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## Comparing the Effectiveness of Behavioral Contracts That Use Function Based Reinforcers Versus Highly Preferred Items for Attention Maintained Behaviors

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Comparing the Effectiveness of Behavioral Contracts That Use Function Based  
Reinforcers Versus Highly Preferred Items for Attention Maintained Behaviors

by

Dánica M. Díaz

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

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## Dedication

To my husband, Steven. Your sacrifice, love, and encouragement facilitated the pursuit of my professional goal. Thank you for your practical and emotional support as I added the roles of work, study, and personal development to our lives; for believing in my dream as if it was your own.

To my mother, Lizzette. Thank you for instilling in me the value of an education, and for teaching me that anything is possible to those who believe. I am grateful for your unconditional love and support in my determination to find and realize my potential. You are my greatest source of inspiration.

To my siblings, Laury, Mandy, Andrés, and Quique. For all the joy and laughter you bring to my life. For your belief that I can excel at anything that I do, and for always being proud of your big sister. Thank you for being by my side and showing me the true meaning of family; you have made my journey worthwhile.

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## Comparing the Effectiveness of Behavioral Contracts That Use Function Based Reinforcers Versus Highly Preferred Items for Attention Maintained Behaviors

Dánica M. Díaz

### ABSTRACT

Behavioral contracts were used to reduce the socially inappropriate and stigmatizing behaviors of adult men diagnosed with an intellectual disability. All three participants were residing in an intensive residential habilitation facility and receiving 24 hour supports due to the intensity of their problem behaviors. A multiple baseline across subjects with a series of reversals within the intervention phase was used to compare and evaluate the effectiveness of two types of behavioral contracts: one based on the function of the behavior and the other based on highly preferred items. Brief functional analyses were conducted to determine the function of the participants' problem behavior and multiple stimulus without replacement preference assessments were conducted to establish a hierarchy of highly preferred items. Based on the results of the brief functional analyses, all three participants' problem behaviors were likely to be maintained by attention. Results showed that the behavioral contracts resulted in a substantial decrease in maladaptive behaviors for all of the participants and, conversely, an increase in the use of functionally equivalent replacement behaviors; one of the participants showed differentiation between the treatment conditions, indicating that a functional approach might be more beneficial for some individuals.

## Introduction

Although behavioral contracts are a widely used and available procedure, very little research has been conducted regarding the efficacy of this treatment intervention when working with individuals who have been diagnosed with an intellectual disability; the current literature has not fully explored behavioral contracting as a way to reduce the intense problem behaviors that are often displayed by these individuals. Moreover, behavioral contracts have not been used specifically to target the precursor behaviors of problem behaviors such as physical aggression, property destruction, self-injurious behavior, and elopement.

A behavioral contract, also known as a contingency contract or a performance contract, is a written agreement in which “one or both parties agree to engage in a specified level of a target behavior or behaviors” (Miltenberger, 2008). A well-written behavioral contract should state clear expectations as well as the consequences that will take place contingent on the occurrence or non-occurrence of the specified behavior.

Typically, there are five essential components of a behavioral contract (Miltenberger, 2008). The first essential component in the development of a behavioral contract is to identify the target behaviors. The behaviors targeted in the behavioral contract must be defined in a clear and objective manner and in a way that all parties involved will understand. In any behavioral contract, there are three possible behaviors to be targeted: (1) undesirable behaviors to be reduced, (2) desirable behaviors to be increased or (3) undesirable behaviors to be reduced as well as desirable behaviors to be

increased (the combination of both). The target behaviors are typically behaviors that are of social significance and will improve the quality of life of the individuals involved.

The second essential component of a behavioral contract is “stating how the target behaviors will be measured” (Miltenberger, 2008). This is a very crucial step as it ensures that both parties involved, the individual implementing the contract and the individual for which the contract was written, are under the same understanding of the behavioral contract and the outlined expectations. In addition, stating exactly how the targeted behavior will be measured allows for an objective and accurate account of the occurrence versus the non-occurrence of the target behaviors. This, in turn, facilitates the successful delivery of the contingencies that will be in place for the target behaviors. Usually, the clients and the “contract manager” will agree on the way the target behaviors will be measured when the initial behavioral contract is written.

The third essential component of a behavioral contract is determining the time and place during which the behavior must be performed. A time frame to establish when the target behavior should or should not occur is essential in order to implement all contingencies appropriately. This leads to the fourth essential component of a behavioral contract, which is identifying the reinforcement or punishment contingencies that will be delivered by the contract manager. There are four possible types of contingencies: positive reinforcement, negative reinforcement, positive punishment, and negative punishment. Typically, positive and negative reinforcement procedures are used when working with intellectually disabled individuals in complex community environments. Whichever contingency is chosen must be stated clearly in the behavioral contract and explained to the client to obtain their agreement.

The fifth and final essential component of behavioral contracts is identifying who will implement the contingency. It is very important that the behavioral contract states who will be the person implementing the reinforcement or punishment contingency, and who will be the person engaging in a specified level of the target behavior. In summary, it is imperative to clearly define target behaviors, state how they will be measured, establish a time frame for occurrence or non-occurrence of the behavior, identify the reinforcement or punishment contingencies, and identify who will implement these contingencies. Most individuals can benefit from the use of positive reinforcement, and behavioral contracts should focus on the appropriate behaviors of the individual, instead of punishing unwanted behaviors.

Previous research supports behavioral contracting as an effective intervention in the treatment of problem behaviors amongst a variety of populations including young children, middle-school aged children, and adolescents. In the school setting, behavioral contracts have assisted with the improvement of student's academic and behavioral performance (Cantrell, Cantrell, Huddleston, & Wooldridge, 1969; Carns & Carns, 2004; De Martini-Scully, Bray, & Kehle, 2000; Newstrom, McLaughlin, & Sweeney, 1999). In vocational settings, behavioral contracts have been effective at increasing the academic productivity of students (Kelly & Stokes, 1982).

In addition to school and vocational settings, behavioral contracts have been used to treat other problems within the general population of the United States, such as exercising, weight control, and anorexia (Bigelow, Sticker, Liebson, & Griffiths, 1976; Mann, 1972; Solanto, Jacobson, Heller, Golden, & Hertz, 1994; Wysocki, Hall, Iwata, & Riordan, 1979). Behaviors of great social significance such as these were improved

drastically and repeatedly when using behavioral contracts as the chosen form of intervention.

Within the field of applied behavior analysis, individuals with intellectual disabilities and autism have also benefited from behavioral contracts (Barry, Apolloni, & Cooke, 1977; Jenkins & Gorrafa, 1974; Mruzek, Cohen, & Smith, 2007). In an attempt to improve the personal hygiene of men diagnosed with mental retardation, Barry et al. (1977) developed behavioral contracts to increase the occurrences of the participants' proper hygiene. The behavioral contracts were individually and independently negotiated with each participant; a pictorial checklist, which included ten physical hygiene areas, was shown to each individual on a daily basis to assist with the completion of the hygiene routine. At first, participants were required to complete five out of the ten areas for five consecutive days in order to earn reinforcement (from different and individualized reinforcer menus). The criterion for reinforcement increased after each five-day period of acceptable appearance. Results showed that all participants benefited from this intervention; behavioral contracts significantly increased the number of acceptable hygiene areas for all participants. It is important to note that the participants' poor hygiene behavior was hindering them from community integration. Behavioral contracts directly addressed the hygiene routine of these individuals and indirectly provided them with a better quality of life. Taking on a different population, Mruzek et al. (2007) developed behavioral contracts to promote rule adherence in an elementary school; one participant was diagnosed with Autism and the other dually diagnosed with ADHD and Asperger's disorder. The behavioral contracts were created after a functional assessment was conducted for each participant in order to identify functionally equivalent coping

strategies. The rules to be followed were clearly stated at the top of the written document, and a sticker could be earned for every hour during which no rules were broken. Two opportunities to earn reinforcers (based on the preference assessments conducted) were available: one in the morning and one in the afternoon. Prior to this intervention, both participants engaged in a variety of disruptive behaviors. The results of this study showed a substantial and immediate increase in adherence to rules of conduct in the school setting after the implementation of the behavioral contracts.

Based on the literature reviewed, none of the behavioral contracts used a reinforcer that was the same reinforcer that maintained the target behavior. Only one study evaluated the function of the behavior being targeted (Mruzek et al., 2007); however, even though the functions of the behaviors were identified, a functionally equivalent reinforcer was not considered when the behavioral contract was developed. Colon (2008) conducted a thesis study that employed a functional approach to behavioral contracting for typically developing youth who ran away from foster care placements. Results showed an initial increase in the number of days spent in an approved placement for all three participants. However, the Colon (2008) study did not make a comparison between behavioral contracts that use a function based reinforcer versus behavioral contracts that use a highly preferred item or activity.

The main objective of this study was to compare behavioral contracts that use function based reinforcers to those that use highly preferred items. A second objective was to evaluate which type of behavioral contract the individuals would choose when given the choice. It was primarily hypothesized that both behavioral contracts would be effective at impacting each of the participants' behaviors (i.e., by reducing the

inappropriate behaviors and increasing functionally equivalent replacement behaviors). It was secondarily hypothesized that the function based behavioral contract would be the most effective type of behavioral contract.

## Methods

### *Participants*

Robert was a 35 year old, Caucasian man diagnosed with mild mental retardation. He had a history of intense problem behaviors that included physical aggression, property destruction, exposing himself, incontinence, and making serious, false allegations that were unfounded (such as, saying that a staff member raped him or that a staff member stole his belongings). Although in the past he was able to progress from the main campus setting (see below for details on the setting) to the community group home, he was transferred back to the main campus due to his inability to tolerate the fading of staff attention that comes with being in a less restrictive setting; it was determined through direct observations and staff interviews that lack of constant attention was the antecedent for most of Robert's maladaptive behaviors. Therefore, the author chose this behavior to be targeted for reduction.

Todd was a 64 year old, Caucasian man diagnosed with mild mental retardation. After spending almost two decades in institutions, he was transferred to this residential facility to receive treatment for his inappropriate sexual and self-injurious behaviors. At the time of this study, Todd was the only participant residing in a community group home. He was literate and able to communicate verbally; however, his socially inappropriate behaviors (for example, touching the belongings of others and asking the same repetitive questions when they had already provided him with an answer) often provoked his housemates and peers, resulting in retaliation from others and an escalation

of his own problem behaviors. In addition, the stigmatizing nature of this problem behavior was hindering him from community integration.

Kevin was a 23 year old, Hispanic man diagnosed with moderate mental retardation. He had a history of intense problem behaviors that included physical aggression, property damage, elopement, and opportunistic inappropriate sexual behavior (for example, walking up to minors or vulnerable adults and touching them inappropriately, or any attempts to do so). Most of his problem behaviors occurred in a behavioral chain; first, he exhibited socially inappropriate behaviors (typically, cursing excessively and calling the person he was targeting offensive and profane names), before he escalated to verbal and physical aggression, property damage, and elopement. For the most part, the socially inappropriate behaviors were directed towards his peers. The author chose this behavior because it served as an antecedent to more serious problem behaviors.

