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Meredith Obaytek

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James Madison University

## Table of Contents

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## Abstract

This project explores the effects of a mindfulness intervention on children with Autism Spectrum Disorder (ASD) in an occupational therapy setting, as well as explores the attitudes of student occupational therapists on the treatment acceptability for mindfulness interventions in occupational therapy. This paper discusses the current research in mindfulness and explores how it may have an impact on children with ASD, and in particular, within the field of occupational therapy. This project was made up of two components and took place at James Madison University's Inter-Professional Autism Clinic (IPAC) over the course of three weeks. The first component was an investigation of the impact of a mindfulness intervention on two children with ASD enrolled in IPAC. This involved collecting data on the behaviors of two children during the mindfulness intervention implemented during their occupational therapy sessions. The second component of this project examined therapist acceptability and satisfaction of the mindfulness intervention implemented by two Level I OT graduate student therapists. This was achieved by collecting survey data on the student therapists before and after implementing the mindfulness intervention. The researcher predicted that frequency of behaviors such as outbursts and number of verbal prompts required to complete a task would decrease for the child participants over sessions. The researcher predicted that the student therapists would have a general acceptability of mindfulness as a therapeutic activity after administering the mindfulness intervention. The researchers concluded that the child participants each showed improvements in the trends of their challenging behaviors, and the student therapists accepted mindfulness interventions as a therapeutic activity in an OT setting. The results indicate that future research is necessary to provide more specific evidence for the effectiveness of mindfulness interventions for children with ASD and the treatment acceptability of mindfulness in the field of occupational therapy.

## Introduction

In recent years, mindfulness has gained the attention of researchers in a number of disciplines including psychology, psychiatry, and medicine (Hardison & Roll, 2016). The word mindfulness can be traced to the Pali word sati, which is translated to mean having awareness, attention, and remembering (Bodhi, 2000, Davis & Hayes, 2011). While mindfulness practices have been traced back to ancient Buddhist principles (Kabat Zinn, 2011), their emergence into secular society has arguably altered their meaning. Mindfulness has been defined as a state of being, a trait, a form of practice, and a type of therapeutic intervention (Hanley & Garland, 2017). Today mindfulness is most recognized by the definition proposed by Jon Kabat-Zinn. A leading expert on mindfulness, Kabat-Zinn defines mindfulness as, "the awareness that emerges through paying attention, on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (1990). This definition emphasizes the psychological nature of mindfulness. To achieve this psychological state of present awareness, many like Kabat-Zinn have practiced meditation, which typically involve sitting in a relaxed position and thinking about a physical sensation like the breath.

Other mindfulness practices have combined this cognitive process of attending to a sensation with a physical body movement in what can be considered a mind-body practice. These practices include activities such as yoga, tai chi, and qigong, and are found to cultivate mindfulness as well (Hanley, Abell, Osborn, Roehrig, & Canto, 2016). The mind-body connections of these practices has caused mindfulness to emerge into a number of health care settings, including rehabilitation practices (Hardison & Roll, 2016). One rehabilitation practice that shares this emphasis on holistic, mind-body practice is occupational therapy (Dale et al., 2002).

OT is distinguished as one of the few therapeutic disciplines that trains its practitioners to value this holistic, mind-body perspective (American Occupational Therapy Association, 2019). The American Occupational Therapy Association (AOTA) defines OT as "the only profession that helps people across the lifespan to do the things they want and need to do through the therapeutic use of daily activities (occupations)." Mindfulness can be considered one of these daily activities, or as a means to enhance the experience of an occupation (Elliot, 2011). Within the scope of practice occupational therapists can serve many populations including children with disabilities to geriatric populations, in order to address physical, cognitive, or psychological needs (AOTA, 2019). One such population that occupational therapists work directly with is children with Autism Spectrum Disorders (ASD). Occupational therapists working with this population work towards "assessing sensory motor, emotional regulation, social relationship, and self-advocacy skills with the aim of facilitating full inclusion with the community" (Crabtree & Demchick, 2018). Occupational therapists work to address difficulties in both the physical and mental health of those with ASD (AOTA, 2019). The success of mindfulness interventions in alleviating physical and mental difficulties for others with these challenges, suggests that mindfulness interventions may be beneficial for those with ASD as well.

