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NEGATIVE REINFORCEMENT THROUGH CONTINGENT EASY-TASK
PRESENTATION

by

Cicely Irene Nickerson

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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ABSTRACT

Negative Reinforcement through Contingent
Easy-Task Presentation

by

Cicely Irene Nickerson, Master of Science

Utah State University, 2015

Major Professors: Sarah E. Bloom, Ph.D. and Timothy A. Slocum, Ph.D.
Department: Special Education and Rehabilitation

Escape from instructional demands is one of the most common functions of problem behavior. Some research suggests that a switch from difficult to easy tasks may function as a reinforcer for problem behavior. This is of particular concern for situations in which easy tasks are part of the intervention procedure to reduce problem behavior. This project examined the reinforcing effects of a switch from low-probability (low- p) to high-probability (high- p) tasks for individuals whose problem behavior was maintained by escape from demands. It also provided preliminary evidence as to the quality of reinforcement provided by a switch from low- high- p tasks. Three individuals with disabilities who were referred for treatment of escape-maintained problem behavior participated in this research. We used a multi-element design to compare the effects of two intervention conditions on problem behavior and compliance in relation to control and baseline conditions. During the control condition, no demands were presented, and

the participant had continuous access to preferred items and attention. In the baseline condition (break), a break from low-*p* demands was presented contingent on problem behavior. In the first intervention condition, problem behavior no longer resulted in a break from demands (escape extinction). During the second intervention condition, problem behavior following low-*p* tasks resulted in a switch to high-*p* tasks. All participants engaged in elevated levels of problem behavior and decreased compliance when problem behavior resulted in a switch of tasks. These results imply that for individuals whose problem behavior is maintained by escape from demands, a switch from low- to high-*p* tasks may reinforce problem behavior.

(60 pages)

PUBLIC ABSTRACT

Negative Reinforcement through Contingent

Easy-Task Presentation

Cicely Irene Nickerson

One of the most common reasons why individuals engage in problem behavior is to escape instructions. Some research suggests that a switch from difficult to easy tasks may reinforce problem behavior. This is of particular concern for situations in which the procedure to reduce problem behavior includes both easy and difficult tasks. This project examined the effects of a switch from difficult to easy tasks for individuals who engaged in problem behavior to escape instruction. Three individuals with disabilities participated in this research. We compared the effects of four procedures on problem behavior and compliance. In one procedure, the therapist continually presented difficult tasks regardless of the occurrence of problem behavior. In the second procedure, the therapist gave the participant a short break from difficult tasks following problem behavior. During the third procedure, if the participant engaged in problem behavior following difficult tasks the therapist temporarily presented easy tasks. During the final procedure, the therapist did not ask the participant to complete any tasks. All participants engaged in elevated levels of problem behavior and decreased levels of compliance when a switch of tasks followed problem behavior. These results imply that for individuals who engage in problem behavior to escape instruction, a switch from difficult to easy tasks may reinforce problem behavior.

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INTRODUCTION

Individuals with disabilities are often placed in learning environments to improve academic, self-help, social, or other habilitative skills. Working with individuals with disabilities in instructional settings can pose difficulties due to problem behavior including self-injury, aggression, and property destruction. Research in the field of behavior analysis has found that one of the most prevalent functions of problem behavior is escape from instructional demands (Iwata et al., 1994; Tiger, Hanley, & Bruzek, 2008; Wacker et al., 1998). For example, Derby et al. (1992) conducted brief functional analyses for 79 participants with developmental disabilities ranging from 1-35 years old. They identified escape from demands as the maintaining variable for aberrant behavior in 48% of cases. More recently, Love, Carr, and LeBlanc (2009) conducted functional assessments, either traditional functional analyses or descriptive analyses, for 32 children with autism spectrum disorders. They found that problem behavior was maintained by escape from instructional demands for 51% of participants.

Many interventions for the reduction of escape-maintained problem behavior have been developed and experimentally evaluated. One category of interventions used to reduce problem behavior is antecedent procedures. Antecedent procedures focus on altering environmental variables in order to weaken the maintaining reinforcer of problem behavior. In this way, therapists can decrease the probability of future occurrences of problem behavior. Some antecedent procedures include curricular revision, activity choice, high-probability (high-*p*) request sequencing, and demand fading.

Curricular revision is an intervention in which the student's curriculum is evaluated and revised to remove or reduce components that are aversive to the student. For example, Dunlap, Kern-Dunlap, Clarke, and Robbins (1991) used curricular revision to reduce the disruptive behavior of a 12-year-old female with intellectual disabilities, attention deficit disorder, and schizophrenia. They began by testing several hypotheses about which instructional components occasioned problem behavior. These included comparing long vs. short tasks, fine motor vs. gross motor skills, functional vs. arbitrary tasks, and choice vs. no choice. Problem behavior increased in conditions that included longer tasks, fine motor skills, arbitrary tasks, or did not have choice opportunities. Researchers then altered the student's curriculum to reduce these characteristics. These alterations resulted in a decrease of disruptive behavior to zero responses per session. Other potentially aversive components of instruction include tasks that are too easy (Umbreit, Lane, & Dejud, 2004), too difficult (Kern, Childs, Dunlap, Clarke, & Falk, 1994), or novel (Smith, Iwata, Goh, & Shore, 1995). When using curricular revision, teachers do not need to optimize every component of the student's curriculum order to reduce problem behavior. For example, Kern et al. (1994) created a list of components that decreased the problem behavior of an 11-year-old boy. They instructed each of his teachers to pick three of the five components to use in their classroom. Although each teacher implemented slightly different procedures, problem behavior decreased for each classroom.

Another intervention, activity choice, allows the client to avoid some aversive aspects of instruction by controlling which tasks are completed. Dunlap et al. (1994)

examined the effects of activity choice and assigned tasks on the disruptive behavior of two 11-year-old boys with an emotional disability. During activity choice, the teacher created a menu of tasks that were comparable to those typically assigned. Participants were allowed to choose which task to complete, and allowed to switch tasks at any time. For the assigned task condition, the teacher assigned a task instead of providing a menu. For both participants, disruptive behavior decreased and task engagement increased during the activity choice condition. Some researchers argue that the decrease in problem behavior may not be due to choice, but avoidance of aversive tasks (Lerman et al, 1997). However, decreases in problem behavior have been observed when comparing the effects of choice and task assignment in which tasks were identical across conditions (Dyer, Dunlap, & Winterling, 1990; Kern, Mantegna, Vorndran, Bailin, & Hilt, 2001).

A third intervention, high-*p* request sequencing (also called interspersed tasks) changes the balance between tasks that a client is likely to complete and tasks that a client is not likely complete, hopefully leading to increased compliance and decreased problem behavior. In this intervention the teacher presents a series of high-*p* tasks (e.g., tasks with which the client is likely to comply) followed by a low-probability (low-*p*) task (e.g., task with which the client is less likely to comply), typically at a 3:1 ratio. Horner, Day, Sprague, O'Brien, and Heathfield (1991) used high-*p* request sequencing to treat the aggression and self-injurious behavior (SIB) of four individuals with intellectual disabilities. They compared the effects of high-*p* tasks alone, low-*p* tasks alone, and high-*p* request sequencing on problem behavior. For each participant, a high percentage

of intervals with problem behavior was observed during low-*p* tasks alone, and a low percentage was observed during high-*p* tasks alone. During high-*p* request sequencing, problem behavior and attempts to perform tasks were similar to those observed during the presentation of high-*p* tasks alone. These data suggest that the presentation of high-*p* tasks prior to the presentation of a low-*p* task creates an abolishing operation for escape from demands. In other words, escape from demands is not as reinforcing during high-*p* request sequencing as escape from demands during low-*p* tasks alone.

The effectiveness of high-*p* request sequencing increases when high-*p* requests are presented rapidly (Davis & Reichle, 1996) and reinforcement is given for both low-*p* and high-*p* tasks (Zuluaga & Normand, 2008). With effective high-*p* request sequencing, instructional time is not lost because low-*p* tasks are presented as part of the intervention. However, this intervention may not be a good match for situations in which it is difficult to find tasks that do not occasion problem behavior, especially if the severity of problem behavior requires its immediate suppression and extinction is not a feasible component (see Zarcone, Iwata, Mazaleski & Smith, 1994 for a discussion of the role of extinction in high-*p* request sequencing).

Demand fading, another antecedent intervention, may be used for situations in which the immediate suppression of problem behavior is necessary. During this procedure, tasks are entirely removed from the instructional setting, resulting in the abrupt reduction of problem behavior, and then tasks are then gradually reintroduced. Pace, Iwata, Cowdery, Andree, and McIntyre (1993) demonstrated the effectiveness of demand fading in reducing escape-maintained SIB. Researchers observed an immediate

decrease in the rate of SIB following the initial removal of demands. Although some small spikes in SIB were observed as the number of instructions per session was increased, SIB remained low relative to baseline throughout the intervention.

When using demand fading, reductions in problem behavior are immediate. This can be especially beneficial for situations in which problem behavior is so severe that low rates of problem behavior cannot be tolerated due to safety concerns for the client, caretakers, or others. However, the loss of instructional time is a drawback that can make demand fading a poor fit for some situations. In addition, an instructional change of this magnitude would require a one-to-one staff-to-student ratio, which may make this intervention infeasible for some settings.

In general, antecedent procedures like curricular revision, activity choice, high-*p* request sequencing, and demand fading are less intrusive than consequent-based procedures. Teachers may be more inclined to use antecedent procedures than consequent procedures (Cooper, Heron, & Heward, 2007). Antecedent procedures may also be easier for caregivers to implement because alterations are not contingent on problem behavior or other client behavior (Wilder & Carr, 1998).

That no specific procedures are followed in case of problem behavior may be a drawback to these procedures. In fact, it is recommended that antecedent procedures be combined with specific procedures to follow in case of problem behavior (i.e., consequent-based procedures) to increase intervention efficacy (Geiger, Carr, & LeBlanc, 2010).

