



Research in Emotional or Behavioral Disorders: Does it Examine Study Quality and Null Results?

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Authors' contributions

This work was carried out in collaboration between both authors. Author ML designed the study, wrote the protocol, method and results sections, analyzed the data and managed literature searches. Author JWM wrote the introduction and discussion sections of the study. Both authors read and approved the final manuscript.

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ABSTRACT

Two experiments were conducted to determine the extent to which interventions focused on children with, or at risk for, emotional or behavioural disorders (E/BD) could be considered as evidence-based practices. Experiment one examined the extent to which meta-analytic and systematic reviews included quality indicators as a criterion for study inclusion and whether they addressed, and accounted for, the file drawer problem. Of the 34 included systematic and meta-analytic reviews, only six addressed the quality of the included studies while only two addressed the file drawer problem as potential publication bias. Experiment two examined the extent to which three prominent journals that focus predominately on studies regarding intervention efficacy for children with, or at risk for, E/BD publish null results. Of the 215 included studies, none reported null results. Implications for determining evidence-based practices and changing the culture of how systematic and meta-analytic reviews are conducted and the publication of only interventions studies with positive results is discussed.

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1. INTRODUCTION

Implementing evidence-based practices (EBPs) has entered the landscape of the education and treatment of children and adolescents with emotional/ behavioural disorders (E/BD). However, Landrum and Tankserly [1] concluded that even by the most lenient standards, educational and mental health practices for youth with E/BD have not been based on the general application of empirically supported interventions. They further described how the field of E/BD has been punctuated with sporadic attempts to use data to guide practice but interventions are driven by fads, shifting public attitudes, financial constraints, or personal preferences are all too frequently the norm. Their conclusions are particularly dismal considering that youth with E/BD have consistently been less successful in school and rarely show significant educational progress as compared to their peers [2,3]. Furthermore, in a survey of over 1,400 special educators licensed to teach students with E/BD, Gable, Tonelson, Sheth, Wilson, and Park [4] found that the majority of them lacked the knowledge and skills to implement evidence-based practices.

It is a daunting task to determine whether a practice for students with E/BD is evidence-based. General guidelines were developed both by Lewis, Hudson, Richter, and Johnson [5] and Simonsen, Fairbanks, Briech, Myers, and Sugai [6] focused on two or more school-age students identified as E/BD, for which there was a minimum of three supporting empirical studies (group experimental, quasi-experimental, single case experimental design), published in peer-reviewed journals, and recommended in textbooks written by experts in the field. In addition, quality indicator standards have been developed to identify evidence-based practices such as those by Horner et al. [7] and Kratochwill et al. [8] for single case experimental design research, and the *What Works Clearinghouse* standard of randomized control trials (RCTs) for group designs. However, Cook and Odom [9] pointed out that approaches for determining whether an intervention is evidence-based in the area of special education for students with E/BD is still emerging.

Meta-analytic reviews are frequently used to designate an intervention as being evidence-based because, when properly implemented,

they provide a high-yield source of clinically significant information [10]. In fact, there are 429 entries on PsychINFO when searching the terms “meta-analysis” and “evidence-based practices.” Of those, 31 specifically had both the terms “meta-analysis” and “evidence-based practices” in their titles. However, a major issue when using meta-analysis for establishing an evidence-base is biased in the literature included to be reviewed [11-13]. Bias can either occur at the study or review levels [11,14]. Study-level bias occurs when the obtained research articles for a review report only significant findings or when journal editors require authors to omit findings of less importance in order to conserve page numbers [13,15]. Review-level bias primarily reflects the inability of reviewers to locate all studies conducted in a body of literature, largely because researchers tend not to submit studies for publication that have null results and journal editors are hesitant to publish null results [16,17]. These biases, through publication omission, creates the “file drawer problem” [18] and in the case of meta-analytic techniques, this systematic omission from the literature may distort the omnibus effect size with the exaggerations being strongest when the true effect size approaches zero [19].

There has been a myriad of creative methods to determine whether a meta-analysis includes as many statistically non-significant results as would be expected from a specific group of effect sizes. Rosenthal’s [18] fail-safe n was one of the first and involves calculating the number of studies averaging null results that would need to be added to the given set of observed effects to bring the overall effect to non-significant levels. Additional methods include an adjusted rank correlation test, funnel plots, linear-regression tests, and the Trim & Fill [20-22]. Nevertheless, two problems persist, especially in the area of E/BD. First, there are no data identifying the extent to which authors of meta-analytic reviews use these techniques to account for the file drawer problem. Second, although these techniques can account for research with null results missing from the published literature their absence nevertheless hampers the conduct of science. Ferguson and Heene [23] cautioned that because science relies on the process of falsification, without the acknowledgement of failed results certain ideologically popular theories may be perpetuated in the absence of any factual basis. They also argued that the

practice to avoid publishing null results limits accurate replication—the cornerstone for determining which practices are evidence-based.