Previous research on mind-body interventions implemented by occupational therapists is limited. While one scoping review found that OT graduate students practicing personal mindfulness interventions benefited from less stress, anxiety, and depression, improved academic skills, and emotion regulation, there were not any measures on the use of mindfulness interventions in their own OT scope of practice (Kinsella, Smith, Bhanji, Shepley, Modor, & Bertrim, 2018). Another review of the literature found that of 16 articles on OT and mindfulness,

only two studies included the occupational therapist as the primary mindfulness provider (Hardison & Roll, 2016). Despite mindfulness interventions falling within the scope of practice for OT, limited research exists on the use of these interventions by occupational therapists. With most children with ASD receiving OT (Monz, Houghton, Law, & Loss, 2019), there is a need for more research on mindfulness interventions in the context of OT for children with ASD.

## Background

Autism spectrum disorder is a common neurodevelopmental disorder affecting 1 in 59 children (CDC, 2018) that varies widely in how it is presented (Copeland, 2018). The American Psychiatric Association's Diagnostic and Statistical Manual (DSM-5) states that those with ASD lack the skills or face deficits in the following three diagnostic domains: social interaction, speech and nonverbal communication, and restricted or repetitive behaviors, interests, or activities (American Psychological Association). Challenges with social interaction and communication can include difficulty in conversation and turn taking, as well as misunderstanding social cues, emotional expressions, and relationships (Copeland, 2018). Restricted and repetitive behaviors can include physical actions such as hand-flapping or organizing toys or their daily routine in a strict, structured manner (Copeland, 2018). Those with ASD may also present with atypical sensory processing, which is categorized under restricted and repetitive behaviors and can involve hypo or hypersensitivity to certain sensations. These hypo and hypersensitivities may present as covering one's ears when they perceive a sound as being too loud, or spinning in a circle for atypical amounts of time in order to perceive senses related to balance. One study found between 82 and 97% of participants with ASD report deficits in this atypical sensory processing (Dellapiazza, F., Vernhet, C., Blanc, N., Miot, S., Schmidt, R., & Baghdadli, A, 2018). These behaviors make up some of the general criteria for ASD, and are most often the target in therapy. Despite the attention to these general characteristics, there are a number of other common characteristics that prove to cause challenges for those with ASD.

Other characteristics related to the three diagnostic criteria often undefined for those with ASD, are deficits in executive functioning. Executive functioning is defined as the mental process required in attending and responding to incoming information (Miyake & Friedman,

2012). These processes occur in the prefrontal cortex of the brain and control one's regulation of their emotion and behavior (Miyake & Friedman, 2012). The deficits that occur in executive function are also found in those with Attention Deficit-Hyperactive Disorder (ADHD). This suggests that executive functions may also be related to attention and hyperactivity. One study found that children with ASD have deficits with shifting attention (Courchesne, Townsend, Akshoomoff, 1994), and an alternate study found difficulty with sustained or selective attention (Noterdaeme, Mildenberger, Minow, Amorosa, 2002). These deficits create challenges for those with ASD in following directions, listening, and completing tasks, which can interfere with school and home-life.

Another characteristic that is often associated with difficulties in executive functioning and occurs often in children with ASD is emotion regulation. Emotion regulation is defined as the ability to control emotional states to achieve a goal (Thompson, 1994). Having emotion regulation allows one to manage negative outcomes such as stress, anxiety, or frustration. Those with ASD are said to demonstrate more resignation and avoidance when engaged in frustrating tasks (Jahromi et al., 2012), which can lead to depressive symptoms later in life (Patel, S., Day, T., N., Jones, N., & Mazefsky, C. A., 2017). These challenges in controlling one's emotions can also work to worsen other areas of executive functioning. Ultimately, difficulties with emotion regulation can contribute to issues in attention and completing tasks and become disruptive behaviors in classroom settings.

