Following is wholistic feedback on paper requirements for the course. I am happy to meet with you in the spring if additional feedback would be helpful to you as you move forward.

Introduction

You have a nice start to your introduction. You establish an important educational problem, but your justification for the need for the review is quite thin. I encourage you to dig deeper in future papers where you need to provide a rationale for a research project. Keep refining your research questions as well—RQ1 in particular cannot be answered through a systematic review.

Methods

Your database search is appropriate, but remember as you move toward dissertation that to be considered a "thorough" review, you will need to utilize as many additional search procedures as feasible (e.g., ancestry and descendent searches).

You have a nice start to your inclusion/exclusion criteria. I suggest you review these with a content area expert, such as your chair, to ensure that you have not missed something relevant to this topic area.

The coding procedures that you developed and used are well chosen, but I was confused by the description of your coding process. Keep working on how to effectively communicate this information to the reader. "Data Analysis" should be a second-level heading.

Results

You did a very nice job providing an overview of the body of literature that you located, and your literature table is very well done. It is impressive that you utilized Tau-U to evaluate study effects across studies. What feels missing is a description of the nature of individual studies. This is a section you will want to unpack further. Also, keep working on Table 3, I'm not sure it is yet accomplishing what you intend—perhaps adding a note to explain how to interpret the plusses would help?

Discussion

The beginning of your discussion reads more as an initial reporting of results rather than a summary of key takeaways from the results. Look closely at other reviews to see how your discussion summary of results differs from published reviews. As you move forward in the program, work on expanding this discussion (which is quite thin within this paper) to connect the findings of your work to the existing literature base on the topic (this takes practice!).

Writing Style

You are a strong writer and except for sections already noted in the methods, you present your ideas in a coherent manner. Your use of headings and figures is effective throughout your paper and tables and figures are complementary to the content you present in text (please, see the APA manual to identify table borders that should be visible/hidden and remove the color from figures prior to submitting for publication). Your APA skills are progressing, but you do have citation errors in text and on your reference pages, so keep working on this. (Also, look at APA guidelines for how to format lists within a sentence and for how to order tables, figures, and appendices).

Conference Proposal

Nice first attempt at a short proposal for a systematic review. It is hard to fit everything in! Three suggestions for improvement:

Currently, the content of the proposal focuses heavily on procedural steps rather than they key ingredients related to the literature support/rationale for the review and key methodological components. This means you will need to strategically cut back in other areas to make room for this information.

Be sure to add a reference list at the bottom of your proposal.

Paraprofessional-Delivered Interventions Addressing Externalizing Behaviors Among Students with Disabilities: A Systematic Review of Research Literature

Kia R. Felder Williams

EDSE 841: Evaluating Intervention Research

Dr. Sheri Berkeley

George Mason University

Fall 2022

Abstract

Paraprofessionals frequently support students with externalizing behavior disorders that account for approximately one-third of special education services in schools (Reddy, Weissman, & Hale, 2013). Without adequate behavior interventions and supports, these students are at risk for academic underachievement, school drop-out, negative relationships with peers and adults, alcohol and drug abuse, teenage pregnancy, unemployment, and incarceration (Dudek, Reddy, Lekwa, Hua, & Fabiano, 2019). Paraprofessionals report spending a substantial amount of time addressing challenging externalizing behaviors across different classroom environments. Descriptive findings suggest that paraprofessionals primarily provide behavioral intervention support for students with Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and multiple disabilities (MD). Studies indicate paraprofessional delivered behavioral intervention results in improved academic and social outcomes, enhanced communication skills, reduced problematic behaviors and increased independence for students with disabilities. The purpose of this analysis was to systematically review single-case single subject design intervention studies that involve paraprofessional-delivered behavioral interventions for students with disabilities. Studies concluded that paraprofessional-implemented behavioral interventions contribute to desired changes in challenging and appropriate behavior. Effect sizes were significantly higher for interventions for early childhood-age students within inclusion classroom settings. Limitations leave unanswered questions of how best to train and support paraprofessionals. Recommendations for preparing paraprofessionals who work with students with low incidence disabilities, and future directions for research are discussed. Implications for practice, limitation, and future research are discussed.

Keywords: *behavior interventions, paraprofessional implementation, students, disabilities, inclusive environments, non-inclusive environments*

Introduction

As defined by the Individuals with Disabilities Act (IDEA, 2004), paraprofessionals work under the direct supervision of teachers and other professionals to assist in the delivery of special education support and services. The number of paraprofessionals continues to rise, with just under 500,000 special education paraprofessionals (paras) supporting students with disabilities (SWD) in school-based settings (U.S. Department of Education, 2018).

