INCREASING UNINNTERRUPTED WALKING DISATNCE FOR STUDENTS WITH AUTISM SPECTRUM DISORDER

By

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ABSTRACT

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Students with autism spectrum disorder (ASD) do not engage in an adequate amount of physical activity. Often, students with a Level 2 or Level 3 diagnosis of ASD engage in behavior that may make it increasingly difficult for practitioners to encourage the increase of physical activity. The purpose of this study was to determine if preference assessment increase Uninterrupted Walking Distance in students with ASD. Researchers have demonstrated positive outcomes on physical activity levels when students are given the opportunity to choose their most preferred physical activity as a reinforcement. Results from this study showed statistically relevant walking data when the students were allowed to access their first preferred activity ($P < .03$. Mall) as opposed to their second ($P < .2$. Bike) and third ($P < .1$, Yoga. Physio Ball). The results from this research expand on previous studies that have focused on increasing the levels of physical exercise for students with ASD.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1: INTRODUCTION

Researchers have reported that students with autism spectrum disorder (ASD) are not exercising as much as their typically developing peers (Bandini et al., 2012; Pan 2009; 2011). Based on the characteristics associated with a diagnosis of ASD many students will need some extra type of support within their typical day to reach consistent exercise levels (John, Dawson, & Estes, 2018). One type of support that has demonstrated success within this population is multiple stimuli without replacement (MSWO; Matthew & Swerdan-Rocío Rosales, 2015). Implementing MSWO allows for the researcher to utilize a preferred activity to increase the performance during a non-preferred activity (e.g., exercise; Matthew & Swerdan-Rocío Rosales, 2015) and may encourage on-task behavior for students with ASD (Matthew &Swerdan-Rocío Rosales, 2015). Physical activity has a host of benefits (e.g., biochemical, psychosocial, physiological) that positively impact the quality of life (QOL) for students, including those with ASD (Dittus, Gramling, & Ades,2017; Sowa & Meulenbroek, 2012). For these reasons, practitioners working with students with ASD need to develop instructional strategies (e.g., MSWO) that continually increase the exercise levels for this

population while also providing decision making opportunities and control over their exercise activity selection.

Autism Spectrum Disorder

The American Psychological Association (APA, 2013) defines ASD as a mental disorder that causes different levels of communication delays (e.g., verbal, non-verbal) and social skill delays (e.g., making friends); as well as, repetitive (e.g., hand flapping, body rocking) and restrictive (e.g., isolated play) behaviors. Students with ASD will be diagnosed based on the level of support needed. For example, a student who needed minimum support would be diagnosed as Level 1. A student who needed consistent support would be diagnosed as Level 2, and a student who needed consistent and intensive support would be diagnosed as a Level 3. In 2016, the Centers for Disease Control and Prevention (CDC) reported that 1 in 68 children was diagnosed with ASD, with boys diagnosed five times more than girls.

Executive Functioning Delays

Executive functioning is defined as the ability of an individual to plan, organize, and complete tasks (Garon, Bryson, & Smith, 2008). For students with ASD, executive functioning has been reported as an area of need for this population in the educational setting. Researchers estimate these delays in executive functioning will result in the student with ASD performing at a lower level than his or her typically developing peers in at least one academic area (e.g., physical education; John, Dawson, & Estes, 2018. Specifically, Bull and Scerif (2001) reported that students with ASD would demonstrate problems in executive functioning on the task that require flexibility and planning. Therefore, practitioners working with students with ASD should focus on improving the student's ability to plan, organize, and complete an assignment before transitioning to the next task.

Preference Assessment

At Vanderbilt University Kennedy Center, ABA technicians utilize preference assessments to find behavioral reinforcements. This type of evaluation allows a teacher to create a hierarchy of the student's preferred items (Chazin & Ledford, 2016). For example, researchers set out seven foods, and allow the student to pick his or her most preferred item. The first item chosen is the most preferred with the following choices

representing descending preferability. Vanderbilt Kennedy Center (Chazin & Ledford, 2016) created the evidence-based instructional practices for students with ASD. The primary researcher believes moving forward adapted physical education practitioners could benefit from this model of reinforcement.

