

EFFECTS OF  
MINDFULNES -BASED  
INTERVENTIONS AND  
YOGA ON ANXIETY IN  
SCHOOL AGED  
CHILDREN

By

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## **DEDICATION**

I dedicate this thesis to the past  
and future children and families that I  
will work with in my career as a Child  
Life Specialist. May the light in me  
reflect on others and into the world  
around them.

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## **LIST OF ABBREVIATIONS**

<b>Abbreviation</b>	<b>Description</b>
CLS	Child Life Specialist
MBIs	Mindfulness Based Interventions
SCD	Sickle Cell Disease



## **ABSTRACT**

The current study examines the effectiveness of mindfulness-based interventions (MBIs) and yoga to reduce anxiety in school-aged children. Participants included 60 children ages 5 to 12 years ( $M_{\text{girls}} = 9.00$  years,  $SD = 1.82$ ; ( $M_{\text{boys}} = 8.77$  years,  $SD = 1.62$ ) who participated in daily MBIs during their homeroom and physical education classes at school. To examine whether participation in MBIs and yoga led to decreased anxiety, participants' self-reports of anxiety were measured before and after engaging in three sessions of yoga. The mean of post-test reports of anxiety ( $M = 2.07$ ,  $SD .67$ ) was significantly lower than the mean of pre- test anxiety

reports ( $M = 2.26$ ,  $SD.67$ ),  $t(50) = 2.62$ ,  $p < .01$ . Thus, participants reported “worrying less” after yoga sessions. Further, results by gender and ethnicity were explored, but no significant differences were found. Findings from the current study provide promising evidence that MBIs and yoga can be used to reduce anxiety in children in the school setting and can serve as the foundation for future research focused on interventions for children with chronic illnesses and disabilities.

## **I. Introduction**

Amid the fallout of the COVID-19 pandemic, one impact of the measures taken to reduce contraction of the disease was social distancing. This practice led to increased anxiety levels in children, especially among those living in minority and economically disadvantaged communities (McKune et al. 2020). Social isolation and loss of contact with peers lead to acute stress disorder, adjustment disorder, grief, and slight post- traumatic stress disorder (PTSD), which has been found among children quarantined during the pandemic (Amorós-Reche et al., 2022).

Mindfulness Based Interventions (MBIs) have increased in popularity as a modality to reduce anxiety and address other mental health concerns among children in schools (Odgers et al., 2020). Specifically, the practice of yoga, in terms of incorporating poses and

stretches, has been linked to mild reductions in anxiety and depression symptoms in children and adolescents (James- Palmer et al., 2020); however there remains a need for further research to more fully explore how mindfulness training and yoga might positively impact children in schools. Thus, the current study examines the impact of MBIs and yoga when integrated into the daily lives of children and their overall effectiveness in reducing anxiety.

### **Theoretical Framework**

According to Bandura, self-efficacy is our belief in our ability to accomplish a task and this reinforces the probability of participating and continuing involvement in an action regardless of challenges and adverse situations. (Bursch et al., 2006). It is possible that individuals with mental or physical challenges to have low self-efficacy about their health and in

relation to some activities that require strenuous physical effort. That is, they might not feel as competent in engaging in fitness activities as compared to their peers without ailments. Self-management, as defined by Modi et al. (2012) is the convergence of health-related behaviors and actions patients and their families participate in to manage their chronic illnesses. Modi et al. (2012) found adolescents showed a potential increase in self-efficacy through a self-management intervention. Therefore, theoretically, individuals with anxiety who participate in a low intensity activity such as yoga might improve not only their physical health, but in their health self-efficacy. Specifically, yoga could serve as a possible activity that offers individuals an opportunity to be physically active, while also monitoring their stress

levels. If children learn techniques that they can use to take charge of their anxiety, they might show improvement in a variety of ways. The current study is based on this theoretical framework and research by Birdee et al. (2016) who adapted Bandura's Self-Efficacy Scale (2006) to identify how aspects of self-efficacy related to health behaviors. The study explores how mindfulness-based interventions and yoga might reduce anxiety, thereby increasing children's belief in their ability to affect their own health.

### **Mindfulness Based Interventions**

According to (Kabat-Zin, 2013), mindfulness is defined as a state of consciousness that encourages special attention to each moment in each situation or experience in a nonjudgmental and open way. Mindfulness requires paying attention to the breath which incorporates it as an anchor for one's attention though

mindfulness is much more multifaceted than observing one's breath (Shonin et al., 2015). As children begin going back to the classroom post- pandemic, there is an opportunity for teachers and faculty in elementary schools to implement MBIs into the day-to-day routines of their classrooms. The introduction of MBIs into the school can also assist with the reduction of emotional outbursts and self-regulation.

According to Hutchison et al. (2018), the introduction of a Mindfulness Based School Program in an elementary school allowed for participants to manage negative experiences, improve self-regulation, and learn to regulate their emotions in a healthy way. The inclusion of MBIs in schools has also increased in popularity. Nelson et al. (2021) found that when primary school teachers incorporated MBIs into their curriculum, there was an increase in

children's well-being and coping abilities. Previous research regarding the efficacy of MBIs in elementary schools suggests that they are a helpful tool in promoting optimal mental/emotional health and well-being (Malboeuf-Hurtubise et al., 2021).