Teacher Shortage

In a national survey of teachers, 39% reported that students' disruptive and aggressive behavior was one of the primary reasons for resigning from their teaching positions (Bettini et al., 2020; United States Department of Education, Institute for Education Sciences, 2010). The risk of teacher burnout is increased by emotional exhaustion, low self-esteem and self-efficacy (Garwood et al., 2018), which are exacerbated by classroom disruptive behaviors. Recent estimates suggest that two and a half hours of classroom instruction are lost each week due to disruptive behaviors, which adds up to three weeks of instructional time over the course of a school year (Education Advisory Board, 2019). To address these negative outcomes, researchers have asserted that teachers need effective classroom behavior management training and supports (Bettini et al., 2020; Reddy et al., 2020).

With the increasing teacher shortage, vacancies place more demands on paraprofessionals to fill the gaps and support students with disabilities and challenging behaviors. Paras are expected to manage disruptive externalizing behaviors and assume a variety of responsibilities including providing one-on-one instructional support, facilitating social relationships, supporting small group instruction, and implementing behavior management interventions (Carter et al., 2009; Fisher & Pleasants, 2012).

Undertrained and Overutilized

The involvement of paraprofessionals in the education of students with low incidence disabilities is both complex and controversial. Paraprofessionals are depended upon to directly support SWD. Although paraprofessionals academically support students with disabilities in a variety of ways, more than 75% of paraprofessionals report they address challenging behavior on a weekly or daily basis (Carter et al., 2009). Paraprofessionals assigned to work with students with disabilities report spending more than 20% of their work day addressing challenging behavior (Giangreco & Broer, 2005). With increasing implementation of multitiered systems of support (MTSS) and Response to Intervention (RtI) frameworks, paraprofessionals will likely assist in the implementation of a wide range of supports associated with intervention initiatives. The prevalence of challenging behavior among students with disabilities is often higher compared with that of their peers without disabilities (Emerson et al., 2001; Poppes et al., 2010) and the agency for paraprofessionals to deliver behavioral interventions may be questioned.

Paraprofessionals spend a significant amount of time supporting students with challenging behavior during the school day, yet consistently report behavior management as a low skill area and training in behavior interventions as the area in most need of training (Carter et al., 2009; Sobeck & Robertson, 2019). In addition, the Council for Exceptional Children (CEC, 2015) established core competencies for paraprofessionals inclusive of supports for addressing challenging behavior among SWD. Paraprofessionals have been successful in implementing behavioral supports with training (Rispoli et al, 2011; Walker & Smith, 2015), there are a number of factors that can influence the extent to which paraprofessionals access high-quality training and supervision pertaining to behavioral intervention.

Purpose & Research Questions

The purpose of this study was to conduct a systematic review of interventions implemented by paraprofessionals that address challenging behaviors among students with disabilities. Currently, an existing review that summarized the status of paraprofessional-implemented interventions specific to challenging behaviors was not located. Other reviews have examined paraprofessional-implemented interventions across a variety of outcomes for students with any disability (Walker & Smith, 2015), intellectual and developmental disabilities (Brock & Carter, 2013), and Autism Spectrum Disorder (Rispoli et al, 2011). Although the reviews provide compelling evidence that paraprofessionals can deliver a wide range of interventions, they do not provide information about the specific conditions under which the delivery of interventions were successful. A future meta-analysis may be useful in estimating the effectiveness of paraprofessional-implemented interventions on student behavior and examining which study characteristics may contribute to expected outcomes (Cooper et al., 2009). The following questions were addressed in this review:

Research Question 1: What classroom behavior management practices are being taught to paraprofessionals?

Research Question 2: What is the effect of paraprofessional-implemented interventions on student behavior?

Methods

Search Procedures and Selection Procedures

A search of literature, guided by systematic literature reviews standards (WWC, 2017), was conducted through EBSCO. Figure 1 follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al., 2009) for identification, screening, eligibility, and inclusion processes. Five online databases including APA PsycINFO, Academic

Search Complete, Education Resources Information Center (ERIC), Medline, and ProQuest Dissertations and Theses were queried by applying search terms relative to paraprofessionals, students with disabilities, least restrictive environments, and challenging behaviors.

Electronic Search

The comprehensive search for literature was completed using electronic databases and articles and subsequently screened for inclusion. Secondly, search keywords were defined as: *behavior* interventions or strategies or evidence-based practices* AND *paraprofession* implement** AND *students with disabilit** or *learning disability** or *special needs or emotional dis** or *behavior dis** or *Aut** or *emotional beh* dis** or *behavior* interventions or para* or paraprofessional** or *para* implement**. After entering the search, the author exported the results to Zotero and Excel for coding. Studies without restriction to publication date were searched. The databases resulted in 345 articles. After removal of duplicate articles (n=156) the number of articles exposed to initial screening procedures were 189.

