TEACHING SELF-CONTROL USING QUALITATIVELY DIFFERENT REINFORCERS: A SYSTEMATIC REPLICATION

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ABSTRACT

Research has shown that self-control can positively impact a variety of areas in an individual's life and that self-control can be taught. Studies that used progressive duration criterions for reinforcement have shown to be effective for teaching self-control. Research that uses socially valid target behaviors and qualitatively different reinforcers to teach self-control may be effective and relevant in applied settings. Still, there is limited research in this area and only one study conducted by Passage et al. (2012) that uses all three elements to teach self-control. Furthermore, the study conducted by Passage et al. is also the only study that utilized qualitatively different reinforcers to teach self-control. Therefore, further exploration of qualitatively different reinforcers and their effects on acquisition is needed. The purpose of this study was to demonstrate a replication of the effects found in Passage et al.'s study by using a multiple baseline across participants design. Results indicated that the self-control training intervention was moderately effective for one participant for increasing the time the participant engaged in a task but this effect was not replicated with the second participant. The third participant dropped out of the study before its completion. These limitations did not allow sufficient replication of the effect found in the original study.

DEDICATION

This paper is dedicated to my family and friends that have supported me along the way.

Thank you for your belief in me.

ACKNOWELDGEMENTS

Thank you to Mathew Tincani for his collaboration and guidance as my academic advisor.

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CHAPTER 1

TEACHING SELF-CONTROL USING QUALITATIVLY DIFFERENT REINFORCERS: A SYSTEMATIC REPLICATION

Self-control has been commonly discussed in academic settings because of its benefits and positive impacts on individuals. Self-control can positively impact an individual's health, wealth, public safety, and their ability for success (Moffitt, 2011). Individuals who exhibit self-control are able to engage in behaviors, even when the longer-term benefits, which outweigh the immediate reinforcing consequences, are delayed (Critchfield, & Kollins, 2001).

Self-control is defined, in behavioral research, as the response of choosing a delayed larger, or more preferred reinforcer over an immediate smaller, or less preferred reinforcer (Ainslie, 1974; Schweitzer, & Sulzer- Azaroff, 1988; Dixon et al., 1998). A delayed larger or more preferred reinforcer (e.g., meeting personal goals, saving money for large purchases, exercising, healthy eating, maintaining relationships) may have more benefits than an immediate smaller or less preferred reinforcer (e.g., making smaller unnecessary frequent purchases, engaging in only sedentary or inactive actives, eating foods low in nutritional value). For example, eating a healthy, moderate calorie diet comprised of fruits, vegetables, and lean meats has demonstrable and lasting health benefits. According to the Center for Disease Control and Prevention (2021), these benefits include a lower risk of heart disease, stroke, diabetes, and other chronic diseases, as well as improved mobility and fitness, and enhancing cognitive functioning. However, processed, high calorie foods contain fats and sugars, ingredients that are potent immediate reinforcers for individuals who eat them. Individuals who over consume these foods likely do so because of the potent, immediate reinforcing value of doing so.

Individuals that demonstrate impulsive behavior choose an immediate smaller, or less preferred, reinforcer at the expense of a delayed larger, or more preferred reinforcer (Ainslie,

1974). Behavior that is disproportionally controlled by immediate, rather than delayed, reinforcers can result in negative outcomes and can directly increase the likelihood of substance use (Levin & Kleber, 1995); aggression (Pliszka, 1998); educational and occupational difficulties (Mannuzza et al., 1997); among other areas (Critchfield & Kollins, 2001).

As described, acquiring self-control skills could enhance quality of life. Throughout the literature, studies show that teaching self-control is possible (Mazur & Logue, 1978; Schweitzer & Sulzer-Azaroff, 1988; Dixon et al., 1998; Passage et al., 2012).

Self-Control Overview

Researchers studying self-control used a two-choice fixed schedule of reinforcement (i.e., gave participants a choice between two options of reinforcement) to demonstrate the dynamic between choice and reinforcement contingencies in self-control. Generally, one choice led to an immediate smaller or less preferred reinforcer and the other choice, a delayed larger or more preferred reinforcer. Researchers then gave participants an opportunity to make a selection (Mischel & Ebbesen, 1970; Schweitzer & Sulzer-Azaroff, 1988; Mazer & Logue, 1978; Grosh & Neuringer, 1981; Anslie, 1974; Dixon et al., 1998; Passage et al.2012). For example, participants were presented a choice between receiving a pretzel right now (less preferred item) or waiting a period of time and receiving a marshmallow (more preferred item) instead (Mischel & Ebbesen, 1970).

Early studies conceptualized self-control as postponement of immediate gratification for the sake of more distant long-term gains (Mischel & Ebbesen, 1970; Schweitzer & Sulzer-Azaroff, 1988; Mazer & Logue, 1978; Grosh & Neuringer, 1981; Ainslie, 1974). Accordingly, human participants were required to wait in a chair while sitting still (Mischel & Ebbesen, 1970) or, in the case of pigeons, abstain from pecking on keys to demonstrate self-control (Mazur &

Logue, 1978) in order to gain the larger or more preferred reinforcer. As a result, researchers developed procedures that taught participants to tolerate delays (Schweitzer & Sulzer-Azaroff, 1988; Mazur & Logue, 1978) or refrain from responding to observe self-control (Mischel et al., 1972; Grosh & Neuringer, 1981).

In one particular study, conducted by Mischel et al. (1974) researchers provided participants with a "distractor stimulus" (slinky toy) and permitted participants to play with the slinky toy during the delay to increase the likelihood the participants would tolerate the delay. If a participant was able to wait the whole duration and not ring the bell to end the session, he or she gained the more preferred reinforcer. If the participant ended the trial by ringing the bell before the trial was over, the participant received the less preferred reinforcer. Researchers found when participants were provided a distractor stimulus, they did not ring the bell to end the trail, waited significantly longer, and received the more preferred reinforcer on more occasions than participants who were not provided with a distractor stimulus. Gosh and Neuringer (1981) replicated this study among animal subjects and found similar results. Researchers concluded activity of some kind (playing with a slinky while waiting; pecking a toy key in an operant chamber while waiting) could help regulate behaviors during delays as participants were more likely to wait when a "distractor" was provided (Mischel et al., 1972; Grosh & Neuringer, 1981; Dixon et al., 1981). Subsequently, researchers began to recognize that self-control can be observed as both withholding responses (i.e., waiting during a delay) or emitting specific responses (i.e., playing with a slinky instead of ringing a bell; pecking a toy key instead of pecking a contingent key) (Grosh & Neuringer, 1981; Mischel et al., 1972) during a delay. This occurrence can be described in applied settings as replacement behavior.

In two studies conducted in applied settings, researchers shifted the approach to observe self-control as emitting specific responses, rather than withholding responses, and using socially important target behavior as replacement behavior. (Dixon, et al.,1998; Passage et al., 2012). In these cases, target behaviors were selected on the basis of having long-term value to the individual. Dixon et al., (1998) argued that although using a distracting stimulus, may help tolerate delays (Mischel et al., 1972; Grosh & Neuringer, 1981), selecting more advantageous "distractor" activities may increase tolerances to delays as well as appropriate responding (Dixon et al., 1998). In their studies, researchers taught participants to increase desired behaviors by requiring in seat behavior; exercise; or participation during group activities to receive the larger reinforcer (Dixon et al., 1998) and required engagement in matching to sample worksheets and a sorting markers activity to receive the more preferred reinforcer (Passage et al., 2012). Both studies found that participants were able to demonstrate self-control by choosing the delayed larger or more preferred reinforcer more often and also, increased their duration of target behaviors (i.e., in seat behavior, exercise, participation, match to sample worksheets, sorting activity). These studies demonstrated target behaviors can be used as an additional method to teach self-control.

As researchers have demonstrated socially valid target behaviors can be employed in teaching self-control, this approach may be a more valid and advantageous method to use in applied settings. Dixon et al. argue, in applied settings, individuals with disabilities may often choose to display unwanted responses (e.g., self-stimulation) at the expense of alternate target responses (e.g., participating in a group activity) because they provide more immediate reinforcement than the target behavior (e.g., immediate self-stimulation versus a completing a worksheet for a good grade) (Dixon et al., 1998). This could suggest that engaging in socially

valid target behaviors may be a measure of self-control in its own merit because individuals may be choosing to engage in a less preferred behavior (e.g., spending time working on a project) that is contingent on a preferred reinforcement (e.g., good grades, social recognition) in the future over a different, more immediately reinforcing behavior (e.g., watching T.V.), that does not produce such long term reinforcers.