*Setting.* All participants resided in a behavior intensive residential facility comprised of six group homes and designated only for male residents. This residential facility offered three levels of residential supervision. The main campus, where most admitted residents began their treatment, consisted of three, 24 hour supervised group homes, serving a total of eighteen men. The community-based group homes, also serving eighteen men, accommodated those individuals who had demonstrated progress with managing their behaviors more effectively by refraining from engaging in maladaptive behaviors, frequently using functionally equivalent replacement behaviors, and making progress regarding the intermediate outcomes established in their behavior plans; the community-based group home maintained 24 hour supervision as well, but worked on

slowly fading these supports. Lastly, the final residential service was a supported living environment, in which the individuals lived on their own and received very minimal supports, often only once or twice per week. In most cases, each resident progressed from the main campus to one of the community based group homes to finally transition to a supported living environment. In addition to the residential services, all of the participants received behavioral and skills training services at an adult day training program. All assessments and interventions were conducted in each participant's home setting.

*Informed consent.* All participants provided written informed consent. The clinical director/psychologist of the residential facility provided documentation regarding the current competency status for each participant. During the initial assessment of capacity to provide informed consent, all participants were asked to read the form. Robert and Todd did so independently; however, Kevin was illiterate and required another person to read it out loud for him. Each participant was asked a variety of questions regarding the content of the consent form to ensure that they understood what it meant to be part of this study. Upon correctly answering questions regarding consent, the participants were asked if they would like to participate in the study. All three participants consented to participate.

*Exclusion criteria.* Females were excluded from this study due to this residential placement being a male-only facility. Juveniles under the age of twenty one and the elderly individuals over sixty five were not considered for this study. In addition, those with severe intellectual disabilities were not considered as it was a requirement that all participants understood the basic expectations outlined in each behavioral contract.

### *Dependent Variables*

*Selection of target behaviors.* Each participant was currently receiving behavioral services at the residential facility; therefore, a functional assessment and behavior analysis services plan had already been developed by a Board Certified Behavior Analyst. Previously developed functional assessments were evaluated; all were based on direct observations and interviews, ABC data and unusual incident reports. It was imperative that the behaviors of concern chosen to be targeted in this study were only maintained by one function; this was done to avoid extraneous variables involving behaviors maintained by multiple functions when developing the function based behavioral contracts. The problem behavior was determined for each participant after his most current behavior plan was reviewed by the author. In addition, and in the interest of avoiding escalation to more intense and dangerous behaviors, only socially inappropriate behaviors that served as precursor behaviors were targeted. Due to the practical nature of this study, this was also done to avoid providing positive and/or negative reinforcement for problem behaviors during the functional analysis, which could put staff, peers, and the participants themselves at risk.

Once the function of each participant's problem behavior was substantiated through the brief functional analysis, two behaviors were chosen to be targeted for intervention: the socially inappropriate (precursor) behavior that was currently high in frequency was targeted for decrease, and the functionally equivalent replacement behavior that was currently low in frequency was targeted for increase.

*Problem behaviors.* For Robert, requesting excessive/unnecessary attention was defined as making excessive statements (within twenty seconds of having received

attention) in attempts to continue to hold staff's attention after he has been redirected to other activities and/or tasks. Examples of these repetitive statements include: "I'm doing good, right?", "I need help with this", or telling staff what he was doing as he completed it ("I'm cleaning the floor", "I'm making my lunch", "I'm reading a book quietly", etc.). Gaining staff's attention appropriately after no social interaction for five consecutive minutes was not documented as this behavior; only consecutive, excessive attempts were documented.

For Todd, inappropriate social behavior was defined as asking the same question repeatedly when an answer had already been provided, inappropriately interrupting the conversations of others (by standing in close proximity and blurting out words or questions in a loud manner specifically while two others were having a conversation), and raising his hand as he was speaking. Examples of repetitive questions included mainly: "How's your car running?", "How's work?", "How are your folks?", and "How's the weather?". Gaining attention in an appropriate manner, such as by saying "excuse me", was not documented as this behavior.

For Kevin, inappropriate social behavior was defined as violating the personal space of others (getting closer than 1 arm's length), touching others, teasing/antagonizing peers (calling his peers profane names when they were engaging in alone activities or problem behaviors as well as taking the belongings of others and hiding them). Very often, the name-calling was accompanied by excessive cursing. However, the cursing alone was not documented unless it was accompanied by name-calling. Although this behavior was occasionally directed towards staff that work with Kevin, he typically targeted peers; mainly, his housemates during the residential time.

*Replacement behaviors.* For Robert, independent leisure activities was defined as him participating in an alone activity of his choice for fifteen consecutive minutes during which time he would not request staff's attention.

For Todd, appropriate conversations was defined as any conversation that involved appropriate topics lasting at least one minute; this included gaining attention appropriately (defined as using any appropriate formula, such as saying "excuse me" by maintaining a distance of two arm's length to gain the attention of others) and refraining from asking repetitive questions.

For Kevin, appropriate positive peer interactions was defined as having positive time with peers that lasted at least three minutes by playing sports with them, spending time doing something they both liked, and talking about good topics (such as, sports, weather, upcoming outings, and work).

#### *Reinforcer Assessment Procedures*

*Stimulus preference assessment.* A brief multiple stimulus without replacement (MSWO) preference assessment similar to that used by Carr, Nicolson, and Higbee (2000) was conducted for each participant to determine which items were highly preferred. Each MSWO preference assessment throughout the study was conducted in the participant's home setting. Initial interviews with direct care staff who worked with each participant were conducted to generate a list of potential preferred items. Following the staff interview, each participant was also interviewed and asked to answer questions outlined in a simple reinforcer survey that included questions regarding favorite tangible items, leisure activities, hobbies, peer and staff related activities, and outings. At the end of the reinforcer survey, each participant was asked to name the five items out of all the

ones that they mentioned that he wished to have. Based on that answer and the items that were named several times through staff reports and the reinforcer survey, the top five items were chosen to be used in the preference assessment.

During each preference assessment session, the top five items were placed on a table; the participant was asked to sit on one side of the table, typically the opposite side of the primary research assistant conducting the session. Once all of the items were in front of the participant, he was asked to pick the one that he would like to have the most at that time. When a choice was made, access to the item was granted for 30 seconds; the main research assistant timed the access to the item using a stop watch. If the item chosen was an edible item, then he was allowed to consume it before making his next choice. After each item was chosen, the remaining items were re-arranged before the participant was instructed to make his next choice. The same procedure took place until there were no items for the participant to pick from and the preference hierarchy was identified. The preference hierarchy was established by ranking each item according to the order in which it was chosen (1 being the item that was chosen first and 5 being the item that was chosen last).

A MSWO preference assessment was conducted prior to each brief functional analysis in order to determine the items used in each condition. The most preferred item (ranked one) was used in the tangible conditions; the item ranked second was used in the control conditions. Also, to ensure that the items used in the behavioral contract were highly preferred at the time of behavioral contract implementation, a MSWO preference assessment was conducted prior to each highly preferred behavioral contract phase. The same top five items that were derived from the initial reinforcer survey were used for all

of the preference assessments that followed; the same procedure was used to conduct the assessment each time and the item ranked most preferred at that time was used for the upcoming highly preferred behavioral contract. Each preference assessment was conducted the day prior or on the same day that the highly preferred behavioral contract was scheduled to begin; on average, four to five were conducted for each participant throughout the study.

*Brief functional analysis.* A modified brief functional analysis similar to that used by Northup et al. (1991) was conducted for each participant. An analogue format within the natural setting was used to further substantiate the findings from previous functional assessments conducted by the participants' current behavior analysts. The problem behaviors defined earlier for each participant are those that were targeted in the functional analysis for each participant.

Each session within the brief functional analysis was ten minutes in length. Sessions were divided into ten, one-minute intervals during which data was collected for the problem behavior (see Appendix B through Appendix E for sample brief functional analysis data collection sheets). The analogue conditions consisted of control, tangible, escape, and attention conditions, based on the analogue conditions used by Iwata et al. (1982) and Carr and Durand (1985). During each condition within the natural environment, the presentation of consequences was made solely contingent on the occurrence of the problem behavior targeted for each participant. Both the primary and secondary observer had access to a stop watch which was used to time each session.

The control condition served as the comparison condition for the other three conditions. During this condition, each participant had access to the item ranked second

on the MSWO stimulus preference assessment while sitting in either the living room or dining room area, and received verbal attention approximately every thirty seconds if they were not already interacting with the research assistant. No demands were placed during this condition.

Prior to starting the tangible condition, the participant had access to the most preferred item (based on the previously conducted MSWO preference assessment) for thirty seconds. Once the research assistant removed the preferred item from the participant, the tangible condition began. The research assistant maintained close proximity with the participant and had the item visibly available. Contingent upon engaging in the problem behavior, the participant received the preferred item for thirty seconds. If it was an edible item, then the participant was given a small portion of the item to eat. All other responses that did not involve problematic behavior were ignored.

During the escape condition, the research assistant presented the participant with a demand. Examples included work activities, such as picking up items off of the floor, sweeping, wiping down a table, shredding some papers, etc. The research assistant presented demands at a stable rate of approximately every thirty seconds unless problem behavior occurred. Contingent upon the occurrence of the problem behavior, the demands were removed immediately and the research assistant moved away from the participant. The research assistant then waited thirty seconds, at which point demands were presented again at the same stable rate until the condition was over or additional problem behaviors occurred.

During the attention condition, the research assistant was in close proximity to the participant and appeared to read a magazine or complete paperwork. No specific tasks or

activities were provided but each participant was able to move freely around the living room or dining room area. The research assistant provided immediate attention in the form of a brief reprimand for five to ten seconds for each incident of problem behavior. All other responses were completely ignored.

The brief functional analysis was conducted twice for Kevin. The first one was conducted in a small room (office type of setup) outside of his home but within the residential facility by research assistants known to the participant but who were not his direct care staff; the second functional analysis was conducted in the living room area of his residence and all conditions were conducted by a trained staff member. Other residents of the home were not in the participant's vicinity or in the living room area when the sessions were conducted. During the last attention condition, Kevin began to escalate to more serious problem behaviors, which included verbal aggression, leaving the area of supervision, and property damage; the functional analysis was terminated at this point. Prior to implementing the conditions, the staff received behavioral skills training to learn how to appropriately run each condition. The training lasted 25 minutes and included instructions, modeling (a research assistant pretended to be the participant), role-playing and positive and corrective feedback.

Brief functional analyses were conducted once for Robert and Todd. For Robert, it was conducted in the dining room area of his residence: the entrance and exit doors to the dining room were locked during his assessment to ensure no other housemates were in the area. Similarly, the brief functional analysis for Todd was conducted on the back porch of his residence and access to the area was restricted to his peers for the entirety of the assessment.

