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Case Studies in Applied Behavior Analysis: Self-Management Package to Increase Walking Behavior and Class Pass Intervention to Decrease Off-Task Behavior

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Case Studies in Applied Behavior Analysis: Self-Management Package to Increase Walking Behavior and Class Pass Intervention to Decrease Off-Task Behavior

by

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ABSTRACT

Case Study 1: Sedentary lifestyles are part of an increasing problem of social significance in the United States. Behavioral interventions can be used to effect change in this area and the target behavior of increase can be physical activity. Multiple behavioral change techniques used within an umbrella of a self-management intervention package were utilized to increase physical activity, more specifically walking behavior, for one participant. The study results showed that the self-management intervention package was effective in increasing walking behavior for the participant, and future research is discussed.

- Applying behavioral interventions to the area of physical activity can assist clinicians in intervening on a variety of behaviors such as weight management, motivation and reinforcement, self-advocacy, teaching leisure skills, dietary issues, social interaction, safety skills, etc.
- Self-management/self-monitoring interventions increase the self-efficacy of participants and clinicians can utilize them to help generalize treatment and fade out services.
- Clinicians can utilize technology when intervening with behavior change techniques on physical activity.
- Clinicians have options of components for a packaged intervention and can pick and choose which components are the most effective for a particular client based on analysis.

Case Study 2: Students often engage in disruptive behaviors in the classroom. Teachers can spend more time managing disruptive behaviors than actually teaching. Effective interventions to

target disruptive students are needed that require low response effort, minimal resources, and have high social validity from both teachers and students. One such intervention that has been shown by research to be effective in reducing disruptive behavior of students in the classroom is the class pass intervention in which students can exchanges passes for breaks or tangible items. This study evaluated the class pass system with one participant who was engaging in high levels of off-task behavior in a virtual classroom. Results showed slight changes in off-task behavior with substantial variability.

- The class pass intervention is a contextually fit program that can be easily taught to teachers and requires minimal oversight by clinicians.
- Reducing disruptive behavior in the classroom is a socially valid target for not only the teacher, but also the student, the family, and peers.
- The class pass intervention can be utilized within an established Multi-Tiered System of Supports (MTSS) program such as School-Wide Positive Behavioral Interventions and Supports (SW-PBIS).

CHAPTER ONE:

CASE STUDY ONE

Introduction

Most people living in the United States are not regularly physically active (Addy et al., 2004). This creates an increasing problem of social significance in the United States (Normand, 2008; Simoes et al., 2018). Behavioral interventions can be used to change those with sedentary lifestyles and the target behavior of increase can be physical activity (Donaldson & Normand, 2009; Normand, 2008). An increase in physical activity can produce numerous health benefits such as weight loss, better cardiovascular health, reduced risk of heart disease, reduced hypertension, and reduced risk of Type 2 diabetes (Donaldson & Normand, 2009; Normand, 2008; Zarate et al., 2019).

A variety of behavior change strategies have been utilized in past research in an attempt to increase levels of people's physical activity. Self-monitoring and goal setting procedures to target physical activity have been successfully employed in numerous studies, usually as part of a multi-component intervention package (Donaldson & Normand, 2009; Tudor-Locke, 2002; Zarate et al., 2019). VanWormer and colleagues in 2004 compared self-monitoring using a pedometer to self-monitoring plus goal setting and feedback. In this study, self-monitoring with the pedometer alone seemed to be more effective in increasing daily physical activity with the participants (VanWormer, 2004). In 2008, Normand replicated and expanded on VanWormer's 2004 study by using self-monitoring with a pedometer, daily goal setting, e-mail praise and

feedback, vocal-verbal feedback, and graphic feedback to increase participants walking step totals (Normand, 2008). Step totals for each participant increased following self-monitoring and feedback, but goal setting appeared to be ineffective. In another research study conducted by Donaldson and Normand in 2009, self-monitoring, goal setting, and feedback was used to increase heart rate and calorie expenditure (i.e., physical exercise). Heart rate monitors were used to help self-monitor and participants received email feedback with graphs including their progress on their goals. All participants in this study increased their calorie expenditure using one or more components of the intervention package (Donaldson & Normand, 2009). In 2019, Zarate and colleagues used goal setting and textual feedback to see if they had an effect on increasing physical activity. The study showed that both behavioral strategies were effective in increasing number of steps collected by a Fitbit for 75% of the participants (Zarate et al., 2019). Ultimately, as a behavior change aid for increasing physical activity, self-monitoring (self-management), supplemented with other techniques like goal setting and feedback are supported by research as effective for both adults who are obese and have no exercise regime and for those who are not obese and have a semi-regular to regular exercise regime (Donaldson & Normand, 2009; Normand, 2008; Tudor-Locke, 2002; VanWormer, 2004; Zarate et al., 2019).

Improving physical health has been greatly impacted by both behavior management and technology (Conroy et al., 2014; Simoes et al., 2018). About one in five people who own a smartphone also have an app downloaded to target health, and 38% of those people have downloaded an app specifically for physical activity (Conroy et al., 2014). In 2014, Conroy and colleagues evaluated the 200 top-ranked physical activity apps used on technological devices. They found that all of the apps utilized at least one behavior change technique and some utilized up to 13 behavior change techniques (Conroy et al., 2014). A similar study was done of 51

physical activity apps in 2018 by Simoes and colleagues, and they found that on average, 5.5 behavior change techniques were found per application and all of the apps had at least three behavior change techniques (Simoes et al., 2018). Of the behavior change techniques in the Conroy and colleagues study, the most commonly built-in features of these apps were providing instruction, modeling, performance feedback, goal setting, and planning social support (Conroy et al., 2014). In the Simoes and colleagues' study, the most commonly use features were providing feedback, prompting self-monitoring, prompting specific goal setting (Simoes et al, 2018). Other behavior change techniques that were found in the apps were prompts/cues, social comparison, self-monitoring, action planning, and environmental restructuring (Conroy et al., 2014; Simoes et al., 2018). The behavior change techniques found in the apps in the Conroy and colleagues study fell into either the educational or motivational category (Conroy et al., 2014). Educational techniques are important because knowledge about how to engage in a particular physical activity is necessary before behavior change can occur and promotes self-efficacy (Bandura, 2004; Conroy et al., 2014). Motivational behavior change techniques are also often needed for actual implementation of physical activity. Ultimately there needs to be a good balance of educational and motivational behavior change techniques utilized to actually help a person increase physical activity (Conroy et al., 2014). Another way to view this is that a person trying to increase their physical activity through self-management must utilize a combination of antecedent and consequence behavior change techniques, and these techniques might be even more effective when combined with technology. The purpose of this study was to evaluate whether a self-management package with multiple behavior change techniques and the use of technology would increase the frequency of walking behavior for one participant.

