell, Rutter, and Yule (2006) focused their research on the connection between developmental reading difficulties and problem behavior. Their research indicated that students with reading deficits have higher rates of problem behavior. Kostewicz and Kubina (2008) noted that as a group, students identified with EBD experience high rates of low reading achievement. Specifically, they reported reading grades for students with EBD are among the lowest reported for school-age groups, and they achieve fewer gains during the K-5 school years than students diagnosed with a learning disability. The importance of reading skills was stressed by Benner, Nelson, Ralston and Mooney (2010) as the key to cognitively accessing other forms of learning, especially in the content areas in which students with EBD often struggle.

Writing

The connection between reading and writing skills has been of interest to researchers for a number of years (Shanahan, 2016). Cramer and Mason (2014) found that students with EBD have difficulty focusing and carrying out the multiple tasks associated with expressive writing (e.g., conveying feelings, expressing opinions, exploring ideas). Similarly, Lane (2004) noted that expressive writing is the most difficult for students with EBD. In another study, Benner, Nelson, and Epstein (2002) reported that students with EBD obtained the lowest mean score on written language subtests, and identified expressive language skills as common deficits among this group of students.

Mathematics

Students with EBD also often perform poorly in mathematics (Mulcahy, Maccini, Wright, & Miller, 2014). Trout et al. (2003) conducted a review of 70 studies published from 1961 to 2000. They found that 92% of the studies indicated that students with EBD had significant academic deficits in math. Mulcahy, Krezmien, and Travers (2016) noted that students with EBD in K-8 were a grade level behind their peers without disabilities and the gap widened to almost three grade levels by ninth grade.

Other Content Areas

Recently, more attention has been placed on improving the academic outcomes of students with EBD in content areas, particularly science (Therrien, Taylor, Watt, & Kaldenberg, 2014) and social studies (Morris, McGuire, & Walker, 2017). Therrien et al. (2014) expressed concerns with traditional instructional methods for science (i.e., textbook, standup and lecture) and their effectiveness for teaching students with EBD. They found that traditional methods are challenging to these students given they are not always academically motivated, have difficulty retaining information, and have difficulty connecting prior knowledge to new information. Morris et al. (2017) studied the integration of social studies instruction with social and emotional learning (SEL) interventions with students with EBD. The researchers espoused the idea that integrating the two in the classroom could lead to improvements in academic performance. They suggested that students with EBD could use social and emotional skills in an effective manner within the context of social studies activities. They also noted that students might be more successful in a classroom environment that is less structured but cognitively challenging.

Interventions to Address Academic and Behavior Challenges

Descriptive research suggests that students with or at-risk for EBD require intervention across multiple academic domains from kindergarten through grade 12 (Gresham, 2014; Ryan, Pierce, & Mooney, 2008). There is a need for highly effective, evidence-based academic as well as social, emotional, and behavioral supports for students with EBD. The need for academic interventions for students with or at-risk for EBD has been a reoccurring concern within the literature (e.g., Ryan et al., 2008). Reading instruction, in particular, has been cited as a concern because of the associations between problem behavior and reading development (Algozzine et al., 2011). In addition, others have noted the need for intervention in writing (Cramer & Mason, 2014), math (Templeton, Neel, & Blood, 2008), and in the content areas of science and social studies (Scruggs, Mastropieri, & Marshak, 2012). Mooney, Epstein, Reid, and Nelson (2003) reported fifty-five published interventions over a 30-year period focused on academic interventions for students with EBD. They found that participant information was limited, and few studies focused on improving the academic performance of students with emotional disturbance. Further, they reported that the interventions used lacked depth and rigor. The evidence base evaluating academic interventions for students with EBD has arguably grown in recent years (Carrero, Collins, & Lusk, 2017).

The purpose of this article was to synthesize and report the state of the academic intervention literature for students with or at-risk of EBD. Previous reviews and meta-analyses were reviewed that focused on academic interventions used to promote social-emotional, behavioral, and academic outcomes for students with or at-risk of EBD. This “review of reviews” sought to: (a) summarize the literature from extant reviews of academic interventions for students with EBD focused on reading, writing, math and the content areas of science and social studies; (b) identify gaps in existing research; and (c) provide implications for intervention practice for students with or at-risk of EBD.