The education and treatment of children with E/BD is a complex process that requires a multidisciplinary approach involving, but not limited to, special education, mental health, and juvenile justice. In addition, the identification, validation, and dissemination of EBPs are essential to combat the chronic nature of this condition and improve the outcomes for children with E/BD. Yet, determining whether a given intervention could be considered evidence-based requires examining the extent to which selection criteria for including studies in a meta-analysis addressed quality indicators and the file drawer problem. A more culturally ingrained problem is the extent to which literature in the area of E/BD (or any social science field for that matter) fails to publish null results. Therefore, the purpose of this study is to address these concerns by (a) identifying reviews related to interventions for students with E/BD to determine the degree to which they addressed quality indicators as study inclusion criteria and accounted for or addressed the file drawer problem, and (b) establishing the extent to which journals specializing in research for youth with E/BD publish studies with null results.

2. METHODS

Two experiments were undertaken to answer the two primary purposes. The first experiment identified meta-analyses and systematic reviews conducted from 2005 to 2017 regarding interventions for children with E/BD in order to determine if quality indicators were used as criteria for inclusion and the extent to which the file drawer problem was addressed. The starting date of 2005 was selected because that is when quality indicators became a prevalent issue in determining EBPs. Cook and Tankersley [24] discussed the problems of trying to “retrofit” present-day quality indicators to studies published years or even decades ago. The second experiment consisted of a hand-search of three peer-reviewed journals that consistently publish articles regarding interventions for youth with E/BD: *Behavioral Disorders*, *Journal of Emotional and Behavioral Disorders*, and *Journal of Positive Behavior Interventions*. These journals were selected because they have a history of publishing research dealing exclusively with interventions for children with, or at-risk for, E/BD. The purpose was to identify the extent to

which these journals published research studies with only positive intervention effects during the last ten years.

2.1 Experiment 1: Meta-analyses and Systematic Reviews

Experiment 1 involved addressing three categories. First, information sources had to be obtained. Second, eligibility criteria needed to be established. Third, coding procedures were developed.

2.1.1 Information sources

Reviews for the current analysis were obtained by systematic searches of the following databases: ERIC, Academic Search Premiere, Education Full Text, and PsychINFO. The following Boolean phrase was used in each database search: TI (“meta-analysis” OR “meta-analysis” OR “research synthesis” OR “review” OR “research synthesis”) AND (“EBD” OR “E/BD” OR “behavior* disorder” OR “emotional disturbance” OR “emotional or behavioral disorder*”) AND (“school” OR “special education” OR “student”). Studies were limited to reviews and meta-analyses in both peer-reviewed journals and dissertations that addressed the effectiveness of an intervention for children with E/BD. In addition, hand searches were performed for the journals *Behavioral Disorders* and the *Journal of Emotional and Behavioral Disorders* covering the years since the seminal work on publication bias written by Rothstein et al. [12]. These journals were selected for hand searches because of their explicit focus on research involving students with E/BD.

2.1.2 Eligibility criteria

Both meta-analytic and systematic reviews were included that focused on interventions for students with or at-risk for E/BD and met three criteria: (a) they had to be in English, and published in either a peer-reviewed journal, or were a dissertation that could be found online between January 1, 2005, and August 13, 2017; (b) they dealt exclusively with students in a K-12 school setting who were served or were at-risk for E/BD (reviews dealing with a larger subset of disabilities including E/BD were not considered); and (c) outcome measures were stated in the review. The screening was conducted by the first author reading the titles and abstracts of each manuscript, with a randomly selected subset of manuscripts (30%) read by three graduate assistants. Disagreements regarding

the inclusion of articles were resolved through discussion, resulting in 100% agreement.

2.1.3 Coding procedures

All reviews retrieved from the search were coded to determine (a) if they used quality indicators as study inclusion/exclusion criteria and (b) if they included a method for addressing publication bias in their methods and results. In addition, reviews were coded for type of research design and intervention(s) on which included studies focused.

2.2 Experiment 2: Search for Null Results

A systematic hand-search was performed of three peer-reviewed journals that consistently publish articles regarding interventions for students with E/BD: *Behavioral Disorders*, the *Journal of Emotional and Behavioral Disorders*, and the *Journal of Positive Behavior Interventions*. The special issue of volume 42 of *Behavioral Disorders* was excluded from the search because it was devoted to solely publishing null results. The purpose of experiment 2 was to determine the extent to which these journals naturally published null results and not special issues soliciting authors to submit manuscripts with only null results.

