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# Immediate Effects of Yoga on Mindfulness, Self-Criticism, Self-Compassion and Depressed Mood

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# Immediate Effects of Yoga on Mindfulness, Self-Criticism, Self-Compassion and Depressed Mood

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Abstract

Immediate Effects of Yoga on Mindfulness, Self-Criticism, Self-Compassion and Depressed Mood By: Blaire E. Cain Chairperson: Thomas Treadwell, Ph.D.

This study examines changes in self-compassion, self-criticism, mindfulness and depressed mood following a single yoga session. This study sets itself apart from already completed research by examining the effects of one single yoga session, as opposed to 4-, 6-, or up to 12 weeks of yoga intervention. Other research exists in this growing knowledge base, see Woodyard (2011) for a review, and the research has deemed positive results over time. This project was designed to determine if any change can be measured after just one yoga class, supporting the idea that yoga may be utilized as a singular or complementary supplement to mental health treatment.

Participants (n=151) in this study were randomly assigned to either the yoga (experimental) condition, or a control condition. Yoga participants were led through an all-levels Hatha style yoga class taught by a Registered Yoga Teacher. Measures were collected prior to and following condition participation and included the Mindfulness Awareness Attention Scale (MAAS), the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R), the Self-Compassion Scale-Short Form (SCS-SF), and the Profile of Mood States-Revised (POMS-R). A mixed between by within-subjects design using pre and post measures, examined differences between the yoga and a control group over time. Results indicate significant decreases in Total Mood Disturbance in the yoga group

based on pre and post test measures, but failed to reveal and significant changes in self-criticism, self-compassion, or mindfulness. Implications for future study are considered and discussed.

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# Immediate Effects of Yoga on Mindfulness, Self-Criticism, Self-Compassion and Depressed Mood

## Chapter 1

## Literature Review

The word yoga literally translates to *yoke*, or union (DeMichelis, 2005). Yoga practice, or *yoking*, refers to promoting the union of the body and the breath, or in other translations, the body, mind and spirit. In its ancient Indian roots, yoga was a spiritual practice and set of moral principles that can lead one to divine enlightenment. Ancient yoga tradition dates back at least 2,500 years and shares its roots with Buddhism and other eastern philosophies and spiritualities. From yoga's most ancient roots arose a collective, written code of conduct including boundaries, limitations, and guidelines for living a fulfilling life while searching for enlightenment. The first systemized presentation of yoga is credited to Patanjali's Yoga Sutras (1975), marking the beginning of classical yoga. In addition, he is credited with the creation of *ashtanga*, the 8 limbs of yoga, although ancient texts suggest it was a combined effort of tradition passed from earlier practices of a similar nature (Adele, 2009).

The first two limbs of yoga are the yamas and the niyamas (Adele, 2009). *Yama* translates to restraint, or moral discipline while *niyama* translates to observance or practice. Included in the yamas are restraints such as *ahimsa*—non-violence in thought, word and deed; *satya*—truthfulness or non-lying; *asteya*—non-stealing; *brahmacharya*—celibacy, and finally *aparigraha*—non-greed. The niyama observences are *saucha*—

cleanliness; *santosha*—contentment; *tapas*—self-discipline; *svadhyaya*—meaning the study of the self and the texts, and finally *isvara pranidhana*—surrender to the divine or contemplation of such a possibility.

Yoga *asanas* are the third limb according to Patanajali (1975). *Asana* translates from Sanskrit to mean the physical postures most associated with yoga practice. In the modern west, yoga in typically considered a practice of asana and *pranayama*, limb number four, meaning observation of the breath pattern and controlled breathing techniques while practicing asana or meditation.

The remainder of Patanajali's eight limbs are, very briefly described, *pratyahara*—sensory withdrawal; *dharna*, or concentration and focus, *Dhyana*, meaning meditation practice, and finally *samadhi*, which refers to achieved spiritual enlightenment or bliss. Yoga's ancient practices then, expand far beyond the exercise benefits of yoga poses. In its true nature, the term yoga is a verb—to yoga, or yoke, creating a union of mind, body and breath in order to reach optimal awareness, or divine enlightenment. As yoga expands and shifts to the west in more modern history, the word yoga is used as an action noun, as in to "practice yoga". Along the way to divine enlightenment, practitioners of yoga, or yogis, noticed physical health benefits associated with the practice, including increased physical fitness and lowered stress.

