

The Benefits of Participation in Yoga for Students with Disabilities

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Abstract

The purpose of this synthesis is to look at the benefits that participation in yoga has on students with disabilities. Many students with disabilities fall behind their peers early on in their education in regards simple social skills and motor abilities. Yoga has been known to have a positive effect in those areas on students without disabilities, however there is limited research on the topic for students *with* disabilities. The studies provided in the critical mass show the positive impact that yoga can have on students with autism, visual impairments, and intellectual disabilities. These benefits include social-adaptation, self-regulation, self-esteem/confidence, concentration, and communication. Methods of incorporating yoga into both general and adaptive PE classes are presented and discussed. While there are many positives from participation in yoga, the field still lacks significant research and further studies must take place in order for us to fully understand the benefits of yoga on students with disabilities.

Keywords: yoga, benefits of yoga, participation in yoga, and students with disabilities

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The Benefits of Participation in Yoga for Students with Disabilities

Yoga is an ancient system of wellness which started in India over 5,000 years ago as a means of physical, mental, emotional and spiritual well-being. It helps those who practice it achieve their highest potential while promoting good health and happiness. Today, yoga has developed into many wide ranging forms all of which promote some form of wellbeing. According to the Yoga Alliance (2018), yoga is a system of techniques and guidance for enriched living. Hatha Yoga may be the most popular form practiced in America as its use of different postures and poses referred to as asanas and breathing techniques referred to as pranayama, is probably the form most closely associated with physical exercise (Yoga Alliance, 2018). It is a mind-body activity that combines the practice of physical movements from one asana to another in conjunction and coordination with pranayama, rhythmic breathing techniques that together are meant to help soothe and stimulate mind and body.

Over the past few decades, yoga has become more and more popular within both the student population and the population at large, and today it is grown to be an activity enjoyed by millions of Americans of all ages across a wide range of physical abilities. According to the YOGA in America Study (2016), the number of Americans practicing yoga at some level is over 36 million, and they indicate that 28 percent of Americans have taken at least one yoga class at some point in their lives (Ipsos Public Affairs, 2016). You can find yoga classes being offered in community centers, churches, retirement communities, nursing homes, prisons, in numerous private studios, and more and more it is even becoming part of the Physical Education (PE) curriculum in schools across the country. Yoga's benefits to mind and body are many, including helping with neuromuscular development and core strength, improving flexibility, balance and posture, and it does so in a relaxing environment (Eggleston, 2015). Yoga helps to reduce stress

and anxiety, and has been known to relieve tension and stress, which helps to build confidence and build self-esteem (Eggleston, 2015). These benefits can be even more pronounced when Yoga becomes part of the PE curriculum at an early age as it can help teach students practices that they can continue to use throughout their life, helping them to develop into more relaxed, calm and confident young adults.

Statement of Problem

The use of yoga in schools has been gaining popularity in recent years. In a 34 week study of seventh graders back in 2015, researchers found that students who participated in a 30 minute Yoga program once a week showed significant improvement in their self esteem (Eggleston, 2015). The program, which consisted of pranayama, asana and savasana, also led to a measurable decrease in stress levels. While academic performance was not a formal part of this study, both school officials and parents indicated that the grades improved over the course of the year for students participating in the weekly yoga class (Eggleston, 2015). So, it seems if children can improve their self-esteem and reduce their stress level, than maybe they will be able to concentrate better and do better in their class work.

It is important for children of all abilities and disabilities to be provided the opportunity to learn and practice yoga within the school. For students with disabilities yoga can provide the perfect therapy that allows them to cope better with the day-to-day obstacles that they face such as communicating with others, and decreasing self-stimulatory movements (Nevola, 2017). It can provide them an outlet in a low stress environment where they are not competing with others but learning together how to relax and concentrate at the same time. Students with disabilities may benefit in multiple ways from participating in yoga; psychologically and physically, that is why

we need to have yoga incorporated into the classroom for students to participate in day in and day out so that these benefits can take place.

Purpose of the Study

The purpose of this synthesis project is to look more closely at how yoga in a school setting can help students with disabilities. Specifically, I will look at both the psychological and social benefits that yoga has to offer for students with disabilities. Social benefits will look into how students will be able to socially adapt, self-regulate, and hopefully be able to provide coping mechanisms for themselves during daily activities. Psychological benefits will look at confidence levels, and improved concentration while in the classroom.

