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Utilizing the Performance Diagnostic Checklist – Human Services to Assess and Improve Employee Performance on Mand Training: A Replication

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ABSTRACT

The Performance Diagnostic Checklist (PDC) is a tool developed to identify the environmental variables that affect poor employee performance. Research has supported the utility of the PDC across a variety of settings and, more recently, the Performance Diagnostic Checklist – Human Services (PDC-HS) was created to address the need for such a tool specifically in human service settings. We identified three staff members that exhibited a need for improvement in their performance during in-home applied behavior analysis sessions. Two supervisors completed the PDC-HS to assess variables that may have affected poor performance in the area of mand training for their staff. The PDC-HS identified that Behavioral Skills Training (BST) would be an appropriate intervention for all participants. BST was then evaluated to determine its effectiveness in improving employee mand training and was found to be effective.

KEYWORDS

Employee performance; PDC-HS; behavioral skills training; mand training

The Performance Diagnostic Checklist (PDC; Austin, 2000) was developed to fill the functional assessment gap in the performance management literature by providing a systematic approach that considers the maintaining variables of poor performance. Since the introduction of the PDC, multiple studies have evaluated its effectiveness in organizational settings. Pampino, Heering, Wilder, Barton, and Burson (2003) used the PDC in a coffee shop in which employees demonstrated poor performance with closing tasks. The PDC suggested task clarification and training as potential interventions, given that the PDC identified a lack of appropriate antecedents and consequences as variables maintaining poor performance. The interventions indicated by the PDC produced an improvement in employee performance on closing tasks.

Eikenhout and Austin (2005) evaluated the effectiveness of the PDC to improve customer service among employees at a large department store. The PDC identified a lack of behavioral consequences and lack of feedback as variables that likely contributed to poor employee performance. Subsequently, graphed feedback and verbal praise were used in a multiple-baseline design

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across various employee behaviors, such as eye contact, assistance offered, and smiling. The results of the study demonstrated an increase in employee-driven customer service procedures. Additionally, a restaurant franchise utilized the PDC to select an intervention to increase the offering of promotional stamps to customers in two sites (Rodriguez et al., 2006). The intervention in this study was a treatment package that consisted of task clarification, self-monitoring, graphed feedback, goal setting, and equipment modification. The results demonstrated an increase in employee performance at both restaurant sites.

The PDC has been modified for use in specific organizational settings that are not explicitly targeted in the original PDC. One of these modifications is the Performance Diagnostic Checklist – Human Services (PDC-HS). The PDC-HS was developed for use with employees working in human services settings (Carr, Wilder, Majdalany, Mathisen, & Strain, 2013). The PDC-HS consists of four sections: (1) Training; (2) Task Clarification & Prompting; (3) Resources, Materials, & Processes; and (4) Performance Consequences, Effort, & Competition. The Training domain consists of questions that are meant to identify if the employee is familiar with the task and has had sufficient training. Task Clarification & Prompting focuses on questions about whether the employee can identify the purpose of the task and has job aides to complete the task. The section on Resources, Materials, & Processes consists of questions about employee accessibility and if the employee has the necessary materials to complete the task. The final domain of Performance Consequences, Effort, & Completion addresses the type of supervision and feedback an employee is receiving and if there are competing contingencies when attempting to complete the task. Each section consists of a variety of questions that attempt to determine whether particular environmental variables may be contributing to poor performance. Each question is scored as either “Yes”, “No”, or “N/A.” In studies that utilize the PDC-HS, experimenters often refer to indicated and nonindicated interventions. When using indicated interventions, experimenters are implementing the interventions suggested by the results of the PDC-HS. Nonindicated interventions refer to any intervention that is not directly suggested by the results of the PDC-HS.

The first study evaluating the PDC-HS was conducted in a center-based Applied Behavior Analysis (ABA) clinic that sought to improve employee performance for the cleaning of treatment rooms (Carr et al., 2013). The results of the PDC-HS suggested that graphed feedback and training were potential interventions for improving performance. The authors of this study also implemented an intervention that was not determined by the PDC-HS in order to analyze the effects of an indicated and nonindicated intervention. The nonindicated interventions were task clarification and increased availability of materials. Intervention effectiveness was evaluated using a concurrent multiple-baseline design across treatment rooms. Performance improved after the

PDC-HS indicated intervention was implemented, whereas the interventions that were not indicated by the PDC-HS were shown to be ineffective.

