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Effects of behavior-specific praise training on one-on-one paraprofessional-student dyads

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In special education, some students with significant needs require one-on-one adult support from a paraprofessional. However, these paraprofessionals often lack adequate training and support. Special education teachers frequently report feeling unprepared and ill-equipped to provide the necessary training. To address this, we used a multiple-baseline across participants design to examine the effects of a paraprofessional training program on rates of behavior-specific praise (BSP), student on-task behaviors, and paraprofessionals' reported levels of confidence in supporting behaviors. Participants were three paraprofessional-student dyads consisting of a one-on-one paraprofessional and a first or second grade student with special needs at an urban public school serving grades PreK-3. The intervention program included BSP training, role play, and case discussion. One paraprofessional also required an additional coaching element. Visual analysis of the data indicated that the intervention was effective in increasing rates of paraprofessional delivered BSP, but did not have a clear impact on student on-task behaviors. The study highlights the importance of ongoing professional development and support for paraprofessionals in implementing evidence-based strategies.

KEYWORDS

behavior-specific praise, low-intensity strategies, paraprofessional training, one-on-one paraprofessionals, paraeducator training

Introduction

Over one million paraprofessionals in U.S. schools serve students with disabilities (U.S. Bureau of Labor Statistics, 2021; U.S. Department of Education, 2018). Paraprofessionals play an important role in providing academic and behavioral support to students. The federal Every School Successes Act (ESSA) mandates that paraprofessionals working in Title I settings hold an associate's degree or demonstrate competency through a state-approved assessment (ESSA, 2015). Still, most districts do not have universal education or training requirements for paraprofessionals. ESSA also requires high-quality professional development (PD) for paraprofessionals in Title I settings, emphasizing job-embedded, data-driven, and classroom-focused training. Yet the scheduling of paraprofessionals' work hours, typically aligned with student schedules, poses a challenge for finding time to provide effective PD. Therefore, the responsibility for providing paraprofessional PD during school hours often falls to special education teachers, who typically supervise one or more paraprofessionals (Carnahan et al., 2009).

Professional development for paraprofessionals

The Individuals With Disabilities Education Improvement Act (IDEA, 2004) mandates adequate supervision of paraprofessionals by special education teachers, but studies indicate special education teachers often feel insufficiently trained and lack the necessary knowledge for supervising paraprofessionals (Douglas et al., 2016; Giangreco et al., 2013). Additionally, special education teachers struggle to find time for these tasks amid their other extensive responsibilities (Zagona et al., 2017). Consequently, paraprofessionals are often deprived of PD opportunities needed to effectively support students (Maggin et al., 2012).

Engagement in PD and training on research-based strategies has been demonstrated to have a positive impact on student achievement (Yoon et al., 2007). Without appropriate professional learning, paraprofessionals' ability to provide proper support for students is hindered. The limited research on PD for paraprofessionals suggests that experiential learning yields better results compared to traditional approaches. Training that includes multiple components, such as modeling, role plays, coaching, feedback, self-monitoring, and self-reflection, has shown positive outcomes (Robinson, 2011; Seaman-Tullis et al., 2019). Given the importance of PD, the lack of time to provide it, and the needs of teachers responsible for providing it, quick, research-based strategies should be considered.

One of the areas in which paraprofessionals report a lack of training and a desire to learn more is behavior management (Giangreco and Broer, 2005). Special education teachers supporting paraprofessionals report behavior management skills as an area where paraprofessionals need more training (Mason et al., 2021). Given that legislation mandates paraprofessional PD, and that paraprofessionals and teachers voice the need for training in behavior management, it is important to explore professional learning experiences that promote paraprofessional confidence in and use of research-based strategies that support students' academic and behavioral outcomes.

Low-intensity strategies

Low-intensity strategies (LIS) are proactive, research- and evidence-based practices designed to enhance engagement and minimize disruptive behavior (Lane et al., 2015). Grounded in applied behavior analysis principles, LIS assist educators in proactively shaping behavior (Cooper et al., 2020; Simonsen et al., 2015) and increasing the likelihood of desired behaviors. LIS include pre-correction (Ennis et al., 2017), active supervision (Allen et al., 2020), opportunity to respond (Common et al., 2020), instructional choice (Royer et al., 2017), behavior-specific praise (Ennis et al., 2020), and high-probability requests (Common et al., 2019). Educators, including paraprofessionals, can apply LIS in one-on-one or group settings across content areas with minimal planning and professional learning (Lane et al., 2018).

Behavior-specific praise

Behavior-specific praise (BSP), an LIS, is an essential classroom practice. It provides acknowledgment contingent upon desired

behaviors, with specific references to the demonstrated behavior, thereby promoting self-confidence (Hattie and Timperley, 2007; Sutherland et al., 2000). BSP has been shown to be effective as a reinforce when it is specific and descriptive, highlighting what the individual has done well (Hattie and Timperley, 2007; Sutherland et al., 2000). Brophy (1981) emphasized the importance of strategic and intentional praise, contrasting it with the often ineffective and non-contingent use of praise observed in classrooms.

By recognizing expectations met through BSP, educators acknowledge the student and clarify the behavior being acknowledged, which may lead to future occurrences of the behavior (Ennis et al., 2018). Early evaluations by Madsen et al. (1968) highlighted the significant impact of BSP in reducing inappropriate behaviors compared to other methods such as rules or planned ignoring, underlining its crucial role in classroom management and student motivation. More recent studies continue to demonstrate the positive effects of BSP. Sutherland et al. (2000) found an association between the number of BSP statements and increased on-task behavior. Allday et al. (2012) found that an increase in teacher use of BSP improved task engagement of elementary students with or at risk for an emotional behavior disorder.

