The Relationship between Yoga and Stress

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The Relationship between Yoga and Stress

A Thesis Submitted in partial fulfillment of the requirements

For the degree of Masters in Psychology

By

Ashley Alayne Corallo

Montclair State University

2012

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THE RELATIONSHIP BETWEEN YOGA AND STRESS

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The Relationship Between Yoga and Stress

Abstract

Research has shown that too much stress can be harmful to your health (Sinha, 2007). Stress can contribute to depression, weaken the immune system, increase the risk of heart attack and stroke, and also speed up the process of aging (Aldwin, 2007). Aside from improving one’s flexibility and endurance, there is evidence that regular yoga practice (i.e., an hour session, at least twice a week) can decrease one’s risk of such health-related problems by lowering stress (Smith, Hancock, Blake-Mortimer & Eckert, 2006).

The aim of the present study was to further investigate the relationship between yoga and stress. We compared two groups—a group of individuals who practice yoga (N=61) and a group of individuals who do not (N=58)—to see if they would differ on a self-report stress survey (Perceived Stress Scale, [PSS]). A one-way analysis of covariance (ANCOVA) was used to see if the means of the groups on the PSS were statistically different. We found that those who practiced yoga had significantly lower scores on the PSS than those who did not practice yoga. Among those who practiced yoga, the amount of practice was not related to stress.
Introduction

Life is full of deadlines, hassles, adversities, demands, and frustrations. Mild stress can help us to perform at our optimal level and motivate us to succeed (DeLongis, A., Folkman, S., Lazarus, R. (1988). However, if stress becomes too intense, it can have a negative effect on the body and mind (Cohen, 1993). Stress is commonly defined as a physiological and/or mental response to a perceived threat causing one’s body to prepare to fight or flee (Selye, 1956). More precisely, according to the Merriam Webster Medical Dictionary (2011), stress is a “physical, chemical, and/or emotional [reaction]” to such a threat that “causes bodily or mental tension and may be a factor in disease causation”.

Studies have shown that cardiovascular exercise is a positive and effective way to diminish and help one cope with stress, in both its physical and mental forms (Atlantis, Chow, Kirby, & Fiatarone-Sing, 2006). In addition, there is some evidence that yoga in particular can help reduce stress, and in so doing, improve one’s overall physical and mental wellbeing (Smith et al., 2006). One way stress can negatively impact health is by causing people to engage in harmful behavior, e.g., substance abuse, poor diet, sleeping too much or too little, excessive exercise, and so on (Larzalere & Jones, 2008). People use “health impacting behaviors” in an attempt to change a negative mood into a more positive one (Larzalere & Jones, 2008). Some of these behaviors, for example, increasing exercise or sleep, can be adaptive when done in moderation, and can actually help to reduce stress, while behaviors such as substance abuse only tend to increase stress in the long term (Larzalere & Jones, 2008). Other common effects of chronic stress that are left unchecked include anxiety, depression, fatigue, and poor concentration (Lovibond, 1998). Of course, there are significant differences among people with respect to how they
respond to stress. Among the factors that have been shown to influence one’s stress response are (i) socioeconomic status, (ii) living environment (e.g., urban vs. suburban); (iii) family size and responsibilities, (iv) career, (v) genetics, and (vi) upbringing (Schnittker, 2005). Therefore, a person’s ability to cope with stress is impacted by personal choices as well as many factors that fall outside of the person’s control.

Yoga and Health Problems

Yoga is an ancient form of exercise; some scholars estimate that it is over 5000 years old (Worthington, 1982). One reason yoga has become popular in the Western world is the physical and mental benefits that are believed to accompany its practice (Dukes, 1958). Unlike many other “secrets of the East”, however, there is actually some evidence to back this belief up. For example, it has been shown that yoga can help to lower high blood pressure, increase immunity, decrease pain, and maintain a balanced metabolism (Farhi, 2000). Additionally, a study conducted by Tran, Holly, Lashbrook, and Amsterdam (2007) showed that eight weeks of regular yoga practice can significantly improve one’s physical strength, flexibility, and stamina (Tran et al., 2007).

