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EVALUATING THE PERFORMANCE DIAGNOSTIC CHECKLIST-HUMAN
SERVICES TO TREAT PERFORMANCE PROBLEMS OF ADULTS WITH
INTELLECTUAL DISABILITIES

by

Brian H. Hess

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Special Education and Rehabilitation

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2019

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ABSTRACT

Evaluating the Performance Diagnostic Checklist-Human Services to Treat Performance
Problems of Adults with Intellectual Disabilities

by

Brian H. Hess, Master of Science

Utah State University, 2019

Major Professor: Dr. Tyra Sellers
Department: Special Education and Rehabilitation

Unemployment continues to be a problem for individuals with disabilities. Supported employment provides occupational supports for the acquisition and maintenance of employment. While there are resources available to use when providing these supports, individuals who are involved may benefit from a systematic tool to assess and treat performance problems of individuals with disabilities. The Performance Diagnostic Checklist-Human Services (PDC-HS) is an experimentally validated tool used to address performance problems with employees in human services settings. This study evaluated the application of the PDC-HS to three adults with intellectual disabilities working in supported employment. Researchers evaluated the tool by assessing and treating participant performance of a shelf-cleaning task. The results of the tool identified insufficient training and prompting as barriers to participant performance. The PDC-HS indicated intervention package (behavioral skills training including video modeling with voice-over instruction and antecedent prompting) was effective in increasing the

participants' performance of the cleaning task across all dependent variables. Responses on a social validity questionnaire indicated that all participants thought the study was fair, they liked the way they were taught to clean the shelf, being in the study helped them improve at their job, being in the study did not cause problems with their friends and the study could help other people.

(70 pages)

PUBLIC ABSTRACT

Evaluating the Performance Diagnostic Checklist-Human Services to Treat Performance
Problems of Adults with Intellectual Disabilities

Brian H. Hess

Unemployment is a problem for individuals with disabilities. Supported employment provides occupational supports for individuals with disabilities to get a job and keep that job once hired. The Performance Diagnostic Checklist-Human Services (PDC-HS) is used to address performance problems with employees in human services settings. This study evaluated using the PDC-HS with three adults with intellectual disabilities working in supported employment at a library cleaning shelves. The results of the PDC-HS identified insufficient training and prompting as barriers. The matched intervention package was effective in increasing performance of the shelf-cleaning task for all participants. Participant responses to a social validity questionnaire indicated that all participants thought the study was fair, they liked the way they were taught to clean the shelf, and felt that being in the study helped them improve at their job.

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Brian H. Hess

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CHAPTER I

INTRODUCTION

Individuals with disabilities are less likely to be employed than their non-disabled counterparts across all age groups and levels of education (Bureau of Labor Statistics, 2016). In 2016, the Bureau of Labor Statistics reported that (a) 17.9% of individuals with a disability were employed, in contrast to 65% of nondisabled individuals; and (b) the national unemployment rate for individuals with disabilities was 10.5%, in contrast to 4.6% for nondisabled individuals. Factors which contribute to the low employment rate experienced by those with disabilities include, but are not limited to: lack of accommodations in the workplace, limited disability awareness, lack of effective supports (Agran, Hughes, Thoma, & Scott, 2016; Nicholas, Attridge, Zwaigenbaum, & Clark, 2015), poor work habits, and low productivity (Martin, 1995).

In 1990, Congress passed the Americans with Disabilities Act (ADA). The purpose of the ADA is to, "...provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities" (Americans with Disabilities Act, 1990). As part of the ADA, employers have a legal obligation to hire individuals with disabilities and are required to provide reasonable accommodation(s) for them to succeed in the workforce. The ADA has helped to alleviate barriers and facilitate employment.

Employment produces positive outcomes for individuals with disabilities (Ellenkamp, Brouwers, Embregts, Joosen, & van Weeghel, 2016). Many people with disabilities have indicated that working is an important part of their lives and they want to

participate in the regular workforce (Ellenkamp et al., 2016). Employment empowers individuals with disabilities to earn wages, support themselves, and pursue their interests (Hendricks, 2010). For example, for individuals diagnosed with Autism Spectrum Disorder (ASD), being employed promotes less reliance on the government, increases tax revenue, and improves personal quality of life (Hendricks, 2010). However, there are challenges associated with employing individuals with disabilities.

Many individuals with disabilities rely on supported employment services to acquire and maintain employment (Plotner & Oertle, 2011). Supported employment is, “the process of enabling a person with a disability to secure and maintain paid employment that is in a regular work environment” (Nicholas, Attridge, Zwaigenbaum, & Clarke, 2015, p. 238). This support makes it more practical for companies to hire individuals with disabilities and increases employers’ confidence that they will be able to perform the tasks required of the job. The two primary settings in supported employment are integrated employment and sheltered workshops. Integrated employment is work in the general labor market in which individuals with disabilities are typically paid at or above minimum wage (Migliore, Mank, Grossi, & Rogan, 2007). The overall goal of integrated employment is for the individual with the disability to reach a position in which they are participating in society as an active citizen. In contrast, sheltered workshops are facility based day services in which individuals with disabilities are typically paid below minimum wage to perform simple repetitive tasks while being closely supervised by staff members.

In supported employment, assessment tools are used to identify the specific

strengths and needs of individuals with disabilities. Assessments are conducted to gather information to inform the planning and implementation of supported employment services. Assessments currently being used include, but are not limited to: interest inventories, career development tools, job analysis, task analysis, and functional behavior assessment (FBA; Plotner & Oertle, 2011; Stevens & Martin, 1999). Interest inventories and career development tools assess the individual's employment interests and work skills (Plotner & Oertle, 2011). Job analysis and task analysis provide information concerning the characteristics and demands of the job. A job analysis matches the individual's skills and interests to potential job placements. A task analysis provides a sequenced description of every step necessary to complete a job task (Stevens & Martin, 1999). In supported employment, an FBA may be used to target behavior negatively affecting employment outcomes. The FBA obtains information concerning the function, or purpose, a problem behavior serves for the individual employee (Cooper, Heron, & Heward, 2007). The results of the FBA may then be used to design behavioral interventions to decrease problem behavior and increase appropriate behavior in the workplace.

Researchers have attempted to provide a practical approach to improve the employment success of individuals with disabilities (Hendricks, 2010; Martin, 1995; Smith & Wilder, 2018; Stevens & Martin, 1999). Stevens and Martin developed a model for service provision to promote employment success with individuals with intellectual disabilities. Hendricks identified five areas (job placement, educating supervisors and co-workers, on-the-job training, workplace modifications, and long-term support) of focus to

support the employment success of individuals with ASD and outlined strategies to promote success for each of the areas. Martin developed a training manual to assist staff working with individuals with intellectual disabilities to improve their work habits and productivity. The manual's intended purpose was to provide a practical tool for staff to use when providing occupational supports with individuals with intellectual disabilities. Martin's manual differs from Stevens and Martin (1999), and Hendricks (2010), in that it identifies specific strategies to promote employment success and presents a list of guidelines for implementing the strategies. Smith and Wilder evaluated the Performance Diagnostic Checklist-Human Services (PDC-HS) with individuals with intellectual disabilities. The PDC-HS is a tool developed by Carr, Wilder, Majdalany, Mathisen, and Strain (2013) to assess and treat performance problems of employees without disabilities in human services settings. Smith and Wilder applied the PDC-HS to a performance problem emitted by individuals with intellectual disabilities working in integrated employment. The PDC-HS differs from the manual developed by Martin in that the tool identifies barriers to participant performance and recommends specific intervention(s) to address the barriers. In contrast to Hendricks (2010), Martin (1995), and Stevens and Martin (1999), Smith and Wilder (2018) conducted an experimental evaluation of the PDC-HS with individuals with intellectual disabilities.

In 2013, and colleagues developed the PDC-HS for human services settings. The PDC-HS is a modified version of the Performance Diagnostic Checklist (PDC; Austin, 2000). The PDC is a performance analysis assessment used in business settings to identify variables maintaining performance problems and to recommend interventions to

address the problems. The items and recommended interventions in the PDC were revised with a focus on common barriers in the human services setting. The PDC-HS is a respondent checklist which identifies barriers to an employee performing a specific work task and indicates one or more interventions to address those barriers (Carr et al., 2013). The tool is designed to be administered by a behavior analyst for performance problems emitted by employees without disabilities. The PDC-HS is designed to match interventions to the hypothesized function of the targeted performance problem. In line with literature targeting the reduction of problem behavior (Geiger, Carr, & LeBlanc, 2010; Iwata & Dozier, 2008), the PDC-HS is founded on the concept that selecting interventions matched to the variables maintaining performance problems will be more effective in resolving those problems than interventions that are not matched to the variables maintaining performance problems.

The PDC-HS is composed of four areas: “training,” “task clarification and prompting,” “resources, materials, and processes,” and “performance consequences, effort, and competition” (Carr et al., 2013, p. 19). The first step in completing the assessment is to operationally define the performance problem. Then the respondent answers items about the individual’s performance and the work environment under each of the four areas by indicating “yes” or “no.” Answering “no” on an item indicates a barrier in that area. The tool is then scored based on the number of items answered “no” under each area. Once the scoring is complete, the “Intervention Planning” (Carr et al., 2013, p. 21) section guides intervention selection. For each item scored as “no,” sample interventions with literature citations are provided. When selecting interventions, priority

is given to areas in which multiple items are scored as “no.”

Carr et al. (2013) also developed a method to evaluate the predictive validity of the PDC-HS by conducting a non-function based treatment comparison, an approach that has been used to evaluate the predictive validity of functional analysis in the treatment of problem behavior in clinical settings (Iwata, Pace, Cowdery, & Miltenberger, 1994). Carr et al. evaluated predictive validity by implementing both an intervention indicated by the results of the PDC-HS (function based, indicated intervention) and an intervention not indicated by the results (nonfunction based, non-indicated intervention) but one that might typically be implemented in the given setting. For example, if the indicated intervention addressed the performance problem, but the non-indicated intervention did not, it would suggest that the PDC-HS predicted an effective intervention. Subsequently, if the nonindicated intervention addressed the performance problem, but the indicated intervention did not, this would suggest low predictive validity. Last, inconclusive results would be produced if the indicated intervention and the non-indicated intervention were either both effective or both ineffective in addressing the performance problem.

