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Effects of a High School Yoga Program on Student-Reported Stress, Resilience, and Academic Outcomes

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A thesis submitted to the faculty of
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ABSTRACT

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High school yoga programs are gaining popularity throughout the United States. The many perceived benefits of such programs among adolescent groups have shown promising outcomes. This mixed-method evaluation of a high school yoga program aims to evaluate the effects of the program on student-reported stress, resilience, and academic outcomes. Program participants include high school students in yoga classes (n = 61) and comparison classes (n = 37), who completed pre- and post-measure surveys along with social validity measures. Overall findings showed a decrease in stress levels among yoga students compared to comparison students, which approached statistical significance, no significant differences between groups on the resilience and academic measures, and high social validity among teachers and students in yoga classes. Future research should include larger sample sizes, interrater reliability for fidelity ratings of yoga practice, and compare yoga to other forms of students' physical activity.

Keywords: high school, yoga, stress, resilience, academics

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CHAPTER 1

Introduction

Yoga is one of the six branches of classical Indian philosophy (Bower et al., 2005). References to yoga are made throughout the Vedas, which is an ancient Indian scripture among the oldest texts in existence (Witzel, 2003). This practice has been around for thousands of years and is commonly used to improve physical, emotional, and spiritual well-being. Over the last several decades yoga has been under empirical scrutiny as researchers strive to identify benefits and outcomes of yoga practice under various contexts. Specific areas have involved the effects of yoga on depression, cardiac conditions, addictions, anxiety, diabetes, pain disorders, and high-risk populations (Bower et al., 2005; Ross & Thomas, 2010; Venkataramana et al., 2008). A population of special interest is adolescents as they face developmental changes physically, socially, and cognitively (Sagone et al., 2020).

For many students, high school can be particularly burdensome. Their social life becomes more complex as they navigate dating, peer acceptance, and identity development (Wang & Hagins, 2016). Many students face significant hormonal changes, which contributes to their body image and overall health. They often feel stress as the pressure to excel academically can stem from parents, peers, and their own plans to attend college. This may contribute to the increase of yoga practice among adolescents within the past decade; approximately 4.9 million in the United States reported practicing yoga, an increase of 5.3% since 2012 (James-Palmer et al., 2020). As yoga may have a positive impact on stress, resilience, and even academic success, it is evident that the adolescent population could largely benefit from programs that give them exposure to the practice and opportunity to participate.

Unfortunately, youth yoga programs have historically been expensive and limited in many areas. Yoga can also be an extracurricular activity that takes time out of their social life, academics, or sleep. One way of combating these challenges is through high school yoga programs. Such programs have proven to be largely beneficial to adolescents in various contexts (Conboy et al., 2013; Khalsa et al., 2012).

While historically there is a spiritual component to the practice of yoga, high school programs throughout the U.S. turn attention to 4 secular components of yoga: (a) breathing exercises, (b) physical postures, (c) relaxation techniques, and (d) mindfulness and meditation practices (Butzer, Ebert, et al., 2015). Current programs aim to enhance students' mental and physical health, as well as their behavior (Noggle et al., 2012). As these school yoga programs continue to gain popularity, it is worth evaluating whether they are achieving such goals. Areas of interest include the effects yoga has on stress, resilience, and academic performance.

The current study aims to measure reported stress, resilience, and academic achievement among high school students in a school-based yoga program at Westlake High School compared to students in a comparison condition. The preliminary hypotheses focused on three areas: stress, resilience, and academic outcomes. It was hypothesized that students in the treatment group would report lower stress levels, higher resilience, and better academic outcomes compared with students in the comparison condition. Five specific research questions were addressed:

1. Can high school teachers implement a yoga program with fidelity?
2. Does the implementation of a high school yoga program effect students' stress levels?
3. Does the implementation of a high school yoga program effect students' levels of resilience?

4. Does the implementation of a high school yoga program effect academic outcomes of students?
5. Do students and teachers perceive the high school yoga program as socially valid?

CHAPTER 2

Literature Review

Adolescence

Mental health conditions of adolescence are an increasing public concern throughout the world. In the United States alone, there were 4.4 and 1.9 million adolescents diagnosed with anxiety and depression as of 2016 (Anxiety and Depression Association of America, 2020). Moreover, adolescence may be a particularly sensitive time where the effects of chronic stress take hold and can manifest as the anxiety and depressive disorders mentioned (Frank et al., 2017). A U.S. national survey of individuals between ages 13-18 showed that approximately one of every 4-5 adolescents has a mental disorder with significant impairment (James-Palmer et al., 2020). As the development of such disorders often happens during adolescent years, this can negatively impact future life outcomes as well as academic performance.

Adolescents' ability to cope with stress has never been more relevant as they face more stressors than ever before. The ability to manage stress has many perceived benefits, including the minimization of mental health crises (Khalsa et al., 2012). Common stressors faced by adolescents include identity development, establishing and maintaining friendships, home life, family relationships, complexities of romantic relationships, extra-curricular activities, academics and the junior high or high school atmosphere (Miller et al., 2014). These are in addition to the stress of shifting hormones and physical development. As adolescence is a transitional period characterized by physical, cognitive, and psychosocial changes, the ability to handle and manage any of these is an essential skill. In fact, active stress coping skills have been linked to fewer depressive symptoms in teens and positive adaptation while avoidance has been linked to higher levels of depressive symptoms and poor adaptation (Cicognani, 2011).

Stress

As stress is a sudden biological change, it has become the silent killer of the 21st century (Ramadoss & Bose, 2010). Stress is one of the greatest dangers of the information era because it can disturb one's mental, physical, emotional, and behavioral balance (Reddy & Ammani, 2013). The relationship between the body and mind has drawn the attention of scholars throughout the world, especially regarding stress.

The American Psychological Association (2018) conducted an annual *Stress in America* survey to understand what causes stress and strategies used for coping. In addition to the main sample of 3,458 respondents ages 18+, interviews of 300 teenagers between ages 15 and 17 were collected. The overall average stress level in this survey was 4.9 (on a scale from 1 to 10) while the average from the adolescent group was 5.3. As adolescents are reporting higher levels of stress, and lower levels of confidence in stress management, it is no surprise that they are looking for coping mechanisms for help.

Resilience

There is also substantial interest in adolescent resilience. Parents throughout the world wonder what tools they can utilize in helping their teenagers become more resilient (Cicognani, 2011). Sagone et al. (2020) found that high levels of adolescent resilience are correlated with self-efficacy in life skills, while others have found correlations between resilience and sense of humor, competence, control, and adaptability (Crosnoe & Elder, 2004).

