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Literacy Based Behavioral Interventions: A Review of the Literature

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COLUMBUS STATE UNIVERSITY

LITERACY BASED BEHAVIORAL INTERVENTIONS: A REVIEW OF THE LITERATURE

A THESIS SUBMITTED TO THE

HONORS COLLEGE

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR HONORS IN THE DEGREE OF

BACHELOR OF SCIENCE

DEPARTMENT OF SPECIAL EDUCATION

COLLEGE OF EDUCATION & HEALTH PROFESSIONS

BY

SHANNON R. ESHMAN

COLUMBUS, GEORGIA

2020

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Abstract

In this systematic review of the literature on literacy-based behavioral interventions (LBBIs), ten selected articles were compared to the Quality Indicators prescribed by the Council for Exceptional Children (CEC). There were eight main categories of standards which included 1) context, 2) participant characteristics, 3) description of the intervention, 4) how it was implemented, 5) if the implementation had fidelity and 6) validity, 7) outcome measures, and 8) data analysis. Each of the studies was evaluated according to these indicators by using a coding chart. Results indicated that LBBIs can be considered an evidence-based practice according to the CEC standards.

Keywords: Evidence-based practices, quality indicators, literacy-based behavioral interventions, literacy based behavioural interventions

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Literacy-Based Behavioral Interventions: A Review of the Literature

Interventions that target skill acquisition or behavioral modifications can increase student progress in academic and functional skills. Many types of behavioral interventions exist, such as discrete trial training, positive behavioral support systems, and more. To best implement such interventions in the classroom, it is important to have a comprehensive understanding of what they entail. Furthermore, it is important to know whether the efficacy of interventions have been proven in the literature. In this paper, literacy-based behavioral interventions (LBBIs) will be examined according to the Council for Exceptional Children (CEC) standards to determine if they meet the requirements for being an evidence-based practice.

The term LBBi was coined by Bucholz and Brady (2008). In their work, LBBIs are defined as interventions that use pictures and print to teach new skills. The implementation of LBBIs also includes elements of behavioral rehearsal (Brady, Hall, & Bielskus-Barone, 2016). Behavioral rehearsal is when a learner performs the skill being learned in a standard way (Dorsey et al., 2017). When implementing such interventions, the text is read to the student as they look at the pictures; then, there is an opportunity to practice the skill. Practicing skills is essential to the efficacy of the intervention. The combination of reading, followed by monitored practice, is a strong tool with which teachers can successfully implement LBBIs with their students.

Historically, behavioral interventions that utilize pictures and visuals have been used in the context of social stories. Social stories were developed by Gray and Garand (1993), and they were originally created to help students with autism progress towards desirable behavioral outcomes. With a strict structure for writing them and a stringent formatting process for the

written/visual combinations, many teachers find these kinds of interventions too difficult or time-consuming to implement in their classrooms. Social stories are required to meet certain criteria that include descriptive, directive, and perspective sentences meaning that these stories must have the correct ratios of first-person language, imperative instructions, and adjectives used to describe the actions (Gray & Garand, 1993). Additionally, it is recommended by Gray et al. that social stories fit on one page and not include illustrations. Furthermore, the literature shows that social stories have varying degrees of success. Much of the research shows these interventions lacking data to support the efficacy of their use. Other research regards social stories as having “low external validity” (Reynhout & Carter, 2006) and considers these interventions to be “questionably effective” (Wahman et al., 2019). These varying levels of efficacy should be noted when considering the use of social stories.

LBBIs are an outgrowth of social stories developed by Bucholz and Brady (2008) when the need arose to find a teacher-friendly alternative to the rigid structure of social story interventions. In contrast, LBBIs encourage images, may be shorter or longer than the typical social story, and emphasize practicing the new behavior rather than simply reading the story (Bucholz & Brady, 2008). While social stories are a type of LBBI, all LBBIs are not social stories. Still, LBBIs carry the same purpose as social stories— to implement interventions that initiate positive behavioral outcomes in students who are lacking certain academic or functional skills sets or who may be demonstrating undesirable behaviors.

According to the research, LBBIs can be utilized to teach a multitude of behavioral skills including first aid skills, daily living skills, and employment skills (Brady, et al., 2008; Brady, Honsberger, Cadette, & Honsberger, 2016; Kearney et al., 2018). These studies included teaching students how to bandage wounds, how to make peanut butter and jelly sandwiches, and

how to request materials in the workplace. In each of the studies, the students who received the interventions had either intellectual disabilities, developmental disabilities (IDD), or both. In each of the studies, the LBBIs were shown to be effective interventions. The results of many of these studies indicated that LBBIs in these isolated scenarios had a high level of efficacy.