METHOD

Literature Search and Inclusion Criteria

Previous reviews were identified through an electronic search of peer-reviewed articles published in the year 2000 or later. Databases searched were PsycINFO, ERIC, and Academic Search Ultimate using the keywords *EBD*, *emotional disorders*, *behavior disorders*, *behavior problems*, *academic instruction*, *academic curriculum*, *academic intervention*, *instructional intervention*, *reading*, *writing*, *math*, *science*, and *social studies*, in combination with the terms *systematic reviews* and *meta-analyses*. This combination of search terms yielded a total of 15 initial results. Systematic reviews and meta-analyses were selected that met the following criteria: (a) participants were students with EBD or at-risk of EBD; (b) studies included interventions for reading, writing, mathematics, science, and social studies; (c) students were in grades K-12; and (d) interventions took place in a school setting. Both single-case design and group designs were included. Two of the authors reviewed the titles and abstracts from this pool of articles and identified all 15 articles for further evaluation. Each author read each of the potential articles. Three of the articles were systematic reviews of observational studies and were excluded. Twelve of the fifteen articles were identified as meeting the inclusion criteria by both authors (see Table 1). Of these, seven were identified as systematic reviews and five were meta-analyses.

Coding and Reliability

Three authors participated in the coding process with two of the authors coding the reviews independently. Information coded included date/range of years in the study, age/grade level, number of participants, disability status, participant ethnicity, gender, dependent variable, independent variable, behavior measured, setting, subject, fidelity of implementation, implementer, intensity, duration, follow up or maintenance, inter-coder agreement and social validity. Initial overall inter-coder reliability was 97.2%. Discrepancies between the two authors' coding were handled by rereading the reviews and reconciling disagreements with a third author. To aid coding accuracy, the systematic reviews were grouped together for coding first, each was coded, and the same process was applied to the meta-analyses. The results are also reported separately.

Table 1. Summary of Academic Intervention Studies for Students with EBD

Author	Intervention Focus	Range of Study	Type of Review	# of Studies	Design Types	Major Findings
Benner, Nelson, Ralston, & Mooney (2010)	Reading	1981-2008	Meta-Analysis	24	18 single-case and 6 group design studies	Results suggest that effective literacy instruction has a positive effect on the reading skills of students with or at-risk of EBD.
Bowman-Perrott, Davis, Vannest, Williams, Greenwood, & Parker (2013)	Reading, Math, Vocabulary, Spelling, and Social Studies	1984-2011	Meta-Analysis	26	26 Single-case research design studies	Findings of this study suggest that aspects of peer tutoring interventions such as repetition of key concepts and opportunities to respond are particularly beneficial for students in need of additional academic supports. Peer tutoring interventions are especially effective for students with EBD.
Garwood, Brunsting, & Fox (2014)	Reading Comprehension and Reading Fluency	2004-2012	Systematic Review	9	Single-case design studies	Results indicated a range of moderate to large effects for reading fluency, and small to large effects for reading comprehension.
Hodge, Riccomini, Buford, & Herbst (2006)	Mathematics	1985-2002	Systematic Review	13	12 single-case and 1 group design study	Teacher-directed interventions that include critical components of effective instructions may be effective in reducing inappropriate behaviors and increasing academic performance for students with EBD.
Losinski, Cuencana-Carlino, Zablocki, & Teagarden (2014)	Writing	2008-2014	Meta-Analysis	16	12 single-case and 4 random controlled trial design studies	Results indicated that SRSD interventions had large effect sizes across three independent variables (essay elements, quality, and word count).