Most studies on BSP training have focused on training teachers (see, for example, Allday et al., 2012; Gorton et al., 2022; LaBrot et al., 2023), however, some studies have begun to pivot to training paraprofessionals. In most previous studies on BSP training for paraprofessionals, participants worked in a classroom setting, where they provided behavioral and instructional assistance to multiple students or the whole class. Sobeck et al. (2020) included BSP in a battery of three LIS strategies they sought to teach to general education inclusion paraprofessionals. Sallèse and Vannest (2022) investigated the effects of manualized teacher coaching on paraprofessional rates of BSP. Wills et al. (2019) investigated the effects of self-monitoring on praise rates of paraprofessionals for students with emotional and behavioral disorders. However, none of these studies were implemented with one-on-one paraprofessionals. Zarate et al. (2021) used short-dosage video training to increase praise rates with one-on-one paraprofessionals, however, these dyads existed within a therapeutic day school setting, and two of the three students were adults. Similar conditions (temporary one-on-one assignment, adult learners) existed in Horn et al.'s (2022) study.

As such, there exists a gap in the literature on training one-on-one paraprofessionals to use BSP when working with K-12 students in general education settings. One-on-one paraprofessionals support one individual student throughout the day, whereas other paraprofessionals support in a group or class-wide capacity. The consideration of providing BSP implementation training to one-on-one paraprofessionals, specifically, is especially relevant given that one-on-one paraprofessionals report spending more of their time (21.58% of their day) on behavior support than group paraprofessionals (13.60%; Giangreco and Broer, 2005).

Effective BSP training most often includes multiple components, with didactic teaching and feedback being the most common (Zoder-Martell et al., 2019), in order to increase participant understanding and implementation. In didactic teaching, the teacher/trainer selects the content or skill of instruction, teaches the content or skill, and the learner listens and implements. Didactic training is usually effective in defining what BSP is, providing clear procedures or steps for implementing BSP, providing examples and non-examples, and

providing an initial model of implementation (Zoder-Martell et al., 2019). Didactic training can be made more engaging for learners by adding video vignettes and additional multimodal content presentation. Performance feedback can be provided during initial training and throughout the study. Engaging participants in role-play during initial training provides additional models and the inclusion of feedback through performance coaching when a need for additional support is demonstrated.

When examining the effectiveness of different configurations of PD packages for training educators to use behavior-specific praise, a 2019 meta-analysis (Zoder-Martell et al., 2019) found that while didactic teaching did increase rates of BSP, the authors recommended investigating additional approaches to provide more substantial increases. Role-playing has been shown to be an effective strategy for increasing the implementation of professional learning (Bagawan et al., 2023; Kilgour et al., 2015). Additionally, researchers have criticized the lack of participant input in designing and delivering PD (Giangreco and Broer, 2005) to paraprofessionals. With this in mind, this study's intervention package began with participant input during strategy selection, provided training that combined didactic teaching with additional approaches, and infused coaching when a need for additional support was demonstrated.

Purpose of study and research questions

The purpose of this study was to examine the effectiveness, implementation, and social validity of an intervention designed to teach one-on-one paraprofessionals how to use BSP with the students with special needs that they support. There is a plethora of literature that explores teaching preparation and training, but paraprofessional training is not well researched, specifically with regard to one-on-one paraprofessionals. This research may provide a quick and cost-effective support for paraprofessional learning.

We aimed to answer the following research questions:

- How does providing training and coaching to one-on-one paraprofessionals increase their: (a) levels of implementation of behavior-specific praise? (b) reported levels of confidence in implementing behavior supports?
- How does the implementation of behavior-specific praise affect: (a) student on-task behavior? (b) student assignment completion?

Method

Participants and setting

This study was conducted at a PreK-3 Title I elementary school in a Southwest urban city, with approximately 250 students (0.004% American Indian, 1.2% Asian American, 1.2% White, 2.8% Multiracial, 27.4% African American, 65.7% Hispanic). The school employed one special education teacher and used a pull-out resource model. The special education teacher was responsible for providing ongoing support and training of special education paraprofessionals, with guidance from the administration. The school implemented PBIS and tiered supports for behavior but had limited tiered supports for

academics. Each year, staff received a short, one-hour behavior support professional development session that encompassed the schoolwide behavior model, discipline procedures, and reinforcement procedures. Paraprofessionals, however, did not participate in this training. Additionally, there was no training provided for paraprofessionals at the district level.

Participants in this study consisted of three dyads of a full-day one-on-one paraprofessional paired with a student with special needs. Paraprofessionals are defined here as adults assigned to support youth with special needs in a one-on-one support capacity in the school setting as a school employee. This assignment was determined by the child's IEP team. In some contexts, paraprofessionals may also be referred to as health aides, student aides, or instructional assistants.

Following approval by the school administration and the authors' institutional review board, participants were recruited as a result of their dyad pairing, meaning that these dyads naturally existed in the school setting, and paraprofessionals and students were recruited as a pair. Both paraprofessionals and parents of the students provided consent for the study. For all dyads, observations took place at school in the regular course of the instructional day. Participant demographics are shown below in Table 1.

Dyad 1: Pam and Tina

At the beginning of the study, Pam and Tina had been paired together for 3 months. Pam reported struggling with redirecting behaviors and getting Tina to comply with putting away her iPad when iPad time was over. The special education teacher and administrator reported that Pam excels at building rapport with Tina, but at times can lack firmness. During baseline observations, Pam was observed regularly stating "good job" to Tina, but her praise lacked specificity. Prior to the study, the general education classroom teacher reported that Tina had an average assignment completion rate of 80% with paraprofessional support, and 20% without.