Operational Definitions

Communication. The ability to understand and coordinate language, and relate to others (Nevola, 2017).

Concentration. Refers to the cognitive process of focusing on relevant information while blocking out irrelevant information (Alexander, Buckley-Reen, chintakrindi, Koenig & Venice, 2013)

Self-esteem. Refers to how we feel about ourselves, and generally, the better we feel about ourselves, the better we are able to do in school and in life. (Eggleston, 2015).

Social Adaptation. Refers to the awareness of the present moment, including the interactions with other persons (Ridderinkof, Brui, Blom & Bogels 2018)

Self-regulation. The ability to regulate and maintain an arousal level and attention/focus to appropriately respond to the demands of the task and intensity of environmental stimuli

(Alexander et al., 2013)

Assumptions

1. Children with disabilities will benefit from participation in yoga classes within their schools.

Limitations

1. Studies will only look at students in the secondary level rather than students of all ages.
2. This is such a new area of study there is limited research covering students with a broad range of disabilities.

Chapter 2: Methods

Search Process

The literature that was chosen for this synthesis was located through The College at Brockport's library website in addition to some Google searches. The data bases that I used to find my articles were SPORTDiscus, Academic Search Complete and Physical Education Index. While searching the databases the key terms and phrases that I used while looking for articles were *yoga*, *benefits of yoga*, *students with disabilities*, *participation in yoga for students*, and *self-esteem*. To narrow down my search, I looked at articles that were "full text" and that were also peer reviewed articles. The benefits of participation in yoga for students with disabilities is a fairly new topic with little related research, so to help me throughout the process I looked at the reference lists from articles I had already found to see not only if they aligned with my topic, but also if they were beneficial to my synthesis. This is commonly referred to as the ancestry method.

To determine whether or not my articles had the criteria to be included or not I looked at a couple different things. First, I made sure that the articles were research based rather than narrative pieces. My articles are both qualitative and quantitative pieces so there are some that deal with numbers in the studies and some that deal with surveys that participants completed at the end of the study. Next, each study that I selected had to look at yoga and how it affected students with disabilities. I looked at these articles from the perspective of both the teachers and parents as they were the ones most likely to notice any impact that yoga might have. Because the research is still pretty new, I did not specifically target any one type of disability in my articles. Instead I included studies on the impact of yoga for students with any type of disability. Before applying this criteria of inclusion I had 5,502 articles come up, but after applying the criteria for

inclusion, I have a total of 10 articles that are in my critical mass for the benefits of participation in yoga for students with disabilities.

Data Analysis

After all my articles were collected and met my inclusion criteria, I created an article grid that broke up all of the articles, and summarized them to better understand (see appendix A). The articles are broken up so they reference the participants in the study, the method that took place, the findings, and what still needs to be done for further research. All the findings from these articles will be discussed in the results section of my synthesis. Also, a thematic coding chart was created to keep track of the common themes that were found in the research articles and is presented in appendix B

Chapter 3: Results

In this next chapter I will discuss the results found in the critical mass of literature, which consists of 10 research articles that examined the benefits that organized yoga classes could have on students with disabilities. The majority of the articles focused on students with Autism, but a couple of articles looked at the benefits that yoga had on students with visual impairments and one study looked at students with intellectual disabilities. Overall the results were very encouraging showing a wide range of benefits for students participating in yoga, ranging from improved confidence and self-esteem to better student behavior in classes that followed the yoga classes. For this paper, the results section will be grouped by the common benefits that researchers found in their studies. The common results, which I discovered while looking at the benefits of participation in yoga for students with disabilities, are improved self-regulation, social adaptation, self-esteem and confidence, concentration, and communication. All of these benefits lead to better overall student behavior in post yoga activities.