CEC Standards

With this mounting evidence, it appeared that LBBIs might qualify as an evidence-based Practice (EBP). To determine this, a systematic review of the literature was conducted using the CEC standards. The Council for Exceptional Children (2014), is “an international community of professionals who are the voice and vision of special education.” The CEC has published a set of standards, called quality indicators, that help researchers and practitioners alike determine whether certain practices qualify as evidence-based. Other research has been done using these standards to prove that strategies and techniques, such as the Universal Design for Learning, is an evidence-based practice (Division for Early Childhood, 2014).

To determine if Literacy-Based Behavioral Interventions were evidence-based practices, we utilized the CEC standards for evidence-based practices (EBP) as used by Cook et al. (2019).

The CEC listed eight main standards that researchers must address if they want to show that the intervention of question meets the EBP criteria. A brief overview of these standards is provided. The rating table for article analysis was developed based on the standards provided by the CEC. If the study met the criteria set by the CEC and the criteria set by the researchers, then the article might be considered an evidence-based practice for the purpose of this systematic review of the literature.

CEC Quality Indicators
1.0 Context and setting are provided.
2.0 There is enough information to identify the population of participants.
3.0 The medium delivering the intervention is detailed.
4.0 The intervention is described thoroughly.
5.0 The practice is implemented with fidelity.
6.0 Internal validity (independent variable is controlled by the experimenter).
7.0 Outcome is measured to demonstrate the level of efficacy held by the intervention.
8.0 Data analysis (reports on effect size).

Method

Understanding the research on the topic of LBBIs was important because it was essential to have a comprehensive overview of the research and compare the efficacy of the studies individually. Using a three-phase method, a systematic review of the literature was conducted. In this study we asked the question:

- 1) Are literacy-based behavior interventions an evidence-based practice when analyzed using the CEC standards?

Phase one

The first phase of the systematic search was conducted through a hand search. The electronic hand search included two databases: EBSCO and Google Scholar. The following

terms were used to find relevant articles: “Literacy based behavioral interventions” or “literacy based behavioural interventions” or “LBBI” or “LBBIs.” The search was limited to peer-reviewed articles published in English between 2008-2018. Articles that utilized these key terms were pulled for further analysis as long as the acronym stood for literacy based behavioral/behavioural interventions. Twenty articles were identified during phase 1 and an initial table was developed for the articles (see appendix A).

Inclusion Exclusion

For phase one of the study, Google Scholar and EBSCO were systematically searched to find articles that fit the criteria defined by the researchers. In this part of the search, an article could only be included if it included the key terms “literacy based behavioral interventions” or “literacy based behavioural interventions” or “LBBI” or “LBBIs.” The British English alternative spelling for “behavior,” “behaviour,” was selected as a key term because some of the research had been written for inclusion in scholarly journals in the United Kingdom. The articles had to include at least one of these key terms to be included in the study. In addition to this, articles for phase one were only selected if they were published originally in English. The search criteria for time considerations was 2008-2018. This decision was made because Bucholz and Brady coined the term “literacy-based behavioral interventions” in 2008, and phase one began in the year 2019. To this end, research that was published after the completion of the phase one selection process could not be included. Finally, to meet the search criteria, the articles had to have been published in a scholarly, peer reviewed journal.

Interrater Agreement

To assure reliability in scoring procedures, interrater agreement data were collected. To collect interrater agreement data, ten articles were chosen from the initial articles collected

during phase one. The ten articles were chosen randomly. Interrater agreement (IRA) was conducted on 50% of the articles found during phase one of the search. Ten articles were selected because this was half of the total of articles found during the initial hand search. Half of the articles were chosen to assure a high quality of interrater data to be collected.

In addition to this, two more articles were selected to be used for training purposes of the second interrater. One included article was chosen and one excluded article was chosen. In a quiet space with no distractions, the interrater was trained using the two example articles that had been selected for training purposes which were not included in the ten that were provided to the interrater to score independently. The interrater was taught how to disaggregate and code the information using the sheet developed prior to the main coding (such a sheet has been filled in appendix A). The interraters disaggregated and coded the data from the articles to make sure that the interrater understood the process. The interrater was instructed on specifics of the inclusion and exclusion criteria for article consideration as well as how to identify key information from the article being scored. This model of trainer instruction, trainee and trainer working together, then trainee working independently, was based off of the gradual release framework, which has been shown to be effective in teaching learners' new information (Ungavarsky, 2019).

