

The Benefits of Yoga in the Classroom: A Mixed-Methods Approach to the Effects of Poses and Breathing and Relaxation Techniques

Abstract

Background: Disadvantaged youth in the United States are disproportionately likely to be more sedentary and obese and experience more stress than their counterparts with higher socioeconomic status. Yoga and breathing and relaxation techniques have positive effects on stress levels, physical activity levels, and behavior of school-aged children. **Aims:** Using social cognitive theory to examine behavioral, personal, and environmental factors, the purpose of this pilot study was to examine the multilevel influences of a yoga-based classroom intervention on urban youth. **Methods:** Using a mixed methodological quasi-experimental design, this pilot study included the third grade students ($n = 40$) at one urban elementary school. A survey contained stress, yoga behavior, and aggression scales. In addition, individual student interviews, a teacher interview, and classroom observations were conducted. **Results:** Paired and independent sample t -tests showed pre/post differences in yoga participation both in and out of school for the intervention participants ($P < 0.01$). Qualitative analysis revealed three main themes: (1) increased use and enjoyment of yoga techniques, (2) behavioral changes both in/out of school, and (3) impact on personal factors. **Conclusions:** Findings suggest that urban classrooms should include yoga and mindfulness training as it contributes to daily student PA and also can be stress relieving, fun, calming, and easy to perform outside of school.

Keywords: *Breathing techniques, elementary school, mindfulness, relaxation techniques, stress, yoga*

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Introduction

Disadvantaged youth in the United States are disproportionately more likely to be sedentary and obese and experience more stress than their counterparts with higher socioeconomic status.^[1] Obesity and stress are linked to physical consequences (i.e., high blood pressure, glucose intolerance, asthma, etc.), low self-esteem, psychological problems (i.e., anxiety), and social problems (i.e., bullying).^[1,2] Stress can also negatively impact mental health, concentration, and sleep, as much as other physical implications.^[3]

In response to low physical activity, high stress, and discipline issues in urban youth, yoga is introduced in both physical education and classroom settings. A review of the literature of yoga in schools shows that yoga provides mental health benefits, improves mood and cognition, and has physiological benefits (i.e., improved blood pressure).^[4] Student survey data

indicated that yoga practice yielded positive changes in the domains of mental, emotional, physical, and interpersonal growth.^[5] A study revealed that yoga in an urban school setting reduced stress and bullying behaviors.^[6] That we know of, there is no research on a comprehensive yoga curriculum that includes breathing and relaxation techniques used as part of classroom management. Using social cognitive theory as a framework, the purpose of this pilot study was to see the impact of Yoga Calm[®] on personal factors, behavior, and the classroom environment.

Methods

Participants

At the beginning of the study, there were 22 students in the intervention classroom and 21 students in the comparison classroom. A few weeks into the study, five students from the comparison classroom were placed in the intervention classroom, leaving the

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Access this article online

Website: www.ijoy.org.in

DOI: 10.4103/ijoy.IJOY_76_19

Quick Response Code:



How to cite this article: Thomas EM, Centeio EE. The benefits of yoga in the classroom: A mixed-methods approach to the effects of poses and breathing and relaxation techniques. *Int J Yoga* 2020;13:250-54.

Submitted: 08-Nov-2019 **Revised:** 12-Mar-2020
Accepted: 07-Apr-2020 **Published:** 13-Sep-2020

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intervention classroom with 27 students. The comparison classroom then only had 16 third graders remaining. Three students did not complete the postmeasures and were excluded from the dataset. Therefore, the total number of participants for this study included 25 for the intervention group and 15 for the comparison group.

Participants included 40 third-grade students ($X_{age} = 8$; standard deviation = 0.5; female = 18) in an intervention group ($n = 25$) and a comparison group ($n = 15$), in an urban school district, in the Midwestern region of the United States (Caucasian [72%], African American [14%], Arab American [11%], and Asian American [3%]). Only 17% of the third graders met the Michigan Educational Assessment Program standards in 2012 and 78% of the students were eligible for free and reduced lunch.

Procedures

After Institutional Review Board approval, parental consent and student consent were obtained. A convenience sample was used for this study where the intervention students were in a third-grade classroom whose classroom teacher was a certified Yoga Calm® instructor. The comparison group students were part of another third-grade classroom in the same school where the teacher was not certified in Yoga Calm but followed the same academic curriculum. The survey data were collected at the beginning of the school year (September) and again after 10 weeks. Surveys were read out loud, verbatim, to each student. Qualitative data were collected from observations of the students by both the PI and by the teacher (three time points), interviews with the intervention students (post), and an interview between the PI and intervention classroom teacher (post).