At present, four studies have conducted an experimental evaluation of the PDC-HS with individuals without disabilities (Bowe & Sellers, 2018; Carr et al., 2013; Ditzian, Wilder, King, & Tanz, 2015; Wilder, Lipshultz, & Gehrmen, 2018) and one study has been conducted with individuals with intellectual disabilities (Smith & Wilder, 2018). The results of all five studies demonstrated that interventions indicated by the results of the PDC-HS improved work performance for all participants. Because there is only one published study evaluating the PDC-HS with individuals with intellectual

disabilities, further research is needed to validate the application of the PDC-HS with this population.

CHAPTER II

LITERATURE REVIEW

The primary literature search was conducted for studies that focused on the PDC-HS. The inclusion criterion was that the sources be directly related to the evaluation of the PDC-HS. A search was conducted employing PsycINFO via EBSCOhost using the term “PDC-HS.” This search produced two sources (Carr et al., 2013; Ditzian et al., 2015). During the process of conducting the literature search, an email was received from Tyra Sellers, Ph.D. (T. P. Sellers, personal communication, February 13, 2017) concerning a Master’s thesis on the PDC-HS (Bowe & Sellers, 2018) which had recently been accepted for publication. A search of the reference lists of the identified sources located a book chapter on the PDC (Austin, 2000). The PDC-HS is a modified version of PDC. During the process of obtaining institutional review board approval additional searches were conducted employing PsycINFO via EBSCOhost using the term “PDC-HS.” These additional searches produced three sources (Bowe & Sellers, 2018; Smith & Wilder, 2018; Wilder et al., 2018). Of the published literature concerning the PDC-HS five journal articles, a Master’s thesis and one book chapter met the inclusion criterion.

Secondary searches were conducted employing PsycINFO via EBSCOhost and google scholar. The searches using PsycINFO via EBSCOhost were limited to peer reviewed articles with references available. The inclusion criteria was that the articles be directly related to supported employment, individuals with disabilities, assessment tools used in supported employment or assessment tools used with individuals with disabilities. The terms “supported employment and individuals with disabilities” were entered into

PsycINFO via EBSCOhost. This search produced 289 results. The terms “vocational training and individuals with disabilities” produced 205 results. The terms “individuals with disabilities and assessment tools” produced 416 results. A systematic review of the abstracts of articles identified in the searches was then conducted. The reference lists of the articles meeting the criterion were reviewed. Articles meeting the criteria were then entered into Google Scholar to locate articles which had cited that article. The abstracts of the articles which had cited the article were reviewed. This process was repeated multiple times, with 11 articles meeting the inclusion criteria. Two articles were accessed from the Bureau of Labor Statistics and ADA websites.

In the existing literature base, there are few studies providing a practical approach for supporting individuals with intellectual disabilities in employment settings. Research taking this approach typically identifies barriers to acquiring and maintaining employment; and provides strategies to address the identified barriers (Hendricks, 2010; Martin, 1995; Smith & Wilder, 2018; Stevens & Martin, 1999).

In 1999, Stevens and Martin reviewed the history of supported employment. The authors discussed the barriers to employment for individuals with intellectual disabilities and the impact of challenging behavior on employment outcomes. The researchers proposed a model for providing supported employment services and behavioral intervention for individuals with intellectual disabilities. In 2010, Hendricks discussed barriers to employment for individuals with ASD and reviewed related research. Hendricks grouped employment supports into four areas (job placement, educating supervisors and co-workers, on-the-job training, workplace modifications, and long-term

support) and suggested strategies to promote success in each of the areas. Although Stevens and Martin (1999), and Hendricks (2010), presented systematic approaches to promoting employment success for individuals with intellectual disabilities, those recommendations were not validated by experimental evaluation. In addition, the recommendations were general, as opposed to presenting a model wherein strategies could be matched to specific performance problems.

In 1995, Martin developed a training manual to assist staff in improving the work habits and productivity of individuals with disabilities. The purpose of the manual was to match the strategies to individuals with disabilities' employment needs and work setting. The manual included a respondent checklist aimed at identifying strategies to improve work performance and productivity; and guidelines for implementing the strategies. It was designed to improve the performance of work tasks which were currently in the individual's repertoire. The manual is composed of three subheadings of strategies: "organize the work area and other tasks," "provide goals, instructions, praise, and feedback," and "tie extra rewards and remuneration to productivity" (Martin, 1995, p. 327). Under each subheading there is a checklist with three choices per strategy: "does not apply, currently satisfactory, and need to improve/apply" (Martin, 1995, p. 328). Although the manual was supported by an extensive research base, it was not validated by experimental evaluation.

In 2013, Carr and colleagues evaluated the efficacy of the PDC-HS using a concurrent multiple baseline experimental design across eight treatment rooms to assess and treat poor cleaning behavior emitted by staff members at a university based Autism

clinic. The participants were three Board Certified Behavior Analyst (BCBA) supervisors and 15 staff members. The supervisors were interviewed using the PDC-HS. Answers provided by all three supervisors indicated lack of training and lack of performance feedback as barriers. Training and graphed feedback were selected as the indicated intervention; and task clarification and more convenient posting of materials were selected as the non-indicated intervention. For two treatment rooms the experimental sequence was: a baseline condition, a nonindicated intervention condition, and an indicated intervention condition. For the remaining six treatment rooms the experimental sequence was a baseline condition followed by an indicated intervention condition. The dependent variable (DV) was the percentage of steps completed on a cleaning checklist. The cleaning checklist was scored after sessions were completed and staff were no longer in the treatment rooms.

The baseline mean for all eight treatment rooms was 32% of steps completed. The introduction of the nonindicated intervention to two treatment rooms produced response levels similar to baseline, whereas the introduction of the indicated intervention increased responding to a mean of 94% of steps completed for all eight treatment rooms. This study contributed to the literature by: (a) introducing the PDC-HS to human services settings; (b) demonstrating the effectiveness of the PDC-HS as a performance assessment and intervention planning tool; and (c) establishing a method to evaluate the predictive validity of the tool.

In 2015, Ditzian and colleagues employed a concurrent multiple baseline experimental design across participants to evaluate the efficacy of the PDC-HS by

assessing and treating the poor securing of therapy room doors by staff members at a university based Autism clinic. Participants were three BCBA supervisors and four staff. Researchers administered the PDC-HS to the supervisors. The tool identified problems with consequences as a barrier. Individual and graphed feedback, delivered by a supervisor, was selected as the indicated intervention; and written prompts describing the target performance posted outside treatment rooms was selected as the non-indicated intervention. For two staff, the experimental sequence was baseline, non-indicated intervention, followed by the indicated intervention condition. For the other two staff the sequence was baseline followed by the indicated intervention condition. The DV was the percentage of opportunities in which a staff passed through a door (leaving a treatment room) and closed it within 10 s. Observers recorded data from both in vivo observations and video footage.

The baseline mean for all four staff was 7% opportunities. For the two staff exposed to the non-indicated intervention condition the introduction of the non-indicated intervention increased responding from a baseline mean of 3% opportunities to a mean of 6%. For all four staff the introduction of the indicated intervention increased responding to a mean of 72%. The indicated intervention substantially increased the securing of therapy room doors for all staff whereas the non-indicated intervention was shown to be ineffective. Researchers replicated and extended the results of Carr et al. (2013) by: (a) addressing a different form of behavior, and (b) demonstrating the predictive validity of the PDC-HS.

In 2018, Bowe and Sellers employed a concurrent multiple baseline experimental

design across participants to evaluate the efficacy of special education preschool teachers using the PDC-HS to assess and treat an error correction procedure emitted by paraprofessional staff. Participants were three special education preschool teachers and four staff. The performance problem was incorrect implementation of an error correction procedure during discrete trial teaching. Sessions were conducted in three early childhood special education classrooms in a public school. The teachers each completed the PDC-HS. Insufficient training was identified as a barrier. The teachers selected BST as the indicated intervention, and posted reminders and feedback as the non-indicated intervention. The DV was the percentage of correctly implemented steps in the error correction procedure. Data were collected in vivo, using a paper-and-pencil checklist. The procedural sequence for all staff was baseline, nonindicated intervention, and indicated intervention.

The nonindicated intervention produced some improvement for two staff, and no improvement for two staff. The introduction of the indicated intervention produced substantial improvements, with all staff meeting the 90% mastery criterion. A social validity measure was included. The results indicated that all teachers rated their experience as positive, were satisfied with the outcomes and would likely use the tool in the future. This study replicated the results of Carr et al. (2013) and Ditzian et al. (2015) by demonstrating the efficacy of the PDC-HS in assessing and indicating an intervention which was effective in resolving the target performance problem. It also extended the research on the PDC-HS by: (a) having preschool teachers complete the evaluation, (b) assessing predictive validity for all participants, (c) including a social validity measure,

and (d) evaluating a more complex performance issue than Carr et al. (2013) or Ditzian et al. (2015). Having preschool teachers complete the PDC-HS demonstrated the accessibility of the assessment, by showing that it can be completed by individuals who are not BCBAAs.

In 2018, Wilder and colleagues employed four variations of the multiple baseline experimental design to evaluate the implementation of interventions across all four domains of the PDC-HS. They conducted two experiments in which they assessed and treated different performance problems emitted by staff members at a university based Autism clinic. Experiment 1 focused on four staff who were not presenting sufficient teaching opportunities during natural environment training to teach verbal operants (mands, tacts, and listener responses) with four children diagnosed with ASD. In experiment 2, two staff members engaged in irregular use of a timer when conducting an eye contact program during discrete trial teaching. Researchers administered the PDC-HS to BCBA supervisors. In both experiments, the interventions indicated by the results of the PDC-HS were effective in resolving performance problems, and non-indicated interventions were ineffective. Researchers replicated and extended the research on the PDC-HS by: (a) demonstrating the efficacy of the PDC-HS to indicate effective interventions across all four domains of the tool; (b) providing further evidence supporting the predictive validity of the tool; and (c) evaluating performance problems not evaluated in previous studies.