As seen in previous studies (Mischel & Ebbesen, 1970; Schweitzer & Sulzer-Azaroff, 1988; Mazer & Logue, 1978; Grosh & Neuringer, 1981; G.W. Anslie, 1974;), when individuals are making responses (i.e., engaging in target behaviors, "waiting", or "refraining from responding") that correlate with more preferred or larger reinforcers (e.g., task completion; three crossword puzzles; marshmallow; Kashi grain; larger quantity of grain; potato chips) over immediate smaller or less preferred reinforcers (i.e., unfinished task; one crossword puzzle; pretzel; mixed grain; smaller quantity of grain; going for a walk) they are considered exhibiting self-control. This interaction between required behavior and schedule of reinforcer is also present when an individual engages in socially valid target behaviors. Therefore, individuals may be displaying self-control by engaging in target behaviors that may have a natural consequence of meeting a goal.

Additionally, when individuals engage in such target behaviors that correlate with long-term goals (e.g., spending time working on a project), they may be more likely to achieve that goal (e.g., task completion) rather than "waiting" or "refraining from responding" alone (e.g., choosing not to watching T.V.). Consequently, using socially valid target behaviors to teach self-control may be a better alternative because individuals may need to do something while they are waiting for more delayed, but larger or more preferred consequences. Socially valid target behaviors may also be inherently beneficial (e.g., on-task behavior may result in task completion,

acquiring a new skill, or meeting goals regardless if the delayed larger or more preferred reinforcers are met) because individuals may increase the frequency of engaging in socially significant behaviors. However, this is not true for "distractor stimuli" (e.g., playing with a slinky or pecking a toy key). Although distracter stimuli may increase the likelihood an individual can tolerate a delay, playing with a slinky or pecking a key are not skills that are inherently beneficial.

Furthermore, using the current description of choosing a large delayed reinforcer over an immediate small reinforcer to demonstrate self-control (Mischel & Ebbesen, 1970; Schweitzer & Sulzer-Azaroff, 1988; Mazer & Logue, 1978; Grosh & Neuringer, 1981; Anslie, 1974) may have applied implications as it may not be applicable to some occasions where self-control is evident and may actually lead to negative outcomes. For example, choosing a delayed larger reinforcer in relation to food can lead to disordered eating. An individual may be demonstrating self-control when they are eating smaller meals when they are hungry (i.e., immediately) rather than waiting to eat a larger meal later. Restrictive eating when one is hungry in order to have a larger meal later can lead to binge eating behavior or other disordered eating (Hsu, 1996). Choosing to engage in target behaviors that correlate with long term benefits may be a solution to this issue. Accordingly, research has found that teaching self-control while engaging in some meaningful activity is important.

Teaching Self-Control Procedures

Procedures Using Gradual Change

Teaching self-control was successful when researchers used procedures with gradual change across successive trials (Mazur & Logue, 1978; Schweitzer & Sulzer-Azaroff, 1988; Dixon et al., 1998; Passage et al., 2012). For example, Mazur and Logue (1978) used a fading

procedure that gradually changed as the study progressed to teach "self-control" to pigeons. In the control group, subjects could choose between a large reinforcer (access to grain for 6-sec) after a delay (6-sec) and a small reinforcer (access to grain for 2-sec) with no delay (i.e., immediately). In the experimental group, a fading procedure was used for the small reinforcer (i.e., the delay for the smaller reinforcer was faded from 6-sec to 0-sec by .5-sec increments). Researchers did this by initially setting both small and large reinforcers to the same delay (6-sec). As sessions continued, the researcher systematically decreased the delay from 6-sec, to 5.5-secs, to 5.0-sec, and so forth, until the delay for the smaller reinforcer was available immediately after a response (i.e., 0-sec) like the choice in the control group. Researchers found pigeons in the experimental group that were exposed to a fading procedure were able to choose the large delayed reinforcer over the immediate small reinforcer on more occasions than pigeons in the control group that were not exposed to a fading procedure.

Similarly, several studies in applied settings have focused on using progressive duration/delay criteria, a procedure that also gradually changes across successive trials, to teach self-control in children (Schweitzer & Sulzer-Azaroff, 1988), adolescents with intellectual disability (Passage et al., 2012), and adults with intellectual disability (Dixon et al., 1998). Researchers that used this type of procedure shared common methods. First, researchers began self-control training by setting the large or more preferred reinforcer with low demands (i.e., there was not a delay; there were not work requirements; duration set to baseline). For example, Schweitzer and Sulzer-Azaroff (1988) set delays for both large and small reinforcement to 0-sec each (i.e., there was not a delay before the large reinforcers), Dixon et al. (1998) set the duration for large and small reinforcers to 0-sec (i.e., the large reinforcer was available without engaging in a target behavior) and Passage et al. (2012) set the duration for the more preferred reinforcer

to the mean duration of the natural baseline. Researchers also established stability within participants before increasing delays or durations. For example, participants needed to select the large reinforcer on four of five trials before the delay increment was increased (Schweitzer & Sulzer-Azaroff, 1988) or accessed the large/more preferred reinforcer in two of three trials before duration increments were increased (Dixon et al., 1998; Passage et al., 2012). Finally, when delays or durations were increased, researchers did so gradually (i.e., increased by .5-sec or the mean duration of natural baseline (Dixon et al., 1981; Schweitzer & Azaroff-Sulzer, 1988; Passage et al., 2012)). Researchers that used progressive delay/ duration criterions found that participants were able to demonstrate self-control by choosing the large reinforcer on more occasions after the teaching procedure (Dixon et al., 1981; Schweitzer & Azaroff-Sulzer, 1988; Passage et al., 2012) and increased their overall duration of engaging in a target behavior (Dixon et al., 1981; Passage et al., 2012). It is evident that using procedures that utilized gradual change over time, like fading or progressive duration/delay criterions, are effective in teaching self-control and that progressive duration/ delay criterions are more commonly used than fading procedures in applied settings.

Quantitative vs qualitative reinforcement

Throughout the literature, researchers commonly used quantitatively different reinforcers when studying self-control (Ainslie, 1974; Mazur & Logue, 1978; Schweitzer & Sulzer-Azaroff, 1988; Dixon et al.,1998). Quantitatively different reinforcers are reinforcers that vary in quantity or magnitude (e.g., 1 crossword puzzle vs 3 crossword puzzles; 1 sticker vs. 3 stickers; 2-sec of grain vs 6-sec of grain; 2-sec of grain vs 4-sec of grain) (Dixon et al., 1998; Mazur & Logue; Schweitzer & Sulzer-Azaroff; G.W., Ainslie). In these studies, researchers used an immediate smaller reinforcer and a delayed larger reinforcer (i.e., 1 crossword puzzle right now vs. 3

crossword puzzles after engaging in a target behavior; 2-sec of grain immediately vs 6-sec after a delay) to study self-control. If subjects made responses (i.e., did not make any key pecks; did not peck on a contingent key; engaged in target behavior) that correlated with the larger delayed reinforcer (i.e., larger quantity of grain; larger quantity of crossword puzzles), researchers determined subjects demonstrated self-control (e.g., participant chose to receive 3 crossword puzzles then, engaged in the target behavior for the required time, finally received 3 crosswords puzzle from the researcher) (Dixon et al., 1998). Researchers used this sequence of operations to demonstrate responding in which larger reinforcement outweighs the immediate reinforcing consequences or, "self-control" (e.g., not spending money on smaller immediate purchases in order to make a larger purchase later).

