

7-18-2019

The effects of mindfulness on the engagement and social interactions of high school students with learning disabilities

Naveen Khan

Rowan University, naveen.khan315@gmail.com

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**THE EFFECTS OF MINDFULNESS ON THE ENGAGEMENT AND SOCIAL
INTERACTIONS OF HIGH SCHOOL STUDENTS WITH LEARNING
DISABILITIES**

by

Naveen Khan

A Thesis

Submitted to the
Department of Interdisciplinary and Inclusive Education
College of Education
In partial fulfillment of the requirement
For the degree of
Master of Arts in Special Education
At
Rowan University
June 30 2019

Thesis Chair: Amy Accardo, Ed.D.

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Dedication

I would like to dedicate this manuscript to my parents, Mudasser Khan and Qaisra Mudasser. Thank you for all the support throughout my educational journey, and the continued love and encouragement you provide to all of your children.

Acknowledgements

I would like to express gratitude, acknowledgement, and appreciation to Dr. Amy Accardo for her help, support, and guidance throughout the process of writing this thesis.

I would like to thank my supervisor Andrew Perrone for his flexibility, support, and morale boosting throughout the writing process.

I would like to thank both the teacher and paraprofessionals of the class where I conducted the study, and the principal of the school, for their assistance and approval in implementing this study. You have made a tremendous environment for the students, and I am proud to have been a part of it.

Abstract

Naveen Khan

THE EFFECTS OF MINDFULNESS ON THE ENGAGEMENT AND SOCIAL INTERACTIONS OF HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES

2018-2019

Amy Accardo, Ed.D.

Master of Arts in Special Education

This study followed a single subject ABABAB design to examine the effects of mindfulness-based interventions (MBI) on the on-task engagement and the positive social interactions of high school students with disabilities. The seven students participating in this study attend a special services school and underwent the study in a basic skills math class. Baseline data was collected in week zero prior to the start of the study via a system of monitoring and checking for desired behavior; how often the students were on task, and how often they showed positive social behaviors. This baseline data was then used to examine the effects of the interventions on the students. Interventions took place in weeks one, three and five, of the total six week-long study. Throughout the course of weeks one, three, and five, students participated in 10-15 minutes of mindfulness-based activities: deep breathing, progressive muscle relaxation, and/or light stretching. Students then began their classwork and lesson for the day, and were observed for ten minutes for signs of improvement in the desired areas.

The results of this study suggest that students with multiple disabilities may improve their on-task engagement and social interactions after practicing mindfulness-based interventions. Satisfaction surveys showed varied opinions, but the majority of students reported they liked the practice and were even observed practicing it on their own throughout the day.

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Chapter One

Introduction

With the number of students with disabilities increasing throughout the United States (Kraus, 2017), there is increased need for students to develop skills and strategies to enhance their focus and engagement in the classroom, so they are not at risk for falling behind, or failing out. The first key to student success in the classroom involves having a non-disruptive learning environment so students can focus on the material at hand, instead of the other distractions present in the classroom (Black, and Fernando, 2014). Developing non-disruptive classrooms can be a challenge for educators because the behaviors may reflect disrespect from the students toward the teachers, generational differences, or a general lack of interest in the subject matter (Mishra, 1992).

Research shows that students can improve their behavior and emotional regulation by using mindfulness and meditative practices (Accardo, 2017). Implementing regular mindfulness and meditative session in classrooms could lead to a more positive behavioral classroom, increased attention rates, and an overall improvement in performance. In this study, high school students ages 14-18 with disabilities will undergo mindfulness sessions, and then be observed to see how their behaviors in the classroom were impacted. The goal is to see students more focused and attentive in the classroom and positively increased social skills, both of which should lead to improved academic performance.

Statement of Problem

For students to be successful in their academic ventures, it is important for them to have a solid set of executive function skills; attention and emotional regulation, initiation and inhibition, goal setting, planning and organization, and flexibility (Meltzer, 2018). In

a school setting, students are required to use their executive functioning skills to be successful (National Center for Learning Disabilities, 2018). However, there are varying patterns of difficulty in executive function skills among many students with learning disabilities. In conjunction with this, as a result of their learning disability, many students have difficulties with hyperactivity, academic difficulties, disorders of attention, and social skills deficits (NASET, n.d.). These difficulties, coupled with the lower executive functioning skill of attention regulation, make it difficult for students to focus on classroom material, and stay focused.

In addition, students with learning disabilities also need to cope with the lower executive functioning skills of attention regulation, initiation and inhibition, and the characteristic of social skill deficits that may be present as a result of their learning disability. These make it difficult for students with disabilities to properly socialize with their peers. When interviewed, a group of individuals reported that their disability contributes to feelings of isolation, difficulty initiating social interactions, and challenges relating to communication (Muller & Yates, 2008). Difficulties with social skills can lead to a student feeling “disconnected and left out” (Lawson, 2003), which can add to behavioral problems in the classroom, depression, anxiety, and stress, which all also continue to lead to poor academic performance. Educators are continuously trying new practices to assist students with disabilities, and the use of mindfulness and meditation practices is one to consider, as mindfulness and meditation have shown to lower anxiety, and depression rates (Schreiner & Malcolm, 2008), positive behavioral and cognitive changes (Schonert-Reichl, et al., 2014), and help individuals cope with stress (Grossman, Niemann, Schmidt, & Walach, 2004).

Significance of the Study

This multiple baseline single subject design sought to see how educators can improve the academic performance of students with learning disabilities by implementing mindfulness and meditation practices in their daily teaching. There are many ways to practice mindfulness; slow breathing, repetition of mantras, yoga, mental scans of the body for spots of tension, and several others (U.S Department of Veterans Affairs, 2011), which demonstrates the flexibility of the practice, and shows that it can be easily incorporated into any academic setting. This study yielded positive results, with the students who underwent mindfulness and meditation practices showing increased engagement, and improved positive social interactions. Therefore, this study showcases another strategy for educators to use to help students succeed in the classroom. Ultimately, success in the classroom could lead to higher retention and graduation rates among high school students, which will likely lead to more students with disabilities entering institutions of higher education.

Another long-term goal of this study is for the students to take mindfulness practices with them and carry them into their personal lives. If students notice a difference among themselves and their interactions with their peers, they will likely continue to engage in mindfulness activities on their own. By teaching themselves to be present in the moment during social interactions, students with disabilities can work to improve their social awareness, something that requires deliberate and consistent effort (Muller et al., 2008). Interacting appropriately and effectively with others is a distinguishing characteristic of working in a team (Morgeson, Reider, & Campion, 2005), and is one employers seek in potential hires. If students with learning disabilities were to use

mindfulness practices to improve their social skills, it could potentially lead to a higher chance of securing a job. The continued use of mindfulness in their daily lives can also contribute to an improvement in their “overall quality of life” (Brown et al, 2010), which could have significant impacts on their futures. Some have characterized mindfulness as a strategy for individuals to “replace avoidance of anxiety with an open curiosity” which then allows the individual to function without the ever-looming interference of anxiety (Brown et al, 2010). As individuals with disabilities have already expressed their increased anxiety in social situations, mindfulness would be a way for them to lessen this anxiety, pay more attention to the present moment, and improve their functionality and quality of life.

Purpose of Study

This study examined the impact of mindfulness and meditation practices on engagement and on task behavior in the classroom, and the social interactions of high schoolers ages 14-18 in a special education math class in Sewell, NJ. The long-term goal of this study was to have students practice mindfulness and meditation practices on their own and continue to improve their engagement and social skills, so they feel more empowered in their social interactions, and in their engagements for tasks.

Research Questions

Q1: What influences do mindfulness and meditation sessions have on the focus and engagement of high school students with learning disabilities in a special education math classroom?

Q2: What influences do mindfulness and meditation sessions have on the social interactions of high school students with learning disabilities among each other?

Q3: Are students and/or teachers satisfied with mindfulness and meditation sessions?

Hypothesis: Since mindfulness helps bring an individual to the present moment without worry of other issues, using mindfulness will result in individuals with disabilities increasing focus and engagement in classroom instruction, and improving their social interactions.

Chapter Two

Literature Review

Mindfulness Based Interventions

Mindfulness is rising in popularity among various groups of people. Not only is it implemented by educators, and behavioral health professionals, it is also becoming an increasingly common practice among individuals in their daily routines. The draw of mindfulness is its many benefits. Mindfulness is a practice to help individuals generate energy, joy, and focus on the moment at hand (Germer, 2004). The practice calls for a “non-judgmental, present-centered awareness” (Sauer, Walach, Offenbacher, Lynch, & Kohls, 2011, p. 694). There are several ways to practice mindfulness; meditation, music, physical activity, and educational methods (University of Rochester Medical Center). Mindfulness based interventions (MBIs) are crucial for students, as they affect “social [and] emotional skills” (Magaldi, & Park-Taylor, 2016). As individuals with disabilities often express difficulty in these areas (Muller et al., 2008). These cognitive functions, among others, are under the umbrella of “executive functions” which are a set of “complex cognitive processes that underlie flexible, goal-directed behavior” (Meltzer, 2018, p. 1).

A review of literature reveals that MBIs have been reported to be effective for students with disabilities in helping develop and improve executive functions, more specifically ones regarding initiating and maintaining social interaction, and maintaining engagement in classroom activities.