As adolescents today are faced with multiple risk factors, the attribute of resilience is an exceptionally desirable quality. If developed, resilience has the capacity to reduce the effects of many risk factors including drug and alcohol use, parental divorce, poverty, and problematic relationships (Crosnoe & Elder, 2004). Sarkissian et al. (2018) defined resilience as "the ability

to thrive and adapt under difficult circumstances, allowing for healthy development despite challenging external conditions" (p. 211) and argued that social and emotional learning is related to its development. They also claim that practices fostering self-regulation may help prevent detrimental outcomes that are often associated with chronic unregulated stress.

Academics

It is important to recognize the growing academic demands and related stressors faced by high school students. Suldo and Shaunessy-Dedrick (2013) gave pre- and post-questionnaires to 134 freshmen at three high schools and found that students in accelerated curriculum programs reported significantly more perceived stress that those in general education. This suggests that academic rigor may directly impact stress levels among high school students. As students are pressured by parents, peers, teachers, and athletic coaches to go to college, many feel special importance of keeping their GPA at a high level. In a shifting society where college degrees are valued in a different sphere than trade certifications or post-high technical degrees, high school students feel the weight of such expectations (Frank et al., 2017). Interventions to relieve stress and build academic confidence are more pertinent than ever before.

Yoga

Yoga is a comprehensive mind-body practice that involves meditation, physical postures, movement, breathing exercises, mindfulness, and relaxation with the goal of unifying the self physically, cognitively, spiritually, and emotionally (Conboy et al., 2013). The popularity of yoga has significantly grown throughout the United States, with the practice increasing from 9.5% to 14.3% among adults between 2012 and 2017 (Clarke et al., 2018). American teenagers are not immune to this growing phenomenon: the 2017 National Health Interview Survey revealed that approximately 4.9 million U.S. youth reported practicing yoga (James-Palmer et

al., 2020), an increase of 5.3% since 2012. Perhaps some of the greatest contributing factors to the holistic tradition gaining such popularity include the number of perceived benefits involved.

A growing body of research suggests that yoga techniques may improve both mental and physical health through down-regulation of the sympathetic nervous system (SNS) and hypothalamic-pituitary-adrenal (HPA) axis (Ross & Thomas, 2010). The SNS and HPA axis are triggered as a response to physical or psychological stressors, which in a constant state can lead to dysregulation of the system. Some of the other physiological benefits that yoga may contribute include a decrease in heart rate, systolic and diastolic blood pressure, levels of salivary cortisol, blood glucose, plasma rennin levels, and 24-hour norepinephrine and epinephrine levels in urine (Ross & Thomas, 2010). Studies have also suggested that yoga reverses the negative impact of stress on the body's immune system by increasing levels of immunoglobulin A.

The impact of yoga on specific health conditions such as depression, diabetes, anxiety, and cardiovascular disease has been examined in several literature reviews (Bower et al., 2005). While studies have compared yoga to other modalities such as exercise and traditional medicine, yoga appears equal or superior to these in many outcomes among both healthy and diseased populations (Schulte, 2015). Anxiety, depression, resilience, mood, stress, and emotional affect are of special psychological interest.

Adolescents and Yoga

Yoga appears to benefit adolescents in terms of resilience, stress reduction, mood, and emotional regulation (Reddy & Ammani, 2013; Schulte, 2015; Suldo & Shaunessy-Dedrick, 2013). These may contribute to academic benefits of yoga. Miller et al. (2014) found that students who were at risk of dropping out of school reported that after 20 sessions of mindful yoga curriculum, they felt better equipped to manage stress. The relaxing effect of yoga can

transfer to all parts of the day, and yoga breathing techniques and stretches can help improve students' ability to relax, change focus, and calm down (Conboy et al., 2013). Schulte (2015) found that yoga practice helped adolescents successfully control emotions and gain more confidence.

School-Based Yoga

Due to the growing popularity of yoga in western society, as well as a growing prevalence of school-based yoga programs, the impact yoga has on adolescents has recently been a specific area of focus. While it has not yet been introduced as an evidence-based intervention, it shows promise in managing stress and anxiety, promoting resilience, and improving academics (Sarkissian et al., 2018).

Khalsa and Butzer (2016) performed a systematic review of 47 studies of school-based yoga programs. Studies from elementary schools (n = 18), middle schools (n = 13) and high schools (n = 13) were included, with some studies including a combination of grades (n = 9). While the authors found that school-based yoga programs are still in their infancy, and there are multiple variances between studies (i.e., studies implemented between 5 and 100 sessions, duration of sessions ranged from 4 to 180 minutes, intervention duration ranged from 1 to 52 weeks) the results are promising regarding mental health, physical health, and positive behavior. The authors addressed the need for further research due to study limitations, though several benefits of school-based yoga have been identified.

Benefits of School-Based Yoga

The literature suggests that yoga appears to be a "mental and emotional tool" (Conboy et al., 2013) that can be used for mood improvement, stress reduction, and emotion regulation. Wang and Hagins (2016) found in a qualitative study that high school students who regularly

practiced yoga reported better anger control, improved relationships, open-mindedness, and the ability to gain better control of emotional reactions. Yoga may contribute to building a lifestyle of habit among adolescents that help them cope with everyday stressors. For example, some studies have shown that yoga has a positive impact on adolescent sleep quantity and quality as some students reported using breathing techniques and postures to help them fall asleep (Conboy et al., 2013). Yoga can also have an impact on diet, which could potentially result in healthy eating habits (Ross & Thomas, 2010).

Khalsa et al. (2012) conducted a study examining the benefits of a school-based yoga intervention and found that high school students enrolled in the intervention group showed a slight increase in resilience, while the comparison group showed a significant decrease. Another study conducted by Sarkissian et al. (2018) specifically targeted the relationship between a high school-based yoga program and resilience. Lead researchers worked with the non-profit organization YOGA (Your Own Greatness Affirmed) to implement school-based yoga programs at three public schools in low-income communities in Southern California. They used the Resilience Scale (RS) which has strong internal reliability (Cronbach's alpha of 0.92) and has been used among adolescent populations. The intervention lasted 10 weeks and included both males and females. The findings showed a significant increase in resilience from pretest to posttest with a medium effect size (Cohen's $d = 0.53$).

Kauts and Sharma (2009) examined the impact of yoga on academic performance in relation to stress. They assigned 301 ninth graders to an experimental group (yoga) or a control group and were each classified as either 'high stress' or 'low stress' (based on their academic achievement stress scores). They found that low stress students had significantly higher academic performance gain scores than high stress students, indicating that high levels of stress

may negatively affect academic performance. Moreover, they found that students in the experimental group who participated in daily yoga lessons for seven weeks performed significantly better in overall academics than the control group, as well as in individual subjects such as math, English, science, and social studies. Their results suggest that yoga may improve academic performance by optimizing stress management.