In contrast, qualitivately differently reinforcers are reinforcers that vary in preference (e.g. pretzels vs. marshmallow; mixed grain vs "Kashi grain"; going on a walk vs eating potato chips) (Mischel & Ebbesen, 1970; Grosh & Neuringer, 1981; Passage et al., 2012). In these cases, researchers used reinforcers that varied in kind rather than quantity. In a study conducted by Mischel & Ebbensen (1970), researchers used different types rather than amounts of reinforcement to study self-control. First participants were presented with both a marshmallow and pretzels. Next, the researcher asked the participant to choose the one they liked more. If the participant picked the marshmallow first, it would be used as the more preferred reinforcer and the pretzel, the less preferred reinforcer (and vice versa). Then, the participant had the choice to receive the more preferred reinforcer (i.e., marshmallow) by waiting for the researcher to return back to the room, or ringing a bell to end the trial early in which case the participant would receive the less preferred reinforcer (i.e., pretzel). If the participant chose the more preferred reinforcer option and waited the amount of time, the participant received the more preferred

reinforcer (i.e., marshmallow) and the researchers concluded the participant demonstrated self-control because the participant engaged in behaviors (i.e., waiting) correlated with delayed preferred reinforcers (i.e., waiting to receive a marshmallow). Researchers Grosh and Neuringer (1981) replicated this study to study self-control among animal subjects by using mixed grain and "Kashi grain" to test if subject would engage in behaviors correlated with delayed preferred reinforcers (e.g., a pigeon subject made no key pecks for the required time, and received the more preferred grain, "Kashi" grain). Researchers found similar effects and concluded subjects that chose the more preferred reinforcer even after a delay demonstrated self-control. It is evident that using qualitatively different reinforcer can be used to study and demonstrate self-control.

When teaching self-control, qualitatively different reinforcers may be relevant and effective in applied settings because they incorporate a natural representation of choices available. Often, available choices are not only presented in differing amounts, but also kind or quality (i.e., choosing between writing, coloring; running, watching TV, biking, going on the computer may all be available options in one's environment). Also, qualitatively different reinforcers may be more effective when teaching self-control because they may reduce satiation and make reinforcers more effective. In contrast, quantitatively different reinforcers may cause satiation due to frequent exposure of the same reinforcer (Cooper et al., 2020). During preference assessments, a large number of stimuli are evaluated to identify highly preferred and non-preferred stimuli that are likely to serve as reinforcers. (Cooper et al., 2007). Studies utilizing qualitatively different reinforcers should use preference assessments in order to establish which stimuli are likely to function as reinforcement (i.e., are more preferred). However, the studies conducted by Mischel & Ebbensen (1970) and Grosh & Neuringer (1981) did not utilize

preference assessments to identify highly preferred and non-preferred stimuli. A demonstrated disparity between more preferred and less preferred reinforcers may need to be present in order to display self-control.

Teaching self-control is important and evidently possible. Upon review, using socially valid target behaviors, progressive criterion procedures, and qualitivately differently reinforcers may be the most effective way to teach self-control in applied settings. However, there is only one study that use all three elements. In a study conducted by Passage et al. (2012), researchers were able to demonstrate self-control by using these three elements. Using a multicomponent ABCAB reversal design, researchers taught self- control using qualitatively different reinforcers to a 16-year old male diagnosed with intellectual disability, spastic cerebral palsy, and cortical blindness. In their study, researchers conducted stimulus preference assessments to determine the participant's high and low preferences for available reinforcement prior to each session. Before self-control training, researchers established a natural baseline level of task performance without reinforcement to measure the participant's duration of engagement in the task. During the choice baseline phase, researchers presented a choice in which the participant could have access to a highly preferred reinforcer after engaging in a task for a specific amount of time or access to a less preferred reinforcer immediately without having to engage in the task (i.e., going on a walk right now without having to engage in the task vs receiving potato chips after engaging in the task for some time). If the participant demonstrated self-control, the participant chose to receive potato chips, engaged in the target behavior for the required time, and received potato chips from the researcher.

During the self-control training phase, researchers used a two-choice fixed duration progressive- duration schedule of reinforcement. After the participant chose and gained access to

the delayed, more preferred reinforcer in two of three trials, the criterion for access to the delayed, more preferred reinforcer was increased by four times the mean duration (42 s) of the natural baseline. The participant was able to demonstrate criterion performance of engaging in the task for 10 times the mean duration of on-task behavior during the natural baseline after 35 trials and during generalization probes (420 s). Researchers found that qualitatively different reinforcers can be used to teach self-control and were effective in increasing the participant's duration of engaging in the task. One limitation to Passage et al.'s study was that the design did not allow for replication of these study's effects within or between subjects. Utilizing a multiple baseline design across participants would permit replication of their study's results.

The purpose of this study is to teach self-control using qualitatively different reinforcers and to demonstrate a replication of the effects found in the study conducted by Passage et al. (2012). The purpose of this study is to also demonstrate these effects using a multiple baseline design to allow replication of their study's effects across participants. There is no previous study other than Passage et al. that uses qualitatively different reinforcers to teach self-control in an educational context. Passage et al.'s demonstration of self-control with qualitatively different reinforcers can provide individuals with reinforcement interventions that can be more effective. Therefore, further exploration of qualitatively different reinforcers and their effects on acquisition is needed. This study will investigate whether qualitatively different reinforcers are effective in teaching individuals self-control by choosing a delayed, more preferred reinforcer. This study will also examine if gradually increasing the duration of task engagement to receive the delayed, more preferred reinforcer will overall increase duration of responding in neuro-typical school aged children.

CHAPTER 2

METHOD

Setting

This study took place within the teacher's lounge / conference room at a performing arts charter school that provides individual academic programming in a typical developing setting in the mid-Atlantic region of the US. Sessions took place during the school's afterschool program. The aftercare program provided recreational activities to children who stayed after school for late pick up. Children had access to homework assistance, board games, arts and crafts, group games (e.g. dodge ball, going to the park, outside play, table ping pong, movies). The teacher's lounge / conference room contained one large table with twelve chairs, as well as a microwave, refrigerator, coffee machine, copy machine, and one shelf. Only participant and researcher were present when sessions were conducted. The researcher and participant were positioned across from each other at the large table.

Participants

Three participants aged 7-9 participated in this study. Criteria to participate in this study were enrollment in the aftercare program and self-control needs reported by teachers in interviews, conducted prior to the study. Self-control needs included difficulty engaging in independent tasks for extended periods of time, difficulty completing assignments, and multiple instances of off-task behavior during assignments. Teachers reported students displaying self-control needs and attending aftercare.

Mary, a 7-year-old white female in second grade, was a neuro-typical individual with no known diagnoses or individualized education support plan at the time of the study. Teacher

interviews indicated that Mary was being monitored to receive response to intervention (RTI) support in her classroom which is a multi-tier approach to the early identification and support of students with learning and behavior needs but did not receive this at the time of the study. In a follow up interview, Mary's teacher reported that the latest data collected on Mary, although borderline, did not qualify her to receive RTI. Reports described that Mary tended to display disengagement and off-task behavior during class. Teacher interviews also reported that when Mary engaged in independent tasks, she displayed difficulty persisting in the task for an appropriate amount of time.

Sharon, a 7-year-old African American female in second grade, was a neuro-typical individual with no known diagnoses or individualized educational program at the time of the study. Teacher interviews indicated that Sharon showed difficulty engaging in independent tasks for an appropriate amount of time during class, often needed redirection to stay on task, and had trouble completing assignments on time. Reports also indicated that Sharon tended to display disengagement and off-task behavior.

Michelle, a 9-year-old Hispanic female in third grade, was a neuro-typical individual with no known diagnoses or individualized educational program at the time of the study. Teacher interviews indicated that Michelle often displayed off-task behavior during independent tasks during class and had trouble completing assignments on time. Michelle stopped attending aftercare where the study was taking place and subsequently dropped out of the study before it's completion.

General Procedure

The researcher conducted sessions at the large table in the teacher's lounge / conference room. Researcher sat across from the participant during sessions. Five to 35-minute sessions were conducted for each phase of the study. This study was composed of three different phases; natural baseline, choice baseline, and self-control training. One session per day and about 5 sessions per week were conducted for each participant. The study was conducted over a total of about 18 weeks. In all three phases, data were collected on duration the participant engaged in the task, percent of answers completed correctly, and total number of questions completed.

Multiple stimulus preference assessment without replacement (MSWO; DeLeon and Iwata, 1996) were conducted before each session during choice baseline and self-control training conditions. The researcher placed 7- 8 items on the table in front of the participant and instructed her to choose an item. Once the item was chosen, the item was removed. Items were ranked 1-8 based on the order the item was chosen.