Dyad 2: Karina and Tate

At the beginning of the study, Karina and Tate had been paired together for one full school year and 3 months. Karina reported that she wasn't sure how to respond when Tate escalated and yelled. She acknowledged that she believed the best strategy would be to recognize his triggers and intervene prior to the tantrum. She reported the most prior training on LIS, having been at least introduced to these strategies, and that her training mainly came in the form of on-the-job support from the special education teacher. Prior to the study, the general education classroom teacher reported that Tate had an average assignment completion rate of 80% with paraprofessional support and 30% without paraprofessional support.

Dyad 3: Sally and Derek

At the beginning of the study, Sally and Derek had been paired together for one full school year and 3 months. Sally reported that she struggled when Derek was defiant or said "no." She believed that the best course of action in this situation was to ignore or remove

TABLE 1 Dyad demographics.

Dyad	Paraprofessional					Student				
	Name	Age range	Gender	Race	Years exp.	Name	Grade level	Gender	Race	Special education eligibility
1	Pam	30–39	F	Hispanic	1–3	Tina	1	F	Hispanic	Developmental Delay
2	Karina	40–49	F	Hispanic	1–3	Tate	2	M	Biracial	Mild Intellectual Disability
3	Sally	18–29	F	White	1–3	Derek	2	M	Hispanic	Autism

preferred activities. She stated that she had received some prior training on BSP in her previous job at a daycare (through watching videos), but had not received training on any other LIS. Prior to the study, the general education classroom teacher reported that Tina had an average assignment completion rate of 90% with paraprofessional support, and 45% without.

Procedures

Research design

To investigate the impact of a multicomponent intervention on paraprofessional use of BSP, this study utilized a multiple-baseline across subjects design (Gast et al., 2014) incorporating baseline, intervention, and maintenance conditions. The possibility of meeting the minimal requirement of at least three demonstrations of effect to establish a functional relation was made possible by the inclusion of three dyads (Kratochwill et al., 2010).

Implementation order was determined by the paraprofessionals' expressed level of confidence, where Pam expressed the least amount of confidence and therefore was perhaps most in need of training, and where Sally expressed the least concern for student behaviors, and therefore the authors were comfortable with her being trained last. Principal input was also sought to determine the implementation order. As such, once three baseline data points were collected for Dyad 1, the training was delivered to Pam, while simultaneously maintaining the baseline condition for Dyads 2 and 3. Next, Karina received the training, while maintaining baseline for Dyad 3. Finally, Sally received the training.

Measures

Pre-study survey

Prior to the start of the study, paraprofessionals completed a researcher-created pre-study survey to gather demographic data and assess their current level of confidence and training implementing low-intensity behavior supports. In the survey, the paraprofessionals were asked to answer the question “How confident are you responding to individual student behavioral issues?” on a scale of 1–5, where 1 = “Not confident at all” and 5 = “Extremely confident.” Pam answered 3 and Karina and Sally answered 4. Next, they were asked to rate their familiarity with LIS, specifically: BSP, pre-correction, active supervision, opportunity to respond, and high-probability requests. These items were rated on a scale of 1–4, where 1 = “I’ve never heard

of this” and 4 = “I am an expert at this.” Instructional choice was not included due to it mainly being a teacher-implemented strategy.

BSP, active supervision, and pre-correction were rated by all paraprofessionals as strategies that they had attempted but did not feel proficient in. Opportunity to respond and high-probability requests were rated as familiar to two paraprofessionals, but unheard of by one paraprofessional. Based on this information, as well as special education and administrator input on paraprofessional training needs, BSP was selected as the focus of the paraprofessional training package.

Pre-study social validity was assessed via researcher-created survey to: (a) determine the need for the training package, (b) to understand pre-study perceptions of LIS and (c) to gather information about paraprofessionals' prior training. Post-study, social validity was assessed using the Adapted Version of the Intervention Rating Profile - 15 (Ci3T, 2016; adapted from Witt and Elliott, 1985). The Rating Profile asks respondents to complete a fifteen-question instrument, responding for each item on a scale of 1–6, where 1 = Strongly disagree, 2 = disagree, 3 = Slightly disagree, 4 = Slightly agree, 5 = Agree, and 6 = Strongly agree. Items assess participant perceptions of intervention feasibility, acceptability, effectiveness, and willingness to implement.

Dependent measures and data collection/analysis

Paraprofessional measures included delivery of behavior-specific praise statements, operationally defined as a statement of positive affirmation that (a) is contingent upon the performance of the behavior, (b) specifies the behavior being reinforced, and (c) sounds sincere (O’Leary and O’Leary, 1977). It is further described as a positive statement that tells the learner what they did correctly, so as to increase the likelihood that they display the same behavior in the future. Examples of BSP are “Thank you for raising your hand” or “Good job looking at the teacher.” Non-examples are “good job” or “I’m proud of you.”

BSP was recorded using partial interval recording for one-minute intervals; wherein if a statement of BSP meeting the requirements of the operational definition was delivered within that interval, the interval was counted. Then, to standardize for variance in length of observation, intervals counted were divided by total intervals observed to obtain a percentage of intervals wherein BSP was delivered correctly.