Extinction is a consequent-based procedure that consists of withholding the reinforcement that has previously maintained a behavior. In the case of escape extinction this means, following problem behavior, demands continue to be placed while breaks from demands are withheld (Carr, Newsom, & Binkhoff, 1980; Heidorn & Jensen, 1984; Repp, Felce, & Barton, 1988). Iwata, Pace, Kalsher, Cowdery, and Cataldo (1990) demonstrated the effectiveness of escape extinction in their study of six subjects with intellectual disabilities who engaged in escape-maintained SIB. During baseline, if the subject engaged in SIB, the therapist provided a break from demands. During baseline, levels of SIB were high and variable within and across participants. Following baseline, experimenters implemented escape extinction such that a break was no longer provided following SIB. For five of the six participants, SIB decreased to levels at or near zero following the implementation of escape extinction. In addition to being effective alone, extinction has been shown to increase the effectiveness of antecedent intervention procedures (e.g., Dawson et al., 2003; Iwata, Cowdery, Andree, & McIntyre, 1993; McCord, Thomson, & Iwata, 2001; Volkert, Lerman, Call, & Trosclair-Lasserre, 2009).

Some researchers suggest that escape extinction may be a crucial part of the success of antecedent procedures (Janney, Umbreit, Ferro, Liaupsin, & Lane, 2013; Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994). For example, Zarcone, Iwata, Mazaleski, and Smith (1994) investigated the effectiveness of high-*p* request sequencing alone and high-*p* request sequencing with extinction on the reduction of escape-maintained SIB and noncompliance. Sessions were identical except when SIB occurred during high-*p* request sequencing alone, the therapist provided a break from demands, but

when SIB occurred during high-*p* request sequencing with extinction, the experimenter physically guided the participant to complete the task. During high-*p* request sequencing alone, levels of SIB and noncompliance remained high and variable. Noncompliance and SIB were only reduced when high-*p* request sequencing was paired with extinction.

Zarcone et al. concluded that when a person engages in behavior maintained by escape from demands, high-*p* request sequencing needs to be paired with extinction in order to be effective. Escape extinction has also been shown to increase the effectiveness of demand fading (Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994), and activity choice (Kern, Mantegna, Vorndran, Bailin, & Hilt, 2001). These studies suggest that even with proper implementation of antecedent procedures, problem behavior may not be reduced to clinically acceptable rates without the addition of extinction. In other words, if problem behavior continues to produce a break from demands, that behavior may continue to occur.

Providing a break following problem behavior is not the only potential form of negative reinforcement that a clinician, parent, or teacher may provide that may maintain problem behavior. A study conducted by Sailor, Guess, Rutherford, and Baer (1968), suggests that a switch to easier tasks contingent on problem behavior may reinforce escape-maintained problem behavior. Sailor et al. investigated the effects of switching tasks contingent on tantrums as a possible method for decreasing tantrums while increasing responding. Their study included one participant, a nine-year-old girl with a limited vocal repertoire who had been diagnosed with a developmental delay. They used a reversal design to compare the effect of two conditions. In the first condition the

therapist continuously presented difficult tasks. Contingent on tantrums, the therapist presented an easy task. In the second condition, the therapist continuously presented easy tasks. When the subject engaged in tantrum behavior, the therapist presented a difficult task.

Although it was not acknowledged as such, the second condition employed punishment techniques (i.e. a stimulus was provided contingent on behavior that resulted in a reduction of that behavior). Sailor et al. explain that they selected this procedure to increase the potency of reinforcement for vocalization attempts by minimizing reinforcement through competing responses (i.e., breaks from demands following tantrums). Furthermore, they wished to explore a method for controlling tantrums that was less aversive than those commonly employed at the time (e.g., timeout, contingent presentation of noxious stimuli).

Sailor et al. observed a decrease in rate of tantrums during the condition in which the therapist presented a difficult task contingent on tantrums. During the condition in which the therapist presented an easy task contingent on tantrums, rate of tantrums increased across sessions. These results indicate that for this participant a switch from difficult tasks to easy tasks may have been a reinforcer for problem behavior. That a switch of tasks may reinforce problem behavior is of particular concern in situations where task difficulty is being manipulated as a treatment procedure. Although antecedent procedures are designed to be precursory measures, without careful implementation they may create situations in which easy tasks could be established as reinforcers for problem behavior. Warnings to avoid implementation of easier, less aversive, or high-*p* tasks

contingent on problem behavior are sparse. This may be in part because the reinforcing effects of the presentation of an easy task in lieu of a difficult task have not been widely researched.

To compound the issue, research on teacher behavior demonstrates that student engagement in problem behavior can modify teacher behavior away from presenting difficult demands. For example, McConnachie and Carr (1997) studied procedural fidelity and task presentation with three adult participants (teachers) while they worked with children who engaged in escape-maintained problem behavior. Prior to the study, researchers trained the teachers on the use of discrete-trial teaching. Training included reading a manual, observing video recording, observing live sessions, role-playing, and finally practicing with students who did not engage in problem behavior. Each teacher was trained on DTT until she met implementation criterion of 90%. Researchers provided additional training on implementing escape extinction that included an overview, observations, and role-playing. Each teacher was given a list of tasks identified for the child with whom she would be working. Researchers had previously identified four tolerated tasks (i.e., tasks that rarely occasioned problem behavior), and four non-tolerated tasks (i.e., tasks for which problem behavior was likely to occur), but teachers were not informed of which tasks were tolerated and which were non-tolerated. In the initial phase, teachers were prompted via a bug-in-ear device to ensure procedural fidelity and equal presentation of tolerated and non-tolerated tasks. In the next phase, prompting was removed and teachers were reminded to present all tasks equally within the session. All three teachers implemented discrete-trial teaching and escape extinction with

high fidelity. However, implementation of non-tolerated tasks decreased to near-zero percentages for two of the teachers and less than 20% for the third teacher. These decreases in presentation of non-tolerated tasks were paired with decreases in rate of problem behavior for all three children.

The decrease in implementation of non-tolerated tasks may be attributed to the teacher's behavior of selecting tolerated tasks being negatively reinforced in the form of avoidance of student problem behavior or the teacher's behavior of selecting non-tolerated tasks being punished by the emission of student problem behavior. These results suggest that even with considerable training on DTT and extinction procedures, teacher, caregiver, and parent behavior can be modified by client problem behavior. Because some antecedent procedures involve presenting tolerated and non-tolerated tasks, or systematically manipulating the frequency of task presentation, these findings are of particular importance. Teachers could unintentionally decrease the presentation of non-tolerated tasks due to contingencies they experience.

It is important to establish whether a switch in tasks contingent on problem behavior functions as reinforcement for that behavior in order to guard against misuse of this switch during intervention. The current study examined the effects of a switch from low-*p* tasks to high-*p* tasks contingent on problem behavior. The research question for this study was: For individuals with developmental or intellectual disabilities, does a switch from low-*p* demands to high-*p* demands function as a reinforcer for problem behavior?

METHOD

Participants and Setting

This study included three individuals with disabilities who were referred for treatment of problem behavior. Participants were included if they engaged in problem behavior maintained by escape from demands as determined by a functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). Richard was a 32-year-old male diagnosed with profound mental impairment and visual impairment that significantly limited the perception of light in both eyes. However, he was able to identify colors, shapes, and large pictures. Richard was referred for aggression, property destruction, and inappropriate vocalizations. Frederick was a 4-year-old male diagnosed with autistic disorder. He was referred for aggression and property destruction. Nicholas was a 7-year-old male diagnosed with attention deficit hyperactivity disorder. He was referred for inappropriate vocalizations and aggression.

Frederick's and Nicholas' sessions were conducted at a university-based clinic equipped with a two-way mirror. Richard's sessions were conducted in an empty room at a day program that he attended. All rooms were equipped with a table, two chairs, and relevant demand materials (e.g., worksheets, pencils, picture cards).

Pre-experimental Assessments

Preference Assessments

We conducted a multiple-stimulus without replacement (MSWO) preference

assessment (DeLeon, & Iwata, 1996) for each participant to identify preferred tangible items to use in the functional analysis and treatment comparison. The preference assessment included seven items (e.g., puppets, iPad, toy cars). Prior to the assessment, the participant was given 30-s exposure to each item. The therapist then placed all seven items in front of the participant with the instruction to, "Pick one." The participant was allowed access to the selected item for 30 s. After the allotted time, the therapist removed the item and re-presented the remaining items. The therapist then prompted the participant to pick another item. This process continued until either there were no items left or the participant no longer made a selection from the remaining available items. This procedure was repeated three times. Preference was calculated by dividing the number of times an item was selected by the number of times the item was available.

During the MSWO preference assessment, Richard consistently selected items on the right side of the array regardless of which items were placed on that side. We conjectured that this was due to his visual impairment. To decrease the necessity to scan a large array of items, we elected to conduct a paired stimulus preference assessment (Fisher et al., 1992). In this preference assessment, we again assessed seven items. After allowing Richard 30-s exposure to each item, the therapist presented two items with the instruction to, "Pick one." Richard was then allowed to interact with the selected item for 30 s. The therapist then removed that times and presented two new items. We continued to present items until each item had been paired with every other item. Preference was calculated by dividing the number of times an item was selected by the number of times the item was available.

Demand Assessment

We conducted a demand assessment (Roscoe et al., 2009) to determine high-*p* and low-*p* demands to be used in subsequent assessments. We used caregiver input to create a list of demands to be used in the demand assessment. For each demand, a 5-min demand session was presented. During the demand session, the therapist continuously presented a single demand. If the participant complied with the demand, the therapist immediately re-presented that demand. If the participant did not comply with the demand within 5 s the therapist represented the demand while modeling the task. If, after another 5 s, the participant still did not comply with the demand, the therapist repeated the demand while physically guiding the participant to complete the demand. Contingent on problem behavior, the therapist provided 30-s break after which the therapist again presented demands. For each demand, we calculated percentage of problem behavior by dividing the number of times the demand was followed by problem behavior with by the number of times the demand was presented. We also calculated percentage compliance with the demand by dividing the number of times a demand was complied with by the number of times the demand was presented. Demands for which problem behavior was less than 10% and compliance was 80% or higher were labeled as high-*p* demands. Demands for which problem behavior was 25% or higher and compliance was 50% or lower were labeled as low-*p* demands (Zarcone, Iwata, Mazaleski, & Smith, 1994). We continued to assess demands until three demands met requirements for high-*p* demands and three demands met requirements for low-*p* demands, or until 15 demands were assessed. If, after 15 demands were assessed, less than three demands met criteria for high-*p* demands

or less than three demands met criteria for low-*p* demands, we selected demands that most closely fit criteria for use in further assessments.