Difficulties for Individuals with Disabilities

Initiating Social Interactions. To evaluate exactly what social situations are difficult for individuals with disabilities, Muller, Schuler, and Yates (2008) conducted a study in which eighteen participants with varying disabilities interviewed and spoke about

their social challenges. Muller et al. found commonalities among their responses, such as feelings of isolation, and “difficulties in initiating social interactions” (Muller et al., p. 173). Feelings of isolation often develop when individuals do not feel connected to existing groups or feel out of place. When Muller et al. asked these individuals what people could do to support them, they reported the need for self-initiated strategies for handling social anxiety (Muller et al., 2008). In terms of initiating social interactions, participants reported not having “the slightest clue how to do it” (Muller et al., 2008, p. 179), and that initiating interactions was a great source of anxiety and stress. The participants also found it difficult to follow an unscripted social context, as the impromptu interactions found in day to day life do not “appear to follow a predictable set of rules” (Muller et al., 2008, p. 179). As these individuals do not have a structure to follow in casual social situations, they need to feel self-initiated and empowered to cope with the stress that comes with these interactions.

One of the identified supports suggested by the individuals was physical activity, such as yoga. Physical activity allows for the individual with disabilities to “[deal] with [their] social frustrations” (Muller et al., 2008, p. 185), and relieve social stress. Other strategies similar to yoga that other participants found solace in were spiritual and religious methods. Participants reported using meditation to achieve his/her “highest aims, [one of which] is to relate socially” (Muller et al., 2008 p. 185). Another self-initiated strategy is that of alone time, which allows participants to feel rejuvenated, and report wishing that alone time was recognized by educators and parents as something enjoyable and needed. The described self-initiated supports can be categorized as mindfulness techniques.

To first understand why mindfulness may benefit students with disabilities’ social interactions, it is important to consider; why do students with disabilities struggle with

social interactions in the first place? According to Burgoon and Langer in *Complementary Health Practice Review*, social interaction is centered around mindlessness, which “entails limited information processing, rigid categorical thinking, single perspectives, and failure to recognize context” (Burgoon & Langer, 2008, p. 107). Individuals without disabilities often interact mindlessly, even while having limited to no difficulties in cognitive processing. In contrast, individuals with disabilities who do have difficulties with information processing face increased mindlessness in social interactions. To mimic mindless interactions versus mindful interactions, Langer et al. (1985) simulated a situation where one group of children were given mindfulness training, and another was not. The children convened at a picnic, chose partners, and participated in activities, such as pin the tail on the donkey. The children who had undergone the mindfulness training were strategic in picking their partners and selected those who would be advantageous to the goal of the game. For example, a child in the mindfulness group selected a “blind child as a partner to play pin the tail on the donkey” while his counterparts in the control group – the one acting mindlessly – “avoided ‘disabled’ children,” due to the lack of deeper thought put into the interaction and decision (Burgoon & Langer, 2008). The need for shifting from mindlessness to mindfulness in social interactions leads to great anxiety.

Mindfulness and meditation strategies have been used to treat anxiety in many different individuals. One study, conducted by Brown, Davis, LaRocco, and Strasburger (2010) applied this behavioral technique on participants with schizophrenia. Through mindfulness practices, individuals can remove themselves from overthinking and overreacting to emotionally and cognitively distressing situations, and instead respond effectively (Brown, Davis, LaRocco, & Strasburger, 2010). Their study involved fifteen

men who have schizophrenia attending two hours of class a week for eight weeks, in which they learned mindful breathing, eating, walking, meditation, body scans, gentle stretching, and hatha yoga (Brown et al., 2010). After the eight-week long sessions, Brown et al. interviewed the participants to see how they felt regarding the overall experience. Participants reported reduction of anxiety symptoms, changes in cognitive behavior, an increased focus on the present, and in some cases, social benefits (Brown et al., 2010). Researchers in this study found mindfulness meditation to help reduce anxiety in individuals. These changes in anxiety regarding social situations can allow individuals to be more comfortable in working with groups, and in showing compassion for others.

In 2011, researchers Black and Fernando sought to see how mindfulness training could impact classroom behavior among lower-income and ethnically minority children. All classrooms at the school where the study was conducted were given instructions on performing mindfulness practices throughout daily occurrences for seven weeks. The results of the study were measured against The Student Behavior Rubric by Kinder Associates, LLC (2007). The rubric criterion includes: paying attention, self-control, participation in activities, and care and respect for others (Black, & Fernando, 2014). All four behaviors, among all the students involved, improved over the course of the study (Black et al., 2014). Teachers found their students more actively participating in classroom activities and showing increased care for others after they completed the mindfulness training. It is one thing to help individuals begin social interactions, it is another to help them have confidence to maintain them.

Maintaining social interactions. As discussed, mindfulness has many benefits. The continued use of it allows individuals to optimize their basic psychosocial needs and

self-regulation (Malboeuf-Hurtubise, Joussemet, Taylor, & Lacourse, 2017). Three basic psychosocial needs are feeling effective with one's environment, feeling choice and willingness in actions, and "feeling connected with and loved by others" (Malboeuf-Hurtubise et al., 2017, p. 34). These three needs can be referred to as competence, autonomy, and relatedness. Malboeuf-Hurtubise et al. (2017) conducted a study to examine the effect of an eight-week long mindfulness-based intervention on the three psychosocial needs in elementary school aged students with severe learning disabilities. Fourteen elementary school students underwent eight weeks of mindfulness meditation programming. Varied types of mindfulness strategies were used and adapted to fit the groups' needs and individualities. Results were obtained through student questionnaires; participants rated how they felt on a scale of 1 (strongly disagree) to 7 (strongly agree) Likert scale for each psychosocial need role in their daily lives (Malboeuf-Hurtubise et al., 2017). Although results of the study showed a *decrease* in ratings among the students, Malboeuf-Hurtubise et al. believe it's because being more mindful lead the students to suddenly become more aware of their respective limitations in regard to social skills. However, the authors of the study hypothesize that since mindfulness interventions increased awareness in the students of their limitations, continued use of MBI can lead to stronger regulatory behaviors, and increased relatedness.

Continued use of mindfulness-based practices can help an individual continue to feel connected to their peers. A study conducted by Idusohan-Moizer, Sawicka, Dendle, and Albany also sought to see the effects of mindfulness-based intervention on individuals with learning disabilities, given that individuals with disabilities often have feelings of "rejection and exclusion," which can be remedied with mindfulness (Idusohan-Moizer et

al., 2013, p 95). Idusohan-Moizer et al. (2013) theorized that using MBI can “enable [individuals with learning disabilities] to be more receptive, flexible, and have greater control over their behavioral and emotional responses to events in their lives” (p. 95). Individuals with learning disabilities may face two kinds of shame; the first is external shame, which manifests when one is worried that they are perceived negatively by others, and the second is internal shame which arises when an individual is self-aware of their functions in comparison to others (Idusohan-Moizer et al., 2013). The study consisted of fourteen individuals who attended between one to ten sessions, over the course of nine weeks, of MBI which strived to improve their self-compassion and compassion for others (Idusohan-Moizer et al., 2013). At the end of the study, participants had increased willingness to be more compassionate towards themselves and others (Idusohan-Moizer et al., 2013). When followed up with six weeks after the conclusion of the study, Idusohan-Moizer et al. found that these outcomes had been maintained; students continued to show compassion for others.

Compassion for others can lead to positive social skills among individuals. Students can show compassion and respect for teachers by exhibiting less disruptive behavior in the classroom. In a study conducted by researchers Minkos, Chafouleas, Bray, and LaSalle (2018), two students who demonstrated behavioral problems began MBI. Results showed decreased disruptive behavior, and increased respect (Minkos et al., 2018). For the purpose of their study, Minkos et al. defined disruptive behavior as “student action that interrupts regular school or classroom activity” such as “fidgeting, playing with objects, and acting aggressively” (Minkos et al., 2018, p. 438). The decreasing of these behaviors are positive social interactions, as the students have improved their social skills. This study also sought

to observe the effects of mindfulness-based intervention on the classroom engagement of students with disabilities.

Classroom engagement and attention. Though finding decreases in disruptive behavior was included in the research outcomes of Minkos and et al.'s study, the primary objective of the study was to observe the effect of mindfulness-based intervention on academic engagement. The same two students that underwent MBI and had lowered disruptive behaviors, also experienced changes in their academic engagement. Minkos et al. report “engaging in mindfulness can promote self-management of attention” (Minkos et al., 2018, p. 436). Mindfulness teaches individuals to be aware of the present moment, therefore; “by engaging in mindful breathing, one learns to recognize when the mind wanders...and reengage in the target behavior” (Minkos et al., 2018, p. 437). Both students showed immense improvement in their academic engagement during intervention, which was then maintained throughout the follow up visit six weeks after the intervention had ended (Minkos et al. 2018).

As discussed, there are several ways to practice mindfulness. One such way is yoga. In her article *Yoga as a School-Wide Positive Behavior Support*, Accardo (2017) explains how yoga can “effectively increase...academic engagement” (p. 110). Accardo discusses various studies that implemented yoga as interventions for students in different populations and reported that each study focused on self-regulation and maintaining attention through purposeful breathing exercises. Yoga was also reported to help reduce anxiety (Accardo, 2017).