Pertaining to mental health, individuals who practice yoga report positive results including elevated mood, decreased tension, heightened relaxation, and decreased negative affect (Woolery, Myers, Sternlieb, & Zelter, 2004). A study by Lavey et al. (2005) reported that practicing yoga positively affected the mood of psychiatric inpatients. The study examined 113 psychiatric inpatients at a hospital in New Hampshire. Participants took a survey, Profile of Mood States (POMS), before and after taking part in a yoga class. Those who participated in the yoga class showed a significant difference on all five of the negative emotion factors on the POMS, including tension-
anxiety, depression-dejection, anger-hostility, fatigue-inertia, and confusion-bewilderment (Lavey et al., 2005). Those who did not participate showed no significant change. The results of this study indicated that yoga was correlated with improved mood and may be an effective way to help manage and maintain positive mood states during hospitalization at an inpatient psychiatric facility.

Another study performed at the Yoga University in Bangalore, India, examined the effects of yoga on depression in 69 patients above the age of 60 (Krishnamurthy & Telles (2007). To be included in the study participants had to show depressive symptoms at baseline. Participants in the study were separated into three different groups: the Yoga group, the “Ayurveda” group, and a wait-listed “Control” group. The 15-item Geriatric Depression Scale, a basic screening measure for depression in older adults (D’Ath, Katona, Mullan, Evans, & Katona, 1994), was used to assess depressive symptoms prior to the intervention, and 3-months and 6-months post intervention (Krishnamurthy & Telles, 2007). The Yoga group took yoga classes each week for 24 weeks. The Ayurveda group received daily herbal supplements two times a day for the duration of the study (24 weeks). The wait list control group was untreated and used to compare to the other two groups (Krishnamurthy Telles, 2007). At the end of the 24-week period, the depressive symptom scores of the yoga group were significantly lower than the baseline scores and continued to decrease at 3-months and 6-months (Krishnamurthy & Telles, 2007). The other two groups in the study showed no change suggesting that yoga is an effective way to reduce depressive symptoms.

A study by Pilkington, Smith, Richardson, and Hoffman (2005) found that yoga was related to improvements in physical ailments associated with certain mental health
problems. In particular, the study examined the effectiveness of yoga and meditation in cases of depressed individuals with chronic lower back pain (a common symptom of depression in older adults). According to this study, yoga was found to have a significant impact on chronic low back pain and was deemed important to the management and recovery of chronic low back pain (Pilkington et al., 2005). There was also a significant reduction in depression mid and post treatment for the yoga group (Pilkington et al., 2005).

Stress

Those who suffer from high or chronic stress can encounter an array of problems that vary in severity: e.g., headaches, high blood pressure, fatigue, heart problems, diabetes, skin conditions, depression, asthma, arthritis, anxiety, and immune system problems (Frank, Khorshid, Kiffer, Moravec, & McKee, 2010). A recent article reported that high stress has adverse physical and mental health effects on individuals from every racial, ethnic, marital, and socio-economic group (Thoits, 2010). The review goes on to state, however, that groups at a socio-economic disadvantage are much more likely to suffer high stress levels, and so the associated negative health-effects, than are non-disadvantaged groups.

Most early stress research was focused on unwelcome changes people experienced in their lives such as death, marital separation, career loss, and so on. Recently, though, researchers have been spending an increasing amount of time studying stress induced by day-to-day burdens that can accumulate over time (for example, burdens related to work, finances, children, home up-keep, bill-paying, etc.). In the book titled, “Stress and
adversity over the life course”, Wheaton (1997) determined that the top stressor among individuals was trauma, which had surprisingly been overlooked in previous research. Roughly put, an individual experiences trauma when that individual is pushed to his or her psychological or physical “limit”. Some examples of trauma in this sense include: sexual abuse, physical assault, war combat, witnessing death or other violent acts, and loss of a loved one at a young age. In particular, trauma suffered at a young age can have life-long effects, hindering social, mental, and sexual development (Wheaton, 1994).

According to Thoits (2010), discriminatory experiences are highly correlated with self-rated poor health, chronic health matters, psychological distress, anxiety disorders, and high blood pressure even when other aspects of an individual’s life experiences are standard (Thoits, 2010). Even though Thoits (2010) only explains a small portion of the relationship between minority groups and health problems, discriminatory acts that occur frequently can have a severe negative impact on an individual’s wellbeing (Thoits, 2010).