Functional Analysis

In order to empirically identify the variables maintaining problem behavior, we conducted a functional analysis (Iwata et al., 1982/1994). We conducted four conditions, attention, escape, play, and tangible, in a multi-element design. Each session lasted 10-min. Each condition was conducted by a separate therapist wearing a uniquely colored shirt (Connors et al., 2000).

During the *attention* condition, the participant and a therapist were in the room while the participant had access to moderately preferred items. The therapist informed the participant that she had some work to do and diverted her attention away from the participant. The therapist delivered brief attention only when the participant engaged in problem behavior.

For the *escape* condition, a therapist placed a continuous series of low-*p* demands on the participant. If the participant complied with a demand, another demand was immediately presented. If the participant did not comply, the therapist modeled the task and then provided a second opportunity for the participant to complete the task. Finally, if the participant still did not comply with the demand, the therapist physically guided him to complete the task. The therapist immediately delivered a 30-s break if the participant engaged in aggression, flopping or inappropriate vocalizations.

During the *play* condition, the participant and therapist were in the room while the participant had continuous access to his most preferred items. Additionally, the therapist provided attention at least once every 30 s. No demands were placed on the participant.

In the *tangible* condition, the participant and the therapist were in the room with highly preferred items visible to the participant but out of his reach. The participant received 30 s of access to the preferred items only after engaging in problem behavior.

We calculated rate of problem behavior by dividing the occurrences of problem behavior in each session by the number of minutes in each session.

Dependent Variable and Response Measurement

The primary dependent variable was rate of problem behavior. We calculated the rate of problem behavior by dividing the total instances of problem behavior by the session duration (in minutes). Topographies of problem behavior for Richard were aggression, property destruction, and inappropriate vocalizations. For Frederick, topographies of problem behavior were aggression and property destruction.

Topographies of problem behavior for Nicholas were inappropriate vocalizations and aggression. During the treatment assessment a third topography, property destruction, was added for Nicholas after observing multiple occurrences and confirming with caregivers that this topography of problem behavior was not uncommon. For Richard, Aggression was defined as hitting, pushing, pinching, biting, kicking, grabbing, spitting at or scratching another person. Aggression for Frederick was defined as hitting, kicking, or spitting at another person, or pulling another person's hair. For Nicholas, aggression

was defined as hitting another person. For all participants, property destruction was defined as throwing, hitting, or kicking an object. Inappropriate vocalizations for Richard were defined as screaming/yelling and/or directing profanity toward someone. For Nicholas, inappropriate vocalizations were defined as yelling and/or threatening to harm another individual.

Secondary dependent variables were compliance with low-*p* demands and percentage of low-*p* demands followed by problem behavior. Compliance was defined as initiating a demand specified by the therapist following the first two instructions. Compliance was not counted following physical prompts. In order to control for the varying number of instructions in each session, we compared percentage of compliance with demands across conditions. We calculated percentage of compliance for each session by dividing the number of times a participant complied with a low-*p* instruction by the total number of low-*p* instructions presented and multiplying by one hundred. Percentage of low-*p* demands followed by problem behavior was also used as a secondary dependent variable. We calculated percentage of low-*p* demands followed by problem behavior for each session by dividing the number of low-*p* demands that were followed by problem behavior by the total number of low-*p* demands given and multiplying by one hundred.

Reliability

Trained observers collected data on therapist behavior (i.e., presentation of demands, breaks, attention, and tangible items) and participant behavior (i.e., problem

behavior, and compliance) using !Observe software on handheld computers. Observers were trained using video modules showing procedures (described below). Training continued until a minimum of 80% agreement was achieved. A secondary independent observer collected data for 33.5% of sessions. Reliability was calculated by dividing each session into 10-s intervals. We then compared the primary and secondary observers' records interval-by-interval. For each interval, we divided the smaller number of recorded responses by the larger number of recorded responses. Agreement for an interval was scored as 1.0 if both observers agreed on the number of responses or agreed on no responses during a given interval. These fractions were averaged across intervals to determine the percentage agreement between the two observers. If, at any time, agreement between observers was below 80%, one of the authors reviewed the response definitions with each of the observers. Reliability calculations are shown in Table 1.

Table 1

Reliability Calculations

Procedure	Sessions with Reliability	Reliability Range	Mean Reliability
Preference Assessment			
Richard	100%	-	100%
Frederick	100%	-	100%
Nicholas	100%	-	100%
Demand Assessment			
Richard	33.3%	86.7-100%	98.2%
Frederick	33.3%	73.3-100%	93.1%
Nicholas	28.6%	73.9-100%	93.5%
Functional Analysis			
Frederick	40.0%	81.7-100%	97.1%
Nicholas	33.3%	93.3-100%	98.0%
Intervention Comparison			
Richard	34.5%	75.8%-100%	96.8%
Frederick	36.0%	77.0-100%	94.0%
Nicholas	32.6%	76.6-100%	95.0%

Procedural Integrity

During the intervention comparison, procedural integrity data was collected by an independent observer for 35%, 36%, and 33% of sessions for Nicholas for Richard, Frederick and Nicholas, respectively. Procedural integrity was scored by breaking each condition into steps (i.e., task analysis; see the Appendix for sample data collection sheets). The observer then recorded whether the therapist correctly implemented each step. Procedural integrity was calculated by dividing the number of steps correctly implemented by the total number of steps and multiplying by one hundred. Procedural integrity averaged 97.4% (range, 82% to 100%) across all participants and conditions.

Procedures

A multi-element design was used to compare the effects of two different procedures, escape extinction and a switch to high-*p* tasks, on problem behavior relative to a baseline condition in which breaks were contingent on problem behavior. Percentage of compliance with low-*p* demands, and percentage of low-*p* demands followed by problem behavior were secondary measures. As a secondary control, we implemented a play condition in which no demands were presented. Each condition was associated with a separate therapist (except Richard's sessions 1-10), who was wearing a uniquely colored shirt. Additionally, for Richard, each condition was indicated by a colored paper placed on the work table. Richard's and Frederick's sessions were 10 min. Nicholas' sessions were 5 min.

Break

The therapist continuously placed low-*p* demands using a three-step prompt procedure (Horner & Keilitz, 1975). During the three-step prompt procedure, the therapist instructed the participant to complete a low-*p* task. If the participant did not comply within 5 s, the therapist repeated the demand and modeled task. If the participant still did not comply, the therapist again repeated the demand and physically guided the participant to comply. At any time, if the participant complied, the therapist immediately presented a new low-*p* demand. Contingent on problem behavior, the therapist provided a 30-s break from demands; then after 30 s, the therapist again placed demands on the participant.

Play

The therapist did not present any demands. The participant had continuous access to his highest-preferred items. The therapist provided attention a minimum of once every 30 s.

Escape Extinction

The therapist presented a series of low-*p* demands. If the participant complied, the therapist immediately presented a new demand. If the participant did not comply with a demand, the therapist followed the three-step prompt procedure. The therapist ignored all instances of problem behavior. In other words, if problem behavior occurred the therapist continued to follow the three-step prompt procedure.

Switch to High-*P* Tasks

This condition was identical to the break condition except that if problem behavior occurred following the presentation of a low-*p* task, the therapist presented 30 s of high-*p* demands in random order. If the participant did not comply with a high-*p* demand or engaged in problem behavior following a high-*p* demand, the therapist followed the three-step prompt procedure as described above. Following 30 s of high-*p* demands, the therapist again presented low-*p* demands.

Data Analysis

We determined potential reinforcement effects by visually analyzing the changes in level and trend of problem behavior between the break condition (baseline) and intervention conditions. Compliance with low-*p* demands and percentage of low-*p* demands followed by problem behavior were analyzed as secondary measures.

RESULTS

Preference Assessments

The results for Frederick and Nicholas' MSWO preference assessments are shown in Figure 1. For Frederick, we identified the light-up roller and fidgets as high-preferred items; however, during the functional analysis, we observed a high rate of problem behavior (i.e., throwing) when Frederick had access to these items. Consequently, we excluded these items from the remaining sessions of the study. Snakes and coloring

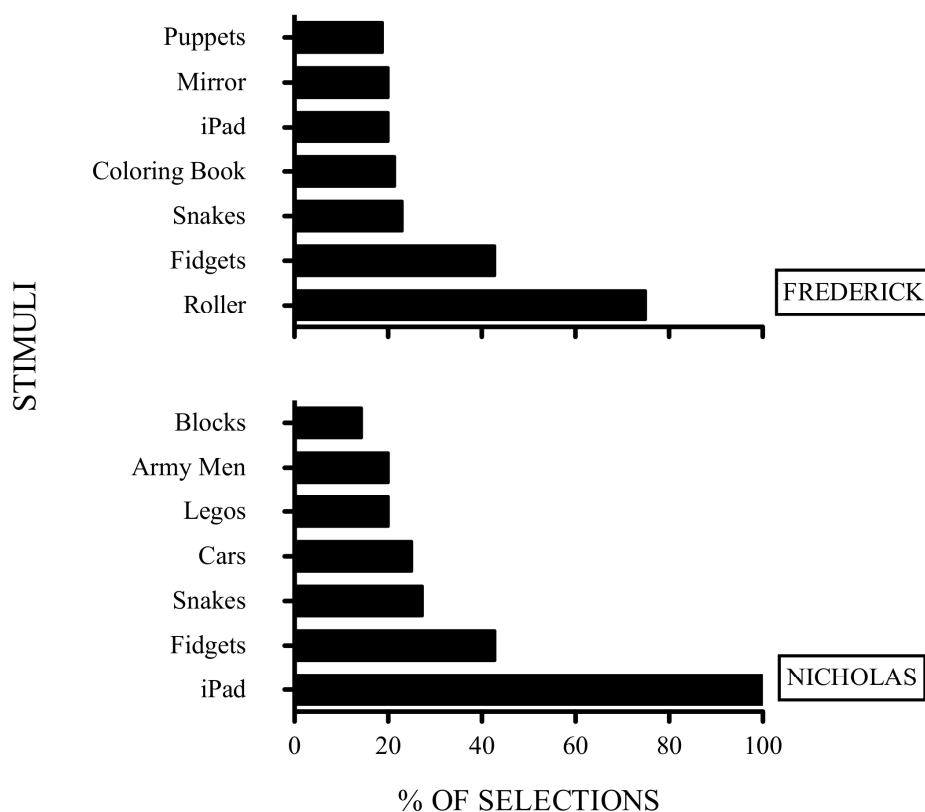


Figure 1. Results from Frederick's (top panel) and Nicholas' (bottom panel) MSWO preference assessments. The y-axes show stimuli evaluated, and the x-axes show percentage of selections.

books were identified as the next highest preferred items, and the mirror and iPad were used as moderately preferred items. For Nicholas, we identified the iPad and fidgets as high-preferred items. The snakes and cars were identified as moderately preferred items.

