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Comparison of Token Reinforcement and Monetary Reinforcement to Increase Steps in Adults with Intellectual Disabilities in a Group Home Setting

Hana Hanashiro-Parson
University of South Florida, hana2@mail.usf.edu

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Comparison of Token Reinforcement and Monetary Reinforcement to Increase Steps in Adults with Intellectual Disabilities in a Group Home Setting

by

Hana Hanashiro-Parson

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

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

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Keywords: intellectual disabilities, adults, physical activity, token reinforcement, monetary reinforcement, group home

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Dedication

I dedicate this manuscript to my family, Jamaal, and friends who have supported me throughout this journey. Thank you for always encouraging and inspiring me to achieve my goals.
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Abstract

As the obesity rate in America continues to rise, the levels of physical activity have persistently declined at a rapid pace across all age groups. This trend is demonstrated most significantly in individuals diagnosed with intellectual disabilities (ID). Due to the high obesity rate in individuals with ID, it is crucial to find an effective intervention to increase physical activity. The purpose of this study is to compare the effectiveness of token reinforcement and monetary reinforcement for increasing physical activity among adults with ID, to assess preference for token or monetary reinforcement, and to evaluate the effects of choice of reinforcement procedure on physical activity. An ABAB design with an alternating treatments design was used to compare the two conditions (token reinforcement and monetary reinforcement). In the second intervention phase, the participants chose between the two reinforcement conditions. Results showed that both reinforcement conditions increased physical activity.

Keywords: intellectual disabilities, adults, physical activity, token reinforcement, monetary reinforcement, group home
Introduction

Across the United States, there is a growing concern regarding the escalating obesity rate. According to the Centers for Disease Control and Prevention (2017), approximately 36.5% of the adult population in America is considered obese. The most vulnerable population for health risks due to low levels of physical activity and poor nutrition are individuals with disabilities—especially individuals diagnosed with intellectual disabilities (ID). Due to unique obstacles, it can be difficult to achieve the recommended levels of physical activity needed to live a healthy lifestyle for individuals with ID, therefore they are more likely to have low levels of physical activity (Heller, Fisher, Marks, & Hsieh, 2014; Hilgenkamp, Reis, Wijck, & Evenhuis, 2012; Hsieh, Rimmer, & Heller, 2013). Rimmer, Yamaki, Lowry, Wang, and Vogel (2010) found individuals with ID have a higher risk of being overweight or obese and secondary conditions related to obesity such as diabetes, high blood pressure, high cholesterol, asthma, depression, and fatigue. Furthermore, adults with ID who prepare meals themselves are more at risk of obesity due to lack of education on nutrition (de Winter, Bastiaanse, Hilgenkamp, Evenhuis, & Echteld, 2012; Yamaki, 2005). Obesity in the ID community is a serious problem because it could lead to interference with employment and engaging in community activities (Rimmer & Yamaki, 2006; Rimmer et al., 2010). Also, the life span of individuals with disabilities is increasing; therefore, it is important to focus on ways to decrease obesity in individuals with ID to decrease the likelihood of health complications related to obesity in older adults with ID (de Winter et al., 2012).

Increasing levels of physical activity within individuals with ID could decrease the risk of future health complications, as well as lower obesity rates overall. Physical activity is defined as energy expenditure produced by any bodily movements (Caspersen, Powell, & Christenson,
1985). It is necessary to increase physical activity among the population of adults with developmental disabilities to minimize common health complications associated with obesity and in turn reduce the challenges and complications faced by the individuals, their caregivers, and the system as a whole (Rimmer & Yamaki, 2006; Seltzer, Heller, & Krauss, 2004). Janicki et al. (2002) found that out of 1,371 participants with ID, 50% stated that they did not engage in any kind of physical activity, yet 81% of the caregivers stated that the participants were healthy and engaged in exercise. Janicki et al. also found that over 50% of the participants were obese; however, the caregivers and health care providers failed to report it so there is a problem that obesity in the ID population could be normalized. Stancliffe et al. (2011) used a similar approach and found that out of 8,911 individuals with ID from 20 states, 62% were overweight or obese with a BMI of 25 or more, 33.6% were obese with a BMI of 30 or more, and 7.6% were morbidly obese with a BMI of 40 or more. Bodde, Seo, Frey, Puymbroeck, and Lohrmann (2013) also sent out two questionnaires to 42 participants diagnosed with mild to moderate ID with ages ranging from 19 to 62. The first questionnaire was called “The Nutrition and Activity Knowledge Scale” and the second one was “Physical Activity Recommendations Awareness.” The results from both questionnaires showed the participants had very poor knowledge of physical activity and nutrition and were only engaging in an average of 7.73 min of moderate-to-vigorous physical activity (MVPA) per day. Almost half of the participants stated that they did not engage in any MVPA per day.

Cowley et al. (2011) and Mendoca, Pereira, and Fernhall (2011) conducted studies to look at the effects of a combined exercise program. The main difference between the two studies was that Cowley et al. had thirty participants with Down syndrome (DS), whereas Mendoca et al. had typically developing adults and individuals with DS as their participants. Both studies used
the combined program of aerobics and resistance exercises. After the exercise program, both studies showed that there were improvements in physical fitness levels of the participants. Interestingly, there was no difference between the adults with DS and the typically developing adults. Both populations showed improvements in their physical fitness levels. Lante, Walkey, Gambley, and Vassos (2011) evaluated the Creating a Sporting Chance (CASC) exercise program for adults with ID. The MVPA levels increased for the participants during the CASC sessions; however, physical activity throughout the day decreased.

Due to the importance of increasing exercise for those with ID, researchers have evaluated various exercise programs and procedures to determine the most effective methods to increase physical activity in individuals with ID (Bennett, Elsenman, French, Henderson, & Schultz, 1989; Croce & Horvat, 1992; Krentz, Miltenberger, & Valbuena, 2015; Valbuena, Miltenberger, Livingston, & Slattery, in press; Vergara, Crosland, Miltenberger, & Church, 2017). Token reinforcement is an intervention method where participants can earn tokens dependent upon engaging in desired behavior and exchange the tokens for preferred items. Bennett et al. (1989), Croce and Horvat (1992), and Krentz et al. (2015) used token reinforcement with adults with ID where the participants earned a token for physical activity. Bennett et al. had three women diagnosed with DS, all considered to be overweight. The exercise program/intervention consisted of cycling for up to 15 min, for 5 days a week, and the participants could earn poker chips for reaching the defined criterion of revolutions of the stationary bicycle. Similarly, Krentz et al. used token reinforcement to increase walking in adult males with ID at an adult day training center (ADT). The participants earned a poker chip for every lap they completed during the designated time. Croce and Horvat also used token reinforcement procedures to increase work productivity and physical activity. The participants
received tokens for completing a set goal for their exercise routine and received an additional token for every 30s of exercise after the initial token. Almost all the participants across the studies increased physical activity with token reinforcement. Valbuena et al. (in press) used monetary reinforcement to increase steps in adults with ID. The participants were adults with ID who attended an ADT and they earned a quarter for every 1,000 steps taken during the designated hour set aside for physical activity. Monetary reinforcement was also effective to increase steps for adults with ID.