Inclusion Criteria and Selection Process

The 189 articles were screened in a three-step process including, by: (1) title and abstract, (2) full read screening, and (3) results coding. The titles and abstracts of the articles had to meet criteria based on the participants, purpose, and research design. The specific inclusion criteria included: (a) studies that involved paraprofessional implemented intervention(s), (b) interventions that specifically addressed challenging externalizing behaviors, (c) participants identified with a disability under IDEA, (d) experimental single case/single subject design, (e) disaggregated data regarding students and disability, and (f) studies written in English. A Study were eliminated if it (a) was not written in English, (b) not in a school setting, (c) not implemented by a paraprofessional, and (d) were group studies, systematic review or metanalysis. As paraprofessionals are responsible for the care and service of a 1-to-1 or very

small group of students at one time, it was important for this researcher to systematically review studies where the participant was their own control and the ability of implementation replication closely resembled what paraprofessionals would experience in their school based inclusive or non-inclusive classroom setting.

After examining the titles and abstracts, the body of articles reduced from 189 to 124. Articles not conducted in a K-12 school setting (n=53); research design other than single case single subject (n=5); undefined disabilities or unidentified participants or participants of the intervention were not students with disabilities (n=5); and studies where the person delivering the intervention was not a paraprofessional (n=2) were eliminated. Next, the 124 articles were exposed to the round of screening which examined the intervention, the implementer and the participants. For an article to be considered in the results coding portion of the review of literature, the article had to receive a total of three points. One point was received for behavior intervention, being implemented by a paraprofessional, and delivered to students with disabilities as outlined by IDEA. If the article did not receive three points during this round of screening the article was excluded. Given the second round of screening, the number of articles was reduced from 124 to 17, and then coding began.

Coding Instrument

A coding instrument to collect information pertaining to student and paraprofessional participants, paraprofessional-implemented interventions, and study quality was developed. The delimiters were developed based on coding instruments found in other literature reviews (Walker et al., 2018). Student participant descriptors captured age, grade (e.g. early childhood, elementary school, middle school (grades 6-8), and high school (grades 9-12)), placement in inside or outside the general education environment, gender, disability as defined by IDEA (2004), and race.

Paraprofessional delimiters included: age, education level, race, gender, years as a paraprofessional, and prior training related to the intervention. Paraprofessional-implemented intervention codes include: (a) challenging behavior, defined as causing harm or threatening the safety of others, (b) disruptive behavior that interferes with learning, (c) distracting behavior that is atypical, deviating from behaviors displayed by same-aged non-disabled peers, (d) functional behavior assessment , (e) descriptive intervention type, (f) inclusive or non-inclusive classroom environment, instructional context. The What Works Clearinghouse (WWC; Kratochwill et al., 2010) standards for single-case research were ascribed to each study to descriptively appraise each quality.

Coding Process

Reflected in Table 2, WWC standards were applied to the dependent variables, following systematic procedures (Maggin et al., 2013). First, a determination was made if the study followed design standards: (a) independent variable systematically manipulated over time, (b) outcome variable measured by more than one assessor, (c) IOA on at least 20% of data points in each condition, (d) IOA meets minimal thresholds (i.e., 80% or higher for percent agreement; 0.60 or higher for Cohen's kappa coefficient [κ]), (e) study includes at least three attempts to demonstrate an intervention effect, and (f) a minimum of three data points are present in each phase. For Standards (a) to (e), scores were as follows: 0 = *standard was not met* and 1 = *standard was met*. For Standard (f), scores were as follows: 0 = *standard was not met*, 1 = *standard was met with reservations*, and 2 = *standard was met*. A final rating of 0 (*does not meet design standards*), 1 (*meets design standards with reservations*), or 2 (*meets design standards*) was assigned**.**

Next, it was determined whether studies that earned a one or two rating met three evidence standards. For the first evidence standard, scores were as follows: zero, there are fewer

than three data points present in each phase, 1, three or four data points are present in each phase, and 2 five or more data points are present in each phase. For the second evidence standard, scores were recorded according to this scale: zero, fewer than three demonstrations of an intervention effect, and, 2, three or more demonstrations of intervention effect. For the third evidence standard, scores were calculated as zero, the ratio of effects to noneffect is greater than 3:1, 1, the ratio of effects is less than or equal to 3:1, and 2, there is no instance of noneffect. A final rating of zero, no evidence, 1, moderate evidence, or 2, strong evidence was assigned. In addition to applying WWC standards, a visual analysis of any graphed student and paraprofessional outcome data to determine whether a functional relation had been established for each study. This involved considering level, trend, variability, immediacy of effect and consistency across similar phases (Ledford & Gast, 2018).