Bowe and Sellers (2018) utilized the PDC-HS to assess inaccurate error-correction procedures among school paraprofessionals. After the completion of the PDC-HS by three preschool teachers, the intervention identified was behavioral skills training (BST). The authors also implemented interventions not indicated by the PDC-HS to compare effectiveness of both treatments. The nonindicated interventions were task clarification and prompting. Bowe and Sellers (2018) implemented the nonindicated interventions first, then introduced the PDC-HS indicated intervention across all participants. A concurrent multiple-baseline design across participants was utilized to analyze the effect of both interventions. The results demonstrated that the PDC-HS indicated intervention was effective, whereas the nonindicated interventions were less effective at improving performance.

Wilder, Lipschultz, and Gehrman (2018) also evaluated PDC-HS indicated and nonindicated interventions in their study conducted at a university-based clinic, serving children with Autism Spectrum Disorder (ASD). In their first experiment, they attempted to increase employee presentation of verbal operant trials (i.e., mands, tacts, and intraverbals). Their results demonstrated that the PDC-HS indicated interventions, such as graphed feedback, BST, and task clarification were effective when compared to the nonindicated interventions (Wilder et al., 2018). Moreover, they conducted the first evaluation of the PDC-HS indicated intervention relating to lack of resources, materials, and processes to increase employee use of a timer during DTT instruction relating to eye contact.

The present study replicates Wilder et al. (2018) and extends the findings to home-based treatment delivered by community-based service providers. In addition, the present study focuses on the complex behavior of contriving opportunities for mand training. Teaching children with ASD to mand for preferred items has been successful via mand training (Falcomata, Muething, Gainey, Hoffman, & Fragale, 2013; Kurtz, Boelter, Jarmolowicz, Chin, & Hagopian, 2011). Communicative responses may also be taught to evoke assistance or attention from another individual (Carr & Durand, 1985). Mand training is an evidence-based antecedent intervention that behavior analysts utilize to teach verbal behavior to clients with ASD (Nigro-Bruzzi & Sturmey, 2010; Plavnick & Ferreri, 2012; Plavnick & Vitale, 2014). Due to the centrality of mand training to the overall ABA treatment process, the present program evaluation focused on this area of treatment. Specifically, the current program evaluation involved extending the PDC-HS in the context of a community-based service provision agency, with the aim of identifying the variables maintaining poor employee performance during implementation of mand training with children on the autism spectrum.

Method

Participants and setting

The participants of this study were three behavior instructors who were not Registered Behavior Technicians (RBT). For all participants, mand training was already an established part of the treatment plans they were required to implement on a daily basis.

Rose was a behavior instructor hired 60 days prior to the onset of this study. She had two years of previous experience with another agency. Rose worked with two different clients, non-concurrently, throughout this study. Sam was a behavior instructor with 1.5 years of experience providing one-on-one behavior analysis services with the agency. Oscar was a behavior instructor with two years of experience providing one-on-one behavior analysis services with the agency. Sam and Oscar worked with the same client throughout the study. Three clients, 2 males and 1 female, diagnosed with ASD, were involved in the study and ranged from age 3 to age 9. The clients' communication skills ranged from non-vocal communication (e.g., PECS) to three-word sentences. Rose's clients had target mands that included: *ball*, *doll*, and *juice*. Sam and Oscar's client had target mands that included: *play video*, *I want chips*, and *open water*. For each of the three clients, none of the mand targets overlapped. Written consent was obtained from the parents of the children.

All intervention procedures and observation sessions occurred during the behavior instructors' regularly scheduled applied behavior analysis (ABA) sessions in their clients' homes. ABA sessions ranged from 2.5 to 3 hours. Observation periods were conducted in all settings in which naturally occurring ABA sessions took place (i.e., playrooms, living rooms, bedrooms, backyards, etc.). Following the conclusion of the study, all behavior instructors were debriefed on the procedures.