Table 1 Continued. *Summary of Academic Intervention Studies for Students with EBD*

Author	Intervention Focus	Range of Study	Type of Review	# of Studies	Design Types	Major Findings
Mulcahy, Krezmien, & Travers (2016)	Mathematics	1975-2012	Systematic Review	19	Single-case design studies	Methodological review of studies focused on methods of instruction and behavioral interventions, with a summary of results. None met the criteria to be considered an evidence-based practice for secondary students with EBD.
Ralston, Benner, Tsai, Riccomini, & Nelson (2014)	Mathematics	1968-2009	Systematic Review	27	Single-case design studies	Several self-regulation interventions and instructional components were highly effective in improving mathematics skills of students with EBD, including cover, copy, and compare; self-instruction; the five-step cognitive behavior therapy; and self-monitoring.
Rivera, Al-Otaiba, & Koorland (2006)	Reading	1977-2003	Systematic Review	11	7 single-case design studies and 4 group designs	All interventions employed in the reviewed studies derived successful literary results for the participants, even though not all of the five components of SBR were included in the research.
Streckovic, Common, Knowles, & Lane (2014)	Writing	2006-2012	Systematic Review	13	10 single-case design studies and 3 group designs	In all 13 studies, a functional relationship was established between the introduction of SRSD and changes in student performance according to visual inspection and small to large effect size magnitudes.

Table 1 Continued. Summary of Academic Intervention Studies for Students with EBD

Author	Intervention Focus	Range of Study	Type of Review	# of Studies	Design Types	Major Findings
Therrien, Taylor, Watt, & Kaldenberg (2014)	Science	1980-2010	Meta-Analysis	11	3 single-case and 8 group design studies	Results suggest that mnemonic instruction is highly effective at increasing students with EBD knowledge and retention of science facts.
Warmbold-Brann, Burns, Preast, Taylor & Aguilar (2017)	Math, Reading, Writing	1986-2015	Meta-Analysis	32	Single-case design studies	Results of the current meta-analysis suggest that academic interventions can offer both positive academic and behavioral outcomes. Academic interventions led to improvements on both on-task behavior and disruptive behavior but the effect was greater for on-task behavior. Modifying task difficulty and delivering a combination of interventions resulted in small to moderate effects, while effects were small for academic instruction. Interventions and modifications provided in an individual setting offered the greatest benefit.
van der Worp-van der Kamp, Pijl, Bijlstra, & van den Bosh (2014)	Reading, Math, Language, Writing, Science	2000-2012	Systematic Review	22	18 single-case and 4 group design studies	Findings of this study suggest that academic learning may have a positive effect on behavioral outcomes in the classroom if teachers positively affect the educational experience of students with EBD.

RESULTS

Systematic Review Summary

A total of seven systematic reviews were included, covering studies published from 1968 to 2012. These reviews focused on several content areas: reading (Garwood, Brunsting, & Fox, 2014; Rivera, Al-Otaiba, & Koorland, 2006), writing (Sreckovic, Common, Knowles, & Lane, 2014), mathematics (Hodge, Riccomini, Buford, & Herbst, 2006; Mulcahy et al., 2016; Ralston, Benner, Tsai, Riccomini, & Nelson, 2014; van der Worp-van der Kamp, Pijl, Bijstra, & van der Bosh, 2014). Six of the systematic reviews reported the intervention implementer. They largely included teachers, researchers, and graduate students/research assistants. One reported that a trained paraprofessional oversaw the intervention; another reported a reading specialist as the implementer.

Participant characteristics. Each article was reviewed for participant characteristics (i.e., age/grade level, ethnicity and gender) identified in the coding procedures. A total of 1,285 participants ranged in age from 5-17 years in grades K-12. Only two reviews reported both age and grade level (e.g., Garwood et al., 2014; Sreckovic et al., 2014); three reported age only (e.g., Rivera et al., 2006; Hodge et al., 2006; van der Worp-van der Kamp et al., 2014) and two reported only grade level (Mulcahy et al., 2016; Ralston et al., 2014). Five of the reviews reported participants' gender ($n = 861$), with 585 males and 276 females. Of the five reporting gender, one did not report gender on all the studies included. Three did not report any information on gender. Ethnicity was generally not reported; only three reported on race/ethnicity for some of the studies included in their reviews. Reported ethnicities were African American, Hispanic, Caucasian, and "multiple" ethnicities. Six of the reviews identified the participants as with or at-risk for EBD ($n = 766$). The remaining review identified participants with EBD along with those with learning disabilities ($n = 519$; Rivera et al., 2006).