Self-Regulation

Students with Autism Spectrum Disorder (ASD) have many different challenges while in the classroom, and as Koenig, Buckley-Reen and Garg (2012) point out in their study, one of the major challenges they face day in and day out is the inability to regulate their own behaviors. During a qualitative study where students with ASD participated in a Get Ready to Learn (GRTL) Yoga program, the 49 participants, 25 of whom were in the intervention group and 24 in the control group, were monitored before and after their morning GRTL yoga class (Koenig, Buckley-Reen, & Garg, 2012). During this program, students in the intervention group started their GRTL yoga class by practicing quiet breathing techniques (pranayama), before following their teacher through different poses and exercises (asanas), and then ending each session with a

short period of relaxation (savasana). This routine was repeated every morning for 15 to 20 minutes for the entire 16 week period for the students in the intervention group while the control group just participated in their regular morning activities (Koenig et al., 2012). Results from the study showed that after the 16 week program, all students who participated in the GRTL yoga classes showed an improvement in their classroom management, which was measured by off-task behaviors and teacher redirection, which coincides with self-regulation. It was also observed that students who participated in the GRTL yoga class showed a decrease in irritable behaviors and were less withdrawn in social activities compared to the students in the control group (Koenig et al., 2012).

A more recent study showed similar benefits (Saber Sotoodeh, et al. 2017). In this qualitative study, the Autism Treatment Evaluation Checklist (ATEC) was used to look at self-regulation within students with ASD. The ATEC was used to evaluate students (7 to 15 years old) who participated in 24, 30-minute sessions of a yoga training program (YTP), and those in the control group. When it came to social regulation, the researchers observed a 13 percent decrease in the sociability section of the ATEC of pre and post-YTP test scores of the experimental group. These results indicated that students were better able to handle social interactions in the classroom after participation in the program. The change in scores from pre to post-test across the entire ATEC indicated many additional benefits for students who participated in the YTP, including decreased heart rate and improved ability to handle stress. According to the authors, this led to an improved social identity which made it easier for those students to establish positive social networks with their peers.

Another study that focuses on self-regulation as a major benefit from participation in yoga was conducted by Buckley-Reen, Alexander, Chintakrindi, Venice, and Koenig (2013). The

study included 51 elementary school students, ages five to nine, classified with a diagnosis of multiple handicapping conditions, developmental disabilities, or ASD. The students in the study participated in a daily 20-minute GRTL yoga program in their classroom for 26 weeks (Buckley-Reen, et al. 2013). The program consisted of following an instructor on a DVD who demonstrated deep breathing, chanting exercises, physical postures/poses, and concluded with a relaxation exercise. After participating in yoga the students went back to their daily lessons and their classroom behaviors were monitored (level of independence, attention, transition, and self-regulation) on a likert scale. On the scale lower scores indicated higher severity of behaviors. At the conclusion of the 26-week program, the student's demonstrated significant improvement in their self-regulation, evidenced by likert scores that increased from 3.27 to 4.11. The special education teacher noted that after 26 weeks of participation in yoga the students were able to maintain focus appropriately and respond to environmental stimuli which demonstrated to their increased abilities in self-regulation.

Finally, self-regulation was also explored in a study conducted by Nevola in 2017. This study is different in that it focused on one student's behavior *during* yoga sessions rather than after yoga sessions. The observed student often engaged in self-stimulatory behaviors that distracted him from everyday tasks (Nevola, 2017). In this study, a 17 year old student with ASD participated in six yoga classes, and the researcher recorded whether the student was engaged and on task during each class. By class number five it was observed for the first time that the student was better able to self-regulate by sitting quietly while waiting for the next direction, rather than engaging in self-stimulatory behavior. During the final yoga session, the student showed even more improvement with enhanced self-regulating behaviors. During the first yoga session, the student would participate in full body rocking, however by the end of the sessions

the student was able to self-regulate and he would only move his fingers during the transition periods between poses.

Social Adaptation

Social Adaptation is an area where many students with ASD struggle. While students without ASD begin to mirror each other at a very young age, that simple action is difficult for those with ASD, and it results in them struggling to adapt to different social situations.