The results of Richard's paired-stimulus preference assessment are shown in Figure 2. For Richard, we identified the coloring book and photo book as high-preferred items and the books and iPad as moderately preferred items. At session 31, we also added Richard's moderately preferred items, iPad and books, to the play condition (Bowman, Piazza, Fisher, Hagopian, & Kogan; 1997).

Demand Assessment

The results of the demand assessment are shown in Figure 3. For Frederick, stringing beads, pointing to numbers, and pointing to words were identified as high-*p*

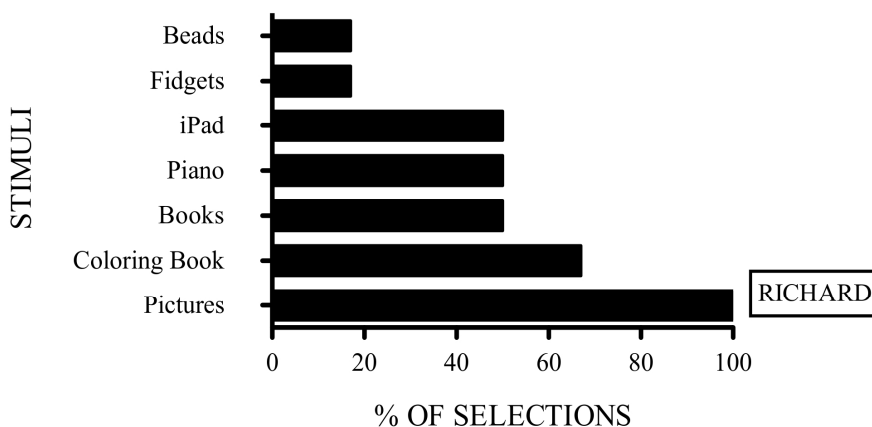


Figure 2. Results from Richard's paired stimulus preference assessment. The y-axis shows stimuli evaluated, and the x-axis shows percentage of selections.

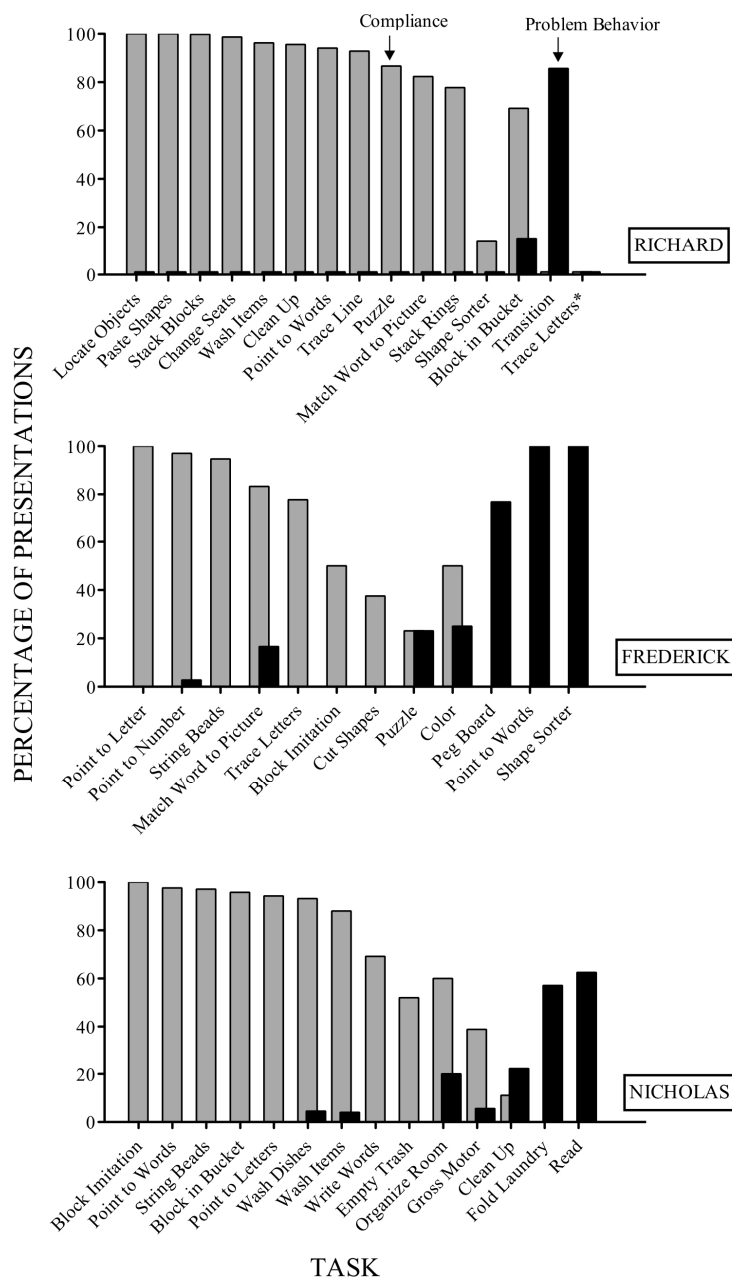


Figure 3. Results from the demand assessments. The top panel shows Richard's data, the middle panel shows Frederick's data, and the bottom panel shows Nicholas' data. The x-axes show demands evaluated, and the y-axes show the percentage of task presentations followed by each response. The gray bars represent compliance and the black bars represent problem behavior.

tasks. His low-*p* tasks were matching pictures to words, pointing to letters, and putting blocks in shape sorter. For Nicholas, we identified pointing to words, imitating block structures, and stringing beads as high-*p* tasks. Low-*p* tasks were reading, folding laundry, and putting away dishes. For Richard, after 15 demands were assessed, three demands met the stated criteria for high-*p* tasks and one demand met the stated criteria low-*p* tasks. We selected the two demands that most closely matched the criteria as low-*p* demands. Tracing letters was excluded as a demand because he was not yet proficient in this skill. Richard's high-*p* demands were locating objects, pasting shapes, and stacking blocks. His low-*p* tasks were transitioning, putting a block in a bucket, and placing a shaped block in a sorter.

Functional Analysis

The results for Frederick's and Nicholas' functional analyses are shown in Figure 4. For Frederick, we saw elevated levels of problem behavior during the escape condition. We initially saw problem behavior in the play condition, but this decreased to zero responding after new preferred items were introduced (see above). We also saw low rates of responding in the tangible condition. These results suggest that Frederick's problem behavior is maintained by escape from demands and access to tangible items. For Nicholas, we saw elevated levels of problem behavior in the escape condition and zero or near zero levels of responding in all other conditions. These results suggest that Nicholas' problem behavior is maintained by escape from demands. We did not conduct a functional assessment for Richard, as a functional assessment had already been conducted in conjunction with another research study (Kunnavatana, 2014). Richard's

functional analysis suggested that his problem behavior was maintained by escape from demands and access to tangibles. The tangible function was treated as part of the aforementioned study.

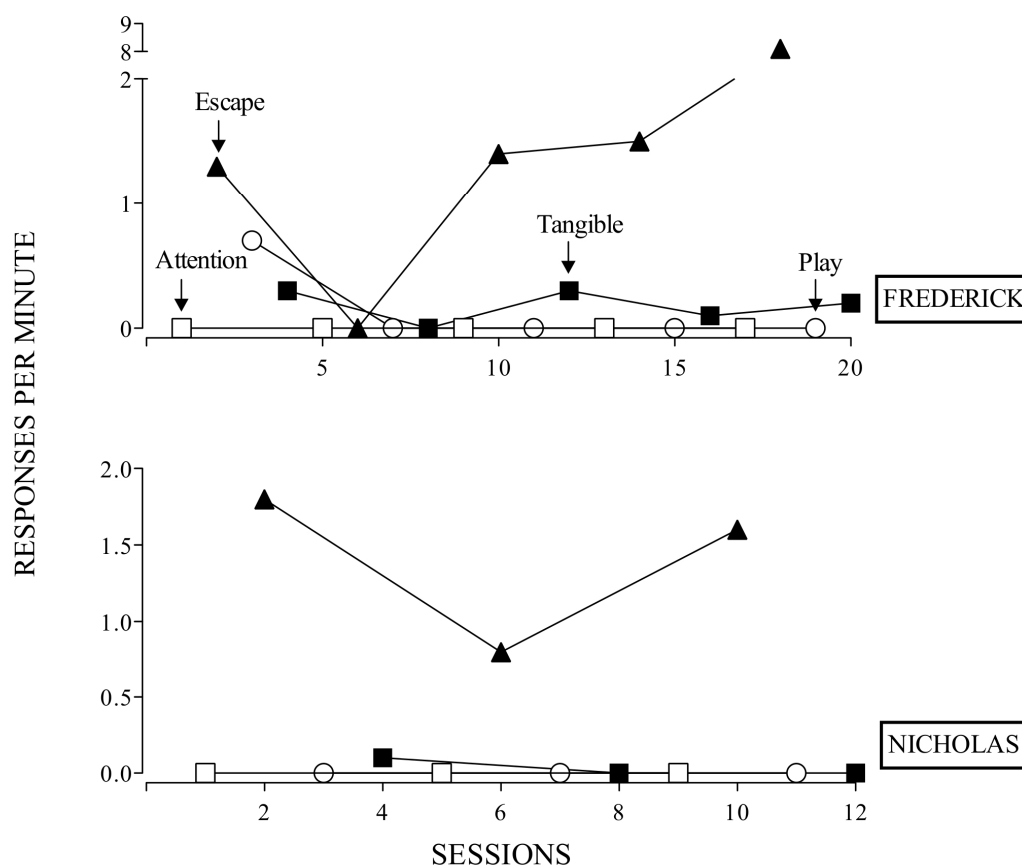


Figure 4. Results from Frederick's (top panel) and Nicholas' (bottom panel) functional analyses. The x-axes show responses per minute, and the y-axes show sessions. Open-squares represent the attention condition, closed-triangles represent the escape condition, open-circles represent the play condition, and closed-squares represent the tangible condition. Note the break in the y-axis on the top panel and different y-axis ranges.

