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Behavior Analytic Interventions for Promoting Skill Acquisition in Individuals with ASD: Two Case Studies

Taylor Marie Comber
University of South Florida

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Behavior Analytic Interventions for Promoting Skill Acquisition in Individuals with ASD:
Two Case Studies

by

Taylor Marie Comber

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Applied Behavior Analysis
Department of Child and Family Studies
College of Behavioral and Community Sciences
University of South Florida

Major Professor: Kwang-Sun Cho Blair, Ph.D., BCBA-D
Raymond G. Miltenberger, Ph.D., BCBA-D
Kimberly Crosland, Ph.D., BCBA-D

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ABSTRACT

This report describes two case studies that used behavior analytic interventions to promote skill acquisition during structured instructional activities for individuals with autism spectrum disorder (ASD). The first study examined the effects of pre-session pairing (PSP) implemented by a teacher in the natural classroom setting for a 6-year-old with ASD whose problem behavior was associated with gaining access to attention and escaping from task demands. Results showed PSP augmented with a visual cue resulted in increased on-task behavior and decreased disruptive behavior. The second study examined the use of discrete trial training (DTT) for a 16-year-old female adolescent with ASD in a clinical setting, who exhibited high rates of rigid behavior that interfered with her daily life. Results showed that using DTT, in particular, DTT with a joint vocal cue, was successful for teaching ‘keeping hands still’, a prerequisite learning skill, and simultaneously decreasing the individual’s rigid behavior.

CHAPTER ONE: INTRODUCTION

Author's Note

Due to the COVID-19 pandemic the thesis requirements for students graduating from the USF ABA program in 2021 have been modified and may include fewer participants, case studies, or a literature review.

Case Study 1: Problem behavior, such as disruptive behavior occurs frequently in the school setting, which can negatively affect children's ability to succeed academically in the classroom (Nelson, 1996). Teachers often feel unsupported or lack self-efficacy in responding to repetitive disruptive behaviors (Iovannone et al., 2009). Harrison et al. (2012) found teachers rated off-task behavior as the most prevalent and reoccurring problem behavior in the general classroom setting. Moreover, managing a classroom full of children with the additional responsibility of addressing individual student problem behaviors can be overwhelming, and intervention fidelity is often compromised when teachers are expected to use complex behavior intervention procedures without adequate training (Iovannone et al., 2009). Researchers have suggested that implementing antecedent-based interventions can help reduce punishment-based procedures, positively contributing toward rapport-building with children while promoting social validity of the interventions (Sofarelli, 2018).

Commonly used antecedent-based interventions in school settings include modifying instructional activities, using visual schedules during daily routines, and incorporating choice or preference into activities (Aldosari, 2017; Wood et al., 2009). Aldosari (2017) discovered that

when kindergarteners with developmental disabilities were given choices during instructional activities, their escape-maintained disruptive behavior significantly decreased compared to when choices were not given; there was a more significant change in the children's disruptive behavior when incorporating choice of preferred stimuli. Antecedent-based interventions produce positive and successful behavior change outcomes in children with and without disabilities; however, not all procedures are viable for teachers to incorporate into their daily classroom routines and activities. Barriers, such as the cost in terms of money and effort, long teacher training sessions, and the lack of motivation for relevant staff to maintain the intervention after behavior professionals leave can all negatively affect intervention fidelity (Nelson, 1996). To resolve these barriers, teachers and school personnel should be included in the intervention design process from the beginning to promote contextual fit in the natural environment and social validity of all involved to produce the most effective behavior change (Sofarelli, 2018).

Pre-session pairing (PSP) is a feasible, antecedent-based intervention that fosters rapport-building between teacher and children during a short amount of time while teachers participate in child-preferred, shared play with children before transitioning to instructional time (Sofarelli, 2018). Previous research on PSP has suggested that PSP can be used with the entire group of children in the classroom, benefiting to the whole class while contributing toward a decrease in the target child's problem behavior (Nelson, 1996; Sofarelli, 2018). Additionally, incorporating child-preferred activities within the classroom both positively contributes toward contextual fit and child participants expressed high social validity after PSP implementation (Kelly et al., 2015; Sofarelli, 2018). Kelly et al. (2015) found a reduction in problem behavior during times of demand when the experimenter first engaged in as little as a 2- to 4-min of preferred activity play with each participant, all of who were diagnosed with autism.

Although there have been studies that positively contribute to implementing PSP to reduce problem behavior during instructional time, the implementers of the intervention were behavior treatment service providers or clinicians, not classroom teachers (Kelly et al., 2015) except Sofarelli's study (2018). Sofarelli investigated the use of teacher-implemented PSP to address the escape and attention-maintained problem behaviors of four elementary-age students with or without disabilities in both general and special education classrooms. The results indicated that the teachers successfully implemented PSP intervention, which resulted in increases in on-task behavior and decreases in problem behavior. However, given the lack of research on the use of PSP by teachers, this case study aimed to further evaluate the feasibility of using the PSP to promote acquisition of appropriate classroom behavior with a child with autism spectrum disorder (ASD).