Response measurement and interobserver agreement

Data were collected on the frequency per minute of instances in which the behavior instructors engaged in the target behavior. Data were collected using paper data sheets and a pencil/pen. The target behavior consisted of contriving learning opportunities for manding and was defined as overtly manipulating the antecedent events to increase the establishing operation (EO; e.g., holding a preferred toy just out of reach). If the behavior instructor contrived an opportunity for the client to mand, but the client did not mand, the data collector marked it as an occurrence of the target behavior, given that data were being collected on the behavior instructors' behavior and not the clients' behavior. If the client did mand, once the opportunity was contrived, the behavior instructor would immediately provide the mand-specific reinforcer. There was not a specific time in which the participants were required to contrive an opportunity for the client to mand. Observation

periods consisted of 10-minute periods throughout the behavior instructors' regularly scheduled ABA sessions.

A second observer collected data during 30% of all sessions. Correct implementation of mand training was defined as overtly manipulating the antecedent events to increase the establishing operation. Interobserver agreement was calculated using the total count method, that is, by dividing the smaller frequency count by the larger frequency count and multiplying by 100 to convert to percentage of agreement. The mean agreement for Rose was 87% (range, 33–100%), 92% for Sam (range, 77–100%), and 88% for Oscar (range, 25–100%).

Procedure

The Performance Diagnostic Checklist – Human Services was completed for each participant and focused on the same behavior for all participants, which was contriving opportunities for mand training. The PDC-HS was completed by the supervising Board Certified Behavior Analyst® for each participant. The results of the PDC-HS for all participants suggested that training should be the focus of the intervention (Figure 1). For all participants, the intervention determined by the PDC-HS was behavioral skills training. A multiple baseline design across participants was used to evaluate the effectiveness of the intervention.

Baseline

Observations were conducted during times when the participants had ample opportunity to engage in mand training. For example, during clients' break times between discrete trial programs, during sharing programs, or natural environment teaching programs. The 10-minute observation periods began immediately after the clients were provided with a break. If the clients' problem behavior or other interruptions occurred during the observation, the entire observation period was immediately stopped, and the data were not used. This rule was consistent across all observations of the study. The behavior instructors were not told why they were specifically being observed. They were only informed that the authors were there to provide general feedback and support. Observations were conducted 1 to 5 times per day, and 1 to 2 days per week.

Behavioral skills training

Behavioral skills training (BST) is a three-component training method that consists of verbal instruction, modeling, and rehearsal with feedback (Miles & Wilder, 2009; Miltenberger et al., 2004; Parsons, Rollyson, & Reid, 2012). BST is often implemented separate from the real work environment, often referred to as simulated BST. However, in this study, all components of the intervention were completed in the instructor's natural work setting (i.e., their scheduled