According to a study conducted by Radhakrishna (2010), students with ASD would participate in an Integrated Yoga Therapy (IAYT) program. This study looks at the importance of imitation skills and how students with ASD often lack those skills, which makes it very difficult for them to understand more complex behaviors and social interactions. Throughout the IAYT, data was collected by parents and special educators in the form of questionnaires and comments while observing their child/student. This assessment procedure was completed at three different stages of the program: before the sessions began, half way through the sessions, and then again at the end of the 10-month program. The yoga classes were 45 minutes long and were held five days per week for 10 months. During the class students were instructed on different yoga poses as well as breathing exercises. At the mid assessment period it was seen that students were making significant improvements in imitating gross motor actions, oral facial movements, and breathing exercises, but little changes were seen with imitation and vocalization. After the 10-month program, and during the post-assessment, positive changes were observed in the students' behavior including communication, functional object use, language, and play with peers. Students who engaged in play during yoga sessions were able to transfer these behavior responses when they partook in symbolic play. Parents also reported that their children were able to increase their sitting tolerances for activities outside of yoga.

Radhakrishna, Nagarathna, and Nagendra (2010) also looked at how an integrated yoga therapy module would affect students with ASD over a two year period. In this study, six students participated in an Integrated Approach to Yoga Therapy (IAYT) as well as an applied behavior analysis (ABA). The study included a control group of students who only participated in the ABA. The participants were 8-14 years old, all of whom received 15 hours of ABA training, but only the six students in the experimental group received the five hours of the IAYT weekly for two 10-month academic years. Assessments were made before the program, midway through the program and again after the two-academic year program completed. Minor changes were seen after the mid-assessment, but major changes were seen at the post-assessment. Before the sessions began, children were unable to provide eye contact with the yoga therapist. However, by the end of the program they were able to provide oral-facial movement imitation skills. There were also major changes in communication, language, play, and joint attention. Student's social adaptation changed for the better because they were able to greet the therapist with a smile, and parents commented on how their children were better able to interact with other children and family members in a positive manner. Parents also reported that their children were better able to socially adapt to new situations.

Ridderinkof, Bruin, Blom, and Bogels (2018) looked at a mindfulness program and the benefits it had on younger children with ASD. This mindfulness program consists of mindfulness-based cognitive therapy such as breathing meditation and yoga practices. The mindfulness program was developed in an attempt to help students navigate social interaction problems by better understanding their emotional process as well as the emotional process of others. Participants in the program included 45 children with ASD whose ages ranged from 8 to 19 years, and the program also involved parental participation. The mindfulness program lasted

nine weeks, and during the program children worked on their attention, feelings, thoughts, and self-control. There were also handouts, meditation practices and daily situations that the children could work on at home with their parents. After the mindfulness program parents reported that their children's social communication problems decreased, which benefitted their social interactions and social- adaptations. Children's emotional and behavioral functioning increased which enhanced their emotional well-being.

Self-Esteem / Confidence

While children without a disability naturally build confidence over the course of their childhood, it can be a struggle for those with one. It is difficult for students with disabilities to build the confidence necessary to grow and be more independent later in life. Mohanty, Pradhan, and Hankey (2016), looked at students with visual impairments (VI) and how yoga helped not only increase their physical strength, but also their overall self-confidence and self-esteem levels. For students with visual impairments upper extremity strength is essential for the performance of important daily activities such as dressing, writing, and house work. Children with VI have lower levels of fitness compared to their sighted peers. This is connected with a loss of independence so students rely on their caregivers (Mohanty et al., 2016). Strategies to improve fitness levels will play a crucial role in keeping students with VI independent (Mohanty et al., 2016). This study included 83 children with VI, aged 9-16. Of this group, 41 participated in yoga, and 42 were in the control group. The group of children participating in yoga did so five days a week for 16 weeks. The 42 children in the control group participated in other activities such as playing games or dance during the yoga sessions (Mohanty et al. 2016). According to the researchers, after the 16-week program, the group that participated in yoga showed greater improvements in muscle strength and motor speed compared to the control group. In addition, yoga helped to

improve the children's posture, spinal alignment, and flexibility. This program showed that yoga can make beneficial changes in upper extremity muscular strength as well as motor speed for students with VI. These beneficial changes helped increase students' confidence levels and self-esteem by enabling them to independently exhibit skills needed for everyday living.

Concentration

Three of the ten studies discuss the improvements in communication that can be gained from participating in yoga classes (Nevola, 2017; Porter, 2013 & Rommer & Anderson, 2013). In one study Rommer and Anderson (2013), students with intellectual disabilities participate in a 20-minute yoga practice that breaks up a 90-minute class period. In this study there are four males and three females in 9th through 12th grade who are easily distracted and lack motivation. After the 20 minute yoga session, students experienced a positive change in their behavior. These students created less disruption in class, increased their on-task behaviors (concentration), and physically looked as though they enjoyed the learning process after the yoga session (Rommel, T. & Anderson, C. 2013).