Butzer et al. (2015) examined the effects of a 12-week school-based yoga intervention on changes in GPA among 9th and 10th grade students. High school students who had registered for a PE class (n=95) participated. The PE class sections were group randomized to either a yoga intervention or PE-as-usual control group. The student's quarterly GPAs were collected at the end of the year via school records, and researchers noted a difference of pattern between experimental and control groups over four quarters of the year. While there was a decreasing trend in both groups regarding GPA, the mean GPA in the experimental group did not change from second to third quarter. This contrasted with the control group which continued a downward trend, suggesting that school-based yoga may have a preventative effect on GPA decline. While the literature thus far is optimistic about school-based yoga positively affecting GPA, there is a growing need of further research about the relationship between academic success and school-based yoga.

CHAPTER 3

Method

Setting

A High School in a suburban area of Utah County served as the site for this evaluation. The total population of the school in January 2021 was approximately 2,337 consisting of 49.13% male and 50.87% female. This included students who identify as Caucasian (87.60%), Hispanic (6.71%), African American (2.05%), Pacific Islander (1.67%), Asian (1.62%), and Native American (.34%).

Participants

Student Participants

Students consisted of those enrolled in two yoga classes as well as two comparison classrooms taught and chosen by the yoga teachers (see Table 1). Most students were in 12th grade (39%) and 11th grade (38%) due to high demand for the yoga and comparison dance classes, with some 10th graders (23%) who were mostly enrolled in the comparison health class. Female participants, (71%) made up the majority of the group, with all ages ranging between 15 and 18. Class modality was in-person, though due to COVID-19, students sometimes participated via Canvas.

Teacher Participants

Two Caucasian female teachers, who also serve as yoga instructors at the school, agreed to participate in this study. One of the teachers was 26 years old and had 3 years of teaching experience when the study began. She received a bachelor's degree in school health education with a minor in community health education. She had taught yoga for one semester in the high school setting before the study began. The other teacher was 25 at the beginning of the study and

received a bachelor's degree in dance education. Before the study she had 2 years' experience as a yoga instructor at the high school, 3 overall years teaching in the public school system, and 8 years of experience teaching professional dance. Neither teacher was a certified yoga instructor at the time of the study. The teachers were not directly included in quantitative data collection but were asked to participate in a focus group meeting at the middle and end of the study.

Table 1

Student Gender and Grade Level by Class

	Teacher 1 Yoga		Teacher 1 Comp.		Teacher 2 Yoga		Teacher 1 Comp.	
	n	%	*n*	%	*n*	%	*n*	%
Female	23	72%	16	59%	23	79%	8	80%
Male	9	28%	11	41%	6	21%	2	20%
Grade								
10th	3	9%	13	48%	5	17%	2	20%
11th	12	38%	13	48%	9	31%	3	30%
12th	17	53%	1	4%	15	52%	5	50%
Total	32		27		29		10	

Note. Comp. = Comparison

Fidelity Observations and Field Notes

Researchers attended and annotated observations in yoga and comparison classrooms once per week over 16 weeks using a structured form (see Appendix A). These fidelity observations/field notes consisted of yoga practices or academic lessons delivered during the class periods, quantity of minutes spent on instruction, happenings of the class, class attendance, interactions between students and/or the teacher, and participation rates. The start and end times were also recorded as part of the field notes.

Dependent Measures

The Perceived Stress Scale 4 (PSS-4; Cohen, 1983) was used to measure stress and is a shortened version of the original PSS. It contains 10 items on a 5-point Likert scale. For each

item, participants are asked to indicate how many times they have felt a given way over the last month. One example item is “In the last month, how often have you been upset because of something that happened unexpectedly?” Items are rated on a five-point Likert scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often). The PSS has demonstrated good psychometric properties in both the long and short versions. The shortened version has an internal consistency between .80 and .86 and has been used in studies measuring stress in adolescents (Nordin & Nordin, 2013). The items are easy to understand, and response options are simple to grasp.

The Social-Emotional Assets and Resilience Scale, Adolescent, Short Form (SEARS-A-SF; Merrell, 2011) was used to assess students’ resilience and is designed for grades 7 – 12. It is a 12-item assessment on a 4-point Likert scale (never, sometimes, often, and always). An example item is “I make friends easily” and the participant is asked to rate the statement according to the Likert scale. The SEARS-A short form that has a .94 correlation with the long-form, which has been nationally normed, and has been used in studies with adolescents (Caldarella et al., 2019).

Social Validity

After the completion of surveys, yoga students were asked to fill out a social validity survey regarding their thoughts concerning the program. The survey included 4 Likert-scale items (1 = never, 2 = sometimes, 3 = often, 4 = always) and three open-ended questions:

1. I looked forward to the yoga class.
2. I felt less stressed after yoga class.
3. I felt more resilient after yoga class.
4. I plan to use yoga in the future.

5. List below anything that you particularly liked about the yoga class:
6. List below anything that you disliked or would change about the yoga class:
7. List below anything else you would like to tell us about the yoga class:

All measures were collected and interpreted using Qualtrics and SPSS respectively. Yoga teachers participated in 30-minute Zoom meetings at the midpoint and end of the study to obtain their perceptions of the yoga program answering general program questions as listed below.

Mid-program Zoom meeting:

1. How's the semester going so far?
2. Are you comfortable with the classroom observations we are conducting?
3. Is there anything we should be doing differently?
4. Are there outside factors causing low attendance and/or stress for students? (e.g., COVID)
5. Have there been any issues with the yoga classes so far? If so, what have these been?
6. Have you noticed any changes in students so far? If so, what have these been?
7. Is there anything else you would like to tell us about the yoga classes?

Post-program Zoom meeting:

1. How did the semester go overall?
2. Was this semester similar or different to your other semesters? Why? (e.g., COVID)
3. Do you believe yoga has benefitted your students this semester? In what ways?
4. Have you received any feedback from students this semester regarding the yoga classes, verbal or otherwise? If so, what have they expressed to you?
5. Did you notice any differences in your students between the beginning and end of the semester? If so, what have you noticed?

6. Is there anything you would change about the yoga classes in the future? If so, what would you change?
7. Is there anything else you would like to tell us about the yoga classes?

Independent Variable

The independent variable in the current study was the implementation of a school yoga program already in place as part of regular instruction in the school. The class was one semester, and two separate yoga classes (with different instructors) were evaluated. The types of yoga practice, as well as the time spent on various poses/meditation/breathing techniques was determined by each instructor. The school's yoga classes typically last 50 minutes in duration. The yoga class was offered for .5 credit and lasted for half the school year.