Given the increase of anxiety in children, one goal of this study was to test the effectiveness of MBI's and yoga on anxiety levels in children.

### **Yoga as a Healing Modality**

Yoga means to "yoke" as translated from the Sanskrit word, yug meaning "to unite or integrate," and thus the practitioner's mind, body, and spirit are to be integrated through the ancient practice of yoga (Thygeson et al., 2010; Varma, 2012).

In the simplest of terms, yoga can be defined as a multifaceted practice that brings together both the mind and body, and involves asana (physical exercises/stretching), pranayama (breathwork and breathing exercises), and



meditation (Thygeson et al., 2010; Ware, 2020). Some past research has suggested that yoga can successfully treat typically developing children and adolescents with symptoms of anxiety and depression in school settings (James-Palmer et al., 2020). Palmer et al. (2020) showed yoga was able to reduce moderate levels of anxiety in children and adolescents regardless of their developmental level or health status. While the exact mechanisms underlying how yoga reduces anxiety are unknown, researchers have described some possibilities. For example, it has been suggested since some types of yoga practices promote slow paced, deep, and steady breathing that calms the nervous system and eases the mind, yoga reduces symptoms of anxiety related to breathing (e.g., short, choppy breathing; Thygeson et al 2010).

Meditation, one component of yoga that involves deep breathing and focus on the body, has been shown to have a positive

impact on anxiety reduction, if administered correctly, has shown to positively impact the ability for one to transfer attention and reduce anxiety (Telles et al., 2019).

There are many possible ways yoga might positively impact the body, making it difficult to know which yoga practices have the most impact as a therapeutic modality (Moody et al., 2017). For example, there are multiple components that make up the practice of yoga and many different types of asanas. Each type has its own specific purpose for the body. Depending on the session of yoga, type of stretches, and intensities, the individual performing the poses can have varied reactions to the type of yoga they are practicing (Forseth & Hunter, 2020). Yin, for example, is a type of yoga that elicits a specific form of relaxation. Through the practice of yin yoga, the individual is in a slow meditative state which incorporates positions held for three to five minutes where the individual

is seated or lying on the mat (Hylander et al., 2017). Hatha is another type of yoga that has been used to promote relaxation and calm. Hatha increases the ability for the physical body to perform an ample number of sequences that incorporate limbs of yoga such as asana and pranayama while standing, sitting, and lying flat on one's back, also referred to as supine (Collins, 1998). Another type of yoga called vinyasa incorporates the same limbs as the types but requires slightly more physical effort due to the sequencing of the movements. Vinyasa has the potential for the individual to expand a higher level of energy than other more restorative styles of yoga (Sherman et al., 2017). Vinyasa yoga's major component is the continuation of synchronized breath which enables the flow of postures and poses (Turlington, 2002). Vinyasa lends itself as a more vigorous style due to the continuous movements through which poses are held (Baptiste &

Corman, 2003).

There are several influences that the practice of yoga can have on an individual. These mechanisms include mindfulness, spiritual peace, body awareness, self-awareness, social cognition, and overall emotional wellbeing (Park et al., 2020). By combining the physical practice of stretching with the mental practice of meditation and the conjunction of the two modalities with deep breathing, it is posited anxiety in school aged children can be decreased.

## **II. PURPOSE**

There remains minimal research documenting the ways in which anxiety might be decreased by combining mindfulness- based interventions and yoga. The purpose of the present study is to examine the interrelations among demographic variables, (age, gender, income level, parental education), anxiety, yoga participation and explore the effects of yoga and mindfulness- based interventions in the classroom setting (MBIs) on anxiety reduction in school aged children. Two specific research questions will be addressed:

Research Question 1: Does participation in mindfulness-based interventions (e.g., yoga, mindful breathing, and meditation) lead to decreased reports of anxiety among school-age children?

It is hypothesized that participation in mindfulness-based interventions (e.g., yoga, mindful breathing, and meditation) will lead to decreases in self-reported anxiety.)

Research Question 2: How do the effects of yoga on reducing anxiety levels in school-age children differ across groups? Group differences (e.g., gender, sociocultural factors) will be examined on an exploratory basis. situation or experience in a nonjudgmental and open way. Mindfulness requires paying attention to the breath which incorporates it as an anchor for one's attention though mindfulness is much more multifaceted than observing one's breath (Shonin et al., 2015). As children begin going back to the classroom post- pandemic, there is an opportunity for teachers and faculty in elementary schools to implement MBIs into the day-

to-day routines of their classrooms. The introduction of MBIs into the school can also assist with the reduction of emotional outbursts and self- regulation. According to Hutchison et al. (2018), the introduction of a Mindfulness Based School Program in an elementary school allowed for participants to manage negative experiences, improve self-regulation, and learn to regulate their emotions in a healthy way. The inclusion of MBIs in schools has also increased in popularity. Nelson et al. (2021) found that when primary school teachers incorporated MBIs into their curriculum, there was an increase in children's well-being and coping abilities. Previous research regarding the efficacy of MBIs in elementary schools suggests that they are a helpful tool in promoting optimal mental/emotional health and well- being (Malboeuf- Hurtubise et al., 2021). Given the increase of anxiety in children, one goal

of this study was to test the effectiveness of MBI's and yoga on anxiety levels in school aged children.