Research designs. Three reviews focused solely on single-case design studies (Garwood et al., 2014; Hodge et al., 2006; Ralston et al., 2014). Four reviews stated that both single-case and group design studies were included (Ralston et al., 2014; Rivera et al., 2006; Sreckovic et al., 2014; Warmbold-Brann, Burns, Preast, Taylor, & Aguilar, 2017).

Duration and intensity. Data on intervention duration (length) and intensity (e.g., number of sessions or number of minutes in the intervention) were not consistently reported. Three systematic reviews reported an average of 30 minutes per session (Garwood et al., 2014; Rivera et al., 2006; Sreckovic et al., 2014). Length of the interventions was reported in five reviews. Sreckovic et al. (2014), Rivera et al. (2006), Garwood et al. (2014) and Ralston et al. (2014) reported a range for the number of sessions—altogether ranging from 5 to approximately 110 sessions. Hodge et al. (2006) reported interventions ranging from 1 to 9 weeks.

Academic outcomes. Of the seven systematic reviews, one addressed writing (story, persuasive, opinion; Sreckovic et al., 2014), another addressed reading comprehension and fluency outcomes (Garwood et al., 2014), and one addressed reading fluency (Rivera et al., 2006). Three of the reviews (Hodge et al., 2006; Mulcahy et al., 2016; Ralston et al., 2014) addressed math. The Hodge et al. (2006)

review focused on computation skills and problem solving, and Mulcahy et al. (2016) focused on rate of accuracy and minutes to completion. One review (van der Worp-van der Kamp et al., 2014) included reading, writing, math, some language and science academic interventions with a focus on changing problem behaviors that has a negative impact on a student's ability to learn and academic achievement.

Reading outcomes. Rivera et al. (2006) did not specifically outline behavioral or academic outcomes. However, the majority of the studies in their review reported on reading interventions targeting students at-risk and focused on fluency. The study results indicated that direct instruction and peer-tutoring are effective reading interventions for students with EBD. Garwood et al. (2014) reported outcomes from nine studies on fluency and reading comprehension levels. Five of the nine studies included in their review focused on words per minute (WCPM) as the measure of fluency and reported an increase in WCPM. Four studies indicated higher levels of reading comprehension.

Writing outcomes. Sreckovic et al. (2014) reported overall benefits for students receiving self-regulated strategy instruction (SRSD) instruction for studies using both single-case and group designs. A range of TauU (Parker, Vannest, Davis, & Sauber, 2011) effect sizes were obtained for studies using single-case research designs (e.g., from .64 to 1.10 for the number of elements in writing samples, and -0.01 to 1.15 for the number of words written). As a note, TauU has been found to produce inflated effect size estimates, with Tau coefficients regularly falling outside of the -1 to +1 range (Tarlow, 2017). Effect sizes for academic engagement ranged from a negative effect for story writing instruction, to large effects with the use of teacher probes. Factors such as teaching style, time of day, and deficits in social skills were reported as possible impacts on student outcomes. In all, students with EBD benefitted from the use of SRSD instruction. Further, the authors applied the Horner et al. (2005) and Gersten, Baker, and Lloyd et al. (2000) quality standards for single-case and group design studies, respectively. At least 80% of the quality indicators were present in each of the single-case studies; all group design studies met the acceptable number of both essential and desirable quality indicators to be considered "high quality" studies.

Mathematics outcomes. Mathematics interventions were examined in three of the literature reviews. Hodge et al. (2006) synthesized the findings of thirteen studies on instructional interventions in mathematics for 9 to 16 years old students with EBD. They found that interventions addressing basic math skills used several intervention types (i.e., student-directed, teacher-directed, peer tutoring, and computer-assisted instruction). They concluded that implications for practice based on this review was limited due the small number of studies reviewed which included a diverse array of intervention types. Mulcahy et al. (2016) reviewed nineteen studies and applied special education quality indicators (i.e., Council for Exceptional Children (CEC; 2014); Horner et al., 2005; Kratochwill et al., 2010) for single-case designs to analyze mathematics intervention for secondary students with EBD. All but three of the articles investigated the functional relation mathematics intervention and mathematics performance. The other three investigated a functional relation between behavioral intervention and mathematics performance. Hodge et al. (2006) reported that mathematics interventions focused on basic math skills rather than advanced concepts. None of the studies they reviewed met the qualifications for an

evidence-based practice because none of the studies used the same intervention in at least five different studies with at least 20 participants. Their findings support the need for replication studies in this area.