Prior to the beginning of each and all conditions, each participant was briefly told what would happen in that condition. For example, before beginning the social attention condition, each participant was told: “For the next ten minutes, you can hang out in this area. I will be busy doing paperwork. If you engage in “x” behavior, then I will tell you not to do “x” behavior, and will then get back to my paperwork again”.

### *Baseline*

None of the participants resided in the same group home at any time during the study. Before the baseline phase, Robert was participating in a level system and also on a weekly behavioral contract in which he could earn one-on-one outings with staff. Kevin was participating in a functional token program in which he could earn token pieces for refraining from engaging in problem behaviors. Behavior analysis services plans for all participants were implemented across all settings for the entirety of the study (no treatment fidelity data were obtained); all other forms of treatment were removed for both Robert and Kevin a month and a half prior to the beginning of baseline. This included the level system, behavioral contract, and token program.

Robert’s behavior analysis services plan included the outcomes of the assessments for each problem behavior, functionally equivalent replacement behaviors, a medical summary including past and current medications, antecedent manipulations (24-hour supervision, regular family visits, engagement protocol of a minimum of once per hour, the level system and token economies, and behavioral contracts to earn outings with preferred staff), acceleration procedures (skill acquisition programs to learn to gain attention and escape aversive situations appropriately), reduction procedures (prompt every 15 minutes for escape maintained behavior, minimize attention for attention

maintained behavior, and least to most manual restraint for intense problem behaviors- verbal redirection, response block, alternatives to behavioral crises techniques), and maintenance/generalization (thinning of schedules, training of multiple exemplars, and probes).

Todd's behavior analysis services plan included the outcomes of the assessments for each problem behavior, functionally equivalent replacement behaviors, a medication summary including his past and current medications, antecedent manipulations (delivering attention protocol on a fixed time scheduled of 15 minutes, protocol for engagement in preferred activities at least once every hour, and sex offender restrictions to review all purchased materials), reduction procedures (ignore-redirect-reinforcer for socially inappropriate behaviors and verbal aggression maintained by attention, and stop-redirect-reinforce for intense problem behaviors that could result in injury to himself and/or others), maintenance/generalization plan as well as a transition plan (which included a decrease in his psychotropic medications, probes, and fading the level of supervision).

Kevin's behavior analysis services plan included the outcomes of assessments for all problem behaviors, functionally equivalent replacement behaviors, previous efforts to impact his behaviors of concern, a medical summary of his past and current medications, treatment goals (intermediate and ultimate outcomes), antecedent manipulations (24-hour supervision, structured schedule, minimizing deprivation by providing food items often, engagement protocol of once at least every ten minutes, CD token program, and sex offender restrictions), acceleration procedures (skill acquisition programs to learn to gain attention appropriately), reduction procedures (minimize attention for all attention

maintained problem behaviors, least to most restrictive alternatives to behavioral crises techniques for intense problem behaviors), transition plan (fade in level of attention, probes, changes in the environment, and decreasing the level of supervision), and maintenance/generalization (training of multiple exemplars, discrimination probes, and schedule thinning of programs).

Data were collected on the problem behaviors for each participant by direct care staff members who were trained on basic data collection techniques as part of their job requirement. In addition, each staff received one-on-one behavioral skills training (conducted by the author) to learn how to collect data on the targeted behavior and to be familiarized with data collection sheets. Behavioral skills training involved instructions, modeling, role-playing, and feedback. The first training occurred on the day that baseline was scheduled to start for each participant. The verbal instructions provided to direct care staff described the topography of the problem behavior as well as how to document it when it was observed. Every behavior definition was reviewed and explained, and a hard copy of it was placed on a clipboard at each residence for future reference if needed. After providing the instructions, the trainer modeled the behavior of documenting data during the first half hour of data collection for that day (3:30-4:00pm) while the direct care staff observed. After this, the direct care staff was instructed to begin taking data when the behavior occurred; the trainer observed and provided feedback each time there was documentation. A minimum of fifteen minutes was spent with each staff providing positive/corrective feedback; once the staff member demonstrated 100% accuracy by recording the last 2 consecutive incidents of the target behavior appropriately, then the

training was over and staff were instructed to continue collecting data for the remainder of the shift as well as days to follow.

Each participant was observed by the staff member working at the residential setting from 3:30pm to 8:00pm. All behavior analysis services plans (BASP) in place continued to be implemented during the baseline phase; if a participant engaged in any problem behavior outlined in the BASP, especially those that could result in injury to self or others or place the community at risk, the community limitations and the restrictive procedures outlined in the BASP were followed; a log was kept dating and describing any time a community restriction or restrictive procedure had to be used for each participant (see Appendix H for sample community restriction and restrictive procedures log).

Each behavior plan described, in depth, the topography of the problem behaviors exhibited by each participant, the hypothesized functions of the behavior, antecedent manipulations, level of supervision, and reduction procedures, amongst others. All of the problem behaviors that were chosen for this study were already included in each of the participant's BASP; therefore, staff's response when the target behaviors occurred were the same as before the baseline phase. For all participants, the behavior plan stated that the problem behavior be redirected if it was directed at a peer, or planned ignored if it was directed towards a staff member. Staff were not told to change the immediate consequences provided for the target behaviors at any point during this study (baseline & intervention phases) and continued to follow all behavior plans as they were trained by the group home behavior analysts and/or master trainers.

### *Intervention*

Each behavioral contract was individualized to meet the needs of each participant by addressing the behaviors chosen to be targeted for reduction and increase. All behavioral contracts were in written format and outlined the specific behavior that participants had to refrain from and engage in (in language that they could understand), the frequency and duration (if applicable) of each behavior, and the positive reinforcement contingencies that would result from earning each contract (see Appendix I and J for sample functional and highly preferred behavioral contracts). Both behavioral contracts were written exactly the same except in the consequence to be delivered upon meeting the criteria (a functional reinforcer or a highly preferred item). The last phase of the intervention involved a “choice” behavioral contract, in which each participant could choose what he wanted to earn that day; the options included the functional reinforcer as well as the highly preferred items that were chosen most often throughout the highly preferred conditions.

Every day, regardless of the behavioral contract that the participant was on and upon arriving home from the work setting at 3:30pm, each participant was prompted to review that day’s behavioral contract with staff. The behavior of concern and what it looks like was discussed, then the appropriate behaviors, and finally what he would earn at 8:00pm if he met the criteria. Robert and Todd were literate and were allowed to read the behavioral contract themselves if they asked to; however, staff members were instructed to still go over it simply to ensure that there was basic understanding of the contingencies; staff members were trained to ask several questions about the behavioral contract they just discussed. Specifically, these are the questions that staff asked each participant: (1) What is the behavior that we are trying to work on? (2) How much do you

have to do or not do of that behavior? (3) What will you get if you meet the contract? And (4) At what time will you get it? Once the participants stated all of the main contingencies in their own words, they were asked to sign it. The staff that discussed the behavioral contract with them also signed it.

All behavioral contracts were daily contracts during the residential times of 3:30pm to 8:00pm, the times that all participants were home from their day work placement and were typically awake. At 8:00pm at night, if the criteria were met, staff delivered either the functional reinforcer, highly preferred item, or allowed them to pick what they would like to earn (it all depended on which behavioral contract phase they were on). During the functional behavioral contract, the participant would earn thirty minutes of a one-on-one home activity with the staff of their choice (the activity was chosen at 3:30 when staff reviewed their behavioral contract). During the highly preferred behavioral contract, the participant would earn thirty minutes of access to the item written on the behavioral contract (ranked one on the MSWO preference assessment conducted). Lastly, during the choice behavioral contract, each participant would earn whichever consequence they had picked at 3:30pm that day: either thirty minutes of one-on-one time with preferred staff or thirty minutes of access to a highly preferred item.

A stimulus signal in the form of highlighting was used in all behavioral contracts: the target behavior box was highlighted red and the replacement behavior box was highlighted green. This way, participants were able to track their own progress of “bad” and “good” behavior for that day by looking at the tally marks that staff had documented. Although stimulus signals in the form of a picture were developed and offered to each participant (to be posted in their bedroom as a reminder of what they would be earning

that day), all participants politely refused. Robert stated that he would like to be independent with remembering what he is supposed to earn and that, if not, he could read it off of his behavioral contract. Similarly, Todd stated that he had a good memory and would not forget; he was also able to read. As for Kevin, due to his inability to read, the picture was placed in his room as a probe; the very same day he gave it to staff and asked that it was not put back in his room.

As was the case during the baseline phase, behavior plans continued to be implemented throughout the intervention phase as well. Staff were not instructed to change the immediate consequence given for the targeted problem behaviors in any way. The first treatment condition (functional or highly preferred behavioral contract) for each participant was randomly assigned by flipping a coin.

### *Experimental Design*

A multiple baseline across subjects with a series of reversals within the intervention phase was used in this study. Within the intervention phase, all participants were exposed to the functional and highly preferred conditions a minimum of three times each. Using this research design, the changes pre- and post- intervention were assessed. By continuing baseline assessment of behaviors in a step-wise fashion, experimental control was established, showing that the likely causal factor for the changes in the participants' behaviors was the intervention.

### *Response Measurement*

The target behaviors were recorded as a frequency within 10 minute sessions in the functional analysis or a frequency within the 4 and ½ hour observation sessions (3:30-8:00) for the treatment evaluation. The MSWO preference assessment sheet required that

the research assistant write her name, the date, the start and end time for the assessment, and the participant number. Numbers were assigned to all of the participants to ensure confidentiality. The data collection sheet also included a table for items to be ranked one through five (see Appendix A for a sample preference assessment data collection sheet).

For the functional analysis, there were four data collection sheets (one for each condition). Name, data, start and end time, participant number, and the target behavior were required fields to be filled out each time. The generic display for all four sheets was the same- data were to be collected per one minute intervals for a total of ten minutes. To further assess the function of each behavior, all conditions had two options under which a frequency could be documented: establishing operation (EO) present and establishing operation (EO) absent. In the control condition, the only available option to document under was EO absent. In the tangible condition, two options were available: EO present (research assistant had the item in sight) and EO absent (participant had the item). In the demand condition, two options were available: EO present (while completing the task) and EO absent (while on a break). Lastly, two options were also available in the social attention condition: EO present (no interaction) and EO absent (while interacting).

During the baseline phase, the name, date, participant number, and target behavior were required fields. Data was collected from 3:30pm to 8:00pm, which was divided into half hour intervals (a total of nine intervals). All responses were manually recorded in the form of a tally. During the intervention phase, staff members collected data on the behavioral contracts under the respective section: target or replacement behavior. Both sections were divided into half hour intervals as well.

#### *Inter-Observer Agreement*

During the MSWO preference assessments, a trial was defined as each time the participant was asked to make a choice. Trials were considered in agreement if the primary and the second observer recorded the same response, and a disagreement if they did not. Inter-observer agreement was calculated for each session using the following formula: number of agreements by the total number of agreements plus disagreements and multiplying by 100%. The second observer typically sat 2-3 feet away from the table to observe and independently document choices in the order made by the participant. Second observers used the same MSWO preference assessment data collection sheet as the primary observer, documenting simultaneously but independently.