Physicians have prescribed exercise to help individuals combat high levels of stress. A study conducted by Kiecolt-Glaser et al. (2010) examined the effect that exercise, specifically yoga, can have on stress and inflammation. The participants in this study were females recruited from a number of different yoga studios. Before participating in the study, the women were screened and classified into two groups: the novice group and the expert group. To be placed in either group the women were asked a series of screening questions: 1.) What type of yoga do you do? 2.) How often do you do it? And 3.) How long do you do it for? The women who were placed in the expert group had to have practiced yoga for at least two years one to two times per week, 75 minutes per session; the others (assuming they had practiced yoga a minimum of 6 times in their life)
were placed in the novice group. Participants in the study were asked to perform a specific sequence of postures, observed by an expert yoga teacher (a certified teacher with no less than 3 years of teaching experience), in order to verify that participants’ self-reports were plausible. If deemed implausible by the expert yoga teacher, the participant was eliminated from the subject pool. The study revealed that there were significant differences in inflammatory levels between novice and expert yoga groups. The experts produced less inflammation and had lower stress levels than the novice group.

We hypothesize that our study will provide further support for the idea that yoga is significantly correlated with reduced stress levels.

Yoga

Many Americans have been exhilarated by the ancient practice of yoga since it was introduced to the United States over 50 years ago (Feuerstein, 2003). One attraction of this ancient practice comes from the proposed health benefits yoga claims to induce and the overall well being the practice offers (Grossman, Neiman, Schmidt, & Walach, 2004). Yoga literally means “to yoke, or unite the mind, body, and spirit and encourages them to balance one another for a sense of well-being” (Garfinkel & Schumacher, 2000). Given the popularity and the appearance of benefits associated with yoga, it’s no wonder that researchers have begun to systematically study the health effects of yoga. A study conducted by Cowen and Adams (2004) examined the physical and perceptual benefits of yoga. The participants for the study were 20 women and 6 men that were recruited through two campus university communities. The study was open to participants who were not regular practitioners of yoga and who were free from health issues or injuries of any kind that would physically limit them. All eligible participants were randomly
assigned to two groups: an astanga yoga group and a hatha yoga group (both differ on levels of intensity, astanga being more rigorous and hatha being more calm). At baseline, the groups were equal in physical and mental health measures as well as in age and gender distribution. The measures were physical fitness pre- and post- yoga measures and perceptual pre- and post- yoga measures. The yoga classes each ran for an hour and fifteen minutes long and were performed at Arizona State University’s Department of Exercise and Wellness two times a week for 75 minutes. Assessments were made the week prior to the first class and the week following the last class (Cowen & Adams, 2004). Results of the study indicate statistically significant improvements were reported for all yoga participants in regards to diastolic blood pressure, upper body and trunk dynamic muscular strength and endurance, flexibility, perceived stress, and health perception (Cowen & Adams, 2004). The astanga group showed greater improvements in diastolic blood pressure (-9%), upper body and trunk dynamic muscular strength and endurance (+69% and +52%, respectively), and flexibility (+20%) (Cowen & Adams, 2004). These results suggest that there are many benefits associated with a regular practice of yoga and that benefits may be greater for more vigorous yoga, such as astanga. The only measure that did not change was health perception (which is defined as the perception of prior health, current health, health outlook, and resistance/susceptibility to illness (Ware, 1976)).

Not only may yoga help one to achieve strength, endurance, and flexibility, it may also help ease pain from an already existing injury (Galantino et al., 2004). In the following study, investigators looked at the possible effects yoga can have on those individuals who suffer from chronic low back pain (Galantino et al., 2004). Chronic low
The Relationship Between Yoga and Stress

back pain is described as pain in the low back that persists for more than 3 to 6 months or longer than the period expected to heal (i.e., longer than the typical, healthy adult takes to recover from a back-related injury or surgery) (Galantino et al., 2004). The idea behind using yoga for treating low back pain is to focus on voluntary control of the nervous system and muscle function by using specific postures that eventually lead to improved relaxation (Galantino et al., 2004). For purposes of this study, the principal investigator selected 22 subjects (5 male, 17 female) ages 30-65 that suffered from chronic low back pain (CLBP). Subjects were randomly put in either the yoga group or the control group. Measurements were made before and after yoga practice with the following: Oswetry Disability Index (ODI), Beck Depression Inventory (BDI), Sit and Reach Test (SR) and functional reach test (Galantino et al., 2004). The yoga group was given a journal to record daily experiences and to evaluate the experience in a semi structured format with guiding questions (e.g., "What is the best part of the experience for you?") (Galantino et al., 2004). Specifically, the results indicated important trends in the measurement scores, how often the yoga group practiced yoga and also showed a decrease in depression and an improvement in flexibility and balance for the yoga group. The data collected from the study suggests that yoga helps those sufferers of CLBP to become more flexible and strong. The results from this study showed the potential short and long term effects of yoga which may prove beneficial in the management of CLBP (Galantino et al., 2004).