### III. METHODOLOGY

Recruitment efforts targeted K-5<sup>th</sup> grades at two elementary schools in Texas. One school was in Texline, Texas. The other school, Idea Academy, was in San Antonio, Texas. Texline Independent School District is a public school located in the panhandle of Texas that serves approximately 180 students in grades K-12, whereas Idea Academy is a tuition free charter school that serves an urban community. Parents provided consent and completed demographic surveys prior to children's participation. In total, 68 cases were gathered, but after matching parental and child reports, only 60 cases were retained; eight incomplete cases were excluded from the dataset. Thus, participants included 60 children ages 5 to 12 years, including 40 girls ( $M = 9.00$  years,  $SD = 1.82$ ), 19 boys ( $M = 8.77$  years,  $SD = 1.62$ ), and one child who did not disclose sex (age 7). Most of the sample was White (91.4%), with one Asian (1.7%),

four who reported ‘Other’ without providing further detail, and two who did not report ethnicity. Slightly over half of the sample was of Hispanic background; 53% Hispanic and 46% non-Hispanic, with one case missing of data. The mean total household income was between \$50,000 and 70,000 per year. The largest segment of families (20.4%) earned between \$50,000 to \$69,999, while 10.2% of families fell in the \$40,000 to \$59,999 bracket. Most parents (30.5%) had a bachelor’s degree, while (5.1%) had a master’s degree, (11.9%) had an associate degree.

### **Design and Procedures**

After parents completed the demographic survey and provided consent, their children were able to participate in in-class mindfulness-based activities that focused on mindful breathing and emotional regulation. These same children also participated in three yoga-based activities in their physical education classes as well as

completing a pre- yoga survey which gauged the student's enjoyment of the activity and their anxiety levels. These yoga activities were accessed through YouTube videos created by a children's yoga teacher. Each yoga video focused on the aspect tuning into one's body and creating a gentler practice if needed. All activities were made to be appropriate for children of varying abilities and ages. After the completion of all yoga videos, children took another survey which examined their anxiety and comfortability levels around practicing yoga. Add mindfulness definition

The current study explored interrelations among variables using correlational analyses and compared groups using analyses of variance.

**Table 1.** Instructions for Teachers and Coaches

<b>Instructions for Teachers/Coaches</b>		
<b>Part 1</b>	<b>Part 2</b>	<b>Part 3</b>
Distribute Survey “Yoga and Mindfulness Student (1)”	Distribute Survey “Yoga and Mindfulness Student (2)”	Distribute Survey “Yoga and Mindfulness Student (3)”
Complete Demographic Survey	Complete Demographic Survey	Complete Demographic Survey
After Completion of Survey, Play “Yoga Series for 7+   Part 1   Nanda Yoga”	After Completion of Survey, “Play “Yoga Series for 7+   Part 2   Nanda Yoga”	After Completion of Survey, “Play “Yoga Series for 7+   Part 3   Nanda Yoga”
Student Re- Answers Questions Yoga and Mindfulness Student Questions	Student Re- Answers Questions Yoga and Mindfulness Student Questions	Student Re- Answers Questions Yoga and Mindfulness Student Questions
Collect Papers and Return to Principal	Collect Papers and Return to Principal	Collect Papers and Return to Principal

## **Measures**

**Demographic Survey.** A demographics survey was completed by parents to gather basic sociodemographic and information. Specifically, parental reports of educational level, yearly total household income, and racial/ethnic background.

**Child Anxiety.** A subtest of the Revised Child Anxiety and Depression Scale (RCADS) was used to measure child anxiety symptoms. The subscale used was the Generalized Anxiety Child Self-Reported. Sample items were, “I worry about things”, and “I worry bad things will happen to me.” These items included response options using a 4-point Likert scale from 0 = never, 1 = sometimes, 3 = often, to 4 = always. Responses were summed across all items in the scale such that higher total scores indicated higher overall anxiety are reported (Kechter & Leventhal, 2018). Reliability was high. For the pre-yoga administered scale, Chronbach’s Alpha = .90, and for post-yoga, Chronbach’s Alpha = .82.

#### **IV. RESULTS**

Initial analyses were conducted to obtain descriptives for all variables and to examine the intercorrelations among children's demographic characteristics (age, income, parental education level) and reports of anxiety before and after engaging in yoga.

Descriptive statistics for age, income, parental education, pre-yoga anxiety, and post- yoga anxiety are reported in Table 1. Children's age in years was positively and significantly correlated with total household income,  $r = .40, p < .001$  and with parental education, and pre yoga anxiety was positively and significantly correlated with post yoga anxiety  $r = .71, p < .01$ .