Researchers have found increased levels of anxiety in children with learning disabilities, and some attribute difficulties in academics to this anxiety. As this anxiety

manifests and causes attention and engagement difficulties for individuals with disabilities, mindfulness can improve attention by decreasing anxiety as well. Beauchemin, Hutchins, and Patterson hypothesized meditation and relaxation techniques “may reduce anxiety and promote attentional factors” (Beauchemin, Hutchins, and Patterson, 2008, p. 35). Beauchemin et al. conducted a study with thirty-four students ages 13-18, where teachers held MBI in classes for five weeks. Although the authors of the study were not particularly looking at the effects of mindfulness on attentional factors, the results of their studies still showed “that mindfulness meditation decreases...detrimental self-focus of attention, which promote...academic outcomes” (Beauchemin et al., 2008, p.34). Just as Black and Fernando observed the effects of mindfulness-based interventions on social interactions, they also observed how they affect attention skills. Their study of 409 elementary school children in the spring of 2011 showed children improving at “paying attention” and at “calm and self-control” (Black & Fernando, 2014, p. 5).

Conclusion. Mindfulness has many benefits and students using mindfulness strategies have been found to optimize their basic self-regulation skills (Malboeuf-Hurtubise, Joussemet, Taylor, & Lacourse, 2017). The purpose of this study is to examine the impact of mindfulness and meditation practices on the engagement, and social interactions of high school students in a special education math classroom. The aim of this study is to have students feel more empowered in their social interactions, and in their engagement to academic tasks.

Chapter Three

Methodology

Setting

The School. The special services school district, located in Southern New Jersey, consists of several different schools geared towards providing support for students with disabilities. These schools and centers include a child development center, an elementary school, two regional schools, and an adult center for transition. Students come to receive these special services from districts all over the South Jersey region; with each respective school districts providing transportation. A few of the services offered include occupational therapy, psychological counseling, medical assistance, interpreter services, parent support groups, speech therapy, physical therapy, involvement in Special Olympics, and access to specialized equipment.

The present study took place at one of the regional schools, South High. The regional school services are broken into several different campuses, and within each campus there are different wings. North and South campus both have a middle and high school. This study took place in South High, the portion of the school designed for students with multiple disabilities, primarily intellectual disabilities. The classroom in which the study took place consists of 3 student groups in varying size; the largest has four students, the smallest has two. In total, there are 11 students in the class, all in 11th grade. The teacher is a math teacher, so the classroom is set up and designed for math. There are math concept posters around the room, such as posters indicating how to tell time, and posters naming different kinds of shapes. The back wall, underneath the windows, is lined with shelves that hold resources and materials. On the same wall, between the two windows, is a

table/chart used to break students into groups and organize them to activities in each class. To the right of the door in the classroom are the student “cubbies,” or “lockers.” Above these, are bins with materials, and to the side are cabinets containing school supplies. On the wall directly to the right of the door is a counter with some media; a piano, a box of headphones. In front of this counter are two tables, used for small group or for students who wish to sit alone. To the left of the door is a laptop cart. The wall to the left has a whiteboard, in front of which is a whiteboard on wheels. The next wall is a whiteboard/SMART board combination. In the center of the room are the three student groups which all face the SMART/white board. In the back, there is a curved table with a whiteboard top. The teacher’s desk is in the far-left corner and is kept clean and organized. Her desk has a desktop, which is connected to the smartboard. To make the environment welcoming for the students, there is student art displayed around the room, and a birthday graph for all the students on the learning team. The teacher decorates parts of the classroom in theme with the season. The classroom inspires a sense of engagement, and its vibrant decorations promote a positive learning environment.

Demographics. The most recent data shows that there are 690 students enrolled at South High. Of these 690, 398 are white, 166 are African American, 16 are Asian, 81 are Hispanic, 1 is American Indian, 1 is a Pacific Islander, and 27 are of mixed race. Of the 690 students, roughly 26% receive a free or discounted lunch, however all students’ lunches are paid for by their districts.

The main population in the classroom consisted of fifteen individuals, not counting the researcher. There is one main teacher, of Caucasian background. She has one direct teacher’s assistant, and then two aids that are one on ones for students. All three of these

individuals are also Caucasian. The students in the classroom are all boys and vary in age, between 16-18 years of age. There are 2 Black Americans, 1 Black Hispanic, 1 Hispanic, and 7 Caucasian students. However, the 1 Black Hispanic student, 1 of the Black Americans, and 1 of the Caucasian students will not be included in the study. All boys vary in cognitive, social, and physical abilities.

Daily Routine. The schedule of this school is always changing; the students have their typical routines, but many times there are changes in the schedule to make accommodations. The basic routines for the students of this classroom run on a nine-period schedule. For first period, the main homeroom students begin to arrive to school between 8am and 8:25am. At 8:25am, they all go to eat breakfast in the cafeteria. Following breakfast, they go to their second period class. For these students, second period is English/Language Arts. Next, for period three, the students return to the homeroom room for math. They only have math four out of five days of the week – on Thursdays, math is replaced with a course called “independent living,” where they learn skills such as basic cooking, cleaning, and upkeep of the house. The students go to physical education for fourth period, except on Thursdays and Fridays. On Thursdays, they have health class in the homeroom room. On Friday, they have Functional Learning Communications, which is a class designed to teach the students basic communication, “slang” terms, idioms, and other nuances to the language that they may not understand due to their cognitive impairments. Following period four, they head to vocations for period five. The students split up for vocations, and are in either; computers, media, woodshop, horticulture, or auto shop. The students then go to period six, which for this main group is history. Next, the students briefly return to the homeroom to get ready to leave for lunch. Two of the students

always pack lunch. The whole group leaves together, teachers and aids included. Period seven is split into two halves; the first half eats lunch in the cafeteria, and the second half can choose between playing in the gym and returning to the homeroom for free time. From here, they dismiss to period 8. For our students, period 8 is science. Following science, the students return to homeroom for period 9, which on Mondays, Tuesdays, and Thursdays is “Life Skills,” a class designed to teach basic life skills for students such as hygiene routines. On Wednesday’s, the students get the chance to go to the school store to spend their earned money, a behavior support for students who complete their required duties in the classroom. On Fridays, the students spend periods 8 and 9 in extracurricular clubs of their choosing.

The students in the classroom also have jobs assigned to them, with jobs changing once a month. There are jobs that need to be done in the beginning of the day, such as taking down chairs and taking student lunch orders, and then there are tasks that need to be done at the end of the day such as wiping down tables and chairs and changing the date for the next day. The students are habituated with their end of the day routine; the buses are announced via a shared google doc, specific to each campus and wing. At the end of the day, students turn in their “point sheets,” sheets they have carried with them throughout the day to each different period, so they can earn up to 100 points (50 on a half day), that go towards earning rewards.

Participants

The participants of this study are varied and unique, with different student development and IEP goals. Not all students were included in the present study. Included students were those with need in the area of focus and engagement and/or social

interactions. However, every student was given the opportunity to participate in the mindfulness-based interventions.

Student A. Student A comes to school every day from about an hour away, which is why he almost always has to go to the bathroom as soon as he arrives in the classroom. His family lives in a wooded area, so student A talks frequently about cutting down trees, and camping. He also takes an interest in the weather, often predicting what the forecast will be. He is 18 years old and does puzzles. One modification that the teacher in the room had already put in place for student A was a note on his desk; saying “wait to speak.” Any time he calls out, the teacher taps the note to remind him. Student A participates in the vocation Horticulture, and the club Dungeons and Dragons on Fridays. He also almost always orders a PB&J sandwich for lunch, despite what the other options are, and is always carrying a water bottle with him. He interacts well with his peers, but often interrupts conversations that do not pertain him, or makes side comments that other peers and teachers appreciate. One goal for student A is to lower the number of times he calls out, raise the number of times he raises his hand, and also, lower the number of times he joins someone else’s private conversation.

Student B. Student B comes to school every day from about twenty minutes away. He is 17 years old, plays sports, and takes the vocation Auto Shop. Student B always takes a basketball to lunch with him, so that he can go directly to the gym after lunch is over. He has also talked about Special Olympics bowling on occasion. In terms of his work in Auto Shop, student B shares what his class did that day after the period has ended. Every week when the students go to the school store and spend their earned “money,” student B comes back with a small stuffed animal. He says he is trying to collect them all. One frequent

topic of conversation for student B is his girlfriend, who visits him every weekend. Student B has an official diagnosis of autism. According to the classroom teacher, student B has a younger sister. Student B interacts often with Student A. He also often watches the other disruptive students in the classroom. One goal for student B is to decrease the number of times he is sitting facing away from the board.

Student C. Student C commutes to school from about fifteen minutes away, where he lives with his aunt and uncle. Based on observation, student C's interests include music, and drawing. He is in Auto Shop with Student B, and in Dungeons and Dragons with Student A. Student C enjoys spending time with students A & B. Student C connects well with his peers, and compliments others frequently. Although student C is friendly, he is often off task and "zoned out," and also tends to call out or talk to his peers during a lesson. One goal for student C is to change these behaviors.