In the Western world, specifically the United States, yoga is classified by the National Institute of Health as a form of Complementary and Integrative Medicine (U.S. Department of Health and Human Services, 2018). It is recognized as a mind-body,

holistic practice that encourages nurturing care of self through the integration of physical, mental and spiritual components to improve various aspects of health. Yoga encourages practitioners to slow down, relax, and breath while focusing on the present moment, an experience that does not match typical achievement standards and can provide a needed break from our fast-paced world. Yoga's focus on mindfulness, or as Kabat-Zinn (1990) defines, "paying attention on purpose", allows for improvement of health, specifically in stress-related illnesses.

Stress has been implicated in numerous studies to not only allow diseases to etiologically develop, but to increase the advancement and severity of such illnesses as cancer, heart disease, and stroke (Cohen, Gianaros, & Manuck, 2016). Thus, according to Büssing, Michalsen, Khalsa, Telles, and Sherman (2012), increased attention to stress management in medical treatment plans is imperative in managing chronic conditions, and contemplative and integrated treatments such as yoga are recommended to reduce stress and negative mood states associated with carrying the burden of disease. The practice of slowing the breathing and focusing on the present, suggested by Pascoe, Thompson and Ski (2017) allows one to shift the fight-or-flight stress response from activation of the sympathetic nervous system, to the parasympathetic nervous system, in turn lowering heart rate, cortisol levels and decreasing blood pressure while restoring blood flow to the vital organs, and allowing regular bodily function to continue effectively.

A major goal of yoga practitioners is to calm the mind, focusing only on the breath and the present moment as it is; allowing for tranquility of mind, a sense of well-being, improved self-confidence, lowered irritability, increased attentiveness, improved efficiency, and a more optimistic outlook on life (Woodyard, 2011). Further, yoga leads to inhibition of the sympathetic area of the hypothalamus, optimizing parasympathetic responses to stress, leading to better stress management. Yoga practice inhibits areas on the hypothalamus relating to rage, aggression and fear, stimulating reward pleasure centers in the medial forebrain and other areas of the brain related to feelings of pleasure (Woodyard, 2011).

On the other hand, stress is a process that puts the bodily systems under strain in order to cope with increased environmental demands. Prolonged stress can leave negative effects on several of the body's important systems, and it can play a role in developing depression and anxiety (Khan & Khan, 2017). Pilkington, Kirkwood, Rampes, and Richardson (2005) reviewed 35 studies on yoga and depression and found the yoga interventions have a beneficial impact on depressive disorders, but with limitations. Since yoga asanas and pranayama are typically taught at the same time, it was difficult to determine if the yoga poses, the breathing techniques, or the meditative nature of the practice resulted in the main effect. Additionally, it was not possible to compare levels of depression; some samples were taken from clinical populations, others, from a non-clinical population. There was limited distribution of age; none of the participants in any of the 35 studies were over fifty years old. Low attrition was also reported in many of the

reviewed studies. It was suggested that symptoms of depression, such as fatigue and loss of interest, may have deterred participants from completing yoga trials.

A wide range of treatments for depression and anxiety, including psychotherapy and medication, exist and are beneficial in the treatment of depression and anxiety. However, yoga may provide a more holistic approach than the common medical model. Yoga is relatively cheap, widely offered, and is less stigmatized than traditional psychotherapy (Woodyard, 2011). Since interest in the west has grown regarding contemplative and alternative therapies and yoga has the potential to improve mood states, yoga should strongly be considered as an adjunctive treatment modality for individuals currently being treated for anxiety and depression.