Method

Participants

The single participant in this study was the author. The participant was a 30-year-old female who was enrolled as a graduate student at the University of South Florida at the time of the study. The participant's highest level of completed education was a bachelor's degree and was working towards her Master of Science degree in Applied Behavior Analysis at the time of the study. The participant was certified as a Registered Behavior Technician, although during the time of the study, the participant was not working due to the Covid-19 pandemic.

Setting

The study was conducted in the neighborhood surrounding the participant's apartment building in Tampa, Florida. The participant took her walks following a variety of different paths around the area. The participant never walked farther than 6.4 k in any direction from her apartment building. The surrounding neighborhood had paved sidewalks and different neighborhoods branching off in all directions. The area was made up of houses, apartment buildings, and gated housing communities. There were scattered ponds situated near the sidewalks and there were often many other people with their pets out walking, running, or biking.

Materials

The materials used for this study were the participant's Apple Watch, Blu-Tooth headphones, iPhone, and a printable monthly calendar used as an activity log. All materials were owned by the participant prior to the study.

Target Behaviors and Data Collection

The dependent variable in this study was the occurrence of a daily walk. This was later calculated as the frequency of daily walks within a week. A "walk" was defined as any instance where the participant left the apartment and walked outside for a minimum of 15 min continuously. For the purposes of this study, there was an opportunity to take one walk a day for up to seven days of each week. The participant measured this behavior by recording in real-time the start and end of the walk on the activity application on her Apple Watch. Once a walk was started, the Apple Watch continuously showed the participant how much time had elapsed, how much distance had been walked, and what the participant's heart rate was. Once the participant ended a walk, the data were saved in the Apple Watch and the corresponding activity application on the participant's iPhone. The participant recorded the walk and its duration on the corresponding day on the monthly calendar. At the end of a 7-day week, the participant counted the number of daily walks for the week and divide by the total days of the week to get the percentage of opportunities (e.g., participant took 3 daily walks so she would calculate 3/7 = 43%). The participant then graphed this percentage weekly. The target weekly goal was for the participant to engage in one walk daily, for four days of the week (nonconsecutive).

Treatment Fidelity

The participant shared the activity application data from the Apple Watch with a friend so that the friend had immediate access to every walk logged with the watch. That friend also knew when the participant was not logging any walks.

Social Validity

No formal social validity measure was implemented during this study, but since it was a self-management study, the participant anecdotally reported that she overall liked the self-management package and thought it was effective in increasing her walking behavior, however she indicated that there might be too many components to maintain over time and that some of them may not be necessary. The participant reported that in her opinion, the public posting, social support, and goal setting were the most effective components of the packaged intervention.

Experimental Design and Procedures

An AB graph was used to evaluate the effectiveness of a self-management intervention package to increase the frequency of the participant's daily walks in a week.

Pre-Assessments. Before the participant collected baseline data, the participant conducted three types of assessments. The participant filled out the International Physical Activity Questionnaire (IPAQ) to get a starting idea of the level of physical activity that the participant was already engaging in on average. The assessment showed that the participant was currently engaging in zero hours of recreational physical activity, which included walking. The participant also conducted a self-interview preference assessment to identify what contingent consequences would be reinforcing for the participant to increase her frequency of walking. The participant identified that having food or snacks bought for her would be a reinforcing consequence. Finally, the participant conducted a self-analysis of the current barriers to engaging in walking. The participant identified that she did not like to go on walks because she felt it was lonely to go by herself. She also identified that she struggled to find the self-motivation to get

herself to walk. The reinforcing value of taking daily walks (e.g., better health, loss of weight, etc.) did not seem to be immediate enough, so a more immediate reinforcer was needed. Lastly, the participant was less likely to walk if it was a spontaneous decision and needed more planning ahead.

Baseline. During the baseline phase, the participant examined the three weeks prior to intervention starting. The participant self-reported the frequency of daily walks in those weeks that occurred with no contingencies in place and no intervention components. As the participant had been engaging in no daily walks, the baseline was self-reported and recorded at zero. There was also the baseline information pulled from the IPAQ that showed 0 hr of walking.

Intervention. During the intervention phase, the participant employed a multi-component treatment package based on evidence-based behavior management techniques. More specifically, the participant utilized the following antecedent and consequent strategies: action planning and prompts, self-monitoring, social support, accountability, reinforcement, public posting, and goal setting. The participant utilized action planning by spending each Sunday scheduling the next week's daily walks in the calendar on her iPhone. The participant also utilized prompts by setting a calendar alarm to go off 15 min before each of the scheduled walks. The participant utilized self-monitoring by tracking the walks on her Apple Watch and then recording the data from the activity app on the printable monthly calendar. The participant also monitored her progress by graphing the data weekly. The participant utilized social support by using Blu-Tooth headphones to talk to family and friends while taking walks. The participant employed accountability by sharing her Apple Watch data with a friend who knew what her behavioral goal was. Every time the participant completed a walk, it notified the friend immediately. This component also overlapped into the social support component and

reinforcement component as well because the friend often sent messages to the participant with encouraging words or congrats when the participant finished a walk. Another way the participant utilized reinforcement was by having a contingent agreement with her parents. If the participant met her weekly goal, her parents would buy her food of her choice. The participant utilized public posting by sharing the graphed data several times with her school cohort throughout the semester, and ultimately sharing the final study with her cohort and outside evaluators. Finally, the participant used goal setting by setting a goal that a walk had to be at least 15 min in duration to count and that she had to walk for at least four days out of a 7-day week to meet her weekly goal and earn her contingent reinforcement.

