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The Use of an Individualized Levels System and Extinction to Increase Task Compliance and to Decrease Aggressive Behavior with a Child with Autism

Savanna A. Chojnacki

Missouri State University, Chojnacki3@live.missouristate.edu

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**THE USE OF AN INDIVIDUALIZED LEVELS SYSTEM AND EXTINCTION TO
INCREASE TASK COMPLIANCE AND TO DECREASE AGGRESSIVE
BEHAVIOR WITH A CHILD WITH AUTISM**

A Master's Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science, Applied Behavior Analysis

By

Savanna Amber Chojnacki

August 2019

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Psychology

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Savanna Amber Chojnacki

ABSTRACT

In a token economy level system, as an individual progresses from one task level to the next, there is an increase in the demand of tasks and an increase in the magnitude of reinforcers earned. The motivation for the individual in level systems stems from the increasing of value of reinforcers earned at each level. In this study a level system in concordance with an extinction procedure for aggressive behaviors was employed as a behavioral intervention. In this single-subject design study, a 5-year-old boy with autism was observed across a variety of 15 minute teaching sessions, implementing synchronously, the reinforcement for task compliant behaviors and extinction for aggressive behavior. Based upon a prior behavioral function analysis, it was hypothesized that, as a function of the intervention, compliance behaviors would increase, and the frequency of aggressive behaviors will decrease. Overall, the intervention was a success. On-task compliance behaviors increased, response latency for on-task behaviors were faster, and aggressive behaviors decreased to 0 levels. These results are further evidence of theoretical and practical importance for the use of a token economy level system.

KEYWORDS: levels system, token economy, autism, applied behavior analysis, extinction, aggression, task compliance

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Approved:

D. Wayne Mitchell, Ph.D., Thesis Committee Chair

Linda Garrison-Kane, Ph.D., Committee Member

Jordan Belisle, Ph.D., Committee Member

Julie Masterson, Ph.D., Dean of the Graduate College

In the interest of academic freedom and the principle of free speech, approval of this thesis indicates the format is acceptable and meets the academic criteria for the discipline as determined by the faculty that constitute the thesis committee. The content and views expressed in this thesis are those of the student-scholar and are not endorsed by Missouri State University, its Graduate College, or its employees.

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INTRODUCTION

In a token economy, a neutral stimulus (token) is awarded to an individual for a series of target behaviors. These tokens are paired with a variety of reinforcers until the tokens themselves become reinforcing; the tokens become secondary reinforcers (Doll, McLaughlin, & Barretto, 2013). From there, an individual can trade in the tokens for a series of reinforcers including tangibles, edibles, or activities. The purpose of this introduction is to (1) provide a brief review of token economies; (2) describe a levels system token economy; and (3) to describe and provide a rationale for a functional analysis (FA).

Token Economies

Token economies are a malleable intervention; they have been used for many different target behaviors including compliance (Wilder, Harris, Reagan, & Rasey, 2007), and aggressive behaviors. LePage (1999) conducted a study assessing the effectiveness of a token economy on injuries and negative events in a psychiatric unit. He found a reduction in aggressive behavior and injuries resulting from it after the implementation of a token economy system. More recently, Glowacki, Warner, and White, (2016) conducted a literature review evaluating studies implementing token economies to reduce aggressive behaviors in psychiatric inpatient units. They found token economies to be effective interventions to reduce aggressive behaviors along with a plethora of other negative behaviors.

Token economies have also been effective with a variety of individuals including psychiatric patients, (LePage et al., 2003) neurotypical children in a classroom setting (Filcheck, Mcneil, Greco, & Bernard, 2004) and individuals with autism. Matson and Boisjoli (2009)

conducted a review on token economies for children with autism, with 7 studies included in it. Participants ranged in age from 2 to 15 years old. Settings included in the studies were a development center, summer camp, group home, and school. Target behaviors were different in each study; some examples were verbal and printing tasks, spontaneous questions, repetitive speech, social interaction, food refusal, and attending to a task. Procedures such as continuous reinforcement (FR1), differential reinforcement of other behavior (DRO) were implemented. Overall, Matson and Boisjoli (2009) found positive evidence for the use of token economy systems for increasing desired and decreasing undesired behaviors in children with autism.

No matter the individual, assessing their interests and preferences for potential reinforcement can enhance an individualized token economy that will motivate the individual. For example, creating tokens incorporating the perseverative interests of individuals with autism have been proven to be slightly more effective than tokens not including perseverative interests. Carnett et al., (2014) conducted an experiment assessing perseverative interest-based token economies. They found using perseverative interest-based tokens ($M = 5.7\%$, range 48-70%) was slightly more effective than tokens that did not include perseverative interests ($M = 45\%$, range 32-55%) and further bolstered research on the effectiveness of token economies for individuals with autism.

Levels Systems Token Economy

There are different variations, or methods of implementing a token economy, including levels systems. In levels systems, “different levels correspond to different degrees of participant behavior” (Doll et al., 2013, p. 137). This means the increase in levels (criterion) moves proportionately to the amount of participant behavior needed within the level. The person starts

off at an initial level, and depending on successful performance and improvement of behavior, are moved to a higher level (Kazdin, 1977). As one moves from one level to the next, there is an increase in the demand of tasks and increase in the magnitude of reinforcers that can be earned. The motivation for the individual in levels systems stems from the increasing of value of reinforcers earned at each level. For example, Phillips, Phillips, Fixsen, and Wolf (1971) employed a levels system to modify the behavior of pre-delinquent young boys in a behavior modification treatment center. There were three levels to this system: the initial level, merit system, and homeward-bound system. Tokens in the form of money could be earned for a variety of behaviors. The tokens could then be traded in for a variety of privileges. Once an individual achieved high levels of tokens earned over a few weeks' time, they were moved to the merit system where all privileges were free and social consequences were given for inappropriate behavior. Tokens must still be earned at high rates during the merit system. If individuals were successful at this level, they moved towards the homeward-bound level where the individuals would start the transition back to their home (preparing them for what to expect outside of the facility and spending more time outside of it) while still maintaining token earnings at higher rates. The results from this study were very positive. Through the use of a reversal design, the experimenters showed the levels system to be effective for the boys in the treatment center. More tasks were completed, more money was saved, they were on time to meals, and they scored higher on quizzes about the news.

One limitation, traditionally, of levels systems has been the lack of individualization, (Scheuermann, Webber, Partin, & Knies, 1994) meaning most studies involving levels systems use the same reinforcers across participants. This can be problematic in many ways. First, all reinforcers (e.g., type and number) earned are the same for all participants. This does not take

into account individual reinforcement differences and therefore motivation differences for an individual to move from one level to the next. Secondly, promotion from one level to the next is the same across all participants. Because of this, individual strengths and capabilities are not taken in account. For example, an individual may not be capable of moving from one criterion to the next. This could be due to a variety of factors including frequency of behavior required, difficulty of the tasks, or the criteria is too much. This inhibits the individual from successfully moving from one criterion to the next, which may cause more problem behavior and unfair conditions placed on the individual. Lastly, group levels systems do not account for each individuals' functions of behavior. Each participant could have a different function for different behaviors. This means some participants will engage in more problem behavior than others, hindering their success with the levels system.

Given the lack of individualized reinforcers in levels systems, Hagopian et al., (2002) conducted a study on individualized levels systems for four individuals with severe problem behaviors. Their purpose was to appraise some of the legal and methodological issues raised by Scheuermann et al., (1994). First, a functional analysis (FA) was conducted to determine the functions of each participant's problem behavior. In the second phase, they used the results from the FA and paired choice preference assessments to create individualized levels systems for each participant. In the last phase, experimenters researched generalization of the levels system by expanding its use to all areas of the inpatient unit prior to discharge. After discharge, parents and caregivers were trained to implement it outside of the inpatient center. Researchers found significant decreases in problem behavior for all four participants. They also found effective generalization across settings and caregivers were able to implement the levels systems with high degrees of fidelity.

A recent study on individualized levels systems was conducted by Randall, Lambert, Matthews, and Houchins-Juarez (2018) to decrease aggressive behavior of a female child with autism. This levels system contained two levels: red and green. While in green, the participant was able to have access to all reinforcers determined by the FA stimulus (attention, escape, tangible). When she engaged in aggression, she would transition to red. While in red, she only had access to escape. In order to get back to green, she had to earn three check marks. She earned a check mark (token) for every 10 seconds she did not engage in aggressive behavior. This levels system was found to be effective for the individual, reducing her aggression to near 0.

Rationale for Conducting a Functional Analysis

A FA is a procedure in which individual are subjected to a variety of conditions in which the antecedents and consequences are manipulated by a therapist and the behavior of the participant is measured (Rooker, Iwata, Harper, Fahmie, & Camp, 2011). The purpose of a FA is to identify the function, or reason, of an individual's behavior. Once the function is determined, one can teach to the function, creating better and faster treatment plans. Iwata, Dorsey, Slifer, Bauman, and Richman, (1982, 1994) investigated the FA procedure and elaborated on how it can be helpful in identifying the function of aberrant behavior. Since then, it has become standard practice for practitioners conduct an FA before any treatment is implemented.

Randall et al., (2018) supported the efficacy of a FA when they conducted a study analyzing the aggressive behavior of a child with autism spectrum disorder. Aggression for the participant took place in the forms of hair pulling, eye gouging, choking, hitting, slapping, pushing, kicking, and scratching. They found through the FA that the aggressive behavior was maintained by a variety of functions including attention, access to tangible items, and escape

from demands. From there, the researchers were able to create a successful treatment plan using a levels system to target the aggressive behavior, which is described in the last section.

The standard conditions in an FA are demand, alone, attention, and play (Iwata et al., 1994). There is also another condition, tangible, which is sometimes included in a FA. A tangible is defined as any physical item or activity. It usually is not included because it has the possibility to create false positives. In other words, a tangible function appears on FA results, but is not a function of the behavior. Rooker et al., (2011) demonstrated tangibles creating false positives in FA's in their study via two experiments. In experiment one, they wanted to see if a novel response was acquired quicker with the addition of a tangible condition. Researchers found that when a novel response is exposed to common contingencies in an FA, it is more susceptible to tangible reinforcement (Rooker et al., 2011). This occurred in five of the six participants. In the second experiment, they conducted FAs on three children where the function of their behavior was previously determined via the first experiment without a tangible condition. In the new FA, they added the tangible condition to determine if tangibles would evoke problem behavior. Experimenters found the emergence of behavior in the tangible condition, therefore making it susceptible to new responses and possible false positive outcomes. That is why it is important to only include the tangible condition when there is a suspicion that tangibles may be the function. If a tangible condition is to be added, the experimenters should only use items typically found in the child's environment (Rooker et al., 2011).

The Purpose of this Study

The purpose of this study was to use an individualized levels system intervention to increase task compliance and an extinction procedure to decrease inappropriate aggressive

behaviors of a child with autism. Prior to implementing the intervention, a FA was conducted to assess the antecedent and consequences controlling the participant's aggression and refusal to comply. It is hypothesized that the child's aggressive behaviors are a function of avoidance of his work behavior, via negative reinforcement. Following the FA, a levels system token economy for compliant behavior and a planned ignoring (extinction) procedure was implemented. It is hypothesized that the aggressive behaviors and the latency to comply will decrease, and the compliance behaviors will increase as will the number of demands completed will increase.

METHOD

Participant

The participant is a 5-year-old boy named Chris (a pseudonym) who has been diagnosed with autism, problems relating to social environments and problems with daily living skills. He exhibits a task compliance behavior deficit and excess problem behaviors in the forms of refusal to comply with instructions and aggression, which are the primary focus of this study. See Appendix A for the parent consent form. This study was approved on April 24, 2019 by the Missouri State University IRB (IRB-FY2019-612; see Appendix B).

Preliminary assessments were conducted with Chris to assess his verbal language. First the pre-assessment made available through the PEAK Relational Training System was used to assess verbal and generalization skills including foundational learning skills, perceptual learning skills, verbal comprehension skills, and verbal reasoning, memory, and math skills via direct and indirect assessments. The direct assessment was conducted using a flipbook made available through the PEAK website and using the visuals within to test the skills above. The therapist recorded responses on a data sheet provided through PEAK. The indirect assessment was conducted by two therapists independently employing data sheets provided by PEAK. The indirect assessment consisted of questions regarding skills similar to the direct assessment. Both indirect assessments were compared along with the indirect and direct assessments.

As a result of PEAK, it was found that Chris had deficits in foundational learning skills. He scored 48 in the direct training module, with a deviation of -97 from his age norm. He scored 32 in the generalization module, with a deviation of -26 from his age norm. Based upon this assessment, Chris was found to be functioning within in the 3-4 age range. The direct and

indirect assessments had a correlation of 0.86 and the average percent correct had a difference of 1% (38% and 37% respectively).

The other assessment conducted was the Early Echoic Skills Assessment (EESA) developed by Barbara Esch. This assessment is a subtest in the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) under the Milestones Assessment component. The VB-MAPP is a verbal behavior protocol that is based on B.F. Skinner's *Verbal Behavior* (1957). The assessment utilizes Skinner's verbal behavior and methodology of applied behavior analysis to teach language to children with language delays (Sundberg, 2014). The EESA assesses the child's ability to repeat a speech model (Sundberg, 2014). Chris's EESA score was 68 out of a possible 100 total points.