In another study, Porter (2013) looked at a 6th grade student with ASD over the course of four weeks where he would participate in yoga for 20 minutes at the start of every day. Before the yoga sessions took place, the student was observed in math class and how well he would stay on task. The student was reported to stay on task for 56% of the time. After this data was recorded, the yoga sessions were incorporated into the start of every day before math class. The yoga sessions were done independently and incorporated different yoga poses as well as relaxing at the end of the session. During this time, where the student participated in yoga before math class, it was recorded that the on-task time increased and the number of times that the student needed to be redirected decreased. Focus time increased to 62% of class time, and at the end of

the four weeks, the student continued to participate in yoga and his focus time increased to 73% of the class time. This student was able to increase his concentration time in math class by participating in yoga at the start of their day (Porter, J. 2013).

Looking back, the Nevola (2017) article focused on concentration as a major benefit from participating in yoga. The 17 year old participant with ASD went from being able to concentrate for 81.67% of the yoga session to 99.39% over the course of the six yoga sessions. Not only did this participant's concentration increase, but his communication with the instructor did so as well. The participant was able to turn his head to face the instructor as well as vocalize. Clearly yoga has helped this student to both relax and concentrate on the tasks and poses at hand during the sessions.

Communication

Four of the ten articles focused on communication as a main benefit from participation in yoga. Radhakrishna (2010), and Radhakrishna et al. (2010) both discuss communication as a major benefit. During the last few sessions out of the 10-month program in the Radhakrishna (2010) study, communication changed for the better as students were able to greet the instructor at the beginning of class, as well as demonstrate vocal imitation. The students in this 10-month program also improved in non-verbal communication skills as they were able to maintain eye contact while talking to one another, and provide gestures to indicate basic needs. In the Radhakrishna et al (2010) study, after the two 10-month academic school years of receiving both ABA sessions as well as yoga sessions, students with ASD started making connections with the instructor, showed more discipline during the yoga sessions by staying focused and concentrating, as well as increases in communication skills, language, and play (Radhakrishna et al., 2010).

In the Sotoodeh et al. (2017) study, communication was also a major benefit. Speech/language/and communication were included in the Autism Treatment Evaluation Checklist. After the 24, 30-minute sessions of YTP there were no significant differences between the control group and the experimental group with speech, but when it came to communication skills there was a significant difference. Students with ASD in the beginning of the study lacked eye contact with the instructor and others; however, after the 24 sessions the experimental group showed changes and were able to maintain eye contact with their instructor throughout an entire session (Sotoodeh et al., 2017).

Summary

Multiple studies have shown that there are many benefits from participation in yoga for students with disabilities. These benefits include self-regulation, social adaptation, self-esteem/confidence, concentration, and communication. All of these benefits help to improve the overall behavior of the student in a positive way. In the next chapter I will discuss the importance of these benefits and why we should integrate yoga into everyday classrooms. I will also explore the limitations of this synthesis, and what needs to be looked at for future research.

Chapter 4: Discussion & Conclusion

This synthesis project researched the benefits that yoga participation in a classroom setting can have on students with autism, visual impairments, and those with intellectual disabilities. The studies in the critical mass showed that participation in organized yoga classes can have many beneficial outcomes for students with disabilities in much the same way that many previous studies had shown for students without disabilities. Incorporating yoga into our curriculums for both general PE and adaptive PE classes can provide benefits to both groups of students. Some of the benefits that were shown in the critical mass included improved behavior, improved concentration, increased verbal and non-verbal communication skills (eye contact and body posture), and improved self-regulation skills and self-esteem, and students showed higher confidence levels. It has also been shown to have psychological benefits such as improving social adaptation as well as helping children with ASD with improving their self-awareness. Many of the studies showed that it was beneficial to introduce students to yoga at an early age and it's equally important to continue with organized classes over a long period of time. The longer the students are exposed to yoga in the classroom, the more beneficial the outcomes can be.