Post-Assessments. Once the participant met the weekly goal she set for at least three consecutive weeks, the study was considered complete and the participant stopped collecting data. The participant again filled out the IPAQ to evaluate if there was any change in her overall walking activity from the pre-assessment. This time the assessment showed that she engaged in 23 hr and 32 min of walking during the intervention, which averaged out to approximately 4.7 hr a week. In addition, the IPAQ showed that the participant engaged in walking for four to five days a week, an increase from zero days a week prior to the intervention.

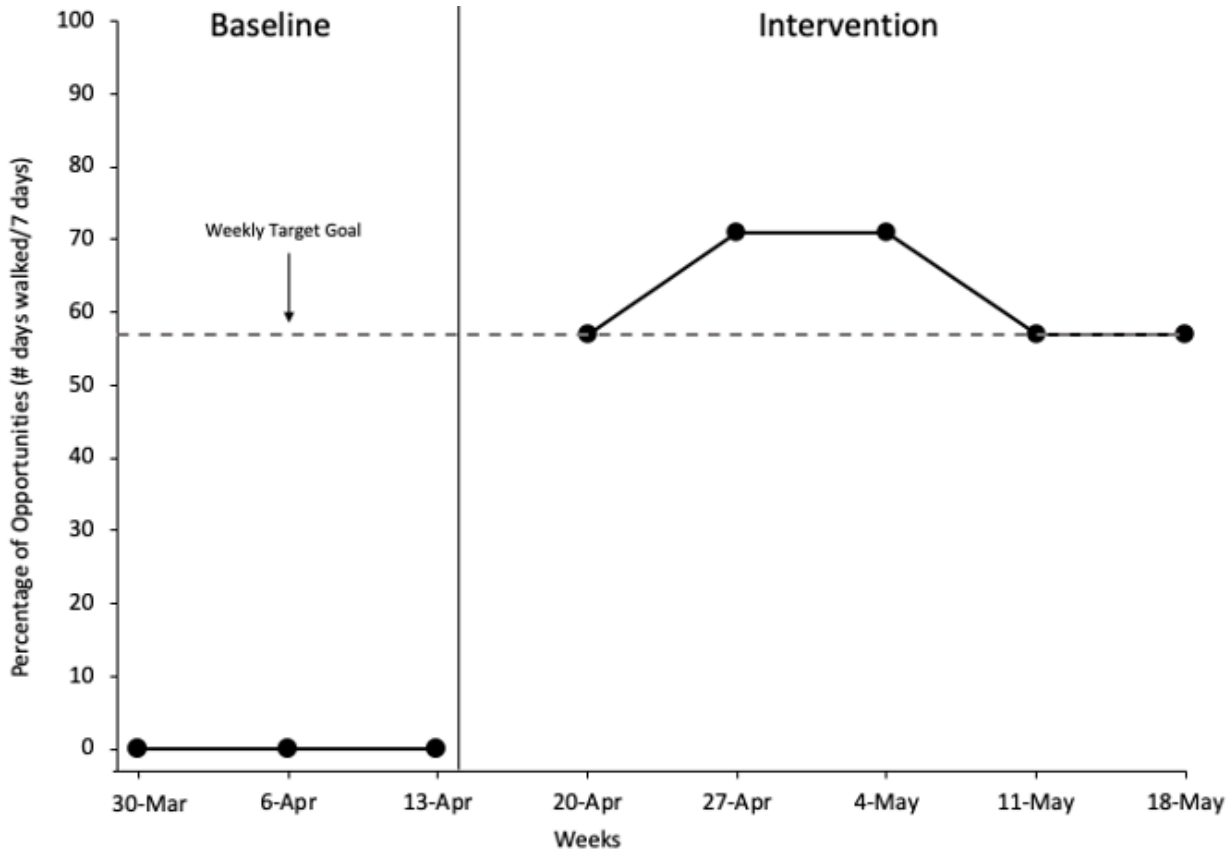
Results

Results of the self-management intervention package are depicted in Figure 1. Figure 1 shows that the frequency of daily walks taken by the participant increased the first week of intervention. In addition, the target weekly walk goal of the participant, walking for four out of seven days a week (or 57% of opportunities), was immediately met after the intervention was introduced and maintained throughout the whole study. There were two weeks during the study

when the participant exceeded the target weekly walk goal. The intervention phase lasted five weeks and the participant took daily walks either four or five days a week for every week. As a secondary result, the length in miles that the participant walked during a single walk and the duration of individual walks increased as the intervention phase progressed. The mean duration of all of the walks was approximately 1.1 hr and the range walked was approximately 3.3 k. The study was terminated when there were at least three consecutive weeks of meeting the target, which was also when the participant started working again and her weekly schedule changed.

Figure 1

Participant's Percentage of Opportunities of Weekly Walks



Discussion

The results of this study showed that a self-management intervention package was effective in increasing the frequency of daily walks that the participant engaged in during a 7-day week. The participant was able to meet or exceed the target walk goal of walking at least 4 out of 7 days a week for the entire duration of the study. These effects were especially influential during a time where the participant was spending a majority of her time in her apartment and sedentary due to the Covid-19 pandemic and not working. When outside exercise was one of the things that was deemed a safer option by the Center for Disease Control, being able to utilize the time and resources to increase physical activity and ultimately better the participant's health was extremely socially valid. This research study corresponds with previous literature that self-monitoring behavior interventions are effective as part of treatment packages to increase physical activity (Cauteruccio, 2016; Tudor-Locke, 2002; VanWormer, 2004). It also appears that social support and different cues are viable components in the treatment package, as suggested by previous literature (Cauteruccio, 2016; Spana et al., 2009). This research study extends the previous literature by adding data to the profusion of information on the success of treatment package interventions for increasing physical activity. The combination of components for the intervention package in this study are unique compared to previous research and the interaction between the different components would be interesting to explore.