Yoga and Stress

There are a number of studies that show how yoga can help such conditions as osteoarthritis and carpal tunnel syndrome (Garfinkel & Schumacher, 1998), multiple sclerosis (Oken et al., 2004), bronchial asthma (Nagarathna & Nagendra, 1985),
pulmonary tuberculosis (Visweswaraiah & Telles, 2004), irritable bowel syndrome, and mild depression (Woolery et al., 2004). High stress levels exacerbate many of these symptoms. Therefore, it is important to study stress levels to see how stress may be related to yoga.

Yoga has been studied as a method of relaxation for individuals with high levels of stress. For example, a study conducted by Michaelson and colleagues (2005) examined the potential effects of Iyengar yoga on stress (Michaelson et al., 2005). The study team recruited 24 female subjects non-randomly on a volunteer basis through a newspaper ad that offered a free three-month yoga course for women with stress. The subjects ranged from ages 26-51. The dependent measure was assessed upon entry and after participation for three months using the Cowen Perceived Stress Scale, State –Trait Anxiety Inventory, Profile of Mood States, CESD Depression Scale, Bf-S/Bf-S Well-Being Scales, Freiberg Complaint List, and ratings of physical well-being (Michaelson et al., 2005). The postures chosen for the yoga classes were in the Iyengar tradition and chosen specifically for the alleviation of stress. The requirements for the study were to attend two 90-minute yoga classes a week for three months and to practice the postures at home. For the control group, participants were asked to continue with their normal daily routine and to not begin any type of exercise for the next three months. Results of the study showed improvements in the participants in the yoga group for psychological changes and stress-related variables, i.e., self reported stress as noted on the Cowen Self-Report Stress Scale (Michaelson et al., 2005). This study represents an important step in understanding the relationship of yoga and stress; however, this study only included women. Therefore, further research is warranted that explores yoga and stress with both sexes. The
hypothesis behind the present study is that regular yoga practice will reduce stress in both sexes, relative to those who do not practice yoga.

Method

Subjects

The subjects consisted of a total of 119 individuals ranging in age from 18-49 including both males and females. The participants of the study consisted of students from Montclair State University and students at yoga studios located in Middlesex County. The participants of the study were selected at Montclair State University to be in the non-yoga group and at 2 separate yoga studios in Middlesex County for the yoga groups. The subjects in the yoga group self-reported practicing yoga at least once a week. The type and duration of yoga practice was not assessed. The non-yoga group was comprised of individuals who self-reported as not practicing any yoga. Other forms of relaxation and physical activity were not assessed in either group. The non-yoga group consisted of 58 participants and the yoga group consisted of 61 participants. Participants were not excluded based on race or gender. Participants had to be able to read the survey in English and be within the age range of 18-49. Out of all the subjects, 24 left gender blank. Therefore, the non-yoga group consisted of 16 males and 28 females who had indicated their gender. In the yoga group there were 61 total participants but only 15 males and 35 females had indicated their gender. (See Table 2). The ages of the participants were between 18-49 years old. The exact ages of the participants are unknown because the ages were checked off in the following categories: 18-25 years of age, 26-33 years of age, 34-41 years of age, and 42-49 years of age. (See Table 1.)
We selected participants to be into two groups: a yoga group and a non-yoga group in order to determine if there were differences between the two groups pertaining to perceived stress. The yoga group was comprised of individuals who self-reported as practicing yoga at least once a week. The type and duration of yoga practice was not assessed. The non-yoga group was comprised of individuals who self-reported as not practicing any yoga. Other forms of relaxation and physical activity were not assessed in either group. The non-yoga group consisted of 58 participants and the yoga group consisted of 61 participants. Participants were not excluded based on race or gender. Participants had to be able to read the survey in English and be within the age range of 18-49.

**Measures**

The Perceived Stress Scale was used to measure the participant’s reported stress levels. The Perceived Stress Scale (PSS), is a 10-question survey of perception of personal stress levels (Cohen, S., Kamarck, T., and Merrelstein, R. (1983); See appendix for survey). The scoring for the Perceived Stress Scale has a range of 0-4, (0=Never, 1=Almost Never, 2=Sometimes, 3=Fairly Often, and 4=Very Often). (Cohen, 1983).