Student measures included on-task behavior and work completion rates. On-task behavior was operationally defined as “getting on with work set by the teacher and/or following his/her instructions” (Chalk and Bizo, 2004), and further defined as attending to the teacher’s lecture, responding to questions or directives, and/or completing

assigned tasks. Assigned tasks may be behavioral (such as cleaning out their desk) or academic (such as reading a book). Examples of on-task behavior are following teacher directions to line up, complete a worksheet, or discuss an academic topic with a peer. Non-examples are wandering the room, having off-task conversations with a peer, or playing with items on their desk. If a student required prompting to complete a task or a reminder (e.g., “look at the problem”), this still constituted on-task behavior if the student complied with the prompt. On-task behavior was selected as the student measure due to its consistent use as a measure in prior studies (Allday et al., 2012; Ennis et al., 2020; Sutherland et al., 2000).

On-task behavior was also recorded using partial interval recording for one-minute intervals; wherein if the student was on task for any portion of the interval, the interval was counted. On-task behavior was also standardized as a percentage. Student on-task behavior was additionally assessed using general education teacher-reported average rates of assignment completion, both with and without paraprofessional support. This information was obtained via teacher interview, by asking the teacher to review their gradebook and other records and provide an average rate.

Both paraprofessional and student measures were collected on a paper data collection form. Observations were scheduled such that they occurred at times when the paraprofessionals identified that they struggled most to support students, which was typically during academic instruction and transitions between activities. No observations took place during lunch, recess, special areas, arrival, or dismissal. Observations were planned to occur for 15–20 min, however, due to unpredictable variations in classroom environments, actual observations were between 12 and 22 min in length, with the mean time being 16 min.

One-minute intervals were selected as an *a priori* decision to standardize the unit of measurement between BSP and student on-task behavior, to allow for accurate data collection. Floress et al. (2018) found that K-5 teachers typically deliver BSP at a rate of 0.01–0.27 statements per minute, and the Iris Center (2018) recommends a rate of around six statements per 15 min (0.4 per minute). As such, we set the one-minute increment recognizing that BSP rates typically fall around less than one per minute.

Collected data was graphed and visual analysis of the data was conducted following procedures outlined by Barton et al. (2018), where graphed data is systematically analyzed in terms of level, trend, variability, stability, and overlap; and evaluated for immediacy of change and potential demonstrations of effect. Based on prior literature, we predicted an increase in rates of praise, as well as an increase in on-task behavior.

Intervention

In this section, we describe the intervention development, intervention procedures, and baseline data collection.

Intervention components

Based on needs identified through baseline data collection, paraprofessional pre-survey, and special education teacher/administrator input, the following training package was designed. Key considerations were the length of training, ease of training delivery, and rapid skill acquisition, as the goal was to create a training package

that could be reasonably replicated by other teacher/paraprofessional teams. The training was administered live by the first author directly to the paraprofessional using a Google Slides slide deck and was designed to be delivered within 15 min, with additional time added for re-teaching if needed. The training consisted of the following components.

Participant-friendly definition

Participants were provided with the following definition of BSP: “Behavior-specific praise is a positive statement directed toward a student or group of students that acknowledges a desired behavior in specific, observable, and measurable terms” (Iris Center, 2018). One additional slide provided highlights of BSP components.

BSP steps

A four-step process was presented for delivering BSP, consisting of the following steps and guiding questions: (1) Identify the expectation. What should the student be doing? (2) Observe the student. Are they following expectations? (3) Praise the student. Tell the student what they are doing correctly. (4) Repeat. Remember we are aiming for four praise statements for every one redirection.

Video modeling

Two videos, both approximately 2 min long and produced by the Iris Center, were shown, each containing an example and non-example of BSP. Following each video, the training paused for discussion and questions.

Verbal discussion and role play

The trainer and the paraprofessional discussed the student needs reported by the paraprofessional on the pre-survey, and how BSP might be utilized to support their specific student. Once a situation was identified, the trainer and paraprofessional completed a role-playing exercise. First, the paraprofessional played the student and the trainer played the paraprofessional, then the roles were reversed.

Quiz

To ensure each paraprofessional had a clear understanding of BSP goals, definition, and procedure, a five-question quiz was administered following the training. Questions consisted of (1) sorting praise statements into BSP or non-BSP, (2) a fill-in-the-blank definition of BSP, (3) a question on preferred praise-to-reprimand ratio, (4) a true/false statement, and (5) a short scenario after which the paraprofessional needed to script out a statement of BSP. If the participant role-played incorrectly and/or did not receive a 100% score on the quiz, the researcher planned to model and re-teach the strategy and then repeat steps 3–5. However, all participants role-played correctly and scored 100% on the quiz on their first attempt.

Printed notes

After the training, participants were provided with a printed copy of the Iris Center (2018). Fundamental Skill Sheet for Behavior Specific Praise, a short handout highlighting components and procedures of BSP, for their reference and review.

Coaching

In the event that despite successfully implementing role-playing and receiving a 100% score on the quiz, the paraprofessional was found to be implementing the strategy incorrectly or not at all, in the moment coaching was provided, where the researcher provided quiet dictations of praise statements for the paraprofessionals to repeat to the student. When coaching was implemented, this was considered a phase change, in order to differentiate between the effectiveness of the training itself, and the effects of coaching, on increasing praise rates.

Fidelity of implementation

As mentioned previously, paraprofessionals were not released to implement BSP until they had successfully demonstrated via performance task and written assessment that they were prepared to do so. During each observation, observers assessed for accurate delivery of BSP by paraprofessionals (100% of observations). If the paraprofessional was observed to utilize the strategy incorrectly, the researcher planned to provide in-the-moment coaching to support with correct implementation of the strategy. However, no paraprofessionals were observed to utilize the strategy incorrectly.