During the brief functional analyses as well as baseline and intervention phases, overall measures of agreement were calculated on a frequency within interval method – the percentage of agreement was calculated for each interval (smaller divided by larger number) and then the percentages were summed across intervals and divided by the total number of intervals.

For two of the functional analyses (Todd and Kevin), there were two observers present; the primary observer ran each condition and delivered the consequences, and the second observer sat three to five feet away from the participant being observed. For Robert's functional analysis, two second observers were available to simultaneously collect the data while the primary observer ran all the sessions (without collecting any data). Second observers used the same functional analysis data collection sheet as the primary observers but documented separately.

During the baseline and intervention phase, second observers typically sat in the common areas of the home in which they had visual and hearing proximity of the

participant being observed. During the baseline phase, the same baseline data collection sheet used by the primary observer was used. During the intervention phase, the sheet was modified to include observations of replacement behaviors.

During the preference assessments and the brief functional analyses sessions, the observer that was not running the session was designated the primary observer. During the baseline and intervention phases, the primary observers were the staff members working with each participant in the group homes.

## Results

Four MSWO preference assessments were conducted for Robert and Kevin; five for Todd. For all participants, the first MSWO assessment occurred prior to conducting each of the brief functional analyses. The other ones were conducted prior to each highly preferred behavioral contract phase (see Table 1 for a detailed summary of each MSWO preference assessment for Robert, Todd, and Kevin).

Table 1.

*Preference assessment results by ranking of each item.*

<b>Robert</b>					
	<b>P.A. #1</b>	<b>P.A.#2</b>	<b>P.A.#3</b>	<b>P.A.#4</b>	
<b>Ranked 1</b>	Magazine	Beach Boys CD	Snickers	Beach Boys CD	
<b>Ranked 2</b>	Beach Boys CD	Word Puzzle	Magazine	Magazine	
<b>Ranked 3</b>	Snickers	Magazine	Word Puzzle	Snickers	
<b>Ranked 4</b>	Gatorade	Gatorade	Gatorade	Word Puzzle	
<b>Ranked 5</b>	Word Puzzle	Snickers	Beach Boys CD	Gatorade	
<b>Todd</b>					
	<b>P.A. #1</b>	<b>P.A.#2</b>	<b>P.A.#3</b>	<b>P.A.#4</b>	<b>P.A.#5</b>
<b>Ranked 1</b>	Candy	Animal Book	Candy	Soda	Soda
<b>Ranked 2</b>	Animal Book	Candy	Soda	Candy	Candy
<b>Ranked 3</b>	Gatorade	Car Magazine	Car Magazine	Car Magazine	Animal Book
<b>Ranked 4</b>	Car magazine	Coloring Book	Animal Book	Animal Book	Coloring Book
<b>Ranked 5</b>	Coloring book	Gatorade	Coloring Book	Coloring Book	Car Magazine
<b>Kevin</b>					
	<b>P.A. #1</b>	<b>P.A.#2</b>	<b>P.A.#3</b>	<b>P.A.#4</b>	
<b>Ranked 1</b>	Sports Book	CD	CD	CD	
<b>Ranked 2</b>	CD	M&M's	Coloring Paper	M&M's	
<b>Ranked 3</b>	Crayons	Coloring Paper	Crayons	Coloring Paper	
<b>Ranked 4</b>	Coloring Paper	Crayons	Sports Book	Sports Book	
<b>Ranked 5</b>	M&M's	Sports Book	M&M's	Crayons	

### *Robert*

Based on the initial reinforcer interview, the following items were used for Robert's preference assessments: snickers bite, Beach Boys CD, men's health magazine, grape Gatorade, and crossword puzzle. By percentage of sessions, each item was ranked

as follow: snickers bite first 50%, third 25%, and fifth 25%; the Beach Boys CD first 25%, second 50%, and fifth 25%; men's health magazine first 25%, second 25%, and third 50%; grape Gatorade fourth 75% and fifth 25%; crossword puzzle second 25%, third 25%, fourth 25%, and fifth 25%.

The functional analysis conducted with Robert consisted of seven consecutive 10 minute sessions for a total of seventy minutes in length (see Figure 1 for the results of the brief functional analysis). A total of nine incidents of requesting excessive /unnecessary attention occurred in the social attention conditions; one incident occurred during the second demand condition; and zero instances occurred in the tangible and control conditions. Based on these results, Robert's problem behavior was likely maintained by social attention.

During the baseline phase, the average number of requesting excessive/unnecessary attention was 47 incidents per day (3:30-8:00); the percentage for decrease chosen for him was 45%, that being 25 incidents or less per day. In regards to replacement behavior, the average of independent leisure skills was 2 incidents; the percentage for increase was 45%, that being 3 incidents per day. Robert's problem behavior baseline phase was thirteen days long; the data ranged from 26 to 70 incidents. A spike in his behavior occurred on the fifth and sixth days of baseline; however, the data points that followed were lower and closer in frequency. Robert's replacement behavior during baseline was collected for three days; the data ranged from 2 to 3 incidents per day.

The first treatment condition introduced to Robert was the functional behavioral contract on day fourteen. After this initial introduction, he alternated between functional

(FC) and highly preferred (HP) behavioral contracts; a total of four FC and three HP conditions were run. Robert met the criteria to earn his contract (for decreases in problem behavior) under all of the FC conditions; however, an upward trend is displayed for all three HP conditions, and the last day of each condition he crossed the threshold and did not meet the criteria to earn his behavioral contract. There was trend differentiation between all FC and HP conditions. After the introduction of the choice condition, low levels of behavior, between the ranges of zero and one, were displayed. The mean level of problem behavior in the treatment phases was as follows: FC = 17, HP = 27, FC = 13, HP = 23, FC = 10, HP = 15, FC = 8, and Choice = 0.

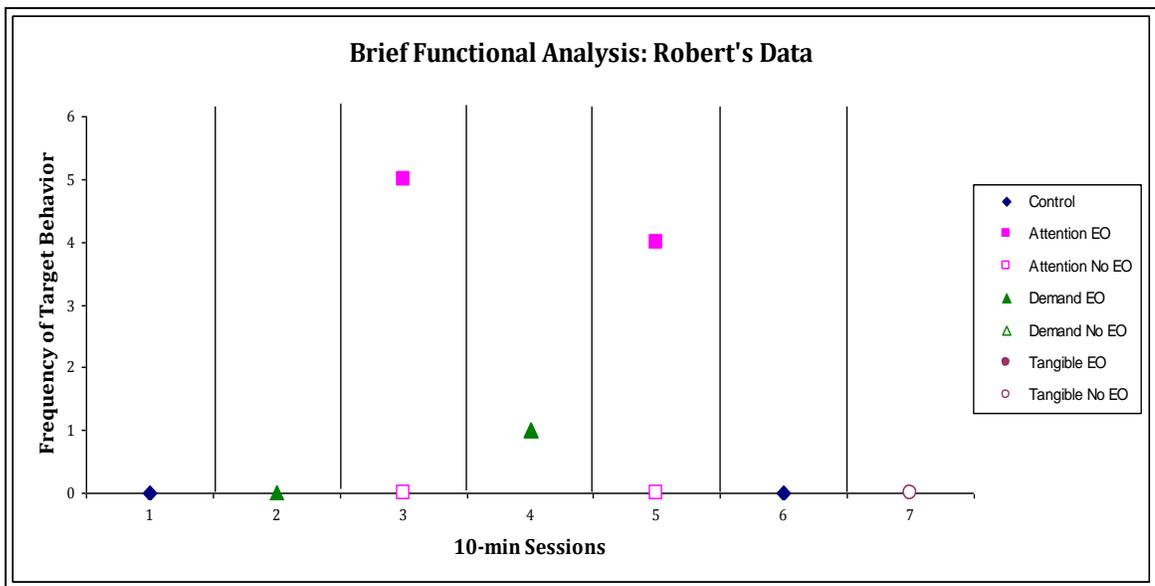


Figure 1. Robert's frequency of problem behaviors per condition.

Robert's replacement behavior displayed high variability at moderate levels; frequency ranges from three to fourteen instances per day. His behavior maintained above the behavioral contract threshold criteria throughout the entire study. For the most part, the FC conditions displayed upward trends. Although the first HP condition displayed a downward trend, the second as well as the third condition displayed upward

trends. During the choice condition, moderate variability was observed. The mean level of replacement behavior in the treatment phases was as follows: FC = 7, HP = 6, FC = 6, HP = 8, FC = 9, HP = 11, FC = 10 and Choice = 9.

Robert was on the choice condition for seven days; prior to the choice condition phase, Robert changed placements and moved to a less restrictive setting. He chose a highly preferred item to earn through his behavioral contract on four occasions (57% of the time); on three occasions (43% of the time), he chose the functional reinforcer.

### *Todd*

Based on the initial reinforcer interview, the following items were used for Todd's preference assessments: candy, animal book, Gatorade (originally) or soda (the last three assessments), car magazine, and coloring book. By percentage of sessions, each item was ranked as follow: candy first 40% and second 60%; animal book first 20%, second 20%, third 20%, and fourth 40%; Gatorade/soda first 40%, second 20%, third 20%, and fifth 20%; car magazine third 60%, fourth 20%, and fifth 20%; coloring book fourth 40% and fifth 60%.

The functional analysis conducted for Todd consisted of eight consecutive 10 minute sessions for a total of eighty minutes in length (see Figure 2 for the results of the brief functional analysis). A total of twelve incidents of socially inappropriate behavior occurred across the social attention conditions (a total of 3 sessions). During the last social attention condition, one incident occurred under the EO absent, otherwise all other incidents of problem behavior occurred under EO present conditions. Three incidents of the target behavior occurred in the first tangible condition. No instances of problem

behavior occurred across the demand and control conditions. Based on these results, Todd's problem behavior was likely maintained by social attention.

