EXERCISE AND THE EFFECTS OF OFF-TASK TIME BEHAVIOR DURING ACADEMIC TIME AMONG CHILDREN WITH INTELLECTUAL DISABILITIES

By

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ABSTRACT

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BACKGROUND: Physical activity participation has decreased, especially for the special education community. With no time for exercise, or the proper exercise, on task time for children with intellectual disabilities can be a very challenging time.

PURPOSE: The purpose of this study was to examine the impact of a physical activity program (i.e., yoga) on the total number of off-task behaviors and total time on-task for children with I.D. during their academic period.

METHODS: On task time data will be collected during control and experimental sessions. Statistical analysis will be conducted to determine if exercise before instructional time effects on task behavior for children with intellectual disabilities.

RESULTS: Future research should continue to study the effects of yoga and off-task time behavior during academic time among children with I.D.

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CHAPTER I

INTRODUCTION

Research on individuals who engage in regular exercise have demonstrated positive health benefits in both cardiovascular and cognitive functioning (Mental Health Foundation, 2017). In 2017, the Centers for Disease Control and Prevention reported that 56.7 million (i.e., 18.7%) people living within the United States have been diagnosed with some type of disability. Individuals living with disabilities, including children with intellectual disabilities (ID), are often excluded from participating in regular exercise and therefore do not receive the same exercise benefits as their typically developing peers (CN). Researchers have reported that physical activity (PA) levels of children and adolescents with ID are consistently lower than their typical developing peers (Hinckson & Curtis, 2013). Practicing yoga may provide a positive type of PA that children with ID can regularly participate in. Researchers have reported that yoga can have a positive impact on an individual's life as yoga has reduced stress, anxiety, and depression, as well as improved cognitive functioning (Tamilselvi & Mala, 2016). For these reasons the primary researcher believes these same benefits could be obtained for children with an ID.

Intellectual Disability

ID has been identified as one of the 13 disabilities under the Individuals with Disabilities Education Improvement Act (IDEIA, 2004). ID is a disorder with onset

during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains (American Psychological Association [APA], 2013). ID is characterized by: (a) significant limitations in both intellectual functioning (i.e., reasoning, learning, and problem solving) and in adaptive behavior (i.e., noncompliance, aggression, disruption, and verbal aggression), covering a wide range of everyday social and practical skills; and (b) an IQ below 70 (American Association on Intellectual and Developmental Disabilities, 2010). Children with ID often have a more difficult time completing and learning new skills, such as reasoning, problem solving, abstract thinking and staying on-task (APA, 2013).

Off-Task Behavior

Children with an ID may become angry and aggressive, as they are not provided the same opportunities as their typical developing peers. These behaviors may include physical aggression, verbal aggression, non-compliance, disruption, elopement and staying on-task (Mehregan et al., 2016). Occurrence of behavioral disorders within this population is four times higher than that of the general population (Mehregan, Hossein, & Kimia, 2016). Problem behaviours assume lot of significance because they perpetuate stigma, discrimination and negative attitudes generally associated with intellectual disabilities. They are universally identified as a potential risk factor for exclusion from mainstream and interfering with inclusion in the society (Kishore et al. 2004).

Yoga

Yoga's traditional purpose is to provide a guide for the integration of body, mind, and spirit, leading to happiness and wellbeing (Feurestein, 2003). Yoga incorporates physical postures breath control, mental concentration, and deep relaxation to positively affect mental states (Zipkin, 1985). Yoga produces similar effects as relaxation, as it promotes feelings of calmness, self-control, attention and concentration, self-efficacy, body awareness, and stress reduction (Nardo & Reynolds, 2002). Children with an ID who demonstrate inappropriate behaviors, such as those listed above may benefit from a yoga program.

LITERATURE REVIEW

Benefits of Exercise

Researchers have reported that incorporating a mix of aerobic and muscle-strengthening activities three to five times a week for 30 to 60 minutes a day can improve mental functioning (CDC, 2018). Additional benefits of physical activity include, reducing risks of cardiovascular disease, Type 2 diabetes, cancer, as well as improving bone and muscle strength, mental health, general mood, and the ability to participate in daily activities (CDC, 2018). Yoga has also been reported as a positive intervention to increase the socialization opportunities and skills for children with disabilities (Ilkim, Tanir, & Ozdemir, 2018).

Children with disabilities need access to physical education to have the opportunity to receive those health benefits. Unfortunately, many children who have a disability, including those with an ID and receive special education services do not receive quality physical education instruction (Block, Taliaferro, Campbell, Harris, & Tipton, 2011). Facing daily discrimination in the form of negative attitudes, lack of adequate policies and legislation, they are effectively barred from realizing their rights to healthcare, education, and even survival (United Nations International Children's Emergency Fund, 2017). To ensure that all children, including those with an ID are meeting physical activity guidelines educators should encourage participation in age appropriate physical activities that are enjoyable and offer variety of movements and exploration (Office of Disease Prevention and Health Promotion, 2018).

Benefits of Yoga

Yoga is one such alternative form of exercise that shows promise as an intervention for a variety of social, emotional, behavioral, and academic difficulties (Nardo & Reynolds. 2002). Yoga improves physical and psychological conditions, including low-back pain, cardiovascular disease, stress, and anxiety. The physical postures enable flexibility and help remediate sports-related and other injuries. Yoga is a relaxation technique that can decrease breathing rate, heart rate, and blood pressure. These physical changes activate the parasympathetic nervous system, triggering relaxation. Continuing this health behavior over time brings increased parasympathetic

drive, calming of stress responses, hormonal release, and brain (thalamic) activity (Atkinson, 2009).

Yoga produces similar effects as relaxation in that it tends to result in feelings of calmness and promotes self-control, attention and concentration, self-efficacy, body awareness, and stress reduction (Nardo & Reynolds, 2002). Specifically, Redfring and Bowman (1981) and Manocha and Rubia (2004) reported that a yoga program was successful in reducing inattention and impulsive and oppositional behavior for children with ADHD. Along with the positive benefits of yoga, this form of exercise is also being used in oppose to stimulant medications that can also treat attention problems (Pelham, 1993).