Ralston et al. (2014) reported their findings in a best-evidence synthesis of the effects of mathematics instruction on the math skills of students with EBD at the elementary and secondary levels. They reviewed 27 studies categorized into three types: peer-mediated, self-mediated, and teacher-mediated. Only one of the studies used a peer-mediation intervention; using the Scruggs and Mastropieri's (2001) criteria, they found peer tutoring to be fairly effective. They found 13 self-mediated interventions, which they noted only four were very effective. All other self-mediated interventions ranged from fair to questionable to ineffective. Seven of the thirteen teacher-mediated intervention studies were evaluated as very effective with the remaining six as questionable or ineffective. One of their conclusions was that teacher-mediated interventions contribute to treatment effects. They also noted that the studies focused on basic math facts and operations and did not address instructional intervention in mathematical problem solving for students with EBD.

Science outcomes. Two studies in the van der Worp-van der Kamp et al. (2014) review examined science outcomes, but only one reported data for students with EBD. While academic outcomes were not investigated, a percentage of nonoverlapping data (PND; Scruggs, Mastropieri, & Casto, 1987) of 90% was reported for engagement, and a PND of 0% was found for destructive behaviors.

Behavioral outcomes. One of the seven reviews, Mulcahy et al. (2016), addressed behavioral outcomes. The behavior outcomes included: increased on-task behavior and academic engagement, a reduction in inappropriate and aggressive behaviors, and increased cooperative behaviors. van der Worp-van der Kamp et al. (2014) conducted a review to study the effect of interventions developed to teach academic skills, on the behavior of students with EBD. They reviewed 30 studies that included participants 5–18 years old. The studies included in their review measured the effect of the academic intervention in subject and content areas on problem behaviors.

Treatment fidelity and social validity. Four of the reviews reported on fidelity of implementation, which ranged from 79% to 100% (Garwood et al., 2014; Mulcahy et al., 2016; Ralston et al., 2014; Sreckovic et al., 2014). Social validity was reported in 12 of the 19 studies in the Mulcahy et al. (2016) systematic review; these data were collected in only 8 of the 27 studies in the Ralston et al. (2014) review.

Interobserver Agreement (IOA). IOA was reported for three of the reviews, ranging from 79% to 95% in Garwood et al. (2014), and 80% in Rivera et al. (2006) and Sreckovic et al. (2014). The remaining four reviews did not report these data.

Maintenance, generalization, and follow-up. Only one of the reviews partially reported follow-up or maintenance (Garwood et al., 2014). The review indicated that 33% of the included studies reported maintenance and follow-up data.

Meta-Analysis Summary

Five meta-analyses were included (Benner et al., 2010; Bowman-Perrott et al., 2013; Losinski, Cuenca-Carlino, Zablocki, & Teagarden, 2014; Therrien et al., 2014; Warmbold-Brann et al., 2017). They included studies published from 1980 to

2015. All five included participants with EBD; two included only participants with EBD. The other three included students with EBD as well as other disabilities, but data were disaggregated for participants with EBD. Two meta-analyses reported intervention implementers. They were more likely to be graduate students, teachers, and researchers—in that order.

Participant characteristics. A total of 2,081 participants were represented in the five meta-analyses; only two reported participants' age range (5-18 years). Four reported grade level, with two focused on 1st-12th grade, one focused on 2nd-10th grade, and one on K-8th grade. Three of the analyses did not provide detailed information on gender, with one reporting participants were mostly female and two reported participants were mainly male; two did not report gender. Race/ethnicity was partially reported by only two of the meta-analyses indicating that some of the participants were Caucasian, African American, Latino, and "other."