Vergara, Crosland, Miltenberger, and Church (2017) evaluated the effects of giving a choice to increase physical activity. The participants in the study were adults diagnosed with mild to moderate ID. Vergara et al. gave choice of exergaming and traditional exercise to increase physical activity in adults with ID during the last phase of the study. There was an increasing trend for the first participant, decreasing trend for the third participant, and no significant difference for the fourth participant during the choice phase. Wulf, Freitas, and Tandy (2014) also evaluated if giving a choice to participants during physical activity would increase engagement. Although the participants in the study were typically developing adults, results showed giving a choice during exercise programs was highly effective. The group given a choice engaged in 60% more exercises than the group that was not given a choice. From the reviewed literature, there are not many studies that focus on giving participants with ID a choice to increase physical activity other than Vergara et al. Giving adults with ID a choice is not invasive and could be an easy addition to programs that are already in place. If there was a program to increase physical activity for adults with ID that could be implemented by all, the obesity rates in the community could drop, there would be fewer secondary health complications, employment opportunities would increase, and the individuals could participate in more leisure activities.
Although studies have shown that monetary reinforcement and token reinforcement are effective for increasing physical activity in adults with ID, it is not clear if one is more effective than the other. Furthermore, although choice of interventions has been effective for increasing physical activity with typically developing adults, other than Vergara et al. (2017), there has not been a lot of research conducted regarding giving choice to individuals with ID during physical activity. Therefore, the purpose of this study was to compare the effectiveness of token reinforcement or monetary reinforcement for increasing physical activity among adults with ID, to assess preference for token or monetary reinforcement, and to evaluate the effects of choice of reinforcement procedure on physical activity.
Method

Participants

Five adult males diagnosed with intellectual disability (ID) who all lived in the same group home participated in this study. The inclusion criteria for the participants were: 18 years old and older, a diagnosis of ID, living in a group home, and have no health complications preventing physical activity. Dominic, 20, had the diagnoses of: mild ID (IQ 58), mood disorder NOS, Bipolar disorder, Post-Traumatic-Stress disorder, Attention Deficit Hyperactivity disorder (ADHD), and Oppositional Defiant disorder (ODD). Dylan, 18, had the diagnoses of: mild ID (IQ 61), Bipolar Disorder, Asperger’s Disorder, ADHD, and ODD. Vince, 21, had the diagnosis of mild ID (IQ 54) due to 47XYY Syndrome. Vince independently commuted to a transition program for adults with ID by the public bus system and walked every day to and from the bus stop. He was the only one who regularly engaged in physical activity outside of school or adult day training (ADT) center. Paul, 19, had the diagnoses of: mild ID, Autism Spectrum Disorder, ADHD, Obsessive Compulsive Disorder, Sensory Deficits, Behavior Disorder, and Bipolar Disorder. Paul did not have his IQ score on record, but his medical records stated that he was in the mild ID range. Brian, 23, had the diagnosis of moderate ID caused by traumatic brain injury. Brian also did not have his IQ score on file, but his medical records stated that he was in the moderate ID range.

The participants completed the Physical Activity Readiness Questionnaire (PARQ; see appendix A) before the study began. The PARQ has been used in similar studies to ensure the participants are physically capable of engaging in physical activity without threat to their health (Krentz et al., 2015; Thomas, Reading, & Shepard, 1992; Valbuena et al., in press; Van Wormer, 2004; Vergara et al., 2017). Four of the five participants were overweight, but none of the
participants had any health complications preventing engagement in physical activity. Their body mass index (BMI) was calculated using the weight and height for each participant prior to the initial baseline phase and BMI was also calculated for each participant after the study had ended. According to Nuttall (2015), BMI of 18 to 24.9 is in the normal range, 25 to 29.9 is in the overweight range, 30 to 34.9 is in the Class 1 obesity range, 35 to 39.9 is in the Class 2 obesity range, and 40 and over is in the Class 3 obesity range. The height, weight, and BMI are in Table 1. The BMI was calculated before the initial baseline and post study for each participant.

**Setting**

Sessions were conducted 5 days a week at the group home where the participants resided. The sessions were conducted for an hour from 4:45 pm to 5:45 pm Monday through Friday. The participants usually returned home from school or their ADT center around 4:30 pm and dinner was usually served around 6:00 pm. Unless there were activities scheduled by the group home staff, the participants had free time from the time they returned home until they went to bed at 8:00 pm. The participants lived a sedentary lifestyle in general, but especially while at home. Each of the participants had a TV in his room with a gaming system, so most of the participants usually spent their time in their bedrooms after returning home from school or the ADT center. The group home had a large fenced in back yard with a basketball court. Usually, the participants were free to leave the group home to go walk around the neighborhood if the weather permitted. They were also allowed to play football and soccer in the cul-de-sac by the group home or in the backyard. Staff were asked not to initiate physical activity with the residents during the study; however, staff could engage in physical activity with the participants if the participants initiated physical activity, or asked staff to participate.
Materials

Yamax ™ Digiwalker ™ SW-200 pedometers were used during this study to measure the participants’ steps. Eight pedometers were used in this study and the participants were randomly given a pedometer at the beginning of each session. An accuracy assessment was conducted with the pedometers. During the assessment, an independent observer and the researcher each had a pedometer and walked for a few minutes while counting their own steps with a clicker. At the end of every assessment session, the number shown on the pedometer was compared with the number shown on the clicker. Then the smaller number was divided by the larger number and multiplied by 100 to calculate the accuracy. The results of the accuracy assessment were: 100%, 100%, 96%, 97%, 99%, 96%, 99%, 99%.

The participants were asked to take their phones or watches with them if they choose to walk around the neighborhood to know when the session ended. Poker chips were used as tokens during the token reinforcement condition. The backup reinforcers included: Nature Valley granola bars (i.e., crunchy, sweet and salty nut, and fruit and nut), Fiber One protein bars, Quaker Chewy granola bars, Gatorade G2 (i.e., Cool Blue, Lemon Lime, Glacier Cherry), boxes of Hawaiian Punch Singles To Go drink mix (i.e., Lemon Berry Squeeze and Wild Purple Smash), Extra chewing gum (i.e., Spearmint and Peppermint), toy cars (i.e., Hot Wheels and Matchbox cars), packs of green army men, packs of building blocks, and ear phones. The token exchange rate for each item chosen, percentage of reinforcers chosen, and the total cost of reinforcement per participant are in table 3. Quarters were used during the monetary reinforcement condition. The researcher also had visual aids in the form of posters available in the common area of the group home throughout the duration of the study (e.g., a poster with
pictures of activities the participants could engage in). A data sheet was also used to record the number of steps taken per minute for each participant for each session (see appendix B).

**Target Behavior and Response Measurement**

The dependent measure was the number of steps taken per minute per daily exercise session for each participant. This was chosen as the dependent measure due to the possibility of varied session duration for each participant. Although the session duration was 1 hr, some participants returned home late or had to leave the session early on some occasions, which made the dependent measure of steps per minute the most accurate. Steps were measured by the researcher resetting pedometers to zero at the start of the session, giving participants pedometers to wear on their hip, collecting the pedometers at the end of the session, recording the number of steps, and calculating steps per minute by dividing the number of steps by number of minutes the participant participated.

**Interobserver Agreement and Treatment Integrity**

An independent observer collected data on the steps the participants took in 99.6% of sessions. Interobserver agreement (IOA) was calculated by comparing the number from the pedometer the observer wrote down with the number written down by the primary researcher, and then comparing the two numbers. The smaller number was divided by the larger number then multiplied by 100 to generate a percentage of IOA. For all participants, IOA was 100%.