Participants were asked to answer questions on a math worksheet. Participants responded by writing answers to questions on the worksheet in the space provided. When participants did not know the answer to a question, the researcher instructed participants to skip the question or do their best. When a participant completed a worksheet before the session ended, the researchers presented another worksheet and continued to do so until the session ended.

Task

Researcher interviewed teachers and staff to determine tasks each participant was able to complete with some accuracy. Second grade participants received single digit adding and subtracting worksheets. There were three worksheets that included subtraction between one

double digit number and one single digit number (e.g., 10-2; 11-2; 12-2). The double-digit numbers were limited to ten, eleven, and twelve. Other double digit numbers were not included on the worksheets. Fifteen worksheets were rotated throughout the study and presented in a randomized order by the researcher. The number of problems on the worksheet varied from one hundred to fourteen. Difficulty varied from below grade level (e.g., 1+1; 1-1) to grade level (e.g., 12-2; 9+9). The third-grade participant received multiplication worksheets for 2,3,5, & 10 multiplication factors. Some worksheets included a mix of multiplication factors (e.g., 2x5; 3x7; 4x4; 5x6), other worksheets included one multiplication factor at a time (e.g., 3x2; 3x5; 3x1). The multiplication factors went up to 12 (e.g., 2x12; 3x12; 5x12). The number of questions on the worksheet ranged from twenty-four to forty. There were five different worksheets the participant completed before leaving the study.

Stimulus Preference Assessment

Prior to the study, the researcher interviewed the participant to identify seven to nine preferred stimuli. Reinforcers ranged from edible items (e.g., skittles, lollipops, chocolate) to tangible items (e.g. “pop-it” fidgets, slime, pencils, lip balm, stickers). MSWO (DeLeon & Iwata, 1996) were conducted before each session during choice baseline and self-control training conditions to identify less preferred and more preferred reinforcers. Items chosen first from each MSWO were identified as more preferred, items chosen fifth from each MSWO were identified as less preferred.

Natural Baseline

The purpose of this condition was to establish a baseline level of performance on the task without reinforcement contingencies. During the natural baseline phase, the researcher

accompanied the participant from her aftercare class to the teacher's lounge where the study was conducted. The researcher instructed the participant to sit down in a chair positioned in front of the table, placed a task in front of the participant, and informed her that she will be performing a task. The researcher modeled the task, told the participant to do the task for as long as she could, and to let the researcher know when she is done by saying "I'm done". The researcher recorded the amount of time the participant engaged in the task.

Choice Baseline

The purpose of this condition was to establish a baseline level of choosing the more preferred or less preferred reinforcers. The time required to engage in the task to receive the more preferred reinforcer was similar to that of the previous study teaching self-control by Passage et al. For Mary, the time required to engage in the task was determined by multiplying the mean value of the time Mary engaged in the task during the natural baseline (2.98 minutes) by four (11.92 minutes). Mary could choose to receive the less preferred reinforcer immediately, or chose the more preferred reinforcer and engage in the task for 11.92 minutes to receive the more preferred reinforcer. For Sharon, because her natural baseline mean was high, the required time to engage in the task for the more preferred reinforcer was initially set to two times her natural baseline (i.e.,17.92 minutes). Because she accessed the delayed more preferred reinforcer at criterion levels, the time required was increased to four times her natural baseline.

During the choice baseline, procedures were identical to those in the natural baseline except a two-choice fixed-ratio schedule of reinforcement was in effect. MSWO (DeLeon & Iwata, 1996) were conducted prior to each choice baseline session. The researcher placed 7-9 stimuli randomly in a straight line on the table in front of the participant. The researcher asked the participant to select a reinforcement (e.g., "which one of these do you like the most?") After

the participant made a choice by pointing, picking up the reinforcement, or verbally responding with the name of the stimuli, the researcher removed the selected reinforcement to prevent multiple selections. Next, the researcher showed the participant the less preferred and more preferred reinforcer and presented a choice saying "you can have the [less-preferred reinforcer] right now for doing nothing, or you can have the [more-preferred reinforcer] for doing [the task] until I say stop, which would you like?" If the participant chose the less-preferred reinforcer, the researcher delivered the reinforcement immediately and ended the trial. If the participant chose the more-preferred reinforcer, the researcher instructed the participant to begin and started the timer.

Intervention

The intervention was self-control training. The purpose of this condition was to use the self-control training procedure used in previous studies to teach self-control (Passage et al., 2012; Dixon & Falcomata, 2004). The conditions were the same as the choice baseline except a two-choice fixed-duration progressive-duration schedule of reinforcement was in effect. If the participant engaged in the task for the specified amount of time, the researcher, ended the trial and delivered the more preferred reinforcer immediately. If the participant did not initiate the task within 30 seconds after instructed to begin the task, or if the participant stopped engaging in the task for 30 seconds, the experimenter ended the trial early.

Similar to the previous study (Passage et al., 2012), for Mary, the criterion for the amount of time required to engage in the task to receive the more preferred reinforcer was set to the mean duration of the time she engaged in the task during the natural baseline (2.98 minutes). After Mary chose and gained access to the delayed, more preferred reinforcer in two of three trials, the criterion to access the delayed, more preferred reinforcer was increased by 2.98

minutes (total mean value from the natural baseline) until the time required to engage in the task equaled six times the mean duration (17.53 minutes). For Sharon, because the natural baseline mean was higher than other participants in this current and previous studies, the criterion was determined by dividing the mean value of the natural baseline by two (4.48 minutes). (1/2 total mean value from the natural baseline . Also, for Sharon, a 50 percent accuracy criterion was applied during self-control training because the percent correct was initially low with an average 25 percent correct. Sharon seemed to show minimal attempts to answer the math questions by mathematical computation. It was possible that she to wrote random numbers as answers on worksheets. For example, Sharon answered math questions wrong in later sessions that were originally answered correctly on worksheets in earlier sessions. On some worksheets, Sharon would write an answer for one of the questions big enough to cover two answer spots and completed worksheets at a significant higher rate than other the other participate or other sessions when she answered more questions correctly. It was important to increase the accuracy of her responding because these were math questions that Sharon has demonstrated being able to do in class (as reported by her teacher). A certain level of accuracy along with duration are both important components to the target behavior of engaging in the task.

Generalization

Generalization probes were conducted during self-control training. Generalization probe procedure was the same as self-control training procedures except the participant engaged in a novel task. The novel task was a double digit addition with no regrouping worksheet (e.g., 52+20). Researcher interviewed the participant's teacher to ensure Mary could complete the novel task with some accuracy.

Dependent Variable and Data Collection

The dependent variables in this study were the participants' duration of engaging in the task, the percentage of correctly answered questions on the task, total number of questions completed, and the number of times the participant chose the more preferred reinforcer.

Experimental Design

A multiple baseline multicomponent ABC deign across participants was used. First, a natural baseline phase was conducted to evaluate each participant's duration of responding without programmed reinforcement (A). After steady state responding was demonstrated in the natural baseline condition, the choice baseline phase (B) was applied to one subject as a control condition where changes in response preference following treatment was evaluated. The criteria to earn the more preferred reinforcer was four times the mean duration from the natural baseline for participant Mary and two times the mean duration from the natural baseline for Sharon. After the participant chose the immediate, less preferred reinforcer for at least three consecutive trails, self-control training was implemented (C). Natural baseline conditions remained in effect for the other subjects until criterion-level responding was attained for the first subject after which, the choice baseline was applied to the second participant.

Interobserver Agreement (IOA)

The secondary data collector for IOA was a staff member from the aftercare program and was trained on recording duration data by the author, who was the primary data collector for the study. During the natural baseline, both the author and secondary observer started their timer when the participant began the task and stopped their timer when the participant said "I'm done". IOA data was calculated by adding the total duration recorded by the researcher and the total

duration recorded by the secondary observer. Then the lower total duration was divided by the greater duration and multiplied by 100. During the choice baseline and self-control training phases, both the author and secondary observer set a timer on their phones for the required time for that session. When the participant began the task, both researcher and secondary observer started their timer. When the timer rang for the set amount of time (e.g., after 2.59 minutes), the researcher recorded that time (e.g. 2.59 minutes) if both the researcher and secondary observer's alarms went off within 10 seconds from each other. IOA data was calculated by adding the total duration recorded by the researcher and the total duration recorded by secondary observer. Then the lower total duration was divided by the greater total duration and multiplied by 100.