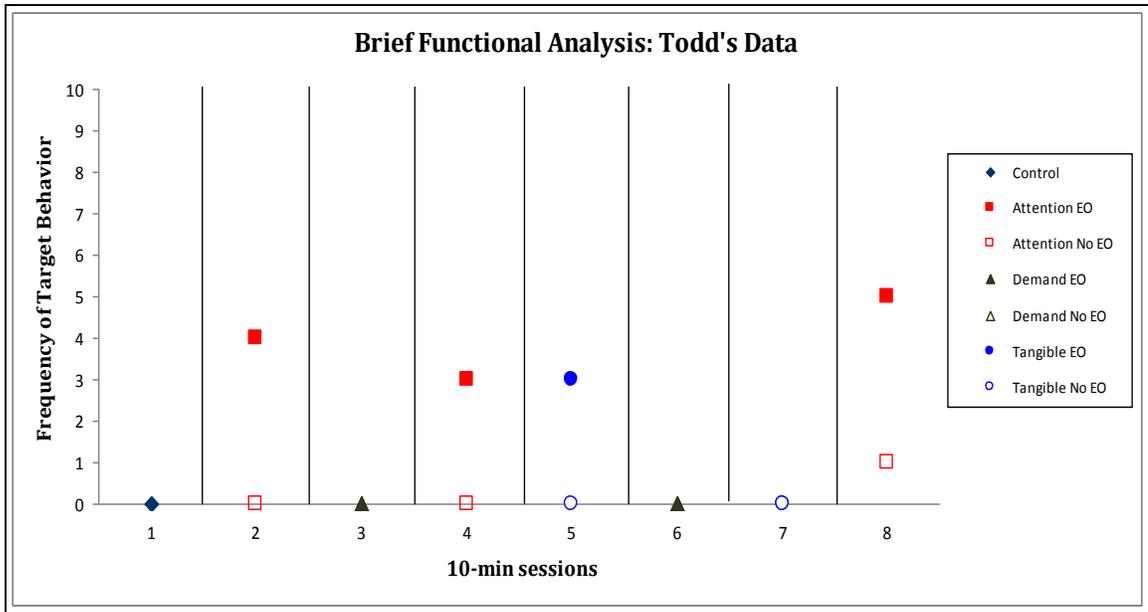


Figure 2. Todd's frequency of problem behaviors per condition.

During the baseline phase, the average number of socially inappropriate behaviors was 26 incidents; the percentage for decrease chosen for him was 20%, that being 20 incidents or less per shift. In regards to replacement behaviors, the average of appropriate conversations was 2 incidents; the percentage for increase was 150%, that being 5 incidents per shift. Todd's problem behavior baseline was sixteen days long; the data ranged from eleven to thirty seven incidents. Originally, the behavior was at its lowest frequency but a spike was displayed on the sixth day and continued until the ninth day; the rest of the data displays a constant, stable trend. Todd's replacement behaviors baseline was six days long; the data ranged from zero to three incidents.

The first treatment condition introduced to Todd was the highly preferred behavioral contract on day seventeen. After this initial introduction, he alternated between the HP and FC behavioral contracts. Todd did not meet his problem behavior

threshold criteria on two occasions: the third day of the second FC condition and the fifth day of the choice condition. Most of the variability in the data is displayed in the choice condition. The mean level of problem behavior in the treatment phases was as follows: HP = 4, FC = 7, HP = 9, FC = 14, HP = 9, FC = 8, HP = 10, and Choice = 11.

Todd's replacement behavior displayed moderate variability, and on five occasions he did not meet the behavioral contract criteria. During the initial HP condition, the behavior was at the zero level on two days. A significant increase was observed in the following FC condition, followed by a drop in behavior in the second HP condition. There was no change in level between the fourth and fifth conditions (FC and HP, respectively). A drop to levels below the behavioral contract criteria was observed at the beginning of the choice phase, with a slight upward trend observed. The mean level of replacement behavior in the treatment phases was as follows: HP = 2, FC = 7, HP = 5, FC = 7, HP = 7, FC = 5, HP = 6 and Choice = 6.

Todd was on the choice condition for eight days. He chose a highly preferred item on six occasions (75% of the time); on two occasions (25% of the time) he chose the functional reinforcer.

### *Kevin*

Based on the initial reinforcer interview, the following items were used for Kevin's preference assessments: sports book, CD, coloring paper, crayons, and M&M's. By percentage of sessions, each item was ranked as follow: sports book first 25%, fourth 50%, and fifth 25%; CD first 75% and second 25%; crayons third 50%, fourth 25%, and fifth 25%; coloring paper second 25%, third 50%, and fourth 25%; M&M's second 50% and fifth 50%.

Two functional analyses were conducted for Kevin. During the first brief functional analysis, he displayed no behaviors in any of the four conditions conducted for a total of forty minutes in length; the four conditions were control, tangible, demand, and social attention (in that order). During the second brief functional analysis, which was conducted by the staff member working at his residence and is presented in Figure 3, five sessions were conducted for a total of fifty minutes. A total of two incidents of problem behavior occurred during the control condition. A total of two incidents of problem behavior also occurred in the demand condition, one when the EO was present and one when the EO was absent. A total of twenty six incidents of problem behavior occurred during the social attention conditions (a total of 2 sessions). In the first social attention condition, three of the incidents occurred when the EO was absent; in the second social attention condition, two incidents occurred also when the EO was absent, all other incidences of problem behavior occurred with the EO present. Lastly, a total of five incidents of problem behavior occurred during the tangible condition, three of which occurred when the EO was present. Based on these results, Kevin's problem behavior was likely maintained by social attention.

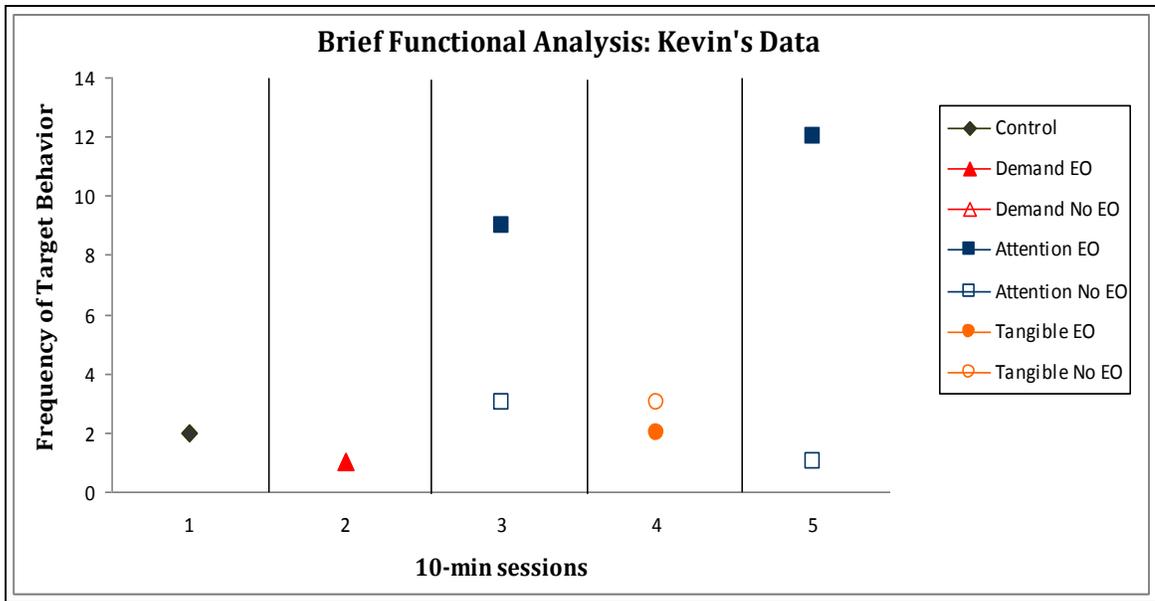


Figure 3. Kevin's frequency of problem behaviors per condition.

During the baseline phase, the average of socially inappropriate behaviors was 26 incidents; the percentage for decrease chosen for him was 45%, that being 15 incidents or less per shift. In regards to replacement behaviors, the average of positive peer interactions was 3 incidents; the percentage for increase was 60%, that being 5 incidents per shift. Kevin's problem behavior baseline was nineteen days long; the data ranged from fifteen to fifty nine incidents. However, except for two spikes on the tenth and fourteenth day, his data displayed a slow, upward trend. Kevin's replacement behavior baseline was nine days long; the data ranged from one to four incidents.

The first treatment condition introduced to Kevin was the highly preferred behavioral contract on day nineteen. After this initial introduction, he alternated between HP and FC behavioral contracts. The mean level of problem behavior in the treatment phases was as follows: HP = 7, FC = 3, HP = 6, FC = 6, HP = 3, FC = 1, Choice = 3.

Kevin's replacement behavior displayed moderate variability; however, it did not fall under the behavioral contract criteria at any point. An upward trend was displayed in

the first and second HP conditions as well as the first FC condition; however, the second FC condition displayed a downward trend. The third HP and FC conditions displayed no trend at the same levels, followed by a slow increase in behavior during the choice condition. The mean level of replacement behavior in the treatment phases was as follows: HP = 12, FC = 18, HP = 13, FC = 13, HP = 12, FC = 11 and Choice = 15.

Kevin was on the choice condition for seven days. He chose the functional reinforcer on five days (71% of the time); on two occasions (29% of the time) he chose a highly preferred item.

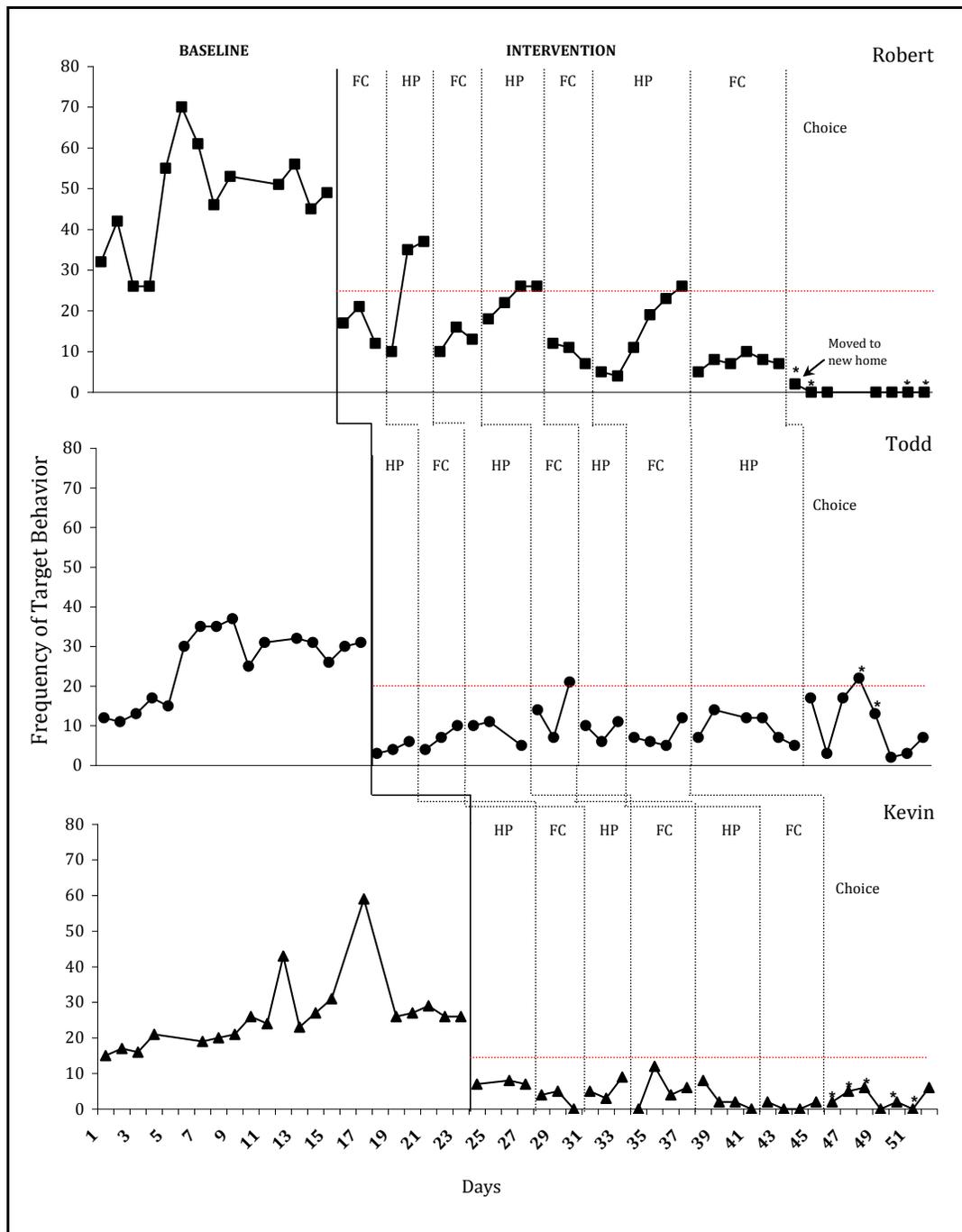


Figure 4. Results for problem behaviors during baseline and intervention conditions.