Setting and Materials

There are two settings: a 1.83 m X 1.83 m therapy room where the intervention (the levels system) will be conducted, and a 2.43 m X 2.43 m therapy room (with a one-way mirror) located in the outpatient therapy building where Chris receives services. In the therapy-intervention room, a table, two chairs, a DVD player, and one toy specified by Chris were present. It is the latter room that the FA will take place.

In a study by Carnett et al., (2014) they demonstrated that a tailored token economy system employing a child's perseverative reinforcement interests can produce higher levels of desired behavior than a neutral token economy system. Following their advice, a levels systems token board will be present during the intervention that is tailored to Chris's perseverative interest of Thomas the Tank Engine along with the additional stick-on pieces representing the tokens earned at each specific level. The tokens are fake coins (pennies, nickels, dimes, and

quarters) which will be placed next to each level (see Appendix C). Money was determined as a token because Chris's mother has used it successfully in the past with him; he would earn money to spend on small Thomas the Tank Engine toys.

There were 5 buckets with different prizes Chris could earn, depending on how much money he has accumulated throughout the session. The order of prizes was determined by a preference assessment described below. In the penny bucket, there were a variety of small prizes provided by his outpatient therapy provider to choose from. In the penny and nickel bucket, there was a book of Thomas the Tank Engine stickers he could choose from. In the penny, nickel, and dime bucket, there were small amounts of edibles for him to choose. In the penny, nickel, dime, and quarter bucket there were small containers of Thomas the Tank Engine bubbles and temporary tattoos. In the final bucket were the "big prizes". In this bucket, there were pictures of the three different play rooms which he could play in and a picture of an iPad. He was then able to choose how he wants to spend the rest of his allotted time. A small, clear piggy bank was provided for Chris to put his money in as he earned it.

Behavior Excess and Deficit Definitions and Measurement

There were two primary behavior excesses identified: Refusal to comply with instructions and aggression, each will be discussed in turn. Refusing to comply with instructions is defined as standing up from sitting in a chair and leaving the table from where demands have been placed or refusal to come to the table. Data were collected by pen and paper and measured by a frequency count (see Appendix D for a sample data sheet).

For aggression, data were collected by pen and paper (Appendix D) and measured by a frequency count. Chris's aggression was contingent on his refusal behavior. It was

determined by an A-B-C observations (FA) that when Chris refuses and leaves the table, he becomes aggressive. His aggression takes place in the forms of *hitting* (using an open or closed fist to strike an object or staff member), *kicking* (using a foot to strike an object or staff member), *throwing* items (taking an object and throwing it at staff or to another part of the room; this includes swiping objects off the table), *self-injurious* behavior (SIB; hitting oneself with a closed fist on the head or face, or banging ones head on the wall or floor), and *removing clothes* (taking off any part of clothing off of one's body, including shoes and socks). Removal of clothes was included as aggression because Chris would take off articles of clothing and throw them at staff or around the room.

Compliant behaviors consisted of the number of educational (work) tasks completed correctly with the therapist during the teaching-therapy sessions. The latency to comply was also be recorded.

Interobserver Agreement (IOA)

For the FA, IOA was taken by two independent observers who had been trained on data collection. They were behind a one-way mirror in the room where the FA took place. IOA was taken for 75% of sessions. IOA was calculated by dividing the small total number observed by the larger total number observed. The mean IOA was 82% (range 75-100%).

IOA data for the preference assessment (described below) was taken by the therapist conducting the preference assessment and a trained observer who was watching it. IOA was calculated by taking the smaller total number observed and dividing it by the larger number observed. The mean IOA was 100%.

During intervention, IOA was collected by having a trained observer on the opposite side of the room from Chris and the therapist delivering the intervention. IOA was collected for 85% of the sessions. Like the FA, the IOA for the intervention was calculated by dividing the smaller total observed by the larger total observed. The mean IOA was 98% (range 86-100%).

Procedure

Baseline. Baseline of compliant and aggressive behaviors were observed and recorded during the typical the 90-minute teaching-therapy session. At the beginning of the session Chris chose a toy he wanted to play with. He then received 5 minutes to play with the toy in the therapy room at the table. A timer was set to indicate how much time was remaining. When the timer went off, the therapist said, “*Chris, it’s time to do some work*”. Contingent on refusal and aggression, extinction was put in place, meaning the problem behavior(s) were ignored. The therapist would block themselves from aggression geared towards them. When Chris came back to the table and sat down, the therapist said, “*Thank you for sitting down in your chair, Chris!*” If Chris refused or aggressed after this was said, extinction was put in place again. If he sat down and did not try to leave the table or aggress, his tasks were completed with his therapist. He was then allowed to have another 5 minutes of free time before the next tasks were presented. This continued for the 90-minute therapy session.

Functional Analysis Observations. Procedures used by Iwata et al. (1982; 1994) were implemented when conducting the functional analysis. The FA took place in a 2.43 m X 2.43 m therapy room with a one-way mirror. Two trained observers were behind the mirror in the next room taking data and timing the length of the sessions. This room was not the normal therapy room for Chris. Both refusal to comply and the aggressive behaviors were recorded (see

Appendix E for an example of the data sheet employed in the observations). There were 4 assessment condition observations modeled after Iwata, et al. (1994). Each assessment condition were 4 minutes in duration and were conducted in this order: Play, demand, attention, tangible. The goal was to identify the sources that were controlling the problem behaviors. The demand condition followed play because that is how normal therapy sessions were set up: Chris had a few minutes to play and then the demand of work was placed on him. Once the demand was placed, problem behavior occurred. Since the demand condition followed play, this should evoke the problem behaviors.

In the *play condition*, Chris had unrestricted access to therapist attention and tangibles and was void of demands. Reinforcement in the form of verbal praise was given every 30s by the therapist. The therapist had a timer set to let her know when verbal praise needed to be delivered. All problem behavior was ignored. The play condition served as the control, and no problem behavior should be emitted during this condition.

In the *demand condition*, tasks were selected from Chris's VB-MAPP assessment. The tasks were chosen by his therapist and shown to have a low probability of completion on his own. Contingent on problem behavior (refusal or aggression), the task was removed for 10 s. After 10 s, the task as represented. This continued through the session. If Chris complied, the same task was repeated until problem behavior was emitted. After problem behavior was emitted, the task was removed for 10 s and represented after that. This condition was to see if the placement of demands was causing his aggression.

In the *attention condition*, no toys were in the room. The therapist told Chris she needed to do some work. Contingent on aggression or refusal, attention was delivered in the form of reprimands such as "Don't hit, that's not nice". The therapist then turned back and continue

working. Any appropriate attempts to gain the therapist's attention were ignored. This was to see if Chris was aggressing because of social-negative attention.

Lastly, in the *tangible condition*, Chris and the therapist were playing with toys chosen by Chris. Every 30s, the therapist took the toys from Chris and said, "*It's my turn!*" Contingent upon aggression and/or refusal, the toy was given back to Chris. The tangible condition was included in this functional analysis because there is a suspicion that tangibles serve as a function of Chris's aggression (Rooker et al., 2011). This condition was to see if Chris is aggressing because he wanted physical items or activities.

Preference Assessment. A multiple stimulus without replacement (MSWO) preference assessment was completed with Chris to determine the order in which the prizes would be available. An MSWO preference assessment is conducted by presenting stimuli and having the child choose one. Once the child chooses one, they are given a short period to interact with it before the therapist takes the item out of the array, puts the remaining items in a different order, and instructs the child to choose another stimulus. This continues until all stimuli have been chosen.

Pictures of the different prize buckets were used as the stimuli. Chris and the therapist sat across from each other during the assessment. The therapist presented the pictures in a row in front of Chris and said, "*Choose one*". Once Chris chose a picture, the therapist took the photo away, rearranged the remaining pictures in a different order and instructed Chris to choose one. This continued until all pictures had been chosen. Data were recorded on an MSWO preference assessment sheet (see Appendix F). Five sessions total were completed.

Scoring the preference assessment was done by adding up the trial numbers at which each item was selected during each session. For example, if Chris chose Thomas stickers for trials 1,

3, and 4 across 3 sessions, the trial numbers were added ($1 + 3 + 4$) for a total of 8. Higher preference items had the lowest totals, and lower preference items had higher totals. Prizes were ranked from lowest totals to highest as highest preferred to lowest preferred respectively.

Compliance Intervention. Each 90-minute session was broken up into 15-minute sessions. The reason experimenters had sessions broken into 15-minute increments was because of a time issue. Chris's main therapist did not want him to, for example, complete his work in 30 minutes and have an hour of free time. This was not the point of his therapy and he needed to learn the idea of structured activity times for when he started school full time.

A changing criterion design was implemented for the task compliance intervention via a Differential Reinforcement of High Rates schedule. A changing criterion design is used by "showing that behavior changes gradually over the course of the intervention phase. The behavior improves in increments or steps to match a criterion for performance that is specified as part of the intervention" (Kazdin, 2011, p.167). Since the treatment design was a changing criterion design, as Chris completed a predetermined number of tasks within a session, the number of tasks needed to be completed to move to the next level increased. For example, if the first criteria were 6 tasks, Chris needed to complete 6 tasks within a 15-minute period. Once therapists had 3 consecutive sessions of Chris meeting the criteria, staff increased the number of tasks (criterion) on a variable ratio (VR) schedule of 4-5. Chris was not informed of the criterion change. Once Chris completed approximately 20 tasks per session successfully, it was determined by a VR 2-3 schedule (this was not counting moving the criterion down to show control). The number of tasks in the beginning were lower in order for Chris to be successful but a higher number of criterion when moved up. The number of tasks were higher with a lower number of criterion when moved up as the sessions got higher in number. This was because

experimenters wanted to look at what his peak number to tasks completed were. If the number of tasks moved too high too quickly, the criteria would not be met.

The token board (see Appendix B) was a picture of a railroad track that twisted around a 20.32 cm by 27.94 cm piece of laminated paper. At the beginning was the word “Start” with space underneath for a laminated Thomas the Tank Engine game piece. Around each turn of the track marked the achievement of a new “level”. Underneath the markings of each level, a picture of the reinforcer earned was velcroed to the paper. The reinforcers increased in magnitude as Chris moved from one level to the next. A penny for level 1 a nickel for 2, a dime for 3, a quarter for 4, and time on an iPad, or time in one of the big play rooms with the other kids for level 5. In-between each level was a “railroad crossing” sign Thomas needed to stop at. No reinforcers other than verbal praise was given at these. There were 5 levels and 5 railroad crossings, equaling 10 stops in all.

In order for Chris to move from one stop to the next, he needed to complete the tasks given to him. Only then was he allowed to move Thomas. Although Chris was not informed of the criteria that needed to be met or receive consequences for not meeting the criteria, there were other motivations for him to complete his work in a timely manner. The shorter amount of time it took for him to comply, the quicker he moved different levels. The quicker he moved to different levels, the more tokens he earned and traded in, along with receiving longer periods of free time.

Each 15-minute session was broken up into 3 parts: 5 minutes of work, 5 minutes of play, and 5 minutes of work. The demands were split evenly between the two work periods. For example, if the criteria were 6, the tasks were broken up into 3 and 3. Chris completed his tasks, was allowed to play for 5 minutes, then completed the rest of his tasks. If he finished the second round of tasks early, he received the rest of the 15-minute session to play. If Chris wanted to skip

the play time between the two work periods, he was allowed to. He was then able to play for the rest of the time he had left in that session.

Before the start of the first 15-minute session, Chris chose one toy set he wanted to play with for the full 90 minutes. Once the toy was chosen, the therapist and Chris went into his room. The DVD player was already in the room and he could request it at any time if that was how he wanted to spend his reinforcement time. He was shown his token board and reminded he must complete his work in order to move to the next train stop. He was then given 5 minutes to play with the toy he chose at the table or on the floor and a timer was set. When the timer went off, the therapist said, "*Chris, it's time to work*". This was when the first 15-minute session began. If Chris stayed in his seat, the therapist gave verbal praise, and presented the demands. If Chris did not stay in his seat or refused to come to the table, all behavior was ignored until he sat back down in his seat and was ready to work. After completing the tasks, the therapist said, "*Good job, Chris! We get to move Thomas!*" Chris was allowed to move Thomas to the next stop and received the reinforcer if there was one at that stop. He then was given the choice to play for 5 minutes or do more work. If he decided to skip the play time or cut it short because he wanted to do more work, the next set of demands were placed. After completion, the therapist said, "*Good job, Chris, we get to move Thomas!*" and allowed Chris to move his Thomas game piece to the next stop. Any extra time after the second work session was given as play time and a timer was set with the number of minutes he had left in the session. When the timer went off, the next 15-minute session began.

If Chris refused or aggressed for an extended period of time during the 15-minute sessions, all behavior was ignored until he sat in his seat and was ready to work. Staff adjusted the rest of the session in order for Chris to have the opportunity to meet the criteria. For example,

if Chris refused and aggressed for the first 10 minutes of the session and then agreed to work, the last 5 minutes were spent completing the work he missed from the first work period and completing the work for the second work period. Any extra time was given as play time. If there was no extra time at the end of the second work period, the next session began, and he continued working.