Initially, the IRA was scored using two separate charts on Google Sheets. Scorer 1 had a sheet (see appendix A) and scorer 2 had a sheet. The two scorers did not discuss any of the articles prior to scoring them independently. After the initial scoring of articles, the results were 70% agreement on inclusion and exclusion criteria, 72% agreement on age, 91% agreement on medium of mediation (i.e. peer or adult), 95% on the area of implementation for the interventions, 81% for the design of the study (i.e., multiple baseline across skills, participants,

etc.), 95% agreement for the effect of the study, and 100% agreement for the target skill being addressed.

For the way the intervention was implemented, there was a disagreement between the scorers regarding the age of the participants. In the study, participants were considered adults if they were over the age of thirty. This disagreement was discussed and determined to be a procedural error. These adults' peers who also had intellectual disabilities delivered the LBBIs. For the intervention setting, there was 5% disagreement. Scorer 1 said that the interventions were delivered by the sink and the scorer 2 said they were delivered in the classroom. While some disagreements were initially noted, a review of the disagreements found them to be nuanced with most of the disagreements being a procedural error, specifically in relation to the amount of detail included in the coding table. However, 100% coding agreement was reached through a discussion that took place after the initial scoring. In the limitations section, a more robust training process for IRA is suggested.

Phase two

During phase two a hand search of each article was done to determine if they met the inclusion criteria. Twenty article titles and abstracts were read. This was to determine if they met the inclusion criteria (described below). An interrater coded 50% of the articles using an electronic data analysis sheet. The analysis sheet was created and an interrater was trained in how to input data into the sheet. The interrater completed the coding independently without any assistance to ensure the integrity of the study remained unadulterated. Studies were included if they met the inclusion criteria discussed in phase two inclusion/exclusion criteria. According to Brady and Bucholz (2008), LBBIs are interventions that provide visual pictures, written step-by-step instructions, and behavioral rehearsal. To more fully define the term according to the body

of research conducted on the efficacy of such studies, we altered this definition slightly. We defined LBBIs as a practice using either paper or e-based written instructions accompanied by visuals to communicate to a learner how to complete either a functional or academic task or how to reduce aberrant behaviors (Bucholz & Brady, 2008). Practitioner papers were excluded from this study because they did not include research data. Practitioner papers, reviews of literature, and empirical articles where LBBIs were not the independent variable were excluded (i.e., A dissertation by Corral, J (2018) was excluded because it addressed peer coaching as a strategy used to implement LBBIs but focused on peer implementation rather than LBBIs). This resulted in 10 articles that were coded during phase three.

Inclusion Exclusion

For phase two of the study, the articles were read and searched for relevance to the study. In this phase, the primary subject of the article had to be the study of LBBIs as defined by Bucholz and Brady (2008). Articles that did not study the efficacy of specific LBBIs were excluded from the study. Articles which cited LBBi research to support the implementation or study of topics not directly related to the study of LBBIs were also excluded. In addition to this, the articles had to be research articles. During phase two of the study, practitioner articles were ruled out of consideration. Articles included in phase two were research articles on the topic of Literacy Based Behavioral Interventions that study the effectiveness of such interventions in increasing the skill acquisition of groups of people with IDD.

Phase three

Evidence-based reviews occur when researchers compare the practice in question to a “predetermined set of standards” (Cook et al., 2019). This study outlined the practical use of the CEC standards for this purpose. These standards, which outlined eight main categories of

qualifications including “context and setting, participants, intervention agent, description of practice, implementation fidelity, internal validity, outcome measures, and data analysis” (Cook et al., 2019). According to the CEC standards, for a study to qualify as methodologically sound, it “must meet all the quality indicators specified for the relevant research design” (Council for Exceptional Children, 2014). To check for methodological soundness, these standards were used. After the articles were coded according to review protocol, they were then tested against the CEC standards for inclusion. These standards were chosen so that this study would meet internationally recognized standards for evidence-based practices (Appendix B).

Results

Quality Indicator 1: Context and Setting

In the studies, the location where the intervention was delivered was noted. For example, in the First-aid study (Kearney et al., 2017) the location used was the cafeteria. In the other studies, classrooms, offices, and bathroom sinks were listed as the setting. In addition to this, the context was provided such that the participants were listed as participating in job training programs, primary grade school, secondary school, or other programs.