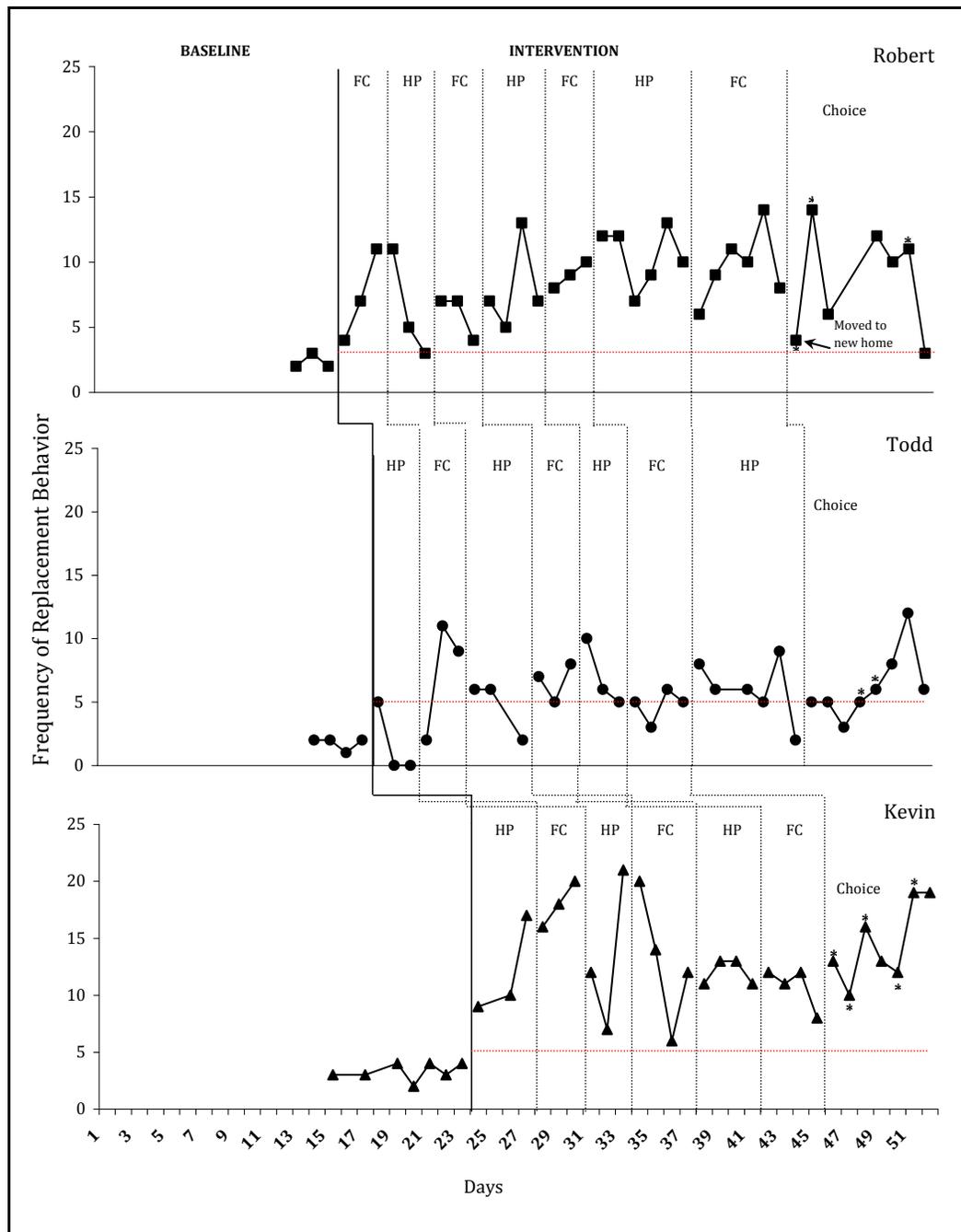


Figure 5. Results for replacement behaviors during baseline and intervention conditions.

*Inter-Observer Agreement*

Two observers simultaneously but independently scored every response during all MWSO preference assessments and brief functional analyses for Robert, Todd, and Kevin. All of the MWSO preference assessments for each participant yielded 100.0%

inter-observer reliability. Robert's functional analysis yielded 100.0% agreement in each condition for an overall 100.0% inter-observer agreement. Todd's functional analysis yielded 100.0% in all conditions except the first tangible condition, which yielded 85.0% agreement; the overall inter-observer agreement for Todd was 98.1%. Lastly, Kevin's functional analysis yielded 100.0% agreement in all conditions except both of the social attention conditions; the first yielded 95.0% and the second 86.7%. The overall inter-observer agreement for Kevin was 96.3%.

Throughout the study, several days of data collection were missing for each participant (refer to Figure 4 and 5 for more details); the staff member working at the participant's home that day did not fill out the data sheets. Therefore, data was not reported on those days and the data series simply skips the day and goes on to the next day during which data was collected. For Robert and Todd, a total of four days of data collection were missing; for Kevin, a total of five days were missing.

For Robert, inter-observer agreement was collected for 32% of sessions during baseline and 34% of sessions during the intervention phase. The mean percentage of agreement for the baseline phase was 86.9%, ranging from 82.0% to 91.8%. The mean percentage of agreement for the intervention phase (problem behavior) was 91.3%, ranging from 66.8% to 100.0%. The mean percentage of agreement for the intervention phase (replacement behavior) was 97.1%, ranging from 75.0% to 100.0%.

For Todd, inter-observer agreement was collected for 33% of sessions during baseline and 36% of sessions during the intervention. The mean percentage of agreement for the baseline phase was 94.6%, ranging from 78.0% to 100.0%. The mean percentage of agreement for the intervention phase (problem behavior) was 96.6%, ranging from

84.8% to 100.0%. The mean percentage of the intervention phase (replacement behavior) was 98.5%, ranging from 85.0% to 100.00%.

Lastly, inter-observer agreement was collected for Kevin for 32% of sessions during baseline and 35% of sessions during the intervention. The mean percentage of agreement for the baseline phase was 92.7%, ranging from 78.6% to 97.4%. The mean percentage of agreement for the intervention phase (problem behavior) was 94.3%, ranging from 75.7% to 98.2%. The mean percentage of agreement for the intervention phase (replacement behavior) was 98.1%, ranging from 92.3% to 100.0%.

## Discussion

The main objective of this study was to compare behavioral contracts that use function based reinforcers to those that use highly preferred items. A second objective was to evaluate which type of behavioral contract the individuals would choose when given the choice. It was originally hypothesized that both types of behavioral contracts, the function based and the highly preferred, would be effective at impacting each participant's behavior (i.e., by reducing the inappropriate behaviors and increasing functionally equivalent behaviors). It was secondarily hypothesized that the function based behavioral contract would be more effective than the highly preferred behavioral contract.

The data fully supports the first hypothesis; both behavioral contracts were effective at significantly decreasing maladaptive behavior and increasing appropriate behavior in men with intellectual disabilities. When the intervention was introduced, regardless of which behavioral contract was initially implemented, all of the participants' problem behaviors decreased; similarly, but not as drastically, replacement behaviors increased. In addition, differentiation between the two treatment conditions was observed only in Robert's data; a functional approach was more effective with keeping his inappropriate behavior at a lower frequency.

By extending the treatment conditions for Robert, increasing trends were observed during the highly preferred conditions. This was replicated on several occasions and the change in his behavior was noted after having been exposed to the highly

preferred behavioral contract for several days; it was then that Robert began to ask staff to switch to earn one-on-one time, or the functional behavioral contract. It was hypothesized by the author that satiation served as an abolishing operation during the first few days of the highly preferred condition (Robert was exposed to the functional condition prior to beginning this condition). With the passage of time, his deprivation state resulted in an increase in the inappropriate behavior in attempts to access attention from staff. When the upward trend was established during each highly preferred condition, which eventually resulted in a day during which he would not earn his behavioral contract, the condition was switched back to the functional behavioral contract. Interestingly, during the choice condition, Robert did not choose a functional reinforcer (which was established to be the most effective approach for him); instead, he chose a highly preferred item during 57% of the opportunities presented. It was hypothesized that, because these staff were not preferred at the time of the study (he moved to a new residence due to the improvement of his behaviors), it should be noted that perhaps this is why he did not choose a functional reinforcer during the choice condition: spending one-on-one time with his new staff members was not as reinforcing as it would have been if he had stayed in his old residence with preferred staff members.

For Todd and Kevin, there was no clear differentiation regarding effectiveness between the functional versus highly preferred behavioral contracts; both behavioral contracts worked well. With Kevin, it was interesting that, during the choice condition, Kevin chose a functional reinforcer on 71% of opportunities. This indicates that the most preferred form of treatment for Kevin was the functional approach, even though his problem behavior decreased under the highly preferred conditions as well. Conversely,

when given the choice, Todd chose a highly preferred item as the consequence of his behavioral contract on 75% of the opportunities presented; although his behavior changed under both conditions, his choice of consequence for meeting the contract was a preferred item. Clearly, there were individual differences when each participant was given the choice regarding his own treatment and what he would earn; although both forms of treatment were effective, providing a choice could in and of itself be effective at reducing problem behaviors and increasing appropriate, alternative behaviors. This was the case for Kevin, who reported liking the choice of behavioral contract more because he was able to choose what he wanted every day; however, this was not the case for Todd, who did not like to choose and instead asked staff to pick for him. In fact, Todd's data during the choice condition display the most variability, his behavior remaining at a low frequency some days and then spiking drastically on some other days.