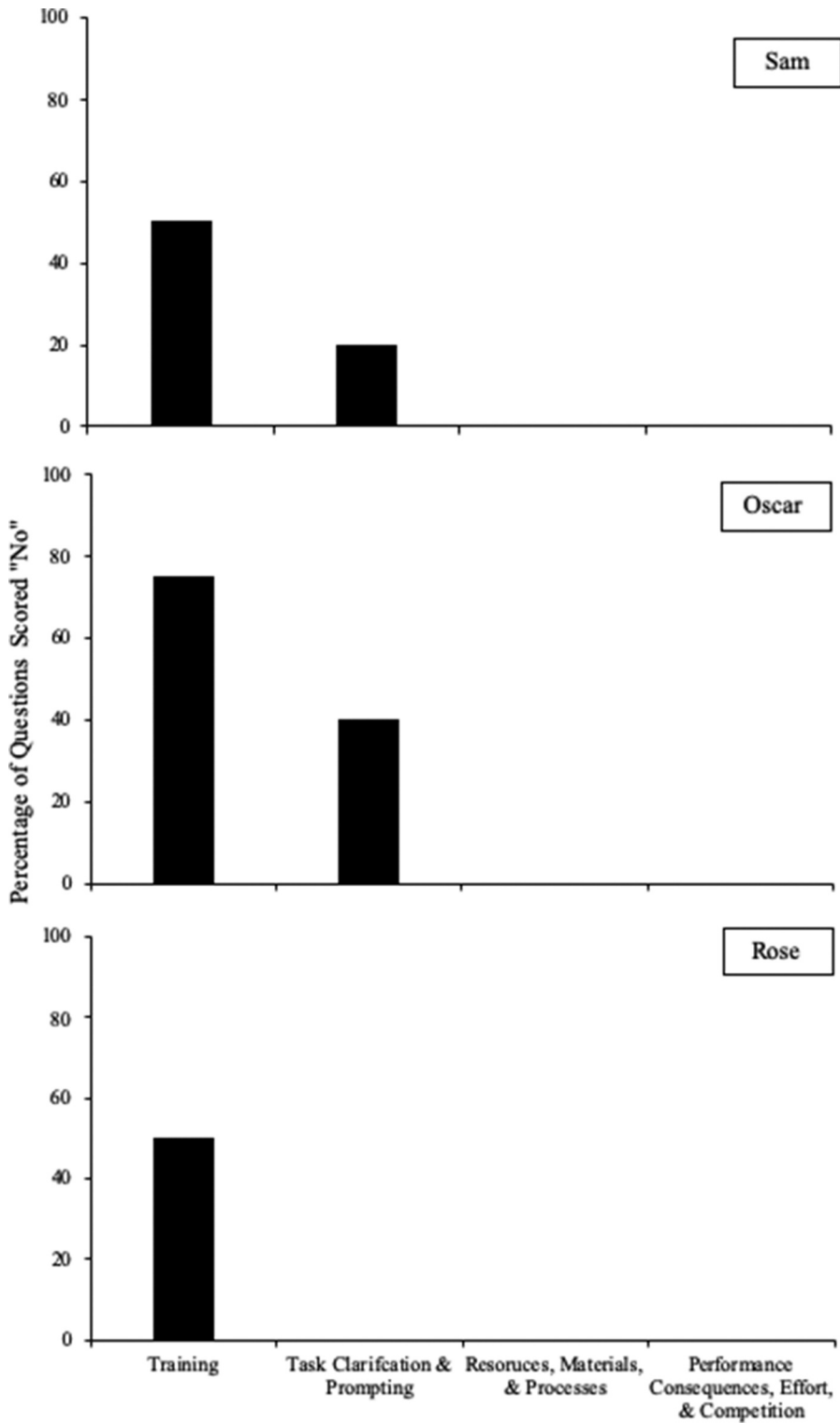


Figure 1. Results of the PDC-HS across participants. The percentage of questions in each section of the PDC-HS that the BCBA's scored as "no".

ABA sessions), thereby constituting in-situ BST. The verbal instruction aspect of the training focused on the purpose of mand training and how the protocol should be implemented with each individual child with ASD. Modeling consisted of the experimenter demonstrating the target behavior of contriving mand opportunities, while working with the child with ASD. Rehearsal with feedback consisted of the behavior instructor engaging in the target behavior while working with the child with ASD; the experimenter provided immediate verbal feedback. Feedback consisted of corrective statements about the mand training, such as appropriately contriving opportunities and immediate delivery of reinforcers. Performance-specific praise was also provided, such as “Good thinking putting the TV remote out of the client’s reach.” For sessions in which a second observer was present, feedback was also provided by the second observer, a Board Certified Behavior Analyst®. The BST process was considered complete after each behavior instructor demonstrated the target behavior with 100% procedural integrity, in a minimum of three consecutive occurrences. The entire BST duration varied for each instructor (range, 45– 120 minutes).

After the initial BST training was concluded, observation sessions continued just as in the baseline phase. During the observation sessions, neither the first author nor the second observer provided any type of feedback to the participant regarding mand training. Feedback was provided for other aspects of the instructors’ treatment implementation unrelated to the current study, such as correct implementation of Discrete Trial Training or prompt fading procedures. Additional brief (i.e., 5–15 minutes) BST was implemented on an intermittent schedule (i.e., immediately after every 1–4 sessions), depending on ongoing clinical and scheduling constraints. Brief BST indicates that less time was spent on each component of the BST procedure. For example, less time may have been spent on modeling or rehearsal.