Based on a series of general stress related questions, a PSS score was calculated for each individual. The PSS scores are calculated by reversing the responses (e.g., 0=4. 1=3. 2=2, 3=1, and 4=0) to the four questions that are stated in a positive nature (items 4, 5, 7, and 8) (Cohen, 1983). The scores are then added up across the scale to determine stress levels of the participant. The scores on the PSS can range between 0-40, with 40 representing high stress. The PSS does not have cutoffs because it was not intended as a diagnostic tool.
Design

The study used a between subjects design subjects assigned to either the control group (non-yoga group) or the experimental group (yoga group). The independent variable was yoga while the dependent variable was stress. The research question was whether there is a significant difference between the responses of the yoga group and that of the non-yoga group.

Procedure

This study was conducted at two yoga studios in Northern New Jersey and on campus at Montclair State University. Tables were set up at both locations and passers by were asked if they wanted to complete a brief survey on stress. For the non-yoga group, participants were recruited from Montclair State University in the following manner: the principal investigator, Ashley Corallo, set up a table in Dickson Hall and said the following to passers by. “Hello, My name is Ashley Corallo and I am a graduate student here at MSU. Would you be willing to participate in a short survey on stress?” If passers by said “no”, the principal investigator replied with, “Thank you, have a nice day.” The principal investigator did not say anything more to anyone who said “no”. Those who agreed to participate in the survey were asked whether or not they practiced yoga. If they did, their survey was collected but then discarded.

For those in the yoga group, participants were recruited at two specific yoga studios in Middlesex County, New Jersey. The owners of both of these yoga studios gave written approval for this study to be conducted in their studios and these letters were submitted and approved by the MSU IRB. The principal investigator set up a table at the yoga studio and asked yoga students after class if they would complete a survey on stress.
in the same manner for screening, obtaining informed consent, and completing the surveys as for the non-yoga group, as described above.

After completing the informed consent, participants completed the Perceived Stress Scale (PSS), a 10-question survey of their perception of their personal stress levels (Cohen, S., Kamarck, T., and Mermelstein, R. (1983); See appendix for survey). The scoring for the Perceived Stress Scale has a range of 0-4, (0=Never, 1=Almost Never, 2=Sometimes, 3=Fairly Often, and 4=Very Often). (Cohen, 1983). Based on a series of general stress related questions, a PSS score was calculated for each individual. The PSS scores are calculated by reversing the responses (e.g., 0=4, 1=3, 2=2, 3=1, and 4=0) to the four questions that are stated in a positive nature (items 4, 5, 7, and 8) (Cohen, 1983). The scores are then added up across the scale to determine stress levels of the participant. The scores on the PSS can range between 0-40, with 40 representing high stress. The PSS does not have cutoffs because it was not intended as a diagnostic tool. For both groups, Ms. Corallo asked individuals who indicated that they were interested in doing the survey the following questions: 1) Are you 18-years-old or older? and 2) Do you practice yoga? To be enrolled in the yoga group participants must have answer “yes” to both screening questions and disclosed on the survey how often they practiced yoga. To be in the non-yoga group participants must have answered, “yes” to the first question and “no” to the second. Ms. Corallo then completed the informed consent process. All consent forms are securely stored in Dr. Nooner's laboratory. Ms. Corallo administered consent while away from the table where the surveys were located at all times. After participants read, understood, and signed the informed consent forms, they were directed to a table where the 10-item survey (Perceived Stress Scale) was located. When participants were
finished with the survey, there was a sign directing them to place their survey in a secure box located on the table. After all of the surveys were collected, Dr. Nooner opened this box for data entry. Dr. Nooner mixed the surveys in the box so they were randomly distributed before returning the box to Ms. Corallo. Participants’ names are not on the surveys and the surveys are stored in a locked cabinet in Dr. Nooner’s laboratory.

Results

An analysis of covariance was conducted on the data used for the yoga and non-yoga groups in their responses to the Perceived Stress Scale (PSS) while controlling for gender. Follow-up statistical tests were run on the yoga group to see if those who practice yoga more often had lower stress levels than those who practice less often. The r-squared change statistic ($F_{1,107} = 92.298$, $p < .001$) was significant with 51.2% of the variance between the groups being explained by the PSS. On average individuals in the non-yoga group (PSS Mean = 21.28, SD 3.815) reported having significantly more stress than those in the yoga group (PSS Mean = 12.00; SD 5.267). The results of the ANCOVA showed that the participants who practiced yoga had lower self-reported stress scores than those who did not practice yoga.