Physiological Effect

The CDC (2013) reported that a sedentary lifestyle may lead to a decline in health; therefore individuals who regularly incorporate exercise into their daily routine may avoid health regression. The APA (2013) suggests regular physical exercise increases emotional resilience to stress and anxiety. Support for this statement was provided in a study done to test the increase in health-related QoL before, during, and after engagement in an exercise program (Vasiliadis & Bélanger, 2018). The practitioners studied 967 participants and found adults who exercised regularly above baseline saw an increase in health-related QoL. Those who reported a baseline or a decrease in exercise saw a decline (Vasiliadis & Bélanger, 2018). Stress can negatively affect QoL, thus exercise training could be used to improve mood and alleviate and protect against symptoms of depression, stress, and anxiety (Strong, 2012). Stress and anxiety stem from one's outlook on life and researchers have concluded exercise may help increase a

positive outlook and decrease anxiety (Thayer et al., 1994). Also, aerobic exercise as well as other forms of physical activity enhance mood and reduce anxiety (e.g., Caldwell, Emery, Harrison, & Greeson, 2011; Johansson, Hassmen, & Jouper, 2011; Kim & Leem, 2014).

Statement of the Problem

Students with ASD are not engaging in an appropriate amount of daily exercise (Bandini et al., 2012). Therefore, the researcher believes that students with ASD, specifically those with a Level 2 or 3 diagnosis need additional support to ensure that appropriate levels of daily exercise are met each day. One such type of support that has a long history of success for students with ASD is an MSWO preference assessment (Eikeseth, Smith, Jahr, & Eldevik, 2007). This study focused on providing students with ASD who have a Level 2 or Level 3 diagnosis a motivational technique with the intended goal of increasing uninterrupted walking distance.

Purpose

The purpose of this study was to determine if an MSWO program would increase the uninterrupted walking distance of students who have a diagnosis of ASD (e.g., Level 2, Level 3).

Research Hypothesis

The primary researcher hypothesized that the students with ASD would increase their total uninterrupted walking distance when given access to their most preferred activity (MSWO) post obligatory exercise.

Key Terms

***Autism Spectrum Disorder (ASD*):** ASD is a developmental disability, involving impairments in social interaction, such as being aware of other people's feelings and verbal and nonverbal communication (American Psychiatric Association, 2013).

Exercise: Exercise is defines as a physical activity that is planned, structured, repetitive, and purposeful for the improvement or maintenance of one or more components of physical fitness (Caspersen, Powell & Christenson,1985).

Exercise Frequency: The number of times an exercise or activity is performed throughout a designated period of time (Physical Activity Guidelines Advisory Committee, 2008).

Exercise Program: Physical activity that is planned, structured, and repetitive and purposive in the sense that the improvement or maintenance of one or more components of physical fitness is the objective (Physical Activity Guidelines Advisory Committee, 2008).

***Preference Assessment*:** A preference assessment is a behavioral technique wherein technicians use a stimulus pyramid with all options available at first. Every time the student makes a decision that option is removed until the student is left with the least preferred activity (Chazin & Ledford, 2016).

Physical Activity: Activity performed during leisure time with the primary purpose of improving or maintaining physical fitness, physical performance, or health (Physical Activity Guidelines Advisory Committee, 2008).

Assumptions

This study was subject to the following assumptions:

1. The students understood the directions.

2. The researcher were capable of administering all testing procedures throughout this study.
3. Each student would respond appropriately to all three levels of motivation within this study.
4. The physical demands of the task typified the levels of exertion recommended for students at this age and gender.

Limitations

This study was subject to the following limitations:

1.Generalizability of results is weakened by a small population size (n = 6).