Intervention

Students received Yoga Calm® for 10 weeks, approximately 500 min of yoga and related breathing and relaxation techniques, taught by a certified Yoga Calm® elementary teacher. The program is an integration of physical yoga, mindfulness practice, and social-emotional learning activities, each part supporting and reinforcing the others.^[7] The program included two, 20 minute sessions of yoga each week where students performed yoga poses in a flow and ended with relaxation. It also included multiple shorter intervals of yoga poses, breathing and relaxation techniques, used throughout the school day.

Measures

Yoga behavioral characteristics

Six questions were added to the survey to understand yoga participation at home and school, yoga enjoyment, and confidence and skill related to yoga: “I have participated in yoga at some time in my life before today” (yes/no answer), “In the last 3 days how many times did you participate in yoga at school,” “In the last 3 days how many times did you participate in yoga at home,” “I enjoy participating in

yoga,” “I feel confident about performing yoga poses,” and “I think I have the skills needed to perform yoga.”

Stress in children

The self-assessed stress level of children was measured using the 21-item “stress in children” scale.^[8] A high score suggests higher levels of perceived stress. Cronbach’s alpha was acceptable ($\alpha = 0.75$).

Modified aggression scale

The aggression of children was measured using the modified aggression scale: 10 items measuring fighting and anger.^[9] Cronbach’s alpha was moderate for both the scales ($\alpha_{fight} = 0.5$, $\alpha_{anger} = 0.64$).

Behavior observation protocol

Behavior was documented using observation forms, filled out by both the teachers and Principal Investigator (PI) at three different time points. Examples of items noted are “talking when should be quiet,” “remains on task,” “sits still,” and “follows directions.”

Student interviews

Students in the intervention classroom participated in individual semi-structured interviews. Some examples of the questions include “Explain the yoga (and techniques) you used in the classroom,” “what did you like/not like?,” “did you use the yoga (and techniques) on your own?,” “how did they help you?,” and “have you noticed any changes in yourself (the way you behave)?” Questions were followed up with other specific questions regarding techniques (breathing and relaxation) and perceived changes to anger and stress.

Teacher interview

A semi-structured interview with the intervention classroom teacher was recorded at the conclusion of the intervention, lasting 40 min. Two sample questions were “Why did you introduce yoga into your classroom?” and “What changes have you noticed as a result of introducing yoga into the classroom?”

Data analysis

A power analysis was conducted using G*Power (HHU, Dusseldorf, Germany). Given the lack of previous research done on this topic, two analyses were conducted, one with the effect size set at 0.5 (medium effect size) and one with the effect size set at 0.2 (small effect size). The minimum amount of participants suggested with a medium effect size was 45, while the suggested participants with a small effect size were 272. Given the limited ability we had to recruit participants for this pilot study, we did the best we could within the restrictions to meet the minimum of 45 participants.

Data-source triangulation between all sources of qualitative and quantitative data was completed to compare alternatives

and expose any inconsistencies.^[10] A peer debriefing was done by having an experienced qualitative researcher to examine the transcripts and coding sheets. A participant check was conducted by the teacher to examine the transcripts of her interview to ensure that it was consistent with her experience. Each of these data sources were analyzed individually and coded to find themes.

From Excel, quantitative items were imported into IBM SPSS, version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp). The data were screened by checking for assumptions for normality and homogeneity of variances and for outliers before conducting the analysis. The 40 third graders were screened for missing values on four initial continuous variables (stress, aggression [fight and anger], and behavioral characteristics). Among the predata, the percentage of imputed missing data for the anger variable was 4% and 12% for the stress variable. Furthermore, 2% of the postdata for the stress variable were imputed. Little's MCAR-indicated data were observed at random ($P > 0.05$). Descriptive statistics were run in SPSS on all variables and all students in the population to check the normality and linearity of the distributions [Table 1].

Results

Quantitative

Correlations, t -tests, and ANCOVA's were run to determine group differences over time. T -tests revealed that there were no significant differences between groups at baseline ($P > 0.05$). Paired and independent sample

t -tests showed significant pre/postdifferences in yoga participation both in and out of school for the intervention participants ($P < 0.01$). Means increased in the intervention group, but changes were not significant in "confidence in yoga" ($P = 0.28$). Significant differences between groups were not found for stress ($P = 0.50$), aggression (fighting $P = 0.22$), enjoyment of yoga ($P = 0.73$), and self-efficacy for yoga skills ($P = 0.48$) [Table 2]. A one-way ANCOVA determined whether there was a statistically significant difference between the intervention and comparison group on all variables, controlling for prescores [Table 3]. There is a significant effect of Yoga Calm[®] on yoga participation in school ($F(2,8) = 5.07, P < 0.05$) and out of school ($F(2,8) = 19.87 P < 0.05$) after controlling for prescores.