Case Study 2: Individuals with autism spectrum disorder (ASD) frequently engage in repetitive or restrictive patterns of behavior that may be resistant to change over time, which is a core feature of ASD (American Psychiatric Association, 2013). The individuals with ASD can have a range of skill deficits that may impede their ability to be successful across daily tasks and social relationships, and impact quality of life. Moreover, when routines and repetitive motor movements are interrupted, problem behavior that is dangerous to the individual or others often occur (Hsu & Ho, 2009). Consequently, individuals with ASD require dissimilar instructional methods of teaching and learning from their typical peers to reduce the likelihood that maladaptive behavior will occur. A combination of antecedent- and consequent-based strategies, such as DTT, can be used to teach alternative behavior (Bogin, 2010; Smith, 2001).

The existing body of research suggests that DTT is an evidence-based practice commonly used to teach verbal behavior and academic skills and maximize comprehension skills in individuals with ASD (Bogin et al., 2010; Wong et al., 2015).

In general, DTT consists of antecedent-based intervention components such as the use of prompts and cues to provide opportunities for an individual to engage in the target response, and when the correct response is evoked, the response is immediately reinforced (consequence), strengthening a new response to a stimulus (Bogin et al., 2010). Further, DTT is a one-to-one systematic approach used to teach a skill or task to an individual by repeatedly presenting opportunities for learning trials broken down into concise, reoccurring steps to engage in a single target response (Smith, 2001). Smith identified five essential elements of DTT: cue, prompt, learner's response, consequence based on the response, (i.e. correct, incorrect), and inter-trial intervals. Although the literature documents the effectiveness of using DTT to teach various skills to individuals with ASD, more research is needed on the effects of DTT on skill acquisition of adolescents with ASD, as the majority of literature focused on early intervention and elementary-aged children (Bogin et al., 2010).

Isenhower et al. (2018) examined the use of active student response (ASR) and modeling error correction procedures in DTT with two ASD learners, an 8-year-old and a 13-year-old, to improve receptive skills. Results showed that both procedures were successful in teaching the target skill to the learners; but, individual differences were noted as each learner had a procedure that was more effective for them. However, during the modeling procedure, spontaneous responses were demonstrated by both learners independently, even when it was not required, as was the expectation of the ASR condition. This indicates that the modeling of error correction

demonstrated similar responding in a lesser amount of trials and using a less intrusive error correction procedure overall.

The literature also supports the efficacy of providing instructor-led prompts to improve joint attention, a shared focus on a task or object with another person (Bean, 2012). Bean showed that the use of verbal joint attention prompts yielded a higher joint attention the use of nonverbal prompts for adolescent with ASD, aged 7 to 17. In addition, the literature indicates that when teaching skills to individuals with ASD, incorporating an assessment into curriculum, based on their language ability and developmental age with consideration of cognitive functioning, is helpful in designing an appropriate program for instruction (Dixon et al., 2014). The purpose of this study was to examine the use of DTT with an adolescent with ASD to teach 'keeping hands still,' a prerequisite learning skill. Research to examine the use of DTT for teaching the prerequisite learning skill would expand the range of potential skill targets for learners with ASD, in particular, for the adolescent population.

CHAPTER TWO:

METHOD

Participants

Case Study 1: The study participants were a 6-year-old child with ASD, AL, served at a private elementary school, and his classroom teacher. The teacher child ratio in AL's ASD classroom was 10:1. The child was referred to the study because of his disruptive behavior, which negatively interfered with his daily activities, in particular, during math time. AL was a White boy, who was diagnosed with ASD at age 2. He had a moderate level of deficits in social interaction and social communication; though, he functionally communicated with 4-to-5-word sentences to get his needs met. AL's teacher was a 26-year-old White woman with 5 years of teaching experience, who had her bachelor's degree in Elementary Education. The teacher was interested in participating in the study and willing to spend 2-to 5-min periods for having AL engage in preferred activities in the class.

Case Study 2: The study participant was a 16-year-old female adolescent, Jude, diagnosed with ASD at the age of three. She was adopted from China at 10 months of age and her birth history was unknown. Jude exhibited significant deficits in functional communication, social skills, and daily living skills although she independently used one- to three-word vocal mands. Jude frequently engaged in maladaptive behaviors that posed a safety concern for herself and others around her such as self-injurious behavior and aggression when interrupted during instances of rigid behavior or routines. Prior to the study, staff on Jude's case used response

blocking when appropriate in response to attempts of Jude engaging in rigid behavior; however, this quickly became reinforcing through access to attention and escape from task demands. Informed consent was obtained from the behavior analyst on Jude's case and Jude's caregivers. Although Jude was 16 years old, she was unable to functionally answer yes and no questions; therefore, caregivers agreed that their consent would be sufficient prior to implementing the intervention.

Setting and Materials

Case Study 1: All sessions were conducted in the natural classroom setting during times of instruction in which disruptive behavior most frequently occurred (i.e., math time). Materials used during the PSP intervention included a projector, a laptop with internet access, GoNoodle videos, and a brief visual aid to promote task engagement. Teacher training occurred in the classroom during planning time when no children were present. Materials for the teacher training were adapted from Sofarelli (2018) including a brief summary of PSP procedures, and the creation of an individualized, concise script for the teacher to use during intervention sessions. Finally, the researcher and an observer who assisted with data collection used a printed behavior data sheet, timer app on the phone, and headphones to record child target behaviors based on the auditory tone notating a switch in interval.