In 2018, Smith and Wilder employed a concurrent multiple baseline experimental design across participants to evaluate the efficacy of the PDC-HS by assessing and

treating the low accuracy of a pricing task by employees with intellectual disabilities at a thrift store. Participants were two supervisors with intellectual disabilities, one manager without a disability and two supervisees with intellectual disabilities. Supervisors and the manager independently completed the PDC-HS in the presence of the researchers so that the researchers could answer questions. No other support was provided. The results of the tool indicated lack of training as a barrier. A training intervention which included informing, describing and delivering performance based feedback was selected as the indicated intervention. A non-indicated intervention was not included in this study. Non-indicated interventions were not included because previous studies have established that the PDC-HS is successful at predicting effective interventions. Researchers trained supervisors to conduct the training and then the supervisors conducted the training with the supervisee participants. The DV was the percentage of items priced correctly.

The training intervention increased responding from 0% in baseline to a mean of 95% for both supervisees. A social validity measure was included in which supervisors reported increased confidence in directing employees, the intervention was easy to deliver and they would use the PDC-HS again. Researchers replicated and extended the literature on the PDC-HS by: (a) demonstrating the efficacy of the tool in resolving performance problems emitted by individuals with intellectual disabilities; (b) applying the tool with a new population; (c) having individuals with intellectual disabilities complete the tool and implement the intervention; and (d) including a social validity evaluation.

Researchers have demonstrated the efficacy of the PDC-HS by conducting studies

with BCBA supervisors and their staff members at university based Autism clinics (Carr et al., 2013; Ditzian et al., 2015; Wilder et al., 2018); with special education preschool teachers and their paraprofessional staff in early childhood special education classrooms (Bowe & Sellers, 2018); and with supervisors with intellectual disabilities and their supervisees with intellectual disabilities in integrated employment (Smith & Wilder, 2018). To date, Smith and Wilder is the only published study to evaluate the PDC-HS with individuals with intellectual disabilities. Therefore, further research is needed to validate the application of the PDC-HS with this population. The primary purpose of this study was to evaluate the efficacy of applying the PDC-HS with individuals with intellectual disabilities. The current study replicated the findings of Smith and Wilder (2018) by evaluating the PDC-HS with individuals with intellectual disabilities, conducting the study in a community setting and evaluating social validity. More importantly, this study extended Smith and Wilder (2018) in several meaningful ways: (a) applying the PDC-HS to a complex performance problem not previously evaluated, (b) conducting the study in a novel setting, and (c) evaluating maintenance/generalization.

Purpose Statement

The purpose of this study was to evaluate the effects of the PDC-HS when applied to performance problems emitted by individuals with intellectual disabilities working in integrated employment. The goals of the study were to evaluate the efficacy and social validity of the PDC-HS. Efficacy was evaluated by measuring participant responding

following the implementation of an intervention indicated by the results of the PDC-HS, while social validity was evaluated by administering a questionnaire to participants with intellectual disabilities.

Research Questions

1. What are the effects of using an intervention indicated by the results of the PDC-HS on the performance of a shelf-cleaning task by three individuals with intellectual disabilities working in integrated employment?
2. What is the social validity of the PDC-HS?

CHAPTER III

METHODS

Participants and Settings

Participants were three adults with intellectual disabilities receiving supported employment services in an integrated employment setting. They were employed cleaning shelves at a library. The participants' pseudonyms were Donny, Maude, and Jeffery. Their ages ranged from 25 to 32. Donny and Maude were diagnosed with Down Syndrome and Jeffery was diagnosed with Williams Syndrome. Donny communicated via single word vocalizations and limited sign language. Maude and Jeffery communicated using short sentences and were capable of reading. An employment coordinator from the human services provider agency where the participants received supported employment services also participated. The coordinator's participation entailed being interviewed during the completion of the PDC-HS and consulting with the experimenter during informal interviews. Information gathered from informal interviews was used to determine the performance problem and mastery criteria for each participant. The coordinator had a high school diploma, had been employed supervising supported employment services for five years and had received informal applied behavior analysis training.

To be included in the study, participants with intellectual disabilities needed to:

(a) have a diagnosis of an intellectual disability; (b) be employed in an integrated employment setting; (c) receive supported employment services; (d) engage in a

performance problem that was negatively affecting their work performance; and (e) complete the target work task with 50% or less accuracy. The performance problem emitted by the participant needed to be a discrete behavior which could be observed, operationally defined, and measured using a percentage. Likewise, participants with a history of engaging in serious problem behavior (e.g. aggression, property destruction, self-injurious behavior, etc.) were excluded. The focus of this study was to evaluate the effects of the PDC-HS when applied to work related performance problems, therefore, the inclusion of participants who engage in serious problem behavior may have complicated the evaluation. All participants met the inclusion criteria. The inclusion criteria for the employment supervisor were that they provided supported employment services and worked with the participants. The employment coordinator met both of the criteria.

The primary setting for the study was the library where the participants were employed. The typical work setting consisted of participants independently cleaning shelves alongside one or two other employees with disabilities. In order to define the setting for generalization and maintenance it is necessary to state that the intervention selected based on the results of the PDC-HS was BST with video modeling with voice-over instruction (VMVO) and antecedent prompting. Generalization probes were conducted in the typical work setting. Experimental sessions for baseline, BST steps 4 and 5 (see Table 1), post BST and maintenance probes were conducted on a row of books separate from other employees. BST steps 1 through 4 (see Table 1) were conducted in a study room at the library. The PDC-HS interview was conducted at the human services

Table 1

Procedures Behavioral Skills Training with Antecedent Prompting

Behavioral skills training checklist	Antecedent prompting procedure	Prompting procedure for practice sessions
1. Describe the purpose of the task	1. Vocally review the four sections of the summary with the participant	1. Vocally describe the error
2. Provide the participant with a summary	2. Ask questions concerning each section (questions targeted errors made in preceding sessions)	2. Vocally describe how to correctly perform the step
3. Review the summary with the participant	3. Provide modeling and practice if needed (modeling and practice targeted errors made in preceding sessions, not implemented each time the procedure was conducted)	3. Model the step
4. Have the participant watch a video of the task being performed	4. Finish review by asking the participant if they have any questions	4. Have the participant perform the step
5. Conduct practice sessions	5. Place the summary on a shelf which is easily accessible	5. Repeat steps 1 through 4 until participant performs the step correctly
6. Conduct test sessions	6. Delivered the discriminative stimulus “the instructions will be here if you need to look at them”	
7. Repeat steps 5 and 6 until the participant meets the mastery criteria for the testing step		

provider office; and the social validity questionnaire was administered at both the library and the human services provider office.

Dependent Variables and Response Measurement

An informal interview with the employment coordinator and direct observations of participant performance were used to select shelf-cleaning as the performance problem. The primary DV for all participants was accuracy of task completion defined as the percentage of steps completed on a checklist. The secondary DV was duration of task completion measured in seconds. The mastery criterion for accuracy was 80% or higher

steps completed correctly and the criterion for session duration was total task completion in 480 s (8 min) or less. The mastery criteria for this study were selected based on the criteria previously used by the human services provider. Session duration was included for Donny for all experimental conditions. Session duration was not reported for Maude or Jeffery for baseline, post BST and maintenance/generalization conditions because they both performed below the 480 s criterion for the majority of sessions. For BST duration was reported for Maude and Jeffery to ensure that the data recorded was consistent with the mastery criteria. The data sheet (see Appendix B) used to measure the DVs included instructions and a checklist. For each step on the checklist an observer recorded “yes” if the step was performed correctly, “no” if the step was performed incorrectly, the exact time the step was completed (displayed on a video recording), and notes if the participant emitted an incorrect response or engaged in behavior not included on the checklist. Duration of task completion was captured by recording the exact time at the start and the end of the session.

During baseline it was necessary to revise the data sheet. Revisions were made to clarify existing procedures, promote accurate data collection and promote accurate interobserver agreement (IOA). Revisions were limited to adding examples to the instructions (e.g. including a picture of the target shelf with a ruler superimposed in front of the books) and creating a miscellaneous section for responses not defined as steps on the checklist. Measurement by permanent product was used to record participant responding for baseline, post BST, and maintenance/generalization conditions. Sessions were video recorded using a camera mounted on a tripod. Data were coded from the

video recordings after the completion of experimental sessions. During BST practice sessions and test sessions, data were recorded in vivo using a paper and pencil checklist. Social validity was evaluated by administering a questionnaire to participants with intellectual disabilities after experimental conditions were completed.

Interobserver Agreement and Treatment Integrity

Point-by-point agreement was used to calculate IOA. For baseline, post BST, and maintenance/generalization IOA was coded from video recordings. For steps completed correctly the mean IOA ranged from 86% to 100% across conditions, and for session duration the mean IOA ranged from 97% to 100% across conditions. For Donny, IOA data were collected for 43% of sessions, the mean scores for steps completed correctly were 91% for baseline (range 88-95), 88% for post BST (range 82-94), and 87% for maintenance/generalization. For Maude, IOA data were collected for 53% of sessions, the mean scores for steps completed correctly were 94% for baseline (range 88-100), 90% for post BST (88-92), and 100% for maintenance/generalization. For Jeffery, IOA data were collected for 42% of sessions, the mean scores for steps completed correctly were 86% for baseline (range 57-100), 94% for post BST (range 90-97), and 95% for maintenance/generalization.

Treatment integrity was evaluated using checklists specific to the experimental condition. For baseline, post BST, and maintenance/generalization treatment integrity was coded from video recordings; the PDC-HS interview was coded from an audio recording; and BST was coded in vivo. Treatment integrity was collected for 46% of

sessions across experimental conditions with a mean score of 99% for all participants.