2.Length of study and number of times each condition was implemented within this investigation could have contributed to final results.

3.Student's degree of effort during all performances was not measured.

Delimitations

This study was subject to the following delimitations:

1. All phases of this investigation occurred in the same setting for each student.
2. All phases throughout this study were recorded by the researcher.

3. All data for each student was collected at the same time for each treatment phase.

Significance

In America, children and adults do not get enough exercise (Matthews et al., 2008). Specifically, students with ASD have been reported as engaging in low levels of exercise throughout their day (Pan, 2009; 2011). Further, researchers have placed students with ASD in a particular risk group due to the low levels of exercise reported within the population (World Health Organization, 2002). For these reasons, the researcher believes that providing evidence for instructional techniques that increase the exercise levels for this population is essential for future outcomes.

LITERATURE REVIEW

Benefits of Exercise for Students with ASD

The CDC (2013) reported that a sedentary lifestyle may lead to a decline in health; therefore individuals who regularly incorporate exercise into their daily routine may avoid health regression (Physical Activity Guidelines Advisory Committee, 2008). The APA (2013) suggests regular physical exercise increases emotional resilience to stress and anxiety. Stress and anxiety stem from an individual's outlook on life and researchers have concluded exercise may help increase a positive outlook and decrease anxiety (Thayer et al., 1994). Also, aerobic exercise, as well as other forms of physical activity enhance mood and reduce anxiety (e.g., Caldwell, Emery, Harrison, & Greeson, 2011; Johansson, Hassmen, & Jouper, 2011; Kim & Leem, 2014).

Benefits of MSWO for Students with ASD

Positive reinforcement is one of the core principles of operant conditioning (Mangum, Fredrick, Pabico & Roane, 2011). Literature suggests preference assessment may help produce targeted behavioral change (Lanner, Nichols, Field, Hanson, & Zane, 2010). A standard way to find reinforcers is an MSWO preference assessment (Mesibov

& Shea, 2009). When developing a positive reinforcement based program for students with ASD and related developmental disabilities the researcher may need to consider that different individuals display preferences for different stimuli thus what may function as a reinforcer for one individual may not work for another individual (Mangum, Fredrick, Pabico & Roane, 2011). Because many students with ASD lack the skills necessary to self-report the preferred items, preference assessments receive much attention (Mangum, Fredrick, Pabico & Roane, 2011). Applied behavior analysts use this technique to develop the desired response and support for the unique needs of the student (Welterlin, 2009). Recently, researchers have demonstrated that moderate and low ranked items on stimulus preference assessments may function as reinforcers (Ciccone, Graff & Ahearn, 2006). In this study, the primary researcher would use an MSWO preference assessment. A benefit of MSWO preference assessments is the ease at which criteria for assessment options can be quickly gathered. Options are gathered by collaborating with parents and support staff. In previous research, half of the preferred items were included based on caregiver reports and the rest were based on staff observations of the student's interaction with the objects (Steinhilber & Johnson, 2007).

CHAPTER II: METHOD

The purpose of this study was to determine if an MSWO program would increase the uninterrupted walking distance of students with ASD (i.e., Level 2, Level 3). A repeated measures (Verma, 2016) design was used that involved two baseline phases and two intervention phases. The information within this Chapter addresses the method used to compare the impact of access to a preferred activity and total uninterrupted exercise distance (i.e., walking). This information is related to the method in the following sections: (a) Participant Information, (b) Instrumentation, (c) Procedures, (d) Research Design, and (d) Data Analyses.

Participant Information

Six students (i.e., 3 male, 3 female) from a non-integrated high school in California were recruited for this study. The students' ages ranged from 14 to 22 years (M =17). Each student had a previous diagnosis of ASD as per DSM-V (2013). Additionally, each student demonstrated low levels of physical activity as reported by the school principal, homeroom teacher, and through direct observation by the primary

researcher before recruitment. Further, each student demonstrated the ability to follow verbal directions when given. Lastly, each student was able to complete a full two laps of walking around the perimeter of the campus before this investigation began.