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confidence levels. It has also been shown to have psychological benefits such as improving social adaptation as well as helping children with ASD with improving their self-awareness. Many of the studies showed that it was beneficial to introduce students to yoga at an early age and it's equally important to continue with organized classes over a long period of time. The longer the students are exposed to yoga in the classroom, the more beneficial the outcomes can be.

Elementary PE teachers should try to incorporate yoga into their curriculum across all their general and adaptive classes remembering to keep it fun and keep it simple. Even starting with kindergarteners should not be considered too young as Butzer, Ebert, Khalsa, and Telles (2015) discovered in their survey of school-based yoga programs in the United States. 75 percent of the programs in their survey offered yoga at kindergarten and even pre-K classroom levels. With the kindergarteners in general PE classes that may include children with disabilities, PE teachers should start slow with breathing exercises that the children can participate in post activities to calm them down and get them ready for the next activity or even get them ready to leave PE or APE class. The PE teachers can even work with the classroom teachers to show them how they can use these same breathing exercises before and after nap time or as a transition from one activity to another. They may even want to incorporate a simple pose like down-dog to help get the children down to and up from their nap mats. Here, the PE teacher can work with the classroom teacher to introduce the poses during PE classes so classroom teachers would not have to demonstrate the pose to their students. These short in-classroom yoga breaks can be a good way to reinforce what the students learn in their PE classes and were found to be used in 80 percent of the programs surveyed by Butzer et al. (2015). Regardless of the grade and whether yoga is being taught in a classroom setting or in a dedicated PE class, the four basic elements of

yoga practice: physical postures, breathing exercises, relaxation techniques and mindfulness practices can be incorporated into the curriculum (Butzer et al., 2015). At these grade levels it is important to keep the lessons simple and keep it fun. As Folleto, Pereira and Valentini (2016), report in their study, the teacher may want to involve free expression when teaching different poses as a method of getting students to work together where they can encourage each other to learn the poses, and have fun doing it.

With APE classes, however, the PE teacher may want to enlist the help of willing aids to ensure each student gets the necessary one-on-one assistance in learning the poses and exercises being taught. This is especially important for students with visual impairments who need a low teacher to student ratio (Mohanty, et al. 2015). In the Mohanty et al. (2015) study with VI students, there were three certified yoga instructors per 10 or 11 students in each class. This number of instructors per class was particularly important for VI students as they indicated that they were all able to learn the poses and exercises better through a touch and feel method of instruction. The PE teacher and any aids helping out must know how to use both physical guidance, and tactile modeling teaching strategies while working with their students. Physical guidance is when the instructor moves the child through the pose, and tactile modeling is when the student feels the instructor or peer doing to the pose (Mohanty, et al. 2016). Modeling the poses for the students is important because many students with and without disabilities are likely to learn yoga poses and techniques more easily through the use of visual aids. Seeing an instructor move their body through different poses will help the student to mirror them and move their body as well. Students will also be able to better connect with their instructor if they are doing the poses with them (Mochan, 2017).

With APE classes the PE teacher may also want to consider devoting 10 to 15 minutes at the end of each class on yoga. The more frequent instruction will help reinforce what the students are learning, and start to make yoga part of their daily activity. As Koenig (2012) pointed out, students participating in regular yoga classes showed better concentration and improved behavior in the classroom. This was also found to be the case in the Folleto et al. (2015) study where the classroom teacher reported the students were more relaxed and better able to concentrate after their yoga classes.

The more yoga becomes part of their curriculum the more PE teachers will need to be knowledgeable about the different poses and breathing techniques, and especially on how to best teach it to their students. They may need to research yoga independently which may be enough to get started at the beginning levels, but as teachers progress to more complicated poses and techniques, outside training courses may be necessary. As Butzer et al. (2015) reported in their study, teacher training varied widely between programs, but many organizations offered workshops and classes to train teachers on yoga instruction. With or without their school's support, the PE teacher will need to participate in classes that teach them how to teach yoga, and then may have to modify what they learn to bring it to their PE and APE classes. At all grade levels though, as reported above, teachers can include all four basic elements of yoga in their lessons, while adapting their lessons to the appropriate age level of their classes (Butzer et al. 2015). Teachers may need to learn how to teach their students using physical guidance and tactile modeling techniques. Providing this level of certified instruction within a school classroom may not always be possible, so providing teachers with the necessary training so they can instruct their students in a manner that is both developmentally appropriate and safe for the participants is important.