Research designs. Two of the meta-analyses examined studies using single-case designs (Bowman-Perrott et al., 2013; Warmbold-Brann et al., 2017). Two reported on single-case and group design studies (Benner et al., 2010; Therrien et al., 2014); one included both single-case and randomized controlled trial (RCT) designs (Losinski et al., 2014).

Duration and intensity. Three of the five meta-analyses reported information on the duration and intensity of academic interventions for students with or at-risk for EBD. Benner et al. (2010) reported an average of 25 to 45 minutes for participation in interventions; 2 to 19 weeks was reported as the duration range. Therrien et al. (2014) reported 40-60 minutes per session, and a range of 1 to 60 sessions across the 11 studies reviewed. Bowman-Perrott et al. (2013) reported dosage, which was represented by duration (number of weeks) x intensity (number of minutes per week) x the number of sessions (number of days per week). Bowman-Perrott and colleagues found that studies above and below the obtained Inter Quartile Range (480 minutes) produced the same effect (which was not statistically significant). Interventions ranged from 280 minutes to 1,137.5 minutes across 26 studies.

Moderator variables. Moderator analyses were included in two studies (Bowman-Perrott et al., 2013; Losinski et al., 2014). Losinski et al. (2014) reported consistently higher effect sizes for single-case designs compared with random controlled trials, single-case design studies significantly impacted the effects accounting for approximately 19% of the variance in effect size results and were associated with higher effect sizes than their group design counterparts. For ethnicity, the percentage of African American students significantly influenced treatment effects and accounted for approximately 21% of the variance in study effects, with higher percentages of African American students being associated with higher treatment effect. Findings from the Bowman-Perrott et al. (2013) moderator analyses revealed a statistically significant effect for the use of rewards. Peer tutoring interventions that used rewards had a larger effect size than those that did not. That is, students demonstrated greater academic gains in peer tutoring interventions that included some kind of reward (whether tangible—such as stickers—or intangible—clapping for the winning team). In addition, students with EBD benefitted most from peer tutoring interventions.

Academic outcomes. One of the analyses focused on reading only (Benner, Nelson, Ralston, & Mooney, 2010), one on writing only (Losinski et al., 2014), and one on science only (Therrien et al., 2014). The other two meta-analyses focused on several academic areas: one on reading, writing and math (Warmbold-Brann et al., 2017) and the other on reading, math, spelling, vocabulary, and social studies (Bowman-Perrott et al., 2013).

Reading outcomes. One of the analyses focused on reading only. Benner et al. (2010) completed a meta-analysis of reading instructions on students 5-18 years who were at-risk or identified with EBD. Their review of 24 studies suggested that effective reading instruction has a positive effect on the reading skills of this population. They found most striking that there were relatively few high-quality studies on reading instruction given the number of students with behavioral disorders with deficits in reading.

Writing outcomes. Two of the studies reviewed literature on writing interventions. Losinski et al. (2014) completed a meta-analysis of sixteen studies that covered K-12 students. They investigated the relative effect sizes of studies that examined SRSD, an evidence-based practice (EBP) that two prior studies had indicated to be effective in improving writing of students with EBD. The researchers found that SRSD interventions had large effect sizes across three dependent variables (i.e., essay elements, quality, and word count). Losinski et al. (2014) also found that treatment effects were significant for study design and race/ethnicity. They concluded that based on the body of knowledge examined in their study that SRSD is an EBP. Sreckovic et al. (2014) also evaluated the evidence base of SRSD for writing intervention with the EBD student in grades 2-11th. The researchers evaluated thirteen studies for quality using the quality indicators for single-case (Horner et al., 2005) design and for group (Gersten et al., 2000) design. Their results suggested that SRSD met the standards for an EBP for this population.