Fidelity was additionally assessed via the fidelity checklist shown in Table 2, where an observer documented researcher adherence to data collection, intervention delivery, observational setting, and interaction protocols. Researcher fidelity to study design was assessed at 100% on eleven out of twelve indicators. One indicator, “Researcher provided coaching for incorrect implementation” was assessed as not observed, given that the need for coaching did not arise. A second evaluator provided the same assessment on a different observation day.

TABLE 2 Study design fidelity implementation checklist.

Study component	Action
Data collection	Observations include para and student dyad
	Observers sit close enough to hear praise
	Data is recorded on standardized recording sheet
	Training is provided to co-observers prior to observations
	Interaction between researcher and dyad is limited to initial greeting during observation
	Researcher remains in the room during entirety of observation
	Strategy implementation was not impacted by disruptions (student pulled out of class, extra people in room, etc.)
Training	Researcher adhered to intervention training steps and materials
	Researcher ensured no intervention implementation until participants met training requirements (quiz)
	Researcher provided coaching for incorrect implementation
	Paraprofessional attended to presentation
	Intervention staggered (one para trained at a time)

Interobserver agreement

Interobserver agreement (IOA) is recommended to ensure internal validity (Cooper et al., 2020). Observation data was primarily collected by the first author, and either the second author or the school special education teacher joined the first author for 33% of baseline and 25% of intervention observations to establish IOA. Prior to data collection, the first author re-trained the special education teacher on BSP (she had received prior training), operational definitions, and partial interval recording. Both the second author and the special education teacher were provided with printed operational definitions, examples and non-examples of BSP, and a completed sample data collection sheet. After the first observation, a meeting was held to review any variance in the data collected and resolve any disagreements.

Following the norming meeting, IOA was calculated using interval-by-interval agreement, where the number of intervals agreed was divided by the total number of intervals and multiplied by 100 to obtain the interval-by-interval IOA percentage (Cooper et al., 2020). IOA exceeded minimum thresholds set by the What Works Clearinghouse (2020, 80% standard), for the overall study (97.4%), baseline condition (98.3%), intervention condition (96.2%), paraprofessional data (97.8%), and student data (97%). While Cooper et al. (2020) caution that interval-by-interval IOA may overestimate due to chance agreements, these values still far exceed the WWC standard.

Results

Paraprofessional delivery of BSP

Following procedures outlined by Barton et al. (2018), graphed data were analyzed, and results are discussed here in terms of the percentage of intervals scored as containing delivery of BSP using partial interval recording. Figure 1 displays the results of the paraprofessionals’ delivery of BSP, which improved under the intervention condition for all three paraprofessionals, when compared to baseline.

During the baseline condition, all three participants demonstrated no or minimal levels of BSP, with minimal variability ($M=1.36\%$, $SD=2.63$) and a slight positive trend for both Karina and Pam. Sally demonstrated a flat, near-zero trend line with no variability. Upon delivery of the intervention (training package), the level immediately increased for two paraprofessionals, to 26.32% for Pam and 19.05% for Karina. These increased levels continued on a positive trend with minimal variability through the conclusion of the study; the intervention mean for Pam was 26.55%, and the intervention mean for Karina was 24.93%. No coaching was necessary to support Karina or Pam with implementation, however, praise and feedback were provided verbally following sessions. For Sally, BSP delivery increased slightly to a mean of 4.79%, with minimal variability and a slightly positive trend following the training. When paired with coaching, Sally’s delivery of BSP increased to 10.18% of intervals, with a stable trend and low-moderate level. Maintenance probes could not be collected for Dyad 2 due to the student’s unenrollment from the study school. However, probes collected for Dyads 1 and 3 showed continued elevated levels of BSP use.

Through summative visual analysis, a functional relation can be seen between the BSP training package and paraprofessional use of behavior-specific praise, as evidenced by the immediacy of change for all three participants in the intervention phase, providing three demonstrations of effect.