Recruitment of Participants

Recruitment of students began after gaining IRB approval from Humboldt State University through flyers and speaking directly with parents, caretakers, and classroom teachers. Information about this study and consent forms were mailed (via United States Postal Service Delivery) to all parents or caretakers for potential participants. The primary researcher informed guardians of each participant that participation in this study is optional, and their child had the option to withdraw from the study at any time. Parents or caretakers were also be informed to contact the primary researcher or IRB at Humboldt State University with any questions concerning this study. Before beginning this study, the primary researcher provided verbal assent to participate.

Recruitment and Training of Research Assistants

Five research assistants were recruited to assist with data collection. Training of volunteers consisted of: (a) a training in prompting procedures for students (i.e., "first walk then play," "place beanbag in a bucket when all done," "all done time to play"), and (b) data collection (i.e., circling lap completion on the data sheet). The primary researcher

also had each research assistant demonstrate they were capable of walking the total distance (i.e., 800 yards) before beginning this study.

Instrumentation

For this study, MSWO preference assessments were implemented (Chazin & Ledford, 2016). The MSWO assessment was created to measure behavior changes based on the introduction of a stimulus (Chazin & Ledford, 2016). For this study, each student had the opportunity to select three tangible items (i.e., rewards) which the researcher made available to the students based on available resources and students' interests (e.g., yoga mat, bicycle, bat and ball set). Student were given the reward and allowed the opportunity to engage in a structured or unstructured activity (i.e., based on participant) for a total of 10 minutes after completing the desired physical activity (i.e., walking) within the intervention phase.

PROCEDURES

Performance criteria

Performance criteria included the ability to complete a walk around the campus perimeter twice (i.e., 400 yards). Each student was told by the primary researcher or research assistant to grab a bean bag (i.e.,6 x 6in) and carry it back to the start area. The goal was for each student to successfully pick-up a bean bag and drop into an orange utility bucket showing they walked a total of 400 yards, completing the walk. In the event, a student stopped walking the research assistant waited a total of five seconds for the student to begin walking again. If the student did not start walking, the research assistant again will provide a verbal prompt (i.e., “first walk then play”). If the student did not begin walking after the first verbal prompt (i.e., 5 seconds) the research assistant gave a final verbal prompt (i.e., “first walk then play”). Students that began walking were allowed to continue. Students who did not start walking had their total time and distance recorded and were escorted by the research assistant back to their scheduled classroom. Verbal prompts were determined based on school procedures and familiarity of students under these conditions.

Assessment

For this investigation, each participant was assessed based on the total time of uninterrupted walking distance completed during each phase of this study. The primary researcher recorded all walking distances for each student, as well as, their item of reward for that day. These distances provided the researcher with data to determine the impact of the MSWO for this group of students.

Performance Setting

The students walked the same 400-yard route every day. The route was along the school perimeter. The preference assessment also took place in the students' naturalistic setting. The students played in a county-owned multi-purpose building. The primary researcher conducted all preference assessments in the same environment.

Selection of Most Desired Reward

To determine the most preferred item (i.e., reward), the primary researcher placed a total of 10 possible items of choice on a table in front of each student. Each student was allowed the opportunity to pick their most preferred item (i.e., item 1). After each student selected their first most preferred item, the primary researcher removed that item and presented each student with a total of nine possible items. Each student was then allowed the opportunity to pick their second most preferred item (i.e., item 2). After each student selected their second most preferred item, the primary researcher removed that item and

presented each student with a total of eight possible items. Each student was then allowed the opportunity to pick their third most preferred item (i.e., item 3). The three most preferred items were used throughout both intervention phases of this investigation as a motivational reward for the students to complete the undesired activity (i.e., walking exercise).

RESEARCH DESIGN

All baseline data for each student was collected for five consecutive school days (i.e., Monday-Friday). To accomplish this as a repeated measures design was implemented which included two baseline phases and two intervention phases. The following paragraphs illustrate the design with which the primary researcher collected data.