Behavioral skills training phase 2

This second phase of BST was identical to the previous phase, except that additional brief BST was implemented after every session, rather than after every 1–4 sessions. That is, during this phase, brief BST was provided at the conclusion of each 10-minute observation period. Once stable responding was observed during this phase of the intervention, the frequency of brief BST was faded. Stable responding refers to a trend in the data points without high variability. For Sam, BST was faded after observation 27 and for Oscar, it was faded after observation 34. Brief BST was then delivered after every two observation periods for both of those participants. This was decided by the experimenter with the rationale that in clinical practice, feedback would likely be given by the case supervisor at least once within a 20-minute period. Due to time constraints, brief BST for Rose was faded out completely after observation 30 and was then delivered after every 4 observation periods.

Maintenance

Once stable responding was observed during the fading procedure, experimenter observations were terminated. The experimenter then returned for two maintenance observations after an average of 18.6 days (range, 14 days – 21 days).

Social validity

A social validity measure was given to the participants and the primary caregivers of the clients. Caregivers and participants were asked to complete a social validity measure that consisted of questionnaires with a 5-point Likert scale. Table 1 depicts the 19 questions presented to the behavior instructors and Table 2 depicts the 17 questions presented to the caregivers.

Results

During baseline, Rose contrived opportunities for mand training for her client at an average rate of 0.03 times per minute (Figure 2; range, 0– 0.1). During the initial

Table 1. Summary of social validity results for 3 behavior instructors.

Questions	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. I would suggest BST to help train others.	3				
2. The training was individualized to meet my skill set.	1	1	1		
3. All aspects of the training were clear to me.	1	2			
4. My questions relating to mand training were answered throughout the training period.	2	1			
5. The verbal instruction regarding mand training was clear.	2	1			
6. The modeling component was demonstrated clearly.	3				
7. The in-vivo rehearsal was demonstrated clearly.	3				
8. The feedback and reinforcement provided to me was clear.	3				
9. I understand the purpose of the training.	3				
10. I am in agreement with the goals of the training process.	3				
11. I understand how the training will affect the client I am working with.	3				
12. I found the training to be effective for increasing my skills.	3				
13. I am more confident in my skills for implementing mand training.	3				
14. I feel comfortable using these skills with other clients who require mand training.	3				
15. I have observed an improvement with my client since the training began.	2		1		
16. I enjoyed the training that was given to me.	2	1			
17. I was satisfied with the amount of training given to me.	1	2			
18. I was satisfied with the frequency of training given to me.	2	1			
19. I am satisfied with the type of training that was given to me (BST).	2	1			

Table 2. Summary of social validity results for 2 caregivers.

Questions	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. All aspects of the training were clear to me.		2			
2. The training occurred naturally during my child's scheduled ABA sessions.	1	1			
3. My questions relating to the intervention were answered throughout the training period.	1	1			
4. I understand the purpose of the intervention.	2				
5. I understand the intervention that was given to the behavior instructors.		2			
6. I am in agreement with the goals of the intervention.	2				
7. I understand how the training will affect my child.	2				
8. The intervention attempted to target a skill that I value in my child's treatment.	2				
9. I found the training to be effective for increasing the skills of the behavior instructors working with my child.	2				
10. I see the effects of the intervention outside of session in my child's natural environment.	2				
11. I am more confident in skills of the behavior instructors for implementing mand training.	1	1			
12. I have observed an improvement with my child since the intervention began.	1		1		
13. I am satisfied with the changes in my child's communication since the onset of the intervention.	1	1			
14. I was satisfied with the amount of training given to the behavior instructors.	1	1			
15. I was satisfied with the frequency of training that was given to the behavior instructors.	1	1			
16. I am satisfied with the intervention that was given to the behavior instructors (BST).	1	1			
17. I would suggest the training to other families.	2				

BST phase, Rose engaged in the target behavior at an average 0.85 times per minute (range, 0.3– 1.1). With the introduction of the BST phase 2, Rose engaged in the target behavior at an average 0.87 occurrences per minute (range, 0.3– 1.6). During the fade out procedure, Rose continued to contrive opportunities at an average rate of 1.1 occurrences per minute (range, 1.0– 1.3). Rose exhibited maintenance of her performance during the maintenance probes by contriving opportunities for mand training at an average of 0.9 occurrences per minute.