One method that has been found to improve behaviors in the classroom for neurotypical children is mindfulness. Mindfulness has been adapted for use in schools by the creation of organizations like Mindful Schools. The Mindful Schools organization developed curriculums that train teachers to implement mindfulness in the classroom. These courses have been found to

improve selective attention and focus among elementary school students (Napoli, Krech, Holley, 2005), and emotional regulation among adolescence (Metz, Frank, Reibel, Cantrell, Sanders, & Broderick, 2013). One possible explanation that neuroscience has for these improvements in attention and emotional regulation is that mindfulness increases activity in the prefrontal cortex of the brain (Chiesa & Serretti, 2010) and decreases activity of the amygdala (Desbordes, Negi, Pace, Wallace, Raison, & Schwartz, 2012). The prefrontal cortex is often found to be less active in brains of those with ASD (Donovan & Basson, 2017) which suggests that mindfulness interventions may be helpful for decreasing attention and emotional regulation problems exhibited by those with ASD.

Currently, there are few mindfulness interventions that have been adopted for those with ASD. The variability in characteristics of those with ASD generates a number of challenges in the selection of mindfulness interventions appropriate for studies. This can be seen in small sample sizes and the overall lack of randomized control trials found in research on mindfulness interventions for those with ASD (Hourston & Atchley, 2017). Similarly, the lack of a universally accepted definitions of mindfulness based practices makes research in this area difficult to specify. Studies on mindfulness for those with ASD used interventions like meditation, yoga, and Qigong (Hourston & Atchley, 2017). One study that reviewed the use of yoga as a mindfulness intervention found that while few improvements were reported in the main, diagnostic features of ASD, behaviors such as the abilities to sit, tolerate adult proximity, and control themselves improved (Semple, 2018). Semple also found that mindfulness yoga interventions reduced aggressive behavior, irritability, and noncompliance. These preliminary findings suggest that yoga may be a mindfulness intervention that is effective at reducing some of the negative characteristics of ASD. Another intervention that may be beneficial for those

with ASD is Qigong. Qigong, or Gigong, is defined by the National Qigong Association as “a mind-body-spirit practice that improves one’s mental and physical health by integrating posture, movement, breathing technique, self-massage, sound, and focused intent.” Orit Tal-Atrzili (2017) found that Gigong Sensory Training improved sensory processing and self-regulation in young children with ASD by 18%. These early findings have shown that there is a potential for benefits of mindfulness based interventions for children with ASD in areas of executive functioning and emotion regulation.

This pilot study will explore the effects of a mindfulness intervention on the executive functioning and emotional regulation of children with ASD within the context of occupational therapy. There is a lack of literature on mindfulness practices facilitated by an occupational therapist for children with ASD. This study serves to add to the existing body of literature on mindfulness interventions in OT for children with ASD, as well as address the treatment acceptability of these interventions in an OT setting by OT graduate student therapists.

## Methods

### Participants

#### Child participants.

This study identified two children with ASD who attend the Inter-Professional Autism Clinic (IPAC) between the ages of 9-11. These clients attend the IPAC program once a week and regularly receive OT, speech therapy, and behavior services during their IPAC session. These clients were recruited for this intervention based on their status as clients with ASD, who are currently receiving OT during structured inter-professional setting.

Child A is a 9 year-old with ASD, who has been attending IPAC since 2016. Child A has difficulty with attention and behaviors related to self-control. Some of these challenging behaviors include making verbal or physical outbursts such as shouting or making an off-task comment, and/or physically leaving the therapy environment. Child B is an 11 year-old with ASD, who has been receiving occupational therapy with the licensed OT supervising this project since 2012, and attending IPAC since its foundation in 2016. Child B has difficulty with behaviors related to self-control and regulating emotions. Often these behaviors involved physical movements unrelated to the activity such as squirming, stomping, or lying on the floor to fall asleep.

#### Student Therapists

This study also identified two graduate students in their second level I fieldwork coursework, whom were enrolled in the pediatric intervention course of the occupational therapy graduate program at James Madison University. This pediatric course is taught by the assistant researcher for this project, who is also the supervising occupational therapist for this fieldwork site. Prior to this study, the student therapists had limited exposure to mindfulness, in that they

had no formal training but did have some experience personally practicing mindfulness. Neither student therapist had experience studying and implementing mindfulness in an occupational therapy setting.