**Table 2.** Intercorrelations among Age, Income, Parental education, Pre- yoga Anxiety, and Post-yoga Anxiety with Means, and Standard Deviations

	1	2	3	4	5
1. Age in years	-	.40**	.33*	.23	-.05
2. Annual household income		-	.16	.09	-.08
3. Parental education			-	.14	.14
4. Pre-yoga Anxiety				-	.71**
5. Post-yoga Anxiety					-
Mean (Std deviation)	8.91(1.74)	5.92(2.64)	3.58(2.05)	2.27(.70)	2.07(.67)

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### Research Question 1

To address Research Question 1 (Does participation in mindfulness-based interventions, e.g., yoga, mindful breathing, and meditation, lead to decreased reports of anxiety among school-age children?), the mean responses of participants' self-reports of anxiety at *pre-test* were compared to participants' self-reports of anxiety at *post-test* using a paired samples *t*-test. The *t*-test revealed that the mean of post- test reports of anxiety ( $M=2.07$ ,  $SD .67$ ) was significantly lower than the mean of pre-test anxiety reports

( $M = 2.26$ ,  $SD .67$ ),  $t(50) = 2.62$ ,  $p < .01$ .

Thus, participants reported “worrying less” after yoga sessions, supporting Hypothesis 1 that participation in mindfulness-based interventions (e.g., yoga, mindful breathing, and meditation) will lead to decreases in self-reported anxiety.

### Research Question 2

To examine the effects of yoga on reducing anxiety levels in school-age children by gender, a 2 X 2 Repeated Measures ANOVA was conducted, with time (pre and post) as the repeated factor and gender as a between subjects’ factor. As noted previously, there was a significant effect of time of anxiety such that post test scores were lower than pre- test scores, but no significant interaction or gender effects were found,  $F(1, 48) = 1.34$ ,  $p = .25$ . Table 2 depicts the anxiety scores pre- and post-yoga participation by gender. These did not significantly differ.

**Table 3.** Means and Standard Errors of Pre- and Post-yoga Anxiety Scores by Gender

	Boys	Girls
Pre-yoga Anxiety	2.37 (.17)	2.20 (.12)
Post-yoga Anxiety	2.26 (.17)	1.20 (.11)



Note: Boys' and girls' pre- and post-yoga anxiety scores did not significantly differ.

To examine the effects of yoga on reducing anxiety levels in school-age children by Hispanic/non-Hispanic family identification, a 2 X 2 Repeated Measures ANOVA was conducted, with time (pre and post) as the repeated factor and Hispanic/non-Hispanic family identification as a between subjects' factor. Similarly, as above, there was an effect of time, but no significant interaction or group effects were found,  $F(1, 48) = .05, p = .83$ . Table 3 depicts the anxiety scores pre- and post-yoga participation by Hispanic/non-Hispanic family identification. These did not significantly differ.

**Table 4.** Means and Standard Errors of Pre- and Post-yoga Anxiety Scores by Hispanic/non- Hispanic family identification

	Hispanic	Non-Hispanic
Pre-yoga Anxiety	2.25 (.13)	2.29 (.15)
Post-yoga Anxiety	2.13 (.12)	2.02 (15)

Note: Pre- and post-yoga anxiety scores by Hispanic/non-Hispanic family identification did not significantly differ.

In the above analyses, anxiety scores across pre- and post-tests for each session were aggregated, to reduce the effects of missing data by session, as reported in Table 5.

**Table 5.** Missing Data by Yoga Session

		PRE1	PRE2	PRE3	POS1	POS2	POS
<i>N</i>	Valid	53	32	33	50	32	
	Missing	7	28	27	10	28	
	Percent Completed	.88	.53	.55	.83	.53	

No analyses were done to examine group difference by parent-reported race, given the lack of diversity nor by data collection site, given the small sample size of participants in one school compared to the other.

## **V. DISCUSSION**

The current study examined if participation in mindfulness- based interventions (e.g., yoga, mindful breathing, and meditation) led to decreased reports of anxiety among school-age children, with the hypothesis that participation in mindfulness-based interventions would lead to decreases in self-reported anxiety. The study also explored for effects by gender and demographic factors. Results indicated that children who participated in mindfulness-based interventions (e.g., yoga, mindful breathing, and meditation) experienced a significant decrease in anxiety after their yoga experience, compared to pre-yoga anxiety levels. When group differences were examined, it was found that there were no significant differences in anxiety levels by gender or by Hispanic/non-Hispanic family background, suggesting that the benefits of yoga were experienced by both girls and boys and Hispanic/non-Hispanic families alike. Thus, this study suggests that MBIs and yoga could be useful as tools to help reduce anxiety in children

in educational settings.