Quality Indicator 2: Participants

Information for the age and gender of the participants were collected in each study. Overall, there were 21 male and 17 female participants. Furthermore, information in regard to their disability category was included. Some of these categories included autism, intellectual disabilities, developmental disabilities, and other health impairments. The average IQs of the participants was 54. All of the students had been identified as having a disability by their respective educational institutions or “at-risk” via teacher nomination.

Quality Indicator 3: Intervention Agent/Medium

For all studies reviewed, interventions were delivered to participants as either paper-based and e-based LBBIs and were structured as adult or peer-mediated interventions. Studies including the one conducted by (Kearney et al., 2018) studied the effect of LBBIs through the use of this medium while other studies observed the efficacy of these interventions using e-based mediums (Anderson et al., 2016; Flores et al., 2014). E-based LBBIs included both e-based LBBIs which delivered the intervention in the same way as the paper-based LBBIs except digitized. Furthermore, the enhanced e-based LBBIs included videos instead of pictures, but kept the written instructions thus allowing them to be counted as LBBIs. Paper-based LBBIs included pictures only in a non-digitalized format. For example, Hall Pistorio et al, (2018) detailed their use of all three of these mediums in their attempt to find which delivery method was most effective. The results found that while all three of the mediums were effective and decreased the amount of time needed to acquire new skills, e-based literacy-based behavioral interventions had a marginally greater effect on the acquisition of job skills for young adults with intellectual and developmental disabilities. The other medium that was detailed in these studies were by whom the interventions were administered (either peer-delivered or adult delivered). In some of the studies, peers were used to help deliver the interventions (Brady, et al., 2016; Brady et al., 2016) while in other studies, adults delivered the interventions (Bucholz et al., 2008; Keeter & Bucholz, 2012).

Quality Indicator 4: Description of Practice

The next requirement according to the CEC standards for evidence-based practices was a thorough description of each intervention. Each study described the intervention in totality. The standard for comparing whether the intervention was described appropriately was Bucholz and

Brady's definition of LBBIs they coined in 2008. This definition is that LBBIs are "instructional interventions that use print or pictures as an instructional medium" (Bucholz & Brady, 2008). In addition to this, to meet the requirements for appropriate description, the medium of delivery (ie. paper-based or e-based) also had to be noted. The studies listed development procedures for creating the LBBIs such as task analysis, story construction, and the development of LBBIs.

Quality Indicator 5: Implementation Fidelity

Following the appropriate description of the interventions, the next quality CEC indicator (QI) was that the practices in the studies should be implemented with fidelity. Of the ten total studies, only two of them assessed and reported on the fidelity of intervention implementation according to the CEC implementation fidelity standard 5.1. The two studies that did report on this information reported high levels of fidelity (100%) for each step of the interventions according to the fidelity checks outlined by the studies (Hall et al., 2017; Pistorio Hall, 2018). Excluding the study conducted by Flores et al., 2014, every study met CEC QI 5.2 which stated that the frequency and duration of the intervention should be reported in the study. QI 5.3 required that fidelity is assessed and reported at least one-time during baseline and intervention in the study. The study by Hall et al. met this QI with no reservations (2017). The study by Hall Pistorio met this QI with some reservations (2018). In this study, fidelity was assessed and reported on the study as a whole, but not necessarily for all sessions (Pistorio Hall, 2018).

Quality Indicator 6: Internal Validity

Next was QI 6.0 measuring for internal validity. In all of the ten studies, the researcher controlled the independent variable in accordance with QI 6.1.

However, for standard 6.2, two of the studies did not describe the conditions of the baseline conditions. (Flores et al., 2014; Keeter & Bucholz, 2012).

No participants in any of the studies had access to the treatment intervention outside of the study. Therefore, all of the studies met QI 6.3. Keeter and Bucholz (2012) analyzed the efficacy of group-delivered LBBIs, the effects on the students were evaluated per the standards of single-case design studies. Therefore, group QIs did not apply to this study.

In addition to this, all of the studies had single-case designs and, therefore, were exempt from being evaluated with QI 6.4. In all of the studies, experimental effects were shown at three different times. For example, all of the studies included three different participants or skills with their data clearly recorded. To this extent, all of the studies also met QI 6.5 which required that experimental effects were demonstrated at least three different times for each individual study. In all of the studies except one (put citation here), all baseline phases included at least three data points. In the study that did not meet this QI, only two of the four baseline phases included three data points and the other two phases included only two data points each (Brady et al., 2016). In accordance with QI 6.6, all of the studies except one meet this standard (which study was this).