Student D. Student D is hearing impaired – not completely, just partially – and has an interpreter with him. Student D is friendly but can be disruptive at times. Student D was awarded student of the month for January. He is polite, and well mannered. Sometimes he shows signs of being overwhelmed, because he is trying to read his interpreters sign language, while also paying attention to what is going around him. This is important to note in relation to his data; he may seem to be off task/not paying attention, but in reality, he would be watching the interpreter. Since he is still able to hear at certain decibels, student D often has conversations with his peers. Sometimes, these take place during instruction. One goal for student D is to decrease the number of times he has side conversations with his peers. However, formal data will not be taken for Student D, due to

the numerous times he is out of the classroom for additional resources. Student D will still be included in the mindfulness-based interventions when he is in the classroom.

Student E. Student E is sixteen years old and is very vocal about his autism, often using it as a scapegoat for anything he feels embarrassed about. While student E is very outgoing and friendly, he sometimes has difficulty expressing himself, and shows frustration in these instances by turning bright red, clenching his fists, and getting defensive. There have been several instances when his defensiveness has escalated into large scale behavior episodes. Student E is involved in two separate basketball teams – one at Rowan University for Unified Sports, and another at his school for Special Olympics. Student E has shown strengths in mathematics. He calls out of turn often, but quickly corrects his behavior when he realizes he called out. Many times, student E will fixate his mistakes, and apologize to the teachers continuously. He currently joins student A in the Dungeons and Dragons club. One goal for student E is to decrease the number of times he calls out and improve his social interactions with both peers and teachers.

Student F. There is still a lot to learn about student F; but, based on current observations, he is quiet during classroom instruction and will say things to the effect of “this is stupid.” When student F is engaged, however, he is eager to answer questions, make jokes, and speak with the class. Student F is friends with two other students (who are not being described as participants in this paper) and can get into mischief with them. One goal for student F is to increase his active participation in class.

Student G. Student G often expresses “I just want to go home and take a nap,” while he lays his head down on the desk. He needs support with cognitive functioning and needs extra support during instruction and independent work. Student G loves movies, and

often quotes scenes from his two favorites; Daddy's Home 2, and Tommy Boy. Student G does not respond well to loud noises and has recently switched into Auto Shop. One goal for student G is to increase his participation, and also decrease the number of times he disrupts the class with personal information and needs.

Student H. Student H is quiet, and often lays his head down in the desk He often holds the sides of desk and rocks back and forth, or hums. Other times he is seen walking to the classroom door and then back to his desk. Student H does not participate in class without excessive prompting, and has difficulty answering questions. Whenever the class has free time, student H will ask to use his phone, on which he watches a game. One goal for student H is to decrease the number of times he rocks and hums and increase the number of times he actively participates in class.

Table 1

Participant Information

<i>Student</i>	<i>Age</i>	<i>Grade</i>	<i>Classification</i>	<i>Race</i>
<i>A</i>	18	11	*MD: CI, AP	Caucasian
<i>B</i>	17	11	MD: A, CI	Caucasian
<i>C</i>	17	11	MD: CI, AP	Caucasian
<i>D</i>	16	11	MD: S/E, ED,	Black Hispanic
<i>E</i>	17	11	MD: A, CI, AP	Caucasian
<i>F</i>	17	11	MD: AD, CI	Black American
<i>G</i>	17	11	MD: A, AP	Caucasian
<i>H</i>	18	11	MD: A, AP	Caucasian

Note, there are three additional students in the class that are not included in the study but are still being exposed to the mindfulness-based intervention. Due to circumstances beyond control, these students' behavior will not be officially charted and/or reported.

*MD = Multiple disabilities	A = Autism
AP = Auditory processing	AI = Auditory impaired
CI = Cognitively impaired	S/E = Social Emotional
ED = Emotionally disturbed	

Table 2

Baseline Data

<u>Student</u>	<u>On task</u>	<u>Positive social</u>
A	41.67%	25.00%
B	33.33%	83.33%
C	33.33%	25.00%
D	66.67%	83.33%
E	75.00%	33.33%
F	33.33%	33.33%
G	25.00%	25.00%
H	25.00%	33.33%

Students were assigned 1 point at each check if they were exhibiting any of the following behaviors. Students were checked for baseline data a total of 12 times over the course of three days.

Table 2.1

Defining Variables

On Task Behaviors	
Paying attention	Participating in whole group experience
Sitting up	Working independently when asked
Actively listening	Following directions (the first time)
Doing classwork	Raising hand
Positive Social Behaviors	
Waiting to speak	Demonstrating agreed upon classroom behavior
Appropriate interactions with peers/teachers	Speaking with peers
Engaging in conversations	Being polite/even tempered
Speaking on topic/appropriate answers	
The goal is to increase these positive behaviors down to above 50%. The students who are already above the goal, are highlighted in green. These students are already at the target behavior but will still go through the mindfulness-based intervention. They are, however, outliers.	

Materials

This study requires very few materials. To ensure consistent and reliable interventions, online video platforms were used to lead students in mindfulness. The videos are between 10-15 minutes long, and present directed mindfulness strategies and soothing music, over a slideshow of peaceful images. The videos were projected onto the smartboard.

The other important materials used in this study were the four different data charts; four of these charts were used on the days without a mindfulness behavior intervention, and four were used on the days that the students do go through the mindfulness intervention. There are two of each of the following; a chart for on task engagement, and a chart for desired social behaviors.

Research Design

The study was conducted using a single subject, ABABAB format. First, I collected baseline data from the students, asking; how is their engagement in the classroom material and the task at hand? How are their social interactions? I monitored this and took 12 separate checks. Then, the first phase of the intervention took place. I conducted mindfulness and meditation techniques with the students for 10 minutes. Then, immediately following the mindfulness activity, I started the lesson and charted student behavior in terms of engagement and social interactions for 10 minutes. This continued for 3 days. Then, the second phase (B) began, consisting of no mindfulness-based interventions, and monitoring of their behavior on 3 separate days for 10 minutes at a time. Two sets of data were taken each day; one in the morning (roughly 9:22am-9:59am) and one in the afternoon (roughly 1:10-1:47pm). These are two periods in which the students

were under my instruction, and one is in the morning and one is in the afternoon. This allows the researcher to observe how long the effects of the MBI last, or if different students behave differently at varying times of the day. The variables in the experiment were; the mindfulness behavior intervention acting as the independent variable, and (1) student engagement, and (2) student social skills acting as the two dependent variables.

Procedures

Timeline of interventions. The study took place over the course of eight weeks; the first two weeks were the ones in which baseline data was collected, as I got to know the students and gain their comfort. Then, weeks 3, 5, and 7 I implemented the intervention and charted its effects. In weeks 4, 6, and 8, I did not implement the intervention and see how the behavior was different. The mindfulness-based intervention was only given once per day, and data was taken once; while the students were in period three math class.

Implementation. The specific instructional method used to implement the intervention was 10 minutes of a mindfulness video at the beginning of the lessons, done in a whole group setting. Students whose parents approved their participation participated in the activity. Some students needed prompting, but as the weeks progressed, the students became more comfortable.

Limitation. It is important to note, that given the structure of this school it was difficult to have all the students in the classroom, at the same time, for 3 days of the week. The school schedule is always changing, students are being pulled out, and things can be thrown off course by the behavior of a single student. For this reason, the tallies of their behavior may not be considered 100% accurate.

Measurement Procedures

Questions 1 and 2 focused on the effect of MBI on student engagement and social interactions. The dependent variables were then analyzed by graphing and visually assessing the data for patterns, comparing each student's baseline data to their intervention data. Question 3 asks "Are high school students with learning disabilities satisfied with the mindfulness intervention?" This research questions were answered via a survey given to the students at the end of week 7.

Data Analysis

Each of the students was scored a total of forty-eight times. Twenty-four of these checks were during the "off cycle" of the intervention, and further split into two categories, so each student was checked twelve times for on task behavior, and 12 times for desired social behavior. The other twenty-four checks followed the same guidelines, except they took place during the weeks that mindfulness-based intervention was implemented. Checks were tallied by hand, and then placed into a spreadsheet. Data from the spreadsheet was then used to create graphs. Each student's data was visually graphed and analyzed for trends.

Chapter 4

Results

In this single subject ABABAB study, students practiced mindfulness behavior intervention three days a week, every other week, over the course of two months. Data was collected for two days each week of the intervention on the effects of mindfulness-based intervention on the students' engagement in classroom activities, and their social behavior. Each student was monitored a total of twelve times per category, per week. In total, 48 data points exist per student. Note, data was collected for both on and off task behavior, and negative and social interactions, because the presence of on task/positive social interactions does not equate to the absence of off task/negative social interactions.

Results: Effects of Mindfulness Based Intervention on Focus and Engagement in the Classroom

Table 3

Baseline Data: Student On Task Behavior

<u>Student</u>	<u>On task</u>
A	41.67%
B	33.33%
C	33.33%
D	66.67%
E	75.00%
F	33.33%
G	25.00%
H	25.00%

Class average: On task 41% of the time.

Table 4

Data from days with MBI: Percentage of time students were on task

<u>Student</u>	<u>On task</u>
A	91.67%
B	91.67%
C	91.67%
D	N/A
E	100.00%
F	50.00%
G	75.00%
H	66.67%

Class average: On task 80.95% of the time, an increase of 39.95%, indicating that students were on task 39.95% more of the time than they were during the baseline phase of the intervention.