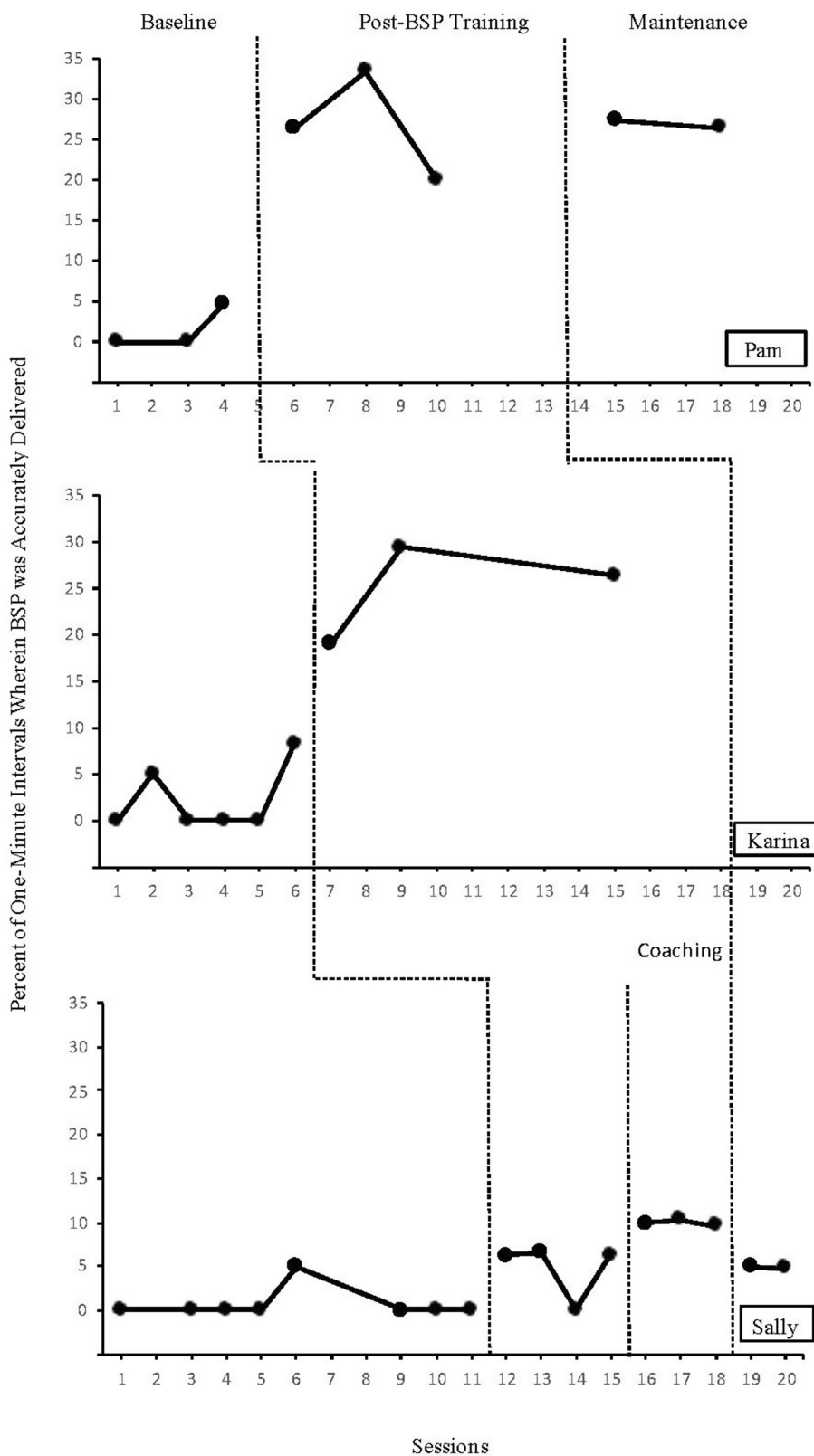


FIGURE 1 Paraprofessional delivery of behavior-specific praise across sessions.

Student on-task behavior

Results are discussed here in terms of the percentage of intervals scored as on-task using partial interval recording. Figure 2 displays student time on task, which provides some valuable information, but does not provide three demonstrations of effect.

During the baseline condition, student on-task levels were high with a mean of 91.23% of intervals scored as on task ($SD=8.88$). There was moderate variability, with a positive trend for both Tate and Derek and a flat trend for Tina. Upon delivery of the intervention, there was no clear visual change in the data Tina, while Tate and Derek's data showed post-intervention stabilization. All students maintained high levels and positive trends.