There were a few limitations of this study that should be noted. First, there were eight different components within the self-management intervention package. While the package as a whole was effective in showing a desired result, it is unclear if all of the components were actually needed. It is recommended that a component analysis be completed in future studies so that only the necessary intervention components could be identified and utilized. Another

limitation of this study was that there was no complete and strong measure of treatment fidelity. While the participant did share the Apple Watch data with a friend for the walks taken, there were no other measures of the other seven components of the package intervention to ensure that the participant was implementing them correctly and at the right times. This point leads into a third limitation of this study, which was that some of the components in the intervention package did vary slightly on some walking days. During one walk the participant forgot to charge her Blu-Tooth headphones so she had to walk holding her phone up to her ear. It depended on the day and time as to who was available to talk with the participant on the phone, so the different types of people that were used for social support varied by walk. In addition, on at least one daily walk there was no one available to talk to on the phone, so the participant listened to a podcast instead. The participant was not always consistent about scheduling the walks in her calendar on Sundays, and sometimes did it on Mondays or Tuesdays. While these variances did not seem to affect the end result during intervention, it does highlight that some of the components may not be necessary for the intervention package to be effective in increasing walking behavior. It also shows the importance of putting in measures of treatment fidelity if replicated.

Future research should study the impact of a self-management package like the one in this study on the duration of walking, the miles walked, and the intensity of the walk (altitude, heat, humidity, elevation, incline, etc.). It would also be beneficial for future researchers to examine if a self-management package could be effective in increasing the frequency of other forms of recreation physical activity such as swimming or biking. Including a formal behavioral assessment or evaluation might be advantageous and could be created for a person to complete as a survey, which could help identify observable and measurable barriers towards physical activity

and what inexpensive and efficient behavioral strategies could be implemented with little to no training to help increase physical activity.

CHAPTER TWO:

CASE STUDY TWO

Introduction

Disruptions in the classroom can have a negative impact on a student's education. Effective interventions to target disruptive students are needed that can maintain with low response effort, minimal resources, (Cook et al., 2014) and high social validity from both teachers and students (Gresham, 2004; Stage & Quiroz, 1997; Witt et al., 1984). One such intervention, the class pass intervention, has been effectively used in educational settings to decrease disruptive student behavior. The class pass intervention was originally designed for use in the educational system to target escape-maintained disruptive behaviors and has been expanded to address other functions of maladaptive behaviors other than escape (Collins et al., 2016; Cook et al., 2014; Narozanick & Blair, 2019).

The class pass intervention is traditionally comprised of two main parts. The first part of the intervention gives the student a way to escape from the non-preferred academic task by appropriately asking for a break using a class pass. This embodies the negative reinforcement component where requesting a break is contingent upon using the passes (Collins et al., 2016; Cook et al., 2014). During the break the student has access to neutral items/toys to play with in a location away from the learning area (Narozanick & Blair, 2019). The second part of the intervention gives the student a way to earn privileges by focusing on academic engagement, saving the class passes and exchanging them for back-up reinforcers. This embodies the positive

reinforcement component where exchanging the saved passes is contingent on engaging in on-task school behavior (Narozanick & Blair, 2019). This incorporates both an antecedent manipulation to decrease off-task disruptive behavior (Cook et al., 2014) and an abolishing operation for off-task disruptive behavior (Carlson et al., 2008).

Previous studies have been conducted using the class pass intervention with elementary and high school students with no disabilities and with hypothesized escape-maintained disruptive behavior (Andreu & Blair, 2017; Collins et al., 2016; Cook et al., 2014) as well as elementary students with disabilities and with hypothesized escape-maintained disruptive behavior (Narozanick & Blair, 2019). In all of the studies, the implementation of the class pass intervention resulted in a decrease of the targeted disruptive behavior and an increase in academic engagement (Andreu & Blair, 2017; Collins et al., 2016; Cook et al., 2014; Narozanick & Blair, 2019). In the Narozanick and Blair (2019) study, student participants were diagnosed with disabilities including speech-language delay, Autism Spectrum Disorder (ASD), language impairment, and Attention Deficit Hyperactivity Disorder (ADHD). One participant in particular had ASD and ADHD and disruptive classroom behavior maintained by escape primarily and attention secondarily. This participant's results showed an average increase in academic engagement of 33% and a decrease in disruptive behavior of 40% after the class pass intervention was introduced. The purpose of this case study was to evaluate the class pass intervention with a similar student who was diagnosed with ASD, ADHD and whose functional behavior assessment identified that his off-task behavior during class was potentially maintained by escape primarily, followed by attention.

Method

Participants

The participant in this study was a 6-year-old male who was attending online synchronous learning for the first grade. He was in the custody of the state child welfare authority and was residing at a group residential foster home in Florida. His diagnoses included ASD, Mixed Receptive-Expressive Language Disorder, ADHD - combined type, and Macrocephaly. He was receiving between 15 to 30 hr a week of applied behavior analysis services both during online schooling and in the natural living environment in his cottage at the residential facility. For his online schooling, he was expected to participate in 4-6 zooms a day in addition to doing independent work outside of the zoom classes. His zooms ranged from 30 min in length to 1 hr in length and were a combination of general education classes and Exceptional Student Education (ESE) classes.

Setting

The study was conducted in a classroom in an educational building at the group residential foster home. The participant completed his online schoolwork five days a week in this building with anywhere between 10-13 of his elementary school aged peers, who were also residents at the foster home. The participant had his own desk with a laptop computer, school supplies, and headphones. For a majority of his school hours, he had 1:1 behavioral support from different registered behavior technicians (RBTs) at the facility. There was an area of the classroom in the back corner where there were bookcases filled with books, a rug, and a bean bag. The targeted zoom class for this intervention was the participant's ESE reading zoom that

occurred for 1 hr (11:10 a.m.-12:10 p.m.) on Tuesdays through Fridays and for 20 min (11:00 a.m.-11:20 a.m.) on Mondays. The same teacher taught this class virtually every day.

Materials

The materials used for this study were the class passes, known to the participant as 'Dino Passes'. When the dino passes were available for the participant to use, they were placed in a small orange bucket on the participant's desk that the participant could easily see and access. In addition to the passes, there were several moderately preferred toys (dinosaurs, playdoh, sand, cars, blocks, etc.) that the participant could play with during his class pass break or 'dino pass break' and a bean bag. Other materials included a social story used to teach the participant about the class pass program, snacks that the participant could trade in saved passes for, and the datasheets.