To estimate the intervention effect, Tau-U was calculated (Parker et al., 2011) for all student measures of challenging and appropriate behavior and paraprofessional measures. Tau-U is a commonly used nonoverlap effect size index appropriate for single-case research for its ability to account for trends in baseline (Parker et al., 2011). Tau-U effect size scores were interpreted as follows: <0.20 = small change, 0.20 to 0.60 = moderate change, 0.60 to 0.80 = large change, and >0.80 = large to very large change (Vannest & Ninci, 2015). Utilizing a Tau-U calculator (Vannest et al., 2016) to produce Tau-U scores for each student and paraprofessional outcome measure, following the single-case design guidelines described by Walker et al. (2018) were utilized.

Data Analysis

The data analysis had three phases: code development, code application, and data synthesis. The coding of information was informed by the research questions and publication of quality indicators of research. The researcher developed the code book based on specific

information needed to answer the three research questions. Second, the code application was satisfied by the researcher applying the code book with definitions (Table 1) during a full read of the articles that met inclusion criteria. Finally, data synthesis was done narratively based on the information found during coding. The result section will present information based on the research questions and additional information the review of literature found.

Results

Overall, the search yielded 17 studies that met inclusion criteria (see Figure 1). Publication years ranged from 1993-2021 (Table 2). Across all studies, there were 41 participants that were exposed to behavior interventions implemented by paraprofessionals. The interventions that were implemented include 14 unique interventions and 2 combined (elements of multiple interventions):; (1) Multicomponent function-based intervention; (2) Time delay, most-to-least prompting; reward chart, and naturalistic strategies; (3) Multicomponent intervention to promote peer interaction; (4)Multicomponent function-based intervention; (5) Embedded choices and prompting; (6)Signaled availability of reinforcement; (7) Reinforcement and response blocking; (8) Discrete trial training; (9)Appropriate adult directives and specific praise; (10) Mand Training; (11) Social Stories^{TM} ; (12) Differential reinforcement of alternative behavior (DRA); (13) Noncontingent reinforcement (NCR); (14) System of least prompts to promote augmentative and alternative communication use.

Student participant characteristics

A total of 41 students received paraprofessional-implemented interventions. Student ages ranged between 4 and16 years (M=8.78 years). The reported gender was 70% male and 10% female. Gender was unreported for 20% of participants. Among the students where race and ethnicity was reported, the participants were 32% White, 7% Black or African American, and 2% Native Hawaiian or Other Pacific Islander. Elementary school students comprised 66% of the

studies, 15% middle school, 12%, early childhood, and 7% high school students. In terms of educational placement, 44% of students spent more than 50% in the general education setting. 34% spent less than 50% in the general education setting. Placement was not reported for 22% of participants. The range of disabilities, as identified by IDEA, were 56% autism spectrum disorder, 32% intellectual disability/developmental delay, 5% specific learning disability, 5% speech language impairment, and 2% emotional disability. There were some students with comorbidities.

Intervention characteristics

Paraprofessionals implemented 16 interventions (Table 2) addressing a variety of nonpreferred behaviors including distracting (46%), disruptive (44%), and destructive (41%). Most of the interventions addressed noncompliance (37%), disruptive verbal behavior (32%), and physical aggression towards students and staff (28%). The selection of the specific intervention was overwhelmingly informed by an FBA (51%). However 42% of behavior interventions were implemented in the absences of an FBA. Most FBAs (79%) relied on interviews and observations.

Interventions were generally implemented within the context where challenging behavior occurred (85%), 56% of paraprofessional intervened in non-inclusive settings or self-contained classrooms. The average duration of intervention ranged from 7 days - 38 days.

Study Quality

Studies implemented multiple baseline design (79%), reversal design (18%), or alternating treatment design (3%) to assess intervention effectiveness on student outcomes.

Social Validity

Social validity of paraprofessional-implemented intervention was assessed across more than 50% of cases. Assessment results indicated acceptable social validity. There were no

measures of generalization of student outcomes given the research design. Maintenance of student outcomes and paraprofessional outcomes postintervention were measured at 49% of the cases. Compared to WWC standards, four met standards (strong evidence), nine studies met standards with reservation (moderate evidence) and four did not meet standards (no evidence).

Discussion

The remaining results will report findings based on the research question two, and will show the positive effect of paraprofessional-implemented interventions on student behavior and student outcomes. To partition variance associated with changes in trend and level, Tau-U was used to calculate intervention effect for all student measures of challenging and appropriate behavior (Parker et al., 2011). Tau-U is a commonly used nonoverlap effect size index appropriate for single-case research due to ability to account for trends in baseline (Parker et al., 2011). Tau-U effect size scores can be interpreted as follows: 0.80 = large to very large change (Vannest & Ninci, 2015). Data point values for baseline and intervention conditions were determined from participant graphs and input into an online Tau-U calculator (Vannest et al., 2016) to produce Tau-U scores for each student and paraprofessional outcome measure.