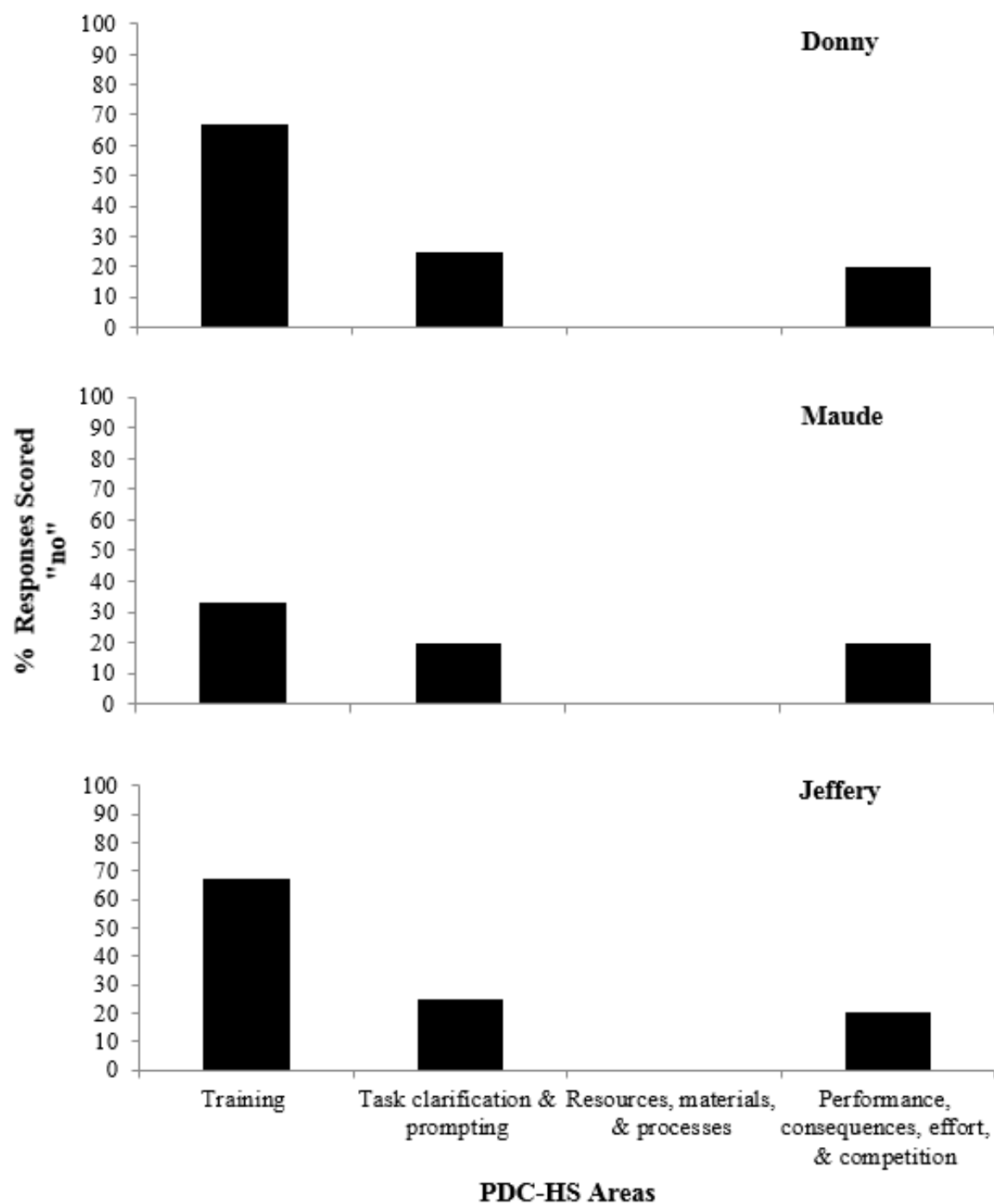
Experimental Design

A concurrent multiple baseline experimental design across participants (Cooper et al., 2007, p.201) was used to evaluate the PDC-HS. The experimental sequence was completion of the PDC-HS, baseline, BST, post BST, maintenance/generalization and social validity. The experimental sequence was implemented first with Donny, second with Maude and third with Jeffery.

Experimental Procedures

Completion of the Performance Diagnostic Checklist-Human Services

The PDC-HS was completed for all participants. The experimenter interviewed the employment coordinator. The interview consisted of answering the items under each area of the assessment according to the instructions provided. Interviews were audio recorded. Data were collected using the paper and pencil checklist included in the PDC-HS. The process also entailed directly observing the participants executing the shelf-cleaning task and evaluating the work environment. The results of the PDC-HS indicated barriers in insufficient training and prompting for all participants (see Figure 1). Using the intervention planning section, BST with VMVO and antecedent prompting were selected as the indicated intervention. The indicated intervention was implemented for all participants.



Note. The vertical axis represents the percentage of responses answered “no” by the employment coordinator under each area of the PDC-HS. The horizontal axis represents the four areas of the PDC-HS.

Figure 1. Performance Diagnostic Checklist-Human Services results for Donny, Maude, and Jeffery.

Baseline

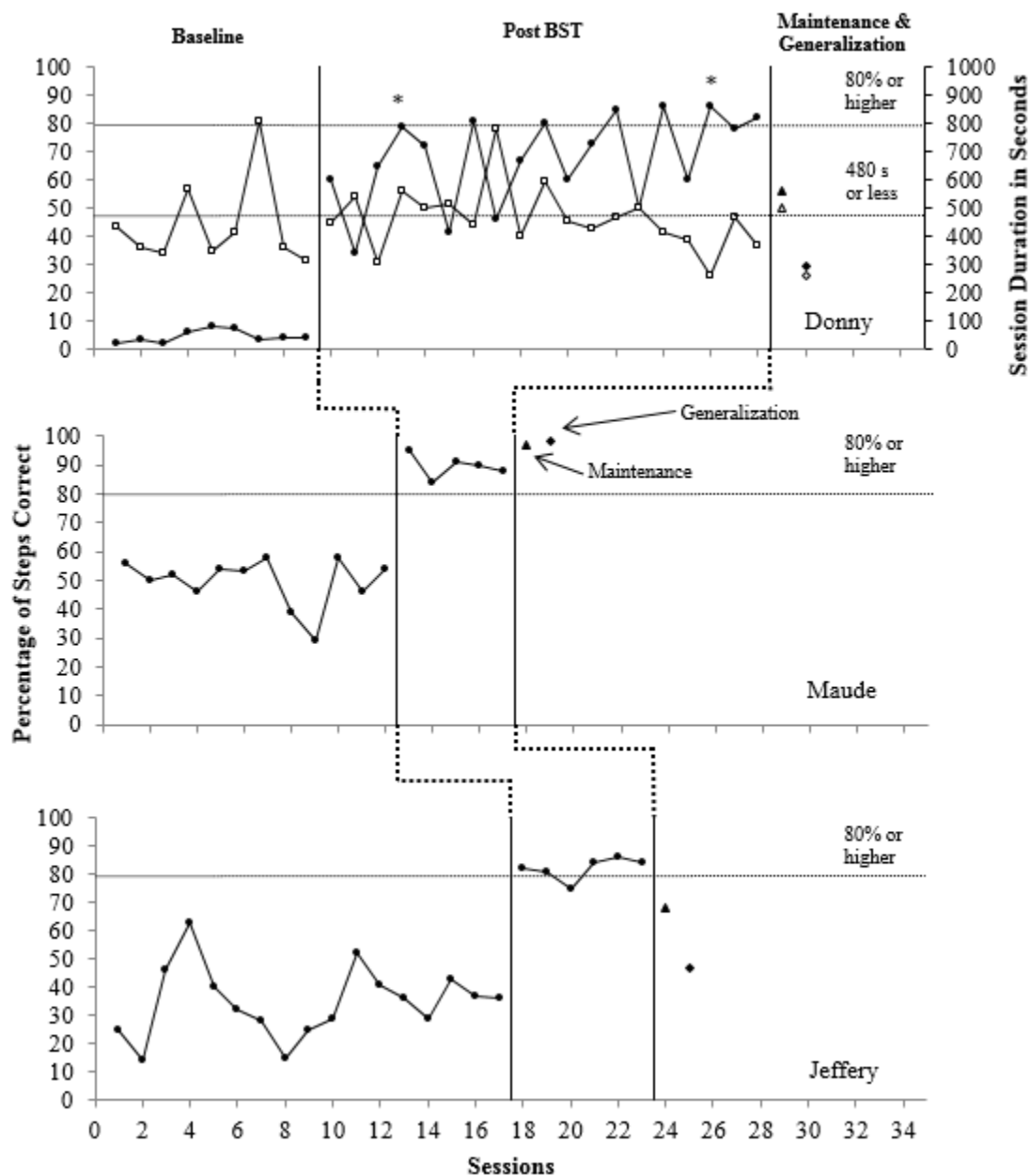
The baseline condition consisted of measuring current performance of the shelf-cleaning task. The steps to begin baseline sessions were: (a) start video recording; (b) guide the participant to the target shelf; (c) deliver the discriminative stimulus “Please clean the shelf. When you are done come find me. I will be around the corner on the right”; and (d) leave the shelf area while the participant performed the task. A minimum of five baseline sessions were conducted for each participant. Sessions were conducted until a stable or decreasing trend in the percentage of steps accurately completed was established and a stable or increasing trend in session duration was established.

Behavioral Skills Training.