Intervention Comparison

Richard

Figure 5 shows results from Richard's intervention comparison. During baseline, we saw elevated levels of problem behavior on an increasing trend, with high variability during the break condition. Additionally, we observed a decreasing trend in compliance with low-*p* demands. The percentage of low-*p* demands followed by problem behavior was highly variable, but also seemed to be on an increasing trend. There were no instances of problem behavior during the play condition. As there were no demands presented during the play condition, percentage compliance and percentage of problem behavior following low-*p* tasks were not calculated.

During the initial sessions of the intervention comparison, we saw a reduction of all problem behavior paired with relatively high levels of compliance. For the extinction condition problem behavior was at or near zero throughout. Percentage of compliance with low-*p* tasks during the extinction condition was at or near zero throughout the phase. In the break condition, we saw a replication of the baseline phase for level and variability of problem behavior and compliance. The switch condition started with three sessions of no problem behavior and relatively high percentages of compliance. We then observed an increase of problem behavior to rates above those seen in the escape condition. Compliance with low-*p* tasks decreased to zero and percentage of low-*p* tasks followed by problem behavior increased.

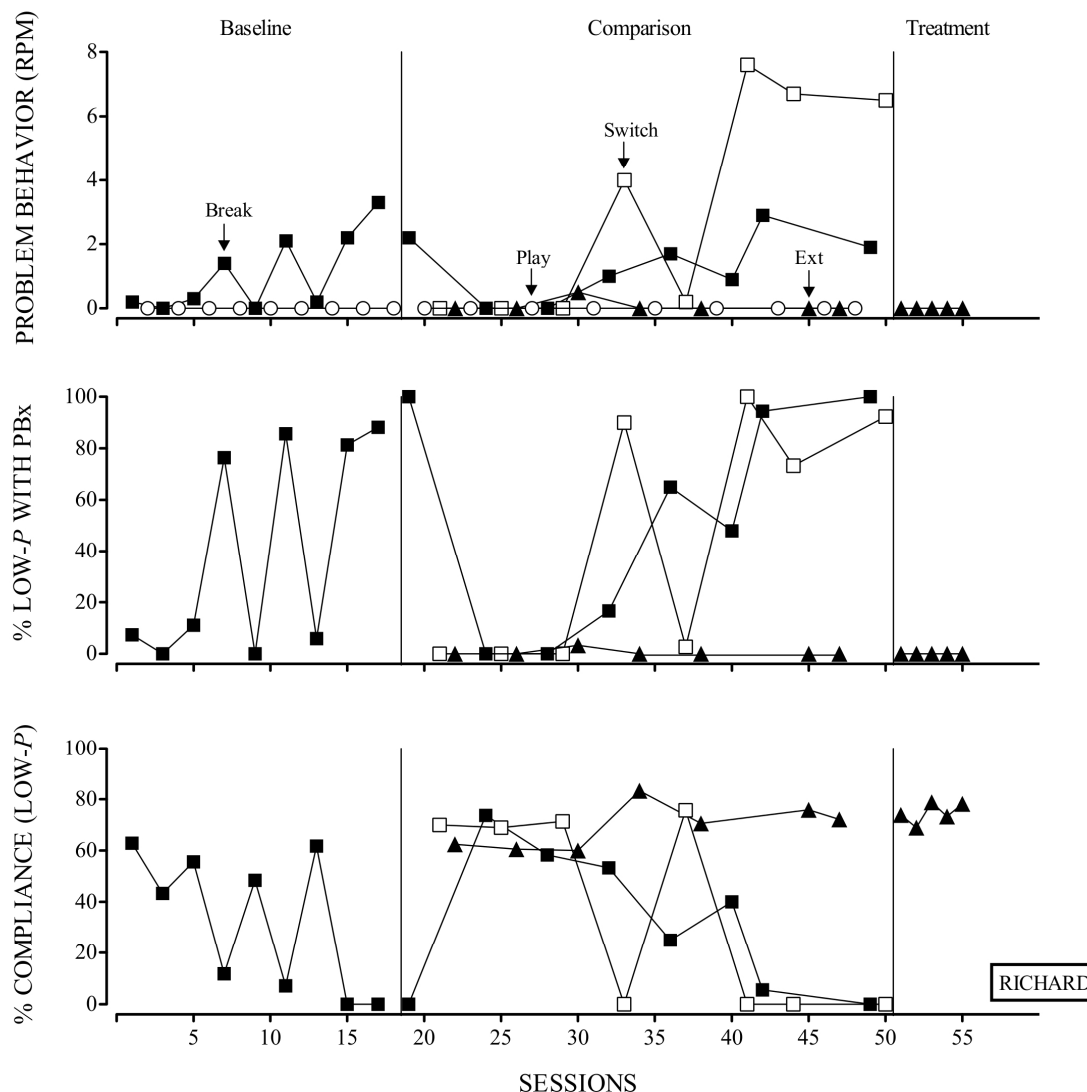


Figure 5. Results from Richard's intervention comparison. The x-axes show sessions. For the top panel, the y-axis shows problem behavior in responses per minute. For the middle panel, the y-axis shows percentage of low-*p* task presentations followed by problem behavior. For the bottom panel, the y-axis shows percentage of compliance with low-*p* demands. Closed squares represent the break condition, open circles represent the play condition, open squares represent the switch-tasks condition, and closed triangles represent the extinction condition.

We implemented escape extinction during the treatment phase and observed high levels of compliance with low- p tasks with no problem behavior.

Frederick

Figure 6 shows results for the intervention comparison for Frederick. During the baseline phase, we observed near zero rates of problem behavior during the play condition. In the break condition, the rate of problem behavior increased across the phase paired with an increase in percentage of low- p tasks followed by problem behavior. The percentage of compliance with low- p tasks decreased from nearly 60% to zero by the end of the phase.

In the intervention comparison phase, there were no instances of problem behavior during the play condition. During the break condition we observed relatively stable rates of problem behavior. This was paired with an increasing trend in percentage of low- p tasks followed by problem behavior and a decreasing trend in percentage of compliance with low- p tasks. During the switch tasks condition rate of problem behavior was also elevated, but at a lower level than in the break condition. Additionally, the percentage of low- p tasks followed problem behavior was noticeably lower in the switch tasks condition than in the break condition. Compliance with low- p tasks during the switch tasks condition was higher than in the other conditions; however, it remained below 40% throughout the phase. During the extinction condition we saw an increase in both rate of problem behavior and percentage of low- p tasks followed by problem

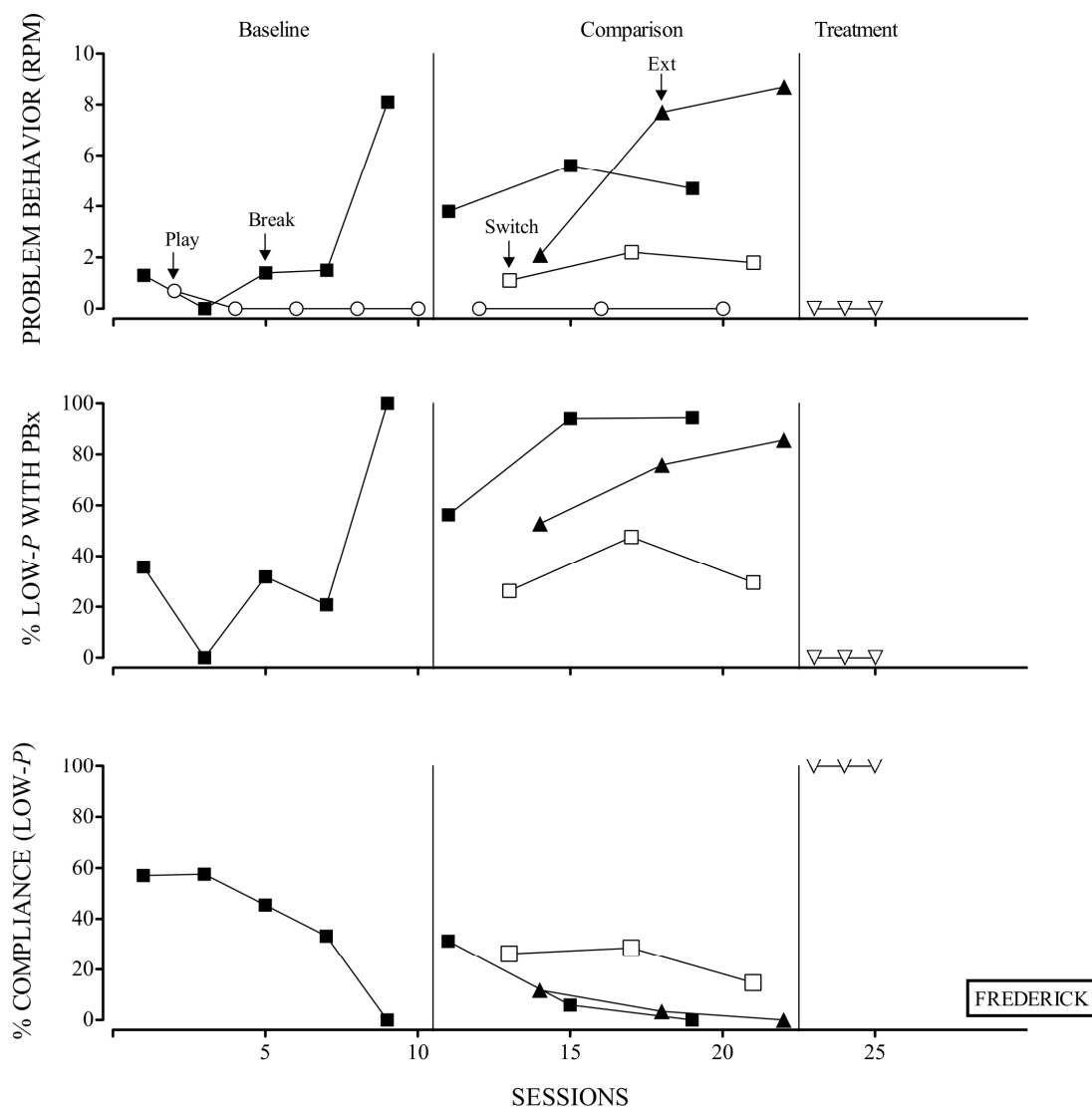


Figure 6. Results from Frederick's intervention comparison. The x-axes show sessions. For the top panel, the y-axis shows problem behavior in responses per minute. For the middle panel, the y-axis shows percentage of low-*p* task presentations followed by problem behavior. For the bottom panel, the y-axis shows percentage of compliance with low-*p* demands. Closed squares represent the break condition, open circles represent the play condition, open squares represent the switch-tasks condition, closed triangles represent the extinction condition, and open inverted triangles represent extinction plus an enhanced break for compliance.

behavior. Percentage of compliance with low-*p* tasks was low and decreased across the phase.