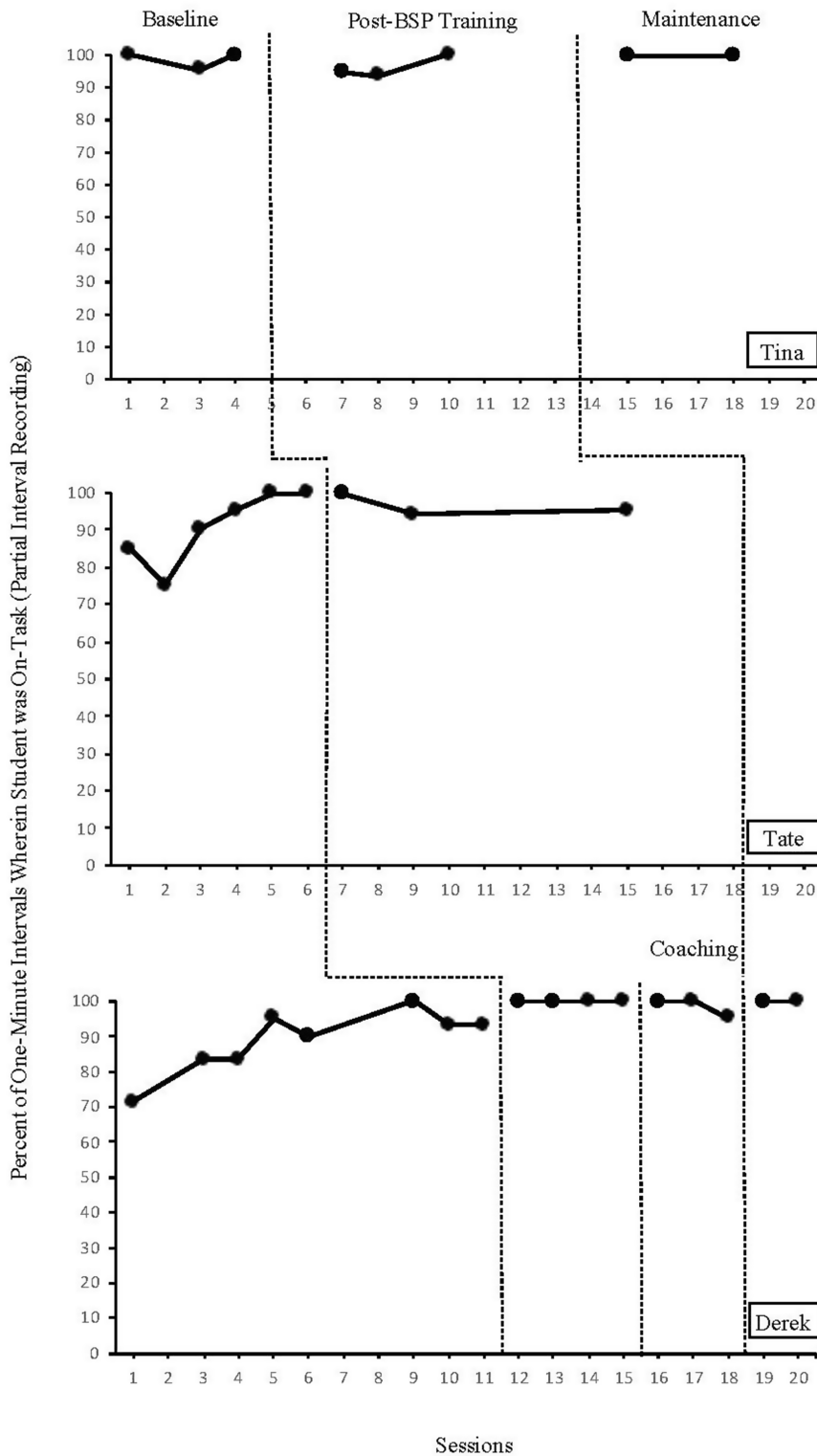


FIGURE 2 Student on-task behavior across sessions.

Student assignment completion

Prior to the study, general education teachers reported average assignment completion rates for each student, with and without para support. These averages were again reported following the study. Results are shown in [Table 3](#). Tina's average assignment completion rate stayed the same with support, but increased 10% in the without support condition. Similarly, Derek's average completion rate also remained unchanged with support, but increased 15% without support. Tate's averages dropped in both conditions by 10%. However, Tate was unenrolled from school and re-enrolled a few weeks later during the study, which may account for some of these changes. It is also possible that the positive changes shown by Tina and Derek may be attributed to maturation throughout the school year, or other extraneous variables, rather than the effects of the study.

Post-study survey

Following the study, paraprofessionals were again asked "How confident are you responding to individual student behavioral issues?" These scores remained the same from the pre-study survey to the post-study survey. However, when asked, "Has your level of confidence increased due to participation in this study?," two participants answered 4, and one participant answered 3, on a scale of 1–5 where 1 = "Not changed at all" and 5 = "Changed a large amount." When asked to rate their level of familiarity with BSP, all participants answered "I am an expert at this" post-study. Finally, when asked if they would like to share any feedback, participants shared that while they learned a great deal about BSP from this study, the strategy "did not change student behaviors" nor did it "help with issues."

Social validity

Pre-study social validity was assessed anonymously via survey by asking the paraprofessionals if they felt a behavior support training would be beneficial, relevant to their jobs, and supportive of their work with their individual student. All participants responded positively to all questions. At the end of the study, paraprofessionals completed an anonymous social validity survey, using the Adapted Version of the Intervention Rating Profile - 15 (Ci3T, 2016; adapted from Witt and Elliott, 1985). For statements regarding acceptability, appropriateness, effectiveness, suitability, fairness, and reasonableness of the intervention, all participants scored these items "Strongly agree." For statements of personal preference ("I liked the procedures used in this intervention," "This intervention was a good way to handle this child's needs," and "I would suggest this intervention to other

teachers"), all participants scored these items "Strongly agree." For three items ("I would be willing to use this intervention in the classroom setting," "This intervention would be appropriate for a variety of children," and "This intervention was consistent with those I have used in classroom settings"), scores ranged from "Slightly agree" to "Strongly agree." No scores were reported on any item lower than 4.

In the comments section, participants shared that "this intervention was easy to understand and would be beneficial for any child," and that their student "loves to be praised and with this intervention not only does she receive the praise but knows why she is being praised."

Discussion

This study investigated the effects of a training package on paraprofessional implementation of BSP, student behaviors, and paraprofessional confidence. One-on-one paraprofessionals often work with students with special needs who need personalized support (Suter and Giangreco, 2009), however, they report being unprepared to support these needs (Carter et al., 2009). The training package developed in this study may be a possible resource to support those responsible for training paraprofessionals.

Treatment effects were consistent across all paraprofessionals for demonstrating a functional relation, but only after adding a coaching component to Dyad 3. Some concern may be noted with the pre-intervention increase in praise rates in Dyads 1 and 2, which may be a consequence of prior PBIS implementation at the school site, or a demonstration of the Hawthorne effect (Mayo, 1933), where the increase in the use of BSP can be attributed to their awareness of being observed for this specific strategy. Despite this, elevated rates of BSP above baseline were maintained for all dyads following the intervention. Through post-study and social validity surveys, paraprofessionals indicated that while the intervention was successful at teaching them about BSP, and that they found the strategy useful and implementable, it did not provide any noticeable effects on student behavior.

Treatment effects for students were mildly positive, in that two students showed some stabilization in their data as a result of the application of BSP. It is important to note that school administration wanted paraprofessionals to continue working with the same student behaviors as before the study. Thus, students' on-task behavior shows limited changes associated with the intervention. Additionally, teacher-reported rates of independent work completion showed mild improvement for two students. These results, while not conclusive, are in alignment with current literature indicating that BSP is a promising practice for supporting students who struggle with behaviors.

The intervention was simple to deliver and easily understood by participants. It took no more than 20 min per participant, including completion of the quiz, and required minimal preparation. During the training, paraprofessionals were successful at each step, however, both Sally and Pam required clarification on the meaning of providing a 4:1 ratio for praise (Trussell, 2008). For both, a bank account analogy of deposits and withdrawals proved useful in illustrating the concept.

Paraprofessionals additionally reported increased levels of confidence in both their ability to manage behaviors and their expertise on the topic of BSP, indicating that the training package may

TABLE 3 Student average rates of assignment completion.