A BST checklist was developed (see Table 1) based on the procedures used in Parsons, Rollyson, and Reid (2012, 2013). The checklist was composed of seven steps. The checklist was specifically designed to accommodate the needs of individuals with intellectual disabilities. These accommodations included: a summary composed of pictures of the shelf-cleaning task being performed and brief written instructions (see Appendix D); a VMVO; an antecedent prompting procedure; and the use of total task behavior chaining during practice sessions (see Table 1, BST checklist, step 5). The mastery criteria for practice sessions was to clean two shelves with a score of 80% or higher unprompted steps and complete the task in 8 min or less; and the criteria for test sessions, was to clean one shelf with a score of 80% or higher steps completed correctly and complete the task in 8 min or less. VMVO was used for the modeling step of BST (see Table 1, BST checklist, step 4). In VMVO the learner watches a video with voice-

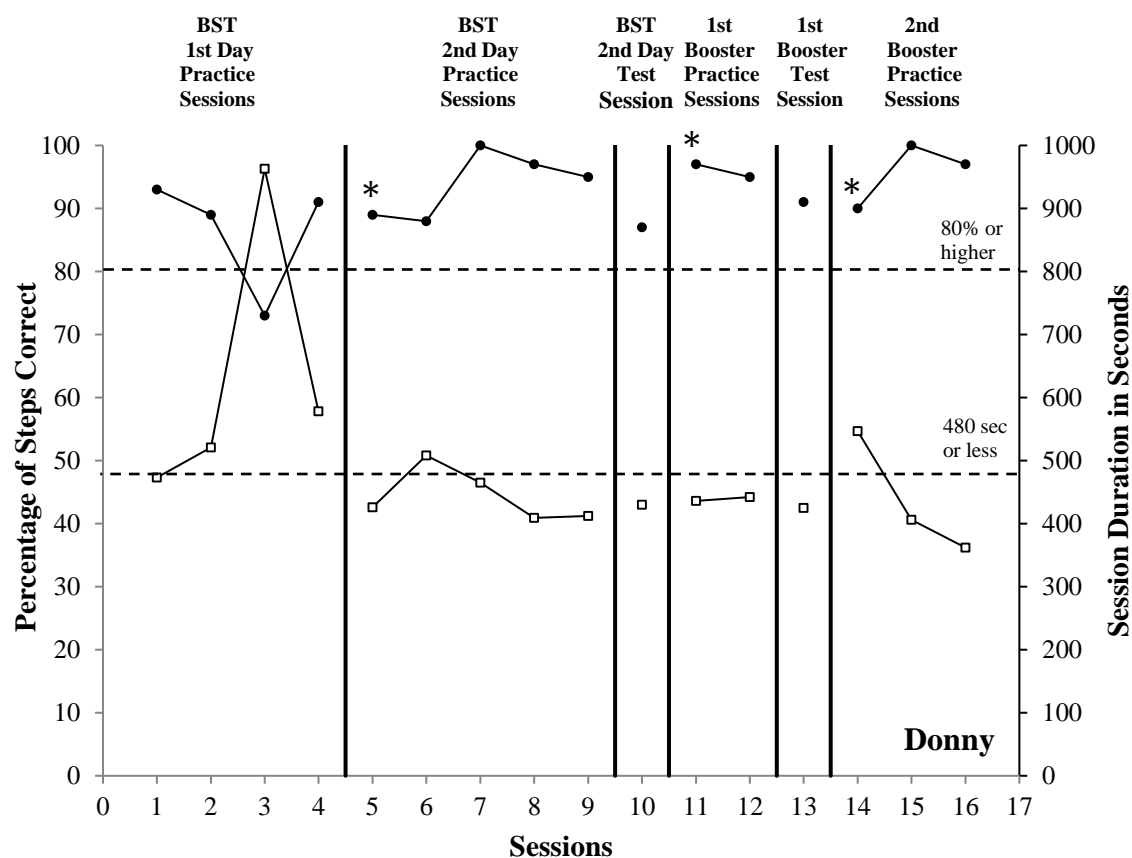
over instructions in which a confederate models each step of a behavior (chained task analysis) targeted for acquisition (Day-Watkins, Pallathra, Connell, & Brodtkin, 2018; Smith, Ayres, Mechling, & Smith, 2013). BST with VMVO has successfully been used to train university students to implement a social skills intervention at an office located on a university campus (Day-Watkins, Pallathra, Connell, & Brodtkin, 2018). Likewise, VMVO has successfully been used to teach adults with disabilities cooking related tasks at a school based transition program (Mechling & Collins, 2012), and to teach adolescents with ASD behavior chains to promote social interactions at a public middle school (Smith et al., 2013). VMVO was selected because (a) it could be consistently applied across participants, (b) it has been used as part of BST (Day-Watkins et al., 2018), and (c) it has been used with individuals with disabilities (Mechling & Collins, 2012; Smith et al., 2013). The procedures used by Mechling and Collins (2012) and Smith et al. (2013) were referenced while developing the VMVO.

An antecedent prompting procedure (see Table 1) was developed for practice sessions (see Table 1, BST checklist, step 5), test sessions (see Table 1, BST checklist, step 6), and post BST sessions. The procedure was composed of six steps. The initial plan was for antecedent prompting to be used exclusively in the post BST condition. However, Donny did not meet the practice session criteria during the first day of BST session. Therefore, we decided to include antecedent prompting in practice, test, and post BST sessions. The initial antecedent prompting procedure was composed of steps 1, 4, 5, and 6. During post BST sessions a booster training was conducted with Donny (see Figure 2, asterisk above session 12; see Figure 3, asterisk above session 11). As part of the training



Note. Closed circles denote the percentage steps completed correctly, open squares denote session duration measured in seconds, closed diamonds denote maintenance for steps completed correctly, open diamonds denote maintenance for session duration, closed triangles denote generalization for steps completed correctly, open triangles denote generalization for session duration, and dotted horizontal lines indicated mastery criteria. The first booster session is indicated by the asterisk above session 12 and the second booster session is indicated by the asterisk above session 26. Mastery criteria is indicated above dashed horizontal lines.

Figure 2. Results for baseline, post behavioral skills training and maintenance/generalization conditions.



Note. Closed circles denote the percentage of steps completed correctly, open circles denote session duration measured in seconds, and dotted horizontal lines indicate mastery criterion. The asterisk above session 5 indicates when the antecedent prompting procedure was added to practice and test sessions (see Table 1, BST checklist, steps 5 & 6), the asterisk above session 11 indicates when steps two and three were added to the antecedent prompting procedure (see Table 1, antecedent prompting procedure), and the asterisk above session 14 indicates booster session 2 (see Figure 2, asterisk above session 26 denotes booster session 2).

Figure 3. Behavioral skills training results for Donny.

steps 2 and 3 were added to the procedure. Maude and Jeffery were exposed to all the steps of the antecedent prompting procedure for practice, test and post BST sessions.

During practice sessions (see Table 1, BST checklist, step 5), total task behavior chaining was used. Total task behavior chaining is a teaching method used to teach specific sequences of discrete behaviors in which prompting is only provided if the learner performs a step incorrectly (Cooper et al., 2007, p. 442). During practice sessions,

the experimenter observed the participant as they performed the task; if they emitted an error, an error correction procedure (see Table 1) was implemented. The error correction procedure was composed of five steps. During test sessions (see Table 1, BST checklist, step 6) the experimenter observed the participant as they performed the target task but did not provide feedback if there were errors.

Post Behavioral Skills Training

The purpose of the post BST condition was to evaluate participant responding following BST. Other than the addition of the antecedent prompting procedure, sessions were identical to baseline. The mastery criterion for all participants was 3 sessions at 80% or higher steps completed correctly and task completed in 8 min or less. Over the course of the condition the mastery criteria for Donny was changed to 3 out of 5 sessions at 80% or higher steps completed correctly and the task completed in 8 min or less.

Maintenance and Generalization Probes

Maintenance and generalization probes were conducted for each participant with an intellectual disability. For Donny and Jeffery, they were conducted approximately two weeks after the completion of the post BST condition. For Maude, they were conducted one week after post BST. Probes were conducted using the same procedures as baseline. Maintenance probes were conducted on a row of shelves separate from other employees, while generalization probes were conducted in the participant's typical work setting alongside other employees.

Social Validity

A questionnaire was developed to evaluate the social validity of the PDC-HS. Prior to creating the questionnaire, a literature search was conducted on social validity assessments for individuals with disabilities. Assessments specific to evaluating social validity with individuals with disabilities were not located. However, two studies which assessed the acceptability of school based behavioral interventions were located (Elliott, Witt, Galvin, & Moe, 1986; Turco & Elliott, 1986). In these studies, researchers developed the Children's Intervention Rate Profile (CIRP) to evaluate the acceptability of school based behavioral interventions with fifth, eighth, and ninth grade students without disabilities. The questionnaire used in the current study was adapted from the CIRP. The CIRP was a good fit for this purpose because it has been validated by previous research and the population targeted by the assessment approximates the intellectual functioning of the participants in this study. The questionnaire used in this study was a rating scale composed of 6 questions (see Appendix A). Each question had three potential answers and displayed an emoticon representing an emotion approximating the response (Yes- Agree smiling face, ?- Unsure neutral face, No- disagree frowning face). The questionnaire was administered only to participants with intellectual disabilities after maintenance/generalization probes were completed. The experimenter and employment coordinator met with each participant individually to complete the questionnaire. If a participant needed help, assistance was provided (e.g. reading questions to the participants, explaining questions).

Data Analysis

Visual analysis was used to analyze data from experimental sessions. Participant responding was evaluated by examining trend, level, and variability. Data was evaluated daily to ensure that the IVs were introduced at the appropriate time.

CHAPTER IV

RESULTS

The results of the PDC-HS are displayed in Figure 1 (see Appendix A for an example of the PDC-HS). The PDC-HS was scored based on the percentage of responses answered “no,” indicating a barrier, for the items in each area of the PDC-HS. The percentages for each area and the corresponding barriers were then used to select interventions from the “intervention planning” guide in the PDC-HS. For all participants, the results indicated barriers in the following areas: training; task clarification and prompting; and performance, consequences, effort, and competition. For Donny, 67% training, 25% task clarification and prompting, and 20% performance, consequences, effort and competition were indicated. For Maude, 33% training, 20% task clarification and prompting, and 20% performance, consequences, effort and competition were indicated. For Jeffery, 67% training, 25% task clarification and prompting, and 20% performance, consequences, effort and competition were indicated.