Treatment integrity, measured using a checklist (see appendix C) during baseline and intervention, was calculated by dividing the number of steps completed by the total number of steps in the task analysis. Treatment integrity was measured during every session and was 100% across all sessions.
Social Validity

A social validity questionnaire was given to the participants (see appendix G) and the group home staff (see appendix H) to assess the participants’ opinion of the interventions and whether they thought the interventions were effective. The social validity questionnaire included items that were rated using a Likert scale and included open-ended questions (e.g., “Why did you choose monetary reinforcement/token reinforcement?”).

Design

An ABAB design was used to determine if reinforcement for steps (token reinforcement and monetary reinforcement) would increase engagement in physical activity in adults diagnosed with ID. An alternating treatments design was used to compare steps in token reinforcement and monetary reinforcement conditions. During the last phase of the study, participants chose the reinforcement condition they wanted to be in effect for that day.

Procedures

The sessions were conducted Monday through Friday from 4:45 pm to 5:45 pm at the group home. During the hour, the participants were asked to wear the pedometers on their hip, so they could easily see their own step count. The pedometers were able to be opened and viewed by the participants across all phases. A preference assessment was conducted for each participant to determine what he would like as back up reinforcers. The study was described to the participants as well as the group home staff, and a consent form was signed by all participant or their guardian (see appendix D). The legal guardian of Dominic, Vince, Paul, and Brian also signed consent forms (see appendix E). Dylan was his own guardian, so his parents did not sign the consent form. The researcher did not engage in activity with the participants during the sessions, but instead supervised the participants to make sure the pedometers were kept on their
hip. If most of the participants were engaging in physical activity outside during the session, the researcher followed the participants to ensure safety. There were no social contingencies for engaging in physical activity.

**Baseline.** The participants were asked to wear the pedometers on their hip for an hour, but the researcher did not give any other instructions. Before every session, the researcher made sure the pedometers were set to zero and worked properly. The participants were told they have a designated hour for exercise, but they are free to do anything they want to within the hour. The poster with the procedures of the study was available during baseline. During the hour, the researcher did not offer any feedback or any consequences, except to tell the participants to keep their pedometers on during the hour. The participants were also notified when the hour began, and when it ended. After every session, the researcher collected the pedometers, recorded the number of steps, and calculated steps taken per minute.

**Preference assessment.** After baseline, a questionnaire (see appendix F) was given to the participants asking what they preferred as backup reinforcers. The questionnaire had questions such as: “what kind of drinks do you like?”, “what is your favorite snack?”, and “what kind of toys do you like?” The researcher sat with each participant and asked the questions to ensure they understood the questions clearly. The researcher believed the questionnaire/interview alone would suffice to assess preference because the participants stated what they liked and disliked on a regular basis.

**Intervention comparison.** During intervention, the researcher made sure all pedometers were reset to zero as in baseline. When the participants returned from school or the ADT center, the researcher went over the rules of the procedure. The reinforcement conditions were randomly chosen before the session began. This was done by the researcher putting two ping pong balls in
a paper bag, shaking the paper bag, and pulling one ball out without looking into the bag. One ball would have the letter “T” written to represent the token reinforcement condition, and the other ball would have the letter “Q” written to represent the monetary reinforcement condition. No more than two consecutive reinforcement conditions of the same type were conducted to ensure the participants had equal exposure to both reinforcement conditions. The researcher described the token reinforcement and monetary reinforcement procedure and told the participants which reinforcement condition was in effect as a reward for the activity they chose to engage in during the 1-hr period. The researcher provided the participants with a poster of activities they could engage in for exercise. The items on the list were: walking, jogging, basketball, soccer, and football. The participants were asked to keep their pedometers on their hip during the entire session. In the monetary reinforcement condition, the participants received a quarter for every 1,000 steps they took. In the token reinforcement condition, the participants received a token for every 1,000 steps they took. The researcher showed the participants a chart that shows the number of steps associated with the number of tokens or quarters (i.e., 1,000-1,999 = 1 token or 1 quarter, 2,000 to 2,999 = 2 tokens or 2 quarters, etc). The researcher also had a poster with the token menu available for the participants that showed how many tokens were needed to exchange for the items (i.e., Hot Wheels = 4 tokens, 1 granola bar = 1 token, etc). The researcher collected the pedometers at the end of the session and told the participants how many steps they took and how many tokens or quarters they earned. At the end of every token reinforcement session, the participants had the choice of exchanging the tokens for a backup reinforcer that day or saving the tokens to use for another day. Participants also had several opportunities throughout the week to go out into the community with staff to go to the store and purchase items using the money they earned.
**Baseline.** The second baseline phase was conducted in the same manner as the first baseline phase.

**Intervention choice.** In the choice phase, the researcher began the session by asking the participant to choose monetary reinforcement or token reinforcement for that day. Each participant was asked to choose between the two reinforcement conditions before every session in this phase. The researcher then conducted the intervention in the same manner as in the first intervention phase. The participants chose the reinforcement at the beginning of the hour session but had the choice to choose the other reinforcement condition at the end of the session if they had changed their mind. As stated in the previous phases, the participants were instructed to keep the pedometer on their hip and they were told they could engage in activities to earn steps if they wanted to. The researcher conducted periodic checks throughout the session to ensure the participants were wearing the pedometers during the designated hour. Pedometers were collected, and the steps taken per minute was calculated at the end of each session. Depending on which reinforcement condition the participants chose for that day, the researcher gave the participant a token or a quarter for every 1,000 steps they took. The researcher showed the participants a chart that showed the number of steps associated with the number of tokens or the token menu available for the participants that showed how many tokens were needed to exchange for the items during this phase as well. If a participant chose tokens as their reinforcement, he had the option to exchange his tokens right after the session or to save the tokens up for a reinforcer that required more tokens. Also, the participants that chose to save up their tokens could exchange the tokens at any time even if they did not earn tokens during that session. Participants that chose to earn quarters had multiple opportunities throughout the week to go to the store with staff.
Results

The five figures depict steps walked per minute per day by each of the participants. During the intervention phases, monetary reinforcement was represented by the black square and token reinforcement was represented by the black triangle. The number of steps taken per minute was very low across all participants during both baseline phases. During the intervention phases, the number of steps per minute increased for all five participants, although more for some than for others. Four of the five participants were overweight or obese; however, there was no correlation between the starting weight and the results. When the weight was measured for each participant post study, Dominic, Dylan, and Paul had gained weight. Although Vince and Brian were still in the same BMI range, Vince and Brian had lost weight post study. The participants and the group home staff also completed the social validity questionnaire at the end of the study.

Steps Per Minute

Dominic. Figure 1 depicts steps walked per minute per day by Dominic. The baseline mean was 6.3 and the mean during the intervention comparison phase was 25.4 for monetary reinforcement and 28 for token reinforcement. In the second baseline the mean was 7.1. The mean during the choice phase was 27.01 during monetary reinforcement and 31.75 during token reinforcement. Dominic chose money 21 times and tokens 12 times.

Dominic played Horse (a basketball game), football, soccer, and walked around the neighborhood with peers and/or staff for physical activity. Dominic’s data were highly variable during both intervention phases; however, the baseline was low but stable. Dominic chose monetary reinforcement more often than tokens. He stated that he used the quarters earned during the study at the vending machines at school to buy a drink or a snack.
**Dylan.** Figure 2 depicts steps walked per minute per day by Dylan. Out of all the participants, Dylan had the lowest mean of 0.82 during the initial baseline phase. During the intervention comparison phase, the mean for monetary reinforcement was 7.14 and the mean for token reinforcement was 16.6. The mean was 0.51 for the second baseline phase. The mean during the choice phase was 8.51 during monetary reinforcement and 19.07 during token reinforcement. Dylan chose money 15 times and tokens 19 times.