Since half of the train stops did not have tokens, verbal praise was extremely important, particularly behavior-specific verbal praise. When more tasks were completed, there needed to be more verbal praise. For Chris, the more tasks completed, the more verbal praise, face animation, and physical touch he received (mimicking a conjugate schedule of reinforcement as introduced by Lindsley, 1956). The first and second stops received a *“Good job completing your work!”* with a smile. The third and fourth stops received a *“Great job sitting at the table and working, Chris!”* with a thumbs up and more animated smile. The fifth and sixth stops received an *“Awesome job staying in your seat and completing your work, Chris! Keep it up!”* with a high five and animated smile. The seventh and eighth stops received an *“Amazing job Chris! I love how you’re focusing on your work!”* with a pat on the back and animated smile. The ninth stop received an *“Almost there! You’re working so well!”* with a pat on the back and animated smile. Lastly, the tenth stop received a *“You did it Chris! You made it to level 5 and completed all your work!”* with a celebration dance and animated smile.

In order to be done with work completely, Chris needed to reach level 5. Within the allotted total (90 minute) session time, Chris could reach the last level. If he reached level 5 before the 90-minute session time is over, he had two choices: pick a prize from one prize bucket and go to another room to play or pick a prize from every prize bucket and stay in the current room. In either case, no demands were placed, and he had free time for the remainder of the 90-

minute session. If Chris did not reach level 5 by the end of the 90-minute therapy session, he had the opportunity to trade in the coins he earned and chose from one of the respective prize buckets before he left. This way, he was not leaving empty handed and still earned something. All aggressive behaviors, frequency of tasks completed, and latency to comply were recorded on the session data sheets (see Appendix E).

RESULTS

Functional Analysis

The results of the FA for Chris are displayed in Figures 1-3. Hitting, kicking, removal of clothes, throwing items, SIB, and refusal to comply with instructions were highest in the demand condition. The same frequency of refusal to comply with instructions occurred in both the demand and attention conditions. The same frequency of throwing items was also observed in the demand and tangible conditions. Although some aggression occurred with the same frequency in more than one condition, all forms of aggression were highest in the demand condition.

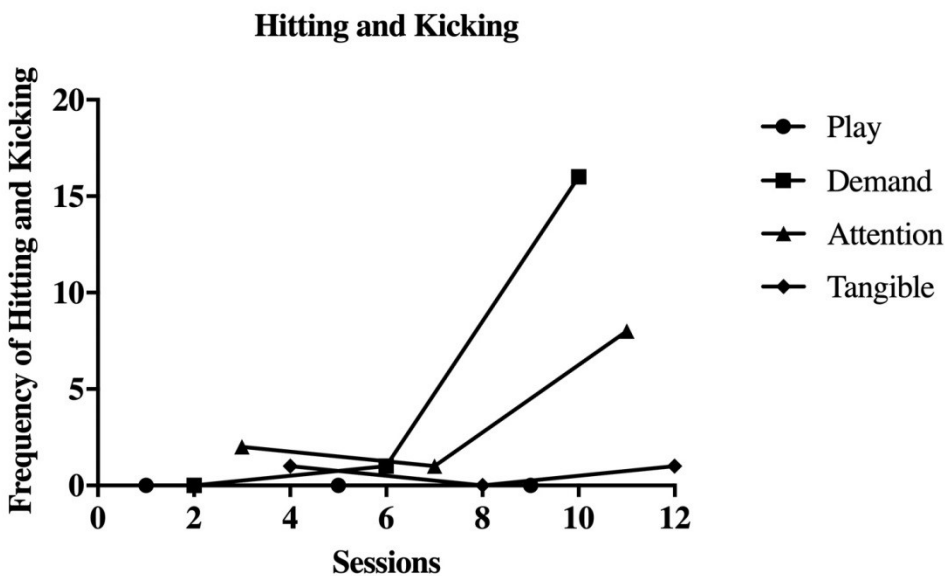


Figure 1. FA results for hitting and kicking

Levels System Intervention

Baseline. During baseline, each data point represents one 90-minute therapy session. In

Figure 4, the average number of tasks completed in a 15-minute period were recorded during

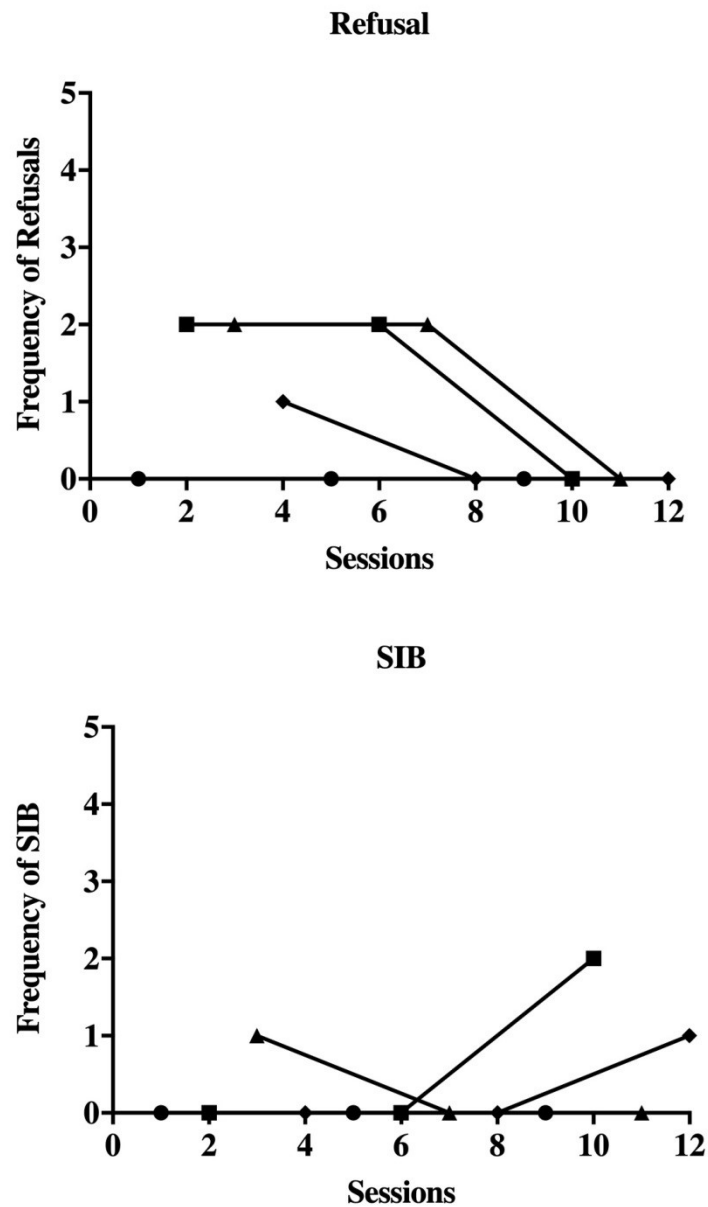


Figure 2. FA results for refusal (top panel) and SIB (bottom panel).

baseline. Chris averaged a total of 5.2 tasks completed during baseline. The average latency to comply (Figure 5) in seconds within a 90-minute therapy session was recorded for baseline. The latency to comply was 753.2 seconds. Refusal to comply with instruction (Figure 6), SIB (Figure 7), throwing items (Figure 8), removing clothes (Figure 9), hitting (Figure 10) and kicking

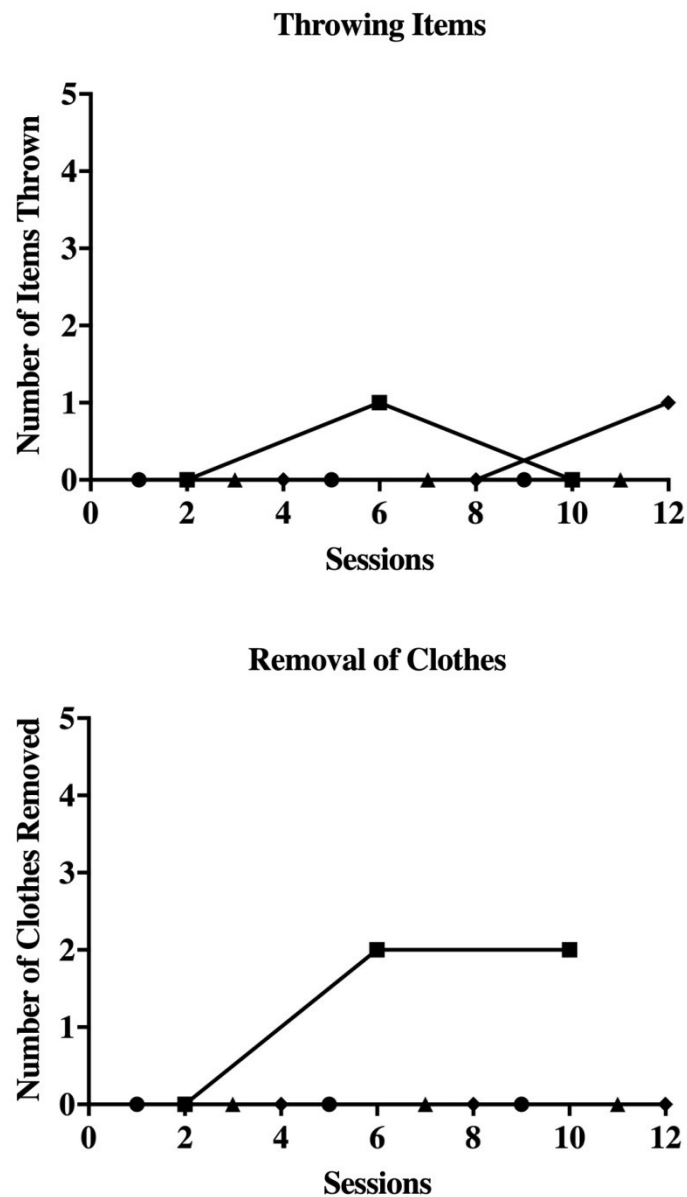


Figure 3. FA results for throwing items (top panel) and removal of clothes (bottom panel).

(Figure 11) were all measured using a frequency count. Each data point represents the total number of instances of problem behavior within the 90-minute therapy session. Averages of 23.8, 7, 1.6, 11.8, and 6.6 were obtained for SIB, throwing objects, removing clothes, hitting and kicking respectively.

Intervention. During the first 10 sessions of intervention, all tasks were completed (Figure 4) within the 15-minute period. From sessions 16-38, there was variability in the number of tasks completed within each 15-minute period. The first 10 sessions also showed lower latency to comply (Figure 5). From sessions 16-40, there was again variability in the latency to comply, but was reduced to immediate compliance from sessions 41-68.

Extinction Intervention. As can be seen in Figure 6, the number of refusals remained lower than baseline the entirety of the intervention. The most to occur in one session was 5, that took place during session 16. As displayed in Figure 7, SIB occurred at low levels until session 30 where it spiked to 19 instances in one 15-minute period. This was also the only point where SIB reached baseline levels. After session 30, SIB decreased and by sessions 40-68 ceased to occur. The frequency of items thrown (Figure 8) reached baseline levels three times: sessions 16, 22, and 25. After the highest data point of 8 items thrown, it decreased to lower levels and were reduced to 0 for sessions 42-68. Clothes were removed during sessions (see Figure 9) until session 28 when it remained at 0 until session 61, where 4 clothing items were removed. In session 61, no aggression was carried out when the clothing items were removed. Despite the variability of baseline in Figure 10, aggression in the form of hitting occurred steadily until session 41 where only one instance of hitting occurred through the rest of the study. Lastly, kicking (Figure 11) occurred at low levels throughout the intervention except for sessions 25 and 26 where it occurred 8 and 11 times respectively. From sessions 47-68, kicking did not occur.