Case Study 2: All sessions were conducted in an Applied Behavior Analysis (ABA) clinic setting. During DTT, Jude and her therapist sat down at a table in one of the available classrooms. The therapists consisted of one assistant behavior analyst and two registered behavior technicians who were trained to run the program prior to baseline. All therapists participated consistently across all phases, with the exception of the last three sessions run only by the assistant behavior analyst. Materials included data recording sheets, including the

Promoting the Emergence of Advanced Knowledge (PEAK) Relational Training System (Dixon et al., 2014) scoring rubric sheet for measuring the performance of hands still skill, a timer, and 10 stimuli comprised of preferred tangibles and edibles, enclosed in a clear container for ease of transportation.

Measurement

Case Study 1: This study evaluated two dependent variables, disruptive behavior and on-task behavior. The behavior definitions were developed by the researcher in direct collaboration with the classroom teacher based on indirect assessments and anecdotal report. Disruptive behavior was defined as any instance in which the student engaged in one or more of the following behaviors at least once during the interval: tipping the chair resulting in one or more of the chair legs leaving contact from the carpet flooring for any amount of time, leaving the chair for more than 1s, engaging in body movements that interfered with engaging activities (i.e., tapping items on desk, leaving the desk area), and/or vocalizations (i.e., crying, groans, high-pitched screams) including but not limited to opposition statements (i.e., ‘no’, ‘no math’, ‘no way’). Exclusions included talking during a group activity, responding to the teacher, and following teacher directions. On-task behavior was defined as sitting in the student’s chair while having all four chair legs on the ground, attending to the teacher and/or the assignment with eyes looking away for no more than 1 s, and the absence of disruptive body movements or vocalizations. Exclusions include when the student raises their hand and the words spoken in response to the teacher and/or leaving his chair to follow teacher directions.

The two behaviors were not mutually exclusive; however, if the researcher marked a (+) for disruptive behavior, only a (-) could be marked for on-task behavior during that interval. Data were recorded on target responses during the math academic time period ranging between 10 to

20 min. Disruptive behavior was measured as the percentage of intervals of occurrence using a 10-s partial interval system. On-task behavior was measured as the percentage of intervals of occurrence using a 10-s whole-interval recording system. The percentage of intervals with target responses was calculated by dividing the number of intervals with response by the total number of intervals during the session and then multiplied by 100.

Case Study 2: The study evaluated a primary and secondary dependent variables (DVs). The primary DV was the average correct skill performance score of Jude engaging in the correct behavior of keeping her hands still during DTT. A session included a 10-trial block to teach the skill of keeping hands still. The total score from the 10-trials was summed, and then the average score for each session was calculated. Computed in compliance with the PEAK scoring rubrics (Dixon, 2014), Jude could score a 0, 2, 4, 8, or 10 during each trial. A score of 0 was defined as a lack of responding from the learner after multiple attempts at prompting; a 2 was defined as the use of multiple prompts or presenting a reduced stimulus array to produce a response; a 4 involved the use of up to 2 prompts for the learner to respond; an 8 used only one visual or verbal prompt; and a score of 10 was given when Jude required no additional prompting to engage in the hands still behavior when told. The mastery criterion for the skill was defined as an average score of 9.0 or above for three consecutive sessions. The PEAK includes four modules of assessment tools and curriculum to teach individuals a wide range of skills, including prerequisite learning skills (i.e., eye contact and keeping hands still) and vocal (imitation), writing, conversation, math, and advanced conversational skills. Of the skills, ‘Hands Still’ was targeted for Jude.

Rigid behavior was the secondary DV and was tracked on Jude’s behavior data sheet using count in the form of tallies, and the data were converted to rate (response per min). Rigid

behavior was defined as any instance of obsessive and repetitive touching of items across her daily routine (e.g., has to touch first or last, touches a certain number of times) and the interruption of her engagement in her rigid behavior likely resulted in additional maladaptive behaviors like aggression and self-injurious behavior.

Implementation Fidelity

Case Study 1: Teacher implementation fidelity was measured using a 5-step checklist (Appendix F) to record and calculate the percentage of correctly completed steps by the teacher during all intervention sessions (Sofarelli, 2018). The checklist included concise, clearly outlined steps to conduct during the intervention to promote high teacher implementation fidelity, including essential verbal transition warnings, teacher engagement in the target child's preferred activity, and appropriate praise to the child and class. For sessions 11 through 13, an additional step was added to the checklist, totaling six steps overall, to ensure the teacher went over the added treatment component of a succinct, visual aid to show on-task behavior expectations of the child. Fidelity was calculated by dividing the number of steps completed correctly by the total number of steps in the PSP intervention. Treatment fidelity was assessed across 100% of PSP sessions and overall averaged 98%, ranging from 80 to 100% across sessions.