The comparison classes consisted of one health class and one dance class as taught and chosen by the yoga instructors. The health class involved the general learning of health and nutrition, exercise, weight management, mental health issues and safety. The dance class involved the instruction of movement, spatial patterns, musicality, and choreographic awareness. Each comparison class was offered for .5 credits and lasted for half the school year.

Procedures

Prior to beginning the study, Institutional Review Board (IRB) approval was obtained from Brigham Young University (see Appendix B) and written approval was obtained from the school district. Teacher and Parent Consent forms were collected, as well as Student Assent Forms. Pre-program measures (PSS and SEARS-A-SF) were completed during the first week of class and post-testing was completed approximately 16 weeks later. These measures were completed outside of regular classroom time, which minimized risks such as students knowing who chose to participate and who did not. Students who chose not to participate in the study did

not complete the assessments and participated in the class as normal. Each class was on an adjusted schedule due to COVID-19 and yoga practice was therefore twice a week, every Monday, and every Thursday for approximately 50 minutes. Every Thursday a BYU researcher physically attended the classrooms for observation. Researchers were not involved with direct intervention and were observers only. These observers remained toward the back of the class to minimize disruption.

Mid-semester there was a meeting between researchers and instructors about how the program was progressing. Updates about students who dropped the class or happenings with the data were addressed. At the end of the study, social validity surveys were completed by students in the yoga classes and $10.00 Amazon gift cards were distributed to all participants. Student attendance records and GPAs were collected from the school at post-test. The findings of the study will be shared with the yoga instructors at the school, and aggregated data will be shared with the school principal to aid their evaluation of the effects of their yoga program on students' stress, resilience, GPA, and attendance.

Design and Data Analysis

A mixed-method evaluation design was used. The inherit assumption of mixed methods research is that combining qualitative findings with quantitative results leads to insights that might be missed with either method alone (American Psychological Association, 2020). Quantitative data, by way of the Likert scale PSS-4 and SEARS-A-SF ratings, were collected along with qualitative data in the form of open-ended survey items, field notes, and teacher interview notes. Quantitative data were analyzed and compared at pre-test to determine whether the groups were similar. Classrooms were matched on the variables of age and grade level. Data was compared from pretests with posttests, using split-plot ANOVA, to examine differences

among students at both measurement points. Data was examined to determine whether it meets the assumptions of matched data pairs, no significant outliers, and normal distribution. Social validity (Likert-type) responses were summarized using descriptive statistics and qualitative responses (open-ended social validity questions, field notes, and teacher meeting notes), then were examined using interpretational analysis to look for common patterns, constructs, and themes. The purpose of such analyses was to provide insight into the participants' impressions of the school yoga program.

CHAPTER 4

Results

Treatment Fidelity

The first research question of this study examined whether teachers could implement a high school yoga program with integrity, as measured by fidelity checklists (see Appendix A). Each class was held twice a week, which came to a total of 128 individuals classes held over the duration of 16 weeks (including both yoga and comparison classes). Of these 128 classes, 48 were observed by a BYU researcher (38%). There were no incidents of yoga being practiced in a comparison class. Of the two yoga classes, Teacher 2 implemented yoga practice in 92.86% of observed sessions, while Teacher 1 implemented yoga practice in 66.67%. In the non-yoga sessions, this teacher typically involved HIIT workouts (high intensity interval training) and cardio trainings. Comparison classes and yoga classes were 60 minutes each, including time for students to change clothing. Yoga practice averaged approximately 41 minutes.

Effect on Stress

The second research question examined the effect that participation in a high school yoga class had on students' self-reported stress levels. Table 2 contains descriptive data on stress measures across time (pretest and post-test) as well as across groups (comparison groups and treatment groups). Comparison via split plot ANOVA indicated no significant interaction between groups and time regarding the PSS measure of stress ($p < .086$) All groups showed a statistically significant decrease of self-reported stress levels from pretest to posttest ($p < .001$), suggesting that student levels of stress consistently decreased over time throughout the duration of the study. Figure 1 provides visual representation of differences among grouped yoga/comparison classes compared to all four classes individually (see Appendix C).

Table 2

Pretest and Posttest Means With Group x Time Interactions

	Yoga 1		Comp. 1		Yoga 2		Comp. 2		Group x Time	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
PSS										
Pretest	33.97	5.96	31.74	4.60	30.17	5.33	31.90	4.77	3.00	.086
Posttest	29.88	6.11	30.00	4.74	27.48	5.89	30.30	5.69		
SEARS-A										
Pretest	32.91	4.79	33.29	4.38	34.52	5.82	34.50	3.60	0.08	.972
Posttest	34.72	4.39	35.41	4.93	36.10	4.60	36.10	3.48		
GPA										
Pretest	3.41	0.91	3.33	0.64	3.55	0.61	3.25	0.86	1.32	.227
Posttest	3.11	1.09	3.45	0.67	3.52	0.76	3.32	0.76		
Absences										
Pretest	6.45	3.96	5.89	4.46	5.56	3.23	9.30	5.58	0.16	.925
Posttest	3.76	3.82	5.70	3.40	5.81	3.32	8.90	6.57		

Note. Comp. = Comparison; Group x Time = group by time interaction; PSS = Perceived Stress Scale; SEARS-A = Social-Emotional Assets and Resilience Scale, Adolescent, Short Form; GPA = Overall Grade Point Average; Absences = Average of total absences per semester.

Effect on Resilience

The next research question explored how participation in a high school yoga program affects students' self-reported levels of resilience. Table 2 contains descriptive data on resilience measures across both groups (comparison groups and treatment groups) and time (pretest and post-test). Analysis indicates that there was no significant difference between groups based on student report ($p = .972$), and split plot ANOVA analysis showed improvement in levels of resilience between pretest and post-test among all groups ($p < .001$).

Effect on Academic Outcomes

The fourth research question in this study addressed the effect that participation in a high school yoga program had on students' academic outcomes. These data were collected from the

school at the end of the school year. Table 2 contains descriptive data on grade point average (GPA) across groups, which include comparison groups and treatment groups, and across time which includes pretest and post-test. Split-plot ANOVA comparison indicated no significant difference in the interaction between group and time (p = .227), no significant differences between groups (p = .657), and no significant difference across time (p = .394).

Table 2 also contains descriptive data on attendance records before the yoga program and after, as well as across groups. Absences represent the number of times each student was absent from school, not absences from the intervention/comparison classes alone. Similar to GPA, there were no statistically significant differences found in the interaction across groups and time (p = .925) nor across time (p = .988). Teacher 2's comparison dance class had more absences overall than the other classes, which approached significance (p = .051). This difference was unanticipated and there was not a significant difference between pre- and post-absences in this class, similar to the other classes.