Off-Task Behavior

Researchers have often focused on off-task behavior as an indicator of students breaking classroom norms and as deviant behavior with negative consequences for student learning (Doyle 2006; Emmer & Stough 2001). Conversely, Hofer (2007) argued that students do display off-task behavior because they try to reach non-curricular goals aside from their learning goals. While little research has focused on on-task time behavior directly preceding PA, reports have demonstrated positive results for self-esteem, depression, self-concept, emotional, behavioral, and social well-being (Donaldson and Ronin, 2006). PA, especially physical education, improves classroom behaviors and benefits several aspects of academic achievement, especially mathematics-related skills, reading, and composite scores in youth (Álvarez-Bueno, Pesce, Cavero-Redondo, 2017).

With research focusing on specific disabilities and the effects that PA can contribute to, the primary researcher in investigating the effects of PA on on-task time behavior in children with ID.

Purpose Statement

The purpose of this study is to examine the impact of a yoga program on the on-task behaviors demonstrated in the following academic time for children with ID.

Keywords:

Intellectual Disability: A disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains

Off-Task Behavior: Breaking classroom norms and as deviant behavior with negative consequences for student learning.

Physical Aggression: Purposely attempting to cause harm to someone or something through hitting, kicking, biting, pinching, pulling hair, etc.

Verbal Aggression: Any threat or comment directed towards others that indicates any form of physical harm to another person (e.g. “I am going to throw you down the stairs!”)

Non-compliance: Refusing to follow directions, refusals to move, refusals to make a choice, falling to the ground and refusing to move; only charted if lasting more than 1 minute.

Disruption/Outburst: Yelling, screaming, knocking over items, destroying or damaging items or property, other physical or verbal incidents that significantly impact others ability to access their environment.

Elopement: Leaving the designated supervised area without permission.

CHAPTER II

METHOD

Participants

Four participants aged 12 to 17 with a previous diagnosis of ID were recruited for this study. Each participant was recruited from a school in Northern California designed for children with disabilities, including behavioral needs. Each of the four participants has been chosen based on age similarity, disability (i.e., ID). Additionally, each participant has demonstrated behavior similarities which include off-task behaviors (i.e., disruption/outburst, elopement, verbal aggression, physical aggression, and non-compliance).

Research Assistant

Research assistant has worked in a one-on-one setting with each participant for at least one year. Research assistant is aware of off-task behaviors and have tracked target behaviors over the course of the school year. Prior to collecting data, the primary researcher will train research assistant by providing a written definition of each off-task behavior, and a modeled example of the off-task behavior. Additionally, research assistant will successfully complete a matching test of off-task behavior with the correct definition at 100%. If research assistant does not successfully meet the 100%

requirements, will be retrained by the primary researcher until the performance criteria is met.

Instruments

The instruments used in this study will include the video "Yoga for Kids!" (Storyhive, 2017). The video is 25 minutes in length and includes breathing exercises, a warm-up, yoga poses, and a power down. In total Yoga for Kids goes through a total of 13 man yoga poses within the 25-minute video. See Figure 1 below for a complete listing of the "Yoga for Kids!" layout.

Table 1: *Yoga for Kids poses, time in pose, and description of movement*

Introductions	0-36 seconds	
Breathing Exercises	Time in video	Description
Balloon Breathing	44 seconds-3:12	Hands on belly breathing in through the nose and out through the mouth.
Warm Up	3:12-6:35	Sitting, crossing legs, painting circles with the spine. Arms doing side bends waving over the head. Head moving from side to side stretching the neck. Stretching legs out in front shaking the body and loosening up all parts of the body.
Yoga Pose	Total Time in Pose	Description of Movement

Cow Pose	1 minute 15 seconds	On hands and knees, stretching back, breathing in pushing belly button to the floor. Then breathing out, arching the back, moving the head down.
Child's Pose	15 seconds	Sitting on your heels, resting your head on the floor and your hands by your heels.
Downward Facing Dog	15 seconds	Hands and feet on the floor with the bottom up in the air.
Upward Facing Dog	15 seconds	Palms and feet still on the flood but pushing the stomach towards the floor
Walking the Dog	20 seconds	Hands on the floor with the bottom up. Legs and feet on the floor, bouncing the feet up and down, bending the knees.
Mountain Pose	1 minute 50 seconds	Standing tall, hands to sides with palms facing out and focus on breathing.
Rocket Ship	30 seconds	Palms touching, interlace fingers, stretching arms over the head, jumping up in the air spreading the legs apart.
Tree Pose	1 minute 30 seconds	Lifting one foot where heel is touching one ankle, or bring foot to opposite calf, lifting arms either to center, above your head or out to the side.
Cobra	40 seconds	Laying down on your stomach , palms to the floor, lifting your chest as far as you can, and bringing your chest back to the floor.

Butterfly	50 seconds	Sitting, feet together, bouncing legs up and down, then crossing legs, stretching the back by bringing one arm back with the other arm on the knee.
Bridge Pose	1 minute	Laying on the back, bending the knees, palms are flat on the floor, lifting the gluteus up, and back down while breathing in and out.
Rock N' Roll	15 seconds	Bringing knees into chest, rock and roll your back front to back and sis to side.
Power Down	Time in video	Description
	18:25-23:30	1.Kneeling on the floor sitting back on the heels with the legs separated. Leaning forward with hands on the floor, lift the chest and tilt head up and roar like a lion to release energy. 2. Sit with legs out in front, wiggling the legs out. 3. Grabbing knee with hand , rock the leg back and forth to stretch hip. Then switch. 4. Legs out in front, lift hands and arms up then breathing out bend forward and touch ankles. 5. Octopus, laying on the back with arms and feet up, wiggle arms and legs to let everything out. 6. Laying on the back and arms to the sides, close eyes and breath. Then wiggle everything out. Hug knees.
Closing	23:30-24:00	Sitting on the bottom, crossing the legs, bring the hands and touching the fingertips and palms at the chest.

Time Sampling Recording Form

A time sampling recording form will be filled out daily by primary researcher and research assistant. The time sampling recording form will tally target behaviors, number of requested breaks, as well as any notes the primary researcher or research assistants need to add. The 30-minute academic session is broken down into increments of five minutes to determine when off-task behaviors are most frequent. Total number of behaviors, time on-task, will be totaled at the end of each session and tracked on the data form. Included with the recording form is the operational definition for off-task behaviors.

Table 2. *Time Sampling Recording Form*

	# Off Task Behaviors Exhibited (refer to text)	**Bx Exhibited (refer to text)**	**Notes (refer to text)**
10:00			
10:05			
10:10			
10:15			
10:20			
10:25			
10:30			
	Total # of behaviors:	**Total time off-task:**	

Target Behaviors

Physical Aggression- Purposely attempting to cause harm to someone or something through hitting, kicking, biting, pinching, pulling hair, etc.