For Maude, the PDC-HS indicated training as a barrier, but produced inconclusive results for task clarification and prompting; and performance, consequences, effort, and competition. BST was the intervention indicated for training; prompting was indicated for task clarification and prompting; and regularly highlight task outcomes was indicated for performance, consequences, effort, and competition. The decision to include prompting instead of regularly highlight task outcomes for Maude was made based on the information gathered during the PDC-HS interview and from direct observation. We were

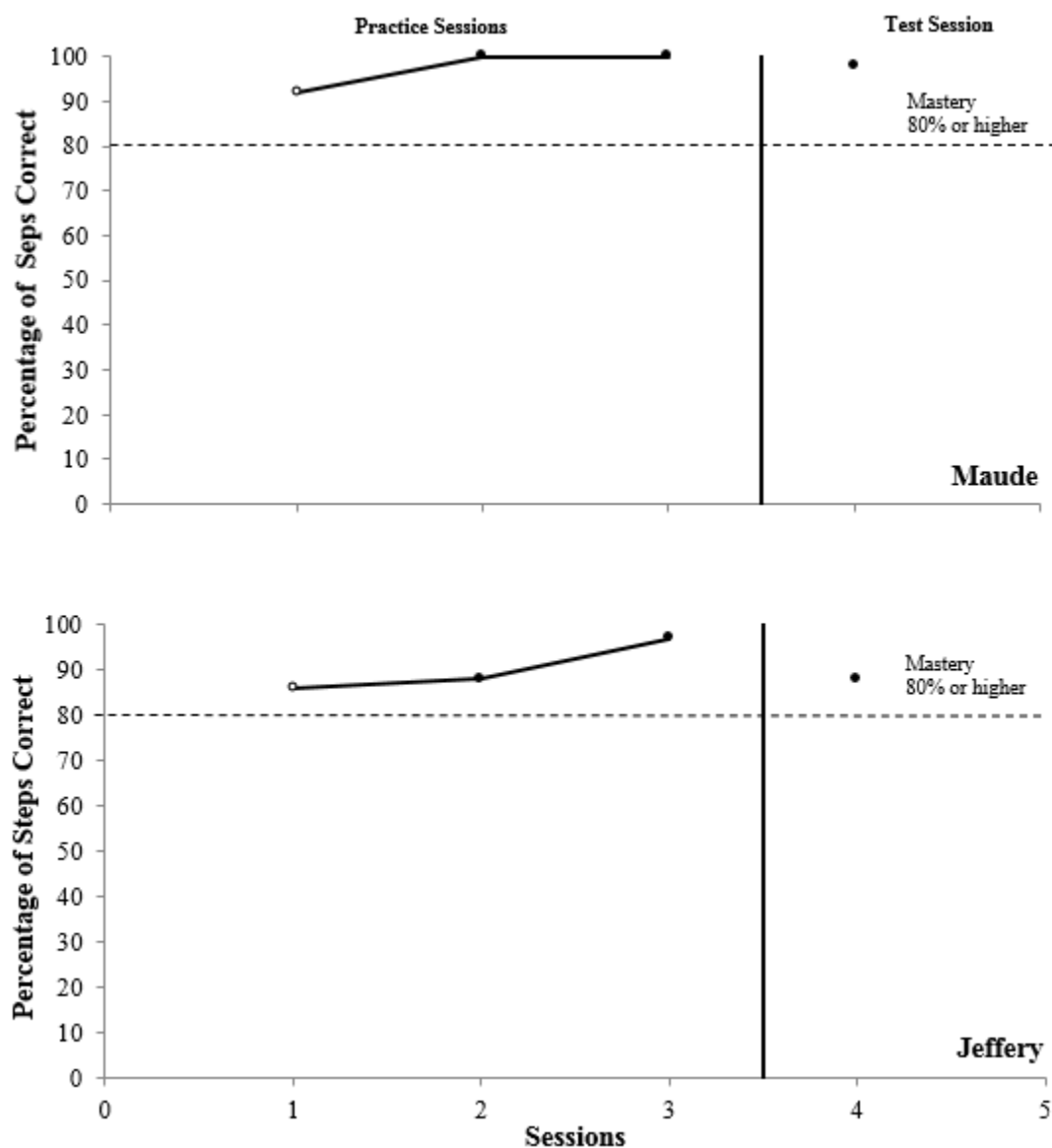
not confident that she would be able to understand an intervention based on regularly highlighting task outcomes. However, we were confident that a prompting intervention would be effective. For Donny and Jeffery, BST and prompting were the interventions indicated. We concluded that the results indicated BST and prompting as the interventions likely to address barriers for all participants. Based on the existing literature, we hypothesized that an intervention package composed of BST and prompting would be more effective than either intervention implemented singly. Therefore, BST with VMVO and antecedent prompting was selected as the indicated intervention package for all participants.

Figure 2 displays data for the baseline condition. For steps completed correctly, Donny demonstrated stable responding, with a mean of 4% (range 2-8%). For session duration, he demonstrated variable responding with seven out of nine sessions below the 480 s criterion, with a mean of 437 s (range 339-809 s). Maude's mean responding for steps completed correctly was 50% (range 29-58%). Other than sessions 8 (39%) and 9 (29%) Maude demonstrated stable responding (range 46-58%). The decrease in the percentage for steps completed correctly during sessions 8 and 9 was due to her looking at the books while performing the task; we suspected that she emitted these responses because she was interested in the content of the books. Both sessions were conducted on shelves that contained books with an abundance of pictures (e.g., anime, art books). Because Maude's interest in books with pictures could have been an extraneous variable, which may have impacted her performance, we conducted the remainder of her sessions with books that contained writing with minimal pictures. For steps completed correctly,

Jeffery demonstrated variable responding with a mean of 35% (range 14-63%).

BST was first implemented with Donny and data from sessions are displayed in Figure 3. During the first day of sessions (sessions 1-4) he met the practice session mastery criterion for unprompted steps (range 73-93%), but session duration was above the criterion and on an increasing trend (range 473-963 s). To increase the effectiveness of BST an antecedent prompting procedure was added to practice and test sessions (see Table 1) beginning with session 5 (see Figure 3). The second day of BST sessions occurred during Donny's next scheduled work shift and the entire BST checklist was repeated (see Figure 3, sessions 5-10). He met the mastery criteria in four practice sessions and one test session. Because of variable responding during post BST sessions 10, 11, and 12 (see Figure 2, range steps completed correctly 34-65%, range session duration 307-540 s) a booster session was conducted following post BST session 12. The booster session included conducting the entire BST checklist and adding steps 2 and 3 to the antecedent prompting procedure (see Table 1). He met the mastery criteria in two practice sessions and one test session (see Figure 3, sessions 11-13). The changes to the antecedent prompting procedure were applied to the remainder of BST beginning with session 11 (see Figure 3) and post BST beginning with session 13 (see Figure 2). Because of consistent variability in the percentage of steps completed correctly during post BST sessions 11-25 (see Figure 2, range steps completed correctly 34- 86%) a second booster session (see Figure 3, sessions 14-16) was conducted after post BST session 26 (see Figure 2). Only BST practice sessions were implemented during the booster and Donny met the mastery criterion in three sessions.

BST data are displayed for Maude and Jeffery in Figure 4. Both participants rapidly met the mastery criteria. Maude met the criteria in three practice sessions (range unprompted steps 92-100%, range session duration 320-545 s) and one test session (steps completed correctly 98%, session duration 299 s). Jeffery met the criteria in three



Note. Open and closed circles denote the percentage of steps completed correctly. Closed circles indicate sessions that met the 480 s session duration criterion and open circles indicate sessions that did not meet the criterion.

Figure 4. Behavioral skills training results for Maude and Jeffery.

practice sessions (range unprompted steps 86-97%, range session duration 373-563 s) and one test session (steps completed correctly 88%, session duration 305 s). The full antecedent prompting procedure was implemented for Maude and Jeffery during BST and post BST conditions.

Results for the post BST condition were displayed in Figure 2. All participants met the mastery criteria. Whereas, it took Donny 19 sessions, two booster sessions, and a modification of the mastery criteria to meet the criteria; both Maude and Jeffery met the criteria in four sessions.

During the post BST condition Donny's mean responding for steps completed correctly was 68% with a range of 34 to 86% and mean responding for session duration was 464 s with a range of 261 to 809 s. For steps completed correctly he demonstrated variable responding with an upward trend across the entire condition. For session duration a variable trend in responding was demonstrated for sessions 10 through 19, beginning at session 19 there was a downward trend in responding for the remainder of the condition. During the first three post BST sessions (10-12), he demonstrated variable responding with a range of 34 to 65% for steps completed. A booster session was conducted to address variable responding (see Figure 3, sessions 5-9). In conjunction with the booster session, steps 2 and 3 (see Table 1) were added to the antecedent prompting sequence. Following the first booster session his responding continued to be variable with a clear upward trend for steps completed correctly (range 41-86%). After session 26, a second booster session was conducted to address variable responding for steps completed correctly. The booster session consisted of conducting three BST

practice sessions and changing the mastery criteria. The modified mastery criteria were three out of five sessions at 80% or higher steps completed correctly and task completed in 480 s or less. Changing the criteria addressed the variability in Donny's responding while still maintaining a criteria that is generally accepted in skill acquisition programming. Following the booster session, Donny met the mastery criteria in two sessions (see Figure 2, sessions 27 and 28).

During post BST Maude met the mastery criteria in five sessions with a range of 84-95% steps completed correctly. Jeffery met the criteria in six sessions with a range of 75-86% steps completed correctly.

Figure 2 displays the results for maintenance and generalization. For maintenance, Donny demonstrated 56% of steps completed correctly and 500 s for session duration; and for generalization 29% of steps completed correctly and 280 s for session duration. For maintenance, Jeffery demonstrated 68% for steps completed correctly, and for generalization 47% of steps completed correctly. For generalization, Maude demonstrated 97% of steps completed correctly, and for generalization 98% of steps completed correctly.

The participant's responses on the social validity questionnaire indicated that they thought the study was fair, they liked the way they were taught to clean the shelf, being in the study helped them improve at their job, being in the study did not cause problems with their friends and the study could help other people. On a single question Maude indicated that she did not like being in the study.

CHAPTER V

DISCUSSION

The PDC-HS was completed for three individuals with intellectual disabilities to assess barriers to accurate and timely completion of a shelf-cleaning task. The results of the PDC-HS indicated insufficient training and prompting as barriers. An indicated intervention, consisting of BST with VMVO and antecedent prompting was successful in improving participant performance to levels above the mastery criteria. A functional relation was demonstrated between the application of the indicated intervention and improved performance of the shelf-cleaning task by the substantial increase in responding for all participants in the post BST condition when compared to baseline.