Results from the current study fit with past research. For example, Hutchison et al. (2018) found that the incorporation of mindfulness in the school setting, akin to the practices used in the present study, led to a reduction of anxiety in children. Similarly, Reid and Raaza (2021) have examined the benefits of a mindfulness program used in classrooms of elementary-school age children and found the program to be beneficial in promoting children's socioemotional competencies related to anxiety. Taken together, past research with the results of the present study provide confirmation that children in the school setting who struggle with anxiety might benefit from MBIs.

Future the present study demonstrates that the addition of yoga into the day-to-day lives of children can have a positive effect in reducing anxiety levels.

Pandya (2018) also examined the effects of a yoga program, though they focused on outcomes of happiness and emotional awareness in children,

in contrast to anxiety. Of interest, Pandya found a significant increase in happiness levels and emotional regulation by measuring type of practice as with others or self-practice. When participants practiced yoga on their own, without the promoting of others, their levels of emotional awareness and happiness increased. Though the present study focused on the impact of reducing cuing negative emotions and Pandya focused on increasing positive emotions, the results converge. A notable difference between the studies was that participants in the present study only participated in yoga and MBIs with others (and when they were prompted by their homeroom or P.E. teacher.) Thus, it is possible that the intervention in the current study could have led to increased knowledge and interest in MBIs and yoga by children, who might then engage in these as self-initiated practices over time. Future research should examine the longitudinal effects of participation in MBIs and yoga, including the effects of social and self-practices.

Another aim of the present study was to examine the effect of yoga and MBIs on anxiety reduction across demographic characteristics.

There were no significant effects when group differences were examined. These results indicate that yoga and MBIs, regardless of class or gender, can have a positive effect on an individual. If yoga and MBIs is easily accessible to members of minority groups, victims of trauma/abuse, children in underserved communities, and children with chronic illnesses and diseases, there is great potential for a decrease in overall anxiety levels in children across the board. This is not to say that children in majority groups would not benefit from the practice of yoga or the benefits of MBIs, but there is quite frankly a higher level of accessibility afforded to these individuals.

According to a study by Park et al., (2015), the average practitioner of yoga was a female from a higher socioeconomic status who is white, middle aged, and educated which alludes to the notion that yoga practice has more to do with accessibility and one's privilege than choosing the practice based on the benefits it provides.

By increasing accessibility of yoga and MBIs to minority groups, given the low cost and adaptable nature of the two modalities, individuals who may benefit from these the most.

### **Study Applications**

The current study informs future research on the effectiveness of yoga as a form of pain reduction and anxiety management for children with sickle cell disease (SCD). Due to the sociocultural factors, implication of COVID-19, and a general lack thereof interest in research participation, this population was not able to be recruited in the current study, however, future research should include this sample of the population when examining the effects of MBI and yoga.

In the United States, the prevalence of SCD is highest among individuals of African descent; approximately 1 in 12 African Americans carry the sickle cell trait and 1 in 375 African Americans have SCD (Long et al., 2011). SCD also impacts individuals from the South Asian,

Caribbean, Middle Eastern, and Central/South American Communities (Long et al., 2011). The racial/ethnic minority status of many patients with SCD is an important factor when considering treatment options. Parents of children with SCD also face many disparities and challenges. Hoegy et al. (2020) conducted a qualitative explorative study, using semi-structured interviews to examine the life- experiences of adolescent and adult patients with sickle cell disease, and their caregivers. They report that all individuals described disease- related limitations. For example, caregivers reported needing time to adjust to the disease, and an increased need to focus on monitoring their child. They also described the need to educate themselves and learn about the disease theoretically. Additionally, caregivers described the negative impacts of having limited childcare options and limitations in professional and family activities. Many reported feelings different and not liking the increased social visibility of SCD. Hoegy et al. (2020) conclude by suggesting that patient care



management adherence is partly based on how individuals' cope with the disease. Yet, there are also many other barriers of medical care adherence.

Women of color, specifically black women, have reportedly greater amounts of mistrust in medical professionals than other groups, due to experiences of being treated with less empathy and acknowledgment of their humanity (BeLue et al., 2006). This might mean that they are less likely to seek treatment for their child with SCD. Among adult patients, there is evidence that some health care providers tend to hold negative, discriminatory feelings towards patients with SCD, which prevents them from receiving adequate care in the hospital setting in relation to pain management for their SCD diagnosis (Haywood et al., 2013). The symptomatic description of racial and ethnic minorities is not as likely to be given the attention needed to properly treat SCD in an acute healthcare setting, such as an emergency department, ED, where many individuals who

have SCD go for proper care if they experience a pain crisis (Todd et al., 2006).

Another barrier individuals with SCD face are discrimination due to the opioid crisis. The term, “sickler” is an overtly racist and ignorant term used by healthcare providers to describe patients with SCD, and due to the opioid crisis, patients with SCD who seek medical care have been accused of taking advantage of the medical system for addiction related purposes, which ultimately delays their ability to receive proper care in a hospital setting (Power-Hays & McGann, 2020). Considering these sociocultural factors, identifying supplemental forms of pain management and anxiety reduction seems especially important. Given that yoga and meditation are cost-friendly practices and can be done anywhere, these seem feasible additions to medical treatments that might be useful while we seek to reduce disparities in access to and quality of care for persons living with SCD.