During baseline, Sam contrived opportunities for mand training for his client at an average rate of 0.17 occurrences per minute (Figure 2; range, 0– 0.6). During the initial BST phase, Sam engaged in the target behavior at an average 0.52 occurrences per minute (range, 0.2– 0.8). Throughout the second BST phase, Sam demonstrated the target behavior at an average rate of 1.57 occurrences per minute (range, 0.7– 2.3). During the fading procedure, Sam continued to engage in the target behavior at an average rate of 1.45 occurrences per minute (range, 1.3– 1.6). Sam also demonstrated maintenance of his performance during the follow-up data collection, demonstrating the target behavior at an average rate of 1.85 occurrences per minute (range 1.8– 1.9).

Throughout baseline, Oscar contrived opportunities for mand training for his client at an average rate of 0.09 occurrences per minute (Figure 2; range, 0– 0.2). During the initial BST phase, Oscar engaged in the target behavior at an average

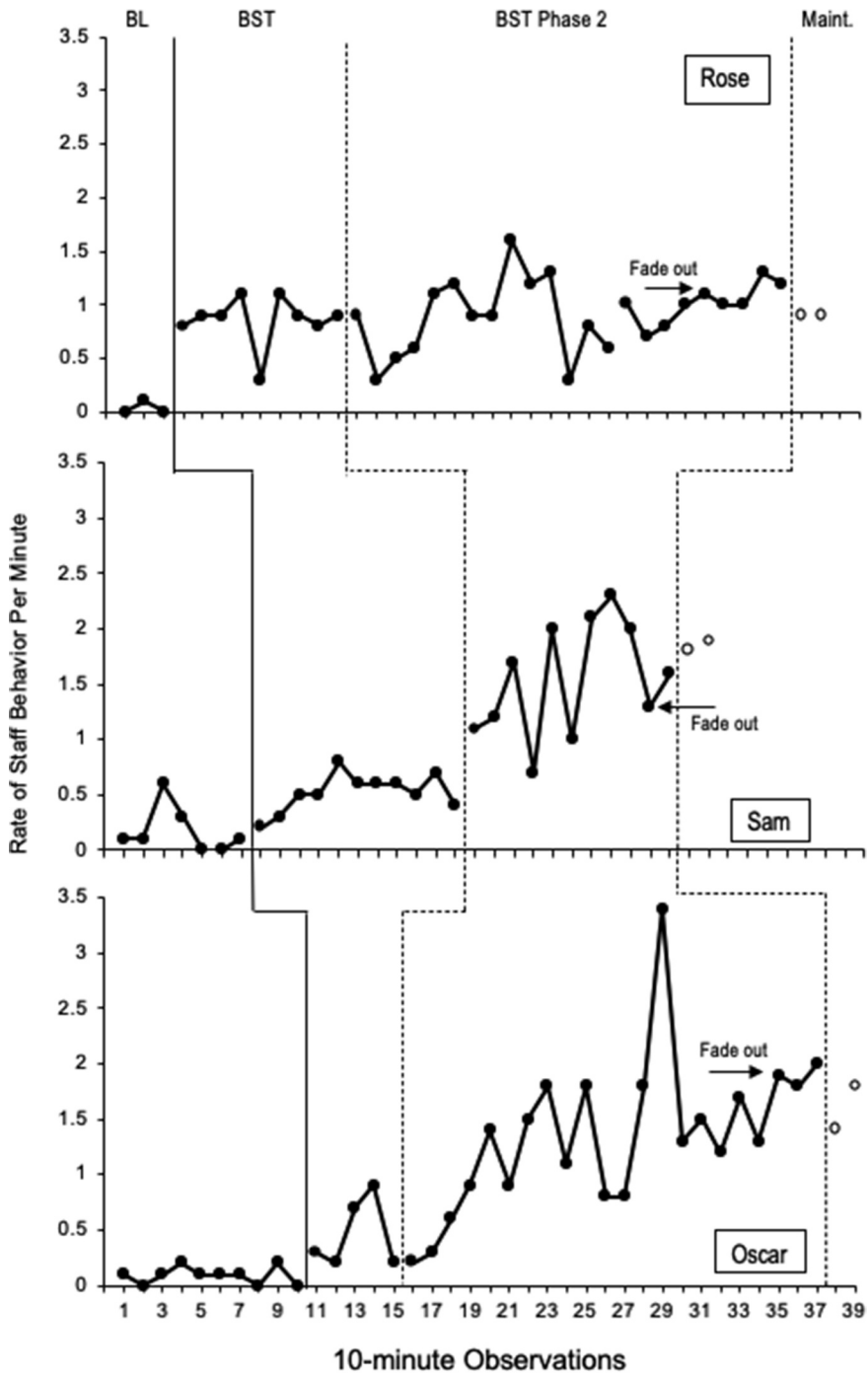


Figure 2. Rate per minute of contriving opportunities for mand training during the following conditions: baseline, BST, BST phase 2, and maintenance.

rate of 0.46 occurrences per minute (range, 0.2– 0.9). With the introduction of the BST phase 2, Oscar engaged in the target behavior at an average 1.28 occurrences per minute (range, 0.2– 3.4). During the fading procedure, Oscar continued to contrive opportunities at an average rate of 1.9 occurrences per minute (range, 1.8– 2.0). Furthermore, Oscar exhibited maintenance of this skill during the maintenance probes. He continued to engage in the target behavior at an average rate of 1.6 occurrences per minute (range, 1.4– 1.8).

Rose scored the social validity questionnaire with a total of 88 points out of a possible 95 points, indicating high acceptability for the procedures, goals, outcomes, and overall satisfaction with the intervention. Sam scored the questionnaire with a total of 92 points, indicating high acceptability. Oscar scored the social validity questionnaire with a total of 91 points, indicating high acceptability as well. A summary of results of the social validity measure given to Rose, Sam, and Oscar can be found in [Table 1](#).