## Instruments

### Child behavior intervention.

In order to study if there is a pattern in challenging social and emotional skills during a mindfulness intervention, the researchers generated a frequency checklist taken from questionnaires that are frequently used to measure areas such as attention, hyperactivity, self-control and emotional regulation. The Second edition of the Behavioral Assessment System for Children (BASC-2) and the Devereux Early Childhood Assessment Program (DECA Program) provided examples of these measures, from which the researchers generated an Observation Form in order to observe and code the quantitative data (Appendix A). In this form, self-control measures were recorded as "verbal interruptions/outbursts" or "physical outbursts; movements or actions unrelated to the activity." Attention was measured in three categories, including, "requires a prompt to listen during initial instruction," "requires a prompt to stay on task,", and "duration; or total time spent in the mindfulness activity." Emotion control was measured as "exhibits signs of anger and or frustration." Lastly, the undergraduate researcher completed a subjective measure of the child's perceived interest in the intervention on a scale of 1-5 with 1 being "no apparent interest, and 5 being highly interested."

### Treatment acceptability intervention.

Treatment acceptability data was collected. This qualitative data consisted of a series of open ended questions that were presented to the OT graduate student therapists administering the mindfulness interventions. These open ended questions generated responses about the

effectiveness and administration of these mindfulness interventions for this population, and was collected once before beginning the mindfulness intervention during treatment sessions (Appendix B) and once following the conclusion of the last intervention treatment session (Appendix C). These questions resembled those that OT graduate student therapists generally receive throughout their fieldwork experience, but was modified to provide a means of reflecting on the intervention. This data is used to elaborate upon the quantitative data that is collected, as well as to consider patterns in the treatment acceptability of mindfulness interventions as an OT practice for children with ASD.

### Procedures

Prior to the data collection process, two graduate student therapists were trained in a mindfulness intervention technique by a mindfulness expert at James Madison University. Following this training, these student therapists completed the Treatment Acceptability Intervention, measuring their views on mindfulness interventions as a form of occupational therapy for children with autism. After this, the student therapists, with the supervision of the supervising OT, facilitated the mindfulness intervention during the final 15 minutes of each child's occupational therapy treatment session during IPAC. This mindfulness intervention consisted of an initial emotional awareness check-in, a breathing activity, a mindfulness game, a breathing activity, and a gratitude activity. During these mindfulness interventions, the undergraduate researcher collected data on each child's social and emotional behaviors using the Observation Forms. Following the treatment period of 3 sessions, the OT student therapists completed the final Treatment Acceptability Intervention.

## Results

### Child Intervention

**Child a.**

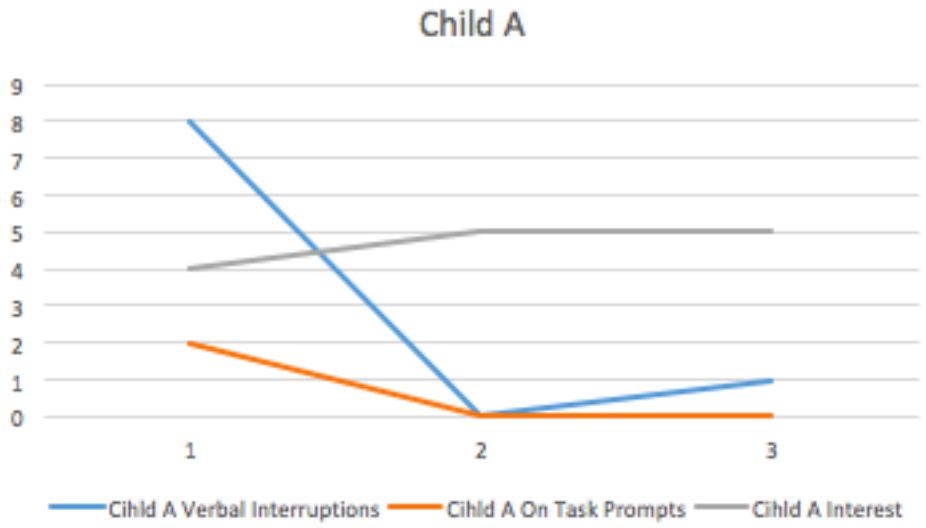


*Figure 1*

Overall, Child A decreased on multiple challenging behaviors over the three sessions of the intervention including frequency of verbal interruptions and the frequency of the number of prompts required to stay on task (Figure 1). The child decreased from 8 verbal interruptions in the first session to 1 interruption in the third session. This child also decreased on the frequency of prompts required to stay on task, from 2 in the first session to 0 on the third session. Their subjective interest in the activity also increased from 4 in the first session to 5 in the third session. The overall duration of the activity increased from 12 minutes and 51 seconds in the first session, to 14 minutes and 38 seconds in the third session. During the study, Child A did not exhibit any instances of physical outbursts, requirements for a prompt to begin initial instruction, and no instances of anger or frustration in any of the sessions, thus these have not been included in the results or discussion session.