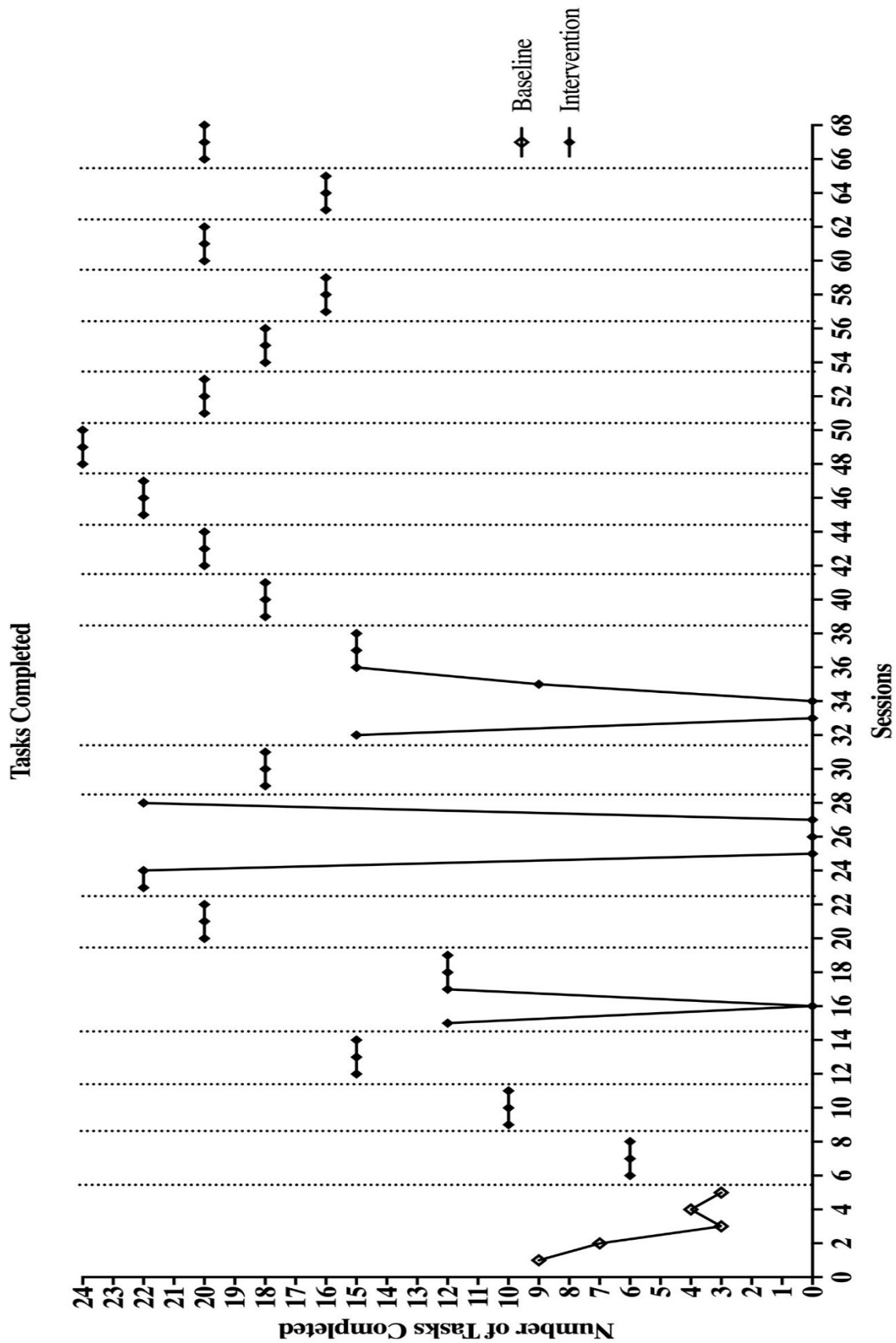


Figure 4. Baseline and intervention results for tasks completed. Open diamonds represent baseline. Closed diamonds represent intervention.

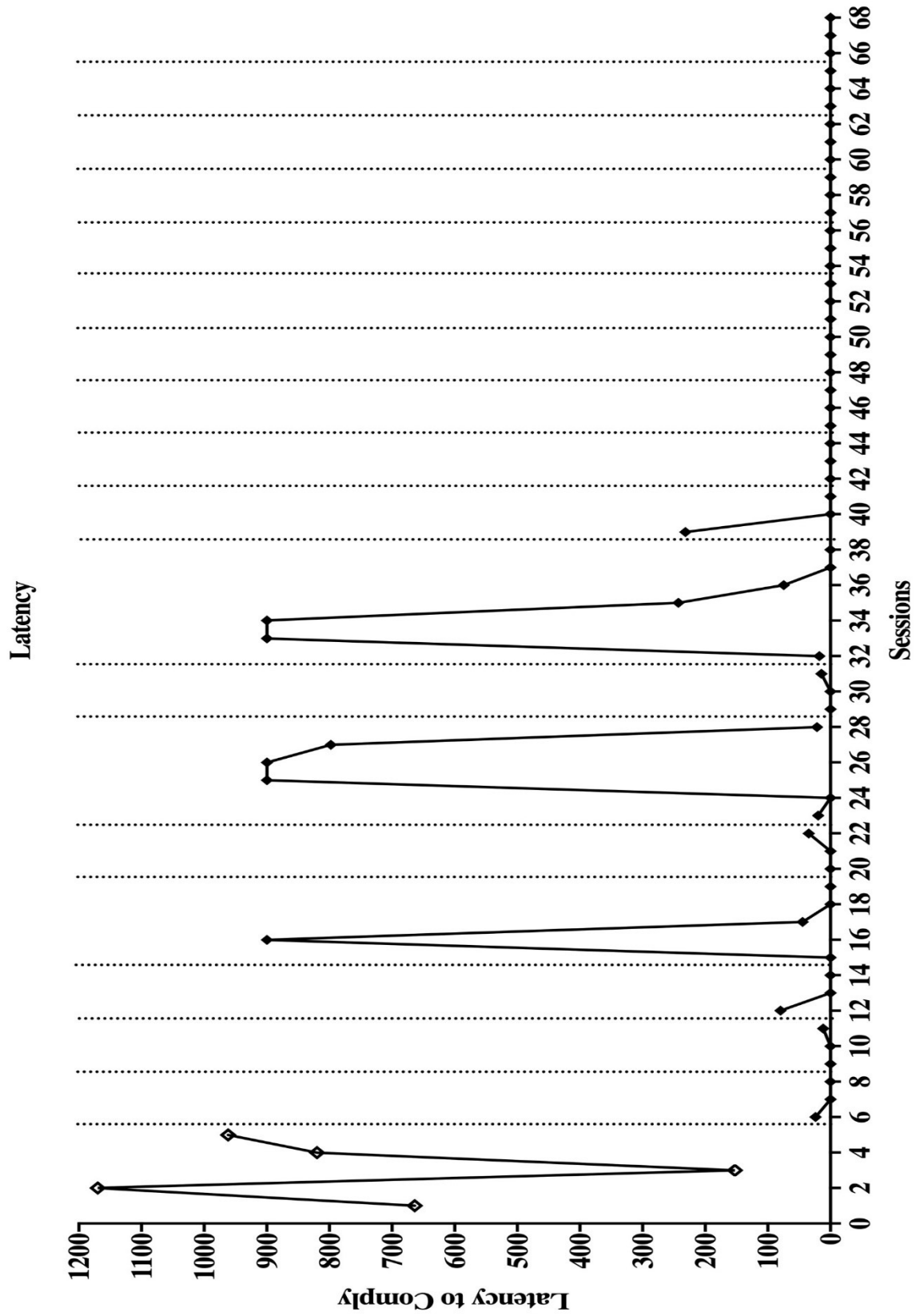


Figure 5. Baseline and intervention results for latency to comply. Open diamonds represent baseline. Closed diamonds represent intervention.

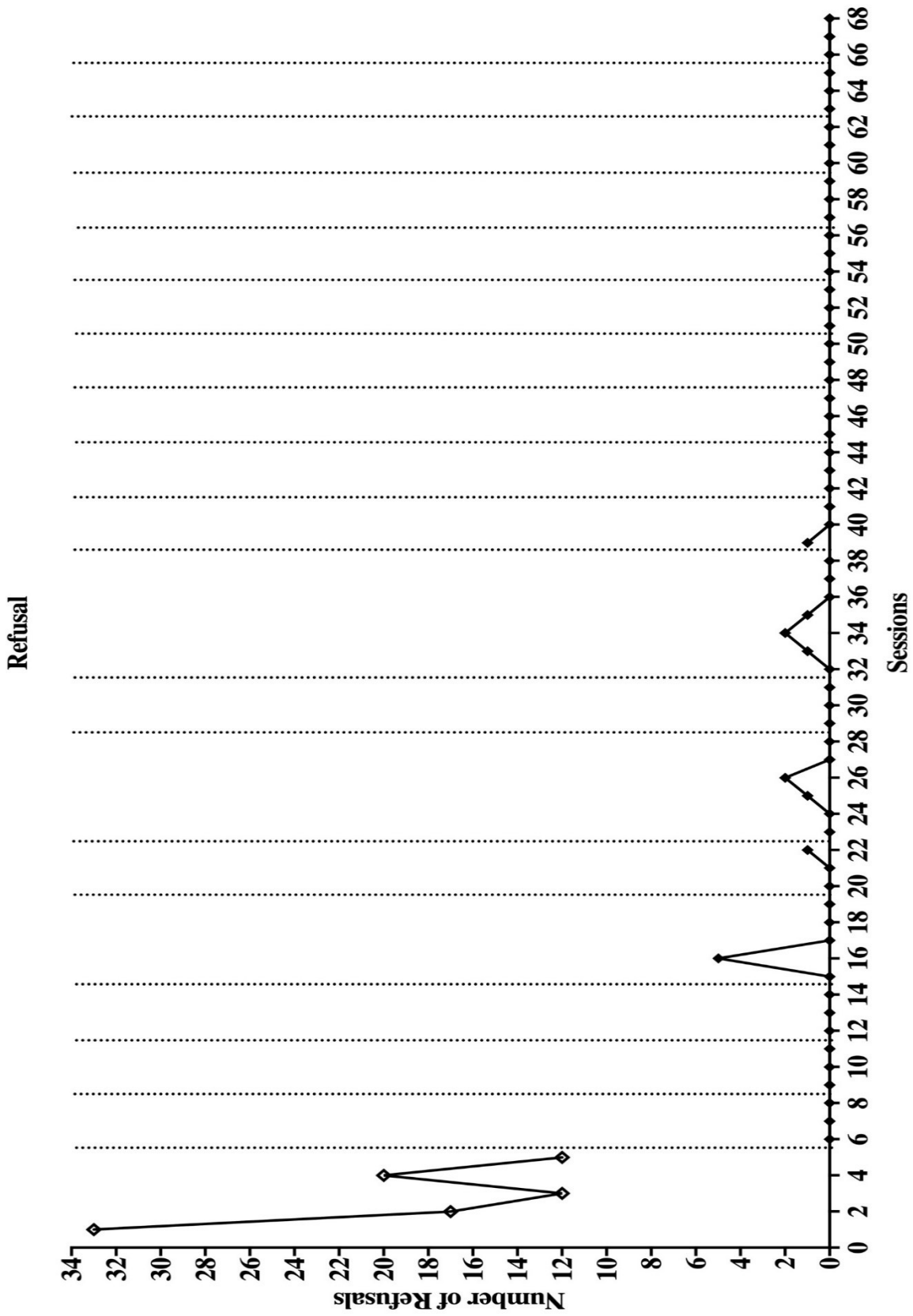


Figure 6. Baseline and intervention results for number of refusals. Open diamonds represent baseline. Closed diamonds represent intervention.

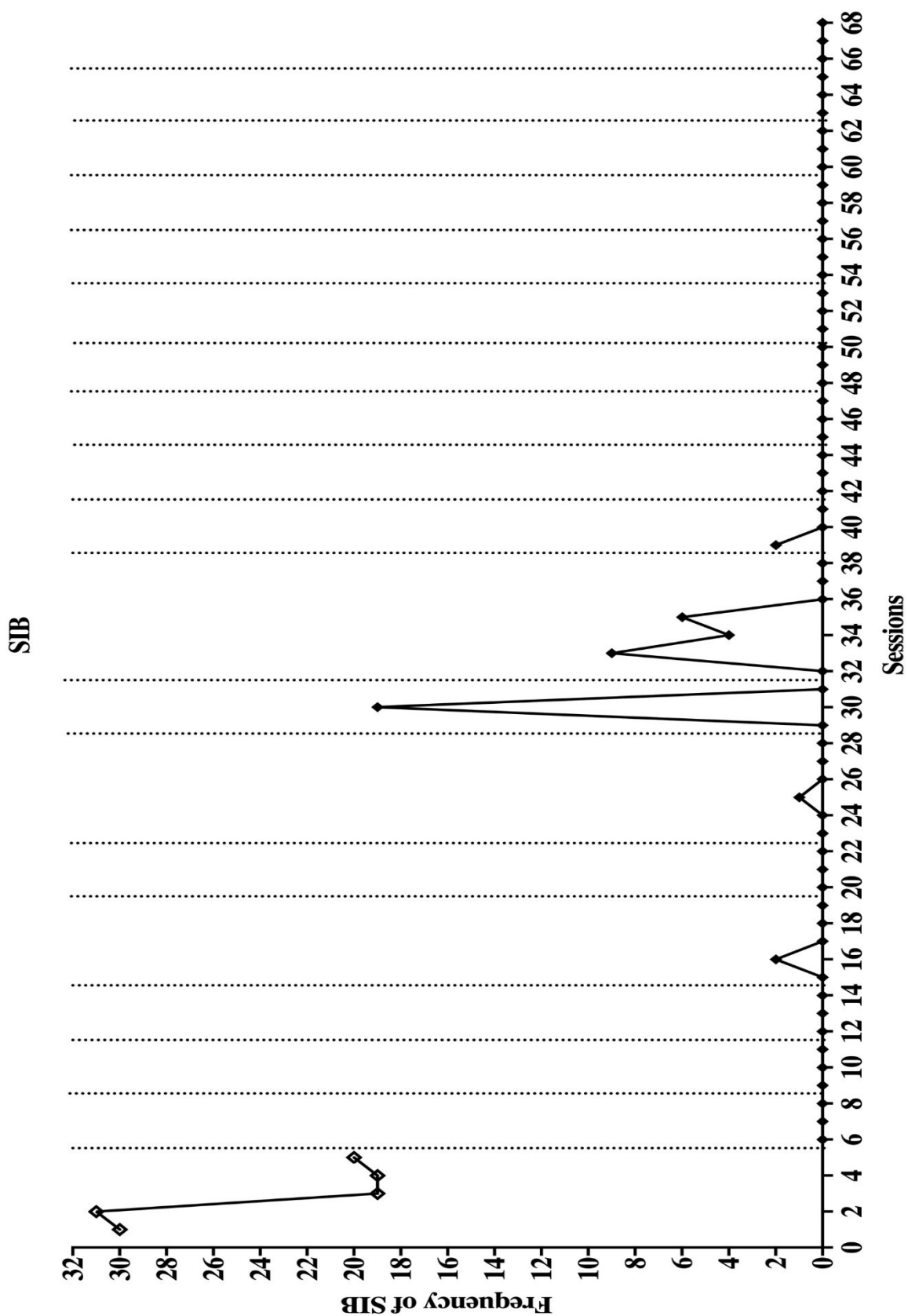


Figure 7. Baseline and intervention results for SIB. Open diamonds represent baseline. Closed diamonds represent intervention.