Interobserver Agreement and Social Validity

Case Study 1: The primary researcher and two independent observers (research assistants) collected data on instances of AL's disruptive behavior and on-task behavior during the targeted math instructional time across 21% of the observation sessions. The independent observers were BCBA's and were former graduate students recruited from the Applied Behavior Analysis program. The observers were trained by the researcher on data collection procedures and behavior definitions prior to baseline. Interobserver agreement (IOA) for disruptive behavior

was calculated by dividing the number of intervals with agreements by the total number of intervals with agreements and disagreements and multiplying by 100. Interobserver agreement for the teacher implementation fidelity was calculated by dividing the number of agreements in the task analysis by the total number of steps and multiplying by 100. An agreement was defined as the researcher and research assistant both scoring a step as completed, not completed, or N/A.

Following the termination of the intervention phase, a survey questionnaire was completed by AL's teacher to assess social validity. The questionnaire was adapted from the Intervention Rating Profile (IRP-15; Martens et al., 1985) and included a 6-point Likert-type scale survey questionnaire consisting of 15 items and two open-ended questions. The questionnaire assessed teacher perception, acceptability, and efficacy of the intervention within their classroom. A 4-question student social validity survey (Appendix F), rated on a 6-point Likert-type scale and adapted from Sofarelli (2018), was completed by AL verbally to assess likability of the PSP intervention.

Experimental Design and Procedures

Case Study 1: An ABCB design was used to determine the treatment effects. Conditions included baseline (A), implementation of PSP (B), implementation of PSP with visual aide (C), and a reversal back to PSP (B). Before data were collected for the baseline condition, a functional behavior assessment was conducted to identify the potential functions of disruptive behavior. Also, a paired stimulus preference assessment was conducted with AL to select preferred GoNoodle videos that were used during intervention (Sofarelli, 2018).

Case Study 2: The study used an ABCB design to examine the treatment effects. Conditions included baseline (A), implementation of the 4-step DTT lesson (B), a modified 5-step DTT lesson with a joint vocal cue (C), and a reversal back to the initial, 4-step DTT (B). A

researcher-led, contrived, free operant observation was conducted in one session with Jude to select preferred tangible items that were utilized as the stimuli in the intervention phase. The researcher presented the opportunity to choose from a multitude of possibly reinforcing items set up intentionally in the room (e.g., toys, stuffed animals) and took duration data on Jude's total engagement with each tangible item to rate them from non-preferred (i.e., no engagement) to highly preferred. Jude interacted with at least six tangibles, which were chosen as stimuli for the program. The preference assessment took less than 30 min. Preferred edibles had been previously identified by Jude's caregivers to be in compliance with dietary restrictions. All sessions were conducted prior to lunchtime to maximize reinforcing potential of preferred edibles.

Functional Behavior Assessment

Case Study 1: Guided by the researcher, the teacher completed the Functional Assessment Checklist for Teachers and Staff (FACTS; March et al., 2000) to identify potential function of AL's disruptive behavior. The FACTS consists of 13 items and is designed to identify instructional times with high amounts of disruptive behavior, antecedents, consequences, and hypothesized functions of the target disruptive behavior. Based on the results, it was hypothesized that AL's disruptive behavior functioned as primarily escape from demands with a secondary function being access to adult attention.

Baseline

Case Study 1: During baseline, the teacher engaged in the usual classroom activities and employed existing responses to disruptive behavior and on-task behavior including verbal reminders and behavior specific praise.

Case Study 2: During baseline, 3-step instructions were delivered across 10 trials, which involved: placing an item on table, telling Jude to put her hands on the table, and saying “hands still.” The therapist attempted to use least to most prompting when Jude remained unresponsive and were to provide reinforcement contingent on correct responses. Prior to initiating the start of each trial Jude was presented an array of two reinforcing stimuli to choose from; however, she remained unresponsive.

Teacher Training, and Preference Assessment

Case Study 1: After baseline data were gathered, the researcher arranged a 15-min teacher training during which the researcher provided a brief overview of PSP and described the intervention procedures. Then, the researcher asked the teacher to identify potentially reinforcing activities to use in the classroom lasting less than 5 min to which the teacher specified GoNoodle videos. Finally, the researcher and teacher collaborated on a script development for the teacher to follow during intervention sessions and rehearsed each step. The teacher training procedure involved using behavioral skills training procedures, used in Sofarelli (2018), which included instructions, modeling, rehearsal, and feedback procedures (see Appendix C). A 6-item, paired stimulus preference assessment was conducted with AL during one session prior to intervention to acquire high preferred GoNoodle videos.

Intervention

Case Study 1: Following the completion of baseline and teacher training, the PSP intervention was implemented before the previously identified problematic academic time, math. The teacher and AL took turns selecting one GoNoodle video from AL’s preferred video list, which was 2-3 min long, to provide an opportunity for shared interactions with the teacher and AL. The teacher first announced the transition to a fun activity, began the video, and directly

engaged with AL by delivering at least one comment to praise his engagement in the activity. AL's teacher participated in the video alongside AL, dancing and singing with him. The rest of the students in the classroom participated in the song and/or dance activities and the teacher delivered a praise statement to the entire class for active engagement. Before the end of the activity, the teacher delivered a transition warning, allowed the activity to come to a natural end, delivered praise, and then stated the instructional demand. Finally, the teacher delivered a first-then statement to signify the start of math time. Following the PSP session, the researcher delivered praise and corrective feedback to the teacher when necessary based on the fidelity. A visual aid outlining three expectations of on-task behavior was added to the PSP procedures (see Appendix B) which reviewed by the teacher with AL following the first-then statement to begin math when data were variable.