Social Validity

The final research question of this study focused on whether teachers and participants considered the high school yoga program to be socially valid. During post-assessments, students in yoga classes completed a social validity questionnaire which related to procedures and outcomes of the program. Table 3 reflects the responses of students in yoga classes.

While treatment fidelity differed between the two yoga classes, the program outcome questionnaires had similar percentages. Most participants reported that they often or always felt less stressed after yoga class and planned to use yoga in the future. Almost all the students reported that they looked forward to class and felt more resilient at least some of the time.

Table 3

Yoga Class Social Validity Questionnaire – Student Responses

Items	Never	Sometimes	Often	Always
Teacher 1				
Program Outcomes				
I looked forward to the yoga class	0%	29%	51%	20%
I felt less stressed after yoga class	11%	23%	40%	26%
I felt more resilient after yoga class	6%	31%	52%	11%
I plan to use yoga in the future	11%	26%	20%	43%
Total Average	7%	27%	41%	25%
Teacher 2				
Program Outcomes				
I looked forward to the yoga class	0%	26%	32%	42%
I felt less stressed after yoga class	7%	19%	45%	29%
I felt more resilient after yoga class	0%	19%	52%	29%
I plan to use yoga in the future	6%	29%	29%	36%
Total Average	3%	23%	40%	34%

There were three open-ended questions included in the social validity survey which invited students to report what they liked about the class, anything they disliked, and anything they wanted to share otherwise. Overall comments were positive and suggested finding the yoga program to be worthwhile. A recurring theme was that students enjoyed the break from other classes and the opportunity to practice yoga. Maybe students reported feeling like yoga was their "stress reliever." There were also many comments about enjoying the atmosphere. One student reported that her athletic performance (as part of the school's soccer team) was better on days that she had yoga class, and another student reported using meditation techniques learned in yoga class during other daily activities. When asked what they liked about yoga, words used most

frequently included “calming,” “relaxed,” “stress relieving,” and “break” (see Appendix D for visual word-cloud representation). Many students commented that they recommend other students take the class.

When asked about things they disliked about yoga, most students either commented “nothing” or mentioned something about class implementation instead of yoga practice. For example, a few students in Teacher 1’s yoga class commented that they did not like the video lessons and much preferred when the teacher led the yoga practice. Others commented that they didn’t like non-yoga days, or the HIIT workouts or other routines for class. There were a few students who commented on yoga practice itself: one did not like “mindful Mondays” where they focused more on meditation on that day of the week. Another did not like how long each of the stretches was held. There were no comments from 59% of students in yoga class (n = 61) on the “what did you dislike” question or they wrote “nothing.”

Both teachers were interviewed post-intervention, and both reported the yoga class had overall gone well. They said the semester had differed from others as the COVID-19 pandemic created fewer days of in-person instruction, but also reported that in-person attendance remained relatively high. Teacher 1 had students fill out an “exit quiz” upon leaving each day, which mostly focused on students’ overall well-being. She eagerly shared that the overall comments were positive, saying that yoga gave them more energy, helped them cope, or they felt happier in general after yoga class. While the same teacher sometimes incorporated HIIT workouts or dance routines instead of yoga, she reported that students (a) participated more on yoga-only days and (b) had more positive feedback on the exit quiz on those days. Both teachers commented that there was a definite difference among students pre and post yoga intervention; topics specifically included their confidence was higher, they were more skilled in actual yoga practice and poses,

coping strategies were more refined, they were more comfortable practicing yoga with their classmates, and meditation time was more productive.

When asked if there was anything they would change about the class, Teacher 1 mentioned that she would become certified as a yoga instructor for future classes. They both hoped the schedule would return to how it was pre-COVID 19 as the class had fewer days of instruction this semester. Both teachers said they themselves benefitted from yoga instruction and thoroughly enjoyed seeing their students learn to use and implement yoga. They each indicated that if given the choice, they would continue teaching yoga in future semesters. Both teachers considered the yoga program to be worthwhile and hoped that students would continue having it as a class option. Teacher 2 considered it the “best class a student can take for their personal well-being.”

CHAPTER 5

Discussion

The goals of this study were to evaluate the effects a high school yoga program had on students regarding their stress levels, resilience, and academic outcomes. Measures were conducted pre- and post-intervention to specifically assess self-reported stress and resilience levels and academic information was gathered from high school administrators. Additionally, the study evaluated the program for fidelity in teaching yoga and both students and teachers completed social validity surveys to gather perceptions on the social validity of the yoga program.

The first research question asked if high school teachers can implement a yoga program with fidelity. While one teacher implemented yoga curriculum with integrity, the other showed lower treatment fidelity. There is currently little information in the literature on fidelity of school-based yoga implementation in high school (Caldarella & Lulla, 2022). Future research of yoga in high school would benefit from the inclusion of fidelity measures. During post-program interviews, this teacher mentioned loosely following yoga curriculum she had obtained online, and she also sometimes showed YouTube yoga videos instead of teaching a live class. Students in this teacher's yoga class commented that they preferred days when the teacher taught the yoga classes live, rather than watching a video. Future research might examine differences between live and online yoga curriculum implemented in school settings. There is a possibility that the alternative activities this teacher incorporated had a beneficial component; a growing body of literature suggests that high-intensity interval training (HIIT) improves physical and psychological health (Eather et al., 2019). This might explain the larger decrease in stress levels among both yoga classes.

The second research question asked if the implementation of a high school yoga program affected stress levels of participating students. The results showed no significant differences between groups across time. There was a clear decrease of stress levels among all participating students. Literature shows a larger decrease of stress among students in yoga classes (Schulte, 2015), and a larger sample size might show statistical significance as this study shows a *p* value of .086. Future studies should try to include larger sample sizes, though such studies are difficult to conduct. This could largely be explained by the infancy of school-based yoga programs throughout the United States (Wang & Hagins, 2016), making large school-based yoga programs difficult to find, evaluate, and implement. Another explanation could involve treatment fidelity, as one yoga instructor taught strictly yoga practice while the other incorporated workouts such as HIIT. Given these limitations, the almost-significant difference is promising.

The third research question evaluated the effect a high school yoga program had on participating students' resilience. Both yoga and comparison groups showed improvements in resilience levels between pre- and post-measures. However, there was no significant difference between comparison and treatment groups. This is not consistent with the literature as resilience levels have increased post-intervention in other studies of school-based yoga programs in comparison to control groups (Khalsa et al., 2012; Noggle et al., 2012). One of these discrepancies may be linked to how resilience was measured. For this study, the SEARS-A short form was used, which has been nationally normed and used in studies with adolescents (Caldarella et al., 2019), but has never been used in yoga outcome studies. Other researchers have used the Resilience Scale (RS) which has also been used among adolescent populations and has strong internal reliability (Sarkissian et al., 2018).