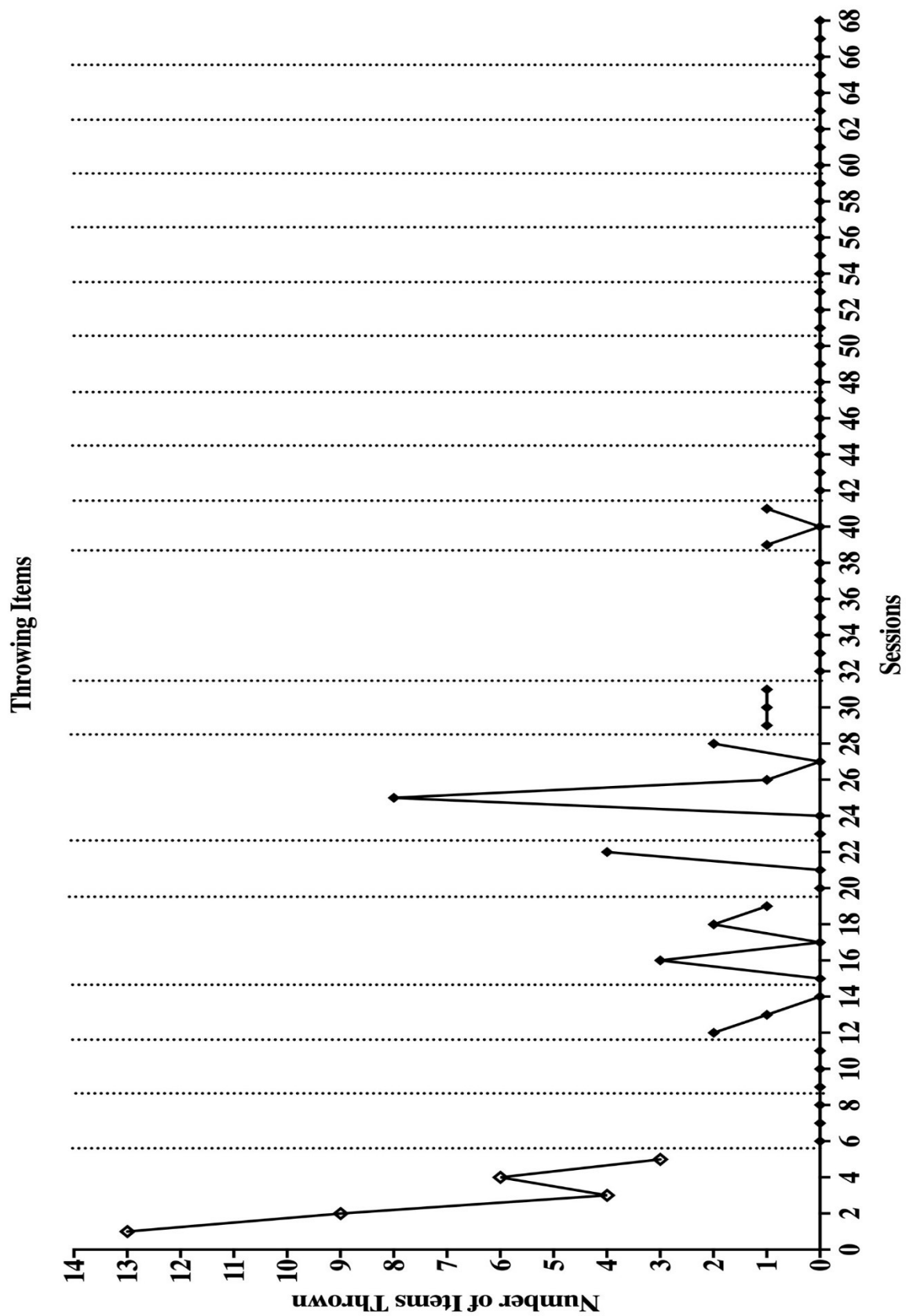


Figure 8. Baseline and intervention results for throwing items. Open diamonds represent baseline. Closed diamonds represent intervention.

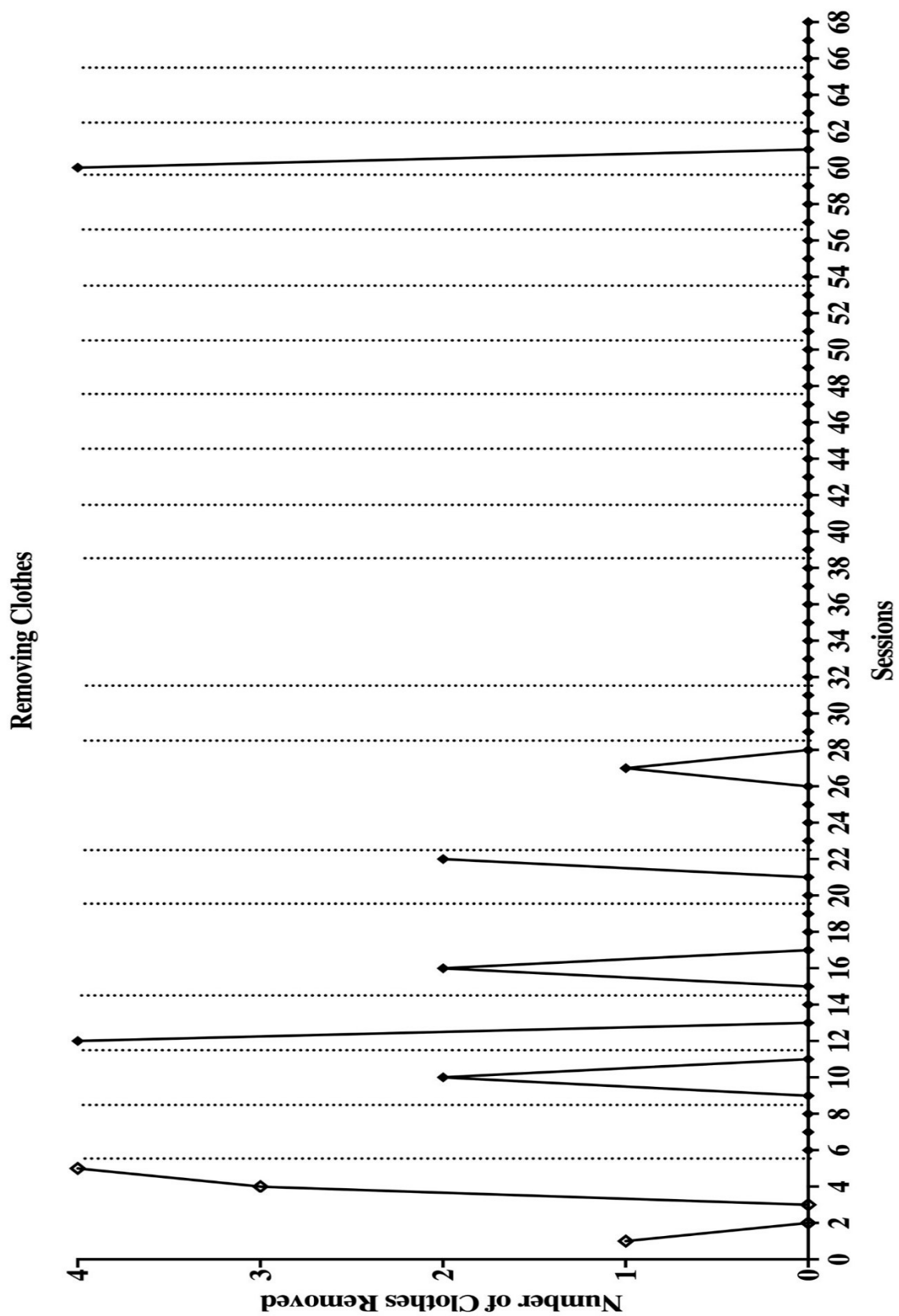


Figure 9. Baseline and intervention results for removing clothes. Open diamonds represent baseline. Closed diamonds represent intervention.

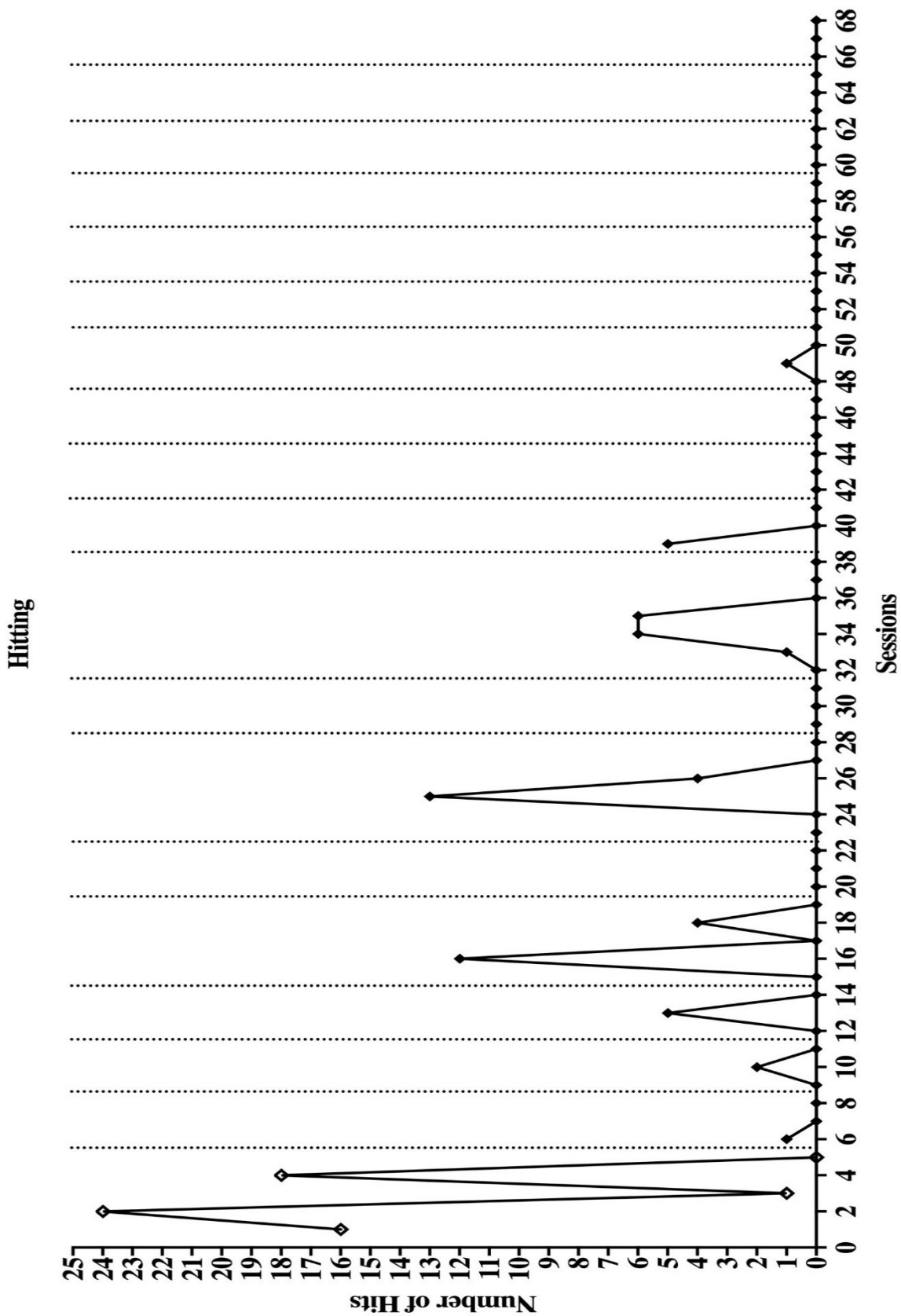


Figure 10. Baseline and intervention results for hitting. Open diamonds represent baseline. Closed diamonds represent intervention.