Since Sam and Oscar were working with the same client, the client's caregiver completed one questionnaire to report social validity. This caregiver scored the questionnaire with a total of 79 points out of a possible 85 points. The caregiver of the client that Rose worked with, scored acceptability with a total of 78 points. A summary of results of the social validity measure given to both caregivers can be found in [Table 2](#).

Discussion

The results of the present community-based program evaluation suggest that the PDC-HS is a useful tool for determining interventions for specific employee performance problems. Given that the PDC-HS identified behavioral skills training as the proposed intervention for all participants, this treatment evaluation further supports the current literature by demonstrating the effectiveness of BST. BST is already known to be a procedure of first resort for training staff in new skills; however, it is important to identify beforehand whether the performance problem is due to a lack of training or a lack of motivation. If staff already had adequate training and mastered a skill, BST would not be expected to be effective. In such a case, a motivational procedure, such as goal setting and feedback, would be indicated. In the current study, the PDC-HS predicted that lack of sufficient training was the underlying cause of the performance problem and the subsequent effectiveness of BST supports this prediction.

The current study extends previous research on the PDC-HS by applying it to an employee behavior that may be considered more complex and socially significant than that investigated in some previous research. Specifically, the behavior of contriving MOs requires multiple steps and requires complex and subtle discriminations on the part of the employee. In addition, the behavior of contriving MOs is likely a direct driver of client outcome, since it is a key procedure which facilitates client learning.