Several commonly accepted designs were identified across this study. The first commonly accepted design was “a multiple probe design across work tasks with a variation of the adapted alternating treatments design” Wolery (2014, as cited in Hall Pistorio et al., 2018). Another commonly accepted design was multiple baseline across participants (Anderson et al., 2016; Brady et al., 2016; Brady et al., 2016; Kearney et al., 2018). The study by Bucholz et al., (2008) had a multiple baseline across participants and time periods Slightly different, but still a single-case design, was the study by Keeter and Bucholz (2012) which took on the commonly accepted design of a multiple baseline design across small groups. The last two studies which met QI 6.7 had the commonly accepted designs of overlapping, non-concurrent multiple baseline design across participants and multiple baseline design across skills, respectively (Hall et al.,

2017; Pistorio Hall, 2018). The final study which did not meet QI 6.7 was excluded according to the CEC standards because the design of this study was not defined (Flores et al., 2014).

In accordance with CEC quality indicators 6.8 and 6.9, the articles that were included in this study were not evaluated because they were single-case studies rather than group studies. Therefore, standards 6.8 and 6.9 were not applicable to the included articles.

Quality Indicator 7: Outcome Measures

QI 6 were followed by the evaluation of the studies in comparison to QI 7.0. These standards measure effect size and data analysis. According to CEC, QI 7.0 helps determine if the effect of the study has been determined with research integrity. QI 7.1 addresses the need for the study to be socially relevant. In each study in this literature review e, social relevance was maintained. They both improved the quality of life for the participants (Anderson et al., 2016) and had important learning outcomes (Bucholz et al., 2008). The next QI was 7.2 which stated that the study must clearly describe how the dependent variable was measured. Students' behavioral and learning outcomes were the target of all studies. Their behavior depended on the efficacy of the intervention (effective or not effective), therefore, the dependent variable was their behavior in response to the intervention. Excluding one study (Flores et al., 2014), every study met the requirements to meet this standard with no reservations. All of the ten included articles met QI 7.3 meaning that they all reported the effect of the intervention on the outcome of the studies. QI 7.4 required that the articles report three data points during the baseline and intervention phases in each study. Here, only one study did not meet the requirements for this standard (Flores et al., 2014). QI 7.5 provided requirements that made sure of the interrater reliability. All of the studies except one (cite here) met the requirements for interrater reliability. The study that did not meet the interrater reliability standard was the iPad study by Flores et al.,

(2014). All of the other studies included measures for interrater reliability (termed interrater agreement in the articles). The requirement was that the IRR (Interrater reliability) must be greater than 80%. One study had an IOR rating of 100% (Pistorio Hall, 2018), another study reported an IOR rating of 100% for the timer task and 99% for intervals with engagement (Hall et al., 2017). For all of the studies except two (Anderson et al., 2016; Hall et al., 2017) IOR was reported overall instead of by participant or skill. Still, these two articles that reported the data differently met the requirement of greater than 80% IOR for each instance of reporting. Four articles reported that their IOR rating was 99% Hall Pistorio et al., 2018; Kearney et al., 2018; Brady, Honsberger et al., 2016; Brady et al., 2016). The final two articles met the IOR requirements at 95% and 96% agreement respectively (Bucholz et al., 2008; Keeter & Bucholz, 2012). Only two of the studies met the requirement for QI 7.6. These studies were the first aid study by Kearney et al., (2018) and Hall Pistorio (2018).

Quality Indicator 8: Data Analysis

The purpose of QIs 8.0 was to analyze whether or not data analysis was completed appropriately and if information on effect size was provided. QI 8.1 was not applicable to the articles being evaluated because the articles were single case studies and not group design studies. All of the studies met QI 8.2 which verified that all of the studies provided graphs which indicated, through visual analysis, the outcome data from each study. QI 8.3 evaluated if the study provided appropriate effect size statistics. Only four of the studies met this standard. The first study that met QI 8.3 was the study by Hall Pistorio et al., (2018). This study compared the efficacy of different delivery modes for LBBI's including paper books, e-books, and enhanced e-books. Percent Non-overlapping (PND) data for baseline to intervention was 100% for all modes except for the paper book which was scored at 90%. For all of the baseline to follow-up