Verbal Aggression- Any threat or comment directed towards others that indicates any form of physical harm to another person (e.g. “I am going to throw you down the stairs!”)

Non-compliance- Refusing to follow directions, refusals to move, refusals to make a choice, falling to the ground and refusing to move; only charted if lasting more than 1 minute.

Disruption/Outburst- Yelling, screaming, knocking over items, destroying or damaging items or property, other physical or verbal incidents that significantly impact others ability to access their environment.

Elopement- Leaving the designated supervised area without permission.

Assessments

For this investigation, each participant's total number of off-task behaviors and time on-task will be recorded at the end of each treatment day within each phase (i.e., baseline phase one, intervention phase one, baseline phase two, intervention phase two) of this study. Primary researcher and research assistant will record the number of individual off-task behaviors and total time on-task for the participant. Time off-task will be recorded and tallied when a participant disengages from the learning environment and engages in any disruptive behaviors that interfere with the teaching lesson. To ensure observer drift did not take place, an interobserver agreement will be calculated at the completion of each treatment session throughout this investigation (Kazdin, 2010). Calculating interobserver agreement requires at least two observers recording the same behavior using the same scoring system (Richards et al., 2014). For this investigation, the primary researcher and research assistant recorded each participant's behavior during the baseline phase one, intervention phase one, baseline phase two, and the intervention phase two. At the end of each treatment day, the primary researcher and research assistant reviewed the recordings, tallied off-task behaviors, and calculated on-task time. If a discrepancy in scores occurred between the primary researcher and research assistant, and if the interobserver agreement dropped below 80%, the primary researcher retrained the research assistants synchronously to come to a 100% agreement.

Setting

Each yoga session will be conducted in the participants/ primary classroom. The classroom is a familiar place for each participant, as each student's academic time takes place in this classroom. Within each yoga session the lights will be dimmed, and the classroom door will have a posted sign on the outside that reads as "Closed" to all other staff and students. The primary researcher and classroom paraprofessionals will be present during each yoga session. Each paraprofessional will be responsible for helping their participant complete the 25-minute yoga session each day.

Procedure for Participation

If during the yoga session a participant is not participating, they will be verbally redirected to participate. If after two verbal requests the student does not respond, they will be prompted with a (from least to most) verbal, gestural, partial – physical or full physical prompt so that they can stay engaged in the yoga session.

Research Design

This study will examine the impact of a structured yoga session on off-task behaviors in the classroom academic setting for children with ID. A withdrawal design (i.e., A-B-A-B) will be used to determine the impact of yoga on off-task behaviors.

Baseline Phase One

During the baseline phase one, the primary research and research assistants will observe and track each participant's total number of off-task behaviors within their homeroom class. Each participant's behavior will be tracked by the primary researcher and the research assistant that has been pre-assigned to the participant Off-task behaviors will be recorded for a total of 30 minutes.

Intervention Phase One

Within Intervention Phase One, the primary researcher will be implementing a 30-minute yoga session between the times of 9:30 am to 10:00 am. During this time, the primary researcher and research assistants will be assisting participants if poses are too difficult or if students are engaging in off-task behaviors. Primary researcher and assistants will be working 1:1 with each participant to keep participants engaged and in hopes of the participants meeting their full potential during the yoga session. Immediately following the yoga session, the academic session will start. During the academic time, paraprofessionals and I will be tallying the amount of times and how long the on-task behavior occurred.

Baseline Phase Two

During the baseline phase two, the primary research and research assistants will observe and track each participant total number of off-task behaviors within their homeroom class. Each participant behavior will be tracked by the primary researcher and the research assistant that has been pre-assigned to the participant Off-task behaviors will be recorded for a total of 30 minutes.

Intervention Phase Two

Within intervention phase two, the primary researcher will be implementing the 30-minute yoga session between the times of 9:30 am to 10:00 am. During this time, the primary researcher and research assistants will be assisting participants if poses are too difficult or if students are engaging in off-task behaviors. Primary researcher and assistants will be working 1:1 with each participant to keep participants engaged and in hopes of the participants meeting their full potential during the yoga session. Immediately following the yoga session, the academic session will start. During the academic time, paraprofessionals and I will be tallying the amount of times and how long the on-task behavior occurred.

Visual Analysis

A withdrawal design was used to determine the impact of a structured yoga session on the total number of off-task behaviors demonstrated in the following academic classroom. This design allowed for visual analysis of the total number of off-task behaviors demonstrated by each participant and visual analysis of data points for each participant (Richards et al., 2014) across all phases.

Descriptive Statistics

For this investigation the mean percentage of the total number of off-task behaviors will be reported within each phase of this investigation. *Mean* percentage of performance will be calculated by adding up the total number of off-task behaviors

performed during the each phase, dividing by the total number of minutes within the phase and then multiplying by 100.

Social Validity

All students and research assistants completed a social validity questionnaire upon completion of the intervention phase two. The questionnaire assessed if the yoga program was a positive experience, if it could be incorporated into their daily routine, and if there were any benefits that they observed. The scale ranged from yes and no with a section for notes.

Table 3. *Social Validity Questionnaire*

Research Assistant / On Site Behaviorists /Paraprofessional Staff	Yes	No	Notes
1. Do you believe this yoga program was a positive experience for the particiants?			
2. Do you believe this yoga program could be a part of the daily routine for these participants?			
3. Were there any other benefits that you observed from this yoga program for the participants?			

CHAPTER III

Individual Results

Participant 1

Participant 1 is a 14 year-old female who was diagnosed with a primary disability of ID (i.e., mild to moderate) and a secondary diagnosis of Speech or Language Impairment (i.e., mild to moderate). Participant 1 was referred for special education services in 2006. Participant 1 uses expressive language and is very social. Participant 1 on a weekly basis participates in yoga either independently or within a class setting.

Baseline phase 1. Participant 1 exhibited a total of six non-compliance (NC) behaviors within baseline phase 1. On average, Participant 1 demonstrated a little more than one NC behavior per day for each 30-minute academic period as observed by the primary researcher. Participant 1 was on-task for a total of 143 minutes in a total of the 150 (i.e., 95%) minute work time throughout the week. Verbal and gestural prompts were used by the primary researcher during the 30-minute academic time to promote on task-time behavior for Participant 1.