Qualitative

Qualitative analysis revealed three main themes that included teacher and student perceptions: (1) increased use and enjoyment of yoga techniques, (2) behavioral changes both in and out of school, and (3) impact on personal factors [Table 4].

Increased use and enjoyment of yoga techniques

Learning Yoga Calm[®] in the classroom enabled 72% of the students to use Yoga Calm[®] techniques outside of school, on their own. When specifically asked about using the breathing techniques they learned, 84% of the students said that they used breathing techniques (unprompted by their teacher) and described that at least one time they used them. The teacher reported that several students were telling her they were doing yoga at home, requesting more yoga during the school day, and using the techniques unprompted by her.

Table 1: Descriptive statistics

Variable	Mean		SD		Cronbach's alpha	
	Intervention	Comparison	Intervention	Comparison	Intervention	Comparison
Behavior characteristics						
POST_YogaPart	1	1.13	0	0.342	—	—
PRE_YogaPart	1.36	1.25	0.49	0.447	—	—
POST_Last3DaysSchool	2.72	1.5	1.173	1.095	—	—
PRE_Last3DaysSchool	1	1.19	0.5	0.75	—	—
POST_Last3DaysHome	2.52	1.94	1.229	1.436	—	—
PRE_Last3DaysHome	1.79	1.94	1.117	1.34	—	—
POST_Enjoy_Yoga	3.88	3.94	1.616	1.181	—	—
PRE_Enjoy_Yoga	4.08	4.31	1.077	0.946	—	—
POST_Confidence_Yoga	3.92	3.69	1.382	1.352	—	—
PRE_Confidence_Yoga	3.88	4.27	1.364	0.772	—	—
POST_YogaSkills	3.48	3.44	1.503	1.504	—	—
PRE_YogaSkills	3.71	4.06	1.428	1.237	—	—
Scales						
POST_Stress	47.88	46.33	9.42	8.54	0.74	0.74
PRE_Stress	49.76	46.13	9.94	6.65	0.75	0.75
POST_Fight	8.32	8.56	2.90	3.34	0.51	0.51
PRE_Fight	8.64	7.43	2.57	3.05	0.67	0.67
POST_Anger	8.59	6.64	2.40	1.59	0.64	0.64
PRE_Anger	7.50	7.35	2.41	1.90	0.63	0.63

Table 2: Independent t-test comparing change from post to pre between intervention and comparison groups

Variables	<i>t</i>	Significance	Mean difference	ES
Yoga behavior characteristics				
Δ Yoga participation	-1.67	0.10	-0.23	
Δ Yoga participation at school	3.47	0.01*	1.40	
Δ Yoga participation at home	1.46	0.15	0.72	
Δ Yoga enjoyment	0.33	0.73	0.17	
Δ Yoga confidence	1.09	0.28	0.61	
Δ Perceived Yoga skill	0.70	0.48	0.39	
Scales				
Δ Stress	-0.67	0.50	-2.08	-0.23
Δ Fighting	-1.23	0.22	-1.44	-0.40

* $P < 0.05$. ES=Effect size, Δ=change from pre to post

Table 3: ANCOVA postgroup differences controlling for prescores

Variable	<i>F</i>	Significance	η^2
Yoga participation	5.07	0.03*	0.13
Yoga participation at school	19.87	0.00**	0.35
Yoga participation at home	0.68	0.42	0.02
Yoga enjoyment	1.72	0.18	0.14
Yoga confidence	0.11	0.74	0.06
Perceived Yoga skill	0.31	0.87	0.05
Stress	1.06	0.45	0.56
Fighting	0.72	0.71	0.28

* $P < 0.05$, ** $P < 0.000$

Behavioral changes

Seventy-six percentage of the students interviewed said that they have changed their behavior at school or home as a result of the Yoga Calm[®] program. Many things like concentration, focus, attention, and being fidgety and antsy improved. Joanne and the PI observed these changes in her students. More notably, for Joanne, she noticed “Yoga in my classroom creates a sense of community. They are more of a unified group. Something about yoga brings the students together, almost like team building.”

Personal factors

Eighty-four percentage of the children interviewed said that they have changed personally since having Yoga Calm[®] in their classroom, such as they are less stressed, more calm, happier, and now have a knowledge of yoga and how and when to use it. The classroom teacher also noticed that children who were the most stressed and anxious had released their anxiety and no longer showed signs of stress.