In the notes taken during each session, Child A was quoted for "requesting to lead breathing activity on his own" in Session 1. It was also observed in the second session, that Child A asked "what are my favorite pants," to which he answered "my favorite are jeans," then asked

"what are you wearing," and answered "you are both wearing white letters." In the third session, Child A was also noted for noticing patterns in previous activities, such as "it's bumpy, big, heavy" in reference to the different balls used during the mindfulness activity game. This child also "generalized from 'shirts' to 'glasses and watches'" during the mindfulness activity game in which the children were asked to describe what they noticed about another person in the game.

**Child B.**

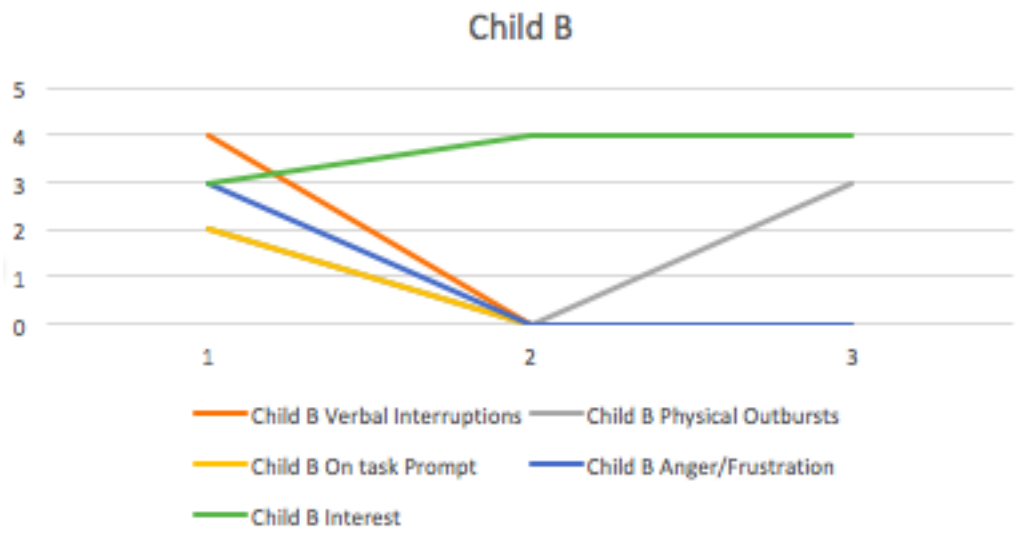


*Figure 2*

Child B decreased in the frequency of verbal interruptions, number of prompts required to stay on task, and the frequency of anger and frustration outbursts (Figure 2). Between the first and third week, the number of verbal interrupts went from 4 to 0, the number of on task prompts required from 2 to 0, and the number of angry or frustrated outbursts from 3 to 0. The subjective interest of the child also increased from 3 to 4 between the first and third week. Child B had 2 physical outbursts in session 1, and 3 physical outbursts in session 3. The overall duration of activity also decreased from 12 minutes and 4 seconds in Session 1 to 10 minutes and 25 seconds in session 3. During the study, Child B did not exhibit any requirements for a prompt to begin

initial instruction, and so this behavior has been removed from the results and discussion sessions.

In the notes taken during each section this child was noted for "enjoying the choice to lead" and for saying "my bottom is tired" in the first session. In the second session, this child said they were tired, and continued to "say things [they] noticed, even when it wasn't [their] turn." In the third session, this child was observed to be "yawning" frequently, and saying "I'm feeling sleepy."

## Student Therapist Intervention

### Initial treatment acceptability intervention.

For Question 1, Student Therapist A said that the clients' previous "basis in mindfulness based YouTube videos and breathing exercises," while Student Therapist B suggested "demonstrating what [they were] asking the client to do before [the clients] attempt[ed] to do it themselves" would work easiest in administering the intervention.