Table 5

Data from days without MBI: Percentage of time students were on task

<u>Student</u>	<u>On task</u>
A	83.33%
B	100%
C	50.00%
D	N/A
E	91.67%
F	58.33%
G	75.00%
H	83.33%

Class average: On task 77.38% of the time, an increase of 36.38%, indicating that students were on task 36.38% more of the time than they were during the baseline phase of the intervention.

Results: Effects of Mindfulness Based Intervention on Social Interactions

Table 6

Baseline Data: Percentage of time students demonstrated positive social interactions

<u>Student</u>	<u>Positive social</u>
A	25.00%
B	83.33%
C	25.00%
D	83.33%
E	33.33%
F	33.33%
G	25.00%
H	33.33%

Class average: Positive Social behavior apparent 42% of the time

Table 7

Data from days with MBI: Percentage of time students demonstrated positive social interactions

<u>Student</u>	<u>Positive social</u>
A	75.00%
B	91.67%
C	83.33%
D	N/A
E	83.33%
F	58.33%
G	91.67%
H	91.67%

Class average: Positive Social behavior apparent 82.14% of the time. This is an increase of 40.14% from the class average during the baseline phase of the intervention, indicating that students demonstrated positive social behaviors 40.14% more of the time following the intervention.

Table 8

Data from days without MBI: Percentage of time students demonstrated positive social interactions

<u>Student</u>	<u>Positive social</u>
A	91.67%
B	83.33%
C	58.33%
D	N/A
E	41.67%
F	75.00%
G	58.33%
H	50.00%

Class average: Positive Social behavior apparent 65.47% of the time. This is an increase of 23.47% from the class average during the baseline phase of the intervention, indicating students demonstrated positive social behaviors 23.47% more of the time in the weeks without an intervention.