Self-criticism is a type of negative self-judgement and self-evaluation of the self, based on various aspects, such as appearance, personality, and intellectual aspects. Self-criticism can lead to various psychopathologies including depression and anxiety (Gilbert, Clark, Hempel, Miles and Irons, 2004). In comparison, self-reassuring and self-compassionate tendencies are negatively linked to psychopathology (Gilbert et al. 2004; Neff 2003Self-criticism is a major risk factor for the development of emotional distress (Blankstein & Dunkley, 2002), as well as feelings of hopelessness, helplessness, depression and anxiety (Shaw & Segal, 1999). Dysfunctional thoughts are related to mood instability and depression (Ramel, Goldin, Carmona & McQuaid, 2004), and self-compassion is negatively correlated to low self-esteem (Longe, Maratos, Gilbert, Evans, Volker, Rockliff and Rippon, 2010). Accordingly, self-compassionate individuals are

likely more aware of physical and emotional states, are more likely to acknowledge them without judgement, and have the understanding that negative emotions are part of the human experience (Neff, 2003). Individuals with greater self-compassion may be more inclined to recognize that stress and negative emotional states are natural and treat themselves with kindness instead of criticism, accepting that negative occurrences are just part of being human. Self-compassion appears to help individuals cope with stressful life events, and act as a buffer against self-critical thoughts (Leary, Tate, Adams, Allen, & Hancock, 2007). Self-compassion has been linked with improvements in emotional regulation, levels of anxiety and depression, and overall well-being (Neff, 2004). Therefore, self-compassion can act as a protective factor against self-criticism.

Longe, Maratos, Gilbert, Evans, Volker, Rockliff and Rippon (2010) researched neural correlates of self-criticism and the ability to self-reassure using fMRI technology. Self-criticism was associated with activity in lateral prefrontal cortex area and dorsal anterior cingulate, therefore linking self-criticism to error processing and behavioral inhibition. Self-reassurance was associated with left temporal regions and insula activation, suggesting self-reassuring thought activates similar brain function as when expressing compassion and empathy towards others. Therefore, the brain seems to take self-criticism as an error message, which can eventually develop into psychopathologies, whereas self-compassion or self-reassurance activates the same neural pathways as when one is reassuring someone else and can act as a protective factor against self-criticism. Because yoga uses mindfulness techniques such as self-compassion, practicing yoga may also act as a protective factor against self-criticism.

The first step, according to Neff (2003), to increasing self-compassion is to become aware of one's state of being without judgement. Mindfulness is described by Jon Kabat-Zinn (1990) as paying attention on purpose, in the present moment, and doing so in a nonjudgmental way. Mindfulness and self-compassion share common features. While Neff (2003) speaks of self-compassion, Kabat-Zinn (2003) describes mindfulness as a loving kindness toward the self, free of self-criticism and negative self-talk. Mindfulness programs, including Mindfulness-Based Stress Reduction (Kabat-Zinn, 2003) which includes a yoga element, have been associated with many positive mental health outcomes as reported by Carmody and Baer (2008), including improved self-regulation and decreased stress, anxiety and rumination.

According to Carmody and Baer (2008), yoga is one of the most effective ways to build mindfulness skills. Yoga is a movement meditation that encourages practitioners to look inward, to notice sensations in a non-judgmental manner, and to treat the body and mind with kindness. While cognitive therapy aims to change the content of one's thoughts, Wallace and Shapiro (2006) state that mindfulness attempts to change the relationship one has with their own thoughts, promoting a loving kindness while decreasing self-critical thoughts. A meta-analysis conducted by Hofmann, Sawyer, Witt, and Oh (2010) reviewed 39 mindfulness-based therapy studies and concluded that mindfulness-based therapies, such as yoga, should be recommended as an effective intervention for psychopathologies. Pilkington, et al. (2005) reviewed 35 studies on yoga and depression and found that yoga-based interventions may have a positive impact on depression and anxiety disorders. While the knowledge base is still growing and

empirically designed studies are few, yoga has been found to alleviate stress (Khalsa, Shorter, Cope, Wyshak & Skylar, 2009), increase quality of life (Kraemer & Marquez, 2009), and improve mood (Posadzki, Parekh & Glass, 2010).