Target Behaviors and Data Collection

The primary dependent variable in this study was the occurrence of "off-task" behavior by the participant during the targeted zoom class which was ESE reading. This would later be calculated as percentage of intervals "off-task". Off-task behavior was defined as not participating and/or attending during school activities, to include sliding off chair, turning around in chair, or out of chair; oriented away from the live zoom class and the computer; nonresponsive to teachers and peers; attending to peers and adults other than those in the virtual class; messing with items on the table; and engaging in something other than the assigned task for at least 2 s. For the purposes of this study, a time sampling of 15-20 min was targeted within the whole ESE reading zoom class. The RBT who was working with the client would take partial interval data, where the intervals were 30 s, during this 15–20 min time sampling. For a 15 min session this

would be equal to thirty 30 s intervals and a 20 min session would be equal to forty 30 s intervals. If the definition of off-task behavior was met by the participant during an interval, the RBT would make a check next to "off-task" in the interval. The RBT's used an interval timer app to cue them to change intervals. If the participant utilized a class pass during the time sampling, the interval timer app was paused, and data collection was suspended until the participant returned to his zoom class after the break was over then the interval timer app was resumed and so was data collection. Once the time sampling was complete, the RBT would calculate the percentage of intervals that the participant was "off-task" by dividing the number of intervals checked "off-task" by the total number of intervals. This percentage was then graphed as the data point for that session. Only one data point or session was conducted per day.

The secondary dependent variable in this study was the occurrence of "on-task" behavior by the participant during the targeted zoom class. On-task behavior was defined as actively participating and/or attending during school activities, to include appropriately sitting in chair, oriented towards and participating in live zoom classes, responding to teachers and peers, oriented towards computer during online assignments, and actively working and focused on school assignments during independent work times for at least 2 s. The behavior was observed over the duration of the entire zoom class and an overall score was recorded on the IBRST rating scale for the approximate amount of time the participant was "on-task" during the Zoom class. The IBRST scale was broken into five possible scores, 1 = 0 - 20%, 2 = 21 - 40%, 3 = 41 - 60%, 4 = 61 – 80%, and 5 = 81 - 100%. The RBT waited until the end of the zoom class and then circled on the scale which score was most representative of the time the participant was "on-task". This score was graphed as a data point for that session. IBRST data was only collected for sessions 3-9 in the study.

Interobserver Agreement (IOA)

A second trained observer (an RBT) observed and took partial interval data for 50% of baseline sessions and 40% of intervention sessions. Before the trained observer collected data, the principal investigator showed them how to fill out the data sheet, how to use the interval timer app, and gave examples and non-examples of the target behavior. Calculations for IOA were calculated by dividing the total number of intervals where the two observers were in agreement by the total number of agreements plus disagreements then multiplying by 100. Agreements occurred when both data collectors made a check mark next to "off-task" in the interval or both data collectors did not make a check mark next to "off-task" in the interval. Disagreements occurred when one data collector made a check mark next to "off-task" in the interval and one data collector did not. IOA for baseline sessions 1 and 4 were 98% and 95% respectively. IOA for intervention sessions 6 and 8 were both 90%. There was no IOA data collected on the IBRST.

Social Validity

A post-validity survey was given to both the participant's teacher and the participant. The social validity survey for the participant's teacher was a 10-item survey that had the teacher rate on a 5-point Likert-type scale eight statements and then answer two open-ended questions. The Likert-type scale ranged from a 1 which stood for "Strongly Disagree" to a 5 which stood for "Strongly Agree". The teacher rated ease of implementation a 5, willingness to use the intervention in other classes a 5, effectiveness at decreasing participant off-task behavior a 4, effectiveness at increasing the participant appropriately asking for a break a 4, willingness to continue to use the intervention a 4, feeling adequately trained to implement the intervention a 5,

and enjoyment using the intervention a 4. She thought the best part of the intervention was that the participant seemed more willing to participate in class when he knew he could use a dino pass. She was unable to identify any challenging aspects of the intervention. The social validity survey for the participant was a 4-item survey that had the participant circle the emoji that corresponded to how the participant felt about 3 different statements. There were three emoji options: “Yes!”, “Kind Of”, and “No”. The participant was also asked to answer a fourth open-ended question. The participant rated that “yes” he liked using the dino passes, it was “kind of” easy to use the dino passes, “yes” he wanted to keep using his dino passes, and that the best part about using the dino passes was getting to take a break.

Experimental Design and Procedures

An AB graph was used to evaluate the effectiveness of the class pass program on “off-task” and “on-task” behavior during zoom class.

Prevent, Teach, and Reinforce (PTR) Functional Behavior Assessment Interview. The principal investigator, who had a history of working 1:1 with the participant during school time, filled out a PTR functional behavior assessment interview on the participant for “off-task” behavior. The PTR functional behavior assessment interview was comprised of three sections (prevent, teach, reinforce) and targets the school environment. After filling out the PTR functional behavior assessment interview, the principal investigator evaluated the answers with a supervisor BCBA and determined that the participant’s off-task behavior was potentially maintained by primarily escape from demands and secondarily access to attention.

Multiple Stimulus Without Replacement (MSWO) Preference Assessment. Before the participant began baseline, the principal investigator conducted a MSWO preference

assessment with the participant to identify some moderately preferred tangible items to use during the class pass breaks. The items to use in the assessment were chosen based on interviews with the participant's caregivers and therapists. Pictures of these five tangible toy items were used and the assessment was repeated three times. Based on the results, a box of toy dinosaurs, sand, cars, blocks, and Play-Doh were available to the client during his class pass breaks as these items ranked in the middle of the items assessed.

Baseline. Baseline partial interval data was collected for four 20 min time samplings of ESE reading zoom classes and baseline IBRST data was collected for two ESE reading zoom classes. During these zoom classes no class pass intervention was in place and redirecting or prompting by the teacher occurred as it normally did during class time.

Training the Teacher. Before the intervention began, the principal investigator conducted a brief training virtually via zoom with the participant's teacher on how to implement the class pass program and gave the teacher an abbreviated program protocol. The principal investigator showed the teacher the class 'dino' passes, explained that the participant would be trained on how to use the program by reading a social story, gave examples of how the program would work, and then modeled how both the participant would use a class pass and how the teacher would respond. The teacher had an opportunity to share any questions or concerns at the end of the training. The teacher also shared any modifications to the program she thought would be beneficial and adjustments were made as needed.