Dylan stayed in his room playing video games during most of the study. The activities Dylan engaged in to earn steps were playing soccer or taking a walk around the neighborhood. The highest data point was when Dylan walked around the neighborhood while playing Pokémon Go. Dylan chose token reinforcement more often than monetary reinforcement. He would exchange the tokens for granola bars and/or Gatorade. He also stated that he saved up the quarters to purchase a cookie at a convenience store.

**Vince.** Figure 3 depicts steps walked per minute per day by Vince. During baseline, the mean was 3.5. During the reinforcement phase, the mean for monetary reinforcement was 3.22 and the mean for token reinforcement was 7.3. The mean was 1.09 for the second baseline phase. The mean during the choice phase was 20.41 during token reinforcement. Vince chose tokens 100% of the time.

Like Dylan, Vince also stayed in his room playing video games most days. However, when he did engage in physical activity, he played football or walked around the neighborhood with peers and/or staff. Vince only chose token reinforcement during the choice phase, and he exchanged his tokens for granola bars or Gatorade.

**Paul.** Figure 4 depicts steps walked per minute per session by Paul. During baseline, the mean was 10.83. In the treatment comparison phase, the mean for monetary reinforcement was
33.89 and the mean for token reinforcement was 26.69. During the second baseline phase, the mean decreased to 7.15. The mean during the choice phase was 44.33 during monetary reinforcement and 38.64 during token reinforcement. Paul chose money 19 times and tokens two times.

Paul was more active than the other participants throughout the study, but especially during baseline. The activities Paul engaged in to earn steps were: football, Horse, soccer, walked around the neighborhood, and jogged around the neighborhood. Paul chose monetary reinforcement almost always during the choice phase. Paul exchanged his tokens for Hawaiian Punch drink mix, Gatorade, and Hot Wheels.

**Brian.** Figure 5 depicts steps walked per minute per session by Brian. The mean number of steps was 4.26 during the initial baseline phase. In the treatment comparison phase, the mean for monetary reinforcement was 24.21 and the mean for token reinforcement was 31.04. The mean during the second baseline phase to 2.58. The mean during the choice phase was 39.72 during monetary reinforcement and 58.02 during token reinforcement. Brian chose money six times and tokens 22 times.

Brian did not engage in much physical activity during both baseline phases. During the intervention phases, the activity Brian engaged in to earn steps was to walk around the neighborhood. He played soccer once with the other participants, but he stated that he preferred to walk around the neighborhood more. Brian chose token reinforcement more often than monetary reinforcement. Brian stated that he used the quarters that he saved up at the vending machine at his ADT. The tokens were exchanged for Hot Wheels, Gatorade, and granola bars.
Social Validity

The participants and staff at the group home completed a social validity questionnaire on the last day of the study. The questions included in the questionnaires were slightly different for the participants and staff. The questionnaire consisted of six questions for participants and staff. The questionnaire for the participants included open ended questions as well. The participants rated each question from 1 (least likely) to 5 (most likely). The participants’ mean score for question 1 was 4.5 (ranging from 4 to 5), question 2 was 3.75 (ranging from 1 to 5), question 3 was 4.75 (ranging from 4 to 5), question 4 was 4.75 (ranging from 4 to 5), question 5 was 4.5 (ranging from 3 to 5), and question 6 was 3.75 (ranging from 1 to 5). Five of the group home staff completed the social validity questionnaire. The staff’s mean score for question 1 was 4.8 (ranging from 4 to 5), question 2 was 4.6 (ranging from 4 to 5), question 3 was 4 (ranging from 2 to 5), question 4 was 4.4 (ranging from 3 to 5), and question 5 was 4.6 (ranging from 4 to 5).
Discussion

Monetary reinforcement and token reinforcement were shown to increase steps for five adults diagnosed with ID in a group home setting in this study. Furthermore, when choice of monetary or token reinforcement was offered, steps increased to similar or greater levels than the first reinforcement phase for the five participants. Even though there was a clear increase during intervention phases, one thing that characterizes the data is great variability across days with very few steps on some days and many on other days. Factors that may have influenced steps taken across days are discussed below.

Dominic had just started at a new school a few months before the study began, so the low data points across the study usually reflected when Dominic would choose to stay in his room because he was upset about something that had happened at school. Dominic bought a subscription to a video game during the choice phase, so some of the lower data points during this phase were due to Dominic choosing to play the video game instead of getting steps. During the choice phase, he chose both tokens and quarters. He frequently played with Hot Wheels, so he usually exchanged his tokens for Hot Wheels, but he has also exchanged his tokens for granola bars, Gatorade, and ear phones. He saved his quarters to use at the vending machines at school or when he went to the store with staff.

Dylan’s had the lowest number of steps compared to the other participants during both baselines. During the intervention comparison phase, there was an increasing trend for the token reinforcement condition, but in the monetary reinforcement condition only two of 12 data points were elevated above baseline. Dylan and Brian were roommates, and during the intervention comparison phase, Brian sometimes prompted Dylan to go on a walk with him around the neighborhood. However, during the choice phase, Brian did not prompt Dylan to go on a walk.
This seemed to affect Dylan; he was less likely to choose to engage in physical activity and more likely to play video games during the final phase of the study. In the choice phase, just three of 14 data points for money and three of 10 data points for tokens were elevated above the baseline level. Increases in steps for Dylan were likely due to establishing operations (EO) being present for edibles as he claimed he wanted to earn tokens to exchange for edible backup reinforcers. The participants did not have access to food or drink items and did not get a snack until after dinner unless they had purchased a snack or a drink before they returned home. This could be why there was likely an EO present for most participants for granola bars and/or Gatorade. Dylan downloaded Pokémon Go on his cell phone the day he had the highest data point; however, he only played Pokémon Go twice during the choice phase. Although he chose monetary reinforcement most often during the choice phase, his steps were noticeably higher when he chose tokens. Prior to the study beginning, Dylan spent most of his time in his room and only came downstairs to eat dinner, so staff was surprised any time Dylan chose to engage in any physical activity.

Vince attended a transition program at a local university. Through the transition program, Vince also had a part time job at a fast food restaurant on campus. He took public transportation to the university and back and most days he walked home from the bus stop to the group home. His steps were extremely low across the first three phases of the study. He usually returned home from the transition program around 4:15 pm to 4:30 pm, and by the time the sessions were about to begin at 4:45 pm, he would say he chose to play video games and relax on the couch because he was tired from working. Like Dylan, being hungry after returning home likely was an EO to get steps to earn tokens to exchange for granola bars or Gatorade. During the intervention comparison phase, Vince earned reinforcement during three out of 21 sessions. However, during
the choice phase there was a noticeable increase in the number of steps with half of the sessions far exceeding baseline levels and a substantial mean increase in steps. The substantial increase in steps taken during the choice phase may possibly have been due to an EO being present for making a choice. During the intervention comparison phase, Vince often asked at the beginning of the session why he could not choose which reinforcers to earn. He chose tokens every session during this phase and decided to save most of his tokens. He also stated that he liked collecting the tokens and liked the color of the tokens which could be why he only chose token reinforcement. He exchanged his tokens only three times and chose granola bars and/or Gatorade. Vince was the only one who chose tokens consistently during the choice phase.