The focus of the current study was to determine whether one session of yoga (45 minutes) and a brief body scan meditation during *savasana* (15 minutes) would results in favorable changes in self-criticism, self-compassion, mindfulness and mood, relative to a no-yoga control condition. Prior research has used longitudinal designs (i.e., four- to twelve-week assessment periods) to study the benefits of yoga. However, yoga has been associated with an array of psychological benefits, and a vast array of self-reported anecdotal evience. West, Otte, Geher, Johnson and Mohr (2004) demonstrated that a one-time 90 minute yoga class was able to reduce perceived stress and negative affect as well as decrease cortisol levels. If yoga is to be used in the future, as either an adjunctive or main treatment modality for psychological disorders such as depression, it is important o investigate changes occurring in just one session, adding to the growing base of knowledge. This kind of information allows for more sophisticated and clinical research to be collected. Having increased data of the effects of one yoga session can eventually allow practitioners to recommend treatment plans, track changes and create well developed programs using yoga as a treatment modality in clinical settings. Further, if progress can be demonstrated using reliable measures before and after each session, yoga sessions could potentially be covered by insurance companies, making them even more accessible.

# Chapter 2

## Hypotheses

The hypotheses of interest to the present study were as follows: (1) Relative to a control group, participants completing a single yoga session will evidence greater reductions in self-criticism from baseline through post intervention; (2) Relative to a control group, yoga participants will evidence significantly greater increases in self-compassion from baseline through post-intervention; (3) Relative to a control group, yoga participants will evidence significantly greater increases in mindfulness through post intervention; (4) Relative to a control group, yoga participants will evidence significantly greater reductions in mood disturbance.

# Chapter 3

## Method

### Participants

The participants of this study (n=151) were West Chester University undergraduate students enrolled in a general psychology course recruited through an online system (i.e., SONA) to complete research in order to earn required course credit. All individuals were welcomed to participate regardless of yoga experience. Those who were pregnant or experiencing any kind of injury or pain were asked to speak to their

healthcare professional before engaging in the study. Participants were assigned a unique user ID when registering with SONA, so names and personal information were kept confidential. On the day of each session, SONA ID numbers were randomized using *Research Randomizer* (Urbaniak & Plous, 2013), an online resource, for placing participants into the two groups. Participants were instructed to report to a room in Wayne Hall for the study. All participants arrived and checked into the same room in Wayne Hall. Once signed in using SONA ID, participants were asked to either remain in the original room or were asked to enter an adjacent room. A double-blind study was not possible due to space and set up. Because the groups were tested in adjacent rooms, it is possible that participants knew the experimental group had the yoga intervention and the control group did not.

Out of 151 participants, 73 were randomized to the experimental (yoga) condition, and 78 were randomized to the control condition. The majority (96%) of the participants were between ages 18-21; the other 4% were between ages 22 and 25 (see Table 1 for demographic summary and yoga experience). Participants were largely female (75%) and white (70%). Participants' yoga experience was mixed. About 31% of participants reported never having practiced yoga before. Many participants (n=56) had practiced yoga 1-3 times in the past, 23 participants reported practicing between 3-10, and 26 participants reported practicing yoga more than 10 times.

Measures

*Self-Compassion Scale—Short Form (SCS-SF; Neff, 2003).* The SCS-SF is a 12-item self-report measure that assesses and individual's level of self-compassion (Neff, 2003). The short form of the scale draws items from the original 26-item scale and uses a Likert scale from 1(almost never) to 5 (almost always). The total score of the short form on the scale has a near perfect correlation with the 26-item version, though typically subscales are not examined as they decrease the reliability (Raes, Neff & Van Gucht, 2011). The subscales were examined here; thus, a number of items that had negative responses were reverse scored and summed. Reliability of this measure was quite low, Cronbach's Alpha=0.38. Despite its low reliability, this test was included as part of the study because of its clear and concise language, as well as its content relating to well to mindfulness measures. Items included "I try to see my failings as part of the human condition"; and "When I'm going through a very hard time, I give myself the caring tenderness I need". Higher scores indicate higher levels of self-compassion. Self-compassion, as measured by the Self-Compassion Scale, was found the negatively correlate with self-criticism (Neff, 2005).

*Forms of Self-Criticising/Attacking and Self-Reassuring Scale (SC/A-SR; Gilbert et al., 2004).* The SC/A-SR is a 22-item self-report assessment that measures self-criticism and the ability to self-reassure. Items measure different ways people think and feel about themselves when things go wrong. The scale includes three subscales, including two types of self-criticalness: inadequate self (9 items) and the hated self (5

items), as well as a reassure self (8 items). The SC/A-SR utilizes a Likert scale from 0 (not at all like me) to 4 (extremely like me). Cronbach's Alpha=0.64, showing low-medium reliability.