For Mary, IOA was completed by a secondary observer for 42 % of duration data during the natural baseline. The Interobserver agreement (IOA) was 93%. During the choice baseline, IOA data was completed for 30 % of duration data, the IOA was 100%. During self-control training, IOA data was completed for 28% of duration data, the IOA was 100%. For Sharon, IOA data was completed by a secondary observer for 41 % of duration data during the natural baseline, the IOA was 92%. During the choice baseline, IOA data was completed for 12% of duration data, IOA was 100%. During self-control training, IOA was completed for 36% of duration data, IOA was 100%. For Michelle, IOA was completed by a secondary observer for 30% of duration during the natural baseline phase. The Interobserver agreement (IOA) was 96%.

CHAPTER 3
RESULTS

This section presents the results of the self-control training intervention for participants Mary, Sharon, and Michelle. Figure 1 shows the duration of target behavior during the natural baseline, choice baseline, and self-control training phases across participants. Visual analysis of the graphs was used to evaluate levels, trends, and variability to determine experimental control.

Mary

The duration of engaging in the addition and subtraction worksheets is shown in Figure 1. During the natural baseline, Mary engaged in low levels of the target behavior. She engaged in the in the task for an average of 2.98 min (range, 2.45 min to 3.50 min). During the choice baseline, Mary displayed immediate increases in duration of responding displaying an average of 9.16 minutes (range 3.16 mm to 11.92 min), but then returned to the same low level responding demonstrated in the natural baseline. During self-control training, she demonstrated criterion performance (17.53 min) after 32 trials and during the generalization probe. The percent of problems completed correctly is shown in Figure 2. During the natural baseline, Mary completed an average of 85% correct (range, 44 to 100%). During the choice baseline, Mary completed an average 71% (range 14 to 100%) correct. During self-control training, Mary completed an average 93% correct (range, 50 to 100%) and 100 percent during the generalization probe. The total number of problems Mary completed is in Figure 3. During the natural baseline, a decreasing trend to low levels was evident for the number of questions Mary answered. She completed an average 16 (range 5 to 52) number of questions. During the choice baseline, the number of questions completed had an initial increasing trend but returned to original low levels of responding. She completed an average 22 questions (range 0 to 85). During self-control

training, Mary completed an average 49 (2 to 142) number of questions and 56 questions during the generalization probe. During the choice baseline, Mary chose the more preferred reinforcer 55% of total trials. During self-control training, Mary chose the more preferred reinforcer 56% of total trials.

Sharon

The duration of engaging in the task displayed by Sharon is shown in Figure 1. During the natural baseline, Sharon engaged in the task for 24.54 minutes in the first session but then decreased her duration to an average 8.96 minutes (range 4.50 min to 24.54 min). During the choice baseline, Sharon immediately increased her duration of engaging in the task for an average of 29.07 min (range 17.55 min to 35.50 min). During self-control training, Sharon demonstrated criterion performance for 8.58 minutes but failed to meet criterion for 13.26 minutes and chose the less preferred reinforcer for six subsequent trials. The percent of problems answered correctly is shown in Figure 2. During the natural baseline, Sharon completed an average 49% (range 21 to 100%) of questions correctly. During the choice baseline, Sharon completed an average 25% (range 7 to 46%) correct. During self-control training, Sharon completed an average 95% correct (range 86 to 100%). The total number of problems completed is in Figure 3. During the natural baseline, Sharon completed an average 87 (range 50 to 165) questions. During the choice baseline, Sharon completed an average 321 (0 to 1056) questions. During self-control training, Sharon completed an average 34 (27 to 42) questions.

Michelle

The duration of engaging in the task displayed by Michelle is shown in Figure 1. During the natural baseline, Michelle engaged in the task for an average of 4.04 min (range, 1.30 min to 7.19 min). The percent of problems completed correctly is displayed in Figure 2. During the

natural baseline, Michelle completed an average 91% (79 to 100%) correct. The total number of problems completed is displayed in Figure 3. During the natural baseline, Michelle completed an average 26 (range 19 to 33) questions. During the natural baseline, Michelle initially demonstrated somewhat high levels of responding. As sessions continued, Michelle's engagement in the task decreased to moderate levels of responding. Overall, her data were unstable and moderately variable. Participant Michelle stopped attending aftercare where the study was taking place and subsequently dropped out of the study before it's completion.

Mary displayed some level of self-control after the intervention but this was not replicated for Sharon or Michelle as Michelle dropped out of the study. Experimental control for the intervention is weak. Replication of the effect across three participants is needed to demonstrate sufficient effectiveness and experimental control. However, the effect was not demonstrated for Sharon and insufficient data were collected for Michelle. Because of this, replication of the effect was not adequate across three participants and therefore experimental control was weak.

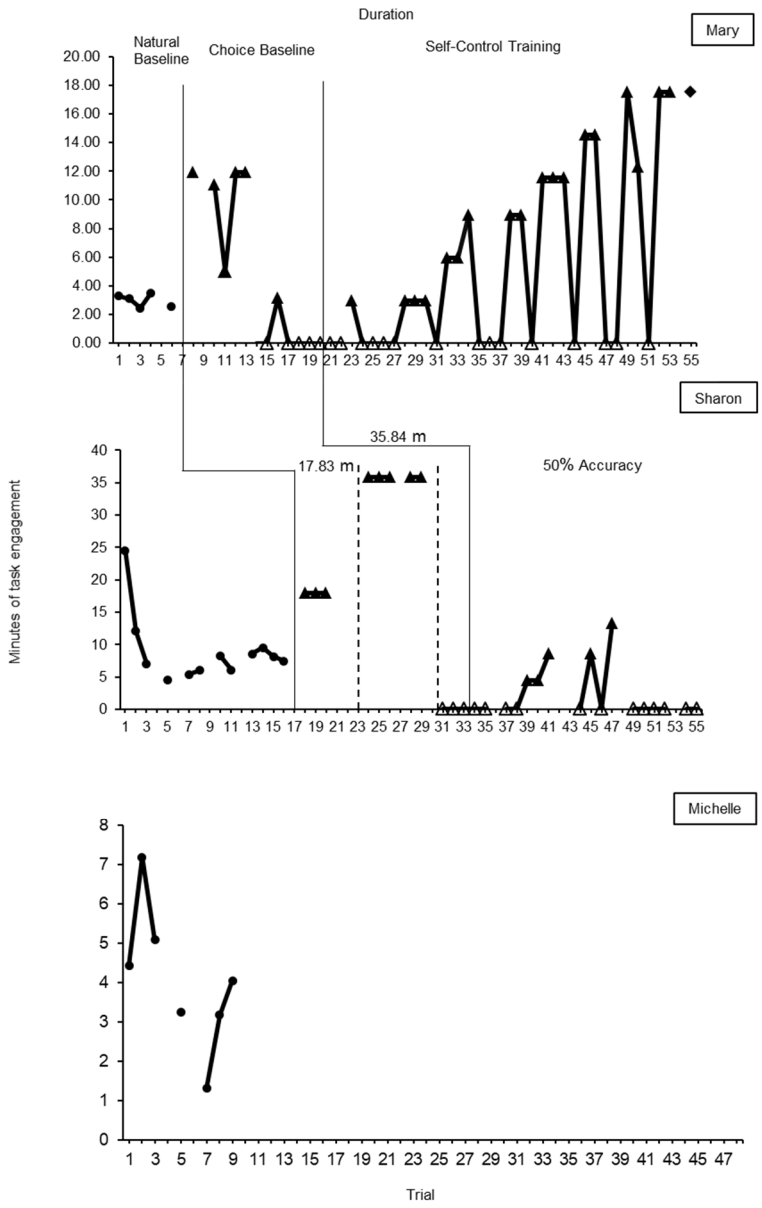

Figure 1. Minutes engaged in the target behavior during natural baseline, choice baseline, and self-control training conditions across participants. The solid triangles indicate that the participant chose the delayed, more preferred reinforcer; the open triangles indicate that the participant chose the immediate, less preferred reinforcer.