Kicking

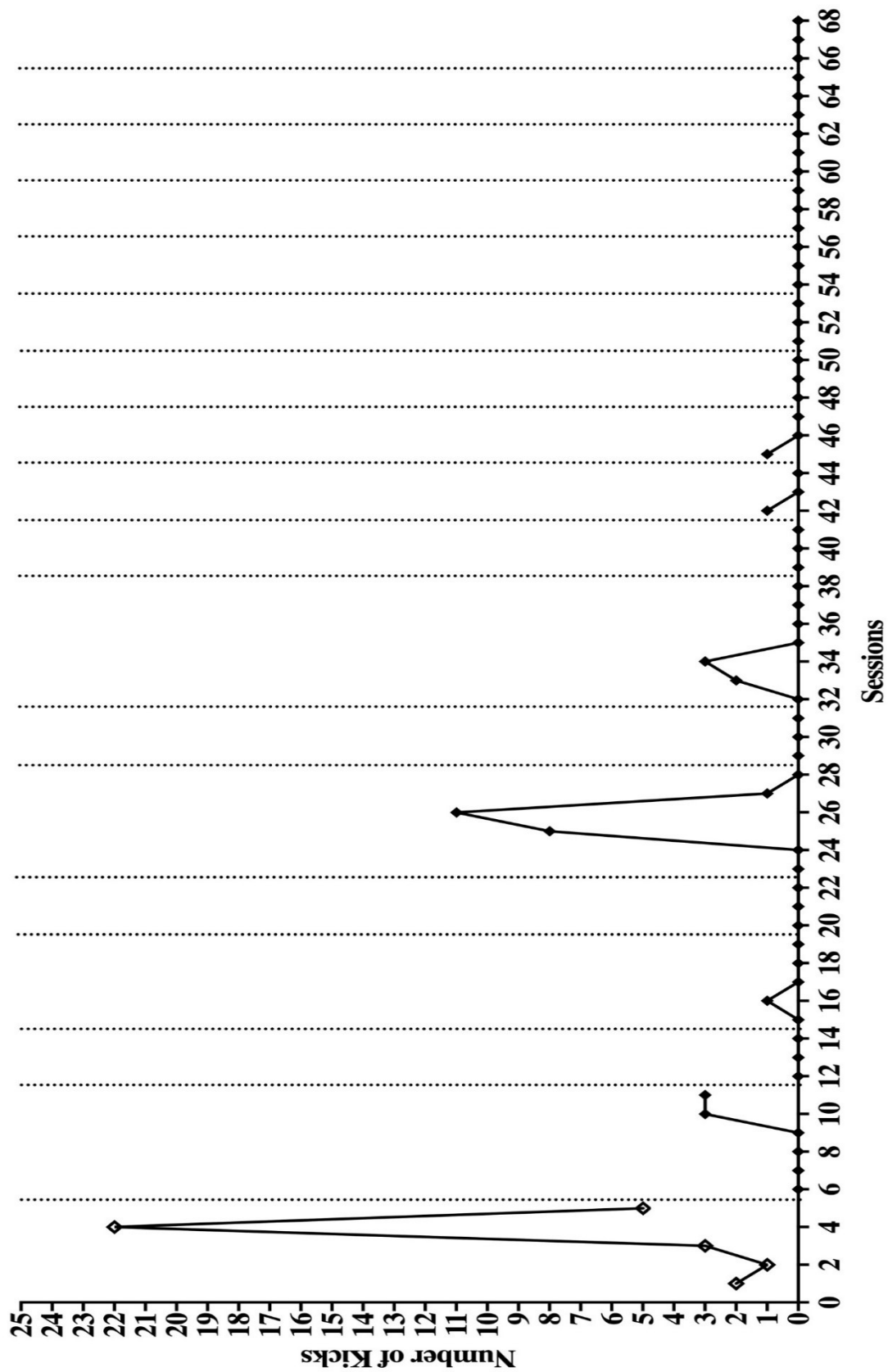


Figure 11. Baseline and intervention results for kicking. Open diamonds represent baseline. Closed diamonds represent intervention.

DISCUSSION

In the current study, the effectiveness of a levels system token economy was employed to address aggression and refusal to comply with instructions in an individual with autism. Overall the intervention was a success, in that an increase in task compliance and a decrease in aggression and refusal was observed.

As a result of the extinction and levels system token economy, aggression was reduced to a frequency near 0 and the latency to respond became immediate. Similar to Hagopian et al., (2002), Chris showed dramatic decreases in problem behavior at the start of the intervention. Some forms of problem behavior occurred at 0 rates and increased at a later point in the intervention; this could point to some form of spontaneous recovery. As can be seen in Figures 1 thru 4, there is a correlation between the number of tasks completed, latency to comply, and the frequency of aggressive behavior. The more tasks completed, the faster the response latency to comply, the fewer aggressive behaviors.

It is important to note that for sessions 6-15, problem behavior was emitted when the therapists did not allow Chris to finish more tasks than the allotted criteria. For example, Chris would complete half of his work, skip the break in between, complete the other half of his work, move Thomas, and would want to complete more work instead of playing for the rest of the session. As the intervention continued, the problem behavior decreased. It is assumed that Chris developed self-control and was better able to handle a delay of reinforcement. As can be seen in Figure 2, by session 39 thru 68 Chris was completing successfully 16 to 24 tasks with within a 15-minute period. This intervention resulted in a smoother routine during the overall session. Another positive outcome was that the relationship between therapists and Chris improved

dramatically. There were increases in positive play between Chris and therapists, positive interactions, and increased frequency of non-contingent verbal praise from the therapists. The observed Therapist-Chris interaction behavior were not tested directly as a function of the intervention, but secondary observations.

Three observable spikes in problem behavior (see Figure 2, sessions 16, 26, and 33) where aggression increased, latency to comply was very slow and the number of tasks completed was low. Upon *post hoc* review of the lab-clinic notes, two of the spikes happened on a Monday and the other on a Wednesday. The spikes in problem behavior and compliance also occurred at different points during each of those 90-minute sessions. A direct cause of these incidences could not be identified, leaving researchers to conclude extraneous setting (clinic or home) events produced these spikes in aberrant behavior which precluded successful task completion.

Rooker et al., (2011) stated that a tangible function should not be included in a FA unless a tangible is a suspected function of the behavior, for a tangible function has been shown to result in false positives within the FA. Although the function of the behavior could not be deduced in this study, the intervention was based upon a tangible function. The results were positive, even though the hypothesized function was escape. This could mean a tangible function was created from the intervention and reduced successfully the problem behavior and increased task compliance.

There was one error in the implementation of the levels system token economy. In sessions 23 and 24, Chris completed 24 tasks. In sessions 25-27, Chris did not complete any tasks due to aggression and refusal. In session 28, the criterion was kept at 24. This did not meet the three consecutive sessions needed to be met in order to move criteria. Therapists should have moved the criterion to a lower level, giving Chris a higher probability of being successful.

This intervention is not without its limitations. First, therapists only saw Chris twice a week for 90 minutes, totaling 3 hours per week. This could have been part of the reason why it took Chris a longer time to have sustained positive outcomes from the intervention.

Second, experimenters could not control what behavior was being reinforced inadvertently by the family at home. Experimenters only had control over what was reinforced during the therapy sessions. Hence, Chris needed to learn to differentiate between environmental contexts (home versus clinic). This could be a reason why it took Chris a longer time to have positive outcomes from the current intervention. Performing certain behaviors may have resulted in positive outcomes for him at home, but similar results were not being obtained when he was with the therapists.

Third, the FA results were inconclusive, thereby not providing the function of the aggressive behavior. More sessions were needed for each condition to determine fully a functional (antecedent-consequence) pattern of the behaviors. As mentioned earlier, this was due to time constraints based on the amount of time Chris spent in therapy and the FA was completed by clinical staff prior to implementing the intervention.

Fourth, this experiment did not follow completely the guidelines from Scheuermann et al., (1994) by creating the level system directly for the function of Chris's escape behavior (which was not determined by the FA). Although the intervention showed positive results, the observed behavior change could have been obtained potentially faster and been more generalizable if the escape function was more readily identified. As Scheuermann et al., (1994) has pointed out, the function of the behavior needs to be addressed within the levels system used for an individual. In the current intervention study, the function was not addressed, yet positive

outcomes were obtained. This is something future applied clinical research should consider prior to implementing an intervention.

Last, there were extraneous factors that could not be controlled and could have produced the variability in Chris' behavior. One day each week when experimenters saw Chris, he came straight from an occupational therapy appointment, while on the other day he did not. He also started going to school for 1 hour a day around the time the intervention started. Another factor was that different people would bring him each time. Either his grandmother or grandfather would bring him, and on rare occasion, his mother. These are environmental events that are inherent in applied research that should be noted.

Despite these limitations, results of the intervention are promising. More research needs to be conducted on levels systems with individuals on the autism spectrum where the levels system is individualized. It is the contention of the author that future applied and basic research should investigate the use of an individualized levels system token economy across settings and individuals (neurotypical and aberrant).

REFERENCES

- Carnett, A., Raulston, T., Lang, R., Tostanoski, A., Lee, A., Sigafoos, J., & Machalicek, W. (2014). Effects of a perseverative interest-based token economy on challenging and on-task behavior in a child with autism. *Journal of Behavioral Education*, 23(1), 368–377. <https://doi.org/10.1007/s10864-014-9195-7>
- Doll, C., McLaughlin, T. F., & Barretto, A. (2013). The token economy: A recent review and evaluation. *International Journal of Basic and Applied Science*, 2(1), 131–149. <https://doi.org/10.1007/978-1-4613-4121-5>
- Filcheck, H. A., Mcneil, C. B., Greco, L. A., & Bernard, R. S. (2004). Using a whole-class token economy and coaching of teacher skills in a preschool classroom to manage disruptive behavior. *Psychology in Schools*, 41(3), 351–361.
- Glowacki, K., Warner, G., & White, C. (2016). The use of a token economy for behaviour and symptom management in adult psychiatric inpatients: A critical review of the literature. *Journal of Psychiatric Intensive Care*, 12(2), 119–127. <https://doi.org/10.20299/jpi.2016.009>
- Hagopian, L. P., Rush, K. S., Richman, D. M., Kurtz, P. F., Contrucci, S. A., & Crosland, K. (2002). The development and application of individualized levels systems for the treatment of severe problem behavior. *Behavior Therapy*, 33(1), 65–86. [https://doi.org/10.1016/S0005-7894\(02\)80006-5](https://doi.org/10.1016/S0005-7894(02)80006-5)
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982). Toward a functional analysis of self-injury. *Analysis and Intervention In Developmental Disabilities*, 2(1), 3-20.
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Towards a functional analysis of self-injury. *Journal of Applied Behavior Analysis*, 27(2), 197–209. [https://doi.org/10.1016/0270-4684\(82\)90003-9](https://doi.org/10.1016/0270-4684(82)90003-9)
- Kazdin, A. E. (1977). Assessing the clinical or applied importance of behavior change through social validation. *Behavior Modification*, 1(4), 427-452.
- Kazdin, A. E. (2011). *Single-case research design methods for clinical and applied settings* (2nd ed.). New York: Oxford University Press.
- LePage, J. P. (1999). The impact of a token economy on injuries and negative events on an acute psychiatric unit. *Psychiatric Services*, 50(7), 941–944. <https://doi.org/10.1176/ps.50.7.941>

- LePage, J. P., DelBen, K., Pollard, S., McGhee, M., VanHorn, L., Murph, J., ... Mogge, N. (2003). Reducing assaults on an acute psychiatric unit using a token economy: A 2-year follow-up. *Behavioral Interventions*, 18(1), 179–190. <https://doi.org/10.1002/bin.134>
- Lindsley, O. R. (1956). Operant conditioning methods applied to research in chronic schizophrenia. *Psychiatric Research Reports*, 5, 118-139.
- Matson, J. L., & Boisjoli, J. A. (2009). The token economy for children with intellectual disability and/or autism: A review. *Research in Developmental Disabilities*, 30(1), 240–248. <https://doi.org/10.1016/j.ridd.2008.04.001>
- Phillips, E. L., Phillips, E. A., Fixsen, D. L., & Wolf, M. M. (1971). Achievement place : Modification of the behaviors of pre-delinquent boys \within a token economy. *Journal of Applied Behavior Analysis*, 4(1), 45–59.
- Randall, K. R., Lambert, J. M., Matthews, M. P., & Houchins-Juarez, N. J. (2018). Individualized levels system and systematic stimulus pairing to reduce multiply controlled aggression of a child with autism spectrum disorder. *Behavior Modification*, 42(3), 422–440. <https://doi.org/10.1177/0145445517741473>
- Rooker, G. W., Iwata, B. A., Harper, J. M., Fahmie, T. A., & Camp, E. M. (2011). False-positive tangible outcomes of functional analyses. *Journal of Applied Behavior Analysis*, 44(4), 737–745. <https://doi.org/10.1901/jaba.2011.44-737>
- Scheuermann, B., Webber, J., Partin, M., & Knies, W. C. (1994). Level systems and the law: Are they compatible? *Behavioral Disorders*, 19(3), 205–220.
- Skinner, B. F. (1957). *Verbal behavior*. East Norwalk, CT: Appleton-Century-Crofts.
- Sundberg, M. L. (2014). *The verbal behavior milestones assessment and placement program: The VB-MAPP (2nd Edition)*. Concord, CA: AVB Press.
- Wilder, D. A., Harris, C., Reagan, R., & Rasey, A. (2007). Functional analysis and treatment of noncompliance by preschool children. *Journal of Applied Behavior Analysis*, 40(1), 173–177. <https://doi.org/10.1901/jaba.2007.44-06>

APPENDICES

Appendix A. Parent Permission Form

PARENT CONSENT FOR PARTICIPANT

Dear Parent,

Missouri State University supports the practice of protection for human participants taking part in our research. A graduate student at Missouri State University is researching an intervention to decrease elopement and aggressive behaviors and increase compliance in an individual diagnosed with Autism Spectrum Disorder. The following information is provided for you to decide whether you wish your child to participate in this study. You may refuse to sign this form and not have your child participate in this study. You should be aware that even if you agree to participate, you are free to withdraw your child from the study at any time. If you do withdraw from this study, it will not affect any relationships you may have with Missouri State University and any other services it may provide to your child.

What is the purpose of this study?