Self-regulation

A subtheme of personal factors is the theme of self-regulation. Children were using Yoga Calm[®] specifically when angry

or for purposes of calming down or dealing with stress: more than half (56%) of the children said that they now specifically use breathing techniques learned in the classroom for purposes of dealing with anger or for calming themselves.

Discussion

The results of this study are meaningful, in which they show the impact of a comprehensive yoga, breathing, and relaxation program on a classroom environment through changes in perceived stress, observed behavior, and personal factors. The social cognitive theory states that behavior, personal factors, and environmental factors interact with each other and change one changes them all.^[11] The implications of yoga as a calming tool can be effective for both classroom management and culture and for influencing the children personally.

Changing the classroom environment to include yoga and breathing and relaxation techniques can decrease stress levels or the perceived stress levels of children in the classroom, as seen in the previous study.^[12] A study that showed the positive effects of relaxation training of children on both physiological markers (blood pressure, pulse rate, and body temperature) and self-reported mood and somatic condition could be a mechanism.^[13] Decreasing anxiety levels in children can further improve the classroom environment, by preventing chaos, decreasing noise volumes, and increasing time ability to focus.^[14] Yoga might give children a “framework for processing and handling their emotions, helping to defuse anger and stress.”^[15] We found in the current study that children not only significantly increased their knowledge of yoga but also learned when to use it and why.

Limitations

This pilot study had some limitations. First, the use of a Yoga Calm[®] certified teacher in a classroom setting removed the possibility of a random sample. Second, the small sample size affected the power of the analysis and generalizability of the results. Another major limitation was the 10-week duration of the treatment.

Conclusions

The influence of environment, behavior, and personal effects were intertwined, changing the classroom culture. As one construct saw improvements, so did another. Yoga was added to the classroom environment, and behavior and personal factors improved. Yoga was introduced as a response to children's behavior, and the climate (environment) of the classroom changed (i.e. became more calm). The students started to see changes in themselves (reduced stress, more calm), and in turn their observed behavior in the classroom improved. Yoga Calm[®] was easily added as part of classroom management and in response to or in anticipation of student's behavior. In particular, for urban youth, yoga and related techniques are inexpensive, easy to learn, and can be done in the home with little space. Yoga Calm[®] is a great way to add

Table 4: Qualitative quotes by theme

Theme	Defined	Quote
Increased use and enjoyment	Use of techniques at school and home	“Sometimes my mom has to make my baby brother a bottle or something and I will sit on my bottom and I will do stuff, like the funny poses for him, and he will start laughing. Like he thinks the eagle is funny when you sit on your perch. He thinks because when I go up and let it go I make the volcano sounds so he thinks volcano breaths are funny, too”
	Enjoy techniques	Ashton says he uses the breathing “before bed and when I am mad. I do the belly breaths so I can calm down”
Change in behavior	Concentration, focus, attention, and being fidgety and antsy improved	Stewart says, “A few months ago I was doing really bad in class (messing around with my friends) and when we started doing yoga it changed me. So now I am sitting down when she tells me”
		Joel, says “When I get back from lunch and I am just really hyper, I just sit down in my seat and do belly breaths. It helps me work better. And pay attention in class”
		Amy says, “One day I was frustrated (in class) so I got up and I did the tree. And I closed my eyes and I took deep breaths in and out. It made me feel better because then I calmed down and I got to do my work because I felt better”
Change in personal factors	Less stress, more calm, and self-regulation	And Renee said this of dealing with her brother at home, “I wanted to play with him and his friend and he wouldn’t let me. So I got mad at him. So I took belly breaths and I asked him one more time <i>nice</i> ly, cause I asked him meanly the last time. And then he said yeah”
	Self-regulation	Jalen said, “My anger comes out when I am at home, especially when I am wrestling. And something just pops out and I can’t control it, so I use the breaths now. I learned how to keep him in. But when I used to wrestle he always use to come out and I couldn’t put him back in”
	More calm	Joel says, “I have been a little bit calmer. I have been letting stuff get by me a little bit, too. Plus it helps me take my mind off stuff” Amanda says, “It really calms me down a lot and it helps me relax and it helps me feel like I am building strength”

physical activity to create a community in the classroom that can improve behavior and decrease stress levels, which, in turn, can affect the learning levels of children in the classroom.

Acknowledgments

We would like to thank the students and teacher at the elementary school for their time participating in surveys, interviews, and observations. We would also like to thank the creators of Yoga Calm[®] for sharing their curriculum training and for their guidance.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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