Baseline Phase One

For the first day of the baseline phase, the researcher instructed each student to walk a total of four laps (i.e., 800 yards). The researcher recorded the total time and distance the student walked. Walking time concluded once the student stopped walking for five or more seconds. Within this baseline phase, no student received any reward for beginning or completing any amount of time or distance of the walking exercise.

Within the first baseline phase on day 2, the researcher instructed each student to walk a total of four laps (i.e., 800 yards). The researcher recorded the total time and distance the student walked. Walking time concluded once the student stopped walking for five or more seconds. Each student had been assessed a total of three times within the first baseline phase (i.e., Wednesday). Within this baseline phase, no student received any

reward for beginning or completing any amount of time or distance of the walking exercise.

Within the first baseline phase on day 3, the researcher instructed each student to walk a total of four laps (i.e., 800 yards). The researcher recorded the total time and distance the student walked. Walking time concluded once the student stopped walking for five or more seconds. Each student had been assessed a total of three times within the first baseline phase (i.e., Friday). Within this baseline phase, no student received any reward for beginning or completing any amount of time or distance of the walking exercise.

Intervention Phase One

For the first day of the intervention phase, the researcher instructed each student they need to walk a total of four laps (i.e., 800 yards) of uninterrupted walking to receive their most preferred item. The researcher allowed each student to view his or her most desired reward before beginning the walking activity. All students were reminded that to receive their most desired reward they would need to complete all four laps (i.e., 800 yards) of uninterrupted walking (i.e., no stopping for more than 5 seconds).

Within the first intervention phase on day 2, the researcher instructed each student they needed to walk a total of four laps (i.e., 800 yards) of uninterrupted walking to receive their second most preferred item. The researcher allowed each student to view his or her second most desired reward before beginning the walking intervention. All

students were reminded to receive the second most desired reward they needed to complete all four laps (i.e., 800 yards) of uninterrupted walking (i.e., no stopping for more than 5 seconds).

Within the first intervention phase on day 3, the researcher instructed each student they need to walk a total of four laps (i.e., 800 yards) of uninterrupted walking to receive their third most preferred item. The researcher allowed each student to view his or her third most desired reward before beginning the walking intervention. All students were reminded to receive the third most desired reward they needed to complete all four laps (i.e., 800 yards) of uninterrupted walking (i.e., no stopping for more than 5 seconds).

Baseline Phase Two

For the first day of the second baseline phase, the researcher instructed each student to walk a total of four laps (i.e., 800 yards). The researcher recorded the total time and distance the student walked. Walking time concluded once the student stopped walking for five or more seconds. Within this baseline phase, no student received any reward for beginning or completing any amount of time or distance of the walking exercise.

Within the second baseline phase on day 2, the researcher instructed each student to walk a total of four laps (i.e., 800 yards). The researcher recorded the total time and distance the student walked. Walking time concluded once the student stopped walking

for five or more seconds. Each student had been assessed a total of three times within the second baseline phase (i.e., Wednesday). Within this baseline phase, no student received any reward for beginning or completing any amount of time or distance of the walking exercise.

Within the second baseline phase on day 3, the researcher instructed each student to walk a total of four laps (i.e., 800 yards). The researcher recorded the total time and distance the student walked. Walking time concluded once the student stopped walking for five or more seconds. Each student had been assessed a total of three times within the second baseline phase (i.e., Friday). Within this baseline phase, no student received any reward for beginning or completing any amount of time or distance of the walking exercise.

Intervention Phase Two

For the second intervention phase on day 1, the researcher instructed each student they need to walk a total of four laps (i.e., 800 yards) of uninterrupted walking to receive their most preferred item. The researcher allowed each student to view his or her most desired reward before beginning the walking intervention. All students were reminded to receive the most desired reward they needed to complete all four laps (i.e., 800 yards) of uninterrupted walking (i.e., no stopping for more than 5 seconds).