We used escape extinction paired with an enhanced break for compliance during the treatment phase. We selected this treatment in order to account for both the escape and tangible functions indicated by the functional analysis. We observed 100% compliance with low-*p* tasks and no problem behavior during this phase.

Nicholas

Results from the intervention comparison for Nicholas are shown in Figure 7. During the baseline phase, in the break condition we observed high rates of problem behavior, a high percentage of low-*p* tasks followed by problem behavior, and low levels of compliance with low-*p* tasks. No problem behavior occurred during the play condition.

During the intervention comparison phase we observed problem behavior in all conditions except play. Problem behavior followed similar patterns across the phase. At session 18, we saw a separation of data paths in which we observed high percentages of low-*p* tasks followed by problem behavior in both the escape and switch tasks conditions, with moderate and decreasing percentages in the extinction condition. We also observed an increase in compliance with low-*p* tasks during the extinction condition and several sessions with zero compliance during the escape and switch tasks conditions. Some difference between conditions in rate of problem behavior also occurred, but this was not as clear. At session 27, problem behavior decreased to near zero and compliance

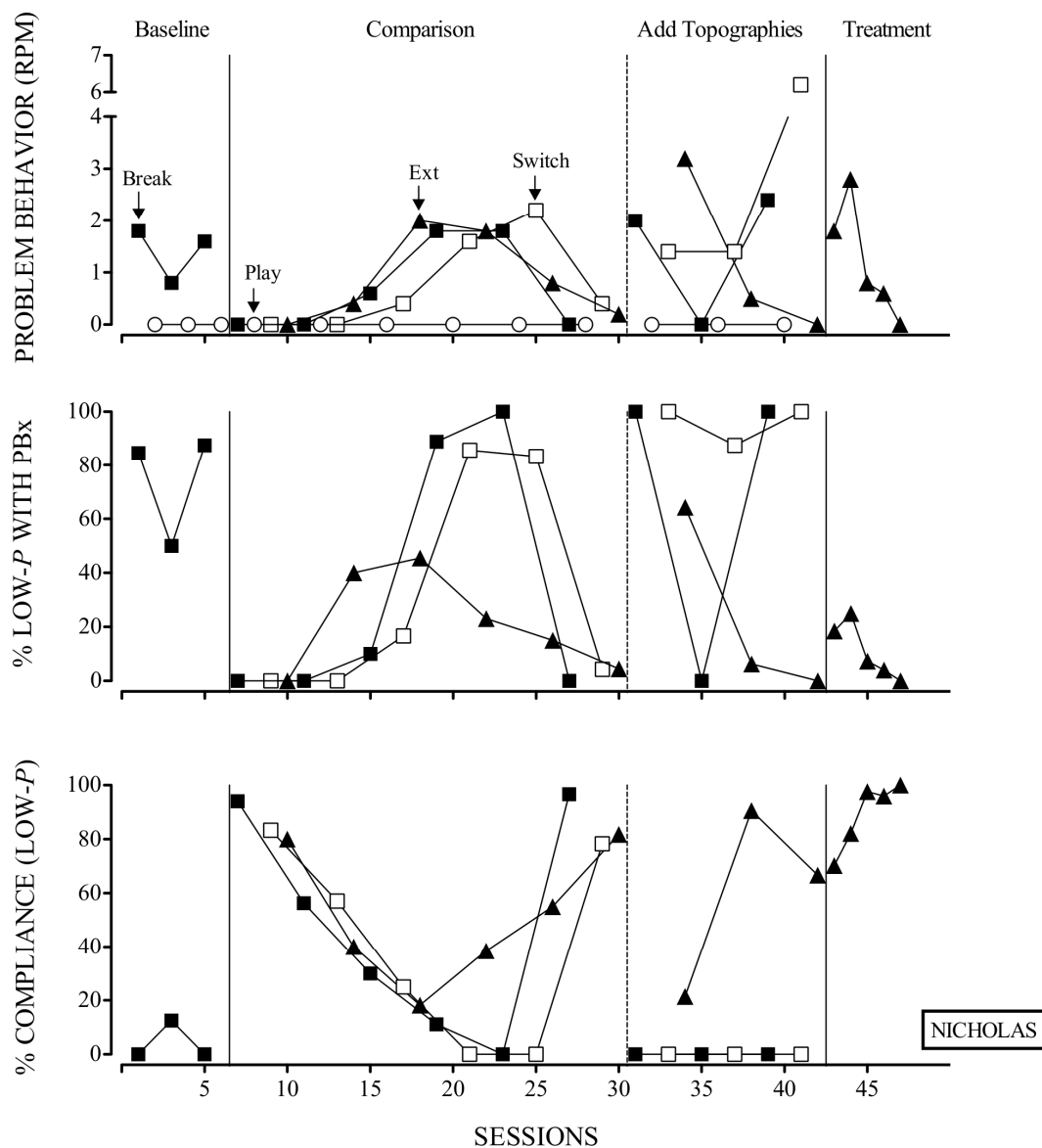


Figure 7. Results from Nicholas' intervention comparison. The x-axes show sessions. For the top panel, the y-axis shows problem behavior in responses per minute. For the middle panel, the y-axis shows percentage of low- p task presentations followed by problem behavior. For the bottom panel, the y-axis shows percentage of compliance with low- p demands. Closed squares represent the break condition, open circles represent the play condition, open squares represent the switch-tasks condition, and closed triangles represent the extinction condition. Note the break in the y-axis for the top panel.

increased for all conditions – by the end of the phase, all three measures were highly similar across all conditions.

During all sessions of the intervention comparison, we had been collecting data on the occurrence of property destruction, a topography of problem behavior that had not been reported during the intake process, but had been observed during the functional analysis. Property destruction for Nicholas was defined as throwing, hitting, or kicking objects or surfaces. Figure 8 shows both the reinforced topographies (inappropriate vocalizations and aggression) and the combination of inappropriate vocalizations, aggression, and property destruction. Because inappropriate vocalizations and aggression were the only behaviors targeted during the functional analysis, they were the only topographies that entered into the relevant contingencies. However, by session 31 it was clear that we had not accounted for all of the influencing variables. Figure 8 shows that the combined topographies of problem behavior, or the broader response class, continued to increase during the switch tasks condition, while the narrower response class of inappropriate vocalizations and aggression decreased. In order to strengthen the influence of our independent variable, at session 32 we provided consequences for all topographies of the broader response class.

During the treatment comparison phase in which we were providing consequences for all topographies of problem behavior, in the extinction condition we saw a decrease in problem behavior and an increase in compliance. In the break condition, we saw relatively high levels of problem behavior and no compliance. During session 35, Nicholas lay on the floor for the entire session. While we did not see problem behavior

during this session, we also did not see any compliance. During the switch tasks condition, we observed increasing levels of problem behavior, and zero compliance.

We used escape extinction as the treatment in the final phase. During the treatment phase, problem behavior decreased to zero and compliance with low-*p* tasks increased to 100%.

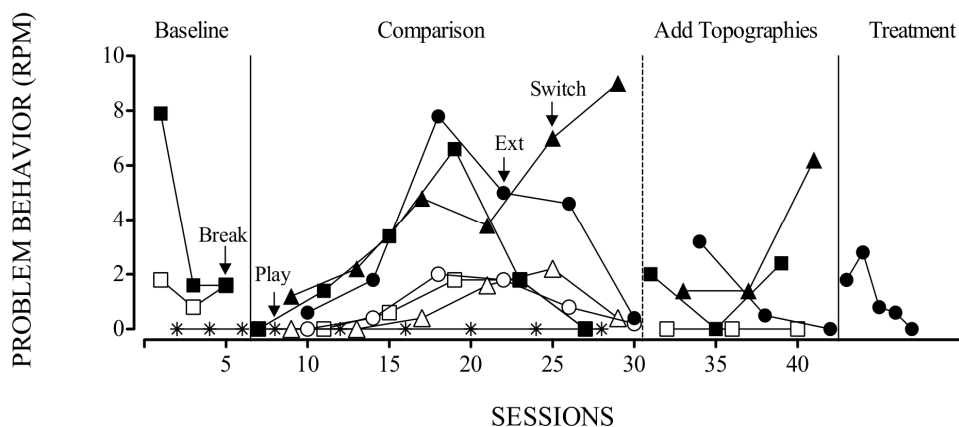


Figure 8. Narrow (open data paths) and broader (closed data paths) response classes during Nicholas' treatment comparison. The x-axes show sessions, and the y-axis shows problem behavior in responses per minute. Squares represent the break condition, asterisks represent the play condition, triangles represent the switch-tasks condition, and circles represent the extinction condition.

DISCUSSION

The current study assessed the effects of four conditions – break, play, extinction, and switch tasks – on rate of problem behavior. We did this in order to investigate the effects of a switch to low-*p* tasks contingent on problem behavior. For all participants during the switch tasks condition we observed elevated rates of problem behavior relative to the play condition. This suggests that a switch from low- to high-*p* tasks contingent on problem behavior may reinforce that behavior.

For two of the participants, Richard and Nicholas, problem behavior in the switch tasks condition increased to levels above those observed in the break condition. The data from this study do not clarify why these participants continued to engage in problem behavior even during the presentation of high-*p* tasks, they only demonstrate that they did so. One possibility that may explain this pattern of responding is to conceptualize this condition as an intermittent schedule of reinforcement. In other words, the participants engaged in problem behavior to avoid completing a task regardless of whether the task was a high- or low-*p* task. This does imply that the high-*p* tasks became more aversive over time, possibly due to association with low-*p* tasks.