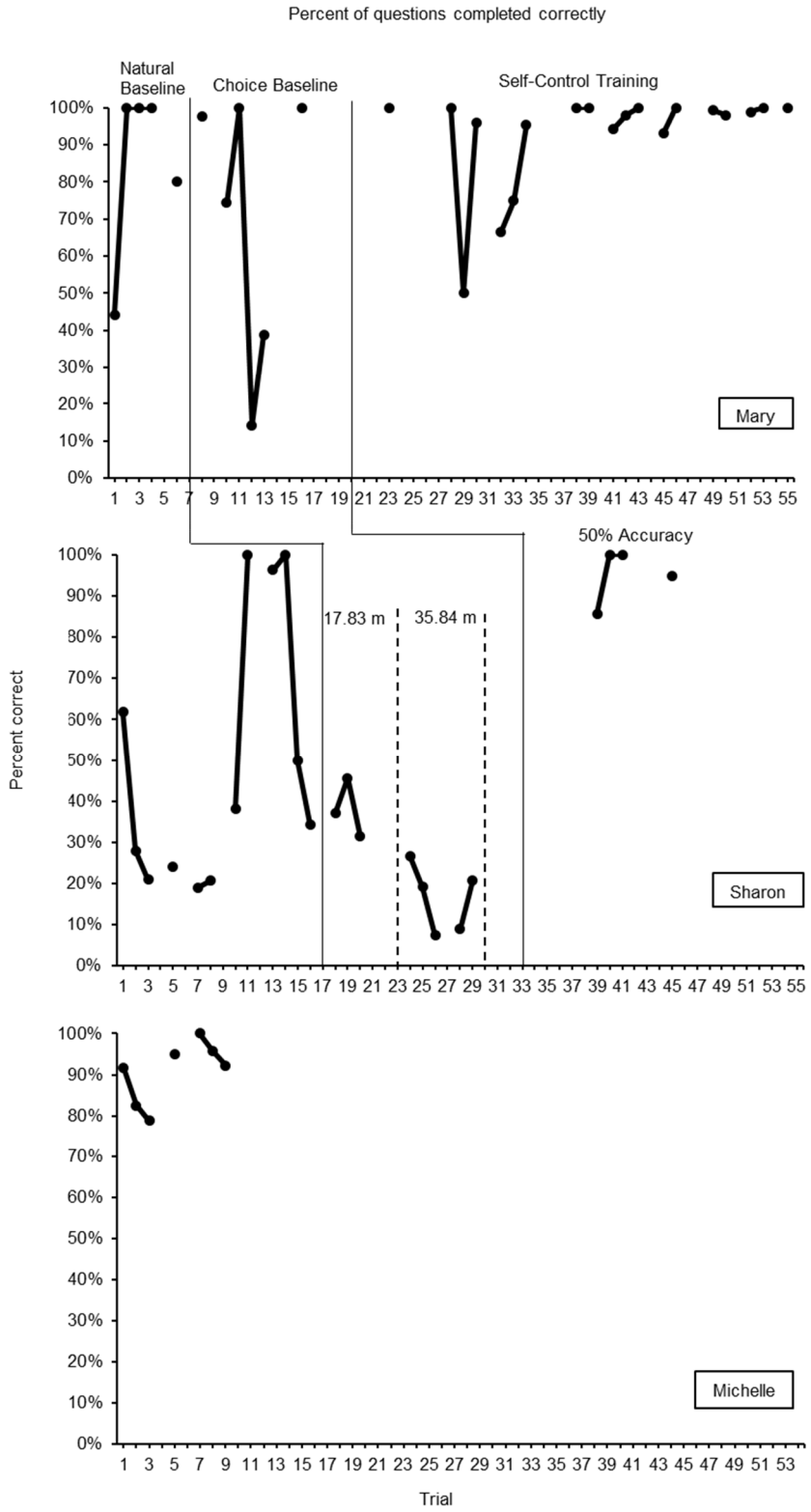

Figure 2. Percentage of questions completed correctly during natural baseline, choice baseline, and self-control training conditions across participants.

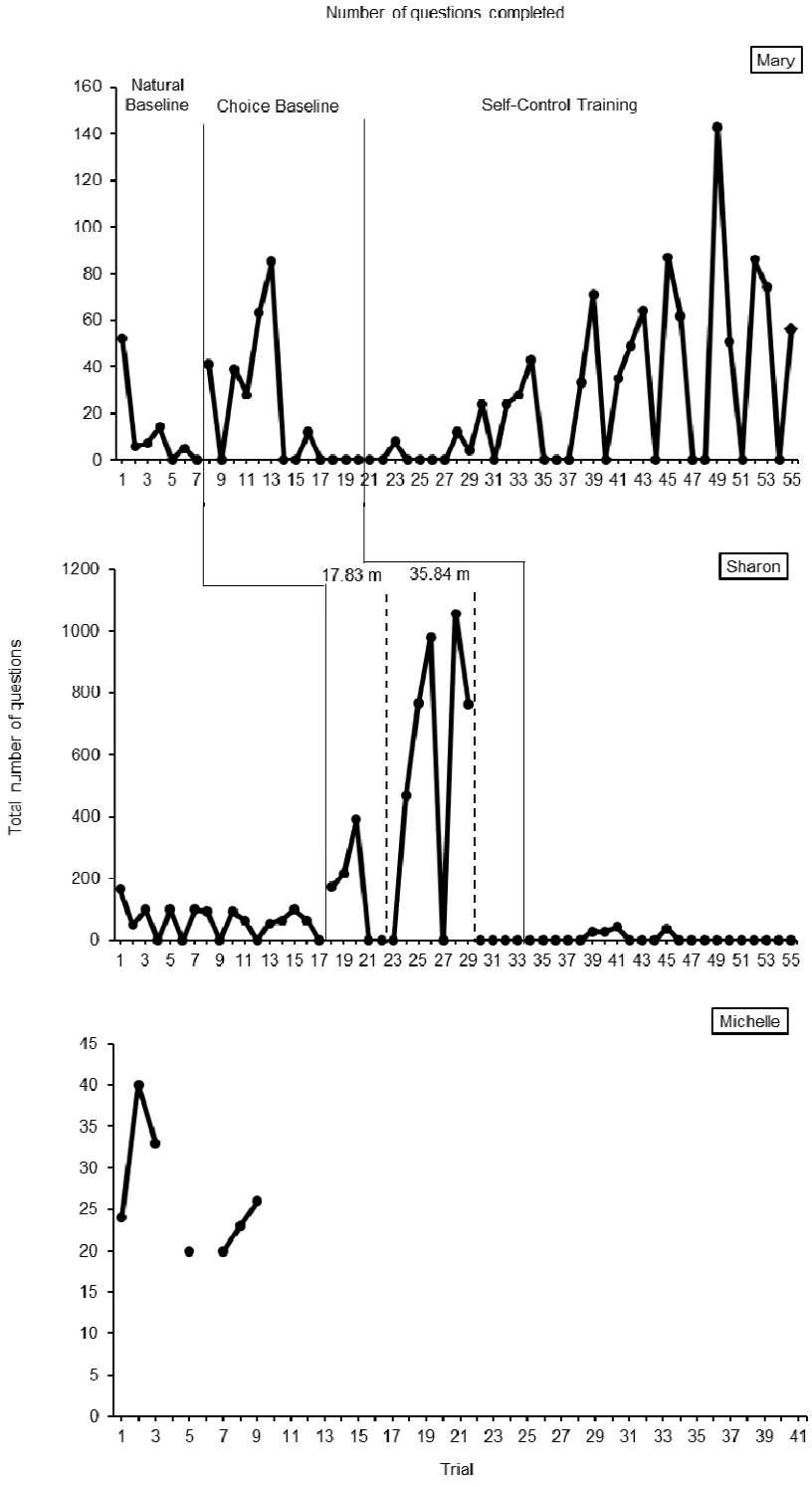

Figure 3. Total number of questions completed during natural baseline, choice baseline, and self-control training conditions across participants.