measurements, the PND was 100%. These results indicated that this study was effective to very effective (Hall Pistorio et al., 2018). The second study that met QI 8.3 was the first aid study by Kearney et al., (2018). This study evaluated the efficacy of an LBBI to teach first aid skills to students with developmental disabilities. For baseline to follow up, all except one (cite study here) of the three participants' PND was 100%. That student had a PND of 83%. For baseline to follow-up, all of the participants had PND of 100%. These scores indicated that the intervention was effective to very effective. The TAU-U score for this intervention was .945, meaning that the effect size was robust (Kearney et al., 2018). The third study that met this standard was (Hall et al., 2017). This study which included four participants had a PND baseline to intervention score of 100% for all of the students. For baseline to follow-up, PND was only recorded for three of the four children. These scores were all 100%. Finally, in this study, PND for generalized engagement was 100% for all of the students except one whose PND was 50% (Hall et al., 2017). The fourth and final study that met QI 8.3 was "An Examination of Literacy Based Behavioral Interventions Delivered in Small Groups to Young Children" (Pistorio Hall, 2018). This study included four participants and three skills. The skills were matching, gluing, and cutting. All but one of the participants had 100% PND across all of the skills for both baseline to intervention as well as for baseline to follow-up. The other participant had a PND of 100% for matching in both baseline to intervention as well as for baseline to follow-up. For gluing, this same student also had PND of 86% for baseline to intervention and they had 100% PND for baseline to follow-up. For cutting, the student had PND of 0% due to an outlier. However, the TAU-U for the measure was .82 and the TAU-U for the intervention as a whole was .91. For the rest of the students, TAU-U for the intervention was 1.0. This indicated that the intervention was highly effective for these students (Hall et al., 2017).

Discussion

Limitations

The study by Flores et al. (2014) did not meet the standards to qualify as an EBP. During the first two stages, this article should have been excluded from the study. However, it was not excluded, so to maintain procedural fidelity, the study was included according to the initial decision. In the future, a more robust training process should be used to help the coders develop a better understanding of the coding process. Furthermore, all of the coders should have been provided with more training so they could have received more instruction on how to decode the meaning of research articles. For example, scaffolding could have been used to help the undergraduate interrater better understand how to read examples of published articles before coding the actual articles (Kershaw, Lippman, Fugate, 2018). In addition to this, scaffolded supports could have been used with more organization and detail to help the second coder better understand and develop the skills needed to implement the coding process with confidence. Additionally, interrater agreement should be used throughout all three phases to check for consistency.

Research

Results from the study indicated that for nine out of the ten selected articles, the CEC standards were met, thereby making LBBIs an evidence-based practice according to CEC. The CEC standards were met because nine of the ten articles met the Quality Indicators provided by the CEC handbook for evidence-based practices. Context data indicated that these interventions were effective across various settings. However, teachers should make sure that the setting aligns with the skill being taught. For example, the skill of handwashing must be taught where the learner has access to a sink to implement the part of the intervention which requires behavioral rehearsal.

In addition to this, it would bolster the existing studies if a greater amount of generalization data was collected. Some studies included such statements regarding generalization (Anderson et al., 2016; Hall et al., 2017; Kearney et al., 2017; Keeter & Bucholz, 2012; Pistorio Hall, 2018). The other studies did not include generalization data which could have shown generalization skills across the different skills and participants. However, from the generalization data that were included, it is appropriate to conclude that these interventions are effective in not only teaching skills, but also for preparing learners for the important skill of generalization. This is a benefit of the intervention for teachers who might encourage hand washing across different settings during the school day, children of divorced parents who must learn to self-regulate in two different environments or homes, or adults with disabilities who can generalize basic workplace behaviors across jobs.

Furthermore, the results indicated that the intervention was effective across different ages and sexes. This indicates that teachers and caregivers of adults or small children may find this intervention effective. However, it should be noted that ethnicity/race was not accounted for and that this may limit who the intervention is effective for. Relating to the quality of the literature which was gathered on LBBIs, there needs to be more information regarding the ethnic and racial demographics of the participants in the studies. It is important to make note of such factors that may result in different outcomes for the intervention.

Practice and Additional Considerations

In both papers, e-based, and enhanced e-based LBBIs were shown to be effective as behavioral interventions. This is promising because it makes the format that teachers can prepare and deliver the intervention in more accessible ways to students. For example, students who have a computer at home may benefit from the e-based or enhanced e-based intervention, while students

with no computer could still reap the benefits of such interventions through paper formatting. In addition to this, teachers can have the choice of having either an adult or peer deliver the intervention. This is good for teachers who may need to supervise many students. Instead of having to pull students aside and singularly direct them in the intervention, they can utilize peers to help the learner with the new skills.