The purpose of this study is to decrease aggressive behaviors and elopement and increase compliance in an individual diagnosed with autism. Your child has been nominated due to fitting the demographic chosen for the present study. We are requesting permission to decrease these behaviors and increase compliance in your child.

What are the behavioral assessments?

Assessment for behavior includes a functional analysis and behavioral observations done by a graduate student at Missouri State University.

What are the appropriate behavioral interventions?

The appropriate behavioral intervention is chosen based on best practices, and include the following:

Token Economy: Based on the number of tasks completed by the participant, he will be able to earn tokens (fake money) to spend on different prizes. The faster work is completed, the more free time the participant will earn.

What are the benefits of your child participating in this study?

The participant may benefit from the intervention. We expect to see decreases in different aggressive behaviors and an increase in compliance throughout the study. Your child's participation is voluntary, and you are free to withdraw at any time without penalty. If you agree, the graduate student researcher will implement research-based strategies to help decrease aggressive behaviors and increase compliance in your child.

What are the confidentiality procedures?

Missouri State University supports the practice of protection for human participants taking part in our research programs. Your permission allows a copy of all information obtained from assessment and interventions to be provided to the Missouri State University staff involved in this study. This information will be kept confidential in closed files at Missouri State

University. Information from assessments or observations shared in verbal or written reports will be shared only with project staff and will be available for parents to review.

If you agree to allow your child to participate, please sign the attached form and return it to either Savanna Chojnacki, the supervising BCBA, or Dr. D. Wayne Mitchell. Should you desire any additional information or have questions, please call Ms. Chojnacki at (816)-582-0400 or email at chojnacki3@live.missouristate.edu

Sincerely,

Savanna Chojnacki

Dr. D. Wayne Mitchell

Missouri State University Professor

(417) 836-6941

Waynemitchell@missouristate.edu

PARTICIPANT CERTIFICATION

If you agree to have your child participate in this study please sign where indicated, then return this page to either Savanna Chojnacki, the supervising BCBA, or Dr. D. Wayne Mitchell. Keep the consent information for your records.

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study, use, and disclosure of any information about my child for the study.

I agree to allow my child to take part in this study. By my signature I affirm that I am the parent/guardian of the child and that I have received a copy of this Consent and Authorization form. I understand this means he/she may be observed and that information will be used to help guide the intervention process. Assistance with the development of the token economy will be developed by the graduate student researcher with consultation from Missouri State University. I understand that my permission allows for sharing of collected data with project staff.

Child's first and last name

Print parent's name

Parent's signature

Date

With my signature I affirm that I have been given a copy of this consent form.

I understand that if I have any additional questions about my rights as a research participant, I may call (816) 582-0400.

Appendix B. IRB Approval

Date: 7-29-2019

IRB #: IRB-FY2019-612

Title: The use of a modified level token system to increase task compliance and to decrease aggressive behavior with a child with autism

Creation Date: 3-20-2019

End Date:

Status: Approved

Principal Investigator: D Mitchell

Review Board: MSU

Sponsor:

Study History

Submission Type	Initial	Review Type	Expedited	Decision	Approved
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Key Study Contacts

Member	D Mitchell	Role	Principal Investigator	Contact	waynemitchell@missouristate.edu
Member	Savanna Chojnacki	Role	Primary Contact	Contact	chojnacki3@live.missouristate.edu
Member	Shelby White	Role	Investigator	Contact	white233@live.missouristate.edu

Initial Submission

Investigative Team

Who is the Principal Investigator?

- 1 *This individual will be required to certify the protocol for submission and will be responsible for the overall project and **MUST be a faculty or staff member.***

Name: D Mitchell

Organization: Psychology

Address: 901 S National Ave , Springfield, MO 65897-0027

Phone: 417-836-6941

Email: waynemitchell@missouristate.edu

Who is the Primary Study Contact?

- 2 *This person, in addition to the Principal Investigator, will be included on all correspondence related to this project. This person may be the Principal Investigator or someone else (**faculty, staff, or student**).*

Name: Savanna Chojnacki

Organization: Psychology

Address: 901 S National Avenue , Springfield, MO 65897-0027

Phone:

Email: chojnacki3@live.missouristate.edu

Will there be any Co-Principal Investigators participating in this study?

3. *Co-Principal Investigators will also be required to certify the protocol for submission and share overall responsibility with the Principal Investigator for the study. Co-Principal Investigators **MUST** be faculty or staff members.*

Yes

✓ No

Will there be any other individuals participating with the investigation?

4

These individuals will be participating as part of the research team, but will not need to certify the protocol submissions, or be included in any correspondence regarding the study. Typically these individuals will be students or individuals from other institutions. Investigators may be faculty, staff, students, or unaffiliated individuals.

✓ Yes

Select the Investigator(s)

Name: Shelby White

Organization: Psychology

Address: 901, S. National Avenue , Springfield, MO 65897-0027

Phone:

Email: white233@live.missouristate.edu

No

What is the full title of the research protocol?

1

The Use of a Modified Level Token System to Increase Task Compliance and to Decrease Aggressive Behavior with a Child with Autism

Abstract/Summary

2

Please provide a brief description of the project.

In a token economy level system, the magnitude positive reinforcers increase concurrently as an individual progresses successfully from an easier task level to a more complex task. The motivation for the individual in a level economy system stems from receiving systematically reinforcers of increased value at each successful task completion. Employing a level token economy system in concordance with an extinction procedure (planned ignoring) for aggressive behaviors is an effective intervention method. In this single-subject design study, a 5-year-old boy with Autism will be observed across a variety of 15 min teaching sessions, implementing synchronously, the reinforcement for task compliant behaviors and extinction for aggressive behavior. It is hypothesized that the compliance task behaviors will increase as a function of the token level system and the frequency of aggressive behaviors will decrease as a function of the extinction (planned ignoring).

Are you requesting Single IRB Review

3

Single IRB Review is applicable to a study that is being reviewed by another Institution's IRB, in which you wish to rely on the external IRB for review, approval, and oversight.

Yes

✓ No

Does the study require review and oversight of the IRB?

4

Regardless of how these questions are answered, the determination of IRB review and oversight is made by the IRB and this study will still need to be submitted for preliminary review.

Is this study a systematic investigation, following a predetermined plan, for looking at a particular issue, testing a hypothesis or research question, or developing a new theory that includes any of the following:

- 4A
- Collection or analysis of quantitative or qualitative data
 - Collection of data using surveys, testing or evaluation procedures, interviews, or focus groups
 - Collection of data using experimental designs such as clinical trials
 - Observation of individual or group behavior
-

☒ Yes

No

Will this study contribute to generalizable knowledge, in that the purpose or intent of the project is to test or to develop scientific theories or hypotheses, or to draw conclusions that are intended to be applicable and/or shared beyond the populations or situations being studied? This may include one or more of the following:

- 4B
- Presentation of the data at meetings, conferences, seminars, poster presentations, etc.
 - The knowledge contributes to an already established body of knowledge
 - Other investigators, scholars, and practitioners may benefit from this knowledge
 - Publications including journals, papers, dissertations, and theses
-

☒ Yes

No

4C Will this study require obtaining information or biospecimens, through intervention or interaction with an individual that will be used, studied, or analyzed by the investigative team?

☒ Yes

☐ No

Will you be requesting an Exempt Review for this study?

5

In order to qualify for review via exempt procedures, the research must not be greater than minimal risk and must fall into at least one of the exempt categories defined by federal regulations.

☐ Yes

☒ No

6 Is this study receiving internal or external funding?

☐ Yes

☒ No

Does this study contain protected health information (PHI)?

7

PHI is any information in a medical record or designated record set that can be used to identify an individual and that was created, used, or disclosed in the course of providing a health care service, such as a diagnosis or treatment.

Yes

☒ No

8 Has all IRB Human Research training been taken through CITI under Missouri State University?

☒ Yes

No

Describe the proposed project in a manner that allows the IRB to gain a sense of the project including:

- The research questions and objectives,
- Key background literature (supportive and contradictory) with references, and
- The manner in which the proposed project will improve the understanding of the chosen topic.

The primary goal of the study is to increase task compliance in a child with autism via a token level system and to reduce aggressive behaviors. A single-subject changing criterion design will be used to establish a systematic relationship between the interventions and the compliant and aggressive behaviors. The research hypotheses are as follows:

1. As a function of the token level system task compliance behavior will increase.
2. As a function of an extinction procedure (planned ignoring) the aggressive behaviors will decrease. And too, as the compliant behaviors increase, they will serve as replacement behaviors for the aggressive behaviors, thereby an alternative means of decreasing the aggressive behavior. In the field of applied behavior analysis, this is referred to as a differential reinforcement of incompatible behavior schedule of reinforcement.

1

Token economies have been used effectively with a variety of individuals including psychiatric patients (LePage et al., 2003), neuro-typical children in a classroom setting (Filchek, McNeil, Greco & Bernard, 2004), and individuals with autism. In Matson and Boisjoli (2009) review of token economies for children with autism they provided a series of positive evidence for increasing desired and decreasing undesired behaviors in children with autism via a variety of token economy interventions including level systems. In level systems, "different levels correspond to different degrees of participant behavior" (Doll et al., 2013, p. 137). That is,

the person starts off at an initial required level of behavior, and depending on individual performance and improvement of that behavior, a higher level of behavior is required (Kazdin, 1977). As the individual moves from one behavior level to the next, there is an increase in the task demands and an increase in the magnitude of reinforcers that can be earned for successful task completion. A level token economy system has been shown to be effective in reducing aggressive behaviors in an individual with autism. For example, Randall, Lambert, Matthews, and Houchins-Juarez (2017) used a level system to decrease aggressive behaviors in an individual with autism. They demonstrated that a level system was effective in reducing aggression to near 0 levels. Although token economies historically have been an effective intervention for individuals on the autism spectrum, there is limited

research demonstrating the effect use of a level systems approach. This study will contribute to the current body of knowledge on token economies and moreover, provide information on the lesser studied variation of the token economy, the level systems approach.

2 Check all research activities that apply:

Audio, video, digital, or image recordings

Biohazards (e.g., rDNA, infectious agents, select agents, toxins)

Biological sampling (other than blood)

Blood drawing

Class Protocol (or Program or Umbrella Protocol)

Data, not publicly available

Data, publicly available

Deception

Devices

Diet, exercise, or sleep modifications

Drugs or biologics

Focus groups

Internet or email data collection

Materials that may be considered sensitive, offensive, threatening, or degrading

Non-invasive medical procedures

✓ Observation of participants

Oral history

Placebo

Record review

Specimen research

Surgical procedures

Surveys, questionnaires, or interviews (one-on-one)

Surveys, questionnaires, or interviews (group)

Other

Describe the procedures and methods planned for carrying out the study. Make sure to include the following:

- Site selection,
- The procedures used to gain permission to carry out research at the selected sites(s),
- Data collection procedures, and
- An overview of the manner in which data will be analyzed.

Provide all information necessary for the IRB to be clear about all of the contact human participants will have with the project.

This proposed study will be conducted at [REDACTED] Permission has been obtained by the BCBA (a certified-licensed behavior analyst) who oversees the treatment of all clients. She has reviewed the potential procedures and approved the intervention. Prior to implementing the intervention, a functional analysis will be completed in order to determine the function or reason for the participant's behavior. This will be done by observing and recording the antecedents and consequences of the participant's aggressive behavior and compliant task behaviors which in turn will provide a starting point for the intervention.

- 3 The are two primary behavior excesses: non-compliance and aggression. Non-compliance is defined as standing up from sitting in a chair and leaving the table from where education task demands have been placed. The non-compliance data will be collected by pen and paper and measured by a frequency count. The aggressive behavior takes place in the forms of *hitting* (using an open or closed fist to strike an object or staff member), *kicking* (using a foot to strike an object or staff member), *throwing* items (taking an object and throwing it at staff or to another part of the room; this includes swiping objects off the table), *self-injurious* behavior (SIB; hitting oneself with a closed fist on the head or face), and *removing clothes* (taking off any part of clothing off of one's body, including shoes and socks). Removal of clothes was included as aggression because Chris will take off

articles of clothing and throw them at staff or around the room. The aggressive behaviors will be measured by a frequency count, meaning each occurrence of behavior will be scored.

The target behavior deficits are the compliant behaviors which consist of the number of educational (work) tasks completed correctly with the therapist during the teaching-therapy sessions. The number of successful compliant behaviors will be counted as well as the latency, how quickly the participant complies to the task demands will be recorded.

Prior to implementing the intervention, a reinforce survey will be conducted to determine a variety of positive reinforcers what differ in reinforcement magnitude that can be earned via tokens earn by completing successfully the required compliant task behaviors.

The compliance and aggressive behavior data will be observed and recorded by direct observation by a trained observer in the room. The observations will be conducted during a series of 90-minute teaching sessions. The data will be recorded in 15-minute time blocks. Baseline compliant and aggressive behaviors will be established across the first 90-minute teaching session. Once baseline has been established, the interventions will begin across a series of teaching sessions. It is anticipated that the rate of behavior change will be established quickly and is predicted to continue over a 3 hours of teaching sessions.

Attach tests, surveys, questionnaires, and other social-behavioral measurement tools, if applicable.

4

[TE Data Sheet Updated.docx](#)
[EBIP_MSWO_Data-Sheet_5-items.pdf](#)
[PEAK DT 184 item assessment.pdf](#)

5 Attach documentation of site permission, if applicable.

1 Specify the participant population(s).

Check all that apply.