## **Study Applications for Child Life Specialists**

Child life specialists (CLS) work in the pediatric hospital setting to assist with psychosocial patient care through helping patients, parents, and family members cope with the vulnerabilities of hospitalization through age-appropriate normalization and coping practices. CLSs can have a role in providing yogic activities to patients with sickle cell disease in the pediatric hospital setting. Play, a major component in the pediatric hospital setting, can serve as a therapeutic practice for patient care in the pediatric hospital setting. The therapeutic components of play include creative thinking, imagination, proficiency, emotional release.

Such properties are incorporated into the work of a CLS for the purpose of giving children the opportunity to have an active role in their environments, articulate their feelings, and develop a sense of control and ownership over their medical journeys (Thompson, 2018). Given the way a child life specialist utilizes therapeutic properties of play,

yoga, as a therapeutic practice, could be easily incorporated into a patient's plan of care in the hospital setting as a modality of play. A CLS also has an opportunity to partner with multiple interdisciplinary roles in the hospital setting to provide the best possible patient care. Another role a CLS plays in the hospital setting is advocating for the needs of their patients. At Red Cross War Memorial Children's Hospital in South Africa, a non-profit organization, Lionhearted Kids developed a program within the hospital which focused on pain management called the Creative Arts Therapy and Wellness Program which provided therapies such as art, music, massage, yoga, and child life services to serve the patient population to address pain management (Thompson, 2018). Thygeson et al. (2010) found yoga had a positive impact on adolescents with hematology and oncology diagnoses but little to no impact on children. Further investigation on a child centered population would support the need for a focused study to emphasize yoga's salience as a form of supplemental treatment in the pediatric

hospital setting.

Information about yoga and other forms of holistic care in the pediatric hospital setting can also be gained from this project and promote the usage of such therapeutic modalities for healing in a variety of contexts. This study could open dialogue on how parents and caregivers handle stress and anxiety related to their children's SCD diagnosis; parental reports of anxiety relate to their children's SCD level of pain (Lemanek et al., 2009). Findings from the present study will pave the way for future research on the topics of yoga, sickle cell disease, and alternative forms of pain management and anxiety reduction for sickle cell disease and other chronic illnesses.

### **Study Limitations**

Various limitations impacted the overall results of the present study. For example, the sample size used was small ( $N = 60$ ). Given the small sample size of the current study, a larger sample size would only enhance the results if the same methodology were used to measure the effects of anxiety reduction in school aged

children. A further limitation was that not all participants completed each yoga session provided. This led to missing data. To mitigate the amount of missing data received in the present study, a future researcher could visit the recruitment site and facilitate the activities and interventions instead of relying on the individuals from the schools to distribute study information and materials to the sample. There might have been social desirability that occurred among children. Another limitation was the limited scope of questions on the demographic survey. One possibility is that religious factors affected participation. Though this is only speculative, based on conversations with teachers, it is possible that some parents did not allow their child to participate in the current study because of their beliefs about yoga and religion. Perhaps future researcher could inquire about religious affiliation to measure whether children in families who are affiliated with a certain faith practice have self-reported anxiety and interest in yoga than others.

## **Conclusions**

Findings from the current study provide additional information on the importance of yoga and MBIs and how they can be used to reduce anxiety in children in the school setting. The current study was able to detect a small effect size of anxiety reduction pre and post yoga participation. Moreover, this study sheds light on group differences (ex. age, gender, income level, parental education) and their impact on children's anxiety levels. This study emphasizes the notion that the youth of today, regardless of demographic characteristics or socioeconomic status, that covid-19 and other societal factors in a larger sense could potentially impact anxiety levels in children as they navigate this new post pandemic world.

## **Appendix A**

### **Recruitment/Informed Consent**

#### **Participant Recruitment**

Dr. Amy Weimer and a team of students at Texas State University are doing a study to find out more about kids and their feelings during COVID-19 and if yoga can be used to make them feel better. We are asking you to be a part of this study because you are a student in the Texline Independent School District.

If you want to be in this study, you will be asked to watch 3 videos and follow along in the activity. You will also be asked to answer questions about how you feel before and after watching each video. You might not want to talk about your feelings and that's OK. You do not have to answer any question or do any yoga poses or exercises you don't want to. You can also stop being in this study whenever you want. If you decide that you don't want to be in this study, then you will not need to answer any questions about how you feel or do the yoga. This study will take place in your P.E class as your activity for the day and like other activities you may feel some sore muscles afterwards.

There are some good things that might happen if you participate. Your school will receive a gift for students to use during P.E classes and we might find out information that will help other kids someday.

Your parents were asked if it is okay for you to be in this study. Even if your parents say you can be in the study, you can still say that you don't want to. It is okay to say "no" if you don't want to be in the study. If you change your mind later and want to stop, you can.

You can ask any questions you have, now or later. If you think of a question later, you or your parents can contact Dr. Amy Weimer about this study.