Case Study 2: Following baseline, the 3-step procedure used in baseline was modified to include an additional antecedent instruction, "wait," delivered to Jude every time a stimulus was simultaneously placed on the table. The subsequent steps of telling Jude to put her hands on the table and delivering the discriminative stimulus, "hands still" were still a part of the lesson component expectations, changing the instructional sequence to a 4-step DTT. Specifically, during trials the therapist secured Jude's attention, presented the instruction to wait while simultaneously placing a stimulus on the table, instructed Jude to put hands on table, and then immediately delivered the prompt, "hands still." Just like during baseline sessions, prior to trials Jude was presented an array of two stimuli. When she manded for which one of the two she wanted to practice with next and subsequently gained access to contingent on completion of the trial. When the therapist told Jude, "hands still," Jude either kept her hands still, or she failed to keep her hands still and touched the item immediately after the instructor placed the stimulus on

the table. Contingent upon keeping her hands still with or without prompt, Jude received reinforcement in the form of praise statements paired with brief access to the preidentified edible or tangible. When Jude placed her hands on the table or stimuli without the instruction from the therapist, a modeling error correction procedure was used in which the therapist modeled the target response before moving to the next trial.

The next phase was a 4-Step DTT with the addition of a joint verbal cue. Sessions were identical to those in the first intervention condition, with the exception of adding a joint verbal cue in which Jude and the therapist counted to 5 s together out loud to clearly discriminate the waiting expectation after the therapist said, “hands still.” When Jude engaged in the target response, reinforcement was delivered as described above, and the same modeling error correction procedure was used when incorrect responses occurred.

Generalization Probes

Case Study 2: Across Jude’s daily activities three therapists delivered the discriminative stimulus, “hands still,” both as an antecedent and consequence-based strategy. When the therapist observed Jude engaging in rigid behavior the therapist delivered the discriminative stimulus, “hands still,” and Jude would cease her engagement in rigid behavior. For continuity, Jude’s response was graded using the PEAK scoring rubric. Further, when previously identified routines that had evoked problem behavior when interrupted in the past have been observed (e.g., getting three pumps of soap) the therapist told Jude “hands still”.

CHAPTER THREE:

RESULTS

Case Study 1: Figure 1 displays AL's disruptive behavior and on-task behavior data during his math routine. AL displayed on average of 84% disruptive behavior and 9% on-task behavior during baseline. Immediate changes to the behaviors occurred when PSP was introduced; however, the data were variable. In session 11 and during the two subsequent sessions, when a visual aid was added to the PSP procedures, AL's disruptive behavior decreased to an average of 19% and on-task behavior increased to an average of 79% on-task behavior. The data remained stable even when the visual was removed.

At the conclusion of the intervention, the social validity score completed by AL's teacher ranged from 5 to 6, with an average score of 5.93 out of 6. She reported a high level of acceptability of the intervention and stated that the intervention was not only easy to implement, but effective with the target student and with all other students in the classroom. AL also rated the PSP intervention highly with a range score from 5 to 6, with an average score of 5.5 out of 6.

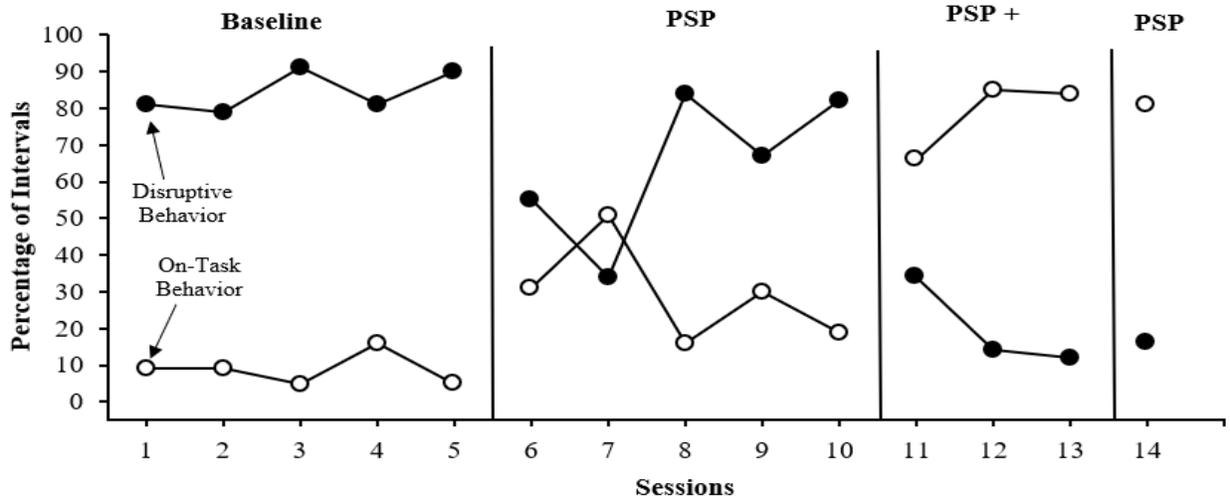


Figure 1

Percentage of Intervals with Disruptive Behavior and On-Task Behavior across Phases