Training the Participant. The principal investigator created a social story to explain how to use the class passes that used actual pictures of the participant and the participant's teacher in the virtual classroom environment. Before the intervention was started, the principal

investigator read the story to the participant and asked clarifying questions to make sure the participant understood the story. In addition, the story was stopped at key parts (e.g., like asking the teacher to use a dino pass) and the principal investigator either modeled the part and/or had the participant role play that part. After the story was finished, the principal investigator modeled the whole process and then had the participant role play the whole process until he did it correctly.

Intervention. The class pass intervention used in this study focused on the participant using a pass to ask for a brief break away from his zoom class/work. In order to match his age and grade level, the initial parameters of the program were as follows: he got two passes for every half an hour of class. So, Tuesday through Friday there were four passes available for the hour-long ESE reading zoom class. For Monday, two passes were available for a 20 min class. For all days of the week, the passes value was for a 5 min break away from class. For the first two classes, the participant had to wait 10 min after coming back from a class pass break before the passes were available to use again. This was modified for the last three classes in intervention to only 5 min due to the noted very brief inter response time between instances of off-task behavior of the participant during those waiting times. If there were any unused class passes left over after the ESE reading zoom was over, he could exchange them for extra time to watch YouTube or for an extra snack item (one per pass).

Before the targeted ESE reading zoom class started, the principal investigator set up the break area in the classroom; the bean bag and the box of toys was put out. The principal investigator or whoever was the therapist conducting the session with the participant that day told the participant that they were going to use the dino passes during the next class and that he should try really hard to focus and work with the teacher, but if he needed to take a break, he

could use the pass and ask for a break. The therapist also quickly modeled how he could initiate using a pass if he needed to. He was also reminded that if the passes were not in the orange bucket next to his computer, that it meant they were not available yet and he had to work hard in class until he saw the passes in the orange bucket. The participant was also reminded that if he did really well focusing in class and saved some of his passes, he could trade them in for YouTube or snacks after class was over.

When the teacher officially started class, the therapist started a timer for 5 min. The participant had to be in class for 5 min before the therapist put the passes in the orange bucket. Once the passes were available, the therapist either waited for the participant to initiate using a pass or waited until the participant engaged in off-task behavior for 5-7 s but did not initiate using a pass. If the latter occurred, the teacher (or sometimes the therapist) prompted the participant to use a pass since he was struggling to stay on-task. The prompt was always successful as a vocal prompt and the participant always complied with this suggestion. Whether the participant initiated the use of the pass himself or was prompted to do so, the participant took a pass out of the orange bucket and held it up to the camera so his teacher could see it. Sometimes the participant just asked the therapist if he could take a break and the therapist needed to prompt him (L->M) to follow the steps of picking up the pass and holding it up to the camera to ask the teacher. The teacher then called on him and the participant asked, “Can I use a dino pass?”. The participant handed the pass to the therapist and went to the break area. The therapist kept that pass so it was no longer available. The therapist told the participant he had 5 min to take his break and then started a timer. The therapist gave the participant 2 min, 1 min, and 30 s time warnings. Once the timer went off, the therapist said “your break is over, it is time to go back to your zoom”. The client put down the toys and returned to his zoom. The therapist

made sure the class passes were out of view of the participant and started the timer. When the time elapsed, the therapist put the remaining class passes in the orange bucket and the cycle continued until the class was over or the participant ran out of class passes.

When the ESE reading zoom class was over, the therapist looked to see if there were any class passes left. If there were, the therapist would praise the participant for staying on-task and saving his passes and asked if he wanted to trade them in for extra YouTube time or snacks. The participant picked his choice either immediately or within the next hour. The participant saved and exchanged at least one pass at the completion of four of the intervention classes.

Results

Results of this study are depicted in Figure 1 and Figure 2. Figure 1 depicts the partial interval data collected on "off-task" behavior during a 15 to 20 min time sampling of the reading ESE zoom class. The different data markers represent which of the participant's three different RBT's were working with him that day. In the baseline phase the data were variable, but "off-task" behavior increased quite dramatically in an upward trend. Therapist 3, which was the principal investigator, recorded the highest percentage of intervals of "off-task" behavior by the participant during baseline classes. During the intervention, the first session showed a slight decrease in "off-task" behavior which was a promising sign. However, throughout the five classes in the intervention phase, the data remained extremely variable. During the third session of intervention, the protocol was edited slightly to require only 5 min of working between when a class pass break ended and when the passes were available again, instead of a 10 min break. This was implemented after an increase from session one to session two in intervention and an observation by the principal investigator that the participant was only able to stay on task and

asking to use class passes again around the 5 min mark versus the 10 min mark. Following this change a decrease in “off-task” behavior was noted, but again followed by more variability. The study ended at session nine as the participant returned to brick-and-mortar school and zoom classes ended.

Figure 2 depicts the IBRST data collected on “on-task” behavior during the entire one hour reading ESE zoom classes. In the baseline phase, IBRST scores for “on-task” behavior were very low, not passing a score of 2, which correlated to low percentages of “on-task” behavior. During intervention, the data were again highly variable, showing the highest percentages of “on-task” behavior during the seventh class, when the protocol was modified.

Figure 2

Participant’s Percentage of Intervals “Off-Task” During a Time Sampling of a Zoom Class