Intervention phase 1. Participant 1 participated in a 30-minute yoga program for four consecutive treatment days (e.g., Monday to Friday). Post-intervention, Participant 1 transitioned to a 30-minute academic period focused on their academic goal. Participant 1 had a total of one off-task behavior during the first intervention phase, which on average was less than one NC behavior per treatment session.. Participant 1 was on-task for a total of 117 of the 120 minutes (i.e., 97%) for the intervention phase (1 day

observed holiday allowed no school). The primary researcher continued to use verbal and gestural prompts during the yoga and academic sessions to keep participant on-task.

Baseline phase 2. Within baseline phase 2, Participant 1 demonstrated three acts of NC over five consecutive non-treatment days based on direct observation by the primary researcher. On average, Participant 1 demonstrated less than one NC behavior during the academic day. Participant 1 was on task for a total of 141 minutes for the 150 minute (i.e., 94%) academic period for the week. Verbal and gestural prompts were used during the academic session to keep participant 1 on task.

Intervention phase 2. Within intervention phase 2, Participant 1 participated in the yoga session and then began a thirty minute academic period. During the academic period, Participant 1 exhibited one NC behavior during the five treatment days. Participant 1 was on task for a total of 148 minutes for the 150 minutes (i.e., 98%) within the five days of academic period following the intervention. Verbal and gestural prompts were used in yoga as well as academic time to keep participant on task.

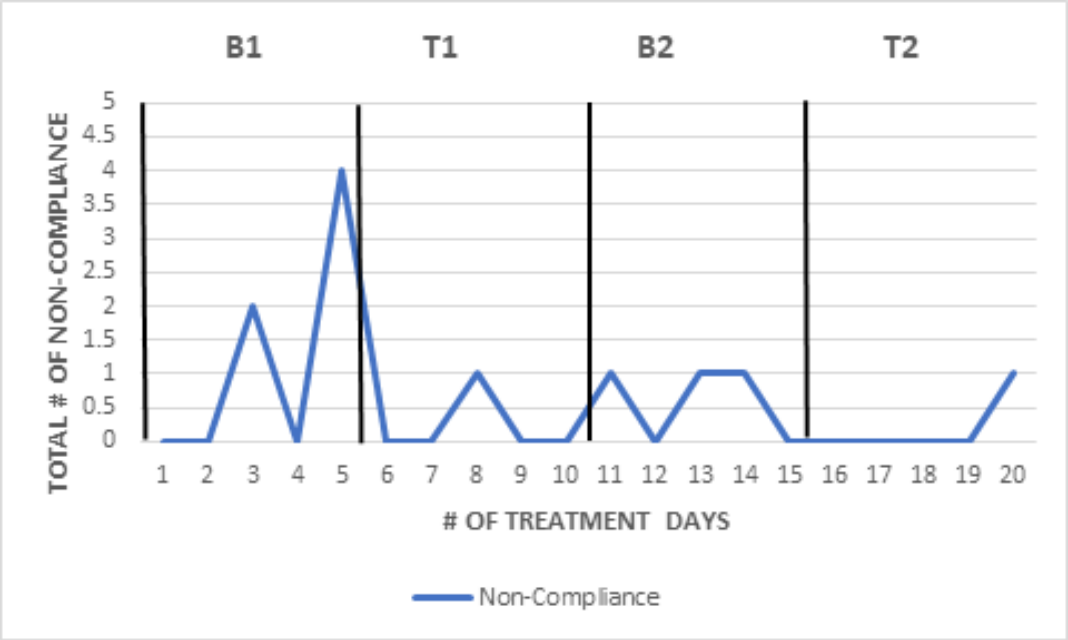

Figure 1. Participant 1: Total Number of Non-Compliance Acts. *Note*: B1 = Baseline Phase 1, T1 = Treatment Phase 1, B2 = Baseline Phase 2, T2 = Treatment Phase 2

Participant 2

Participant 2 is a 13 year-old male who was diagnosed with a primary diagnosis of ID (i.e., moderate to severe) with no secondary disability. Participant 2 was referred for special education services in 2008. Participant 2 frequently demonstrates behaviors which impede his learning, as well as the learning of others. Participant 2 engages in daily individual physical activity (i.e., bike riding) or in the regular physical education class. Participant 2 has no prior experience with yoga.

Baseline phase 1. Participant 2 exhibited a total of 37 NC, 2 verbal aggression (VA) and 3 acts of elopement within baseline phase 1. On average, participant 2 demonstrated 7 acts of N.C., less than 1 act of Elopement and less than 1 act of Verbal Aggression per day for each thirty-minute academic period as observed by the primary

researcher. Participant 2 was on task for a total of 67 minutes in a total of the 150 minute (i.e., 44%) work time throughout the week. Verbal and gestural prompts were used by the primary researcher during the 30-minute academic time to promote on task-time behavior for participant 2. Planned ignoring, waiting, instruction given and redirection were used when student was showing signs of non-compliance and elopement.

Intervention phase 1**.** Participant 2 participated in a 30-minute yoga program for four consecutive treatment days (e.g, Tuesday to Friday). Post-intervention, Participant 2 transitioned to a 30-minute academic period focused on IEP goal work. Participant 2 had a total of 11 acts of NC and 2 acts of Elopement, which on average is 2 incidences of NC and less than 1 incidence of elopement per treatment session. Participant 2 was on task for a total of 74 minutes of the 120 (i.e., 61%) minutes for the intervention phase (1 day observed holiday allowed no school). The primary researcher continued to use verbal and gestural prompts during the yoga and academic sessions to keep participant on-task. Planned ignoring, waiting, instruction given and redirection were used when student was showing signs of non-compliance and elopement.

Baseline phase 2**.** Within baseline phase 2, Participant 2 demonstrated 15 acts of NC and 1 act of elopement over five consecutive non-treatment days based on direct observation by the primary researcher. On average, Participant 2 demonstrated 3 NC behaviors per day and .2 behaviors of elopement during the academic period. Participant 2 was on task for a total of 126 minutes for the 150 (i.e., 84%) minute academic period for the week. Verbal and gestural prompts were used by the primary researcher to keep

participant on-task. Planned ignoring, waiting, instruction given and redirection were used when student was showing signs of NC and elopement.

Intervention phase 2**.** Within intervention phase 2, Participant 2 participated in the yoga session and then began a thirty-minute academic period. During the academic period, Participant exhibited 12 acts of NC and 2 acts of elopement, on average that is 2 incidences of NC and less than 1 incidence of elopement per treatment session. Participant 2 was on task for a total of 70 minutes for the 150 minutes (i.e., 46%) within the five days of academic period following the intervention. Verbal and gestural prompts were used by the primary researcher to keep participant on-task. Planned ignoring, waiting, instruction given and redirection were used when student was showing signs of NC and elopement.