Paul started the study on the sixth day due to his guardians being out of town resulting in a delay to sign the consent forms. Paul had therapy sessions, doctor’s appointments, after school clubs, and other obligations that resulted in him typically missing one to two sessions per week. His steps during money and token reinforcement conditions were both substantially higher than baseline. During the choice phase, Paul chose tokens only once and chose money all other times. He stated that he was trying to earn enough money to buy a large pizza for himself. This was likely an EO for Paul to earn quarters rather than tokens for steps. Although Paul missed a lot more session days compared to the other participants, there was a clear effect for Paul during both intervention phases compared to the baselines. Furthermore, Paul had the highest sustained rate of steps in the choice phase.

Brian also started the study on the sixth day. Brian had weekly dinners with his family, so he was not present for sessions at least once a week. Brian’s steps were very low during both baselines. During the intervention comparison phase, his steps increased slowly, but there was a clear effect for both conditions. In the beginning of the choice phase, Brian said that he wanted
to continue the alternating conditions and chose money and tokens on alternating days. However, after the 58th session, Brian chose only tokens as his reinforcer and showed a consistent high number of steps. For Brian, there likely was an EO present for having access to new Hot Wheels and he would usually attempt to take just enough steps to get enough tokens to exchange for a Hot Wheel (i.e., 4,000 steps). Brian also downloaded the Pokémon Go app on his phone towards the end of the choice intervention phase. Unlike Dylan, after he downloaded the app, he played it during every session while walking around the block to earn steps. However, the app seemed to be distracting for Brian; he stopped frequently during his walks, and the lower data points towards the end of the choice phase were when he was on the app.

This study showed that monetary reinforcement and token reinforcement were effective in increasing steps for five adults with ID. Although the intervention produced variable increases across the participants, the results are consistent with research that shows token reinforcement and monetary reinforcement are effective to increase physical activity (Bennett et al., 1989; Croce & Horvat, 1992; Krentz et al., 2015; Valbuena et al., in press). Also, during the choice of reinforcement phase steps increased for all five of the participants after steps had decreased during the second baseline. All participants achieved the highest mean number of steps during the choice phase. The results from the choice of reinforcement phase are consistent with the results from Wulf et al. (2014). The participants from Wulf et al. were typically developing adults; however, the findings from this study show that this intervention is also effective for adults with ID. The results show that, given a choice of reinforcers for steps, adults with ID increase their levels of physical activity. Also, the total cost of reinforcers for both intervention phases was $78.75, which indicates that this study might be cost effective for group homes. For all five participants, it would cost around $40 per month. The current study adds to research by
evaluating the intervention in a group home, comparing token reinforcement and monetary reinforcement, including choice of reinforcement, and evaluating the intervention over several months.

The feedback given by the participants on the social validity questionnaire was very positive. All the participants stated that they had enjoyed participating in the study and liked earning tokens or quarters. The participants also stated that they started to exercise more when they received token or monetary reinforcement. Although one of the staff member’s scores were low for two of the questions (question 2 and 4), none of the staff members stated that they had suggestions on making the program better. The low scores by the one staff member could have been due to this staff being the one that usually prompted the participants to engage in physical activity with him prior to the study beginning. Since staff were asked not to initiate physical activity with the participants throughout the study, the staff might have thought the researcher was being intrusive. Almost all the staff stated there was a difference in activity levels of participants during intervention compared to pre-intervention.

The two interventions were effective in increasing steps for the participants; however, there were several considerations throughout the study. First, it was extremely hard for the reinforcers in both reinforcement conditions to compete with reinforcement from playing video games and/or watching TV for all the participants. This was especially true during the intervention comparison phase. There were also multiple people visiting the group home on a regular basis which have competed with reinforcers for steps as well. Second, the weather affected the number of steps walked by the participants as well. If it was too hot or too cold the participants were more likely to choose to not go outside to get steps. The time the study was conducted could have been a limitation as well. Most of the participants expressed that when
they returned home from school or their ADT centers at 4:30, they wanted to time to relax. The participants’ obligations with their families or group home staff also limited their steps on some days.

For future research, evaluating the effects highly reinforcing items that could compete with playing video games could be beneficial. If possible, future researchers could evaluate various reinforcers while also limiting access to video games during the sessions. A more flexible schedule for each participant, including weekends in the study, should also be considered to maximize the number of sessions and the likelihood of engaging in physical activity for each participant. For instance, most of the participants stayed at home during the weekends, so the weekends would offer multiple times for engaging in physical activity. Future research could add prompts to the reinforcement interventions to determine if the prompts could get the participants to get up from their video games and initiate physical activity. Finally, future research could also evaluate reinforcers that do not have a cost value. For instance, participants could exchange tokens for being able to engage in preferred activities with staff. Although this study showed that tokens and money were effective in increasing steps by each participant, more research is needed to determine if one is more effective or more preferred than the other. Overall, there is a need for more research to evaluate procedures to see which is most effective for increasing physical activity in adults diagnosed with ID.
Table 1
The height, weight, and BMI of each participant. The weight was measured, and BMI was calculated pre-intervention and post intervention.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Height (ft)</th>
<th>Pre-Intervention Weight (lbs)</th>
<th>Post Intervention Weight (lbs)</th>
<th>BMI Pre-Intervention</th>
<th>BMI Post Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominic</td>
<td>5 ft 11 in</td>
<td>236 lbs</td>
<td>239.6 lbs</td>
<td>32.1</td>
<td>33.4</td>
</tr>
<tr>
<td>Dylan</td>
<td>6 ft 2 in</td>
<td>268 lbs</td>
<td>270 lbs</td>
<td>34.4</td>
<td>34.7</td>
</tr>
<tr>
<td>Vince</td>
<td>6 ft</td>
<td>186 lbs</td>
<td>184 lbs</td>
<td>25.2</td>
<td>25</td>
</tr>
<tr>
<td>Paul</td>
<td>5 ft 4 in</td>
<td>133 lbs</td>
<td>142 lbs</td>
<td>22.8</td>
<td>24.4</td>
</tr>
<tr>
<td>Brian</td>
<td>5 ft 7 in</td>
<td>213 lbs</td>
<td>206.8 lbs</td>
<td>33.4</td>
<td>32.4</td>
</tr>
<tr>
<td>Participants</td>
<td>Backup Reinforcer Chosen with Token Exchange Rate</td>
<td>Percentage of Backup Reinforcer Chosen in Intervention Comparison Phase</td>
<td>Percentage of Backup Reinforcer Chosen in Choice Phase</td>
<td>Total Cost of Backup Reinforcers</td>
<td>Total Cost of Quarters</td>
</tr>
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<td>------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
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<tr>
<td>Dominic</td>
<td>Hot Wheels (4) Gatorade: (1) Drink Mix: (4) Ear Phones: (4)</td>
<td>Hot Wheel: 16% Gatorade: 66.7% Drink Mix: 16%</td>
<td>Ear Phones: 6.25% Gatorade: 81.25% Granola Bars: 12.5%</td>
<td>$7.75</td>
<td>$10.75</td>
</tr>
<tr>
<td>Dylan</td>
<td>Granola Bars: (1)</td>
<td>Granola Bars: 100%</td>
<td>Granola Bars: 100%</td>
<td>$5.50</td>
<td>$1.75</td>
</tr>
<tr>
<td>Vince</td>
<td>Gatorade: (1) Granola Bars: (1)</td>
<td>Gatorade: 33% Granola Bars: 66.7%</td>
<td>Gatorade: 35% Granola Bars: 65%</td>
<td>$6.50</td>
<td>$0.25</td>
</tr>
<tr>
<td>Paul</td>
<td>Hot Wheels: (4) Gatorade: (1) Drink Mix: (4)</td>
<td>Hot Wheels: 20% Gatorade: 60% Drink Mix: 20%</td>
<td>Hawaiian Punch Drink Mix: 100%</td>
<td>$3.75</td>
<td>$14.75</td>
</tr>
<tr>
<td>Brian</td>
<td>Hot Wheels: (4) Gatorade: (1) Granola Bars: (1)</td>
<td>Hot Wheels: 60% Gatorade:20% Granola Bars: 20%</td>
<td>Hot Wheels: 80% Gatorade: 30%</td>
<td>$21.00</td>
<td>$6.75</td>
</tr>
</tbody>
</table>
Figure 1. Steps per minute across days for Dominic.
Figure 2. Steps taken per minute across days for Dylan.
Figure 3. Steps per minute across days for Vince.
Figure 4. Steps per minute across days for Paul.
Figure 5. Steps per minute across days for Brian.
References