For challenging behavior, the aggregated Tau-U score across students was 0.75, 95% confidence interval (CI)=[0.66, 0.84], *p*, .001. For student appropriate behavior, the aggregated Tau-U score across students was 0.81, 95% CI=[0.69, 0.93], *p*,.001. The effect size estimates reflect an overall large to very large change in challenging and appropriate behavior (Vannest & Ninci, 2015). There was a wide range in Tau-U scores for challenging behavior (0.06-1.00) and appropriate behavior (0.16-1.00).

The review determined that the intervention setting contributed to significant differences in challenging behavior outcomes. Changes in behavior were greater when intervention took place in inclusive settings (*M*=0.88) as compared with non-inclusive settings (*M*=0.69).

Improvement in appropriate behavior was greater for students when interventions were informed by an FBA (M=0.91), compared to when an FBA was not conducted (M=0.74). The intervention setting contributed to significant differences in appropriate behavior $x^2(1, N=30)= 4.27$, p =.04. Interventions that are delivered in inclusive setting produced significantly greater improvements in appropriate behavior (M=0.92) than in non-inclusive settings (M=0.70)

Implications

Based on this review, there are several implications for practice. Paraprofessional-implemented behavioral interventions were effective in decreasing students' challenging behavior across a range of disabilities, settings, and behaviors, with interventions delivered in inclusive settings having the strongest outcomes. A missing partner in the implementation of behavioral interventions for students in inclusive settings is the general educator. As the role of the paraprofessional continues to evolve, one constant expectation is to support the classroom teacher and case manager in the delivery of supports. This underscores the importance of both the general education teacher and the paraprofessional being thoroughly trained in behavioral interventions. General educators need to be trained in the delivery of behavioral interventions so they can also provide support to the paraprofessional and special educator in the contexts that are relevant to inclusive settings.

Limitations

There are several limitations to the current review that warrant additional research. First, a relatively small number of studies were reviewed. As a result of the inclusion criteria, screening process, and research design, conclusions cannot be drawn, nor generalizations made. Definitively, it can be said that there is a functional relation between paraprofessional-implemented interventions and the reduction of challenging behavior, the increase in appropriate behavior and paraprofessional behavior.

Second, additional research is needed to explore the effectiveness of paraprofessional-delivered intervention for students with a variety of disabilities who engage in challenging behavior, including those with specific learning disabilities and emotional disabilities, as only one study addressed these populations. Likewise, the extent to which a variety of school-based personnel, including both general and special education teachers, can deliver effective supervision and training will be important to explore. In addition to these gaps, student and paraprofessional characteristics (e.g., gender and race/ethnicity) were not always described clearly, thereby limiting our ability to describe participants. Future research must include operational participant descriptions to allow for these analyses so as to establish effective practices and promote replicability (Horner et al., 2005).

A third potential limitation is the inclusion of studies in the analysis that did not meet the WWC standards. It is of importance to note that including studies with poor quality can increase the risk for bias as a result of combining different levels of evidence (Cooper et al., 2009) and, therefore, results from this review should be interpreted with caution.

Forth, findings are limited due to a small number of cases and exclusion of some comparisons due to an insufficient number of cases (e.g., comparison of FBA). Future studies should consider examining resources and demands not included in this study. This analysis focused on behavioral intervention, but special educators have many other demands on their time, including academic interventions.

Lastly, students with EBD are at greater risk for poor long-term outcomes than are students with any other disabilities, and they require highly effective teachers to mitigate those outcomes (Conroy et al., 2014). Research on this disability as it pertains to behavioral interventions in an academic setting is paltry and is much needed to improve behavioral outcomes.