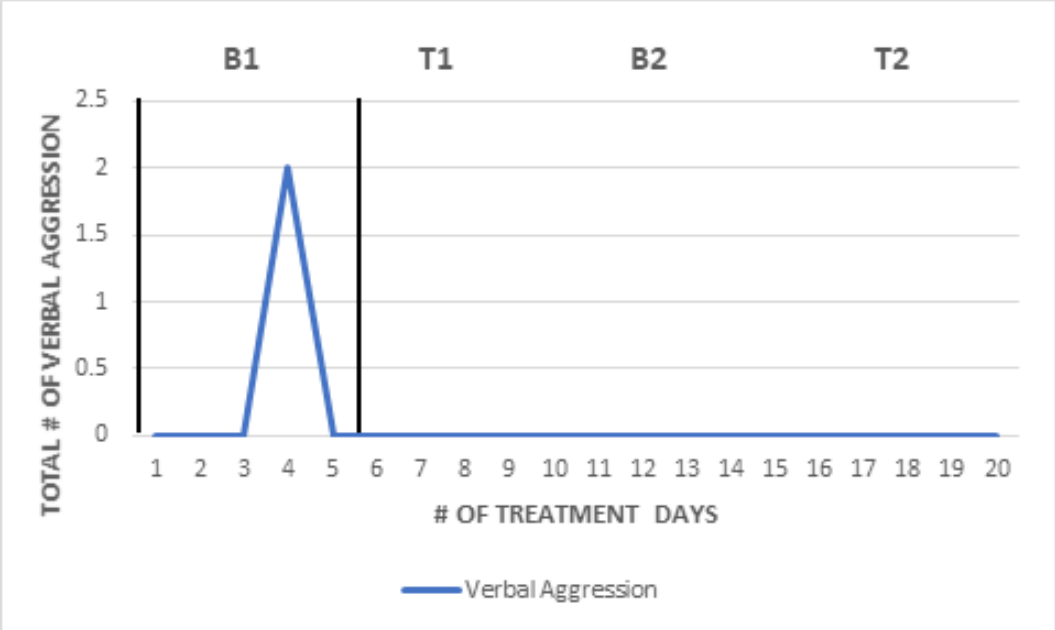

Figure 2. Participant 2: Total # of Verbal Aggression Acts. *Note*: B1 = Baseline Phase 1, T1 = Treatment Phase 1, B2 = Baseline Phase 2, T2 = Treatment Phase 2

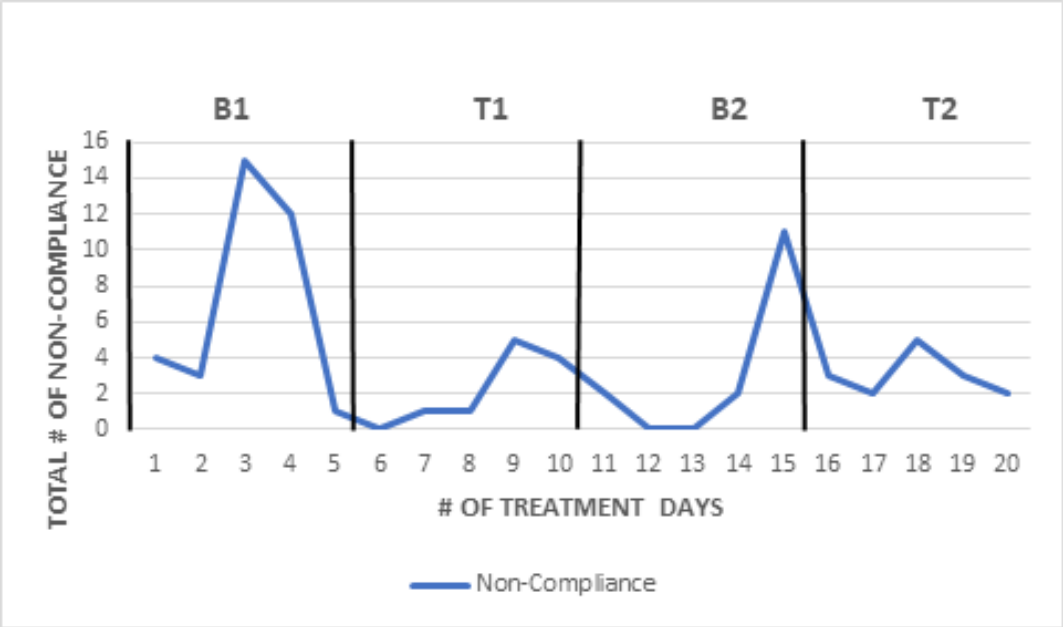

Figure 3. Participant 2: Total Number of Non-Compliance Acts. *Note:* B1= Baseline phase 1, T1 = Treatment phase 1, B2 = Baseline phase 2, T2 = Treatment phase 2