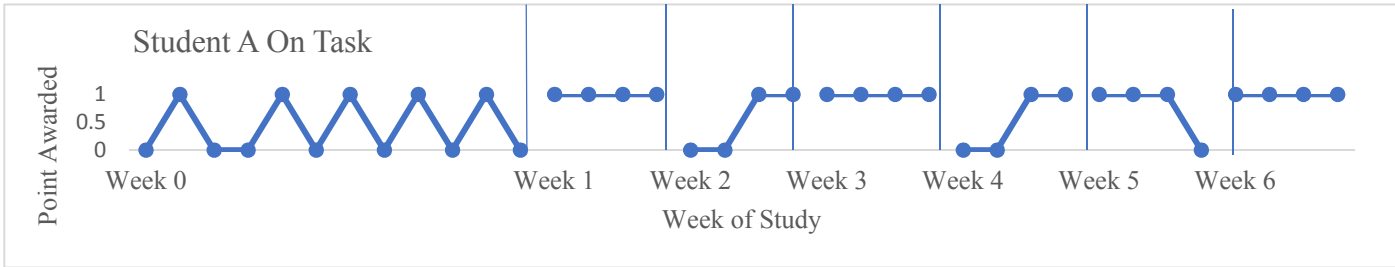


Figure 1. Student A On Task Behavior

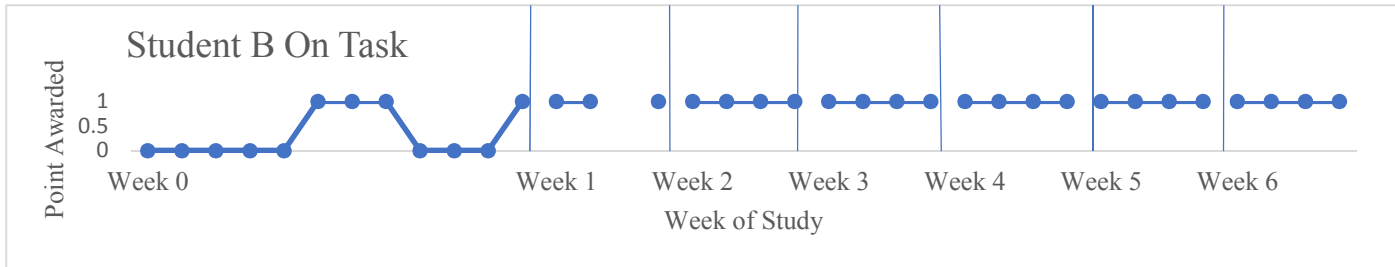


Figure 2. Student B On Task Behavior

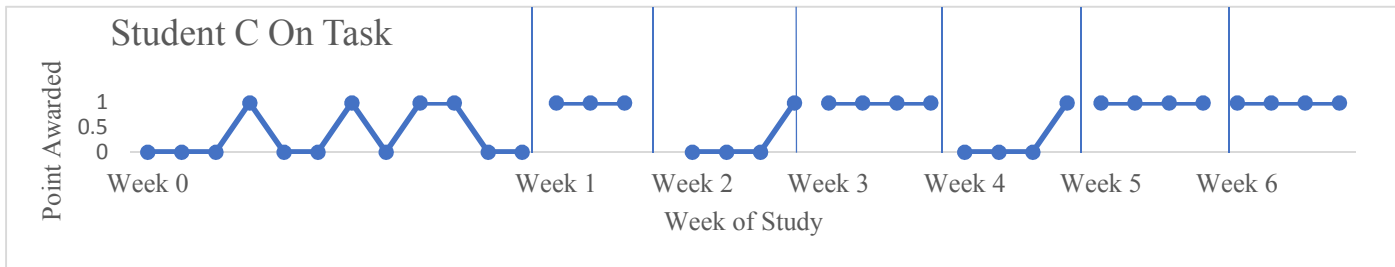


Figure 3. Student C On Task Behavior

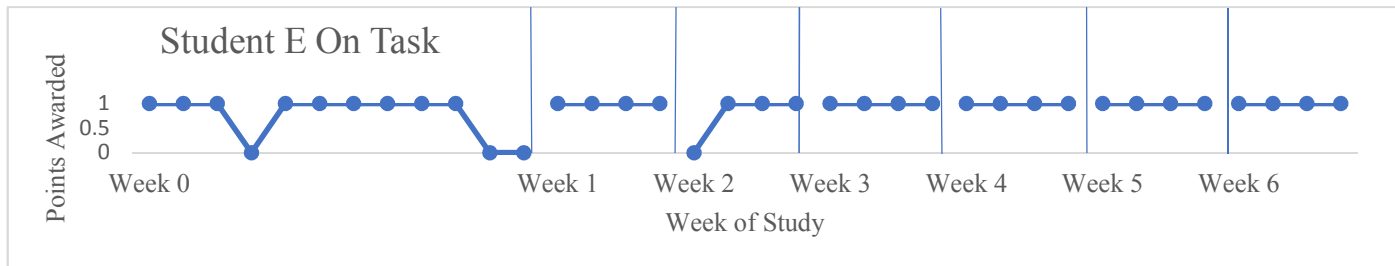


Figure 4. Student E On Task Behavior

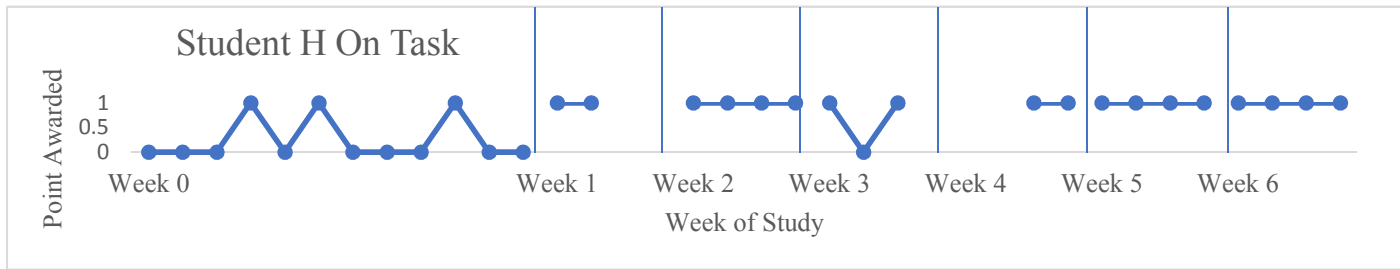


Figure 7. Student H On Task Behavior

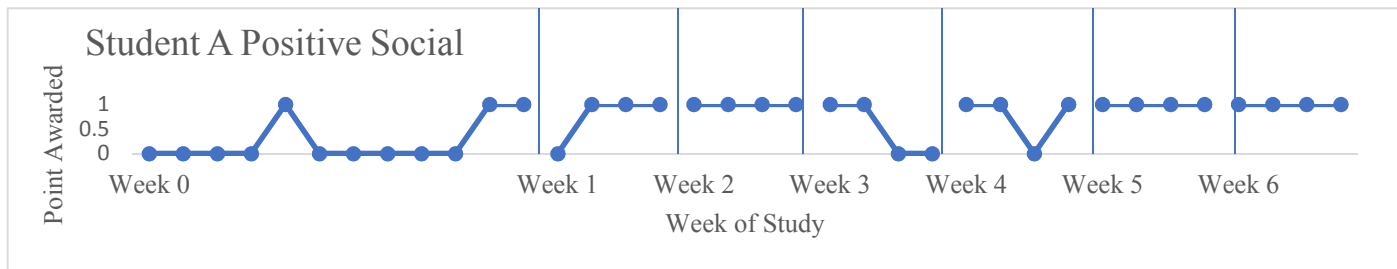


Figure 8. Student A Positive Social Behavior

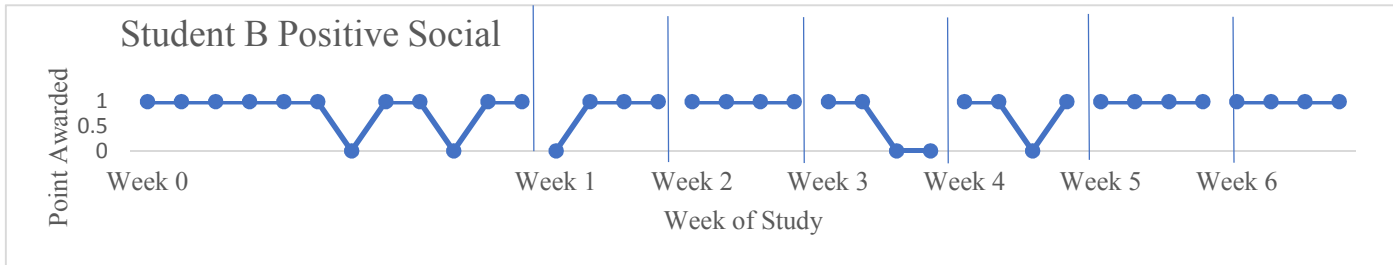


Figure 9. Student B Positive Social Behavior

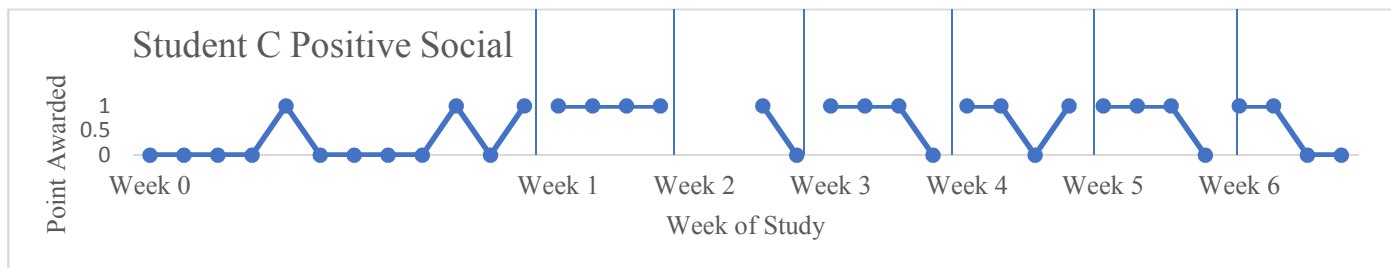


Figure 10. Student C Positive Social Behavior

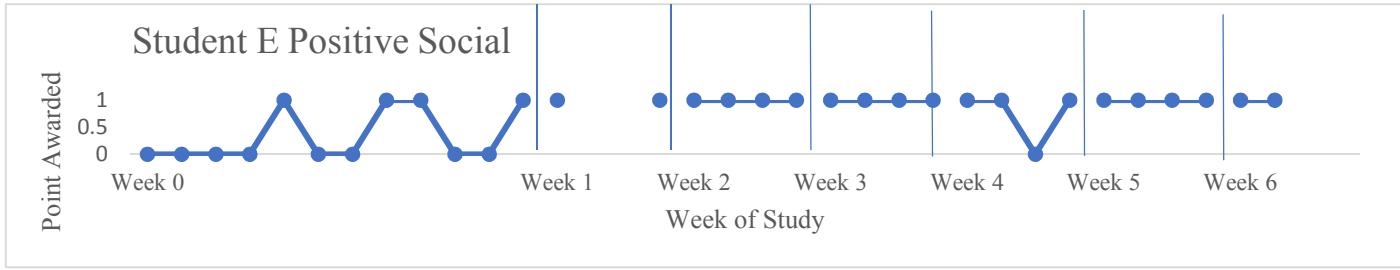


Figure 11. Student E Positive Social Behavior

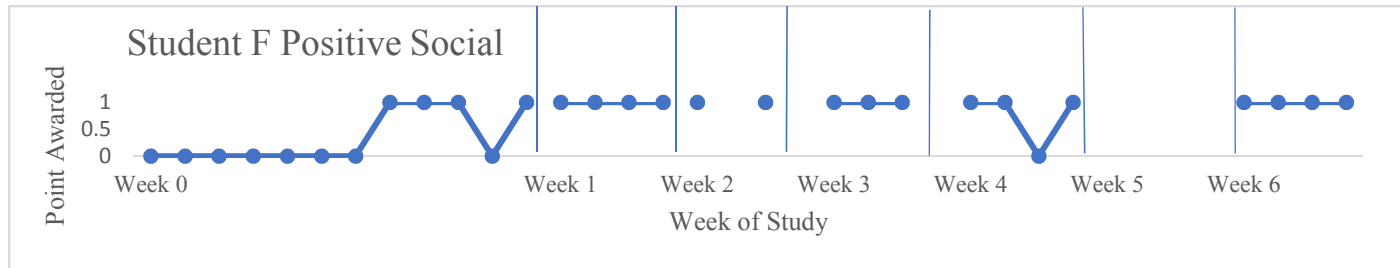


Figure 12. Student F Positive Social Behavior

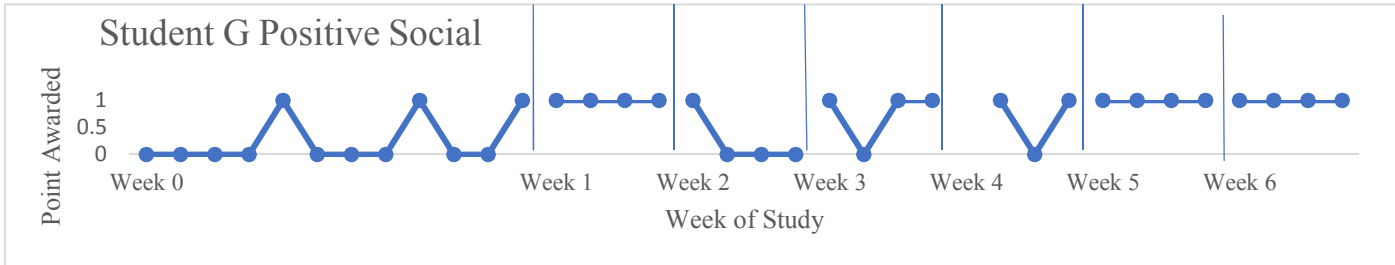


Figure 13. Student G Positive Social Behavior

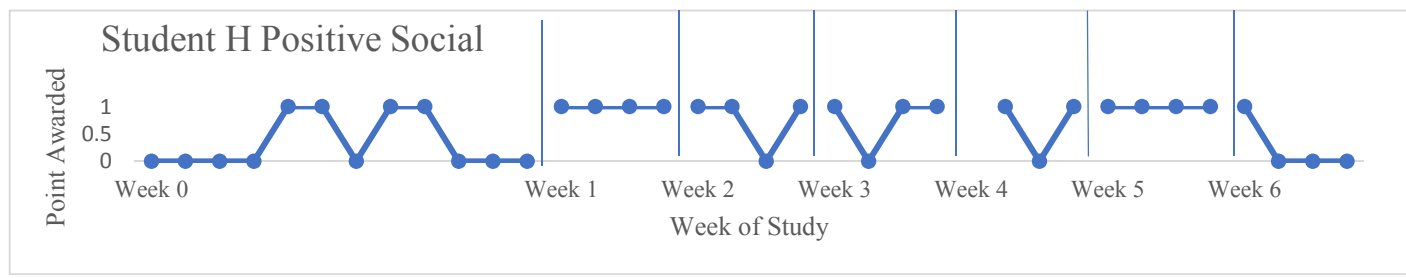


Figure 14. Student H Positive Social Behavior

Survey Results

Students were given a Likert scale at the end of each intervention week and asked to rate their experience. A sample of the Likert scale is below:

Student: (A/B/C/D/E/F/G/H) Intervention Week (circle which one): 1, 3, or 5

Type of Mindfulness Intervention (circle which one): Deep breathing, progressive muscle relaxation, or light stretching

Hand Likert scale out to each student participant in the study at the end of each intervention week and ask them to rate how much they liked the activity done that week.

How much did you like this week's mindfulness activity?				
Disliked a lot	Slightly disliked	Neutral	Slightly liked	Liked a lot

Intervention week one. For week 1, the students practiced deep breathing exercises. When given the Likert scale at the end of the week, one student disliked the intervention a lot, one student slightly disliked the intervention, two students reacted moderately to the intervention, two slightly liked the intervention, and one liked the intervention a lot.

Table 9

Likert Responses, Intervention Week 1

Rating	Number of Responses
Disliked a lot	1
Slightly Disliked	1
Neutral	2
Slightly liked	2
Liked a lot	1

Intervention week three. For week 3, the students learned progressive muscle relaxation, but were given the option to participate using deep breathing exercises they learned from the first intervention week. Students did either both, or just progressive muscle relaxation; no student did only deep breathing. When given the Likert scale at the end of the week, the responses indicated that one student slightly disliked the intervention, one student felt neutral about the intervention, three students slightly liked the intervention, and two students liked the intervention a lot.