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Figure 1. PRISMA Chart

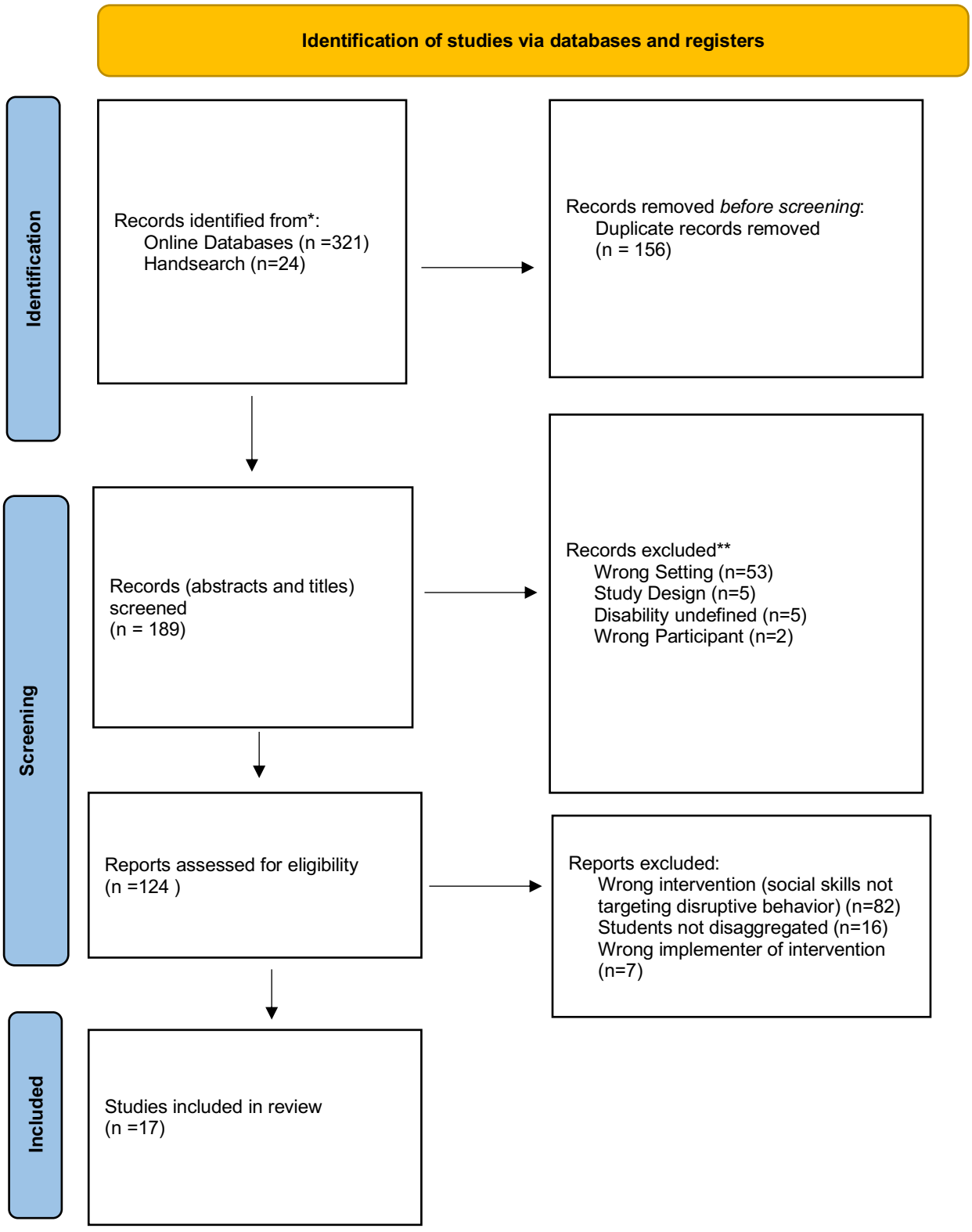

Table 1. Code Book

sss

Information Coded	Definition
Reference	APA In-text and reference citations.
Study Purpose	Copy and paste the purpose statement as stated by the author(s)
Research Questions	Copy and paste how the author states their research questions.
Research Design	Record experimental type. For single case designs state the type.
Participant Information 1. Number of participants 2. Demographics a. Gender b. Age range c. Race	Record the number of participants in the study and list specific numbers under gender, the age range, and race by participant numbers
Participant Type	Record whether the participants were ES, MS, HS
Participant Certification/Licensure	Record the degree being sought by participants and if participant is seeking licensure in the field of special education
Classroom Behavior Management Practice	Record the following for each practice • Name of intervention • Author(s) definition of practice • Field identified – early childhood, applied behavior analysis, etc.
Dependent Variable Data Collection	Summarize how the dependent variable was data tracked and if record reliability/validity data of the measurement tool if included. State the name of the measurement tool if included.
Behavioral Intervention	Record the following information for the behavioral intervention • State the name of intervention given by author(s)