Science outcomes. Only one of the reviews included focused on science instructional intervention for students with EBD. Therrien et al., (2014) completed a meta-analysis that included eleven group and single-case design studies with 1st – 12th grade participants that examined classroom science instruction. Across all of the group studies, the calculated mean effect size of .471 obtained indicated that the interventions as a whole had a small to medium impact on the students with EBD achievement. They further analyzed findings by student characteristics, intervention type, dependent measures utilized and study variables and reported that the results indicated that while additional research is needed, students with EBD might benefit from inquiry approaches provided the method implemented includes enough structure to ensure student engagement. Results also suggest that mnemonic instruction is highly effective at increasing knowledge and the retention of science facts for students with EBD. They also noted that the majority of the studies included in their review examined the effects of the interventions on small populations of students with researchers as the primary interventionists. Therefore, they suggested that in order to generalize the findings, it is important that future research replicates the findings with larger sample sizes and examine the feasibility and fidelity of teachers implementing these practices within their own classrooms.

Multiple academic outcomes. The last three reviews included two meta-analyses and a systematic review that examine intervention practices used across core subject and content areas. Bowman-Perrott et al. (2013) conducted a meta-analysis of 26 studies that examined the effects of peer tutoring for students in grades 1-12. They applied the What Works Clearinghouse quality standards as part of their inclusion criteria (Kratochwill et al., 2010). The criteria were: (a) the peer tutoring intervention had to be systematically manipulated; (b) academic achievement outcome variables had to be measured using interobserver agreement of at least 80% for at least 20% of all observations; (c) studies had to demonstrate experimental control by at least three demonstrations of the effect of the intervention at three points in time, and (d) phases had to have a minimum of three data points. Their review included ten studies focused on reading, six on spelling, six on math, three on vocabulary, and three on social studies. The authors also examined five potential moderators of these effects: dosage, grade level, reward, disability status, and content area. They noted findings that suggested that peer tutoring is an effective intervention regardless of dosage, grade level, or disability status and that among students with disabilities those with EBD benefitted most. Two of the limitations noted for this review were the lack of disaggregated disability data in some studies, which limited their sample for the analyses and similarly, data were not disaggregated by grade level in most of the articles, so they could not present results and recommendations by grade level.

Warmbold-Brann et al. (2017) completed a meta-analysis of 32 single-case design studies examining the effect of academic interventions and modifications on behavioral outcomes for elementary and middle school participants. The majority of the studies focus on mathematics difficulties, followed by reading and only two focused on writing. Academic interventions included in the studies were modifying task difficulty, providing instruction in reading, writing, or mathematics, and contingent reinforcement for academic performance. Their study found that interventions designed to enhance academic skills resulted in positive effects on observable behavior problems. The effect was stronger for increasing time on task than for decreasing disruptive behavior, but a positive effect was found for both. They reported that interventions that were delivered 1-on-1 were the most effective in influencing behavioral outcomes.

Behavioral outcomes. Warmbold-Braun et al. (2017) found that small to moderate effects on improving behavioral outcomes were associated with gains in academic achievement using strategies such as shared reading, decoding instruction, and peer-assisted learning strategies. Specifically, on-task behaviors increased, while disruptive behaviors decreased.

Effect sizes. Five effect sizes were used across the five meta-analyses. Hedges' g was used in two meta-analyses (Benner et al., 2010; Losinski et al., 2014), and a Phi coefficient was used in the other (Warmbold-Brann et al., 2017). In the meta-analysis analyzing single-case data, percentage of all nonoverlapping data (PAND; Parker, Hagan-Burke, & Vannest, 2007) and PND were used in one article (Therrien et al., 2014), and TauU was used in the final review (Bowman-Perrott et al., 2013).

Treatment fidelity and social validity. One of the five analyses reported fidelity of implementation. Sixteen of the 21 studies in the Bowman-Perrott et al.,

(2013) meta-analysis reported treatment fidelity data. Fidelity ranged from 82.86% to 100%. The mean reliability for student implementation of peer tutoring procedures was 93.64%, and 94% for teachers. Seven of the studies included in their review gathered teacher and student feedback via questionnaires and survey and one study collected data from parents. Satisfaction for teachers, students, and parents was high for the eight studies.

IOA. IOA was reported in only two of the analyses (Bowman-Perrott et al., 2013; Therrien et al., 2014). Therrien et al. (2014) reported an IOA of 100% for treatment implementation and 84%-99% for observed behaviors found in single-case designs. Bowman-Perrott et al., 2013 reported IOA for all studies included for at least 20% of all observations with 80% or more agreement (average agreement of 97.69%).