The fourth research question examined the effects of a high school yoga program on academic outcomes. Similar with the item for resilience, the findings for students' GPA were not consistent with the literature as there were no differences between comparison and treatment groups. Kautz and Sharma (2009) found that lower stress was indicative of better academic outcomes. Butzer et al. (2015) noted a difference between experimental and control groups, with yoga interventions keeping a consistent GPA while the control group continually decreased, which suggested yoga having a potential preventative effect in GPA decline. There is currently little literature on the specific academic outcome of attendance, and the results of this study showed no positive impact of yoga on student attendance. Future studies might also focus on the specific academic outcome of attendance in relation to yoga interventions versus comparison classes, given that there is little research on this topic.

The final research question focused on whether students and teachers found the yoga program to be socially valid. Both teachers and students found the program to be worthwhile and enjoyable, like past studies (Butzer et al., 2015; Caldarella & Lulla, 2022). Self-reported measures on the socially validity survey indicated that they felt less stressed, more resilient, and overall, better after yoga practice, but the quantitative results were not as strong. Doing focus groups or individual interviews with students might prove beneficial in adding qualitative data on social validity.

Limitations and Areas for Future Research

While we aimed to account for various factors, this study had several limitations. Comparison classes were included to evaluate differences between yoga and others, but the sample size was quite small. As there were only two yoga classes offered in the semester, options to increase the sample size were limited. Future studies might consider increasing sample size by

evaluating multiple schools, ensuring more sections offered, or ensuring open enrollment by offering yoga classes during flextime at school.

The HIIT workouts in Teacher 1's yoga class were unprecedented, and treatment fidelity was therefore not as strong as we had hoped. This is a limitation of a program evaluation versus a program implementation; future studies might implement their own yoga practices with certified instructors, which would follow suit with many current studies. A strength of a program evaluation is the ability to see what local schools are currently doing and it was insightful to learn about ways yoga curriculum was implemented. Schools might benefit from stricter curriculum plans in teaching yoga. They also might consider aiding their yoga teachers in becoming certified. Future research might evaluate programs where teachers are already certified or conduct a pre-program training on fidelity in yoga practice.

Some of the yoga sessions were taught via video instruction rather than in-person instruction provided by the teacher. This was a limitation because teaching styles from online teachers vary from styles of the teacher, which can be difficult to account for. As this school year 2020-2021 was during the peak of the COVID-19 pandemic, online and alternative instruction practices were difficult to avoid. Future studies might focus on outcome differences between in-person yoga instruction and online programs.

The comparison classes were each taught by one of the yoga teachers. These classes were chosen in attempt to reduce differences in teaching styles; however, teachers may have had a motivation to report that the yoga class was beneficial to their students. For this reason, having the same teachers for both yoga and comparison classes would be considered a limitation. Using student surveys to track changes across time, as done in this program evaluation, may have

helped mitigate this limitation. This can also be addressed by increasing treatment fidelity, as teaching styles shouldn't have as large an impact if yoga is being practiced with fidelity.

The measures used in this evaluation (PSS-4 and SEARS-A-SF) have been used previously with adolescent populations, but there's a possibility that the difference between these measures and those used in similar studies had an impact on student outcomes. Future researchers might use the same measures as previous studies, seek out other options to measure stress and resilience, or use measures of this study while accounting for other limitations mentioned.

There is little literature regarding the separation of the mindfulness components and the physical activity components of yoga in relation to school-based yoga programs. This separation was not addressed in this study, and future research might evaluate school programs that focus specifically on one or the other. This may prove beneficial in learning whether one component more powerfully effects stress levels, resilience, and academics, or if it is a combination that makes school yoga programs beneficial.

Conclusions

There is growing evidence that school yoga programs are positively affecting student outcomes throughout the nation. While this evaluation of a high school yoga program did not have the outcomes we hypothesized, it served as a fabulous learning opportunity. This was the first time the Counseling Psychology and Special Education Department at BYU evaluated a local school yoga program and there were many good takeaways. We were able to see how a local high school is implementing yoga practice and found that treatment fidelity is not as strong as it could be. We found that there's a possibility that incorporating workouts such as HIIT into a yoga class may have beneficial components. While treatment fidelity is key to understanding

whether the program effected student outcomes, we also found that despite limitations, the reported stress levels may have yielded statistically significant results with a larger sample size. This is promising. The effects of the yoga program on resilience and academic outcomes did not align with current literature, which could be due to several limitations including sample size, fidelity, and the measures used. Future research should focus on larger sample sizes, certified yoga teachers, in-person yoga instruction, treatment fidelity, and random assignment. We encourage continued evaluation of school-based yoga programs, given the promising results found in the literature and in the present study.

REFERENCES

American Psychological Association. (October, 2018). *Stress in America: Generation Z* [Press release]. https://www.apa.org/news/press/releases/stress/2018/stress-gen-z.pdf

American Psychological Association. (2020). Journal article reporting standards. In *Publication manual of the American Psychological Association* (7th ed., pp. 105-108).

Anxiety and Depression Association of America. (2020). *Facts & statistics.* https://adaa.org/understanding-anxiety/facts-statistics

Bower, J. E., Woolery, A., Sternlieb, B., & Garet, D. (2005). Yoga for cancer patients and survivors. *Cancer Control, 12*(3), 165-171. https://doi.org/10.1177/107327480501200304

Butzer, B., Ebert, M., Telles, S., & Khalsa, S. (2015). School-based yoga programs in the United States: A survey. *Adv Mind Body Med.,* 29(4), 18-26. https://pubmed.ncbi.nlm.nih.gov/26535474/

Butzer, B., van Over, M., Noggle Taylor, J. J., & Khalsa, S. B. S. (2015). Yoga may mitigate decreases in high school grades. *Evidence-Based Complementary and Alternative Medicine*, Article 259814. https://doi.org/10.1155/2015/259814

Caldarella, P. & Lulla, S. R. (2022). Reported benefits of yoga in high schools: A review of the literature. *Education, 142*(3), 1-15. https://www.researchgate.net/publication/359175910_Reported_Benefits_of_Yoga_in_High_Schools_A_Review_of_the_Literature

Caldarella, P., Millet, A., Heath, M., Warren, J., & Williams, L. (2019). *School counselors use of social emotional learning in high school: A study of the Strong Teens curriculum, 17*(19). https://files.eric.ed.gov/fulltext/EJ1219658.pdf

Cicognani, E. (2011). Coping strategies with minor stressors in adolescence: Relationships with social support, self-efficacy, and psychological well-being. *Journal of Applied Social Psychology, 41*(3), 559-578. https://doi.org/10.1111/j.1559-1816.2011.00726.x

Clarke, T., Barnes, P., Black, L., Stussman, B., & Nahin, R. (2018). *Use of yoga, meditation, and chiropractors among U.S. adults aged 18 and over*. Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/products/databriefs/db325.htm?mod=article_inline

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396.