If yoga cannot fit into the PE curriculum, teachers and staff could try to find other creative ways to incorporate yoga into their daily schedules for students with disabilities. As Butzer et al. (2015) pointed out, over 80 percent of the programs in their survey used in-classroom instruction as a method to incorporate yoga into their daily curriculum. These short in-classroom yoga lessons may take place during morning meetings or after lunch or recess when they can be used to help calm students down and get them back into a mindset to learn.

Limitations & Future Recommendations

The critical mass on the topic of the benefits from participation in yoga for students with disabilities has limited research at this time. There is research on general benefits for students without disabilities, but when it comes to students with disabilities the research is restricted. Clearly more work is needed on the subject, and one of the questions that many of the researchers brought up was what would be the effects over longer periods of study. Many of the studies in this synthesis were limited in duration to 16 weeks or less. The researchers questioned what the benefits would be over longer periods of time, and also would the benefits be long lasting. Would the benefits that the researchers observed during and immediately after their studies persist after many weeks, months or even years? These were questions that could not yet be addressed from the current critical mass of research that this synthesis project was able to discover.

Eggleston (2015) reported a possible selection bias in his study as the students that participated in the yoga class all volunteered rather than being randomly assigned to the intervention and control groups. This, he suggests, may have skewed the results of the intervention group as the students who volunteered for the yoga class may have already had a higher level of self-esteem than the control group when the study began. The same was reported

by Koenig et al (2012), as they too were not able to randomly assign students to the intervention and control groups. Instead school administrators selected the classrooms to participate in the study.

Conclusion

The studies included in this synthesis project document many positive benefits that yoga in the classroom can have on students with disabilities. These benefits include improved behavior, improved concentration, increased verbal and non-verbal communication skills (eye contact and body posture), improved self-regulation skills, self-esteem, and confidence for students with disabilities. These encouraging results suggest that yoga programs should be integrated more into schools so that it can become an option for all students both with and without disabilities. It is recommended that yoga be incorporated into the PE curriculums and daily classroom activities of students with disabilities as well as for students in general education.

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Appendix A: Synthesis Article Grid

Author	Title	Source	Purpose	Participants	Methods	Findings	Recommendations
Buckley-Reen, A., Alexander, L., Chintakrindi, R., Venice, L., & Koenig, K.	The Effectiveness of a Mutualized Yoga Intervention on Classroom Behaviors in Elementary School Children with Disabilities: A Pilot Study	Journal of Occupational Therapy, Schools, & Early Intervention	To look at the behavior changes after a 26 week GRTL yoga program	51 elementary students with disabilities	Special education teachers completed a likert scale on their students behaviors post yoga	Improvements in all behaviors, especially self-regulation	Small sample sizes and there was no control group
Koenig, K., Buckley-Reen, A. & Garg, S.	Efficacy of the Get Ready to Learn Yoga Program Among Children with Autism Spectrum Disorders: A Pretest-Posttest Control Group Design	American Journal of Occupational Therapy	To look at students with autism spectrum disorder while engaging in a Get ready to learn yoga program (GRTL) to see if it changes their challenging behaviors	Eight classrooms were picked from a large urban school where it serves more than 700 students with autism. There was a total of 48	A Aberrant Behavior Checklist (ABC) was used to assess challenging behaviors, and then analyzed all data with SPSS version 18.	Students in the GRTL program showed significant differences then the students who did not participate in the program with their behavior	To use random sampling instead of selecting specific classrooms

				participants			
Mohanty, S., Pradhan, B., & Hankey, A.	Upper extremity strength and motor speed in children with visual impairment following a 16-week yoga training program	Isokinetics and Exercise Science	This study was to look at and measure the changes in upper extremity strength and motor speed in children with visual impairments following a 16-week yoga program	83 participants, 41 participated in yoga, 42 were in the control group and they were all aged 9-16 years old	SPSS was used for statistical analysis	There were major improvements in all variables (eg. Muscle strength, elbow flexion/extension, pinch strength, and finger tapping)	To possibly implement this yoga program into all schools with students who are visually impaired
Nevola, E.	A Clinical Case Study: Using Yoga to Improve Functional Communication in an Adolescent with Autism Spectrum Disorder	Academic Festival	To look at a student with ASD and track and maximize time spent on task during the yoga program	One 17 year old male with ASD	Sessions occurred one to two times a week for 30 minutes a time for six sessions	Time spent on task increased over the six sessions and self-stimulatory behaviors decreased	To have more participants
Porter, J. (2013)	Yoga as an Effective Behavioral Intervention for Children Diagnosed	Graduate Annual	To look at a student with ASD and to see how often they are on task/ off task	One 6 th grade boy with autism	For one month every day at the beginning of the school day	Time spent on task increased over time!	Bigger sample size