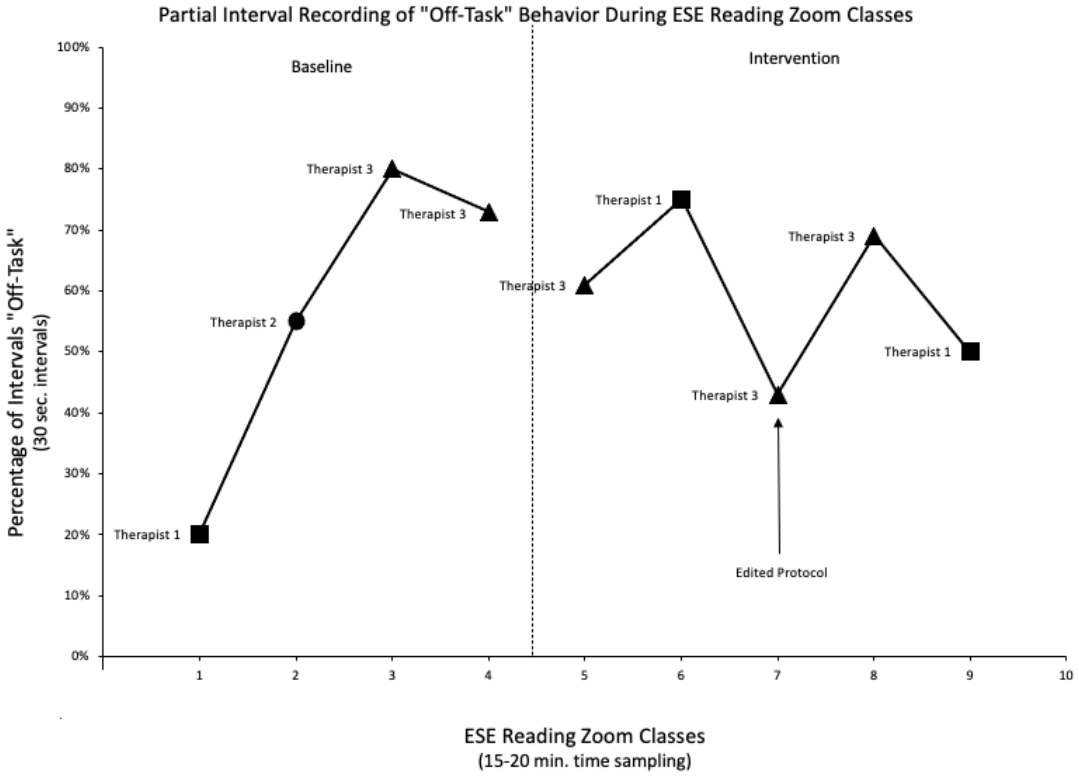
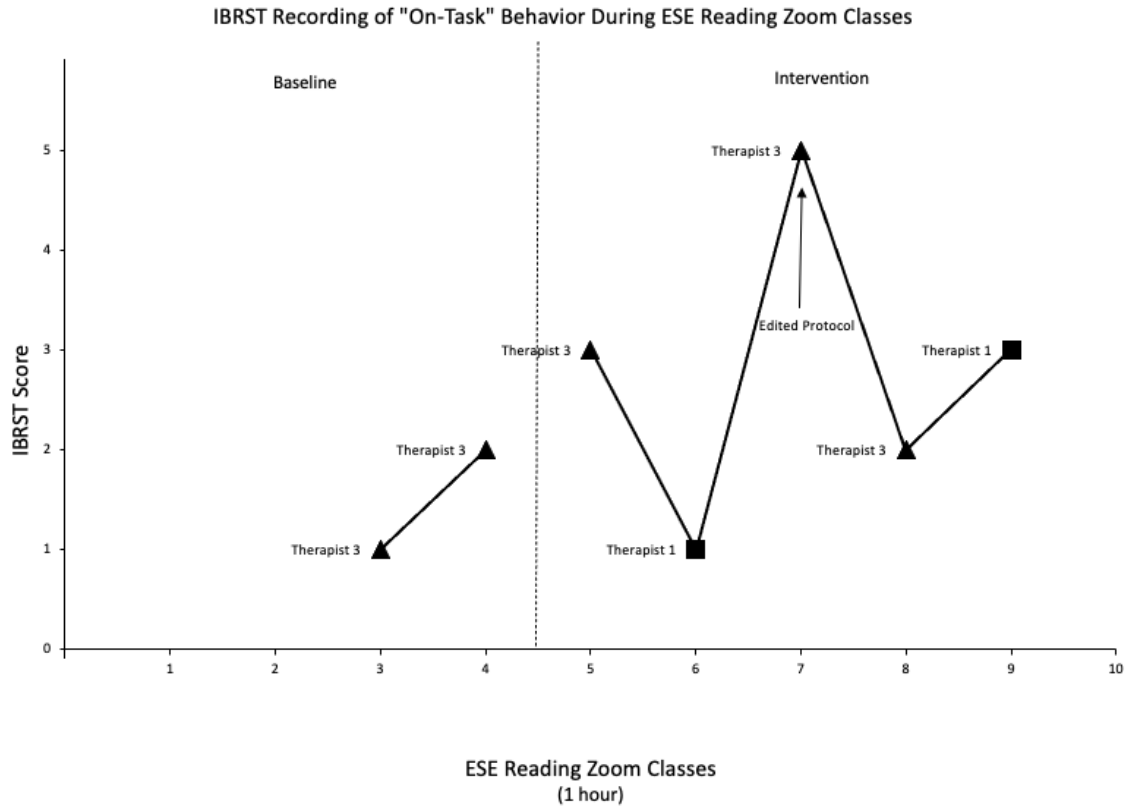


Figure 3

IBRST Score of Percentage of Participant's "On-Task" Behavior During a Zoom Class



Discussion

The results of this study were inconclusive with regard to the effect of the class pass program on the participant's "off-task" and "on-task" behavior during his ESE reading zoom class. If the intervention was carried out for longer than nine sessions and an alternative experimental design was implemented (such as a reversal), it would be easier to draw better conclusions related to the intervention. While no strong conclusions can be drawn from this data, it is possible to note that the majority of data points for therapist 3 on "off-task" behavior in intervention did decrease from those taken by therapist 3 in baseline, suggesting for at least that

therapist there may have been a positive effect. Also, it does look like the overall trend in the partial interval intervention data is in a downward direction compared to the upward direction in baseline. With the IBRST data, the level from baseline to intervention certainly increased for "on-task" behavior, however, only two data points were collected in baseline, so it is not clear the trend of the baseline without additional data points.

It is noted that because there were several partial interval data points that showed a decrease in "off-task" behavior compared to the highest baseline data points, that the intervention may have started showing a steady decreasing trend if it was implemented for a longer period of time. Anecdotally, during intervention, the participant began to ask more frequently (and independently) to use the dino passes and he asked if he could use the dino passes during other zoom classes. Even if the data continued to be highly variable, it may have been possible to implement small modifications to the protocol to find the right fit for the participant and setting. For example, the principal investigator could have potentially adjusted the number of passes available, the backup rewards that the passes could be exchange for, reduced the time again between available passes, added a visual aid to assist the participant in managing his passes, or added an attention component to his class pass breaks.