Appendix A:

Physical Activity Readiness Questionnaire

Physical Activity Readiness Questionnaire (PAR-Q) and You

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly:

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
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</table>

If you answered YES to one or more questions

Talk to your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- Start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- Take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

Delay becoming much more active:

- If you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better; or
- If you are or may be pregnant — talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Appendix B:

Data Sheet

Researcher and/or the research assistants will fill out the data sheet at the end of each session. Only use initials for each participant. Number of steps taken per minute will be calculated by dividing the total number of steps by the number of minutes during the session (i.e., 1000/60 = 17). Sessions are an hour long each weather permitting.

Initials:

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th># of steps taken per minute</th>
<th>Was the pedometer worn during the entire hour? (Y or N)</th>
<th>Comments (Include if it rains)</th>
<th>Observer Initials</th>
</tr>
</thead>
<tbody>
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Appendix C:

Treatment Integrity

Treatment Integrity Checklist: Baseline

<table>
<thead>
<tr>
<th>Steps for procedure</th>
<th>Check if completed</th>
<th>Date and initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reset pedometer to zero before the beginning of every session.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Give the participants the pedometers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Make sure the participants are wearing their pedometers correctly.</td>
<td></td>
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<tr>
<td>4. Tell the participants they have a designated hour to exercise if they wish.</td>
<td></td>
<td></td>
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<tr>
<td>5. Collect pedometers after 1 hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Write down number of steps taken by each participant.</td>
<td></td>
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</tbody>
</table>
## Treatment Integrity Checklist: Intervention

<table>
<thead>
<tr>
<th>Steps for procedure</th>
<th>Check if completed</th>
<th>Date and initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reset pedometer to zero before the beginning of every session.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Give the participants the pedometers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Make sure the participants are wearing their pedometers correctly.</td>
<td></td>
<td></td>
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<tr>
<td>4. Tell participants if they are in money or token phase and describe the procedure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Tell the participants they have a designated hour to exercise if they wish and that they will earn money (or tokens) for steps they take.</td>
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<td></td>
</tr>
<tr>
<td>6. Collect pedometers after 1 hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Write down number of steps taken by each participant.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Have participants look at the chart to see the number of tokens (or quarters) they earned.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Give individuals tokens or quarters.</td>
<td></td>
<td></td>
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</tbody>
</table>
Appendix D:

Consent Forms (Participant)

Study ID:Pro00036571 Date Approved: 9/24/2018

Informed Consent to Participate in Research Involving Minimal Risk and Authorization to Collect, Use and Share Your Health Information

Pro # 00036571

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

We are asking you to take part in a research study called:

Comparison of Monetary Reinforcement and Token Economy to Increase Steps in Adults with Intellectual Disabilities in a Group Home Setting

The person who is in charge of this research study is Ilana Haashiro-Parson. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by Dr. Raymond Miltenberger.

The research will be conducted at the group home where you reside.

Purpose of the study

The purpose of this study is to compare the effectiveness of token economy or monetary reinforcement for increasing physical activity among adults with intellectual disabilities, to assess preference for token or monetary reinforcement, and to evaluate the effects of choice of reinforcement procedure on physical activity. These procedures have been used in similar studies.

Why are you being asked to take part?

We are asking you to take part in this research study because of where you currently reside and your diagnosis. Adults with intellectual disabilities typically live a sedentary lifestyle and we want to help increase opportunities to engage in physical activity for you. We also want to promote a healthy lifestyle and encourage appropriate social interactions between peers in the group home by organizing a time where peers can engage in physical activity together.
Study ID: Pro00036571 Date Approved: 9/24/2018

Study Procedures:
If you take part in this study, you will be asked to:

- You will be asked to wear a pedometer on your hip 5 days a week (Monday through Friday) from 4:45 pm – 5:45 pm. The sessions will all be conducted at your group home.
  - A pedometer is a device used to measure steps taken.
- If you do not want to, you do not have to engage in any physical activity to earn steps during the hour.
- The PI will have a poster of possible activities you can engage in to earn steps. The PI will also have a poster of procedures as a visual guide. These two posters will be placed in an area of the group home where all participants can easily see.
- During the first phase of the study (baseline), you will be asked to wear the pedometer during the designated hour but will not be given any other instructions. You will not be able to earn rewards for steps during this phase.
- After the first phase, the PI will give you a “Preference Assessment Questionnaire” to find out which rewards you would like to exchange your tokens for.
- During the second phase, the rewards you can earn will alternate (e.g., first day = earning tokens, second day = earning money).
  - For every 1,000 steps, you can earn 1 quarter or 1 token (e.g., 2,000 steps = 2 quarters, 2,000 steps = 2 tokens).
- After the second phase, we will go back to baseline where you will only be told to wear the pedometer during the hour. You don’t have to exercise if you do not want to.
- For the final phase, you will have a choice before every session to determine the type of reward you would like to earn for that day. You will be able to choose between money or tokens.
- Once the final phase is completed, you will be asked to complete a “Social Validity Questionnaire”. This questionnaire will be used to find out what you thought about the study.

Usually, there will be another observer who has been approved by USF. This will be to ensure the PI is collecting reliable data and to measure treatment integrity. There may be some days where another observer may not be able to attend the sessions. If this occurs, it may be necessary to video tape the sessions. Only the PI and the approved observers will have access to the recorded sessions. The PI will try her best to ensure the information will not be identifiable. The recorded sessions will be maintained for at least 5 years after the final report of this study is submitted to the USF IRB. After at least 5 years, the recordings will be destroyed by deleting all files containing the recordings.

Do you agree to the PI possibly recording some of the sessions? ___ Yes ___ No

Total Number of Participants
About 6 individuals will take part in this study at USF.

Voluntary Participation/Withdrawal
You do not have to participate in this research study.
You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.
Even if you want to stay in the study, there may be reasons we will need to withdraw you from the study. You may be taken out of this study if we find out it is not safe for you to stay in the study or if you are not coming for the study visits when scheduled. We will let you know the reason for withdrawing you from this study.

Benefits
The potential benefits of participating in this research study include:

- Encouraging an active lifestyle
- Lowering risk of obesity
- Decreasing risks of secondary conditions related to obesity (i.e., diabetes)
- Opportunities to interact more with peers in the group home.