Student	Pre-study %		Post-study %	
	With support	Without support	With support	Without support
Tina	80.0	20.0	80.0	30.0
Tate	80.0	30.0	70.0	20.0
Derek	90.0	45.0	90.0	60.0

provide increased levels of confidence for paraprofessionals regarding their behavioral skillsets. Paraprofessional self-reported skillsets vary widely, but training can improve self-perceptions of ability (Walker et al., 2017), as was partially the case in this study. Two of the three paraprofessionals reported that the training increased their confidence, while one rated the statement as neutral.

These results are consistent with the results of previous studies that showed paraprofessional training in BSP increased the use of BSP (Ennis et al., 2020), while other studies produced more conclusive results for student on-task behavior. The quick acquisition of skills by paraprofessionals following the training aligns with previous findings that PD is more successfully internalized by trainees when additional components beyond didactic training are included, such as role playing and coaching (Robinson, 2011; Seaman-Tullis et al., 2019). Because it has been established that special education teachers are primarily responsible for paraprofessional training (Carnahan et al., 2009) and that special education teachers feel unprepared and under-resourced to fill this role (Douglas et al., 2016; Giangreco et al., 2013), this training package may be useful in supporting teachers in their role of providing PD to paraprofessionals.

Implications and future directions

This study lends support to the growing research base around paraprofessional training in LIS as a means to increase paraprofessional behavior management skills and provides a free, fast, and packaged training tool to support special education teachers and administrators with providing on-the-job professional development for one-on-one paraprofessionals.

Results from this study are consistent with previous research aimed at training general education or classroom paraprofessionals in the use of BSP (Allday et al., 2012; Gorton et al., 2022; LaBrot et al., 2023; Sallèse and Vannest, 2022; Wills et al., 2019) and may provide preliminary evidence that techniques utilized for training those groups in BSP are also effective at training one-on-one paraprofessionals. Because one-on-one paraprofessionals provide more specialized support than a typical classroom paraprofessional, and report being tasked with behavior support more often, it is essential to ensure that PD is relevant and personalized (Giangreco and Broer, 2005). This training package provides an opportunity for both a brief discussion of students as well as individualized role play for personalization, which may provide increased social validity.

Because administrator and special educator time is limited, the optional coaching provision of this package provided additional support only when participant need was demonstrated. This allowed both Pam and Karina to move forward with independent implementation while providing the additional support to Sally that was needed to increase BSP use to more moderate levels. Because coaching was only applied to Sally, there are not enough demonstrations of effect to make any conclusive statements about the addition of coaching; however, this appears to lend additional support to the research done by Gage et al. (2017), which investigated the results of using tiered PD models to increase elementary teacher use of PD (MTS-PD). Their study found that the addition of Tier II support (performance feedback) to teachers showing limited implementation after Tier I didactic training, increased the use of BSP beyond the rates exhibited in Tier I.

In the future, researchers should consider special education teacher delivery of the training package, to more closely replicate a natural training environment. Additionally, researchers could create on-demand modules accessible by trainers (teachers/administrators) or paraprofessionals themselves to use for training in BSP. Furthermore, it would be beneficial to see if a similar model could be used to train one-on-one paraprofessionals in the use of other LIS, such as active supervision or pre-correction, and to test the effectiveness of those models.

Limitations

While partial interval recording is appropriate in this case for tracking student on-task behaviors, it may have been more accurate to count paraprofessional BSP statements using frequency recording. Before the onset of the study, we believed it would be sufficient to use partial interval recording for both sets of data, but since paraprofessional rates of praise were occurring at a maximum of 33.33% of intervals, it would have been feasible to count frequency. Additionally, since on-task behaviors were not a significant struggle for any of the students, BSP did not show strong effects on student behavior. This effect may have been more evident had a shorter interval been used.

While paraprofessional needs and principal input were considered in the selection of BSP as the LIS of focus, it is also possible that despite strong social validity scores, this study would have been strengthened by allowing paraprofessionals to select target behaviors for students. The effects of BSP may have been more strongly demonstrated had we targeted individual student behaviors that were reported as challenging for each student. For example, in the pre-study survey, Pam noted that Tina struggled with discontinuation of non-preferred activities. Had we selected this behavior to target as a dependent variable, perhaps BSP would have shown a more marked impact on Tina's behaviors, as well as Pam's perceptions of BSP being a change agent. Similarly, Karina reported that Tate struggled with yelling and calling out, and Sally reported that Derek sometimes exhibited defiance. Had individual student behaviors been targeted more strategically for each student, this may also have resolved paraprofessional statements post-study that BSP did not impact student behaviors.

Finally, we acknowledge the increase in paraprofessionals' use of BSP during baseline, which is attributed to the Hawthorne effect, where their awareness of the presence of observers and interest in BSP may have potentially increased their use of BSP. Even though it could not be entirely avoided, extending the baseline phase to ensure stability prior to intervention may have helped in reducing this effect. Additionally, maintenance data was unable to be reported for Dyad 2 due to student attrition.

Conclusion

This study used a multiple baseline across participants design to examine the effectiveness of a training package designed to teach one-on-one paraprofessionals to use behavior-specific praise with the students they work with. Results showed that the training package, when paired with coaching, was effective at increasing paraprofessional

use of BSP and was found to be feasible and relevant in a social validity survey. Despite being supported by previous research, delivery of BSP in this case did not show a clear impact on student on-task behavior.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Arizona State University Tempe. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

KS: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft,

Writing – review & editing. CB: Data curation, Writing – original draft, Writing – review & editing. SM: Conceptualization, Methodology, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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