Table 10

Likert Responses, Intervention Week 3

Rating	Number of Responses
Disliked a lot	0
Slightly Disliked	1
Neutral	1
Slightly liked	3
Liked a lot	2

Intervention Week Five. For the final week of interventions, week 5, students learned light stretching techniques, and were given the option of which of the three techniques to use. Some students chose to participate in progressive muscle relaxation only, while others combined deep breathing with light stretching. This week’s reactions are below.

Table 11

Likert Responses, Intervention Week 5

Rating	Number of Responses
Disliked a lot	0
Slightly Disliked	0
Neutral	1
Slightly liked	3
Liked a lot	3

End of intervention. At the end of week five, students were also given a cumulative survey to reflect on their overall experience with mindfulness-based interventions. All the students either slightly liked, or liked a lot, the overall intervention.

Table 12

Likert Responses for Overall Experience, Week 5

Rating	Number of Responses
Disliked a lot	0
Slightly Disliked	0
Neutral	0
Slightly liked	4
Liked a lot	3

Findings

Throughout the course of the study, students voiced appreciation and liking for the different forms of mindfulness-based interventions. Several students were observed practicing progressive muscle relaxation throughout the day, even during times that formal intervention was not taking place. Students also expressed an increase in relaxation and started showing signs of eagerness when nearing the intervention each day. Each student had their preferred activity

Table 13

Student Preferred Activities

<u>Student</u>	<u>Preferred Activity</u>
A	Progressive Muscle Relaxation; finger pinching
B	Stretching; neck rolling
C	Progressive Muscle Relaxation; finger pinching
E	Stretching; wrist rolling
F	Stretching; shoulder shrugging, rolling
G	Stretching; neck rolling
H	Stretching; shoulder shrugging, rolling

On Task Behavior.

Student A. Student A’s progress throughout the course of the intervention varied. He started off with a baseline record of being on task 41.67% of the time, but by the end of the intervention he was averaging an on-task percentage of 91.67%. Student A is often intertwined in any and all distractions in the classroom, including those caused by other paraprofessionals. Still, his on-task behavior improved over the course of the weeks. Examining the pattern of his behavior, it is evident that he was more on task the weeks the intervention as given, than in the weeks it was not. Student A reported enjoying progressive muscle relaxation, and finger pinching, as his two favorite methods of mindfulness, and was often observed throughout the day using these techniques in other school settings.

Student B. Student B showed tremendous growth. During the baseline phase, he was only on task 33.33% of the time; often facing away from the board and watching the students in the back of the classroom instead of paying attention in class. His on-task behavior increased throughout the course of the intervention. He was out of the room for

one of the on-task checks, so he was only observed eleven out of twelve times. Given this, he was on task the entire time, but is still measured as being on-task 91.67% of the time.

Student C. Student C is similar to Student A in that he easily gets distracted by the activities occurring in the classroom. He was on task only 33.33% of the time during the baseline phase of the intervention, but his on-task behavior steadily increased, and he became more focused throughout the course of the intervention. By the end of the intervention, he was on-task 91.67% of the time. At this moment, it is important to note that Students A, B, and C are all friendly with one another, and thus it is not unusual that their on-task behavior increased to the same amount; when one is focused, they are all focused.

Student E. Student E showed consistent results throughout the course of the study. After a slight dip in week 2 of the intervention, student D was consistently on task throughout the course of the six weeks, even in weeks without the mindfulness-based intervention. Student E was on task 75% of the time prior to the intervention, which was higher than the class average of 41%. Student E's on task behavior rose by 25% to 100% for the weeks with the mindfulness-based intervention and was at a solid 91.67% in the weeks without the intervention. Though he was on task for less time during the weeks without intervention, he was still more on task than he was at the start of the study.

Student F. Student F started off on task 33.33% of the time during the baseline portion of the intervention, falling short of the class average of 41%. During the weeks of intervention, student F was on task 50% of the time, showing an increase of 16.67%. Oddly, during the weeks without intervention, student F was on task 58.33% of the time. This might be because student F has defiant behaviors and will not be on task if he knows that

is what is expected of him. Student F also showed occasional dislike for the mindfulness-based interventions and may have been put off from being on task on the days that he underwent the interventions.

Student G. Student G started off during baseline by being on task 25% of the time. This number tripled during the weeks of the intervention and rose to being on task 75% of the time. His progress was not consistent, and he showed drops at the beginning of weeks two and three, a drop in the middle of week four, an absence in week five, and a drop at the end of week six. During the weeks without intervention, student G continued to show growth by being on task 75% of the time. This may imply a lasting impact of the interventions.

Student H. Student H was on task 25% of the time during the baseline intervention. During the six weeks of the intervention, his behavior was rather consistent, demonstrating on task behaviors 66.67% of the time during the weeks of intervention, and 83.33% of the time during the weeks without the intervention. This discrepancy is not similar to that of student F. Student H was absent twice during week one with the intervention, and once during week three with the intervention. These absences could've led to the decrease in the amount of time student H was on task. During the checks of week four, student H was absent twice. Nonetheless, student H showed growth in his overall on task behavior, in line with the others, demonstrating that the mindfulness-based interventions had a lasting impact.

Positive Social Interactions

Student A. Prior to the start of the interventions, student A was demonstrating positive social interactions 25% of the time. He showed consistent positive social

interactions in weeks two, five, and six, with inconsistent results in weeks one, three, and four. As mentioned before, student A's behavior is highly intertwined in any and all distractions in the classroom, including those caused by other paraprofessionals. This often results in his social interactions being skewed; calling out, talking to peers and paraprofessionals, and creating disruptions for the rest of the class. However, despite this, student A's demonstration of positive social behaviors increased to 75% of the time during weeks with the mindfulness-based intervention and stayed at 75% even in the weeks without mindfulness-based interventions, showing that the interventions had a lasting impact on student A's positive social interactions.

Student B. Student B started off strong during the baseline phase, by demonstrating positive social behaviors 83.33% of the time. He started with a dip in performance in week one, showed consistently positive social behaviors during week's two, five, and six, and a few inconsistencies during weeks three and four. By the end of the study, student B was on task 91.67% of the time during the weeks of intervention, and 83.33% of the time during the weeks without intervention. This lack of growth in the weeks without the intervention suggest that student B did not have any lasting impact from the interventions.

Student C. Student C started off by demonstrating positive social behaviors 25% of the time during the baseline phase of the intervention. Week one was promising, with all around positive social behavior consistent throughout. He was absent for two of the checks in week two but continued to show consistently positive results for the majority of weeks three through five. However, there was a decrease in his demonstration of positive social behaviors in week six. Despite the inconsistencies, student C did show immense growth; overall, he demonstrated positive social behaviors 83.33% during the weeks with

an intervention. In the weeks without an intervention, he demonstrated positive social behaviors 58.33% of the time. Although not immense growth, it is still more than the behaviors from the baseline stage.

Student E. Student E started off by showing positive social behaviors 33.33% of the time. He was absent for two out of four of the checks during weeks one and six of the intervention. Weeks two, three, and five showed consistent progress, with the demonstration of positive social behavior 100% of the time and demonstrating positive social behavior 75% of the time for week four. Overall, student E demonstrated positive social behavior 83.33% of the time during weeks with intervention, showing a 50% increase, and 41.67% of the time during the weeks without intervention, showing an increase of 8.34%. Although student E's growth in the weeks without the interventions was not substantial, the little growth still implies that the intervention still had a lasting impact on his ability to demonstrate positive social behaviors.

Student F. Student F demonstrated positive social behaviors 33.33% of the time during the baseline intervention stage. In week one, he was absent for three out of the four checks. However, weeks two and three demonstrated similar patterns, with a start off of not showing positive social behaviors, to an immediate increase. In weeks two and five, he was exhibiting positive social interactions 50% of the time, and 75% of the time in week three. Week four was an outlier for the student, with him exhibiting positive social behaviors only 25% of the time. However, he ended the six weeks strong; by the end of week six, he had shown positive social behaviors 100% of the time. Overall, student F showed positive social behaviors 58.33% of the time during the weeks with intervention, and 75% of the time during the weeks without the intervention. Again, the discrepancy in

student F's performance in comparison to the other students may be due to his defiant behaviors; whenever the class underwent mindfulness interventions, student F was not in the brightest of moods.

Student G. Student G started off by demonstrating positive social behaviors 25% of the time during the baseline intervention stage. For weeks one, five, and six with the intervention, student G showed positive social interactions 100% of the time. This is quite unusual for student G, who is very unaware of proper social behavior. In week two of the study, a week without the intervention, student G showed positive social behaviors only 25% of the time, and in week three – a week *with* intervention, he showed positive social interactions 75% of the time. He was absent for one of the checks in week four, but still showed positive social behaviors 50% of the time. Overall, student G showed positive social interactions 91.67% of the time in weeks with the interventions, and 58.33% of the time in the weeks without interventions. Just like the others, student G showed more positive social interactions in the weeks with an intervention than in the weeks without.

Student H. Student H started off by showing positive social behaviors 33.33% of the time. In weeks one and five he demonstrated positive social behavior 100% of the time. Week one was a week with an intervention, and week six was one without. For weeks two and three, he showed positive social interactions 75% of the time. In week four, he was absent for one of the checks, but still demonstrated positive social interactions two out of three times. In week six, he demonstrated positive social behavior only 25% of the time. For student H, one of the behaviors he worked on correcting was to stop rocking back and forth at his desk as much. He was also encouraged to speak up more, and participate in the

class discussions and activities, since prior to the intervention he would often lay his head down at his desk and withdraw from what was happening in the classroom.