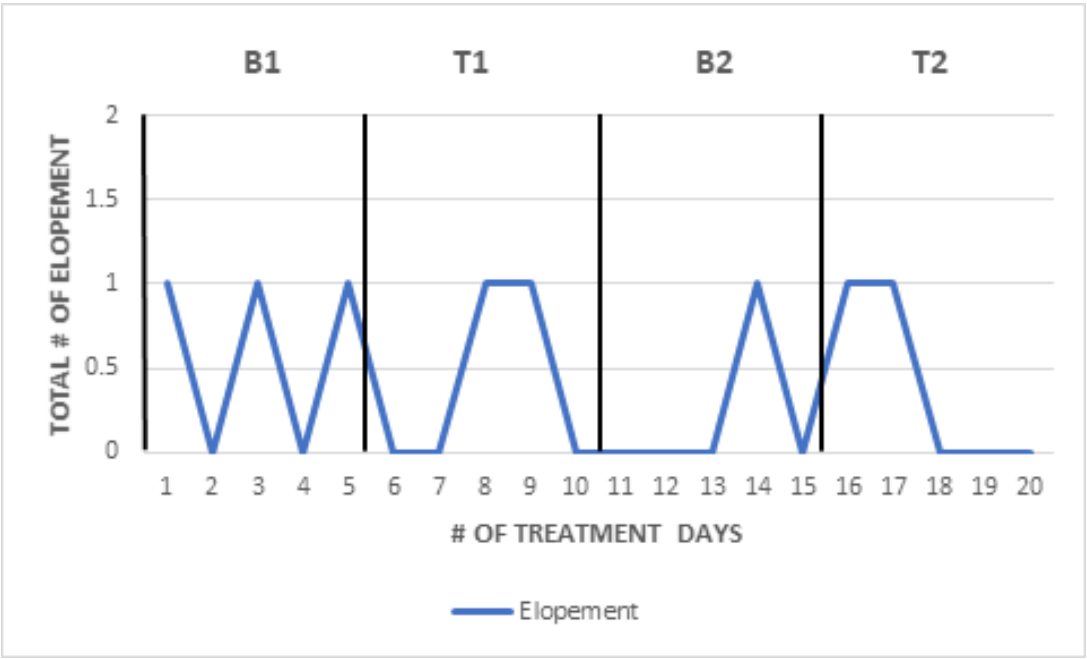

Figure 4. Participant 2: Total Number of Elopement Acts. *Note:* B1= Baseline phase 1, T1 = Treatment phase 1, B2 = Baseline phase 2, T2 = Treatment phase 2

Participant 3

Participant 3 is a 14 year-old male who was diagnosed with a primary diagnosis of Intellectual Disability (i.e., mild to moderate) and a secondary diagnosis of Other Health Impairment. He was referred for special education services in 2007. This participant is considered to have mild to moderate disabilities. Participant 3 engages in physical activity daily for a total of 20 minutes. Physical activity for this student involves riding bikes, fast pace walks, physical education class and an occasional yoga class.

Baseline phase 1. Participant 3 exhibited a total of NC behaviors within baseline phase 1. Participant 3 demonstrated on average less than 1 act of NC behavior per day for each thirty-minute academic period as observed by the primary researcher. Participant 3 was on task for a total of 148 minutes in total of the 150 (i.e., 98%) minute work time throughout the week. Verbal and gestural prompts were used by the primary researcher during the 30-minute academic time to promote on task- time behavior.

Intervention phase 1. Participant 3 participated in a 30-minute yoga program for four consecutive treatment days (e.g., Tuesday to Friday). Post Intervention, Participant 3 transitioned to a 30-minute academic period focused on IEP goal work. Participant 3 had a total of 1 off-task behavior of NC during the intervention phase, which on average was less than one NC behavior per treatment session. Participant 3 was on task for a total of 118 minutes of the 120 (i.e., 98%) minutes for the intervention phase (1 day observed holiday allowed no school). The primary researcher continued to use

verbal and gestural prompts during the yoga and academic sessions to keep participant on-task.

Baseline phase 2. Within baseline phase 2, Participant 3 demonstrated 4 acts of NC over five consecutive non-treatment days based on direct observation by the primary researcher. On average, Participant 3 demonstrated less than 1 NC behavior during the academic period during the five non-treatment days. Participant 3 was on task for a total of 139 minutes for the 150 (i.e., 92%) minute academic period for the week. Verbal and gestural prompts were used during the 30-minute academic session to promote on task-time behavior.

Intervention phase 2. Within intervention phase 2, Participant 3 participated in the yoga session and then began a 30-minute academic period. During the academic period, participant 3 exhibited 1 NC behavior during the five treatment days. On average, Participant 3 demonstrated less than 1 NC behavior per treatment session. Participant 3 was on task for a total of 148 minutes for the 150 (i.e., 98%) minutes within the five days of academic period following the intervention. Verbal and gestural prompts were used during the yoga and academic sessions to promote on task-time behavior.

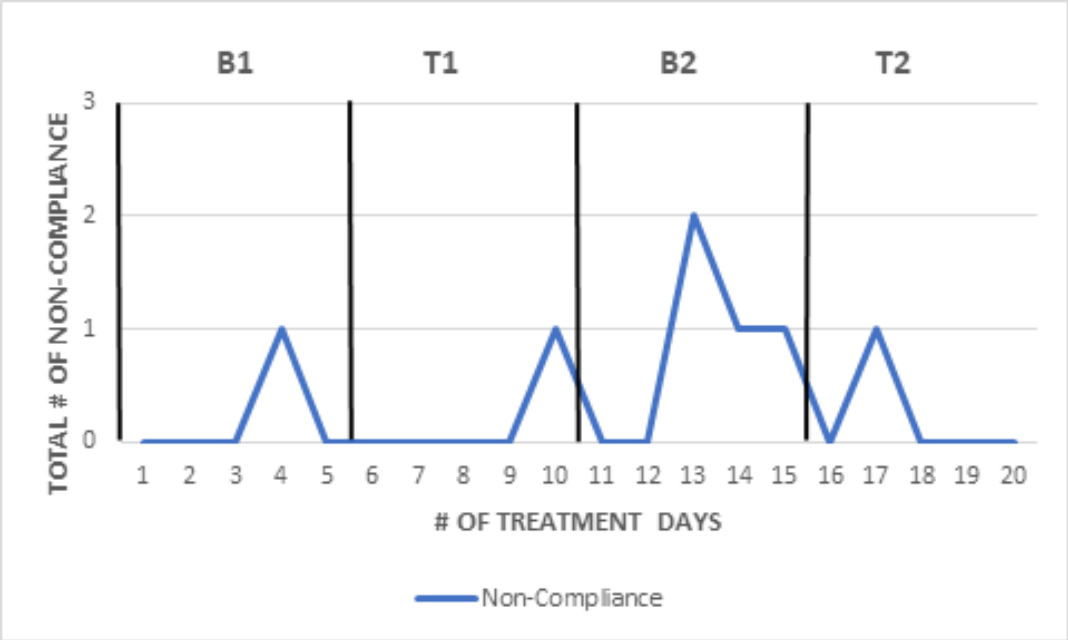

Figure 5. Participant 3: Total Number of Non-Compliance Acts. *Note*: B1 = Baseline Phase 1, T1 = Treatment Phase 1, B2 = Baseline Phase 2, T2 = Treatment Phase 2

Participant 4

Participant 4 is a 17 year-old female who was diagnosed with a primary disability of Intellectual Disability (i.e., moderate to severe) and a secondary disability of Hearing Impairment (i.e., moderate to severe). She was referred to special education in 2004. This student is considered have moderate to severe disabilities. Participant 4 engages in behaviors that can waver her focus when she is working on table-top activities. These behaviors can include, non-compliance, disruption and verbal aggression. She engages in mild physical activity due to reconstructive pelvic surgery 1 year prior to study. Light, mild physical activity involves riding a tricycle, walking, and

horseback riding. Student has participated in yoga classes before and frequently requests to use yoga as a form of her daily physical activity.