For Question 2, Student Therapist A said "enduring the length of the activity and following prompts," would be most challenging for administering the intervention, while Student Therapist B thought the "concepts of mindfulness [would] be challenging for the clients to grasp and understand."

For Question 3, both Student Therapists A and B said the "coping techniques […and] recognizing emotions" would be the aspects of executive functioning and emotion regulation to improve most. Student Therapist B specifically mentioned breathing as a coping strategy to help improve these skills.

For Question 4, both student therapists mentioned that "relating the techniques back to themselves [the clients]" would be the most difficult for the clients. Student Therapist B

specified that "some of the visualization techniques […and] body awareness" would be most difficult.

For Question 5, both student therapists stated they would consider using this mindfulness intervention in a future session with another client with ASD. Student Therapist A said that "mindfulness based strategies can be beneficial in creating a foundation for mindfulness and self-regulation, therefore coping strategies and thoughtful responses to the environment can be encouraged moving forward," and specified that these activities should be used "with appropriate structure."

**Final Treatment Acceptability Intervention**

For Question 1, both student therapists stated the breathing activity worked easiest in administering the mindfulness intervention, with Student Therapist A stating that the client "prefer[red] the [breathing] activity over other [mindfulness activities] often," and Student Therapist B mentioning that allowing the clients to lead the activity made it much more motivating to the clients. Student Therapist A also credited the "program set up and repetition of the mindfulness intervention" as working well for the client and administration of the activities.

For Question 2, both student therapists mentioned that remembering the directions and the prompt for the mindfulness game and the gratitude activity were the most challenging aspects of the intervention for the clients. Student Therapist A said, "the last week of the intervention I could really tell a difference, [the client] began to understand more of what was asked […] but still had difficulty stating the prompt [to state something s/he noticed about someone else in the group], rather than asking it [the observation]." Student Therapist B commented on the challenges with the gratitude activity, proposing that, "a lack of understanding

what being thankful is, was a barrier here and with limited time, we weren't able to educate our clients to fully understand what that means."

For Question 3, both student therapists noted that the use of breathing as a self-regulation strategy improved most for the clients, and were utilized in "multiple IPAC sessions" including treatment sessions other than occupational therapy sessions. Student Therapist A reflected that, "mindfulness and emotion regulation strategies [such as breathing] were mentioned and chosen 4 times when completing a 'toolbox' workbook about emotion regulation" in another session. Student Therapist B also noted that "focus/attention to their surroundings" also improved.

For Question 4, both student therapists mentioned that executive functioning skills were most challenging for the clients, and that because of this challenge, prompts and redirections were required more often than the student participants anticipated. Student Therapist A mentioned that they, "could tell the clients knew what they were supposed to do, but did need more assistance, redirection, repetition and phrase mimicry than projected." Student Therapist B mentioned one client as "often slouch[ing…and] need[ing] to be reminded multiple times to sit crisscross applesauce and sit up straight during mindfulness interventions." This client was also noted for having challenges with "managing emotions" but that this client "seemed less frustrated during the mindfulness time and exhibited less verbal outbursts during that time (growling, verbalizing that he was bored)."

For Question 5, the student therapists both supported the use of mindfulness interventions in future sessions with clients with ASD, and in their future careers as OTs. Student Therapist A noted overall that for these particular clients "improvements in behavior, mood, attending skill, endurance through activity demands, observation skills on part of the clients,

communication and social skill development and emotional recognition and regulation" were seen. This student therapist also said that, "on days when activity performance was not as strong [at IPAC as a whole…] the only activity that seemed to captivate and ground them was mindfulness time." Student Therapist B reflected on the usefulness of mindfulness for other populations, including their own personal use. This student said "the breathing portion of the intervention was my favorite part to witness and is the most transferable to everyday life (ADLs, IADLS, self-care, and coping strategies) that I feel would work well with almost any client."