Adults

✓ Children (<18 years of age)

Adults with decisional impairment

Non-English speaking

Student research pools (e.g. psychology)

Pregnant women or fetuses

Prisoners

Unknown (e.g., secondary use of data/specimens, non-targeted surveys, program/class/umbrella protocols)

2 Specify the age(s) of the individuals who may participate in the research.

The participant is a 5 year old boy who has been diagnosed with autism, problems relating to social environments and problems with daily living skills.

Describe the characteristics of the proposed participants, and explain how the nature of the research requires/justifies their inclusion.

3

The participant has a diagnosis of autism (stated in 2). He exhibits a task compliance behavior deficit and an excess of problem behaviors in the forms of noncompliance and aggression, which are the primary focus of this study.

- 4 Provide the total number of participants (or number of participant records, specimens, etc.) for whom you are seeking IRB approval.
-

This study will contain one participant with Autism Spectrum Disorder. He is 5 years old.

- 5 Describe what time commitment will be required from each participant, including individual interactions, total time commitment, and long-term follow-up, if any.
-

This study will be conducted in the spring semester (2019). Sessions will occur twice a week for 1.5 hours, equaling 3 hours per week.

- 6 Describe how potential participants will be identified (e.g., advertising, individuals known to investigator, record review, etc.). Explain how investigator(s) will gain access to this population, as applicable.
-

Not applicable

- 7 Describe the recruitment process; including the setting in which recruitment will take place.
-

Not applicable

Attach recruitment materials (ads, flyers, website postings, recruitment letters, and oral/written scripts), if applicable .

- 8 Will participants receive compensation or other incentives (e.g., free services, cash payments, gift certificates, parking, classroom credit, travel reimbursement, etc.) to participate in the research study?
-

☐ Yes

☒ No

Describe all reasonably expected risks, harms, and/or discomforts that may apply to the research. Discuss severity and likelihood of occurrence.

1

Consider the range of risks - physical, psychological, social, legal, and economic.

The participant's aggression is not severe to the point he will injure himself or staff. At times the aggression can be frequent in number of occurrences. There is no risk of the participant or therapists being injured.

Discuss the steps that will be taken to minimize risks and the likelihood of harm.

2

Therapists will block any aggression towards them, preventing them from harm.

The participant will also be given a pseudonym to protect confidentiality.

The parent is free to withdraw their child at any point in the study.

Describe the potential benefits that participants may expect as a result of this research study. State if there are no direct benefits to individual participants.

3

By reducing aggression and increasing task compliance, the participant could benefit from this study. He will not be a harm to himself or others and create better relationships with his therapists. This can also prepare him for the school setting in which he will have work to complete before free time is awarded.

Discuss any potential indirect benefits to future subjects, science, and society.

4

This is a single-subject design study, only one participant, however the goal is to demonstrate that behavior changes are a result of systematic changes in the intervention. The study does have practical and theoretical importance; however external validity is limited. And given that the

participant may learn adaptive social behavior, this should increase the probability of the participant's future advancement academically and socially. Also, this study should contribute to the advancement of applied behavior analysis regarding the use of token economy systems.

5 Describe how risks to participants are reasonable when compared to the anticipated benefits to participants (if any) and the importance of the knowledge that may reasonably be expected to result.

In this study, the benefits will outweigh the risks. The aggression is currently holding the participant back from participating fully in a school setting. By reducing aggression, the participant will be more successful in school.

1 From the list below, indicate how consent will be obtained for this study.

Check all that apply.

Written/signed consent by the subject

✓ Written/signed consent (permission) for a minor by a Parent or Legal Guardian

Written/signed consent by a Legally Authorized Representative (for adults incapable of consenting)

Request for waiver of documentation of consent (verbal consent, anonymous surveys, etc.)

Waiver of parental permission

Waiver of consent (consent will not be obtained from subjects)

2 Describe the consent process including where and by whom the subjects will be approached, the plans to ensure the privacy of the subjects and the measures to ensure that subjects understand the nature of the study, its procedures, risks and benefits and that they freely grant their consent.

Since the participant is 5 years old, the parent of the child will be giving consent for the study. The parent will meet with the BCBA and review the research protocol. Upon obtained informed consent, the parent will receive updates on their child's progress after each session. The parents will be able to withdrawal their child from the study at any time.

Attach all consent and assent documents here:

[Parent Permission Form.docx](#)

Missouri State University is committed to keeping data and information secure. Please review the Missouri Ste University [Information Security Policies](#). Discuss you project with the MSU Information Security Office or your College's IT support staff if you have questions about how to handle your data appropriately.

Statement of Principal Investigator Responsibility for Data

- 1 The principal investigator of this study is responsible for the storage, oversight, and disposal of all data associated with this study. Data will not be disseminated without the explicit approval of the principal investigator, and identifying information associated with the data will not be shared.
-

- ✓ By checking this box, all personnel associated with this study understand and agree to the Statement of Principal Investigator Responsibility for Data.

- 2 How will the data for this study be collected/stored?
-

Check all that apply.

Electronic storage format

- ✓ On paper

Describe where the data will be stored (e.g., paper forms, flash drives or removable media, desktop or laptop computer, server, research storage area network, external

source) and describe the plan to ensure the security and confidentiality of the records (e.g., locked office, locked file cabinet, password-protected computer or files, encrypted data files, database limited to coded data, master list stored in separate location).

3

At minimum, physical data should always be secured by lock and key when stored. Electronic data should be stored on University secure servers whenever possible (Office 365 or other secure campus server). If data has to be stored off campus, the file should be encrypted and the device password protected. Additionally, any data to be shared outside the University network will require a SUDERS request be filed and approved. See <https://mis.missouristate.edu/Central/suders/create>

The data for this study will be collected on paper and electronically (question 2 would not allow for selection of both). No identifying information will be on the data sheets in either format.

Nevertheless, paper data will be kept in a locked desk drawer at Burrell Behavioral Health. Paper data will be transferred to electronic format. The electronic data will be stored on a password protected computer and if necessary, a password protected flash drive.

Describe how data will be disposed of and when disposal will occur.

4

At minimum, Federal regulations require research records to be retained for at least 3 years after the completion of the research (45 CFR 46). Research that involves identifiable health information is subject to HIPAA regulations, which require records to be retained for at least 6 years after a participant has signed an authorization. Finally, funded research projects may require longer retention periods, you may need to follow the sponsoring agency guidelines.

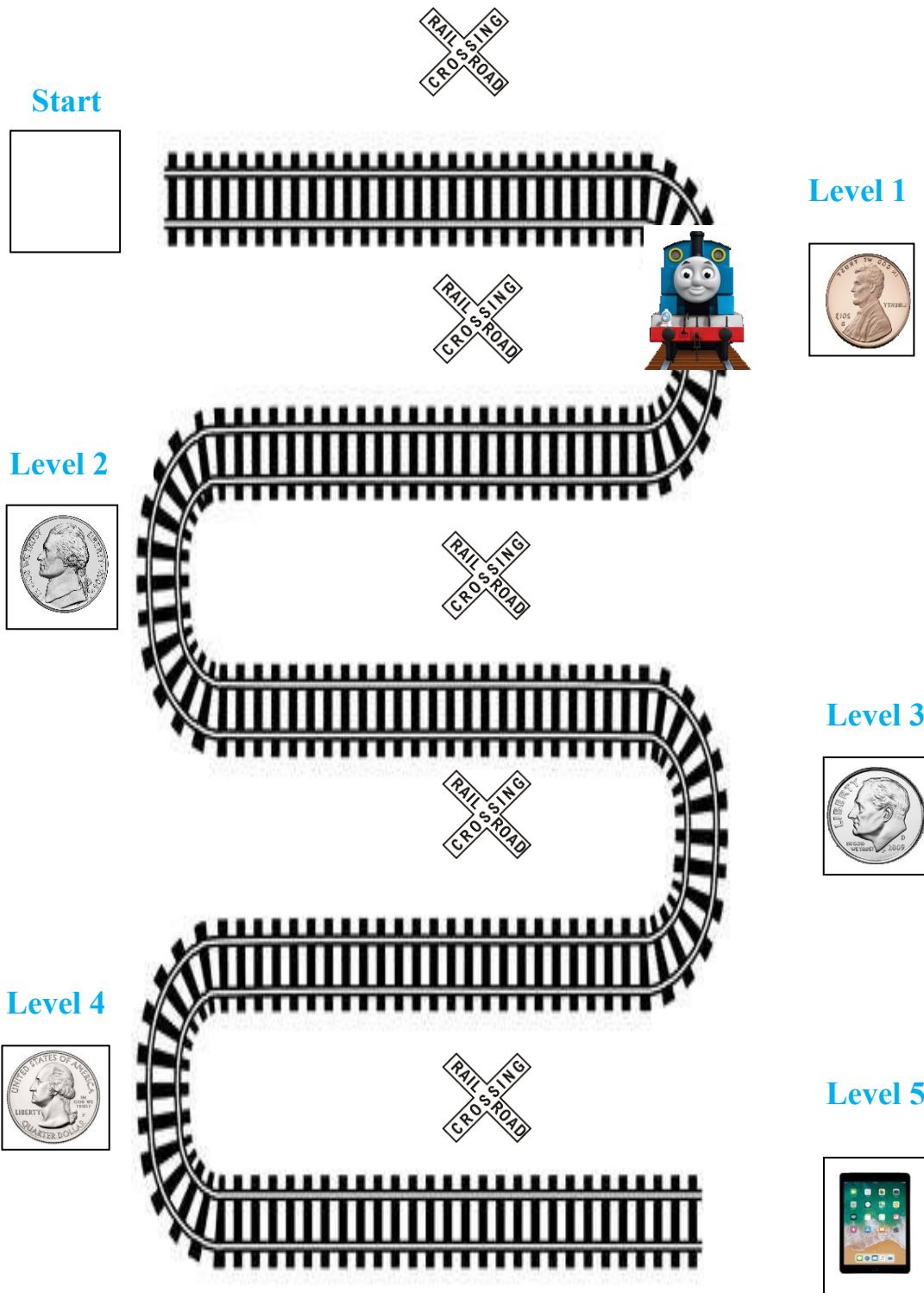
Data collected on paper (that has already been transferred to electronic format) will be disposed of by the use of a locked box through Burrell Behavioral Health that gets shredded monthly through a shredding company. The electronic data will be kept on a password protected laptop and if necessary, a password protected flash drive for up to 3 years after the study's completion.

Additional Information

1 Please include any additional information about the study below.

2 Please include any additional documents that aren't covered within the application.

Appendix C. Token Board



Appendix D. Session Data Sheet

Date	0-15 minutes		15-30 minutes		30-45 minutes		45-60 minutes		60-75 minutes		75-90 minutes		Time Until Compliance
Refusal Walking away from the table where the demand was placed or not coming to the table													Session 1
SIB Hitting head or face with hand (closed fist)													Session 2
Throwing Items Throwing an object at staff or other part of the room; this includes swiping objects off the table													Session 3
Removing Clothes Taking off any part of clothing off his body; this includes shoes and socks													Session 4
Hitting Striking an individual with an open or closed fist													Session 5
Kicking Striking an individual with one's foot.													Session 6
Number of Targets Completed													

Appendix E. FA Data Sheet

	Play	Demand	Alone	Attention	Tangible
Refusal Walking away from the table where the demand was placed or not coming to the table					
SIB Hitting head or face with hand (closed fist)					
Throwing Items Throwing an object at staff or other part of the room; this includes swiping objects off the table					
Removing Clothes Taking off any part of clothing off his body; this includes shoes and socks					
Aggression Any physicality towards staff or objects (hitting or kicking)					

	Play	Demand	Alone	Attention	Tangible
Refusal Walking away from the table where the demand was placed or not coming to the table					
SIB Hitting head or face with hand (closed fist)					
Throwing Items Throwing an object at staff or other part of the room; this includes swiping objects off the table					
Removing Clothes Taking off any part of clothing off his body; this includes shoes and socks					
Aggression Any physicality towards staff or objects (hitting or kicking)					

Appendix F. MSWO Preference Assessment

MSWO for 5 items

Item A: _____
 Item B: _____
 Item C: _____
 Item D: _____
 Item E: _____

Sum of trial #s for A: _____
 Sum of trial #s for B: _____
 Sum of trial #s for C: _____
 Sum of trial #s for D: _____
 Sum of trial #s for E: _____

Date:		
Child name:		
Teacher name:		
Trial #	Item selected	Placement of item selected
1		x x x x x
2		x x x x
3		x x x
4		x x
5		x

Date:		
Child name:		
Teacher name:		
Trial #	Item selected	Placement of item selected
1		x x x x x
2		x x x x
3		x x x
4		x x
5		x

Date:		
Child name:		
Teacher name:		
Trial #	Item selected	Placement of item selected
1		x x x x x
2		x x x x
3		x x x
4		x x
5		x

Date:		
Child name:		
Teacher name:		
Trial #	Item selected	Placement of item selected
1		x x x x x
2		x x x x
3		x x x
4		x x
5		x

Date:		
Child name:		
Teacher name:		
Trial #	Item selected	Placement of item selected
1		x x x x x
2		x x x x
3		x x x
4		x x
5		x

Highest preferred items (lowest summed trial #s):

Moderately preferred items (moderate summed trial #s):

Lowest preferred items (highest summed trial #s):