Due to the progress that Robert made with his behavioral contracts, he was able to move to a less restrictive environment on the day that his choice behavioral contract began; from that point on, he did not display the inappropriate behavior targeted for reduction. Although his behavior of requesting unnecessary/excessive assistance dropped to zero and near-zero levels immediately following the move, it was hypothesized that it was the unavailability of preferred staff that temporarily maintained the behavior at low levels. Although in the new home, the staff and housemates were known to him from the adult day training program but had not been present in his prior home environment. Also, it is important to point out that prior to the move and implementation of his choice behavioral contract, Robert was already displaying very low levels of problem behavior.

On several occasions, Todd did not earn his behavioral contract due to refusals to engage in the replacement behavior outlined as part of the criteria. Staff members reported prompting him frequently to, not only refrain from his socially inappropriate behaviors, but to also participate in appropriate conversations. It was thought by the author that Todd was receiving high levels of attention for engaging in this behavior; staff continued to prompt and Todd continued to refuse. Fortunately, this did not occur often enough to be a concern but it should be noted.

In this study, the primary observers were the staff members that were currently working at the residential facility. It was important to the author that research assistants were not the primary observers because this would not mirror conditions in applied settings. Staff members were trained on each behavioral contract and were asked to document and implement them as they would any other program. Many difficulties are experienced in the group home setting, especially when working with individuals with intellectual disabilities who also display intense problem behaviors. First, it is typically the case that one staff has to supervise more than one client at a time; this can, of course, hinder staff's ability to accurately document every instance of every behavior. Another factor affecting the inter-observer agreement is the constant changes in the environment; this ranges from the people that come in and out every day, to the daily needs of those not involved with the behavioral contract, to staff having to intervene when difficult, problematic situations involving client behaviors arise. However, with constant training and supervision, staff correctly implemented and documented this intervention; the percentages of IOA during this study are indicative of this. As shown in the range of the inter-observer agreement, there were sessions that fell below the desired minimum of

70%; however, there were very few of these due to corrective feedback (typically the following day) that was provided to the staff member before his/her next opportunity to collect data.

Although it is often thought of as ideal to have two independent observers other than direct care staff collecting data on a daily basis, it should be noted that the inter-observer agreement obtained would not have accurately represented natural situations that involve the group home setting. Also, as demonstrated in this study, staff were able to correctly implement all of the intervention conditions and document the incidents of problem and replacement behaviors accordingly. An advantage to staff being the primary observers is that the intervention could continue to be carried out in the absence of the research assistants, which is typically a concern when conducting research.

The second observers were members of the facility's clinical and behavior team. They were all trained in the behaviors of concern, and their presence in the residences did not result in staff or participant reactivity because they already worked in those group homes. Therefore, it was often the case that the participant engaged in the problem behavior with the research assistant and not necessarily the staff member.

Regarding the MSWO preference assessment, it was necessary to conduct one prior to the implementation of each highly preferred condition to ensure that the item chosen was preferred at the time and something the participant would be likely to work for. As was expected, the ranking of items of choice changed every time the preference assessment was conducted. Most of the assessments did not last more than 5 minutes, as each participant was asked to pick items in the order he would like them until there were no items. To simulate what might be feasible to do in the practical setting, only one trial

was conducted per preference assessment. Each participant was able to communicate well and make his choice without any prompts; there was no concern that any of the participants would not know what to choose or if the choice was truly their preferred item.

Regarding the brief functional analyses, a few things are worth mentioning. For Robert and Todd, conducting each session in an isolated area within the home yielded behavioral responses. However, for Kevin, this was not the case; the main author of this study, who is a highly preferred staff for Kevin, was the person conducting his first functional analysis. In addition, Kevin was taken to a room that he typically doesn't go to, so this change in his environment could have also affected his behavior; he did not display any problem behavior during the four conditions that were run (control, social attention, tangible, and escape, respectively). Conducting his brief functional analysis in the living room area of his home and having a staff member run each condition yielded more accurate results; as it has been shown in the literature, there are a variety of variables that can affect the outcomes of functional analyses, including who is running the sessions (Ringdahl & Sellers, 2000).

During Todd's brief functional analysis, there was a spike in the first tangible condition. Before this condition was replicated, it may have seemed like his behavior was maintained by both social attention and tangibles; however, both the primary and reliability data collectors agreed that his behavior was not maintained by tangibles based on his response when given the tangible. The first time he engaged in the target behavior and was given the piece of chocolate, he simply looked at it and then just looked at the research assistants. This was similar for every time the tangible was provided, and on the third occasion he simply got up and threw it away in the trash can while looking back at

the research assistants as if waiting for them to say something about it. It is important to observe the participant's behavior closely during functional analyses to establish whether or not the consequence provided is functioning as a reinforcer; although Todd engaged in the problem behavior three times, it was clear that his behavior was not maintained by tangibles. Had those observations not been made, the data might indicate that his behavior is multiply maintained and the inaccurate information could have led to erroneous conclusions regarding the function of the behavior.

During the choice contract, Todd chose a highly preferred item 67% of the time. At first, the main author thought that perhaps this could have been a function of his inappropriate behaviors. Therefore, interviews were set up with the staff working with Todd to further evaluate what was happening when he received his tangible at 8pm. Staff reported that, at the beginning of the shift, when asked to make his choice, he would state that he wanted staff to choose for him. When staff used planned ignoring for this behavior, as established by his behavior plan, he would then say that he would like a soda or a candy. At 8pm, he would receive his tangible, and ask to go outside to eat it; because of his history of inappropriate sexual behavior, he is not allowed to be on the back porch without a staff member present, which he is aware of. Although staff were instructed throughout the study to not provide one-on-one attention when the tangible was delivered under the highly preferred condition, staff members were still sitting close to Todd (as per stated in his behavior plan). This, in turn, could have functioned as somewhat of a functional reinforcer. Therefore, it was hypothesized that Todd was choosing the tangible to have access to staff's attention (in the form of close proximity); when the tangible was

not accompanied by the close proximity, he began to choose the functional reinforcer and not the highly preferred item.

All of the brief functional analyses were evaluated in regards to whether or not an establishing operation (EO) was potentially present or absent at the time that the target behaviors were emitted. Due to the complexity of some of the inappropriate, precursor behaviors, it was imperative that a distinction was made so that a more accurate functional relationship was established. It was hypothesized that if the behavior occurred when the EO was present for each condition, then the behavior was most likely maintained by that reinforcer; however, when the behavior occurred when the EO was absent, then most likely that was not the reinforcer maintaining the problem behavior. For example, during Kevin's functional analysis, he displayed problem behaviors across all conditions, even if at low levels. However, during the social attention condition, he mainly engaged in the target behavior when staff were not providing him with attention (EO present). During the tangible condition, although at first it may have seemed like access to a preferred item could have been maintaining his behavior, he engaged in the behavior even after the magazine was given to him (EO absent). He put the magazine to the side, and continued to engage in problem behavior. Had this observation not been made, then documentation during this condition could have wrongly pointed to access to tangibles as one of the functions of his behavior.

The percentage for change for both the problem and replacement behaviors was chosen on an individual basis by the author of this study (who worked with each participant on a daily basis); the frequency of the problem in the past as well as the ultimate outcomes for each participant was evaluated and taken into consideration when

choosing the threshold criteria. Although they may have seemed as unrealistic decreases and increases at first, all participants remained below the threshold criteria for problem behaviors and above the threshold criteria for replacement behaviors for the majority of the study.

## Limitations and Future Research

All forms of treatment were not removed during the baseline phase of this study; the author felt the necessity to continue to provide behavior analysis services via a behavior plan to each of the participants to ensure their safety and that of others as well as to ensure that they continued to make progress with their intense problem behaviors that were not directly addressed in this study. However, all other forms of treatment (the level system, token economies, previous behavioral contracts, etc.) were discontinued a month and a half prior to the beginning of baseline data collection to ensure that only the behavior plan and subsequent behavioral contracts were in place. Although the frequency of behavior may have been different had there been no form of treatment during baseline, it is often not feasible for this to occur in a practical setting. However, to ensure consistency across all phases, the behavior plan for each participant continued to be implemented during all phases of the study and it was not discontinued at any point.

Another limitation was the lack of documentation regarding staff trainings. Every staff member was trained individually by the main author of this study; this was done prior to the beginning of data collection using behavioral skills training, but no specific measure was used to record staff's responses during training or booster sessions, which occurred on a weekly basis. In addition, it was often the case that fill-in staff members (those who do not typically work at that group home or with those clients) were working in the participant's home and the author, or a trained member of the behavior team, ensured that training for that staff was provided prior to the implementation of the

behavioral contract that day; there was also no proficiency measures to document staff performance.

Regarding inter-observer agreement, it is important to mention that there was not any collected for the replacement behaviors during the baseline phase. Originally, the focus of the study was to implement behavioral contracts only to decrease the problem behaviors of the participants; however, upon further thought, it was logical and necessary to include a more appropriate behavior for the participants to engage in. Therefore, what is reported in the data is based on the documentation of staff members during the short period that baseline was collected. It should also be noted that the inter-observer agreement improved over time (at its worse during the beginning of the study and at its best towards the end of the study), which could be a direct reflection of the effectiveness of staff trainings and booster sessions. Baseline phases yielded much lower percentages of inter-observer reliability than the intervention phases; during the intervention and as time went on, 100.0% reliability was achieved on several occasions. At any time that the inter-observer reliability percentages fell under 80.0%, staff received a booster training session that involved reviewing the target behavior definition and also reviewing data collection techniques.

The times designated for the behavioral contract were the residential times of 3:30 to 8:00pm; this is a limitation as no other times are included in the intervention, and most of the participants were aware of this. At one point, one participant stated that it was okay for him to engage in the socially inappropriate behavior because his behavioral contract had not started yet. Also, during the weekends, the participants were not at work from

7:30 to 3:00pm; instead, they were home all day but the contract continued to be in place from the hours of 3:30 to 8:00pm.

On several occasions, data collection was missing for an entire session (one day from 3:30-8:00pm). When this occurred, the day was disregarded for data collection purposes and was not included in the data series for the participant. Typically, this occurred due to last minute changes in the staff schedule, which resulted in fill-in staff members working at the participant's location on that day. Anytime that the main author was aware of a fill-in staff working with one of the participants, the initial training was conducted prior to the session; however, at times the main author was not notified, the training was not possible. Other times, the main author was not notified and noticed the missing day when arriving to pick up the data sheets. In any case, most of the incidents occurred during the baseline phase; by the time the intervention phase began, most staff members were trained. Also, it was reported that on many occasions the participants told the fill-in staff about their contract, prompting them to contact the main author so that they could be trained right away. If one trained staff was working, then that was the staff assigned to the participant for the remainder of the shift.

Another limitation was that only problem behaviors that were maintained by a single function could be targeted through the functional behavioral contract; this was done in order to avoid extraneous and multiple variables that could arise from providing multiple functional reinforcers within the same behavioral contract.