Chapter Five

Discussion

The purpose of this study was to examine the effects of mindfulness-based interventions on high school students with disabilities, on their engagement in on task behavior and the effect on their positive social interactions and behaviors among their peers. The reason for focusing on on-task behavior and positive social behaviors lies in the goal to improve executive functioning for students with disabilities. Executive functions, as stated in chapters one and two, are important skills that assist in “complex cognitive processes that underlie flexible, goal-directed behavior” (Meltzer, 2018, p. 1). These skills help students to be successful in academic settings and can also be used to succeed in work settings. In order for students to be successful, they must demonstrate efficient on-task engagement and positive social behaviors to interact well with others. These mindfulness-based interventions seek to improve the executive functions of on-task engagement and positive social interactions.

Similar to the findings of Minkos et al., 2018, the mindfulness-based interventions had an impact on both the on-task engagement, and the positive social interactions of high school students with disabilities. As expected, the mindfulness-based interventions effected each student differently. While some had a steady improvement in both areas, others were stronger in one than in the other. Student A, for example, showed greater improvement in his on-task engagement than he did in his positive social interactions. However, student H was on-task less of the time following mindfulness-based interventions but displayed increased positive social interactions. Perhaps the reasoning for this lies in the classifications of each student; while both have multiple disabilities and

auditory processing difficulties, student A has increased cognitive impairment, while student H is on the autism spectrum. This suggests that the mindfulness-based interventions may have more of an effect on students with different abilities/disabilities. Since student A faces higher cognitive impairment, he may have been more susceptible to an increase in his on-task engagement, while student H has greater difficulties socializing due to his presence on the spectrum and may have been more susceptible to an increase in his positive social interactions.

Student performance may also have been impacted based on the type of mindfulness-based intervention activity that took place that particular week. For example, week one consisted of deep breathing exercises, and all but one student showed 100% on task engagement, and one student stated that he did not like this exercise in the post exercise surveys. For the positive social interactions, all but two students demonstrated positive social interactions 100% of the time that they were checked. In week three the students practiced progressive muscle relaxation, which led to increased fluctuations in the on-task engagement and the positive social interactions.

Nearing the end of the study in week five, the students learned light stretching techniques and were also given a choice as to which of the three activities they wanted to use. Again, just as in week three the results varied, but the majority of students showed on-task engagement or positive social interactions more than 50% of the time. Since week five was the week that incorporated physical movement, it is curious to see that this did not yield as great a results as expected. Muller et al. (2008) reported increased success from physical activity because it “allows for the individual with disabilities to “[deal] with [their] social frustrations” (p. 185) and relieve social stress. Perhaps the students involved in this

study used their physical education as an outlet for their frustrations, which is why the light stretching did not have as significant an impact.

Another factor of the light stretching was its tie to yoga. Though not exactly the same, light stretching and yoga have a few moves in common, and the latter was the best alternative to yoga that was feasible in this classroom during this study. As reported by Accardo (2017) in her article *Yoga as a School-Wide Positive Behavior Support*, light stretching helped “effectively increase...academic engagement” (p. 110). Dr. Accardo also reported on various similar studies finding yoga allowed students to self-regulate and maintain attention, primarily through purposeful breathing; which the students in this study did, starting in week one all the way through week five.

However, overall different aspects of mindfulness-based intervention did have an effect on the students individually. Some students were observed practicing progressive muscle relaxation or deep breathing whenever they were in a stressful, or overstimulated environment. This finding aligns with the study done by Brown, Davis, LaRocco, and Strasburger (2010), who report mindfulness-based interventions can allow individuals to remove themselves from overthinking and overreacting to emotionally and cognitively distressing situations, and instead respond effectively (Brown et al., 2010). In this case, for example, students A and E were noted finger pinching and shoulder rolling, respectively, to assist them from showing negative social interactions. While each student had his own reactions to the mindfulness-based interactions, the class as a whole had overall different results.

The impacts on each individual student varied; but as a whole, the mindfulness-based interventions had a greater impact on the positive social interactions of the students

than it did on their on-task engagement. This is evident by the class averages. When calculated, the on-task engagement of the class rose by an average of 39.95%, while the positive social interactions rose by 40.14%. There are several reasons as to why the on-task engagement of the class as a whole did not rise the same as it did per individual, and these reasons can be found in the limitations of the study.

Limitations

It is important to keep in mind the limitations of this study that may have impacted the results. One such limitation is the presence of disruptions. This study takes place in a high school classroom, one that is not isolated from disruptions. These disruptions tend to steer the on-task engagement of students off track and cause the class as a whole to be distracted. There were two major types of disruptions present in the classroom during the intervention; external disruptions, which took place outside of the classroom, and internal disruptions, which took place within the classroom.

External Disruptions: Schedule Changes. This study took place in part over the course of winter months when weather is unpredictable. Therefore, there were days when the school was either closed due to snowy conditions or had a delayed opening. When the school was closed, it prevented the intervention from taking place all together. When there were delayed openings the schedule was altered, limiting the amount of the time the students had to undergo the intervention.

In part, with these changes, other external disruptions related to scheduling include the taking place of unexpected safety drills. These drills, although necessary, also created alterations in the schedule and led to limited time to complete the interventions, or the complete elimination of it all together for that day. These inconsistencies affect the impact of mindfulness-based interventions on the students.

One last external disruption related to the schedule is that there are some students who attend outside resource and support sessions during the periods in which intervention took place or need to leave to see the nurse for a scheduled and regular appointment. These are limitations because it creates a break in the students' exposure to the intervention, and may prevent them from going through the intervention properly

External Disruptions: Staff and Students. The classroom in which this intervention took place is in a hallway with three other classrooms; one with freshman aged students, one with sophomore aged students, and one with senior aged students. These students also all vary in multiple disabilities, and behavior. Because of this, there were multiple occasions in which a student had a behavior related incident out in the hallway, and the noise of it created distractions and disruptions for the students inside the mindfulness-based intervention classroom.

Students are not the only causes for external disruptions; often times staff members would create unintentional disruptions as well. One such example is the use of the PA system; announcements made during the mindfulness-based intervention created distractions. Other distractions came in the form of staff members physically coming in and out of the classroom during the intervention. This opening and closing of the door, and subtle change in the environment during the mindfulness-based intervention created distractions for the students. Because of the circumstances of the school, it was not completely plausible to limit the staff's entrances into and exits from the classroom.

Internal Disruptions: Noise. Inside the classroom, there were several disruptions, most of which can be generalized under noise related issues. The staff in the school uses walkie-talkies to communicate with one another, and these devices are not by any means,

quiet – even when they are not being used. There were instances when the walkie-talkie would give off static, when it would start beeping, ringing, or be on high volume when a staff member used it. These noise disruptions negatively impacted the mindfulness-based interventions and created distractions for the students. It was not plausible to turn off the walkie-talkies, as they are to be used in case of emergencies, and for the staff to maintain contact with each other.

Other noise disruptions in the classroom include conversations among the staff; whether it was staff that was entering the room, or staff that was already in the room at the start of the intervention, the conversations between staff members created many distractions and disruptions for the students during the mindfulness-based interventions. Again, it was not plausible for the teachers to be asked not to talk.

Other limitations to the study include the limited time in which the intervention took place. It would be interesting to see what kind of changes would happen if the study took place over the course of a few months, instead of a few weeks. Similar to the length of time over which this intervention took place, another limitation might be the amount of time spent on each mindfulness-based intervention. The interventions lasted between 5-10 minutes throughout this study, but perhaps a longer session would yield better results.

Finally, a last limitation may be the sample of students used for the study. This classroom contained all boys, primarily Caucasian, between the ages of 16-18 years old. Perhaps the overall effect would have been different had there been a more diverse group of students undergoing the intervention processes.

Implications and Recommendations

This study implies that mindfulness-based interventions have a positive effect on the social interactions, and on the on-task behavior of high school students with disabilities. The impact is not only immediate, but also lasting. When students underwent the mindfulness-based intervention, they continued to stay on task even in the weeks without the interventions. However, the impact was not as lasting for the social interactions. This may imply that mindfulness-based interventions do not have as strong of an impact on social behaviors as they do engagement related behaviors.

Educators may consider implementing mindfulness-based interventions in their daily classroom routines to increase on task behavior. The length of the intervention can vary, but consistency is key; educators should strive to implement this intervention regularly in order to see the full effect on the students.

Conclusions

The purpose of this study was to examine the effects of mindfulness-based interventions on the on-task engagement, and social interactions, of high school students with disabilities. After six weeks of intervention, results indicate that mindfulness-based interventions do have a positive effect on both the on-task engagement, and the positive social interactions, of the population at hand. However, such as with all studies, there are limitations to the impact. Limitations include the time frame in which MBI takes place, and the type of MBI used.

For further and future studies in this area, it is recommended that the sample size be more varied, and that the study take place over the course of a few months rather than a few weeks. The design for the MBIs should be consistent, as to not derail the progress of

the students. If possible, the study should also take place in an environment that is not prone to disruptions, as this can greatly negate the impacts of the MBI on the students.

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