Within the second intervention phase on day 2, the researcher instructed each student that they needed to walk a total of four laps (i.e., 800 yards) of uninterrupted

walking to receive their second most preferred item. The researcher allowed each student to view his or her second most desired reward before beginning the walking intervention. All students were reminded to receive the second most desired reward they needed to complete all four laps (i.e., 800 yards) of uninterrupted walking (i.e., no stopping for more than 5 seconds).

Within the second intervention phase on day 3, the researcher instructed each student they needed to walk a total of four laps (i.e., 800 yards) of uninterrupted walking to receive their third most preferred item. The researcher allowed each student to view his or her third most desired reward before beginning the walking intervention. All students were reminded to receive the third most desired reward they needed to complete all four laps (i.e., 800 yards) of uninterrupted walking (i.e., no stopping for more than 5 seconds).

Research Design

The experimental design focused on the cause and effect of utilizing preferred activities to encourage an increase in uninterrupted baseline walking distance. The dependent variable in this study was the amount of uninterrupted walking the student completed. The independent variable was the preferred activity. The hypothesis is students would engage in more uninterrupted walking when assured access to their preferred activity.

Data Analyses

A paired-samples t-test was conducted to analyze differences between students' (n = 6) continuous exercise compliance (e.g., 400 yards). The primary researcher undertook two experimental conditions (e.g., access to the preferred activity, no access to the preferred activity). Student groups partook in both conditions. Two samples of data were gathered, compared and calculated with a significant level of $p > .05$.

CHAPTER III: RESULTS

A paired-samples t-test was conducted to analyze the impact of the intervention on the student's total uninterrupted walking distance. uninterrupted walking mean scores between two different phases. The researcher conducted a repeated measures design that included two baseline phases and two intervention phases. The below results represent the group's performances within each one of these phases. It was hypothesized that total uninterrupted walking distance would increase within the two intervention phases when the MSWO assessment was introduced.

First Preferred Activity

Results for the group (n = 6) within the first preferred activity demonstrated an uninterrupted walking increase from M = 354 yds (SD = 190.78 yds) to M = 498 yds (SD = 113.81 yds). These results demonstrate that when students with ASD are provided the opportunity to select a reward (i.e., most preferred) for the completion of a task the likelihood of the performance increasing is significant (i.e., $P < .03$). See Table 1 below.

Table 1: t-Test: Paired Two Sample for Means

	Baseline	*First Preferred Activity*
Mean	354.00	498.00
Variance	36396.00	12952.00
Observations	6.00	6.00
Pearson Correlation	0.90	
Hypothesized Mean Difference	0.00	
df	5.00	
t Stat	-3.48	
P(T<=t) one-tail	0.01	
t Critical one-tail	2.02	
P(T<=t) two-tail	0.02	
t Critical two-tail	2.57	

Second Preferred Activity

Results for the group (n = 6) within the first preferred activity demonstrated an uninterrupted walking decrease from M = 354 yds (SD Baseline = 18.81 yds) to M = 258

yds (SD = 16.07 yds). These results demonstrate that when students with ASD are provided the opportunity to select a reward (i.e., second most preferred) for the completion of a task the likelihood of the performance increasing is not significant (i.e., P < .2). See Table 2 below.

Table 2: t-Test: Paired Two Sample for Means

	Baseline	*Second Preferred Activity*
Mean	354	258.3333333
Variance	36396	31166.66667
Observations	6	6
Pearson Correlation	0.0219715	
Hypothesized Mean Difference	0	
df	5	
t Stat	0.91157517	
P(T<=t) one-tail	0.20190011	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.40380022	
t Critical two-tail	2.570581836	

Third Preferred Activity

Results for the group (n = 6) within the first preferred activity demonstrated an uninterrupted walking decrease from M = 354 yds (SD Baseline = 18.81 yds) to M = 223 yds (SD = 106.78 yds). These results demonstrate that when students with ASD are provided the opportunity to select a reward (i.e., third most preferred) for the completion of a task the likelihood of the performance increasing is not significant (i.e., $P < .1$). See Table 3 below.