Another possible explanation for this pattern of responding is that the participants engaged in problem behavior both to escape and avoid low-*p* tasks. Specifically, during the presentation of low-*p* tasks, participants engaged in problem behavior to escape the task. During the presentation of high-*p* tasks, they engaged in problem behavior to avoid or delay the re-presentation of low-*p* tasks.

In the case of Frederick, we observed elevated rates of problem behavior during both the break condition and switch tasks condition, with higher rates of problem behavior in the break condition than in the switch tasks condition. These data provide some preliminary evidence to suggest that although both consequences function as reinforcers, for some individuals a complete break from tasks may have a higher qualitative value than a switch to easier tasks. Reinforcers with different qualitative values have been utilized in DRA without extinctions interventions to reduce problem behavior (e.g., Athens & Vollmer, 2010). In these interventions the therapist provides the reinforcer with a lower qualitative value contingent on problem behavior and provides the reinforcer with a higher qualitative value contingent on an alternative behavior. When using this intervention to treat escape-maintained problem behavior, a complete break from demands was given contingent on problem behavior and the alternative behavior resulted in an enhanced break (i.e., a break from demands plus access to tangible items). Data from Frederick suggest an alternative approach to DRA without extinction for escape maintained problem behavior in which problem behavior results in a switch of tasks and the alternative behavior is met with a break from demands.

One potential limitation of this study is that for Frederick a reduction in problem behavior was not observed in any of the demand conditions during the treatment comparison phase. It is possible that with continued exposure to the contingencies, problem behavior could have decreased in one or more conditions. However, because problem behavior was maintained by both escape from demands and access to tangible items, problem behavior may have continued to occur in order to gain access to tangible

items. Data from the treatment condition in which compliance resulted in both a break from demands and access to tangible items supports this hypothesis. In this condition, Frederick complied with all of the low-*p* demands and did not engage in problem behavior.

Although not the focus of this study, the changes made during Nicholas' treatment assessment shed some light on the importance of including all topographies of a response class. During the phases in which inappropriate vocalizations and aggression were receiving reinforcement, we observed low levels and undifferentiated responding across conditions. However, when considering a broader response class, which included property destruction, we can see evidence of differentiated responding. This speaks to the importance of investigating possible response classes across topographies in order to gain an accurate picture of the maintaining variables of problem behavior.

This study adds to previous research on escape-maintained problem behavior in a number of ways. First, this study expands current knowledge of events that can reinforce problem behavior maintained by escape from demands. Most commonly, research regarding demand related problem behavior has shown that a complete break from demands maintains problem behavior and/or its replacement behavior (e.g., Iwata et al., 1982/1994; Lalli, Casey, & Kates, 1995). Researchers have also shown that assistance with difficult tasks (Carr & Durand, 1985), and a break from the demand with preferred stimuli (Lalli et al., 1999) can maintain escape behavior. In the current study, a switch from low- to high-*p* tasks sustained elevated rates of problem behavior for all three

participants. This suggests that a switch from low- to high-*p* tasks contingent on problem behavior can reinforce escape behavior.

Given the results of this study, we suggest that clinicians, teachers, and parents do not switch from low- to high-*p* tasks contingent on problem behavior as it may function as a reinforcer for problem behavior. This is not to say that antecedent procedures like high-*p* request sequencing, curricular revision, and activity choice should not be used. Research has shown that antecedent procedures can effectively decrease problem behavior. The issue addressed by this research concerns whether a change in instruction should be made contingent on emission of problem behavior. A teacher using high-*p* request sequencing to reduce problem behavior uses an anticipatory measure. The teacher presents high-*p* demands prior to each low-*p* demand. Once a low-*p* demand has been presented, the teacher does not switch the demand until the student complies with that demand regardless of occurrence of problem behavior. In contrast, a teacher may imprudently use the presentation of high-*p* tasks as a reactive measure. In this scenario, when the student engages in problem behavior following a low-*p* demand, the teacher presents several high-*p* tasks, perhaps thinking to come back to the low-*p* task once the student has begun to comply. However, the teacher may have mistakenly reinforced problem behavior. This study emphasizes the importance of using antecedent interventions as proactive, and not reactive, measures. That is, clinicians, teachers, and parents should not present or offer a switch of tasks contingent on problem behavior, as this may reinforce problem behavior.

The results from this study also add insight to the warnings from research on teacher behavior. Previous research has demonstrated that the behavior of teachers can be modified by the contingencies they experience while implementing treatment procedures (e.g., Carr, Taylor & Robinson, 1991; McConnachie & Carr, 1997). For example, a teacher presents a demand and the student begins to engage in problem behavior. The teacher removes the demand and instead presents an easier task. The student stops engaging in problem behavior. The literature on teacher behavior indicates that for the teacher, the removal of problem behavior may function as negative reinforcement, increasing the likelihood of switching tasks in the future. Alternatively, the teacher could be experiencing a punishment contingency in which the emission of student problem behavior functions as a punisher for the presentation of difficult or non-preferred tasks, thus decreasing the likelihood of the presentation of difficult tasks (see Lerman, & Vorndran, 1994 for a review). In either case, the data from the current study indicate that for the student, the switch of tasks may function as negative reinforcement, increasing the likelihood of problem behavior in the future. Literature on teacher behavior notes that in addition to regularly evaluating curriculum to ensure that it has educational and functional benefits for the child, teachers should ensure that curriculum has not drifted away from presenting difficult or non-preferred tasks due to problem behavior. This research adds that presenting easy tasks in lieu of difficult or non-preferred tasks, especially as an in-the-moment reaction to problem behavior may strengthen the maintaining contingencies of the problem behavior.

REFERENCES

- Athens, E. S., & Vollmer, T. R. (2010). An investigation of differential reinforcement of alternative behavior without extinction. *Journal of Applied Behavior Analysis*, 43, 569-589. doi: 10.1901/jaba.2010.43-469.
- Bowman, L. G., Piazza, C. C., Fisher, W. W., Hagopian, L. P., & Kogan, J. S. (1997). Assessment of preference for varied versus constant reinforcers. *Journal of Applied Behavior Analysis*, 30, 451-458. doi: 10.1901/jaba.1997.30-451
- Carr, E. G., Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, 18, 111-126. doi: 10.1901/jaba.1985.18-111
- Carr, E. G., Newsom, C. D., & Binkhoff, J. A. (1980). Escape as a factor in the aggressive behavior of two retarded children. *Journal of Applied Behavior Analysis*, 13, 101-117. doi: 10.1901/jaba.1980.13-101
- Carr, E. G., Taylor, J. C., & Robinson, S. (1991). The effects of severe behavior problems in children on the teaching behavior of adults. *Journal of Applied Behavior Analysis*, 24, 523-535. doi: 10.1901/jaba.1991.24-523
- Connors, J., Iwata, B. A., Kahng, S. W., Hanley, G. P., Worsdell, A. S., & Thompson, R. H. (2000). Differential responding in the presence and absence of discriminative stimuli during multielement functional analyses. *Journal of Applied Behavior Analysis*, 33, 299-308. doi: 10.1901/jaba.2000.33-299
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

- Davis, C. A., & Reichle, J. (1996). Variant and invariant high-probability requests: Increasing appropriate behaviors in children with emotional-behavioral disorders. *Journal of Applied Behavior Analysis*, 29, 471-482.
doi: 10.1901/jaba.1996.29-471
- Dawson, J. E., Piazza, C. C., Sevin, B. M., Gulotta, C. S., Lerman, D., & Kelley, M. L (2003). Use of the high-probability instructional sequence and escape extinction in a child with food refusal. *Journal of Applied Behavior Analysis*, 36, 105-108.
doi: 10.1901/jaba.2003.36-105
- DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, 25, 519-533. doi: 10.1901/jaba.1996.29-519
- Derby, K. M., Wacker, D. P., Sasso, G., Steege, M., Northup, J., Cigrand, K., et al. (1992). Brief functional assessment techniques to evaluate aberrant behavior in an outpatient setting: A summary of 79 cases. *Journal of Applied Behavior Analysis*, 25, 713-721. doi: 10.1901/jaba.1992.25-713
- Dunlap, G., Kern-Dunlap, L., Clarke, S., & Robbins, F. R. (1991). Functional assessment, curricular revision, and severe behavior problems. *Journal of Applied Behavior Analysis*, 24, 387-397. doi: 10.1901/jaba.1991.24-387
- Dunlap, G., dePerczel, S. C., Wilson, D., Wright, S., White, R., & Gomez, A. (1994). Choice making to promote adaptive behavior for students with emotional and behavioral challenges. *Journal of Applied Behavior Analysis*, 27, 505-518.
doi: 10.1901/jaba.1994.27-505

- Dyer, K., Dunlap, G., & Winterling, V. (1990). Effects of choice making on the serious problem behaviors of students with severe handicaps. *Journal of Applied Behavior Analysis*, 23, 515-524. doi: 10.1901/jaba.1990.23-515
- Fisher, W. W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis*, 25, 491-498. doi: 10.1901/jaba.1992.25-491
- Geiger, K. B., Carr, J. E., & LeBlanc, L. A. (2010). Function-based treatments for escape-maintained problem behavior: A treatment-selection model for practicing behavior analysts. *Behavior Analysis in Practice*, 3, 22-32.
- Heidorn, S. D., & Jensen, C. C. (1984). Generalization and maintenance of the reduction of self-injurious behavior maintained by two types of reinforcement. *Behaviour Research and Therapy*, 22, 581-586. doi: 10.1016/0005-7967(84)90062-7
- Horner, R. D., & Keilitz, I. (1975). Training mentally retarded adolescents to brush their teeth. *Journal of Applied Behavior Analysis*, 8, 301-309.
doi: 10.1901/jaba.1975.8-301
- Horner, R. H., Day, M., Sprague, J., O'Brien, M., & Heathfield, L. (1991). Interspersed requests: A nonaversive procedure for reducing aggression and self-injury during instruction. *Journal of Applied Behavior Analysis*, 24, 256-278.
doi: 10.1901/jaba.1991.24-265
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis*,