## Discussion

While the small number of data points limits the analysis of the study's results, the available points and survey results from the Student Therapists suggest that the mindfulness intervention may have been helpful in reducing the frequency of some challenging behaviors, as well as increasing some positive behaviors. The number of verbal interruptions and the number of prompts required to stay on-task decreased for Child A, which the Student Therapists attributed the cognitive understanding of the task that was gained by repeating the same activity over the course of the study. The consistency of the activities and schedule of mindfulness time was believed to have set expectations for Child A, and is thought to have allowed Child A to more easily attend to the activities each week and therefore have fewer behaviors related to inattentiveness such as verbally interrupting. Similarly, Child B decreased in the frequency of verbal outbursts, instances of exhibited anger or frustration, and the number of verbal interruptions, which was thought to be a result of this child's becoming more aware of their emotional and physical state during the emotion regulation and breathing activities included in mindfulness time. The Student Therapists noted that the children were most engaged in the breathing activities included in the mindfulness intervention, and that strategies involving use of

a visual aid and allowance of the Child Participants to lead the activity helped maintain their attention in the activity. These observations about the children's performance of the breathing activity, may be consistent with research by Singh, Lancioni, Karazsia, Myers, Kim, Chan, Jackman, McPherson, and Janson (2019) which found that a breathing activities was related to decreases in verbal and physical aggression. If breathing helped to increase emotional regulation, and de-escalate behaviors, it may therefore be related to increased attention and time spent on-task in activities.

These findings support the current literature and suggest that research in mindfulness activities, specifically related to breathing for children with ASD, be conducted in the future. Collectively, these children seemed to improve in behaviors related to self-control, attention, and emotion control over the course of the three-week mindfulness intervention during occupational therapy, and supports the literature that mindfulness interventions are related to improvements in attention and emotion control (Napoli, Krech, Holley, 2005) (Metz, Frank, Reibel, Cantrell, Sanders, & Broderick, 2013). Future research could explore the strength of these suggested relationships, specifically for children with ASD.

Despite the need for additional research and changes to the survey questions asked, some general themes emerged from the Student Therapists' treatment acceptability forms. Overall, the Student Therapists were supportive of the utilization of mindfulness techniques in an occupational therapy setting and specifically for children with ASD. They were open to the use of mindfulness interventions before the study began, and following the study, had a number of suggestions for how the mindfulness intervention could be improved for children with ASD that have been validated in the current literature on mindfulness interventions for children with ASD, and with occupational therapy practices for children with ASD. With the lack of current research

available on the treatment acceptability of mindfulness interventions for children with ASD in an occupational therapy setting, this study found a general acceptance of these interventions for this population in this therapy setting, and demonstrated a need for future research in this area.

In the future, it would be worthwhile to make a number of considerations regarding study design, specific essential and non-essential mindfulness practices, and treatment acceptability changes to get a clearer representation of the relationships between the mindfulness intervention and behaviors, and of the treatment acceptability of these interventions from current students studying occupational therapy.

## Limitations

This study presented a number of limitations discussed below.

### Project design.

The use of case designs limits this study. The inclusion of 2 child participants and 2 student therapists limits how the study may be generalized to the greater population of children with ASD and to students studying occupational therapy, and so future research should be aimed at getting a larger, more diverse sample of children with ASD and student occupational therapists.

It is commonly said that, "if you have met one child with ASD, you have met one child with ASD" and this is because of the variance in a diagnosis and the behaviors that a child with ASD experiences. The uniqueness of each child with ASD adds an additional challenge to most research within this population, and is a factor in why it is important to study a large number of children in order to get a more accurate representation of this population. In the future we would recommend this be done with a larger sample of children in the community with ASD, and of a similar age since another limitation to our study was that the children were not the same age.

This difference in age and development may have been related to discrepancies in their behaviors and responses to the intervention due to their differences in development, which may have been better captured in a study which conducted a baseline period.

In order to obtain a more accurate and detailed representation of occupational therapy student attitudes toward the treatment acceptability of mindfulness interventions, it would be helpful to conduct a lengthier survey. It may be worthwhile to administer a general mindfulness treatment acceptability survey to every occupational therapy student preparing for their first fieldwork regardless of the setting. This survey could be a part of a separate research study and may identify how attitudes in treatment acceptability toward mindfulness interventions may differ in various treatment settings including specific populations such as pediatrics and geriatrics, and specific settings such as those of inpatient and outpatient treatment facilities.

Ultimately, this study explored behaviors of children with ASD and the treatment acceptability of a mindfulness intervention through the use of two single case studies. In the future, the researcher recommends larger, separate research designs, to explore further questions about the relationships of mindfulness interventions on behaviors for children with ASD, and on questions surrounding the treatment acceptability of mindfulness interventions for specific populations and settings.