Case Study 2: Figure 1 displays the average correct skill performance scores on Jude’s keeping hands still. During baseline, the data remained stable as Jude was unable to perform hands still skill. She did not attend to the trials, not being responsive even when the therapist tried to use additional prompts. Following baseline, an immediate increase in correct responses was observed when the 4- step DTT sequence was implemented, resulting in an average of 6.4 out of 10 across the initial intervention sessions. However, Jude’s score still remained below the criterion of 9.0 across three consecutive sessions. When the second intervention condition was introduced, her score averaged 9.0 across the remaining sessions, attaining the mastery criterion level in session 22 across multiple therapists, which was a socially valid goal of Jude’s caregivers. To further demonstrate treatment effects, the 5th step of joint vocal cue was removed in the final phase. No regression was observed during this phase. Due to time constraints and the immersion of COVID-19, the study was ended after three sessions in the final phase in which only the assistant behavior analyst conducted the intervention. The mastery criterion was met

across the three sessions. Figure 2 depicts the rate of rigid behavior during baseline and intervention. The data were variable with a high degree of overlap in baseline and intervention but decreased in the second half of intervention when the verbal cue was added.

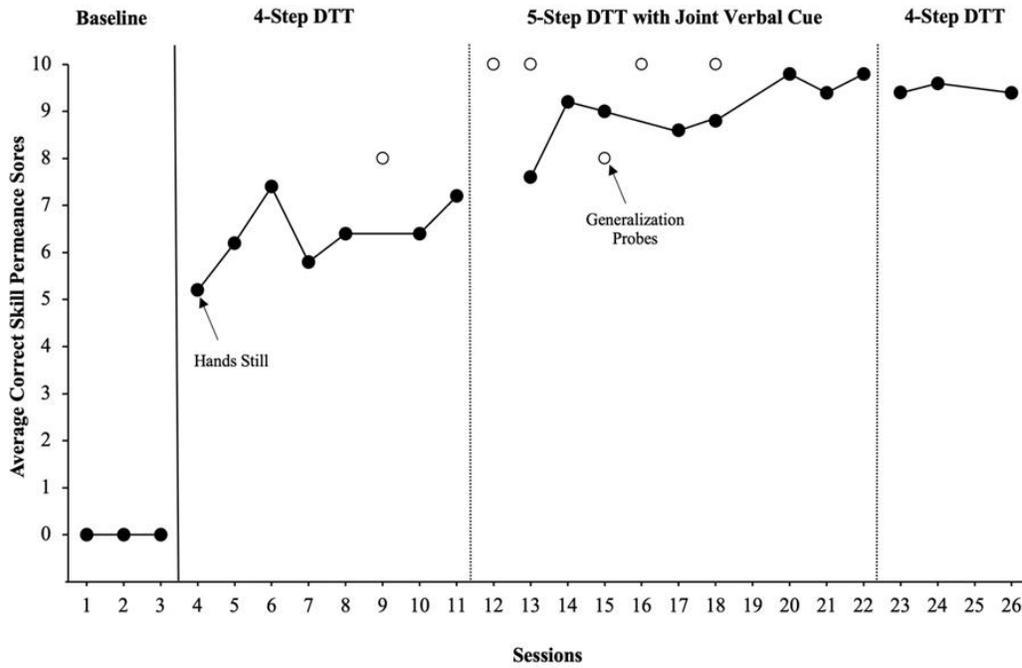


Figure 2
Average Correct Skill Performance Scores across Phases and Generalization Probes

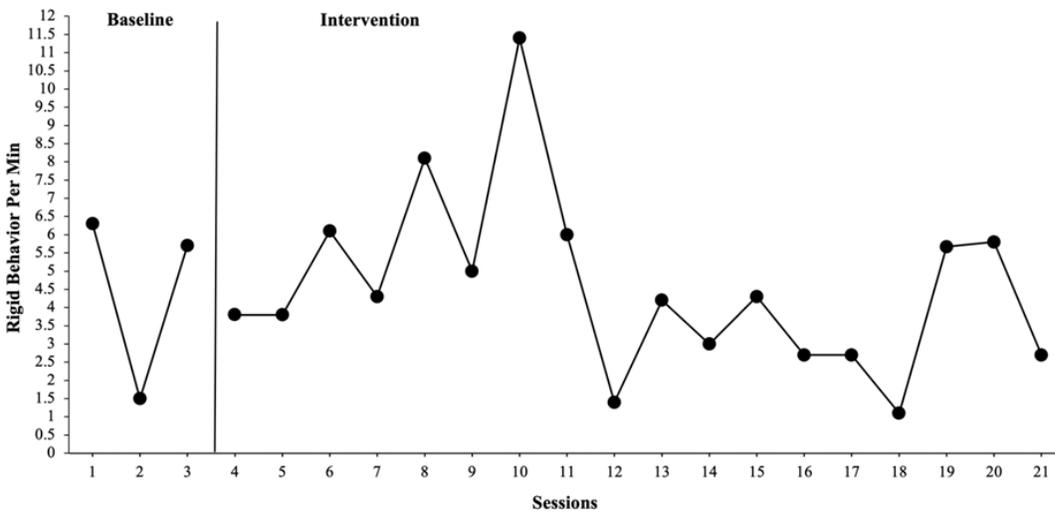


Figure 3
Rigid Behavior Per Min across Phases

CHAPTER FOUR:

DISCUSSION

Case Study 1: This study further examined the use of PSP in the classroom setting with one elementary-aged child with ASD and the classroom teacher who was responsible for the intervention implementation. The results show that the brief interaction between the teacher and target child and the addition of a visual aid lead to a decrease in disruptive behavior and an increase in on-task behavior during the problematic math academic time. These data support previous findings and suggest that PSP does not interfere with existing instruction (Kelly et al., 2015; Sofarelli, 2018). Anecdotally, the teacher reported wanting to continue the intervention and implementing within a novel academic time period.

There are multiple directions for future research. Investigators should track duration or latency to on-task or task engagement behavior and evaluate maintenance effects. Next, researchers should test the PSP intervention on young children with ASD, specifically preschoolers to assess its feasibility for improving classroom behavior in the young children with ASD. In total, PSP proved to be a practical and effective intervention for use by the teacher with little training required. With using only the antecedent-based PSP and visual aid procedures, the targeted problem behavior decreased and on-task behavior increased. More studies should be conducted to extend the literature on PSP.

Case Study 2: This study evaluated DTT used to teach an adolescent girl with ASD, an essential prerequisite learning skill, keeping hands still. The secondary goal was to decrease the rate of rigid behavior. The results indicate that the use of DTT successfully increased Jude's

independent performance of the hands still skill and resulted in little to no effect on rigid behavior. These data expand upon previous literature. First, these results support the findings that adolescents with ASD can benefit from DTT when it is programmed with the PEAK assessment and curriculum and provides increased opportunities for performance (Dixon et al., 2014). Additionally, this study showed that the discriminative stimulus, “hands still” evoked the alternative behavior across the three trained therapists during generalization probes in the natural environment. Anecdotally, the therapists noted that the “hands still” verbal prompt was used as an antecedent and as a consequent-based approach to reduce and interrupt instances of rigid behavior in the clinic and according to caregiver report, at home.

A few limitations of this study should be noted. First, although generalization probes were conducted throughout intervention phases, no probes in baseline were conducted. Further, maintenance effects were not evaluated. Due to the emergence of the COVID-19 pandemic, the family decided to pause services for a period of time, thus follow-up data were not collected. Prior to stopping services, anecdotal report from the caregivers favored the use of delivering the verbal vocal phrase, “hands still” as an antecedent and consequent-based measure to prevent and reduce occurrences of rigid behavior across environments. Future research should ensure the collection of maintenance data to assess if the DTT lesson would be effective over time. Finally, only three baseline data points were collected, demonstrating limited experimental control (Kratochwill et al., 2013). Despite these limitations Jude reached the mastery criterion across intervention phases for the targeted prerequisite learning skill, keeping hands still when asked, suggesting that there may be benefits to the use of DTT to teach a new behavior for an adolescent with ASD.

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APPENDIX A: IRB APPROVAL LETTER



APPROVAL

October 13, 2020

Taylor Comber

Dear Ms. Taylor Comber:

On 10/12/2020, the IRB reviewed and approved the following protocol:

Application Type:	Initial Study
IRB ID:	STUDY001188
Review Type:	Expedited 7
Title:	Teacher-Implemented Pre-session Pairing for Preschoolers with Disruptive Behavior
Approved Protocol and Consent(s)/Assent(s):	<ul style="list-style-type: none">• Protocol Proposal;• Parent Consent Form;• Teacher Consent Form; <p>Approved study documents can be found under the 'Documents' tab in the main study workspace. Use the stamped consent found under the 'Last Finalized' column under the 'Documents' tab.</p>

This research involving children as participants was approved under 45 CFR 46.404: Research not involving greater than minimal risk to children is presented.

Requirements for Assent and/or Permission by Parents or Guardians: 45 CFR 46.408
Permission of one parent is sufficient.



Assent is waived because it is not appropriate due to the age, maturity, and/or psychological state of the child.

Within 30 days of the anniversary date of study approval, confirm your research is ongoing by clicking Confirm Ongoing Research in BullsIRB, or if your research is complete, submit a study closure request in BullsIRB by clicking Create Modification/CR.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

Jennifer

Walker
IRB Research Compliance Administrator

APPENDIX B: AL'S VISUAL

Lightning's On-Task:

1. All four chair legs on the floor,
just like Lightning's wheels on the track!



2. Sit down in my chair to work

3. Looking eyes on the teacher, the board, or my assignment



Figure 4A

On-Task Visual of Teacher Behavior Expectations

APPENDIX C: TEACHER TRAINING PROCEDURES

Sofarelli (2018)

Greeting: Good morning/afternoon. Thank you so much for taking the time out of your busy schedule to participate in this training. Today I will introduce you to the pre-session pairing intervention and we will come up with implementation procedures and a script. Then, you will have the opportunity to practice and receive feedback to ensure we are ready to move into the intervention sessions.