Conboy, L. A., Noggle, J. J., Frey, J. L., Kudesia, R. S., & Khalsa, S. B. S. (2013). Qualitative evaluation of a high school yoga program: Feasibility and perceived benefits. *Explore, 9*(3), 171-180. https://doi.org/10.1016/j.explore.2013.02.001

Crosnoe, R., & Elder, G. (2004). Family dynamics, supportive relationships, and educational resilience during adolescence. *Journal of Family Issues, 25*(5), 571-602. https://doi.org/10.1177/0192513X03258307

Eather, N., Riley, N., Miller, A., Smith, V., Poole, A., Vincze, L., Morgan, P. J., & Lubans, D. R. (2019). Efficacy and feasibility of HIIT training for university students: The UNI-HIIT RCT. *Journal of Science and Medicine in Sport*, *22*(5), 596–601. https://doi.org/10.1016/j.jsams.2018.11.016

Frank, J. L., Kohler, K., Peal, A., & Bose, B. (2017). Effectiveness of a school-based yoga program on adolescent mental health and school performance: Findings from a randomized controlled trial. *Mindfulness*, *8*(3), 544-553. https://doi.org/10.1007/s12671-016-0628-3

James-Palmer, A., Anderson, E. Z., Zucker, L., Kofman, Y., & Daneault, J. (2020). Yoga as an intervention for the reduction of symptoms of anxiety and depression in children and adolescents: A systematic review. *Frontiers in Pediatrics, 8*(78). https://doi.org/10.3389/fped.2020.00078

Kauts, A., & Sharma, N. (2009). Effect of yoga on academic performance in relation to stress. *International Journal of Yoga, 2*(1), 39-43. https://doi.org/10.4103/0973-6131.53860

Khalsa, S. B., & Butzer, B. (2016). Yoga in school settings: A research review. *Annals of the New York Academy of Sciences*, *1373*(1), 45–55. https://doi.org/10.1111/nyas.13025

Khalsa, S. B. S., Hickey-Schultz, L., Cohen, D., Steiner, N., & Cope, S. (2012). Evaluation of the mental health benefits of yoga in a secondary school: A preliminary randomized controlled trial. *The Journal of Behavioral Health Services & Research, 39*(1), 80-90. https://doi.org/10.1007/s11414-011-9249-8

Merrell, K. W. (2011). *SEARS: Social-emotional assets and resilience scales*. PAR Publishing.

Miller, S., Herman-Stahl, M., Fishbein, D., Lavery, B., Johnson, M., & Markovits, L. (2014). Use of formative research to develop a yoga curriculum for high-risk youth: Implementation considerations. *Advances in School Mental Health Promotion, 7*(3), 171-183. https://doi.org/10.1080/1754730X.2014.916496

Noggle, J. J., Steiner, N. J., Minami, T., & Khalsa, S. B. (2012). Benefits of yoga for psychosocial well-being in a us high school curriculum. *Journal of Developmental & Behavioral Pediatrics, 33*(3), 193-201. https://doi.org/10.1097/dbp.0b013e31824afdc4

Nordin, M., & Nordin, S. (2013). Psychometric evaluation and normative data of the Swedish version of the 10-item Perceived Stress Scale. *Scandinavian Journal of Psychology*, *54*(6), 502–507. https://doi.org/10.1111/sjop.12071

Ramadoss, R., & Bose, B. (2010). Transformative life skills: Pilot study of a yoga model for reduced stress and improving self-control in vulnerable youth. *International Journal of Yoga Therapy, 20*(1), 73-78. https://doi.org/10.17761/ijyt.20.1.a4214885w7101046

Reddy, T. N., & Ammani, S. (2013). Stress management: A case study of professional students on impact of meditation & yoga on stress levels. *I-manager's Journal on Educational Psychology, 6*(4), 42-47. https://files.eric.ed.gov/fulltext/EJ1101780.pdf

Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *The Journal of Alternative and Complementary Medicine, 16*(1), 3-12. https://doi.org/10.1089/acm.2009.0044

Sagone, E., De Caroli, M. E., Falanga, R., & Indiana, M. L. (2020). Resilience and perceived self-efficacy in life skills from early to late adolescence. *International Journal of Adolescence and Youth, 25*(1), 882-890. https://doi.org/10.1080/02673843.2020.1771599

Sarkissian, M., Trent, N., Huchting, K., & Khalsa, S. (2018). Effects of a Kundalini yoga program on elementary and middle school students' stress, affect, and resilience. *Journal of Developmental & Behavioral Pediatrics, 39*(3), 210-216. https://pubmed.ncbi.nlm.nih.gov/29369073

Schulte, E. C. (2015). *Yoga and adolescent psychological health, depressive symptoms, and flourishing* [Doctoral dissertation, University of Missouri–St. Louis]. Institutional Repository Library. https://irl.umsl.edu/dissertation/173/

Suldo, S. M., & Shaunessy-Dedrick, E. (2013). Changes in stress and psychological adjustment during the transition to high school among freshmen in an accelerated curriculum. *Journal of Advanced Academics, 24*(3), 195-218. https://doi.org/10.1177/1932202X13496090

Venkataramana, H. L., Poomalil, S. N., & Shobhasree, T. (2008). Effect of yoga on academic stress of high school students. *Social Science International, 24*(1), 89-97.

Wang, D., & Hagins, M. (2016). Perceived benefits of yoga among urban school students: A qualitative analysis. *Evidence-Based Complementary and Alternative Medicine, 2016,* Article 8725654. https://doi.org/10.1155/2016/8725654

Witzel, M. (2003). Hinduism and the proper work of reason. In *The Blackwell companion to Hinduism* (pp. 68-98). Blackwell Publishing.

APPENDIX A

Fidelity Checklist

Observer: _____ Date: _____

Start time: _____

10-minute intervals (i.e., 9:00-9:10)	Was yoga practiced? Y/N	Unusual happenings	In-person lesson or video?

Notes:

End time: _____

APPENDIX B

Institutional Review Board Approval

Memorandum

To: Paul Caldarella
Department: BYU - EDUC - Counseling, Psychology, & Special Education
From: Sandee Aina, MPA, HRPP Associate Director
Wayne Larsen, MAcc, IRB Administrator
Date: October 21, 2020
IRB#: IRB2020-425
Title: Effects of a high school yoga program on student-reported stress and resilience: A mixed-method evaluation

Brigham Young University's IRB has approved the research study referenced in the subject heading as exempt level, categories 1 and 2.