	• Define the intervention as reported by author(s) • State how the intervention was delivered • State who delivered the intervention (e.g., researcher. paraprofessional) • State frequency
Fidelity of Implementation	State the data recorded and how the data was recorded for fidelity of intervention
Instructional Setting	Record the following information for instructional setting: • Public or Private School • Type of school – elementary, middle, high • Classroom type – general education, special education self-contained • Instructional Setting – reading, math, social studies, science etc. • Number of students in the setting and any demographic information included by author(s)
Technology Used During Study	State the type and name of any technology used in the study *if technology was not utilized, state n/a
Quality Indicators for Single case design Answer yes or no to each question	***Describing Participants and Settings*** 1. Participants described it with sufficient detail to allow others to select individuals with similar characteristics. 2. The process for selecting participants is described with replicable precision. 3. Critical features of the physical setting are described with sufficient precision to allow replication. ***Dependent Variable*** 1. Dependent variables are described with operational precision. 2. Each dependent variable is measured with a procedure that generates a quantifiable index. 3. Measurement of the dependent variable is valid and described with replicable precision. 4. Dependent variables are measured repeatedly over time. 5. Data are collected on the reliability of interobserver agreement associated with each dependent variable, and IOA levels meet minimal standards (e.g., IOA = 80%, Kappa = 60%).

Independent Variable

1. Independent variables are described with replicable precision.
2. IV is systematically manipulated and under the control of the experimenter.
3. Overt measurement of the fidelity of implementation for the independent variable is highly desirable.

Baseline

1. The majority of single-subject research studies will include a baseline phase that provides repeated measurement of a dependent variable and establishes a pattern of responding that can be used to predict the pattern of future performance if introduction or manipulation of the independent variable did not occur.
2. Baseline conditions are described with replicable precision.

Experimental Control/Internal Validity

1. The design provides at least three demonstrations of experimental effects at three different points in time.
2. The design controls for common threats to internal validity (e.g., permits elimination of rival hypothesis)
3. The results document a pattern that demonstrates experimental control.

External Validity

1. Experimental effects are replicated across participants, settings, or materials to establish external validity.

Quality Indicators for Experimental/Quasi-Experimental	Record how many yes and no answers for each question. Convert to a percentage and record percentage

1. Describing Participants

1.1. Was sufficient information provided to determine/confirm whether the participants demonstrated the disability(ies) or difficulties presented?

1.2. Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?

	1.3. Was sufficient information given characterizing the interventionists provided? Did it indicate whether they were comparable across conditions? ***2. Implementation of Intervention and Description of Comparison Conditions*** 2.1. Was the intervention clearly described and specified? 2.2. Was the fidelity of implementation described and assessed? 2.3. Was the nature of services provided in comparison conditions described? ***3. Outcome Measures*** 3.1. Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention and measures of generalized performance? 3.2. Were outcomes for capturing the intervention's effect measured at the appropriate time? ***4. Data Analysis*** 4.1. Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study? 4.2. Did the research report include not only inferential statistics but also effect size calculations?
Key Findings	Summarize the findings as the author has reported them in 2-3 paragraphs – some of key components should include whether there was functional relation demonstrated, did the intervention improve behavior
Implications for behavior management	Report as the author reports the implications on teacher education and summarize each point • State the implication • Describe implication

Table 2. Literature Table

Study	*N*	Disability	Setting	Intervention	WWC-DS	WWC-ES	FR-CB	FR-AB	FR–PB
Bingham et al., (2007)	3	MD, other	ES, MS, HS	System of least prompts to promote augmentative and alternative communication use	1	1	Yes	No	Yes
Blair et al., (2007)	1	MD	ES	Multicomponent function-based intervention	1	1	Yes	Yes	
Brock et al., (2017)	1	ID/DD	ES	Time delay, most-to-least prompting, reward chart, and naturalistic strategies	2	2		Yes	Yes
Causton-Theoharis, and Malmgren (2005)	4	CD	ES	Multicomponent intervention to promote peer interaction	0	0		Yes	Yes
Cipani 2021	4	ASD;ID/DD	ES	Multicomponent intervention in place prior to study	2	2	No	No	Yes
Cole and Levinson (2002)	2	ASD;ID/DD other	ES	Embedded choices and prompting	1	1	Ye		
Conroy et al. (2005)	1	ASD	ES	Signaled availability of reinforcement	2	2	Yes	Yes	
Courtemanche et al (2014)	1	ASD	HS	Reinforcement and response blocking	1	1	Yes		Yes

Study	*N*	Disability	Setting	Intervention	WWC-DS	WWC-ES	FR-CB	FR-AB	FR–PB
Dib and Sturmey (2007)	3	ASD	ES, MS	Discrete trial training	1	1	Yes		Yes
Mahon (2018)	5	ASD;ID/DD	EC	Multicomponent function-based intervention	1	1	Yes		Yes
Martella et al. (1993)	1	ID/DD; other	HS	Appropriate adult directives and specific praise	0	0			Yes
McCulloch and Noonan (2013)	1	ASD	ES	MAND training	1	1		Yes	Yes
Quilty (2007)	3	ASD	ES	Social Stories™	2	0	No		
Reeves et al. (2013)	3	ASD	ES	Multicomponent function-based intervention	0	0		Yes	
Smith (2017)	3	ASD; ID/DD	ES	Differential reinforcement of alternative behavior (DRA)	2	2	Yes	Yes	Yes
Walker and Snell (2017)	3	ASD; ID/DD	ES, MS	Multicomponent function-based intervention	1	1	Yes	Yes	Yes
Waller and Higbee (2010)	2	ED; SLD	MS	Noncontingent reinforcement (NCR)	1	1	Yes	No	