Do you want to participate in the study?

Yes/No

### **Informed Consent**

Dr. Amy Weimer and a team of students at Texas State University are conducting a study to examine how yoga might reduce anxiety. We are asking family groups to participate in this study. We will ask parents to complete a 5- minute survey with questions about family characteristics, family stress, and child stress levels. The survey will include questions that will ask you about topics such as race, ethnicity, income, how the COVID-19 pandemic has affected your personal finances, and how you feel about your personal finances.

We are also asking for your consent to allow your child to participate in this study. If you consent, your child will be invited to participate. The study team will work closely with school experts to invite any child who wishes to participate to be included, however, if a child cannot provide consent, they will be excluded. If your child chooses to participate in the study, they will watch yoga videos in their Physical Education class at school and will be asked to answer questions about their stress (e.g., I worry about things. Never to Always).

The videos include light yoga stretching and deep breathing exercises and are geared for children. In the past, children have enjoyed yoga and breathing activities displayed in similar videos. These three separate videos will be used as the physical activity for the day and will be done over 3 classes, with each session taking approximately 30 minutes for the class to complete the activity from one video and complete the questions.

Participation in this research is completely voluntary. Choosing not to participate will not

adversely affect your child's school status. Participants can stop at any time without penalty.

This study involves no foreseeable serious risks. We ask that you and your child try to answer all questions; however, if any discomfort is experienced, please leave the answer blank.

However, if participation in this study causes any concerns, anxiety, or distress, please contact the School Counselor to make an appointment to discuss your concerns. The physical risk with yoga is no greater than any other physical activities that would occur during PE class, however there is still a risk of sore muscles, sprains, or strains.

There are no direct benefits to you or your child, but this study may provide insight about how stress or anxiety might be reduced.

Efforts will be made to keep the personal information in your research record private and confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law. The members of the research team, and the Texas State University Office of Research Compliance (ORC) may access the data. The ORC monitors research studies to protect the rights and welfare of research participants. Your name will not be used in any written reports or publications which result from this research. Data will be kept for three years (per federal regulations) after the study is completed and then destroyed. Your child's school will receive a small health-promoting gift (e.g., yoga mat, water bottle) for participating in this study.

**If you have any questions or concerns, contact Dr. Amy Weimer  
Amy Weimer, Professor Human Development & Family Sciences 512-245 - 1106  
[Amy.Weimer@txstate.edu](mailto:Amy.Weimer@txstate.edu)**

This project [insert IRB Reference Number or Exemption Number] was approved by the Texas State IRB on [insert IRB approval date or date of Exemption]. Pertinent questions or concerns about the research, research participants' rights, and/or research-related injuries to participants should be directed to the IRB chair, Dr.

Denise Gobert 512-716-2652 -  
(dgobert@txstate.edu) or to Monica  
Gonzales, IRB Regulatory Manager 512-245-  
2334 - (meg201@txstate.edu).

If you consent to participate and to allow your child to participate, please select "Yes," If you do not consent, select "No" and this survey will end.

## **Appendix B**

### **Parent Surveys**

#### **Demographics**

This survey is being completed by the child's...

- ☐ Mother
- ☐ Father
- ☐ Other

Please write your child's initials. What is your  
child's date of birth? What is your child's gender?

- ☐ Male
- ☐ Female
- ☐ Other What is your race?
- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native Asian
- ☐ Native Hawaiian

- ☐ Pacific Islander
- ☐ Other

What is your ethnicity?

- ☐ Hispanic
- ☐ Non Hispanic

What is your zipcode?

How many children (less than 18 years old) reside in your household?

Which of the following best describes your current relationship status?

- ☐ Married
- ☐ Widowed
- ☐ Divorced
- ☐ Separated
- ☐ In domestic partnership or civil union
- ☐ Single, but cohabiting with a significant other

Single, never married? What is your annual household income?

- ☐ Less than \$10,000
- ☐ \$10,000 to \$19,999
- ☐ \$20,000 to \$29,999
- ☐ \$30,000 to \$39,999
- ☐ \$40,000 to \$49,999
- ☐ \$50,000 to \$59,999
- ☐ \$60,000 to \$69,999
- ☐ \$70,000 to \$79,999
- ☐ \$80,000 to \$89,999
- ☐ \$90,000 to \$99,999
- ☐ \$100,000 or more

What is your current employment status?

- ☐ Employed full-time

- ☐ Employed part-time
- ☐ Laid off (COVID)
- ☐ Unemployed
- ☐ Retired

What is the highest degree or level of education you have completed?

- ☐ Some High School
- ☐ High school diploma
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Masters degree
- ☐ Ph.D. or higher
- ☐ Trade School
- ☐ Prefer not to say

## **Appendix C**

### **Instructions for Yoga and Mindfulness Study**

#### **Part One**

First, distribute the student survey “Yoga and Mindfulness Student (1)” to those who are participating in the study.

Those students will need to answer the demographic portion of the survey (i.e., assent, name, gender, initials) and the 7 questions.