This study does not require an annual continuing review. Each year near the anniversary of the approval date, you will receive an email reminding you of your obligations as a researcher and to check on the status of the study. You will receive this email each year until you close the study.

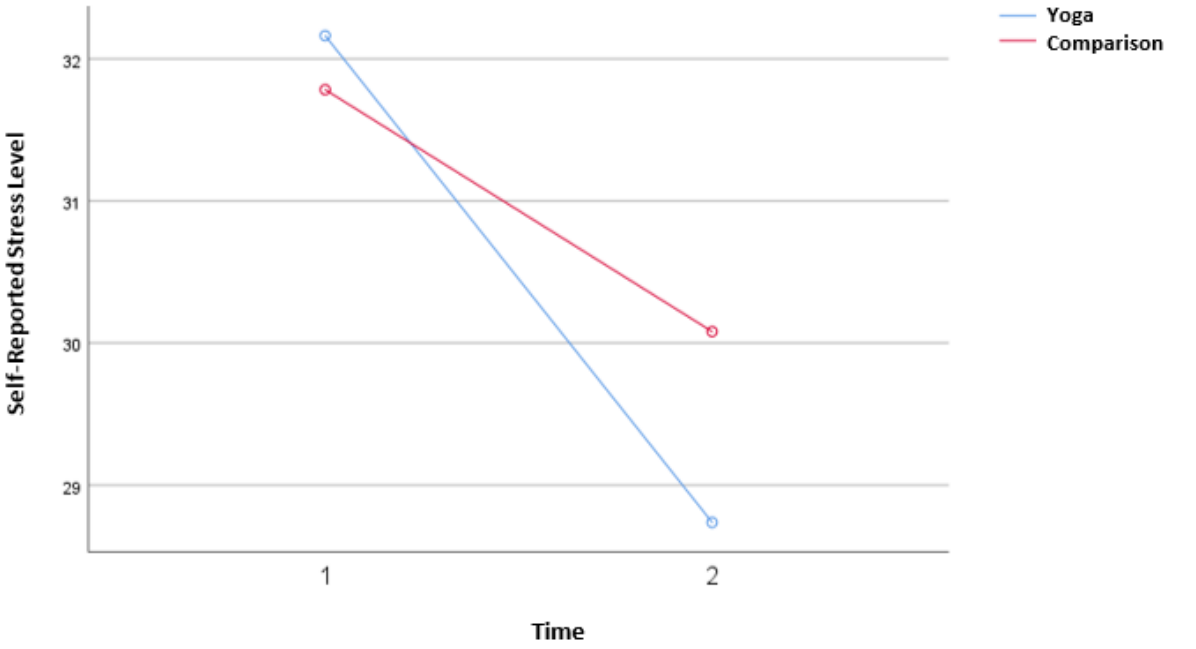
The study is approved as of 10/21/2020. Please reference your assigned IRB identification number in any correspondence with the IRB.

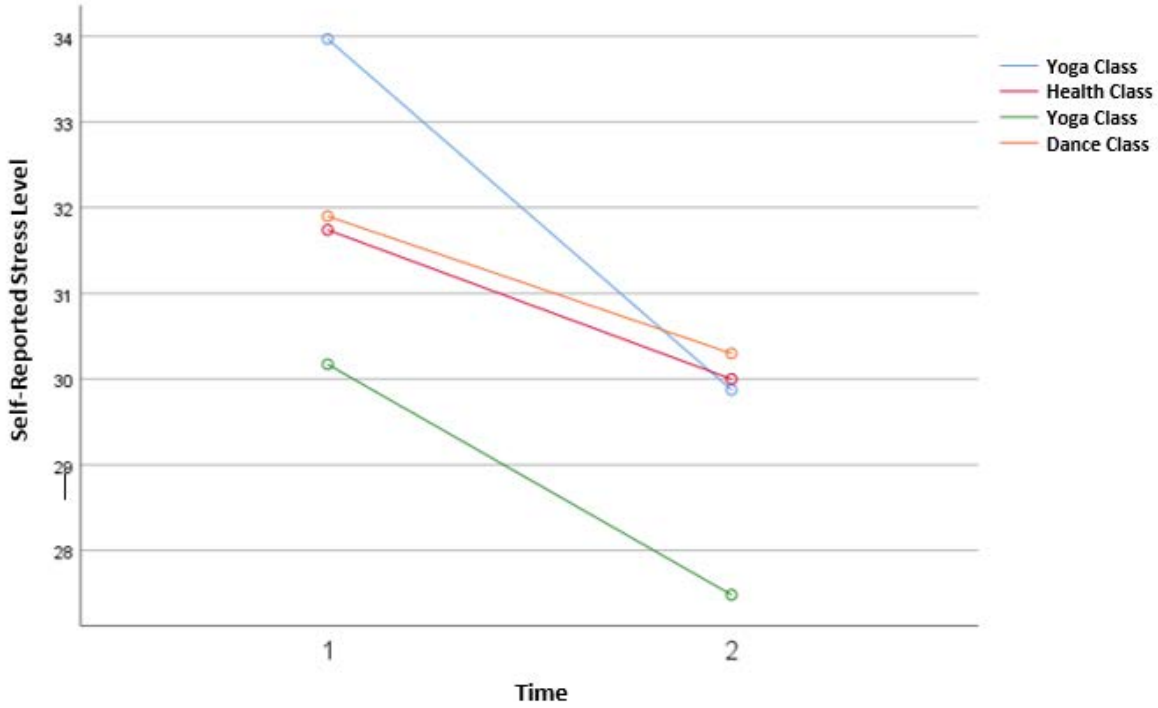
Continued approval is conditional upon your compliance with the following requirements:

1. A copy of the approved informed consent statement can be found in iRIS. No other consent statement should be used. Each research subject must be provided with a copy or a way to access the consent statement.
2. Any modifications to the approved protocol must be submitted, reviewed, and approved by the IRB before modifications are incorporated in the study.
3. All recruiting tools must be submitted and approved by the IRB prior to use.
4. Instructions to access approved documents, submit modfications, report adverse events, can be found on the IRB website, iRIS guide: https://irb.byu.edu/iris-training-resources
5. All non-serious unanticipated problems should be reported to the IRB within 2 weeks of the first awareness of the problem by the PI. Prompt reporting is important, as unanticipated problems often require some modification of study procedures, protocols, and/or informed consent processes. Such modifications require the review and approval of the IRB. Please refer to the IRB website for more information.

APPENDIX C

Results With Yoga Groups Combined (Top Panel) Versus Separated (Bottom Panel)





APPENDIX D

Word Cloud Representation of Students' Perceptions of What Students Liked About Yoga