Baseline phase 1. Participant 4 exhibited a total of 5 NC and 4 disruption behaviors within baseline phase 1. On average, Participant 4 demonstrated 1 NC and less than 1 disruption behavior per day for each thirty-minute academic period as observed by the primary researcher. Participant 4 was on task for a total 141 minutes in a total of the 150 (i.e., 94%) minute work time throughout the week. Verbal and gestural prompts were used by the primary researcher during the 30-minute academic time to promote on task-time behavior for participant 4 when shown signs of non-compliance and disruption.

Intervention phase 1. Participant 4 participated in a 30-minute yoga program for four consecutive treatment days (e.g., Tuesday to Friday). Post-Intervention, participant 4 transitioned to a 30-minute academic period focused on IEP goal work. Participant 4 had a total of 6 NC and 3 disruption behaviors during the first intervention phase. On average, this is 1 NC behavior and less than 1 disruption behavior per treatment session. Participant 4 was on task for a total of 109 minutes of the 120 (i.e., 90%) minutes for the intervention phase (1 day observed holiday allowed no school). The primary researcher continued to use verbal and gestural prompts during the yoga and academic sessions to keep participant on-task.

Baseline phase 2. Within baseline phase 2, participant 4 demonstrated 11 NC and 3 disruption behaviors over five consecutive non-treatment days based on direct observation by the primary researcher. On average, this is 2 NC behaviors and less than 1 disruption behavior for each 30-minute academic period. Participant 4 was on task for a

total of 115 minutes for the 150 (i.e., 76%) minute academic period for the week. Verbal and gestural prompts were used during the academic session to keep participant on-task when behaviors of NC and disruption arouse.

Intervention Phase 2. Within intervention phase 2, participant 4 participated in the yoga session and then began a thirty minute academic period. During the academic period, participant exhibited 2 NC and 2 disruption behaviors during the five treatment days. On average, this is less than 1 NC behavior and less than 1 disruption behavior per treatment session. Participant 4 was on task for a total of 140 minutes for the 150 (i.e., 93%) minutes within the five days of academic periods following the intervention. Verbal and gestural prompts were used in the yoga and academic sessions to keep participant on-task when behaviors of NC and disruption arouse.

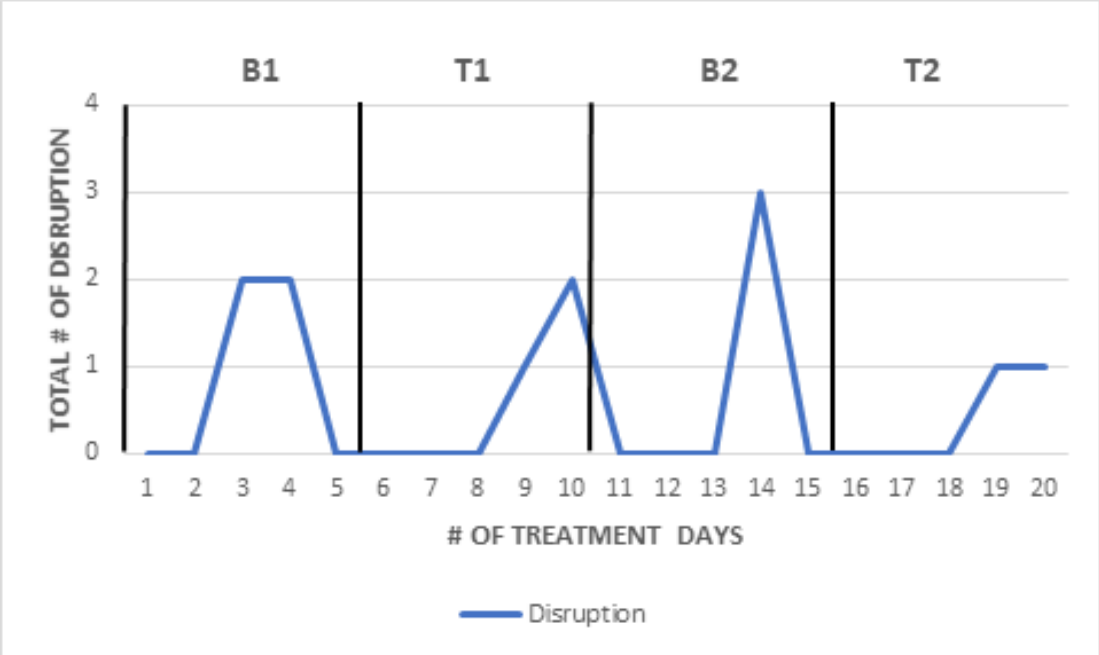

Figure 6. Participant 4: Total Number of Disruption Acts. *Note*: B1 = Baseline Phase 1, T1 = Treatment Phase 1, B2 = Baseline Phase 2, T2 = Treatment Phase 2