Pre-session Pairing Overview: Pre-session pairing is a research-based, antecedent-based intervention during which the teacher engages in a highly preferred activity with the student exhibiting escape- or attention-maintained problem behavior immediately preceding the problematic academic time.

Procedures: (Provide teacher with a copy) I would like to read over the general procedures with you at this time and incorporate any feedback or suggestions you have to make this best fit to your class. As we go over each step, please give input on specific additions you would like to include in the procedures and script so that it fits well within your schedule and routines.

Pre-session Pairing Procedures and Teacher Script

- Immediately preceding transition to academic time, prompt class to transition to designated area by saying, “Okay, class let’s sit on the carpet (or other designated area)”
- As the class transitions to the carpet (or other designated area), select an activity from the student preference list. Tell the class the activity for that session and for how long it will take place. For activities with a natural end, like videos or songs, that will signal the end of the pre-session pairing session. For other activities, like playing catch or another class game, set a timer for 5 min. Ideally, pick a moment when you are in control of the activity (e.g., you catch the ball) that is around the 5-min time mark to end the activity.
- During the activity, engage with the students, provide plenty of praise and positive statements, like “great job!” or “This is so fun” or “I love your dance moves!” or “Great catch!” Specifically, provide at least one positive comment or interaction with the targeted student.
- Provide a time warning about halfway through the activity, such as, “Two more minutes until math, and then we will rest or go home,” etc. (The use of a first, second, and then statement shows the students there will be another preferred activity following the academic demand time so it will be less aversive.)

- When the activity comes to a natural end or when the 5-min timer rings (depending on the activity), provide praise and/or a positive comment and high-fives and instruct the class to take their seats for academic time using a first, then statement to remind them what is coming next in the routine (ex. “Okay class, take your seats. First, we will do the math worksheets and then we will have recess).

Teacher Implementation Fidelity Checklist: (Provide teacher with a copy) This is a general overview of the steps you will complete during each intervention session. I will use this to ensure that you are following to procedures and any student behavior changes are due to these specific procedures. I will provide you with a copy of the completed checklist after each session.

Model: I will now model the procedures for you and I would like for you to fill out the fidelity checklist as I go so you can see what each step looks like. If you notice anything you would like to modify during this time, please let me know.

Rehearsal and Feedback: Now, I would like for you to practice the procedures while I fill out the checklist. When you are finished, we will go over each step to make sure they are straightforward and easy to implement. ... Great job! I loved how you (specific praise). Give corrective feedback, if necessary.

Teachers will be involved in the creation of specific procedures and a script for pre-session pairing in order to ensure contextual fit. These activity scripts will be included here once created during the study.

Conclusion: Do you have any questions? Thank you so much again for taking the time to meet with me. I look forward to getting started with the intervention! If, at any time, you have questions or concerns, please do not hesitate to contact me.

APPENDIX D: TEACHER TRAINING FIDELITY CHECKLIST

Sofarelli (2018)

Greeting	Yes/No
Overview	Yes/No
Review Pre-session Pairing procedures	Yes/No
Incorporate Teacher Feedback into procedures	Yes/No
Discuss Implementation Fidelity Checklist	Yes/No
Model of procedure	Yes/No
Provide teachers with opportunities to rehearse	Yes/No
Provide praise and feedback, if applicable	Yes/No
Ask if there are questions	Yes/No

(# of "Yes" answer: ____/9 total steps) *100%

Score: ____%

APPENDIX E: TEACHER IMPLEMENTATION FIDELITY CHECKLIST

Sofarelli (2018)

Step	
1. Teacher announced activity to class during transition to academic/instructional time.	Yes/No
2. Teacher initiated chosen activity with class.	Yes/No
3. Teacher delivered at least one positive comment to targeted student during activity.	Yes/No
4. Teacher delivered praise to class.	Yes/No
5. Teacher delivered first, then statement before transitioning to academic/instructional time.	Yes/No
Total Yes: /5	
Percentage of Completed Steps:	

Step	
1. Teacher announced activity to entire class and to the target child individually during transition to academic/instructional time.	Yes/No
2. Teacher initiated chosen activity with class and target student.	Yes/No
3. Teacher delivered at least one positive comment to targeted student during activity.	Yes/No
4. Teacher delivered praise to class.	Yes/No
5. Teacher delivered first, then statement before transitioning to academic/instructional time to entire class and to the target child individually.	Yes/No
6. Teacher reviewed on-task visual after the pre-session pairing activity.	Yes/No
Total Yes: /6	
Percentage of Completed Steps:	

APPENDIX F: STUDENT SOCIAL VALIDITY SURVEY

Adapted Sofarelli (2018)

1= Strongly disagree	2= Disagree	3= Slightly disagree	4= Slightly agree	5= Agree	6= Strongly agree						
1. I liked playing with my teacher before math.				1	2	3	4	5	6		
2. Playing with my teacher before math helped me work harder.				1	2	3	4	5	6		
3. I liked the activities we did before math.				1	2	3	4	5	6		
4. I want my teacher to keep playing with me before math.				1	2	3	4	5	6		