Maintenance, generalization, and follow-up. None of the five analyses reported follow-up, generalization, or maintenance data.

DISCUSSION

Students with EBD experience negative academic outcomes in schools. Academic interventions that are empirically sound must be implemented to encourage their academic and behavioral success. This review of reviews focused on summarizing instructional interventions for students with or at-risk of being diagnosed with EBD. Limitations of the literature, and recommendations for research and practice extracted from the included systematic reviews and meta-analyses are presented here.

Overall Findings, Limitations, and Directions for Future Research

Results of this summary “review of reviews” shows that peer-mediated (e.g., Bowman-Perrott et al., 2013), teacher-directed (e.g., Hodge et al., 2006), and self-regulated (e.g., Losinski et al., 2014) strategies are beneficial in improving academic and behavioral outcomes for students with or at-risk of EBD. While only one systematic review (e.g., Warmbold-Braun et al., 2017) and one meta-analysis (e.g., Mulcahy et al., 2016) targeted both academic and behavior outcomes, six others drew conclusions regarding problem behavior. Garwood et al. (2014) noted that giving students a choice of the instruction activities or how close they want to work with peers during instruction might improve student engagement and motivation substantially with positive impact on reading achievement. Benner et al. (2010) concluded that given the negative impact of problem behavior on literacy outcomes, students with or at-risk of EBD benefit from tier 2 and 3 of school-wide Positive Behavior Support and Intervention programs that motivate these students toward increasing attentiveness and engagement along with controlling their behavior. Teacher-directed interventions that include the components of effective instruction was pointed out by Hodge et al. (2006) as potentially the most effective in mathematics instruction for students with EBD and may be effective in decreasing problem behaviors. Some of the studies included in Rivera et al. (2006) showed increased attentiveness after reading only instructional intervention and two of the studies included showed reductions in problem behaviors. Therrien et al. (2014) reported on one science instructional intervention study showed positive results for student engagement and reduction in destructive behavior from hands-on instruction and allowing students to choose

their instructional activities. The meta-analysis completed by Warmbold-Brann et al. (2017) showed a moderate effect on student engagement and a small effect for disruptive behavior.

Few studies included across these systematic reviews and meta-analysis reported participant demographics such as age/grade level, fidelity of implementation, or social validity (Strain, Barton, & Dunlap, 2012). Each of these is important to report for the purpose of conducting moderator analyses to help identify for whom and under what conditions interventions are most effective, and to ensure that practices are acceptable to and consistently used by teachers and students. In addition, data need to be disaggregated by disability category across dependent variables examined to best understand the efficacy of interventions for certain groups of students (*viz.*, students with or at-risk for EBD). Data on the length and duration of interventions is important to report as well, as this can help inform practice to help ensure students receive maximum benefit from interventions.

Several authors noted limitations of the student descriptions included in their reviews. van der Worp-van der Kamp et al. (2014) found that the description of participants and settings had numerous flaws and in some of the studies, participants were removed for disruptive behavior. They did not report conclusive findings due the variety of designs and implementation strategies used and noted that the results indicated that systematic research on the effect of teaching academic skills on the behavior of students with EBD is still in its infancy. They found that due to limited replications, external validity of the studies was difficult to establish. In their review of reading interventions, Rivera et al. (2006) reported that authors did not always report the length of the intervention, nor did they regularly report treatment fidelity. Finally, applying proposed standards to assess the methodological quality of studies investigating interventions for students with EBD is key—for both systematic reviews and meta-analytic research.

CONCLUSION

Students with or at-risk for EBD are often behind academically, experience learning difficulties in basic skill areas (e.g., reading, writing and math) or struggle in the content areas (e.g., science and social studies). These academic deficits are further exacerbated by the social-emotional and behavioral challenges. Together, these deficits work together to negatively impact educational outcomes and can have life-long effects if not addressed. The body of research on effective academic interventions for students with or at-risk of EBD is growing. However, much additional research is needed on the linkage between social-emotional and behavioral problems, academic performance, and correspondingly, effective interventions for students with or at-risk of EBD in the academic domain.

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