	with an Autism Spectrum Disorder		post yoga class				
Radhakrishna, S.	Application of Integrated yoga therapy to increase imitation skills in children with autism spectrum disorder	International Journal of Yoga	This study is to look at the Integrated approach to yoga therapy as a treatment method with children with autism spectrum disorder to increase their imitative skills	Parents and six children with autism spectrum disorder	10- month program with five sessions a week with regular practice at home as well. Observations, parent ratings of imitation, oral facial movements and imitating breathing exercises	There was an improvement in children's imitation skills, parents also reported change in their child's play pattern	For future study to include teachers as well as parents as well as follow-up studies
Radhakrishna, S., Nagarathna, R., & Nagendra, H.	Integrated Approach to Yoga Therapy and Autism Spectrum Disorders	Journal of Ayurveda and Integrative Medicine	This study also looks at students with ASD and an integrated yoga therapy program and see if their communication skills,	Six children with ASD	Two 10-month academic school years. 15 hours of ABA a week and 5 hours of IAYT	There were improvements in connections made with the therapist, improvements in discipline, and communication	Having a bigger sample size of participants

			adaptive skills, and imitative skills				
Ridderinkhof, A., Bruin, E., Blom, R., & Bogels, S.	Mindfulness-Based Program for Children with Autism Spectrum Disorder and Their Parents: Direct and Long-Term Improvements	Springer Link	Whether or not there were long term benefits from students participating in yoga with ASD	45 children ages 8-19, their parents also reported problems at home	Mymind program was nine weeks with a group session once a week, but participants were encouraged to participate in these activities at home too	Improved emotional and behavioral functioning	Some students received more sessions than others
Rommel, T., Anderson, C.	Benefits of Yoga as an Intervention for those with Intellectual Disabilities	Therapeutic Recreation Journal	To look at students attitudes, time on task, and instructional disruptions post yoga sessions	Four males and three females in high school with intellectual disabilities	Yoga sessions would take place half way through the 90 minute instruction time for 20 minutes	Increase in on-task behaviors, caused fewer disruptions in class, and enjoyed learning	To have more students participate in study
Sotoodeh, M., Arabameri, E., Panahibakhsh	Effectiveness of Yoga Training Program on	Complimentary Therapies in Clinical Practice	This study looks at the effects that yoga training	29 children aged 7 to 17 years old were	Parents or caregivers completed a autism	Findings showed that there were significant	To have a larger sample size and to also look at other relaxation

, M., Kheiroddin, F., Mirdoozandeh, H., & Ghanizadeh, A.	the Severity of autism		program (YTP) on the severity of autism in children with high function autism (HFA)	randomly placed in the YTP or a control group	treatment evaluation checklist post intervention	differences between the two groups when and reduces severity of symptoms in children with autism	skills/strategies besides yoga
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Appendix B: Coding Table

Article	Self-Esteem/ Confidence	Social Adaptation	Self- Regulation	Concentration	Communication	Improved Behavior
Buckley-Reen, Alexander, Chintakrindi, Venice, &Koenig (2013)			X			X
Koenig, Buckley- Reen, & Garg (2012)			X			X
Mohanty, Pradhan, & Hankey (2016)	X					X
Nevola (2017)			X	X		
Porter, J (2013)				X		
Radhakrishna (2010)		X			X	X
Radhakrishna, Nagarathna, & Nagendra (2010)		X			X	X
Ridderinkhof, Bruin, Blom, & Bogels (2018)		X			X	X
Rommel &Anderson (2013)				X		X
Sotoodeh, Arabameri, Panahibakhsh, Kheiroddin, Mirdoozandeh, & Ghanizadeh (2017)		X	X		X	X