The description of the intervention was effective in that teachers could read and easily replicate the studies from the interventions. For example, the first aid and handwashing studies included visual and written depictions and examples of how the intervention should be constructed (Brady et al., 2016; Kearney et al., 2018). This could help educators who are trying to learn how to create task analysis and then turn them into such LBBIs

Per the results, fidelity was not consistently recorded throughout the studies. However, in all of the studies, a positive correlation was found between the intervention and the desired behavioral outcomes. Therefore, it is arguable that this intervention, by nature, is flexible and may be implemented effectively despite slight differences or alterations in the delivery of the intervention. This is beneficial because while teachers may not have experience developing these interventions, they can still effectively do so and implement them with positive behavioral outcomes for their students.

In the study, the independent variable was controlled by the experimenter in all of the studies. In addition to this, baseline data and data for each phase thereafter is beneficial to teachers and other individuals who are looking for an effective intervention to teach new behaviors because this data shows the efficacy per study. This is valuable to educators who desire to use evidence-based practices to bolster the rationale for goals on IEPs in a way that can most benefit their students.

In each of the studies, the outcome was measured to demonstrate the intervention's level of efficacy. The studies all focused on functional skills, but they did not specifically evaluate the skills being taught for social validity. Still, it is arguable that since these skills are high-frequency skills that can be used across multiple types of environments, that they are still socially valid. Additionally, specific behaviors were targeted so the outcomes could be appropriately measured. This is important for teachers so they understand the purpose of such interventions and so they can orient themselves to the proper approach to implementing it. Also, interrater agreement was used in the studies to make sure that there was agreement on the multifaceted creation and implementation of the interventions. This will help teachers understand both errors and correct practices in making use of these interventions in the classroom.

An important consideration to make for future research purposes is to more specifically measure the generalization of skills taught using the LBBIs. The report on effect size from all of the studies will benefit teachers and other researchers by providing clear data analysis that show the percentage of the sample size that the intervention was effective for. Literacy based behavioral interventions were shown by the research to be largely effective across all participants and skills which is a promising result for classroom teachers or others who plan to utilize the intervention to help learners acquire functional daily living skills.

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Appendix A

Authors	Title	Journal	Year	age 5-	
				age 0-5	10
Pistoro, K. H., Brady, M. P., Keamey, K., & Downey, A.	Comparing Different Delivery Modes for Literacy-Based Behavioral Interventions during Employment Training for College Students with Developmental Disabilities.	Education and Training in Autism and Developmental Disabilities,	2018	0	0
Keamey, K. B., Brady, M. P., Hall, K., & Honsberger, T.	Using peer-mediated literacy-based behavioral interventions to increase first aid safety skills in students with developmental disabilities	Behavior Modification	2018	0	0
Leach, D., & Rodecki, J.	Literacy Based Behavioral Interventions and Video Self-Modeling with Students with Autism Spectrum Disorder (ASD)	Journal of the American Academy of Special Education Professionals	2013		
Jessica L. Bucholz, Michael P. Brady, Mary Lou Duffy, Jack Scott, & Larry G. Kontosh.	Using Literacy-Based Behavioral Interventions and Social Stories to Improve Work Behavior in Employees with Developmental Disabilities	Education and Training in Developmental Disabilities Education and Training in Autism and Developmental Disabilities	2008	0	0
Keeter, D., & Bucholz, J. L.	Teaching Positive Work Behavior With Literacy-Based Behavioral Interventions.	Teaching Exceptional Children	2012	0	0
Bucholz, J. L., & Brady, M. P.	The Apple iPad as Assistive Technology for Story-based Interventions.	Journal of Special Education Technology,	2014	4	3