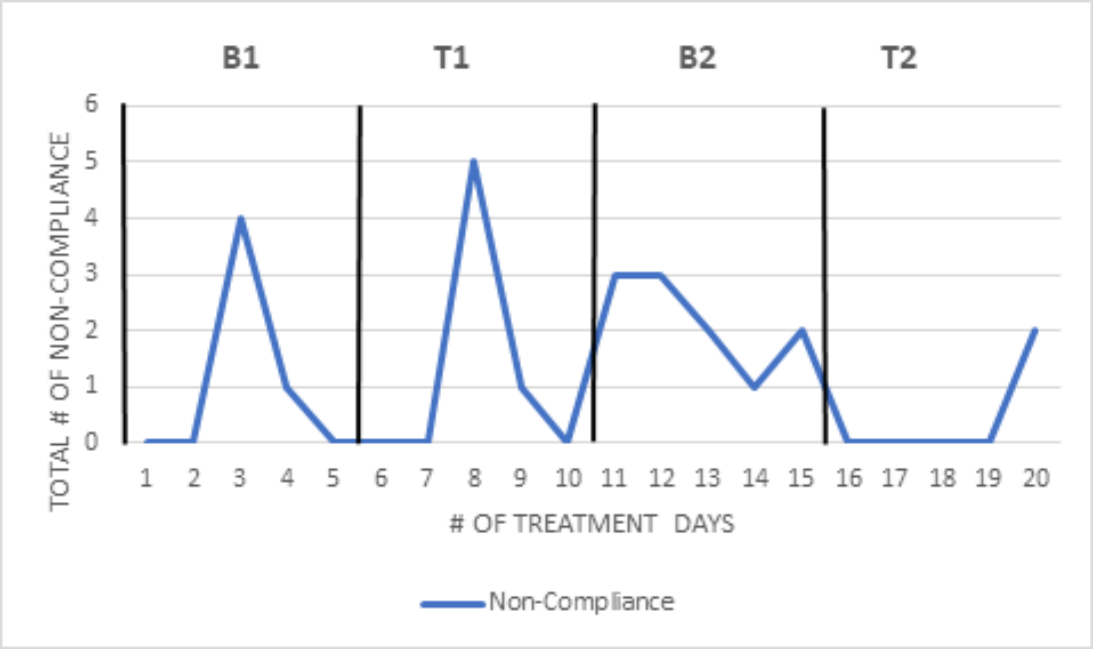

Figure 7. Participant 4: Total Number of Non-Compliance Acts. *Note*: B1 = Baseline Phase 1, T1 = Treatment Phase 1, B2 = Baseline Phase 2, T2 = Treatment Phase 2

Fidelity of Intervention

This intervention was delivered as intended and has a high degree of fidelity as exhibited by the primary researcher and research assistant. A procedure sheet was created to ensure all steps were taken and implemented in the same way at the same times. The yoga program began each day at 9:35 am. During the yoga program, verbal, gestural and partial physical prompts were used to keep participants on task. All yoga sessions were recorded and reviewed independently by both the primary researcher and the research assistant to determine the total number of off-task behaviors and total time on-task for each participant. All participants, immediately following the yoga program,

continued into their regular schedule (i.e., 30-minute academic session) lead by the primary researcher or paraprofessionals.

Table 4. *Total Percentage of Off-Task Time for all Participants*

Participant	*Baseline Phase 1*	*Intervention Phase 1*	*Baseline Phase 2*	*Intervention Phase 2*
1	5%	3%	6%	2%
2	565%	39%	16%	54%
3	2%	2%	8%	2%
4	6%	10%	24%	7%

Social Validity

Upon completion of this study, the research assistant, paraprofessionals, and students completed a survey that assessed if the yoga program was a positive experience, if it could be incorporated into their daily routine, and if there were any benefits that they observed. The survey answers ranged from yes to no and had an additional section for comments. Overall, each paraprofessional, research assistant and students, believed that this yoga program benefited the participants and believed that it could be implemented within the daily schedules of each participants.

During the program, paraprofessionals and students made comments when they were advised that it was time for yoga. Comments that I heard from paraprofessionals were “I really like this,” as well as “We should do this every day,” and “This video really

engages the students and makes yoga fun for us and the students." Three out of the four participants expressed a desire for the program on a daily basis. Participants 1, 3, and 4 came into school and asked if they were doing yoga that day. Participant 2, was not as eager to engage in yoga as the others, but would still participate. Participant 2 made the comment "again?" twice during the study when his staff told him it was time for yoga. With the mixed emotions physically and verbally from the research assistant and students, all felt that this program should continue.

CHAPTER IV

Discussion and Conclusions

The purpose of this study was to examine the impact of a physical activity program (i.e., yoga) on the total number of off-task behaviors and total time on-task for children with I.D. during their academic period. The primary researcher hypothesized that the yoga program would positively impact the total number of off-task behaviors and increase the time on-task for each participant. Results from this study were mixed as each participant was impacted differently throughout both intervention phases.

Yoga has demonstrated a number of benefits across different populations that range from increasing mental focus, physical vigor, awareness and practice of eating, as well as communication with family and friends (Chen & Pauwels, 2014). Researchers have also reported that alternative therapies, such as yoga can be complementary to behavioral interventions for children with attention and inhibition problems (Chou & Huang, 2017). A recent study also reported that high school students perceived that yoga benefited their ability to self-regulate, while also increasing mindfulness, paying more careful attention from moment to moment, self-esteem, physical conditioning, academic performance, and stress reduction (Wang & Hagins, 2018). This research demonstrated the positive impacts yoga can have on individuals, including those with disabilities.

In 2012, a systematic review of the literature of yoga in schools was conducted which included youth with youths with autism spectrum disorder, ID, learning disability, and

emotional disturbance, as well as typically developing youths (Serwacki & Cook-Cottone, 2012). Results from this study demonstrated that overall yoga could reduce stress and lower pulse rate, improve IQ and social adaptation scores, as well as improve self-confidence and social confidence in the classroom (Serwacki & Cook-Cottone, 2012). Although generally supportive, the empirical evidence for the utility of using yoga instruction in educational settings is inconclusive (Serwacki & Cook-Cottone, 2012). A lack of methodological and statistical rigor, small sample sizes, absence of systematic randomization, and a high degree of variability between intervention methods undermine our ability to evaluate the effects of yoga for a particular population (Serwacki & Cook-Cottone, 2012). In the 2008 a systematic review of the literature on therapeutic effects of yoga for children was conducted. The results demonstrated physiological benefits that may benefit children through the rehabilitation process, but larger clinical trials, including specific measures of quality of life are necessary to provide definitive evidence (Galantinio,Galbavy, Quinn, 2012).

CONCLUSION

Despite the mixed results of this study, the primary researcher believes that yoga can be an effective form of exercise and way to increase on-task time for students with ID. This belief is based on direct observation throughout the study when participants showed signs of improved mood, willingness to participate in school activities and a more stabilized energy level throughout the day. The benefits that the primary researcher and research assistants found in common were that all researchers and participants enjoyed the study and that the yoga program could be implemented into the participant's daily classroom schedule.

The disadvantages that the primary researcher found after conducting the study, is the limitations that came with the design of the study. The design of the study that the primary researcher implemented was a 4 week withdrawal design. To see conclusive results that the yoga program had, the sample size and duration of this study needed to be larger and longer such as increasing the sample size to 50 students and a study lasting at least 3 months. The primary researcher recommends that future researchers conduct a study with a larger sample size and a longer duration of study to get more conclusive results. It is also recommended that student attitudes, motivation, level of understanding, heart rate levels during yoga and support from peer educators are all recorded to determine if these factors had impact that could control the results. With yoga implementations showing signs of benefits and for results to be conclusive, interventions

need to involve larger sample sizes, longer intervention periods, and frequency of sessions.

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