CHAPTER 4

DISCUSSION

The purpose of this study was to evaluate the effectiveness of using qualitatively different reinforcers to teach self-control among neuro typical school age children. Results showed that the self-control training intervention was moderately effective for one participant, Mary. Mary substantially increased the time she engaged in the task after self-control training relative to the natural baseline. Additionally, Mary displayed generalization of the skill when provided with a novel task. However, during self-control training, Mary continued to choose the less preferred reinforcer on 14 out of 32 trials. The intervention was moderately effective in increasing percent of correctly answered questions for the second participant, Sharon. However, increases in Sharon's percentage of correct responding were offset because her duration of task engagement did not improve. After self-control training, the amount of time Mary engaged in the task substantially increased from the natural baseline however, this effect was not replicated with Sharon. Replication of the effect across three participants is needed to demonstrate sufficient effectiveness and experimental control which was not evident in this study.

The current study's results were partly similar to those of the previous study's results conducted by Passage et al. (2012). Both Mary's results and the results from the Passage et al. study showed increases in duration of engaging in the task after self-control training. Similar to the participant in the first study, Mary engaged in proportionally low levels of engaging in the task during the natural baseline. After self-control training, the amount of time Mary engaged in the task increased by six times her mean duration from the natural baseline. There is a clear change in level at the end of self-control training from the natural baseline similar to the original study. During choice baseline and self-control training, the participant in the Passage et al. study

chose the more preferred reinforcer more often than the less preferred reinforcer (i.e., chose the more preferred reinforcer on 74% of trials during choice baseline and 86% of the trials during self-control training). Although the participant in the original study increased the number of times he chose the more preferred reinforcer during self-control training, this number was already relatively high during choice baseline. In contrast, in the current study, Mary chose the more preferred reinforcer on far fewer occasions than the participant in the original study for both choice baseline and self-control training (Mary chose the more preferred reinforcer on 46% of trials during choice baseline and 56% of the trials during self-control training). The difference in findings may be accounted for by differences in preferences between the participants in the two studies. Because the more preferred stimulus identified in the original study was more effective as a reinforcer, or the disparity between the more preferred and less preferred reinforcer in the original study was greater, this could account for why the participant in the Passage et al. study responded more favorably to self-control training. The percent increase for choosing the more preferred reinforcer after self-control training for Mary was similar to that in the Passage et al. study as well. The participant in the Passage et al. study increased the number of times they chose the more preferred reinforcer by 12%. In the current study, Mary increased the number of times she chose the more preferred reinforcer by 10%, a similar increase.

Conversely, Sharon did not demonstrate similar results to the original study conducted by Passage et al. and other studies examining self-control training (e.g., Dixon et al., 1998; Schweitzer, & Sulzer- Azaroff, 1988; Grosh, & Neuringer, 1981; Mazur, & Logue, 1978; Ainslie, 1974). During self-control training, Sharon demonstrated criterion performance for two increased durations (4.48 minutes and 8.58 minutes) but did not meet criterion for the following duration increase (13.26 minutes) and chose the less preferred reinforcer for 6 subsequent trials.

At the conclusion of study, Sharon increased her duration one and a half times of her mean duration from the natural baseline, far less the participant in the Passage et al. study that increased their duration 10 times their mean duration. There is not a clear change in level from the natural baseline phase during self-control training that is seen in Passage et al.'s study and with participant Mary in this current study as Sharon's data remained at low levels during self-control training. Previous studies demonstrated that self-control can be used to teach a variety of skills (increased duration of match to sample activities, participation, exercise, in seat behavior, tolerating a delay (Passage et al., 2012; Dixon et al., 1998; Schweitzer, & Sulzer- Azaroff, 1988; Grosh, & Neuringer, 1981; Mazur, & Logue, 1978) however, it was not replicated in this study.

As seen in Figure 2 and 3, the amount of time Mary engaged in the task and number of questions completed initially increased during the choice baseline when she chose and accessed the more preferred reinforcer for five successive sessions, but then chose the less preferred reinforcer for the last six subsequent trials. During self-control training, Mary increased duration and total number of questions answered when compared to the natural baseline. At the start of the study, Mary was engaging in the task an average of 2.98 minutes. By the end of self-control training, Mary engaged in the task for 17.53 minutes for three consecutive trials, significantly longer than her average duration during the natural baseline. Similarly, Mary completed almost triple the amount of questions answered during self-control training (average 48 questions) when compared the number of questions completed during the natural baseline (16 questions) while continuing to answer questions correctly. Although Mary displayed high percentages of correctly answered questions during the natural baseline (average 85%) and choice baseline (average 71%), she increased her overall average of percent correctly answered questions during self-

control training (average 95%) and gained stability as she consistently scored between 93-100% on the last twelve consecutive trials.

For Sharon, as evidenced by Figure 2, self-control training was somewhat effective in increasing her percentage of correctly answered questions. Sharon displayed low levels of accuracy during the natural baseline phase. On seven trials out of 12 trials, Sharon scored a low percentage of questions answered correctly (19- 38%) and scored below 65% for the majority of the trials (9 out of 12 trials). During the natural and choice baseline, reinforcement was contingent on duration and not accuracy. As a result, Sharon's number of questions completed increased exponentially (469-1056 questions per session) during the choice baseline when the time required to engage in the task to receive the more preferred reinforcer was 35.84 minutes, but her accuracy declined rapidly to low levels (9%-27%). For example, on trial 28, Sharon completed the most questions answered in one session (1056 questions) but also had one of her lowest recorded accuracies (9% of the questions were answered correctly). After answering only 9% of 1056 questions correctly, Sharon still received the more preferred reinforcer because she continued to "engage" in the task for the set duration by answering questions. Because Sharon continued to answer a large volume of questions with low accuracy, a 50% accuracy contingency was applied to receive the more preferred reinforcer. When the 50% accuracy criterion was applied, it was evident that she was able to complete the worksheets accurately (e.g., scored over 85% on 4 out of 4 trials). Consequently, her accuracy increased from low levels during the natural baseline (average 49%) and choice baseline (average 25%) to higher levels of accuracy during self-control training (average 95%).

However, Sharon's duration of task engagement remained low. Due to repeated exposure to the same worksheets and repeated exposure of receiving the more preferred reinforcer after

answering a large portion of the questions incorrectly, when the accuracy criterion was applied, Sharon may not have been able to produce the appropriate response effort to receive the more preferred reinforcer and chose the less preferred reinforcer on the final 6 trials. Sharon demonstrated low accuracy during the natural baseline line. If the 50% accuracy contingency was applied earlier in the study (i.e., natural baseline), her baseline duration may have been lower and, arguably more accurate during the choice baseline and self-control training. Although her criterion was adjusted to account for this (i.e., half the natural baseline mean instead of total mean was used for Sharon's duration criterion), it may have still been inadequate to teach self-control. To account for this issue in future studies, establishing a specific criterion for performance when the participant is engaging in the task during self-control training may be useful. For example, researchers can determine how many questions should be answered in a given time frame along with a percentage of questions completed correctly before conducting self-control training. Researchers can consider peer norms and other standards to determine performance criterions.

Limitations

This study expands upon the literature for utilizing qualitatively different reinforcers to teach self-control to neuro-typical children that demonstrate impulsive behavior. One limitation of the study was that the inclusion criteria for this study limited the population set. Participants needed to attend after care in order to be a part of the study. Students with higher levels of off-task behavior could have been included in the study if the population was not limited to students attending aftercare. This study only utilized teacher interviews to identify children that qualified for the study instead of a screening process that observed participants displaying high off-task behavior. Participant Sharon engaged in longer durations during the natural baseline than those

in previous studies (Passage et al., 2012; Dixon et al., 1998; Schweitzer, & Sulzer- Azaroff, 1988; Grosh, & Neuringer, 1981; Mazur, & Logue, 1978; Ainslie, 1974). If a screening process was utilized, Sharon may not have been included in this study and instead, participants engaging in shorter periods of time. In the future, studies should consider using a screening process to ensure that participants respond at low levels of duration during the natural baseline phase.

To account for confounding variables, the same level of difficulty for the task was consistent throughout the study (i.e., the same 15 worksheets were rotated for 55 trials). Because difficulty of the task was determined in the beginning of the school year (i.e., October 28th) but the tasks selected were continued for months later (i.e., March 23rd), participants could have learned the math skill by being repeatedly exposed to the same set of math worksheets over the duration of the study. Tasks were not adjusted as the math skill was learned. Using current material (adjusting tasks as skills are learned; using materials from class) may increase social validity.