Brady, M. P., Honsberger, C., Cadette, J., & Honsberger, T.	Effects of a Peer-Mediated Literacy Based Behavioral Intervention on the Acquisition and Maintenance of Daily Living Skills in Adolescents with Autism.	Education & Training in Autism & Developmental Disabilities	2016	0	0
Francis, G. L., McMullen, V. B., Blue-Banning, M., & Haines, S.	Increasing the Social Skills of a Student With Autism Through a Literacy-Based Behavioral Intervention.	Intervention in School & Clinic	2013		
Brady, M. P., Hall, K., & Bielskus-Barone, K.	Literacy-based behavioural interventions delivered by peers: a teaching strategy for students with severe disabilities Using narrated literacy-based behavioural interventions to decrease episodes of physical aggression in elementary students with disabilities.	Educational Psychology in Practice	2016	0	3
Anderson, S., Bucholz, J. L., Hazelkorn, M., & Cooper, M. A.		Support for Learning,	2016	0	3
Pistorio, K. Brady M.P., & Morris, C	Using literacy-based behavioural interventions to teach self-regulation skills to young children	Early Child Development and Care	2017	4	0
Pistorio, K.	An Examination of Literacy Based Behavioral Interventions Delivered in Small Groups to Young Children	(Doctoral dissertation)	2018	4	0
Bennett, K., Brady M. P., Scott, J., Dukes C., & Frain M.	The Effects of Covert Audio Coaching on the Job Performance of Supported Employees	Focus on Autism and Other Developmental Disabilities	2010		

Konrad, M., Luu, K. C. T., Rowe, D. A., Mazzotti, V. L., Kelley, K. R., Mustian, A. L., Keese, S., & Fishley, K. M.	In Other Sources.	<i>Career Development for Exceptional Individuals</i>	2009
Corral, J Patricia A. Normandin, Kristin A. Coffey, Stacey A. Benotti, Dennis P. Doherty,	The Impact Of A Peer-Teaching Instructional Approach On A Student's Self-Confidence	(Doctoral dissertation)	2018
Cindy Cheng, Jodi Oakman, Christine Ellie Fossey, Jillian Cavanagh, Hannah Meacham & Bartram, T.	Autism Emergency Care Success: Plan, Collaborate, and Accommodate What constitutes effective support in obtaining and maintaining employment for individuals with intellectual disability? A scoping review	Journal of Emergency Nursing Journal of Intellectual and Developmental Disability	2018 2017
Adam Styles	Social Stories™: does the research evidence support the popularity?	Educational Psychology in practice	2011
Katherine E. Severini, Jennifer R. Ledford, Rachel E. Robertson	Systematic Review of Problem Behavior Interventions: Outcomes, Demographics, and Settings	Journal of Autism and Developmental Disorders	2018
I dont have this journal			Information type included
How do I disaggregate this journal			Information type not include
Does not pertain ruling out			Variable
Found when searching google scholar for LB B-iours Is			I have a question about this

age 10-14	age 14-18	age 18-25	age 25+	boys	girls	race	Disability category	paper based	e-based	peer mediated	adult mediated
	0	0	3	0	1	2	ID, OHI, ADHD, ASD	V	V		
	0	3	0	0	3		ASD				
	0	0	0	2	0	2	ID				
	2	3	0	0	3	2	ID				
	0	0	0	0	5	2	DD, ASD				

0	4	0	0	3	1	ASD	
0	0	0	0	1	2	IND, LI	
0	0	0	0	2	1	DD, ASD	
0	0	0	0	1	3	DD Students who teacher's identified as being "at risk"	
0	0	0	0	2	2		



21

Practitioner not included

Mentioned, not the main thing

individual	group	skill	setting	Design	Effect	other information
		Filing papers and reports	Job coach's office/workplace	Multiple baseline across skills repeated across participants.	PND effective-very effective	
		First aid skills	school cafeteria	multiple baseline across participants	PND effective-very effective	
		requesting additional materials or supplies	sheltered work setting	Multiple baseline across skills and participants	effective	
		blurting out/off task	self-contained classroom	Multiple baseline across participants	effective	
		Shared play, walking instead of running, hitting, transitions,	Classrooms 1, 2, 3, and 4	multiple baseline across skills	effective	

		Making a peanut butter and jelly sandwich	School lunchroom, vocational area in the school	multiple baseline across participants	effective
		handwashing	self-contained classroom	multiple baseline across participants	effective
		agression	homeroom, various settings empty preschool classroom, living or dining rooms of participants' family homes.	multiple baseline across participants	effective
		Self-regulation		multiple baseline across participants	PND highly effective
		cutting, gluing, matching	preschool class	multiple baseline across skills	PND effective and TAU U effective

Reason for exclusion

[Redacted]
Practitioner

[Redacted]
Practitioner

Practioner

Briefly mentioned, not
the main idea

This was a review of many different sources, not a research article
Talked about peer coaching, a strategy used to implement LBBIs, but focused on peer implementation rather than LBBIs.

Practitioner

reviewing social stories rather than LBBIs. All social stories are LBBIs, but not all LBBIs are social stories.

reviewed different kinds of interventions, not solely LBBIS.