Table 3: t-Test: Paired Two Sample for Means

	Baseline	*Third Preferred Activity*
Mean	354	223
Variance	36396	11404
Observations	6	6
Pearson Correlation	-0.193127961	
Hypothesized Mean Difference	0	
df	5	
t Stat	1.360001636	
P(T<=t) one-tail	0.115968784	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.231937568	
t Critical two-tail	2.570581836	

CHAPTER IV: DISCUSSION, CONCLUSIONS, AND RECCOMMENDATIONS FOR FUTURE RESEARCH

The purpose of this study was to determine if an MSWO program would increase the uninterrupted walking distance of students with ASD. The primary researcher hypothesized that the students with ASD would increase their total uninterrupted walking when given access to preferred activity (MSWO) post obligatory exercise. Results from this study demonstrated that when given access to their first preferred physical activity students increased their total walking distance. Additional results also suggested that students with ASD will not exercise more when given access to the second or third preferred activities. Researchers have reported that students with ASD are not exercising as much as their typically developing peers (Bandini et al., 2012). Because of this, many students with ASD will need some form of extra support (e.g., behavior) within their typical day (John, Dawson, & Estes, 2018). Implementing an MSWO assessment allowed the researcher to utilize a preferred activity to increase the performance during non-preferred physical activity. These results are similar to a study conducted by Mathew and Swerdan-Rocio Rosales (2015). Physical activity has a host of benefits (e.g., biochemical, psychosocial, physiological) that positively impact the quality of life for

students with ASD (QOL; Dittus, Gramling, & Ades, 017; Sowa & Meulenbroek, 2012). For these reasons, practitioners working with students with ASD need to develop instructional strategies (e.g., MSWO) that continually increase the exercise levels for this population. The students preferred to walk to the mall over any of their other physical activities. The primary researcher believes that an MSWO helped find this preference, and without taking data, it may have gone unnoticed. One reason for success within this study could be attributed to the research assistants who were knowledgeable of their behavior and preferences for each student. Some aspects were unsuccessful; perhaps more research should have been dedicated to student workout cessation and how the students were to communicate when there were done walking.

CONCLUSION

When provided with the opportunity to engage with their first preferred activity, students with ASD demonstrated an increase in walking distance. The activity for the students in this research was walking to the mall. Students showed statistically relevant walking data outcomes when they are allowed to walk to the mall ($P < .03$) as opposed to the second ($P < .2$, Bike) and third ($P < .1$, Yoga, Physio Ball) most preferred activities. For a study of this population to warrant any result whether relevant or not takes expertise in the field of applied behavior analysis and also takes familiarity with the subjects. Therefore, a strength of this study was the primary researcher's relationship with the students, staff, and parents. Most research opportunities may not be so lucky as to know the students' behaviors and traits. A limitation may be some students did not hold the bean bag the entire time they were walking, and drop it but continue walking. Some students grabbed the hand of the research assistant when they were tired; this may have shown they were done walking independently. Some students dropped to the ground when they were tired or overstimulated; this may have also indicated cessation. Some students dropped the bag in the bucket some drop it because they had no desire to hold it and some grab the hand of the research assistant when they were tired and wanted help

walking. The sample size (n = 6) is a limitation. Perhaps a larger sample size may yield different results.

Recommendations for Future Research

Forward, research should focus on destination walking as a means to increase physical activity. The primary researcher found students are more likely to exercise when they are excited to walk to a place of their liking (e.g., mall). These findings are useful to classroom teachers because they can encourage physical activity and engagement in community outings. Finding age-appropriate activities may be difficult for this population, walking to and around the mall may be an excellent opportunity to socialize and achieve fitness. Both are necessary for the positive development of the student.

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