Additionally, there were potential limitations of the MSWO in detecting true preferences. Participant interviews were conducted to identify reinforcement. However, if the more preferred stimulus was not in fact reinforcing, the procedure would not result in self-control since the dynamic between a preferred reinforcer and schedule of reinforcement would not be an accurate representation of self-control. Future research could utilize staff and parent/ guardian interviews along with participant interviews to ensure effective reinforcement.

Future Research

Because the third participant, Michelle, dropped out at the start of the study, the researcher was unable to demonstrate replication of the effect across three participants; three is

typically regarded as the minimum number of replications to demonstrate experimental control in a multiple baseline design (Cooper et al., 2007). Future research could use a multiple baseline design across participants with at least three participants to allow sufficient replication of the effect found in previous studies that was not demonstrated in this current study.

Future research may also consider using different types of target behaviors that are popular in applied settings (e.g., function communication training) to teach self-control to increase social validity. Previous studies in applied settings use progressive delay or duration criterions to teach self-control. However, other procedures like schedule thinning used in functional communication training may also be effective in teaching self-control as these procedures, similar to progressive delay and duration criterions, gradually change over time and are commonly used to increase desired responses (Muharib et al., 2021).

Additionally, according to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association, 2013), individuals with ADHD display characteristic impulsive behavior and or inattention that may inhibit functioning or development and often demonstrate deficits in self-control. Future research can extend this research and its findings to participants with ADHD and target populations that have known issues with impulsivity and inattention.

Not all individuals have the same available opportunities of choices in their environment. For example, although eating a nutrient dense diet composed of fruits, vegetables, and lean meats have demonstrable health benefits, such foods can be higher in cost and may have a shorter shelf life compared to foods higher in fats, sugars and processed material. Foods with lower nutritional value may also be more readily available in one's environment compared to foods higher in nutrients. Therefore, individuals may be making choices between physical health, financial

factors, and effort costs rather than based on the reinforcing elements of food. It is evident making a choice to demonstrate self-control includes an analysis of complex interactions between cost and benefits that exist within a socioeconomic and effort context. Future studies should consider the impacts socioeconomic factors and effort may have on self-control and if these procedures are effective in those settings.

Future studies should also consider implementing this procedure with less researcher involvement to help phase out researcher presence to create a procedure that individuals may use independently to acquire goals as it may increase social validity. For example, researchers can record duration during natural baseline and selections during choice baseline to determine criterions, but participants may start and end sessions by using a timer for the designated criterion during self-control training. As a result, individuals will be aware of their own duration. Researchers may administer reinforcers or use task completion as a reinforcer (if applicable). Similarly, indicating to the participants the required duration to access the delayed reinforcer, may be relevant in accurately depicting self-control (individuals have more details in available choices).

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APPENDIX A

Condition: Multiple-Stimuli Preference Assessment Without Replacement Student: _____ Date: _____ Observer: _____Interobserver Agreement: Y/N										
	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Trial #10
1. (If presenting items (s) for first time) Experimenter says "Wait until all items are on the table"	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
(If presenting item(s) for the first time) Experimenter places 10 preferred items in a row, in front of the student. 2.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experimenter says "Make a choice." 3.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student does not take an item, Experimenter repeats the direction "Which one do you want?" Does 10 Times 4.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student does not take an item, Experimenter manually prompts the student from behind to make a choice. 5.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
6. Repeat Steps 3 – 5 eight more times.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Key: + = correct response - = incorrect response n/a = not applicable										

Condition: Concurrent schedule reinforcer assessment
Student: _____ Date: _____
Observer: _____ Interobserver Agreement: Y/N

	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Trial #10
1. (If presenting items (s) for first time) Experimenter says "Wait until all items are on the table"	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
(If presenting item(s) for the first time) Experimenter places 3 switches in a row facing the student. At random, experimenter places the stimuli chosen first during the MSWO, the stimuli chosen second, and nothing behind the third switch. 2.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
(If presenting item(s) for the first time) 3. Experimenter says "Press Button [A] and you can [have access to the reinforcer behind it], Press Button [B] and you can [have access to the reinforcer behind it, Press Button [C] and nothing happens."	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
4. If student does not press a button, trial is over.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If student presses button without a reinforcer, no reinforcer is produced 5.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
6. If student presses button with a reinforcer behind it, the reinforcer is provided, timer is set for 1 min, and data is collected	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a

Key:
+ = correct response

- = incorrect response n/a = not applicable	

Condition: Natural Baseline Student: _____ Date: _____ Observer: _____Interobserver Agreement: Y/N										
	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Trial #10
1. Experimenter places a bin containing the student's task in front of the student.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experimenter informs the student that he/she will be asked to perform a task. 2.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
3. Experimenter models the task.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
4. Experimenter says "[Do the task] for as long as you can, let me know when you're finished by saying 'I'm done'"	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
5. Experimenter does not give any other instructions or prompts	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experimenter ends trial when one of the following conditions are met: 6. The participant did not initiate the task within 30 s of the instruction to engage in the task. 7. The participant had stopped engaging in the task for 5 s.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Key: + = correct response - = incorrect response n/a = not applicable										

Condition: Choice Baseline Student: _____ Date: _____ Observer: _____Interobserver Agreement: Y/N										
	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Trial #10
Experimenter places a bin containing the student's task in front of the student. 1.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
2. Experimenter shows a less-preferred and a more-preferred [food?] to the student.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experimenter say: "If you would like to receive the [less-preferred food] for doing nothing point to it. If you would like to [do the task] for Y amount of time [10x the mean level of baseline responding] to receive the [more-preferred reinforcer], point to it." 3.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student chooses the less-preferred R^+, Experimenter delivers R^+ immediately and ends trial. 4. Go to Step 10."	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student chooses the more-preferred R^+, Experimenter says "Please begin." 5.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
6. If the student does not initiate the task within 30 s of the instruction to engage in the task, Experimenter ends trial and no R^+ is delivered. Go to step 10. 7. Experimenter starts timer immediately after the student engages in task	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a

If the student stops engaging in the task for 5 s before the specified duration of time, Experimenter stops timer, ends the trial, and no R^+ is delivered. Go to Step 10. 8.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student engaged in the task for the specified amount of time, Experimenter stops timer, ends trial and delivers R^+ immediately. Go to Step 10. 9.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experiment says "All done", delivers token (from Melmark's BSP) for participation, and ends session. 10.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If there is time for additional trial(s), Experimenter waits 5 s after consumption of R^+ (I.e., no chewing) & says "Let's do it again". 11. No delay necessary if no R^+ is delivered	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Key: + = correct response - = incorrect response n/a = not applicable										

Condition: Self-Control Training Student: _____ Date: _____ Observer: _____Interobserver Agreement: Y/N										
	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Trial #10
Experimenter places a bin containing the student's task in front of the student. 1.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
2. Experimenter shows a less-preferred and a more-preferred [food?] to the student.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experimenter say: "If you would like to receive the [less-preferred food] for doing nothing point to it. If you would like to [do the task] for Y amount of time [10x the mean level of baseline responding] to receive the [more-preferred reinforcer], point to it." 3.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student chooses the less-preferred R^+, Experimenter delivers R^+ immediately and ends trial. 4. Go to Step 10."	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student chooses the more-preferred R^+, Experimenter says "Please begin." 5.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
6. If the student does not initiate the task within 30 s of the instruction to engage in the task, Experimenter ends trial and no R^+ is delivered. Go to step 10. 7. Experimenter starts timer immediately after the student engages in task	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a

If the student stops engaging in the task for 5 s before the specified duration of time, Experimenter stops timer, ends the trial, and no R^+ is delivered. Go to Step 10. 8.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If the student engaged in the task for the specified amount of time, Experimenter stops timer, ends trial and delivers R^+ immediately. Go to Step 10. 9.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Experiment says "All done", delivers token (from Melmark's BSP) for participation, and ends session. 10.	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
If there is time for additional trial(s), Experimenter waits 5 s after consumption of R^+ (I.e., no chewing) & says "Let's do it again". 11. No delay necessary if no R^+ is delivered	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a	+/-/ n/a
Key: + = correct response - = incorrect response n/a = not applicable										