Both the participant and the participant's teacher rated the program high on social validity measures and both wanted to continue to use it. With the nature of education during the Covid-19 pandemic, the adjustment to virtual learning for both teachers and students has been difficult. The participant struggled with remaining on-task during his zoom classes and his teacher was limited in what she could do to support him through a computer screen. Regardless of the variability of the data, this study showed that a class pass program could be implemented in a virtual environment and has the potential to improve class academic engagement. This

research study supports the previous literature in that the class pass intervention was a socially valid intervention and was easy for the teacher to implement (Gresham, 2004; Stage & Quiroz, 1997; Witt et al., 1984). This study also adds to the literature by the virtual nature of the implementation. All of the prior literature on the class pass system was in person in a physical classroom. In addition, this study incorporated both parts of the class pass intervention, the negative reinforcement and the positive reinforcement components. The previous study evaluating the class pass intervention with students with disabilities only used the negative reinforcement component of the class pass intervention (Narozanick & Blair, 2019).

There are several limitations of this study that should be noted. First, there was no measure of treatment fidelity, either for the participant's teacher or the RBT that was implementing the intervention during that class to ensure it was implemented correctly. Second, the PTR functional behavior assessment interview did not include collection of ABC direct observation data on the participant, so was not a complete functional behavior assessment. Direct observation data in addition to the completion of the interview is recommended in future studies. Other limitations of this study include only using only one participant, lack of time to run out the intervention due to the participant returning to brick-and-mortar school, and the AB design does not show adequate experiment control. A reversal in which we removed the intervention may have helped to determine the effectiveness of the class pass. Future research with the class pass intervention should focus on replication of the previous studies in addition to expanding the intervention to use with multiply maintained disruptive classroom behaviors. In addition, more research should be conducted on the feasibility of implementing the intervention in a virtual environment. Research could also be implemented in alternative school settings with students that have a wider range of disabilities or behavioral concerns.

REFERENCES

Addy, C. L., Wilson, D. K., Kirtland, K. A., Ainsworth, B. E., Sharpe, P., & Kimsey, D. (2004). Association of perceived social and physical environmental supports with physical activity and walking behavior. *Research and Practice, 94*(3), 440-443.

Andreu, M., & Blair, K. C. (2017). *Using the class pass intervention (CPI) for children with disruptive behavior*. Manuscript submitted for publication.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education and Behavior, 31*(2), 143-164. https://doi.org/10.1177/1090198104263660

Carlson, J., Luiselli, J., Slyman, A., & Markowski, A. (2008). Choice-making as intervention for disrobing in children with developmental disabilities. *Journal of Positive Behavior Interventions, 10*, 86-90.

Collins, T. A., Cook, C. R., Dart, E., Socie, D. G., Renshaw, T. L., & Long, A. C. (2016). Improving classroom engagement among high school students with disruptive behavior: Evaluation of the class pass intervention. *Psychology in the Schools, 53*(2), 204-219. https://doi.org/10.1002/pits.21893

Conroy, D. E., Yang, C-H., Maher, J. P. (2014). Behavior change techniques in top-ranked mobile apps for physical activity. *American Journal of Preventive Medicine, 46*(6), 649-652. https://doi.org/10.1016/j.amepre.2014.01.010

Cook, C. R., Collins, T., Dart, E., Vance, M. J., McIntosh, K., Grady, E. A., & DeCano, P. (2014). Evaluation of the class pass intervention for typically developing students with hypothesized escape-motivated disruptive classroom behavior. *Psychology in the Schools, 51*, 107-125. https://doi.org/10.1002/pits.21742

Donaldson, J. M., & Normand, M. P. (2009). Using goal setting, self-monitoring, and feedback to increase calorie expenditure in obese adults. *Behavioral Interventions, 24*, 73-83. https://doi.org/10.1002.277

Gresham, F. M. (2004). Current status and future directions of school-based behavioral interventions. *School Psychology Review, 33*, 326-343.

Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*, 127-155.

Narozanick, T., & Blair, K. C. (2019). Evaluation of the class pass intervention: An application to improve classroom behavior in children with disabilities. *Journal of Positive Behavior Interventions, 21*(3), 159-170. http://doi.org/10.1177/1098300718806650

Normand, M. P. (2008). Increasing physical activity through self-monitoring, goal setting, and feedback. *Behavioral Interventions, 23*, 227-236. https://doi.org/10.1002/bin.267

Simoes, P., Silva, A. G., Amaral, J., Queiros, A., Rocha, N. P., & Rodrigues, M. (2018). Features, behavior change techniques, and quality of the most popular mobile apps to measure physical activity: Systematic search in app stores. *JMIR Mhealth Uhealth, 6*(10). https://doi.org/10.2196/11281

Stage, S. A., & Quiroz, D. R. (1997). A meta-analysis of interventions to decrease disruptive classroom behavior in public education settings. *School Psychology Review, 26*, 333-368.

Tudor-Locke, C. (2002). Taking steps toward increased physical activity: Using pedometers to measure and motivate. *President's Council on Physical Fitness and Sports Research Digest, 3*(17), 1-8.

VanWormer, J. J. (2004). Pedometers and brief e-counseling: Increasing physical activity for overweight adults. *Journal of Applied Behavior Analysis, 37*(3), 421-425.

Walker, H. M., Ramsey, E., & Gresham, F. M. (2004). *Antisocial behavior in school: Evidence-based practices*. Belmont, CA: Wadsworth/Thomson Learning.

Witt, J. C., Martens, B. K., & Elliott, S. N. (1984). Factors affecting teacher's judgments of the acceptability of behavioral interventions: Time involvement, behavior problem severity, and type of intervention. *Behavior Therapy, 15*, 204-209.

Zarate, M., Miltenberger, R., & Valbuena, D. (2019). Evaluating the effectiveness and textual feedback for increasing moderate-intensity physical activity in adults. *Behavioral Interventions, 34*, 553-563. https://doi.org/10.1002/bin.1679