A regression analysis was conducted with the yoga group to see if there was a relationship between frequency of yoga practice and stress. Results indicate there was no relationship between frequency of yoga practice and stress ($t(1) = .359$, $p$ is less than .001).

Discussion

The purpose of this study was to investigate the relationship between yoga and stress. Consistent with the findings that yoga is related to improvements in many
health problems, it was hypothesized that individuals who practiced yoga would have lower stress scores than individuals who did not practice yoga. In addition, among individuals who practiced yoga, it was hypothesized that those who practiced yoga more often would have lower scores than those who practiced yoga less often. Our findings support the hypothesis that the participants who practiced yoga would have lower self-reported stress scores than those who did not practice yoga. However, our findings do not support the hypothesis that the amount of yoga practice is related to stress levels; differences were not detected in stress scores based upon frequency of yoga practice. The lack of support for the second hypothesis is important because most of those who practiced yoga, be it once a week for 75 minutes or four or more times a week (each session being 75 minutes), had lower stress scores than those who did not practice yoga at all. This means that as long as yoga is practiced one day a week for 75 minutes, an individual may have lower stress scores than someone who does not practice yoga at all. The explanation for this finding suggests that the variability in stress levels between the two groups, that is, the non-yoga group and the yoga group, is the same although there are different values pertaining to frequency. These results held even after controlling for age and gender of the participant.

The findings in the present study are supported by other studies that have also shown that yoga practice is related to low levels of self reported stress (Michaelson et al., 2005). Another study also used the PSS to compare stress scores in a dance group, a yoga group, and a control group (West, 2004). The results of the current study are in keeping with this previous study looking at yoga and dance, in that the current yoga group also had lower stress scores than the non-yoga group in the present study. However, in the
yoga and dance study, both of the physical activity groups (i.e., yoga and dance) had lower stress scores than the control group; the yoga and dance groups did not differ significantly with respect to their stress scores. Therefore, it is possible that the results of our study point to the utility of any regular physical activity in reducing stress and not yoga per se. This is discussed further in the limitations section.

Limitations

Those in the yoga group who were asked to participate in the study had to at least practice yoga once a week. However, low stress levels may not be the result of yoga practice per se. Rather, yoga practice and low stress may be found together. Those who are willing to try and regularly practice yoga may also be people who have lower stress levels in general. That is, those who have the patience, time, and energy to do yoga, may be less stressed to begin with and this was not ruled out by the present study. Future research should more carefully measure yoga practice and control for other factors such as patience, energy, and time to do yoga as well as baseline stress levels, overall health, and other physical activity.

A second limitation found in the study pertains to the type of survey used. The Perceived Stress Scale used in the study asks ten basic questions on stress. The questions on the survey do not go into depth on the various ways stress may impact daily life. Using multiple surveys or other interviews that may account for different kinds of stress would be useful in future research on this topic.

A third limitation in the study is that it does not rule out the alternative explanation that something other than yoga might be correlated with low stress levels. The data could be explained equally well using another hypothesis: it might be simply
that physical activity done several times a week reduces overall stress, not yoga in particular. A future study would have to control for physical activity in general.

A fourth limitation of the study is that the data was collected at two separate locations. The study should have been administered either at Montclair State University or in the communities where the yoga centers are located. The potential limitation to this methodology is that people who go to yoga studios may lead less stressful lives overall independent of the choice of practicing yoga as compared to university students. The better option would be to have only university students because the people at yoga studios tend to lead low-stress lifestyles or at least make an effort to do so. Even though it would be better to take students from a university setting, this could lead to a potential problem of finding enough people to participate in the yoga group. An alternative suggestion could be to take students registered in the university yoga class vs. students who do some less vigorous physical education class.