2.2.1 Study selection

The hand-search of the included journals resulted in 751 articles published between January 2003 and August 2017. For purposes of continuity, each title in the table of contents of the issue was considered a separate article and was included in the coding. Studies included in the analysis were only those with results from the effects of an intervention. No attempt was made to differentiate between participant characteristics (e.g., students with E/BD versus students with Autism Spectrum Disorders) because the primary focus of the experiment was only to determine the journals' history of publishing studies with positive findings. Considering that many studies contain multiple dependent variables, the title and abstract of each included manuscript were read to determine the primary dependent variable of the study, and findings were analyzed from that variable alone.

2.2.2 Coding procedures

A coding sheet was developed by the first author and was piloted on 10 randomly selected articles.

During the pilot testing, the first author and three graduate assistants each coded the article and then compared results. Inter-rater reliability of the pilot test was 99% and when discrepancies arose, the coders met to discuss the article and arrived at an agreement, resulting in 100% agreement. Once pilot testing was completed, each article was coded by one of the authors, with two coders independently reviewing and coding 10% ($n = 76$) and the inter-rater reliability was 100%.

Studies were coded based on the following characteristics: (a) focused on an intervention; (b) research design used; (c) topic of intervention research (academic, behaviour/social skills, scale development, other); and (d) results of the intervention. This last study characteristic, *results of the intervention*, was coded on the overall reported effect. Group designs were coded as significance positive ($p < .05$) or negative ($p > .05$) results. Single-case design graphs were visually inspected, but no attempt was made to calculate effect size or extent of the effect.

3. RESULTS

3.1 Experiment 1: Meta-analyses and Quality

The search of ERIC, Academic Search Premiere, Education Full Text, and PsychINFO databases resulted in a total of 294 reviews after removal of duplicates. Of the 294 citations, 266 were excluded after reviewing titles and abstracts. The 30 remaining reviews were read in their entirety and met all inclusion criteria. The hand-search of *Behavioral Disorders* and the *Journal of Emotional or Behavioral Disorders* resulted in an additional four reviews added to the analysis.

Of the 34 included meta-analyses, only six (12.5%) addressed the quality of the included studies [25-30]. Of those four, Magee-Quinn et al. addressed study quality by having authors rate the study on a scale but no set of standard quality indicators were used. The other five reviews assessed study quality using the Horner et al. [7] or CEC [31] standards, but none used the quality of the study as inclusion criteria for their analyses.

With regard to the file drawer problem, only 8.82% ($n = 3$; [28,32,33]) accounted for this form of publication bias in their methods and results in sections. Hollo et al. used the Eggers statistical tests, the trim and fill method, and an analysis of

funnel plots, with each indicating that publication bias was not a significant threat to the results. Reddy et al. used both Rosenthal's Fail Safe N and examination of funnel plots, with findings also indicating that publication bias was not likely. The Losinski et al. meta-analysis evaluated single case research design studies and as such added null effect sizes for a percentage of non-overlapping data, standard means difference, and improvement rate difference until the overall effect was insignificant which would require over 300 unidentified cases.

3.2 Experiment 2: Publication of Null Results

A total of 751 articles were published between January 2003 and August 2017 in *Behavioral Disorders*, the *Journal of Emotional and Behavioral Disorders*, and the *Journal of Positive Behavior Interventions*. Of those 751 articles, 28.6% ($n = 215$) were studies examining the effectiveness of an intervention and were included in the analysis. Single-case designs ($n = 167$) were the most frequently used research design, followed by quasi-experimental and pre-post test designs ($n = 41$), randomized controlled trials ($n = 12$), and case studies ($n = 1$). Based on the variables coded, behaviour and social-skills based interventions were examined most frequently ($n = 144$), followed by academic interventions ($n = 43$) and various other topics. Finally, 100% of the studies ($n = 215$) reported positive findings for the intervention under investigation. There were no studies reporting null results for the primary dependent measure(s).

4. DISCUSSION

Two experiments were conducted in the current study examining interventions focused on children with, or at risk for, E/BD. Experiment one examined the extent to which meta-analytic and systematic reviews included quality indicators as a criterion for study inclusion and whether they addressed the file drawer problem. Of the 34 meta-analytic reviews, only four addressed the quality of the included studies while only three addressed the file drawer problem as potential publication bias. Experiment two examined the extent to which three prominent journals (*Behavioral Disorders*, the *Journal of Emotional and Behavioral Disorders*, the *Journal of Positive Behavior Interventions*) contained studies regarding

intervention efficacy for children with, or at risk for, E/BD publish null results. Of the 215 included studies, none reported null results.