The current study replicated the findings of Smith and Wilder (2018) by demonstrating the efficacy of applying the PDC-HS to performance problems emitted by individuals with intellectual disabilities, evaluating the PDC-HS in a community setting, and evaluating social validity. The results of this study provide further evidence to support using the PDC-HS with individuals with intellectual disabilities in integrated employment. This study extended the findings on the PDC-HS by: (a) applying the PDC-HS to a complex performance problem not previously evaluated, (b) evaluating the PDC-HS in a novel setting, and (c) evaluating maintenance and generalization. This is the first study to use a modified version of the CIRP (Elliott et al., 1986; Turco & Elliott, 1986) to evaluate social validity with individuals with intellectual disabilities. Likewise, research on BST was furthered by our successful application of BST with VMVO with individuals with intellectual disabilities.

The performance problem evaluated in this study was a shelf-cleaning task composed of discrete steps which needed to be completed in a specific sequence to be scored as correct. The mean number of steps completed per session across experimental conditions was 41 with a range of 26 to 63. The shelf-cleaning task was more complex than performance problems evaluated by Carr et al. (2013) (steps completed on cleaning checklist), Ditzian et al. (2015) (securing therapy room doors), and Smith and Wilder (2018; pricing task. While the performance problems evaluated by Bowe and Sellers (2018; incorrect implementation of an error correction procedure during discrete trial teaching), and Wilder et al. (2018; infrequent teaching of verbal operants during natural environment teaching, infrequent use of timer during discrete trial teaching) were complex, the self-cleaning task required many more steps that needed to be correctly completed in a particular sequence and repeated for a sustained period of time. In the existing literature base, the shelf-cleaning task is the most complex task that has been used to evaluate the PDC-HS with individuals with intellectual disabilities.

The PDC-HS has been evaluated at university based Autism clinics (Carr et al., 2013; Ditzian et al., 2015; Wilder et al., 2018) in which experimenters were able to exert a high degree of control over environmental variables. Likewise, the PDC-HS has been evaluated in special education classrooms (Bowe & Sellers, 2018) in which it is possible to exert a moderate amount of control over environmental variables. In contrast, this study was conducted in the community setting of a library in which we closely approximated the participant's typical work setting. In community settings it can be more difficult to control environmental variables and it is more likely that uncontrolled

variables (noise volume, presence of people not associated with the study, etc.) will be present that may influence participant responding. An advantage of having the instructional setting similar to the targeted generalization setting is an increase in the likelihood of acquired behavior being emitted in the generalization setting (Cooper et al., 2007, p. 632). Furthermore, training in a setting that is as close to the generalization setting as possible may present the participant with opportunities to contact reinforcement in their typical work environment.

This is the first study on the PDC-HS to evaluate maintenance and generalization. During maintenance/generalization probes (see Figure 2) Donny's responding for steps completed correctly did not maintain (56%) or generalize (29%) above the mastery criterion (80% or higher) but demonstrated a substantial improvement when compared to baseline (mean of 4%). For session duration his responding maintained at 500 s (20 s above the 480 s criterion) and generalized at 260 s. However, maintaining/generalizing performance for session duration but not for steps completed correctly does not demonstrate adequate completion of the task. Maude's responding maintained at 97% steps completed correctly and generalized at 98%. Factors that may have contributed to Maude's responding maintaining/generalizing at a high percentage are that she had previously performed the task to criteria and had been employed at the library longer than the other participants. Jeffery's responding did not maintain or generalize at levels above the mastery criterion (maintenance 68%, generalization 47%). His levels of responding for maintenance were above the baseline range of responding (range 14% - 63%) but within that range of baseline responding for generalization.

On the social validity questionnaire, all participants responded that they thought the study was fair, they liked the way they were taught to clean the shelf, being in the study did not cause problems with their friends, being in the study helped them improve at their job and the study could help other people. For the question “I liked being in the study” Donny and Jeffery responded “yes” and Maude responded “no.” Maude’s response may be attributed to her having missed several preferred activities while participating in the study. However, her responses still indicated that she thought the study was fair, liked the way she was taught to clean the shelf, being in the study did not cause problems with her friends, being in the study helped her improve at her job and the study could help other people. Participant responses may to some extent indicate the success of the PDC-HS in future applications.

Further research is needed to establish the efficacy of the PDC-HS with individuals with disabilities. Research could be conducted by replicating this study in different settings, with individuals diagnosed with a variety of disabilities and levels of functioning, and by targeting different performance problems. We did not have employees within supported employment assist with completing the PDC-HS or with selecting, designing, or implementing the intervention. Future research could evaluate incorporating supported employees in completing the PDC-HS and implementing indicated interventions. Another area to consider is revising the tool so it is more accessible for individuals without advanced applied behavior analysis training to complete. Creating a revised version of the tool might increase the likelihood of it being completed with a high degree of accuracy. Revisions could include providing

descriptions of, and providing templates for, interventions indicated in the intervention planning section, and simplifying the language used in the tool. Based on the lack of social validity assessments specific to individuals with disabilities future research could develop and validate assessments to evaluate social validity in this population. Because a primary goal of improved work performance is to sustain goals over long periods of time, future research on the PDC-HS should evaluate the maintenance and generalization of behavior(s) acquired or modified by indicated interventions.

One limitation of this study is that IOA was not assessed for the PDC-HS interview. Previous research has evaluated IOA by having more than one individual complete the PDC-HS or by interviewing more than one individual. However, we interviewed a single individual. The PDC-HS interview was limited to the employment coordinator based on their previous experience (a) working with the participants and (b) supervising the implementation of supported employment services. We determined that there were no other employees at the human services provider who met the qualifications to participate in the PDC-HS interview. To promote valid results we decided to interview the individual we determined was most qualified. If feasible future research should evaluate agreement by having more than one person complete the PDC-HS. The lack of maintenance and generalization for Donny and Jeffery is a limitation. The decrease in responding for both participants was most likely due to a long history of performing the task below criteria and being employed at the library for a shorter duration than Maude. If intervention components had been systematically faded it may have promoted maintenance. Likewise, we could have conducted sessions in the typical work setting

prior to conducting generalization probes to facilitate generalization.

In conclusion, the findings of this study support past research and extend the literature on the PDC-HS by demonstrating the efficacy of using the PDC-HS with individuals with intellectual disabilities, applying the PDC-HS to a complex performance problem not previously evaluated, evaluating social validity, evaluating the PDC-HS in a novel setting, and evaluating maintenance and generalization. We also extended the literature on BST by using BST with VMVO in the intervention package. Replication of the PDC-HS with individuals with disabilities provides support for using the tool in integrated employment and provides preliminary evidence for using the tool in other supported employment settings.

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APPENDICES



















Appendix A
Social Validity Questionnaire

Social Validity Questionnaire

Name: _____

Date: _____

We want to know about how you felt helping out with this study. Please read the comments below. If you agree with the comment circle the happy face. If you are not sure circle the unsure face. If you disagree circle the sad face.

1. I liked being in this study.	Yes - Agree 	? - Unsure 	No - Disagree 
2. The way I was taught to clean the shelf was fair	Yes - Agree 	? - Unsure 	No - Disagree 
3. Being in this study caused problems with my friends.	Yes - Agree 	? - Unsure 	No - Disagree 
4. I liked the way I was taught to clean the shelf.	Yes - Agree 	? - Unsure 	No - Disagree 
5. This study could help other people.	Yes - Agree 	? - Unsure 	No - Disagree 
6. Being in this study helped me get better at my job.	Yes - Agree 	? - Unsure 	No - Disagree 

Appendix B

Data Sheet Shelf-Cleaning Task

Shelf-Cleaning Task Data Sheet

Participant: _____ Session number: _____

Date of session: _____ Date coded: _____

Experimental condition: _____

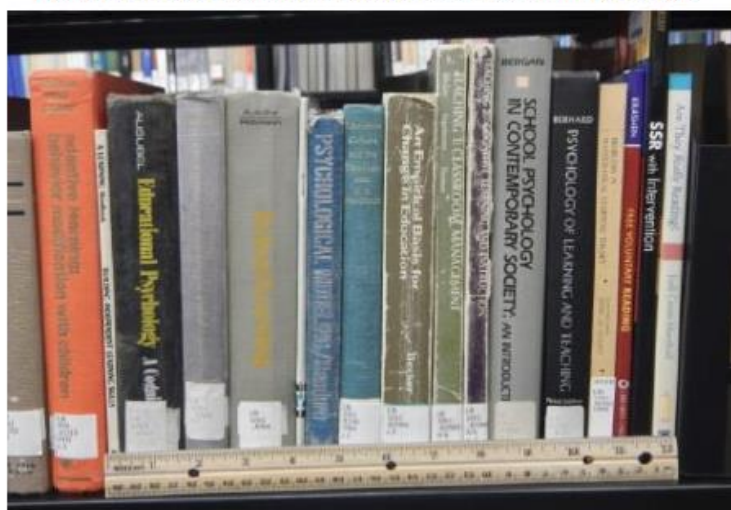
Data collection: (Circle one) Primary IOA

Researcher scoring data/IOA: _____

Researcher conducting session: _____

Instructions: The participant begins the session with a green dusting rag and a yellow cleaning rag. The shelves are divided into separate sections. The target shelf section will be marked by a colored tab inserted between the last two books on the left side; and a bookend on the right side. The shelf-cleaning task will begin on the right side of the target shelf.

- 1) **Post BST sessions begin on this step.** Researcher will review a task summary with the participant. The researcher may ask the participant questions to clarify the task. The researcher will set the task summary on a shelf close to the target shelf and deliver the discriminative stimulus *"The instructions will be here if you want to look at them"*.
- 2) **Baseline, maintenance, and generalization sessions will begin on this step.** Following the discriminative stimulus "Please clean the shelf. When you are done come find me. I will be around the corner on the right" the session will begin.
- 3) The participant will use the green rag to dust from the right to the left (section 2).
- 4) After reaching the left side of the target shelf the participant will use the yellow rag to clean from the left to the right (section 3).
- 5) Refer to the image below to determine if the participant slides between 2 and 6 inches of books.
- 6) For dusting/cleaning steps approximately 6 inches of the width of the shelf needs to be wiped. The bones in the participant's wrist will be used to approximate 6 inches. For the step to be scored correct the shelf needs to be wiped so the radius/ulna bones of the wrist are clearly past the outside edge of the shelf (see image of hand below).