Since this study involved a performance management evaluation within a specific agency that provides behavior analytic services, the results have important implications within the agency. The information provided by the treatment evaluation highlighted the behavioral systems within the agency, specifically relating to behavior instructor training. Based on the findings of the present study, the agency at which this treatment evaluation took place designed and executed a new BST program for behavior instructors. All supervisors working at this organization were trained in implementing BST for mand training with the behavior instructors. Since the implementation of this new training method, the agency has anecdotally observed an improvement in the implementation of mand training among their frontline staff.

Phase 2 of BST was introduced due to the small change in the employees' behavior after solely introducing Phase 1 of BST. While there was not a specified amount of performance increase required for each instructor, the experimenters and the case supervisors determined that it was clinically appropriate for the instructors' behavior to reach and maintain at higher levels than was observed in Phase 1. This is partly due to the number of opportunities available for the behavior instructors to contrive opportunities for mand training in their respective cases. Although more frequent feedback was introduced to all participants, there was not an overall significant effect on Rose's performance. Nonetheless, Rose did demonstrate an improvement when compared to baseline. Since this treatment evaluation was conducted in community-based field settings, the case supervisor determined that Rose's performance was satisfactory.

One limitation of the present investigation is that although the results of the PDC-HS indicated an intervention that was effective, it could be argued that the intervention could have been identified without the use of the PDC-HS. BST is a commonly used procedure so it seems possible that supervisors may arbitrarily select a BST procedure. However, two of the three participants in the study had been working in behavior instructor positions for many months or years. Agency staff actually believed they already knew how to do mand training, so it is possible that a different arbitrary intervention would have been chosen.

A second limitation of the current investigation is that we only evaluated the treatment that was indicated by the PDC-HS; we did not compare it to an arbitrarily selected procedure. In initial proof-of-concept research for the PDC, it was important to show that the interventions it indicated were better than "business as usual." However, the current project was a replication and extension in a community-based setting. When implementing interventions in the field, one could argue that it is more ethical to directly implement and evaluate the procedure indicated by the functional assessment, rather than comparing it to a procedure which may be ineffective.

In addition, the use of 10-minute observation sessions is a limitation of the present study. The short observation duration was selected in order to avoid presenting an unreasonable burden to clinical staff in their daily implementation

of their clinical jobs. Still, longer observations would have provided a more comprehensive picture of staff members' behavior across their entire sessions.

The present study did not evaluate generalization of the participants' skill across settings or clients. Future studies should evaluate the generalization of the target behavior to novel environments or examine staff performance with other clients who were not present during the training. Furthermore, although the authors implemented a social validity measure with the participants and the caregivers, it would have been beneficial to have a separate social validity measure for the supervisors of the behavior instructors. Given that these supervisors were overseeing the instructors, their acceptability of the results of the PDC-HS, and its subsequent recommendation, is a valuable consideration.

Within the training domain of the PDC-HS, there were two specific questions to which all participants scored "no." One of these questions pertained to the presence of fluency of the target skill. While the BST that was delivered to each participant attempted to improve all components of mand training, future research should examine fluency training specifically, as conducted in Pampino, Wilder, and Binder (2005). The fluency of mand training is an additional component that could assist in improved employee performance.

A final limitation is also one of the strengths of the study, that is, the variability that is inherently found in applied clinical settings. Since the participants were engaged in their regular daily therapy jobs during observations, many uncontrolled factors could have affected performance. For example, parents, siblings, pets, and others can interrupt sessions in the home environment. This could have been a factor in the variability of the results obtained for Sam and Oscar. Although variability in data is generally not desirable, the size of the change in the dependent variable from the baseline to treatment phases is arguably sufficient to detect a change due to treatment. We would argue that the benefits of demonstrating effectiveness in applied research settings outweigh the limitations of additional variability in data.

In conclusion, within behavior analytic organizations, it is especially imperative to utilize our own science and technology in how we manage performance. However, it is not enough to merely use arbitrarily-selected performance management procedures, even when they are evidence-based. Taking a functional approach to understanding staff behavior before we change it, is foundational to applied behavior analysis (Cooper, Heron, & Heward, 2020) and is consistent with being conceptually systematic (Baer, Wolf, & Risley, 1968) in our daily performance management activities.

Disclosure statement

No potential conflict of interest was reported by the authors.

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