The results from both experiments paint a dismal picture even though reviews and studies were not included prior to the publication of widely accepted quality indicators in 2005 (e.g., [7]). Unlike quality indicators that have only appeared in the literature for about the past decade, methods for addressing the file drawer problem have existed for almost 40 years (e.g., [18]). Granted, the results from experiment two only focused on three journals and not the entire intervention literature for children with, or at risk for, E/BD. Nevertheless, results provide a glimpse of the extent authors only submit, and journal editors only publish positive results. Ferguson and Heene[23] argued that the practice of journals not publishing null results limits accurate replication—one of the cornerstones for determining which practices are evidence-based. They also cautioned that, because science relies on the process of falsification, without the acknowledgement of failed results certain ideologically popular theories may be perpetuated in the absence of any factual basis.

There are a few notable exceptions to the absence of published null results. In 2017 the journal *Behavioral Disorders* had two issues of volume 42 devoted to publishing null effects. In the first issue, five studies were published with null results. In addition, there have been journals devoted solely to publishing null results such as the *Journal of Negative Results* and the *Journal of Articles in Support of the Null Hypothesis*. However, in the current study, those journals and the special issue in *Behavioral Disorders* were not searched because the purpose was to determine the natural rate of published articles reporting null results and not journals either solely devoted to null results nor special issues inviting manuscript submission with null results.

Perhaps it is fruitless to look for evidence-based practices in E/BD—at least when examining meta-analyses addressing quality indicators and accounting for publication bias. In fact, Landrum and Tankserly[1] recommended that a better approach may be to look for “targets for intervention.” For example, instead of finding evidence-based practices for the E/BD “population,” researchers and reviewers may be better served by determining evidence-based practices for treating aggression, remediating academic deficits, or methods of

teaching/promoting social skills. They further stated that most interventions that address specific behavioural and academic needs of students are uncomplicated, consist of explicit implementation procedures, and contain expected results. Those types of interventions (e.g., strategy training, mnemonics, positive reinforcement) are what practitioners may find useful and add to an evidence base accumulating for children with, or at risk for, E/BD.

Furthermore, Cook and Cook [34] indicated that interventions should have robustly positive, socially valid effects to be considered evidence-based practices. Gersten et al. [35] recommended that weighted effect sizes significantly greater than zero across high and adequate quality studies should be used. However, without really knowing the extent of the file drawer problem for a given body of research, it is not possible with absolute certainty to label an intervention as truly evidence-based. Finally, many studies in education and psychology have been conducted through nonrandomized group or correlational designs, and single case research designs (e.g., [36]). Consequently, there will always be a certain degree of professional opinion/expertise involved in determining what interventions are evidence-based.

Perhaps an even greater concern regardless of how evidence-based practices are conceptualized and identified is whether it even matters. Cook and Cook [34] indicated how interventions shown by research to be effective are not commonly implemented in classrooms while interventions that show little, no, or negative effects on student outcomes are frequently applied. They went on to say that educators customarily have used personal experience, tradition, and "expert opinion" to decide what works in a classroom, thereby increasing the threat of both Types I (determining ineffective practices are effective) and Type II (determining effective practices are ineffective) errors. In this regard, perhaps the best solution is to ensure interventions deemed to be evidence-based are packaged in a way that teachers find acceptable and easy to use in their classrooms [37]. The continuing challenge is that once an intervention is considered evidence-based through the results of meta-analyses is that social validation is required to predict which interventions educators may find desirable.

5. CONCLUSION

This study demonstrates the importance of researchers adhering to quality indicators for the type of design used (e.g., group, correlational, single case) for two reasons. First, just because a study contained significant results does not automatically mean it is of high quality. Second, a study can be of high quality but not have significant results. This last point is important to the second purpose of the present article. Namely, how often do journals publish null results. A high-quality study with null results may be more important than a low-quality study with significant results. Yet the present article found that many journals are still averse to publishing null results. However, a caveat to this conclusion is that the present study only examined a limited number of journals in a specific subfield of the social sciences (education and treatment of emotional and behavioural disorders), and other disciplines in that area (e.g., psychology, sociology) may have different policies regarding the treatment of study quality and null results. It is encouraging that there are current journals devoted solely to publishing null results, although in limited fields. Therefore, it may behoove future researchers to focus more heavily on study quality and not solely on obtaining any significant findings.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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