Risks or Discomfort
This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation
You will receive no payment or other compensation for taking part in this study.

Costs
It will not cost you anything to take part in the study.

Privacy and Confidentiality
We will do our best to keep your records private and confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Certain people may need to see your study records. These individuals include:

- The research team, including the Principal Investigator, study coordinator, and all other research staff.
- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
- The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.
- The sponsors of this study and contract research organization.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints
If you have any questions, concerns or complaints about this study, or experience an unanticipated problem, call Hana Hanashiro-Parson at (813) 240-1678.
If you have questions about your rights as a participant in this study, or have complaints, concerns or
Even if you want to stay in the study, there may be reasons we will need to withdraw you from the study. You may be taken out of this study if we find out it is not safe for you to stay in the study or if you are not coming for the study visits when scheduled. We will let you know the reason for withdrawing you from this study.

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If you have questions about your rights as a participant in this study, or have complaints, concerns or
issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.

Authorization to Use and Disclose Protected Health Information (HIPAA Language)

The federal privacy regulations of the Health Insurance Portability & Accountability Act (HIPAA) protect your identifiable health information. By signing this form, you are permitting the University of South Florida to use your health information for research purposes. You are also allowing us to share your health information with individuals or organizations other than USF who are also involved in the research and listed below.

The following groups of people may also be able to see your health information and may use that information to conduct this research:

- The medical staff that takes care of you and those who are part of this research study;
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance and the USF Health Office of Clinical Research;
- Data Safety Monitoring Boards or others who monitor the data and safety of the study;

Anyone listed above may use consultants in this research study, and may share your information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your information with others without your permission. They can only do so if permitted by law. If your information is shared, it may no longer be protected by the HIPAA Privacy Rule.

By signing this form, you are giving your permission to use and/or share your health information as described in this document. As part of this research, USF may collect, use, and share the following information:

- Your research record
- All of your past, current or future medical and other health records held by USF, other health care providers or any other site affiliated with this study as they relate to this research project. This includes, but is not limited to records related to HIV/AIDS, mental health, substance abuse, and/or genetic information.

You can refuse to sign this form. If you do not sign this form you will not be able to take part in this research study. However, your care outside of this study and benefits will not change. Your authorization to use your health information will not expire unless you revoke (withdraw) it in writing. You can revoke this form at any time by sending a letter clearly stating that you wish to withdraw your authorization to use your health information in the research. If you revoke your permission:

- You will no longer be a participant in this research study;
- We will stop collecting new information about you;
We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with others, or we may need it to complete and protect the validity of the research; and
Staff may need to follow-up with you if there is a medical reason to do so.

To revoke this form, please write to:
Principal Investigator: Hana Harashiro-Parson
For IRB Study # 00036571
3478 Saint Bart Lane
Apt 302
Tampa, FL 33614

While we are conducting the research study, we cannot let you see or copy the research information we have about you. After the research is completed, you have a right to see the information about you, as allowed by USF policies. You will receive a signed copy of this form.

Consent to Take Part in this Research Study

I freely give my consent to take part in this study and authorize that my health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

Signature of Person Taking Part in Study Date

Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

Signature of Person obtaining Informed Consent Date

Printed Name of Person Obtaining Informed Consent
Appendix E:

Consent Form: Legally Authorized Representative

Study ID: Pro00038571 Date Approved: 9/24/2018

Informed Consent of Legally Authorized Representative for an Individual to Participate in Research and Authorization to Collect, Use and Share Your Health Information

Pro # 00036571

You are being asked to enroll an individual in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you. Please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to enroll your loved one in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

We are asking you to take part in a research study called:

Comparison of Monetary Reinforcement and Token Economy to Increase Steps in Adults with Intellectual Disabilities in a Group Home Setting

The person who is in charge of this research study is Hana Hanashiro-Parson. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by Dr. Raymond Mittenberger.

The research will be conducted at the group home where the individual resides.

Under certain circumstances, an individual can give consent for another person to take part in research. This person is the Legally Authorized Representative (LAR). The LAR can make choices for the participant, if the participant is not able to make choices for him or herself.

Purpose of the Study

The purpose of this study is to compare the effectiveness of token economy or monetary reinforcement for increasing physical activity among adults with intellectual disabilities, to assess preference for token or monetary reinforcement, and to evaluate the effects of choice of reinforcement procedure on physical activity. These procedures have been used in similar studies.

Should the person for whom you are signing consent take part in this study?

This form tells you about this research study. After reading this form and having someone explain the research to you, you can decide if you think the person for whom you are consenting to take part would want to take part in the study.
This form is written as if you, the LAR, were taking part in the research. This helps you think in terms of what the person for whom you are consenting would do or what is best for him/her. After reading this form, you can choose if you want to agree to allow this individual to take part.

You may have questions this form does not answer. If you do have questions, ask the principal investigator or the person explaining the study as you go along. Take your time to think about the information that has been given to you.

This form explains:

- Why this study is being done.
- What will happen during this study and what you will need to do.
- Whether there is any chance of benefits from being in this study.
- The risks involved in this study.
- How the information collected about you during this study will be used and with whom it may be shared.

Taking part in this research study is up to you. If you choose to be in the study, then you should sign this informed consent form. If you do not want to take part in this study, you should not sign this form.

Why are you being asked to take part?

We are asking you to take part in this research study because of where you currently reside and your diagnosis. Adults with intellectual disabilities typically live a sedentary lifestyle and we want to help increase opportunities to engage in physical activity for you. We also want to promote a healthy lifestyle and encourage appropriate social interactions between peers in the group home by organizing a time where peers can engage in physical activity together.

Study Procedures:

If you take part in this study, you will be asked to:

- You will be asked to wear a pedometer on your hip 5 days a week (Monday through Friday) from 4:45 pm – 5:45 pm. The sessions will all be conducted at your group home.
  - A pedometer is a device used to measure steps taken.
- If you do not want to, you do not have to engage in any physical activity to earn steps during the hour.
- The PI will have a poster of possible activities you can engage in to earn steps. The PI will also have a poster of the procedures as a visual guide. These two posters will be placed in an area of the group home where all participants can easily see.
- During the first phase of the study (baseline), you will be asked to wear the pedometer during the designated hour but will not be given any other instructions. You will not be able to earn rewards in exchange for steps during this phase.
- After the first phase, the PI will give you a “Preference Assessment Questionnaire” to find out which rewards you would like to exchange your tokens for.
- During the second phase, the rewards you can earn will alternate (e.g., first day = earning tokens, second day = earning money).
For every 1,000 steps, you can earn 1 quarter or 1 token (e.g., 2,000 steps = 2 quarters, 2,000 steps = 2 tokens).

- After the second phase, we will go back to baseline where you will only be told to wear the pedometer during the hour. You don’t have to exercise if you do not want to.
- For the final phase, you will have a choice before every session to determine the type of reward you would like to earn for that day. You will be able to choose between money or tokens.
- Once the final phase is completed, you will be asked to complete a “Social Validity Questionnaire”. This questionnaire will be used to find out what you thought about the study.

Usually, there will be another observer who has been approved by USF. This will be to ensure the PI is collecting reliable data and to measure treatment integrity. There may be some days where another observer may not be able to attend the sessions. If this occurs, it may be necessary to video tape the sessions. Only the PI and the approved observers will have access to the recorded sessions. The PI will try her best to ensure the information will not be identifiable. The recorded sessions will be maintained for at least 5 years after the final report of this study is submitted to the USF IRB. After at least 5 years, the recordings will be destroyed by deleting all files containing the recordings.