Once all the students have completed the first part of the survey, you may play the yoga video titled “Yoga Series for 7+ | Part 1 | Nanda Yoga” for the entire class.

Link here: <https://www.youtube.com/watch?v=DneSATvaPzg>

When the video is finished the students participating in the study will then answer the next 7 questions. These questions are identical to the ones they answered before watching the video.

Lastly, collect the completed surveys from the students and please return them to the principal, Mr. Perschbaucher.

If you have any questions, feel free to contact us at any time. Thank you in advance for your willingness to participate.

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## **Part Two**

First, distribute the student survey “Yoga and Mindfulness Student (2)” to those who are participating in the study.

Those students will need to answer the demographic portion of the survey (i.e., assent, name, gender, initials) and the 7 questions.

Once all the students have completed the first part of the survey, you may play the yoga video titled “Yoga Series for 7+ | Part 2 | Nanda Yoga” for the entire class.

Link here: <https://www.youtube.com/watch?v=97Lj7bvJxuo>

When the video is finished the students participating in the study will then answer the next 7 questions. These questions are identical to the ones they answered before watching the video.

Lastly, collect the completed surveys from the students and please return them to the principal, Mr. Perschbaucher.



If you have any questions, feel free to contact us at any time. Thank you in advance for your willingness to participate.

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### **Part Three**

First, distribute the student survey “Yoga and Mindfulness Student (3)” to those who are participating in the study.

Those students will need to answer the demographic portion of the survey (i.e., assent, name, gender, initials) and the 7 questions.

Once all the students have completed the first part of the survey, you may play the yoga video titled “Yoga Series for 7+ | Part 3 | Nanda Yoga” for the entire class.

Link here: <https://www.youtube.com/watch?v=jCqM3klGCDM>

When the video is finished the students participating in the study will then answer the next 7 questions. These questions are identical to the ones they answered before watching the video.

Lastly, collect the completed surveys from the students and please return them to the principal, Mr. Perschbaucher.

If you have any questions, feel free to contact us at any time. Thank you in advance for your willingness to participate.

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## **Mindfulness Practices for the Classroom**

### **Week 2**

#### **Hand Trace Breathing**

##### **Benefits**

This is a great way to take a few minutes to settle in and check in with your breath.

##### **Duration**

This exercise will take approximately 2 minutes, but there is no specific time limit.

##### **How to Apply**

1. Students will hold out the hand of their choosing in front of them and spread their fingers
2. With the other hand's index finger, they will trace the fingers on their outstretched hand
3. The teacher will instruct students to breathe in when the trace finger goes upwards, and when the trace finger starts going down, students will breathe out
4. After the first hand is traced, the students will switch hands
5. Students will be encouraged to go slowly and focus their attention on their breath

## **Week 2**

### **Shark Fin Breathing Exercises**

#### **Benefits**

Shark Fin breathing exercises are perfect for facilitating calmness quickly and spontaneously and for helping kids sort out their thoughts and feelings while relaxing the body. It helps focus on the “now”. You can also use it as a warm-up before longer mindfulness activities for students.

#### **Duration**

This exercise will take 2 minutes at most.

#### **How to Apply**

Students can sit down on a chair, floor or comfortable surface, and close their eyes.

1. Tell them to place their thumb on their forehead with their other fingers pointing to the sky like a shark fin. Their palm should be looking towards their side. They should take a deep breath and move their hand slowly down from their forehead to their chest, keeping the 5-S's in mind:
  - Sit straight
  - Still
  - Silent
  - Soft breathing
  - Shut eyes
2. Breathe in and out a few more times.
3. They can open their eyes; encourage them to notice how they feel.

## **Week 3 - Mindful**

### **Breathing Colors**

#### **Exercise Benefits**

Children will calm down and let go of their unhealthy thoughts and feelings. It will also help them overcome anxiety and reduce stress.

#### **Duration**

This exercise will take 5 minutes.

1. Ask students to assign colors to their feelings. First, start with a relaxing positive color.
2. Then, ask them to think of a color that represents stress, sadness, or anger, or whichever of those emotions is most relevant or suitable for your students' age group etc.
3. Students start breathing. When they breathe in, they imagine inhaling the relaxing color and visualize it filling their lungs.
4. When they breathe out, they imagine exhaling the stress, sadness, or anger color out of their body.
5. If you have any questions, feel free to contact us at any time. Thank you in advance for your willingness to participate.

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### **Appendix 3**

#### **Demographics Survey**

##### **Completed by Child Participants**

Please write

your initials \_\_\_\_\_ What is your date

of birth? \_\_\_\_\_ What is

your gender? \_\_\_\_\_

What is the name of your homeroom

teacher? \_\_\_\_\_

##### **Child Survey on Anxiety**

For the questions below please select the word that shows how often these things happen to you. There are no right or wrong answers. You do not have to answer any question you don't want to.

1. I worry about things
2. I worry that something awful will happen to someone in my family
3. I worry that bad things will happen to me
4. I worry that something bad will happen to me
5. I worry about what is going to happen
6. I think about death

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