Future research should explore using a functional approach when designing behavioral contracts for problem behaviors maintained by other functions (i.e., escape, tangibles, and automatic reinforcement). As the data suggested in this study, interventions

that are based on functions versus highly preferred items could significantly impact problem and replacement behavior. For instance, if the problem behavior is maintained by escape, then perhaps the consequence of the behavioral contract could be earning to escape one task contingent on the completion of other tasks. Similarly, if the problem behavior is maintained by tangibles, then refraining from problem behaviors to access tangibles could result in earning the tangible at the designated time.

Another suggestion for future research would be to modify the threshold criteria for meeting each behavioral contract as each participant makes progress with his or her own behavior; perhaps employing a changing criterion to further promote lower levels of problem behaviors while increasing the use of functionally equivalent replacement behaviors. Also, programming for fading procedures is an issue that should be addressed; in this study, each participant was on a daily behavioral contract. It certainly could enhance their lifestyles as well as community integration and independence if the behavioral contract could be faded from daily to weekly, bi-weekly, and so on and so forth.

Although this study lasted fifty two days, looking at further maintenance as well as collecting follow up data is worthy of future research. Along with this, generalization could be programmed to ensure that the consumers are making progress not only during the residential times, but also while at work and in the community setting. In addition, researchers should also look into generalization techniques that will promote an increase in replacement behaviors not only with staff members, but also with peers, family members, and members of the general community.

In relation to intense problem behaviors, behavioral contracts should be studied to further assess their effectiveness with different and more serious topographies of behaviors. In this study, only socially inappropriate behaviors that served as precursor behaviors were targeted; however, there may be consumers who do not exhibit these precursor behaviors and a behavioral contract could target the actual problem behavior (physical aggression, property destruction, self-injurious behavior, etc.).

Lastly, perhaps in the future preference assessments could be conducted on a daily basis and prior to the implementation of the behavioral contract. This could ensure the novelty of the items is not lost and could provide an effective intervention; however, this may not be a very feasible approach but an option when a brief functional analysis cannot be conducted right away, as it is often the case in the applied settings. This way, in the meantime, the consumer would receive treatment until a more functional approach can be developed.

The findings of this study are significant and extend the literature because they not only show that behavioral contracts are an effective form of treatment when working with individuals with developmental disabilities, but also that behaviors of social significance were reduced by the simple contingencies outlined in each behavioral contract. Due to the author choosing to target the precursor behaviors of each participant, at no point during the study did any of the participants engage in more intense problem behaviors; therefore, the behavioral contracts were effective at directly reducing precursor behavior and indirectly reducing the intense problem behaviors to which precursor behavior could have escalated.

The main goal for the author was to design an intervention that would improve the quality of life of each of the participants by reducing maladaptive behavior and increasing replacement behavior, but that would also be feasible in the applied setting. Most definitely, this intervention could be carried out at another group home due to its simplicity. The preference assessment can certainly be conducted in the home setting and in a timely fashion, and the brief functional analysis really does cater to the many aspects of working in an applied setting; the sessions are 10-minutes in length, can be conducted in the home versus a very controlled setting that is often not available, and staff can be trained to run the sessions accurately.

There are many barriers to treatment in the applied setting when compared to a more controlled setting. It is for this reason that more research should be conducted in the settings in which the problem behaviors are happening. Also, more emphasis should be given to types of training that staff members receive to carry out the interventions, because it is these caregivers that have the most contact with our consumers. It was important to the author to address all of these barriers; behavioral contracting proved to be a feasible and effective intervention which, not only impacted the behaviors of each participant, but was also tailored to meet the needs of staff members working in the group home setting. While on the behavioral contracts, problem behaviors decreased and replacement behaviors increased, and one participant was able to move to a less restrictive setting.

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## Appendices

Appendix A: MSWO Preference Assessment: Data Collector Sheet

RA: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_ End time: \_\_\_\_\_

Participant #: \_\_\_\_\_

Preference Assessment:

Item Ranked #1	Item Ranked #2	Item Ranked #3	Item Ranked #4	Item Ranked #5

Notes:

Appendix B: Brief Functional Analysis Data Collector Sheet

RA: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_ End time: \_\_\_\_\_

Participant #: \_\_\_\_\_ Target Behavior: \_\_\_\_\_

FA Condition: **Control**

Interval (in minutes)	Target Behavior Tally		Total
	EO Present	EO Absent	
0:00-1:00		N/A	
1:00-2:00		N/A	
2:00-3:00		N/A	
3:00-4:00		N/A	
4:00-5:00		N/A	
5:00-6:00		N/A	
6:00-7:00		N/A	
7:00-8:00		N/A	
8:00-9:00		N/A	
9:00-10:00		N/A	

Appendix C: Brief Functional Analysis Data Collector Sheet

RA: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_ End time: \_\_\_\_\_

Participant #: \_\_\_\_\_ Target Behavior: \_\_\_\_\_

FA Condition: **Tangible**

Interval (in minutes)	Target Behavior Tally		Total
	EO Present (RA has item)	EO Absent (Part. has item)	
0:00-1:00			
1:00-2:00			
2:00-3:00			
3:00-4:00			
4:00-5:00			
5:00-6:00			
6:00-7:00			
7:00-8:00			
8:00-9:00			
9:00-10:00			

Appendix D: Brief Functional Analysis Data Collector Sheet

RA: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_ End time: \_\_\_\_\_

Participant #: \_\_\_\_\_ Target Behavior: \_\_\_\_\_

FA Condition: **Demand**

Interval (in minutes)	Target Behavior Tally		Total
	EO Present (While doing task)	EO Absent (While on break)	
0:00-1:00			
1:00-2:00			
2:00-3:00			
3:00-4:00			
4:00-5:00			
5:00-6:00			
6:00-7:00			
7:00-8:00			
8:00-9:00			
9:00-10:00			

Appendix E: Brief Functional Analysis Data Collector Sheet

RA: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_ End time: \_\_\_\_\_

Participant #: \_\_\_\_\_ Target Behavior: \_\_\_\_\_

FA Condition: **Attention**

Interval (in minutes)	Target Behavior Tally		Total
	EO Present (No interaction)	EO Absent (While interacting)	
0:00-1:00			
1:00-2:00			
2:00-3:00			
3:00-4:00			
4:00-5:00			
5:00-6:00			
6:00-7:00			
7:00-8:00			
8:00-9:00			
9:00-10:00			

Appendix F: Target Behavior (Baseline Phase) Data Collector Sheet

Staff / R.A. : \_\_\_\_\_

Date: \_\_\_\_\_

Participant #: \_\_\_\_\_

Target behavior: \_\_\_\_\_

Interval	Target Behavior Tally	Total
3:30-4:00pm		
4:00-4:30pm		
4:30-5:00pm		
5:00-5:30pm		
5:30-6:00pm		
6:00-6:30pm		
6:30-7:00pm		
7:00-7:30pm		
7:30-8:00pm		

Appendix G: Target/Replacement Behavior (Intervention Phase) Data Collector Sheet

RA #1: \_\_\_\_\_ RA #2: \_\_\_\_\_ (if applicable)

Date: \_\_\_\_\_

Participant #: \_\_\_\_\_

Target behavior: \_\_\_\_\_

Replacement Behavior: \_\_\_\_\_

What is he earning today? (look at contract): \_\_\_\_\_

**Target Behavior:**

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

**Replacement Behavior:**

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

Appendix H: Community Restrictions and Restrictive Procedures Log

Participant: \_\_\_\_\_

Date & Staff Initials	Community Restriction Y or N	Restrictive Procedure Y or N
Explain the Incident:		

Date & Staff Initials	Community Restriction Y or N	Restrictive Procedure Y or N
Explain the Incident:		

Date & Staff Initials	Community Restriction Y or N	Restrictive Procedure Y or N
Explain the Incident:		

## Appendix I: Function Based Behavioral Contract

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Today, I will have the opportunity to earn: 30 MINUTES OF 1-on-1 TIME WITH STAFF at 8:00pm.

1-on-1 home activity: \_\_\_\_\_

Staff chosen: \_\_\_\_\_

The way I will earn this will be by:

Engaging in 15 or less incidents of “inappropriate social behavior” from 3:30 to 8:00pm

- I will be nice to others and not tease them
- I will not call other people names
- I will not stand too close to others or touch them

AND

Engaging in 5 or more “positive peer interactions” (3 minutes each) from 3:30 to 8:00pm

- I will play sports with my peers
- I will be nice to them and talk about good topics
- I will spend time with them doing something we both like

Tally all occurrences of “inappropriate social behavior”.

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

Tally all occurrences of “positive peer interactions” that lasted at least 5 minutes.

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

I will not earn my reward if:

- \* If I engage in more than 15 incidents of inappropriate social behavior
- \* If I don't engage in 5 or more (3-min) positive peer interactions.

I have read or had someone read this behavioral contract to me. I agree and understand what I am working towards today.

Participant Signature	
Staff Signature	

## Appendix J: Highly Preferred Behavioral Contract

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Today, I will have the opportunity to earn: **30 minutes of the following item at 8:00pm.**

\_\_\_\_\_

The way I will earn this will be by:

Engaging in 15 or less incidents of “inappropriate social behavior” from 3:30 to 8:00pm

- I will be nice to others and not tease them
- I will not call other people names
- I will not stand too close to others or touch them

AND

Engaging in 5 or more “positive peer interactions” (3 minutes each) from 3:30 to 8:00pm

- I will play sports with my peers
- I will be nice to them and talk about good topics
- I will spend time with them doing something we both like

Tally all occurrences of “inappropriate social behavior”.

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

Tally all occurrences of “positive peer interactions” that lasted at least 5 minutes.

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

I will not earn my reward if:

- \* If I engage in more than 15 incidents of inappropriate social behavior
- \* If I don’t engage in 5 or more (3-min) positive peer interactions.

I have read or had someone read this behavioral contract to me. I agree and understand what I am working towards today.

Participant Signature	
Staff Signature	

## Appendix K: Choice Behavioral Contract

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Today, I will have the opportunity to earn one of these at 8pm. **CIRCLE THE ONE HE PICKS.**  
30 minutes of CD.

1-on-1 home activity with staff: \_\_\_\_\_

The way I will earn this will be by:

Engaging in 15 or less incidents of “inappropriate social behavior” from 3:30 to 8:00pm

- I will be nice to others and not tease them
- I will not call other people names
- I will not stand too close to others or touch them

AND

Engaging in 5 or more “positive peer interactions” (3 minutes each) from 3:30 to 8:00pm

- I will play sports with my peers
- I will be nice to them and talk about good topics
- I will spend time with them doing something we both like

Tally all occurrences of “inappropriate social behavior”.

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

Tally all occurrences of “positive peer interactions” that lasted at least 5 minutes.

3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00

I will not earn my reward if:

- \* If I engage in more than 15 incidents of inappropriate social behavior
- \* If I don't engage in 5 or more (3-min) positive peer interactions.

I have read or had someone read this behavioral contract to me. I agree and understand what I am working towards today.

Participant Signature	
Staff Signature	