Do you agree to the PI possibly recording some of the sessions? Yes No

**Total Number of Participants**

About 6 individuals will take part in this study at USF.

**Alternatives/Voluntary Participation / Withdrawal**

You do not have to take part in this research.

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study. If you decide you want to stop taking part in the study, tell the study staff as soon as you can.

Even if you want to stay in the study, there may be reasons we will need to withdraw you from the study. You may be taken out of this study if we find out it is not safe for you to stay in the study or if you are not coming for the study visits when scheduled. We will let you know the reason for withdrawing you from this study.

**Benefits**

The potential benefits of participating in this research study include:

- Encouraging an active lifestyle
- Lowering risk of obesity
- Decreasing risks of secondary conditions related to obesity (i.e., diabetes)
- Opportunities to interact more with peers in the group home.

**Risks or Discomfort**

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.
Compensation
You will receive no payment or other compensation for taking part in this study.

Costs
It will not cost you anything to take part in the study.

Privacy and Confidentiality
We will do our best to keep your records private and confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Certain people may need to see your study records. These individuals include:

- The research team, including the Principal Investigator, study coordinator, and all other research staff.
- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, staff in USF Research Integrity and Compliance.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints
If you have any questions, concerns or complaints about this study, or experience an adverse event or unanticipated problem, call Hana Hanashiro-Farson at 813-240-1678.

If you have questions about your rights as a participant in this study, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638 or contact by email at IRB@usf.edu.

Authorization to Use and Disclose Protected Health Information (HIPAA Language)
The federal privacy regulations of the Health Insurance Portability & Accountability Act (HIPAA) protect your identifiable health information. By signing this form, you are permitting the University of South Florida to use your health information for research purposes. You are also allowing us to share your health information with individuals or organizations other than USF who are also involved in the research and listed below.

The following groups of people may also be able to see your health information and may use that information to conduct this research:
- The medical staff that takes care of you and those who are part of this research study.
The USF Institutional Review Board (IRB) its related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance and the USF Health Office of Clinical Research.

Data Safety Monitoring Boards or others who monitor the data and safety of the study;

Anyone listed above may use consultants in this research study, and may share your information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your information with others without your permission. They can only do so if permitted by law. If your information is shared, it may no longer be protected by the HIPAA Privacy Rule.

By signing this form, you are giving your permission to use and/or share your health information as described in this document. As part of this research, USF may collect, use, and share the following information:

- Your research record
- All of your past, current or future medical and other health records held by USF, other health care providers or any other site affiliated with this study as they relate to this research project. This includes, but is not limited to records related to HIV/AIDS, mental health, substance abuse, and/or genetic information.

You can refuse to sign this form. If you do not sign this form you will not be able to take part in this research study. However, your care outside of this study and benefits will not change. Your authorization to use your health information will not expire unless you revoke (withdraw) it in writing. You can revoke this form at any time by sending a letter clearly stating that you wish to withdraw your authorization to use your health information in the research. If you revoke your permission:

- You will no longer be a participant in this research study;
- We will stop collecting new information about you;
- We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with others, or we may need it to complete and protect the validity of the research; and
- Staff may need to follow-up with you if there is a medical reason to do so.

To revoke this form, please write to:
Principal Investigator: Hana Hanashiro-Parson
For IRB Study # 00036571
3478 Saint Bart Lane
Apt 302
Tampa, FL 33614

While we are conducting the research study, we cannot let you see or copy the research information we have about you. After the research is completed, you have a right to see the information about you, as allowed by USF policies. You will receive a signed copy of this form.
Consent of Legally Authorized Representative (LAR) And Authorization for the Collection, Use and Disclosure of Health Information

I give consent to have ___________________________ take part in this study and authorize that his/her health information be disclosed/collected as outlined above. I have received a copy of this form to take with me.

I understand that I am being asked to serve as the LAR and give permission for the individual outlined above to participate in this research study. My signature on this form also gives authorization for the collection, use and sharing of private health information. My decision is based on what I believe this individual would choose for him/herself and what I believe is now best for him/her, based on the information I have been provided.

_____________________________ Date
Signature of Legally Authorized Representative

_____________________________
Printed Name Legally Authorized Representative

Statement of Person Obtaining Informed Consent / Research Authorization

I have carefully explained to the LAR of the person taking part in the study what he or she can expect from participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

_____________________________ Date
Signature of Person Obtaining Informed Consent

_____________________________
Printed Name of Person Obtaining Informed Consent
Appendix F:
Preference Assessment Questionnaire

1. What is your favorite granola or protein bar flavor?

2. What type of Hot Wheels do you like?

3. What is your favorite type of sports drink?

4. What is your favorite flavor of sports drinks?

5. Do you like Crystal Light or Mio to add to your water?

6. What flavor gum do you like?

7. Do you like squishy toys or stress balls?

8. What are some other small toys that you like?

9. What are some other items you would like to earn?

10. What is your favorite fruit?
Appendix G:
Social Validity for Participants

1. I enjoyed participating in this study to get me to exercise more.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<td>1</td>
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<td>5</td>
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2. I liked earning tokens for getting steps.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
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<td>5</td>
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</table>

3. I liked earning money for getting steps.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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4. I liked having the choice of earning money or tokens.

<table>
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<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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5. I started exercising more when I earned money.

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<th>Strongly Disagree</th>
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<th>Agree</th>
<th>Strongly Agree</th>
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6. I started exercising more when I earned tokens.

<table>
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<th>Strongly Disagree</th>
<th>Disagree</th>
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<th>Agree</th>
<th>Strongly Agree</th>
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7. What did you like most about the program?

8. Why did you choose monetary reinforcement/token economy?

9. What is better about monetary reinforcement/token economy?

10. If you chose monetary reinforcement, what did you spend your money on?

11. If you chose monetary reinforcement, where did you spend your money?
Appendix H:  
Social Validity for Staff

1. I think this program was easy to implement.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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2. I would like to continue this program after the study is finished.

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<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
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<th>Agree</th>
<th>Strongly Agree</th>
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3. This program did not cost too much.

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<th>Strongly Disagree</th>
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<th>Agree</th>
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4. The program did not interfere with group home routines.

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<thead>
<tr>
<th>Strongly Disagree</th>
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<th>Agree</th>
<th>Strongly Agree</th>
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</table>

5. The participants seemed to enjoy being more active.

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<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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</table>

6. Suggestions to make this program more successful for the future?
Appendix I:

IRB Approval Letter

9/24/2018

Hana Hanashiro-Parson
CFBH-Child and Family Behavioral Health
Tampa, FL 33614

RE: Expedited Approval for Initial Review
IRB#: Pro00036571
Title: Comparison of Monetary Reinforcement and Token Economy to Increase Steps in Adults with Intellectual Disabilities in a Group Home Setting

Study Approval Period: 9/24/2018 to 9/24/2019

Dear Ms. Hanashiro-Parson:

On 9/24/2018, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
Protocol, Version #1, 9/19/18

Consent/Assent Document(s)*:
Adult Assent Form, Version #1, 9.12.18.pdf
Adult ICF without HIPPA (Staff), Version #1, 9.20.18.pdf
LAR Consent, Version #1, 9.14.18.pdf
Adult ICF, Version #1, 9.14.18.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR
56.110. The research proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) business days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Kristen Salomon, Ph.D., Chairperson
USF Institutional Review Board