- 7) Unless specified the steps need to be completed in order. If steps are performed in the incorrect order score them as incorrect.
- 8) If there are errors or a step is skipped mark the step incorrect and go to the next step.
- 9) Each step needs to be time stamped. Record the exact time when a step is completed. Skipped steps do not need to be time stamped.
- 10) A column is included for notes. Record notes: (a) To specify what the participant did for a step to be scored as incorrect; (b) If the participant performs a step differently than specified on the checklist; (c) If a step is removed (see *examples to clarify protocol #3*); (d) Anytime a step is recorded in the misc. section.
- 11) A misc. section has been included in case the participant engages in a step that is “not included” on the data sheet (e.g. picking up a book, stacking books, moving books to different shelves, etc.). If this happens: (a) score the step as incorrect and time stamp the step; (b) during section 2 or 3 score the “not included” step accordingly and also score any steps that are skipped incorrect. Do not write repeated steps in the misc. section (see *examples to clarify protocol #2*).

The session begins: immediately following the discriminative stimulus “Please clean the shelf. When you are done come find me. I will be around the corner on the right”.

The session ends when:

- 1) The final step of the shelf-cleaning task is complete. Stop the session the last moment the participant’s hand touches the books or target shelf.
- 2) The participant leaves the target shelf for more than 2 minutes (session time stops the instant the participant leaves)
- 3) The video recording is terminated.

If the participant stays in the target area after they complete the task, each time they touch the target shelf extend the ending time.

When scoring:

- 1) If the participant completes section 2 (dusting) but skips section 3 (cleaning) or vice versa; use the total number of steps in the completed section (section 2 or 3) as the total for the skipped section. Score skipped steps as incorrect.
- 2) Section 2 and section 3 need to have a minimum of 10 steps when scoring. If the participant completes less than the required steps then add the missing steps to the total and score them as incorrect.

Examples to clarify the protocol:

- 1) Steps need to be complete in a specific direction. Section 1 begins on the right side of the shelf moving to the left, section 2 right to left, section 3 left to right, section 4 there is not a direction steps need to be completed. Anytime a participant is moving in the incorrect direction score the steps as incorrect.
- 2) In section 2 or section 3 if a participant repeats steps score them incorrect because the steps have already been performed/are out of sequence. However, when they reach the point they were at when they began repeating steps and are progressing toward completing the section those steps are performed in the correct sequence and can be scored as correct or incorrect.
- 3) The participant is blocking the video:
 - a) If this happens when a participant is completing steps in sequence and you cannot see enough to evaluate whether the step was performed correctly remove the step. Do not use the step when completing the scoring section and write a note specifying which step(s) were removed.

- b) If this happens when the participant is out of sequence and all their responses are being scored as incorrect anyway- do not remove the step. As long as you can tell they completed a step you have enough information to score it incorrect.
- c) If the participant is blocking the video but you can see enough to tell if the step was completed correctly score the step according to the typical protocol.
- 4) In section 3 if the participant slides the entire shelf of books to the left side of the shelf begin section 4. If steps from sections 2 or 3 are repeated after participant begins section 4 score the steps as incorrect because the steps are out of sequence. Write the steps under section 2 or 3 based on which direction they are progressing. For example if the participant is moving right to left write them under section 2. If they are moving left to right score under section 3.

After the discriminative stimulus is delivered begin timing the session		Beginning time: _____		
Section 1	Step completed correctly Y= Yes N= No (circle one)	Time Stamp	Notes:	
1. Remove bookend	Y N			
2. Dust bookend with green rag (dusting rag)	Y N			
3. Move bookend to shelf other than the target shelf	Y N			
4. Dust area where bookend was sitting with green rag	Y N			

Section 2: Dusting section (minimum 10 steps)	After the books are dusted skip remaining steps in section and proceed to section 3. Section 2 needs to end on a dusting step. <i>"Dust the width of the shelf with green rag".</i>			
5. Slide 2 to 6 inches of books from the left to the right side of shelf	Y N			
6. Dust the width of the shelf with green rag	Y N			
7. Slide 2 to 6 inches of books from the left to the right side of shelf	Y N			
8. Dust the width of the shelf with green rag	Y N			
9. Slide 2 to 6 inches of books from the left to the right side of shelf	Y N			
10. Dust the width of the shelf with green rag	Y N			
11. Slide 2 to 6 inches of books from the left to the right side of shelf	Y N			
12. Dust the width of the shelf with green rag	Y N			
13. Slide 2 to 6 inches of books from the left to the right side of shelf	Y N			
14. Dust the width of the shelf with green rag	Y N			
15. Slide 2 to 6 inches of books from the left to the right side of shelf	Y N			

16. Dust the width of the shelf with green rag	Y	N		
17. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
18. Dust the width of the shelf with green rag	Y	N		
19. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
20. Dust the width of the shelf with green rag	Y	N		
21. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
22. Dust the width of the shelf with green rag	Y	N		
23. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
24. Dust the width of the shelf with green rag	Y	N		
25. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
26. Dust the width of the shelf with green rag	Y	N		
27. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
28. Dust the width of the shelf with green rag	Y	N		
29. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
30. Dust the width of the shelf with green rag	Y	N		
31. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
32. Dust the width of the shelf with green rag	Y	N		
33. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
34. Dust the width of the shelf with green rag	Y	N		
35. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
36. Dust the width of the shelf with green rag	Y	N		
37. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
38. Dust the width of the shelf with green rag	Y	N		
39. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
40. Dust the width of the shelf with green rag	Y	N		
41. Slide 2 to 6 inches of books from the left to the right side of shelf	Y	N		
42. Dust the width of the shelf with green rag	Y	N		

Section 3: Cleaning section (minimum 10 steps)	After the books are cleaned on the target shelf skip remaining steps in section and proceed to section 4. Section 3 needs to end on a cleaning step. <i>“Clean the width of the shelf with yellow rag”</i> .			
43. Clean the width of the shelf with yellow rag	Y	N		
44. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
45. Clean the width of the shelf with yellow rag	Y	N		
46. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
47. Clean the width of the shelf with yellow rag	Y	N		
48. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
49. Clean the width of the shelf with yellow rag	Y	N		
50. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
51. Clean the width of the shelf with yellow rag	Y	N		
52. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
53. Clean the width of the shelf with yellow rag	Y	N		
54. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
55. Clean the width of the shelf with yellow rag	Y	N		
56. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
57. Clean the width of the shelf with yellow rag	Y	N		
58. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
59. Clean the width of the shelf with yellow rag	Y	N		
60. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
61. Clean the width of the shelf with yellow rag	Y	N		
62. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
63. Clean the width of the shelf with yellow rag	Y	N		
64. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
65. Clean the width of the shelf with yellow rag	Y	N		
66. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		

67. Clean the width of the shelf with yellow rag	Y	N		
68. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
69. Clean the width of the shelf with yellow rag	Y	N		
70. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
71. Clean the width of the shelf with yellow rag	Y	N		
72. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
73. Clean the width of the shelf with yellow rag	Y	N		
74. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
75. Clean the width of the shelf with yellow rag	Y	N		
76. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
77. Clean the width of the shelf with yellow rag	Y	N		
78. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
79. Clean the width of the shelf with yellow rag	Y	N		
80. Slide 2 to 6 inches of books from the right to the left side of shelf	Y	N		
81. Clean the width of the shelf with yellow rag	Y	N		

Misc. steps	If the participant performs an action that is not included on the data sheet (e.g. picking up a book) score it as an incorrect step and write the step in this section.		
1.	N		
2.	N		
3.	N		
4.	N		

Section 4: 82, 83, 84 needs to be completed after section 3. Step 85 can be completed during any of the preceding sections.			
82. Replace bookend	Y	N	
83. Straighten the books so they are even with the outside edge of shelf	Y	N	
84. Slides books to the left side of shelf; books need to be firmly pressed against the left side of the shelf when the session ends	Y	N	
85. The colored marking tab is removed from the shelf	Y	N	

Scoring section			
Beginning time: _____	Ending time _____	Total seconds _____	Total min & Seconds _____
# Correct Steps _____		Total # of Steps _____	
% steps completed correctly	# steps completed correctly/total # of steps * 100= _____		

If you have any questions call or text (name) (phone number); if you do not reach me by phone email me at (email)

Appendix C

Treatment Integrity Post Behavioral Skills Training Condition

Treatment integrity- partial shelf

Date of session: _____ Date coded: _____ Participant: _____

Session number: _____ Experimental condition: _____

Researcher scoring data/IOA: _____

Researcher conducting session: _____

Checklist		Y= Yes N= No (circle one)
1. Researcher displays session identification card (does not vocally identify information on card, date, participant, and experimental condition are written on card)		Y N
2. Target shelf section is video recorded; camera is panned horizontally across the entire target shelf section		Y N
3. On the right side there is approximately 4 inches between the bookend and the metal shelf divider; colored tab is inserted between the last 2 books on the left side		Y N
4. Researcher reviews the task summary with the participant		Y N
5. Researcher places the task summary on a shelf close to the target shelf section and delivers the S ^D "The instructions will be here if you want to look at them".		Y N
6. Researcher delivers vocal S ^D "Please clean the shelf. When you are done come find me. I will be around the corner on the right"		Y N
7. Researcher leaves the target shelf area for the duration of the session		Y N
8. No prompts are delivered during the session		Y N
Total correct components _____		
% of correct components	Total # steps completed correctly/total # steps * 100= _____	

Appendix D

Summary Shelf-Cleaning Task

Shelf-cleaning instructions- partial shelf

1st



Remove the colored tab. Then remove the bookend that is on the right side of the shelf. Use the green rag to dust the bookend. Move the bookend to a different shelf.

2nd



Use the green rag to dust the shelf where the bookend was sitting. Slide a handful of books to the right. Dust the shelf. Repeat until you get to the left side of the shelf.

3rd



Switch to the yellow cleaning rag. Use the yellow rag to clean the shelf you just dusted. Slide a handful of books to the left. Clean the shelf. Repeat until you get to the right side of the shelf.

4th



Pick up the bookend you moved to a different shelf. Replace the bookend on the right side of the shelf. Straighten the books so they are on the edge of the shelf.