**Previous Experience.**

Another limitation in this study was the possible confounding variables of previous experiences with mindfulness practices and relationships that exist between the Child Participants, the Student Therapists, and the researchers. The Child Participants have attended IPAC for many years and receive many services in the school community. With the emergence of mindfulness practices many have been incorporated in schools, where it is possible that the

Child Participants may have had previous practice with some of the activities included in this intervention. For example, one child participant was noted for having used yoga in occupational therapy before this study, and the other subject had previously watched YouTube videos involving breathing techniques. These previous experiences are worth noting, as they may have affected the child's interest and ability to attend to the mindfulness activities included in our intervention. Future studies should likely try to establish a history of a child's previous experiences, if any, with mindfulness practices.

Another possible limitation to the frequency of child behaviors observed and reported in this study are the comfort in the therapeutic relationship between the Child Participants, the Student Therapists, and the researchers. While the child participants have attended IPAC for many years, and are likely used to their attendance of this program, the Student Therapists in this study were part of a fieldwork rotation, and so were new therapists for the Child Participants. This introduction of new therapists, as well as the inclusion of the mindfulness intervention in the last 15 minutes of the occupational therapy session during IPAC, may have introduced other variables for the child participants that may have had a relationship with the changes in their behavior. In the future it may be helpful to allow for a longer period of time for child participants to establish a therapeutic relationship with student subjects, or whoever is facilitating the mindfulness intervention, in order to more accurately represent the treatment's effectiveness. Similarly, children with ASD often prefer routines and improve in performance of an activity that occurs on a consistent schedule (American Psychiatric Association), and so the researchers recommend including this mindfulness intervention in a regularly scheduled time and place.

## Conclusion

Ultimately, these two single case design studies explored the potential effects and acceptability of mindfulness interventions within occupational therapy for children with ASD. While there were a number of limitations in study design, and generalizations about the effects of this mindfulness intervention on the general population of children with ASD cannot be made, it was found that the child participants in this study generally improved in a number of challenging behaviors related to attention and emotion regulation during these interventions. The children were found to have fewer physical and verbal outbursts, and required fewer prompts during these activities. The child participants were also able to engage in the activity in increasingly longer times each session, therefore indicating positive indications for the usefulness of mindfulness interventions in occupational therapy for children with ASD in the future. While this study only surveyed two occupational therapy students, these students reported acceptance of mindfulness interventions for children with ASD, and their positive responses suggest that future research may illuminate more acceptance and validity for mindfulness in other occupational therapy settings and populations. Lastly, the limitations of this study inspired more areas of future research for mindfulness in occupational therapy.

## Appendix A

Observation Form

Date:_____

| Theme | Behavior | Frequency for Child A | Frequency for Child B |
|---|---|---|---|
| Self-Control | Verbal interruptions/outbursts. | | |
| | Physical outbursts; movements or actions unrelated to the activity. | | |
| Attention | Requires a prompt to listen during initial instruction. | | |
| | Requires a prompt to stay on task during activity. | | |
| | Duration | | |
| Emotion Control | Exhibits signs of anger and or frustration | | |
| General Interest | Rate interest with 1 being no apparent interest, and 5 being highly interested. | 1 2 3 4 5 | 1 2 3 4 5 |
| Notes | | | |

## Appendix B

Student Intervention Reflection Form A

Date:_____

Client: _____

OT Student #: _____

Questions:

1. What do you think will work easiest in administering the mindfulness intervention for this client?

2. What do you think will be most challenging for administering the mindfulness intervention for this client?

3. What aspects of executive functioning and emotion regulation do you think will most improve for the client?

4. What aspects of executive functioning and emotion regulation do you think will be most difficult for the client?

5. Would you consider using this mindfulness intervention in a future session with another child with ASD in your career as an OT? Why or why not?

Student Intervention Reflection Form B

Date:_____

Client: _____

OT Student #: _____

Questions:

1. What do you find worked easiest in administering the mindfulness intervention for this client?

2. What did you find most challenging for administering the mindfulness intervention for this client?

3. What aspects of executive functioning and emotion regulation do you think improved most for the client?

4. What aspects of executive functioning and emotion regulation do you think were most difficult for the client?

5. Would you consider using this mindfulness intervention in a future session with another child with ASD in your career as an OT? Why or why not?

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