Finally, the yoga populations chosen may have had a bias towards the type of yoga style taught at their particular yoga studios. Both studios chosen for this research were one specific style, vinyasa (a style that focuses on linking postures by breath). A future experiment would select yoga studios of two different methods and compare the results based on the two different styles and what the differences would be between the two different styles as compared to a control group. The results therefore only apply to vinyasa yoga.
Conclusion

This study aimed to explore how yoga may be related to lower levels of stress. By presenting a 10-item stress questionnaire, Perceived Stress Scale, we were able to examine if yoga was related to self-reported levels of stress. Our results indicate that those who practice yoga have lower levels of self-reported stress than those who do not practice yoga. These results held even after controlling for age and gender of the participants. Somewhat surprisingly, we found that for the yoga group, it did not matter how frequently a person did yoga as long as it was at least once a week. This study supports other research that has shown that yoga may be useful in reducing stress.
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### Table 1

*Description of Sample*

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<th>Age in Years</th>
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<th>Non-Yoga</th>
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<td>12</td>
<td>33</td>
<td></td>
</tr>
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<td>% of Yoga/Non-yoga</td>
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<td>19.7%</td>
<td>27.7%</td>
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<td>% of Total</td>
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<td>10.1%</td>
<td>27.7%</td>
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<td>26-33</td>
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<td>34</td>
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<td>% of Yoga/Non-yoga</td>
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<td>16.4%</td>
<td>17.6%</td>
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<td>8.4%</td>
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<td>26.1%</td>
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The Relationship Between Yoga and Stress

Table 2

*Gender*

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</tbody>
</table>
Appendix:

**Perceived Stress Scale**

Age: (18-25)_____, (26-33)_______, (34-41)____, (42-49)____

YOGA: Yes_____ No_____
If yes, how often do you practice: 1-2_____ , 3-4_____ , 5-6_____ , 7 or more_____

Gender (Circle):  M  F

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never   1 = Almost Never   2 = Sometimes   3 = Fairly Often   4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?............................................ 0 1 2 3 4

2. In the last month, how often have you felt that you were unable to control the important things in your life?............................................................ 0 1 2 3 4

3. In the last month, how often have you felt nervous and “stressed”?.............. 0 1 2 3 4

4. In the last month, how often have you felt confident about your ability to handle your personal problems?............................................................. 0 1 2 3 4

5. In the last month, how often have you felt that things were going your way?................................................................. 0 1 2 3 4

6. In the last month, how often have you found that you could not cope with all the things that you had to do?................................. 0 1 2 3 4

7. In the last month, how often have you been able to control irritations in your life?................................................................. 0 1 2 3 4

8. In the last month, how often have you felt that you were on top of things?....... 0 1 2 3 4

9. In the last month, how often have you been angered because of things that were outside of your control?................................................................. 0 1 2 3 4

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?................................. 0 1 2 3 4

Consent Form for Adults

Please read below with care. You can ask questions at any time, now or later. You can talk to other people before you fill in this form.

**Study’s Title:** Yoga and Its Effects on Stress

**Why is this study being done?** This study aims to see how yoga practice is related to stress. We will compare two groups, a yoga group and a non-yoga group, to see if there are differences between the two groups pertaining to stress.

**What will happen while you are in the study?** Participants in this study will be asked to answer a 10-question survey about stress.

**Time:** This study will take no longer than 10 minutes to complete.

**Risks:** You may feel or experience some thoughts about stress in doing this survey. If you need counseling related to your participation in this study, you may contact Dr. Nooner at 973-655-7381 who will refer you to counseling services.

**Benefits:** There are no direct benefits to you being in this study. However, your participation will help us to learn more about the relationship between yoga and stress.

**Who will know that you are in this study?** You will not be linked to any presentations. We will keep who you are anonymous according to the law. No information that can identify you will be used.

**Do you have to be in the study?** You do not have to be in this study. You are a volunteer! It is okay if you want to stop at any time and not be in the study. You do not have to answer any questions you do not want to answer. Nothing will happen to you.

**Do you have any questions about this study?** Feel free to contact the Graduate Advisor of the Principal Investigator of this study, Dr. Kate Nooner, Department of Psychology, 1 Normal Avenue, Montclair State University, Montclair, NJ 07043. Phone: 973-655-7381.

**Do you have any questions about your rights?** Phone or email the IRB Chair, Debra Zellner :reviewboard@mail.montclair.edu or 973-655-4327).

It is okay to use my data in other studies:
Please initial: ______ Yes ______ No

I would like to get a summary of this study:
Please initial: ______ Yes ______ No
The copy of this consent form is for you to keep.

If you choose to be in this study, please fill in your lines below.

_________________________ __________________________
Print your name here       Sign your name here         Date

_________________________ __________________________
Name of Principal Investigator   Signature          Date

_________________________ __________________________
Name of Faculty Sponsor       Signature          Date