Note.
N = number of student participants included in the review; 0 = does not meet standards; 1 = meets standards with reservations; 2 = meets standards; WWC = What Works Clearinghouse; DS = design standards; WWC-ES = evidence standards; FR = functional relation; CB = challenging behavior; AB = appropriate behavior; PB = paraprofessional behavior; MD = multiple disabilities; ES = elementary school; MS = middle school; HS = high school; ID/DD = intellectual or developmental disability; ASD = autism spectrum disorder; EC = early childhood; ED = emotional disability; SLD = specific learning disability.

Table 1. Quality Indicators

Reference	Participants	Dependent variable	Independent variable	Baseline	Experimental control/ internal validity	External validity
Bingham et al., (2007)	+	+	+			+
Blair et al., (2007)	+	+	+	+	+	+
Brock et al., (2017)	+	+	+	+		+
Causton-Theoharis, and Malmgren, (2005)	+	+	+			
Cipani 2021	+	+	+	+	+	+
Cole and Levinson (2002)	+	+	+	+	+	+
Conroy et al. (2005)	+	+	+	+	+	+
Courtemanche et al., (2014)	+	+	+	+	+	+
Dib and Sturmey (2007)	+	+	+	+	+	+
Mahon (2018)	+	+	+	+	+	+
Martella et al., (1993)	+	+	+			
McCulloch and Noonan (2013)	+	+	+	+	+	+
Quilty (2007)	+	+	+	+	+	+
Reeves et al., (2013)	+	+	+			+
Smith (2017)	+	+	+	+	+	+
Walker and Snell (2017)	+	+	+	+	+	+
Waller and Higbee (2010)	+	+	+	+	+	+

Table 4. Appropriate Behavior Outcomes Analysis

Study characteristic (*n*)	Tau-U appropriate behavior outcomes		
	M	***SD***	χ^2
Student disability			0.01
ID/DD (6)	0.83	0.27	
Autism spectrum disorder (15)	0.81	0.30	
Student placement in general education setting			3.58
>50% of the school day (19)	0.96	0.22	
<50% of the school day (6)	0.67	0.36	
Challenging behavior type			1.56
Destructive (14)	0.92	0.18	
Disruptive (17)	0.90	0.22	
Distracting (17)	0.86	0.31	
Preintervention FBA			4.49*
Yes (24)	0.91	0.25	
No (12)	0.74	0.30	
Intervention setting			4.27*
Inclusive (16)	0.92	0.24	
Non-inclusive (14)	0.70	0.32	
Paraprofessional training			0.65
Experiential only (6)	0.97	0.04	
Didactic and experiential (12)	0.81	0.27	
Didactic only (12)	0.75	0.37	

Note. Chi-square derived from Kruskal–Wallis one-way analysis of variance (ANOVA) tests. $p < .05$.

Table 5. Challenging Behavior Outcomes Analysis

Study characteristic (*n*)	Tau-U challenging behavior outcomes		
	M	***SD***	χ^2
Student grade level			7.65*
Early childhood (5)	0.99	0.01	
Middle school (6)	0.89	0.11	
Elementary school (18)	0.65	0.32	
Student disability			1.12
ID/DD (32)	0.81	0.23	
Autism spectrum disorder (19)	0.68	0.33	
Student placement in general education setting			1.15
>50% of the school day (11)	0.80	0.29	
<50% of the school day (7)	0.74	0.24	
Challenging behavior type			0.46
Distracting (16)	0.74	0.30	
Destructive (14)	0.74	0.26	
Disruptive (9)	0.68	0.25	
Preintervention FBA			1.23
Yes (18)	0.82	0.25	
No (12)	0.74	0.29	
Intervention setting			6.46*
Inclusive (11)	0.88	0.27	
Non-inclusive (23)	0.69	0.29	
Paraprofessional educational level			2.28
High school degree (12)	0.98	0.27	
Some college (5)	0.64	0.31	
Four-year college degree (6)	0.64	0.26	
Paraprofessional training			0.27
Didactic only (7)	0.82	0.25	
Didactic and experiential (26)	0.72	0.30	

Note. Chi-square derived from Kruskal–Wallis one-way analysis of variance (ANOVA) tests. *$p < .05$.