- 27, 197–209. (Reprinted from *Analysis and Intervention in Developmental Disabilities*, 2, 3–20, 1982) doi: 10.1901/jaba.1994.27-197
- Iwata, B. A., Pace, G. M., Dorsey, M. F., Zarcone, J. R., Vollmer, T. R., Smith, R. G., et al. (1994). The functions of self-injurious behavior: An experimental-epidemiological analysis. *Journal of Applied Behavior Analysis*, 27, 215–240. doi: 10.1901/jaba.1994.27-215
- Iwata, B. A., Pace, G. M., Kalsher, M. J., Cowdery, G. E., & Cataldo, M. F. (1990). Experimental analysis and extinction of self-injurious escape behavior. *Journal of Applied Behavior Analysis*, 23, 11-27. doi: 10.1901/jaba.1990.23-11
- Janney, D. M., Umbreit, J., Ferro, J. B., Liaupsin, C. J., & Lane, K. L. (2013). The Effect of the Extinction Procedure in Function-Based Intervention. *Journal of Positive Behavior Interventions*, 15, 113-123. doi: 10.1177/1098300712441973
- Kern, L., Childs, K. E., Dunlap, G., Clarke, S., & Falk, G. D. (1994). Using assessment-based curricular intervention to improve the classroom behavior of a student with emotional and behavioral challenges. *Journal of Applied Behavior Analysis*, 27, 7-19. doi: 10.1901/jaba.1994.27-7
- Kern, L., Mantegna, M. E., Vorndran, C. M., Bailin, D., & Hilt, A. (2001). Choice of Task Sequence to Reduce Problem Behaviors. *Journal of Positive Behavior Interventions*, 3, 3-10. doi: 10.1177/109830070100300102
- Kunnavatana, S. S. (2014). *Manipulating parameters of reinforcement to reduce problem behavior without extinction* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (Accession No. 3683440)

- Lalli, J. S., Casey, S., & Kates, K. (1995). Reducing escape behavior and increasing task completion with functional communication training, extinction, and response chaining. *Journal of Applied Behavior Analysis*, 28, 261-269.
doi: 10.1901/jaba.1995.28-261
- Lalli, J. S., Vollmer, T. R., Progar, P. R., Wright, C., Borrero, J., Daniel, D, et al. (1999). Competition between positive and negative reinforcement in the treatment of escape behavior. *Journal of Applied Behavior Analysis*, 32, 285-295.
doi: 10.1901/jaba.1999.32-285
- Lerman, D. C., Iwata, B. A., Rainville, B., Adelinis, J. D., Crosland, K., & Kogan, J. (1997). Effects of reinforcement choice on task responding in individuals with developmental disabilities. *Journal of Applied Behavior Analysis*, 30, 411-422.
doi: 10.1901/jaba.1997.30-411
- Lerman, D. C., & Vorndran, C. M. (2002). On the status of knowledge for using punishment: Implications for treating behavior disorders. *Journal of Applied Behavior Analysis*, 35, 431-464. doi: 10.1901/jaba.2002.35-431
- Love J. R, Carr J. E, & LeBlanc L. A. (2009). Functional assessment of problem behavior in children with autism spectrum disorders: A summary of 32 outpatient cases. *Journal of Autism and Developmental Disorders*, 39, 363–372.
doi: 10.1007/s10803-008-0633-z
- McConnachie, G., & Carr, E. G. (1997). The effects of child behavior problems on the maintenance of intervention fidelity. *Behavior Modification*, 21, 123-158.
doi: 10.1177/01454455970212001

- McCord, B. E., Thomson, R. J., & Iwata, B. A. (2001). Functional analysis and treatment of self-injury associated with transitions. *Journal of Applied Behavior Analysis*, 34, 195-210. doi: 10.1901/jaba.2001.34-195
- Pace, G. M., Iwata, B. A., Cowdery, G. E., Andree, P. J., & McIntyre, T. (1993). Stimulus (instruction) fading during extinction of self-injurious escape behavior. *Journal of Applied Behavior Analysis*, 26, 205-212. doi: 10.1901/jaba.1993.26-205
- Repp, A. C., Felce, D., & Barton L. E. (1988). Basing the treatment of stereotypic and self-injurious behaviors on the hypotheses of their causes. *Journal of Applied Behavior Analysis*, 21, 281-289. doi: 10.1901/jaba.1988.21-281
- Roscoe, E. M., Rooker, G. W., Pence, S. T., & Longworth, L. J. (2009). Assessing the utility of a demand assessment for functional analysis. *Journal of Applied Behavior Analysis*, 42, 819-825. doi: 10.1901/jaba.2009.42-819
- Sailor, W., Guess, D., Rutherford, G., & Baer, D. M. (1968). Control of tantrum behavior by operant techniques during experimental verbal training. *Journal of Applied Behavior Analysis*, 1, 237-243. doi: 10.1901/jaba.1968.1-237
- Smith, R. G., Iwata, B. A., Goh, H., & Shore, B. A. (1995). Analysis of establishing operations for self-injury maintained by escape. *Journal of Applied Behavior Analysis*, 28, 515-535. doi: 10.1901/jaba.1995.28-515
- Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional communication training: A review and practical guide. *Behavior Analysis in Practice*, 3, 22-32.

- Umbreit, J., Lane, K. L., & Dejud, C. (2004). Improving classroom behavior by modifying task difficulty: Effects of increasing the difficulty of too-easy tasks. *Journal of Positive Behavior Interventions*, 6, 13-20.
doi: 10.1177/10983007040060010301
- Volkert, V. M., Lerman, D. C., Call, N. A., & Trosclair-Lasserre, N. (2009). An evaluation of resurgence during treatment with functional communication training. *Journal of Applied Behavior Analysis*, 42, 145-160.
doi: 10.1901/jaba.2009.42-145
- Wacker, D. P., Berg, W. K., Harding, J. W., Derby, K. M., Asmus, J. M., & Healy, A. (1998). Evaluation and long-term treatment of aberrant behavior displayed by young children with disabilities. *Journal of Developmental and Behavioral Pediatrics*, 19, 260-266. doi: 10.1097/00004703-199808000-00004
- Wilder, D. A., & Carr, J. E. (1998). Recent advances in the modification of establishing operations to reduce aberrant behavior. *Behavioral Interventions*, 13, 43-59.
doi: 10.1002/(SICI)1099-078X(199802)13:1<43::AID-BIN3>3.0.CO;2-1
- Zarcone, J. R., Iwata, B. A., Smith, R. G., Mazaleski, J. L., & Lerman, D. C. (1994). Reemergence and extinction of self-injurious escape behavior during stimulus (instructional) fading. *Journal of Applied Behavior Analysis*, 27, 307-316.
doi: 10.1901/jaba.1994.27-307
- Zarcone, J. R., Iwata, B. A., Mazaleski, J. L., & Smith, R. G. (1994). Momentum and extinction effects on self-injurious behavior and noncompliance. *Journal of Applied Behavior Analysis*, 27, 649-658. doi: 10.1901/jaba.1994.27-649

Zuluaga, C. A., & Normand, M. P. (2008). An evaluation of the high-probability instruction sequence with and without programmed reinforcement for compliance with high-probability instructions. *Journal of Applied Behavior Analysis*, 41, 453-457. doi: 10.1901/jaba.2008.41-453

APPENDIX

Treatment Integrity
Play Condition

Date:	Client:
Session:	Data Collector:

Therapist wearing correct color of shirt	Yes	No
Session is correct duration (+/-30 s)	Yes	No
Highly preferred materials are within the participant's reach	<u>Yes</u>	<u>No</u>
No demands are presented	<u>Yes</u>	<u>No</u>
Attention is provided at least every 30 s	<u>Yes</u>	<u>No</u>

[Yes] / [Yes + No] x 100 = Treatment Integrity

<input type="text"/>	/	<input type="text"/>	x 100	=	<input type="text"/>
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Treatment Integrity

Break Condition

Date:	Client:
Session:	Data Collector:

Therapist wearing correct color of shirt	<u>Yes</u>	<u>No</u>
Session is correct duration (+/-30 s)	<u>Yes</u>	<u>No</u>
Presents ONLY low- <i>p</i> demands: 1. 2. 3.	<u>Yes</u>	<u>No</u>
Increases prompt after 5 seconds (+/- 3 s)	<u>Yes</u>	<u>No</u>
Presents new demand immediately following (0-5 seconds) completion of demand (prompted or independent)	<u>Yes</u>	<u>No</u>
Provides break from demands immediately following (0-5 seconds) problem behavior	<u>Yes</u>	<u>No</u>
Break is provided for 30 s (+/-3 s)	<u>Yes</u>	<u>No</u>

[Yes] / [Yes + No] x 100 = Treatment Integrity

$$\boxed{} / \boxed{} \times 100 = \boxed{}$$

Treatment Integrity
Escape Ext Condition

Date:	Client:
Session:	Data Collector:

Therapist wearing correct color of shirt	<u>Yes</u>	<u>No</u>
Session is correct duration (+/-30 s)	<u>Yes</u>	<u>No</u>
Presents ONLY low- <i>p</i> demands: 1. 2. 3.	<u>Yes</u>	<u>No</u>
Increases prompt after 5 seconds (+/- 3 s)	<u>Yes</u>	<u>No</u>
Presents new demand immediately following (0-5 seconds) completion of demand (prompted or independent)	<u>Yes</u>	<u>No</u>
Withholds break from demands immediately following problem No consequence given for problem behavior.	<u>Yes</u>	<u>No</u>

[Yes] / [Yes + No] x 100 = Treatment Integrity

$$\boxed{} / \boxed{} \times 100 = \boxed{}$$

Treatment Integrity
Switch Tasks Condition

Date:	Client:
Session:	Data Collector:

Therapist wearing correct color of shirt	<u>Yes</u>	<u>No</u>
Session duration is correct duration (+/-30 s)	<u>Yes</u>	<u>No</u>
Except during switch task, presents only low- <i>p</i> demands: 1. 2. 3.	<u>Yes</u>	<u>No</u>
Increase prompt after 5 seconds (+/- 3 s)	<u>Yes</u>	<u>No</u>
Presents new demand immediately following (0-5 seconds) completion of demand (prompted or independent)	<u>Yes</u>	<u>No</u>
DURING LOW- <i>P</i> DEMANDS: Presents 30 s (+/- 5 s) of high- <i>p</i> demands following problem behavior. 1. 2. 3.	<u>Yes</u>	<u>No</u>
DURING HIGH- <i>P</i> DEMANDS: No consequence given for instances of problem behavior.	<u>Yes</u>	<u>No</u>

[Yes] / [Yes + No] x 100 = Treatment Integrity

$$\boxed{} / \boxed{} \times 100 = \boxed{}$$