*Abbreviated Profile of Mood States Questionnaire—Revised Version(POMS-RV; Grove and Prapavessis, 1992).* The POMS-RV is based on the original POMS (McNair et al., 1971) and contains 40 self-report questions utilizing a Likert scale from 0 (not at all) to 4 (extremely). The questions contain a series of descriptive words and phrases that describe what people are feeling in the present moment. Total mood disturbance is calculated by summing the totals for negative subscales (depression (DEP), tension (TEN), fatigue (FAT), confusion (CON) and anger (ANG), then subtracting the totals from the positive subscales (vigor (VIG) and esteem-related affect (ERA). Total Mood Disturbance (TMD)= [TEN + ANG + FAT + DEP + CON]—[ERA+VIG). A constant of 10 was added to eliminate negative scores. In the scale, 11 items are considered negative and 29 items indicate positive feelings. Cronbach's Alpha=0.89, indicating high reliability.

*Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003).* The MAAS is a 15-item self-report scale developed to assess dispositional mindfulness, defined as receptive or open awareness of and attention to what is taking place in the present moment. A Likert scale of 1 (almost always) to 6 (almost never) is utilized for questions such as "It seems I am running on automatic, without much awareness of what I'm doing", and "I find it difficult to stay focused on what's happening in the present".

Higher scores indicate higher levels of mindfulness. Reliability was low-to-medium; Cronbach's Alpha=0.68.

*Cognitive and Affective Mindfulness Scale—Revised (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007)*. The CAMS-R is a 12-item self-report questionnaire developed to assess mindfulness with language that is not specific to meditation training. It utilizes a Likert scale from 1 (rarely/not at all) to 4 (almost always). Items include "I can accept the things I cannot change", and "I am able to focus on the present moment". Due to error, items 2 and 7 were omitted from this study because study PI neglected to add these items to the scales distributed to participants. Even after the error was detected, items 2 and 7 continued to be omitted for consistency. Reliability is low; Cronbach's Alpha=0.5.

## Procedure

Once participants arrived at a previously agreed upon room in Wayne Hall, study PI and/or Research Assistant verified their enrollment in the study using their SONA ID number. No more than twenty participants per session per condition were in attendance. Each participant was then asked to stay in the original room, or to report to an adjacent room. Participants completed informed consent procedures, signed off on a yoga waiver, and then completed baseline assessment measures. Participants were made aware that their participation was voluntary and they were free to leave at any time.

*Yoga Intervention*

All yoga sessions were delivered by a Registered Yoga Teacher (RYT) trained at the 200-hour level. Participants in the yoga condition were invited to sit on yoga mats placed on the floor. Prior to beginning yoga, the yoga instructor encouraged participants to make mindful movements, and to only engage in movements that felt good. Straining and engaging in painful movements were discouraged. Participants were encouraged to focus on the breathing, and were informed there would be no hands-on adjustments. Yoga session activities (i.e., sequences, poses, cues) were standardized using a protocol (see Appendix). Each yoga session lasted approximately 45 minutes. Once participants were led into *savasana*, or final resting pose, they were led through a basic body scan meditation. It is common for a guided meditation to be offered during savasana. The body scan meditation was additionally recited in as consistent a manner as possible. Scripts were created and referenced, however in order to promote a natural, conversational tone, the instructor recited the phrases from memory. See script in appendix. Following the completion of yoga and meditation, participants were asked to complete post-condition packets and to return assessment measures to a research assistant.

*Control Condition*

Participants in the control condition sat in a half-circle around a table in front of a large television monitor. Participants completed pre-condition assessment measures, and then watched two TED talks (Balcetis, 2014; Suzuki, 2017) focused on the benefits of exercise. Following the TED videos, participants were led by a research assistant to the

stairwell, there they walked up, and then down a flight of stairs, before returning to the study room to complete post-condition assessment packets. The walking component of the control condition was implemented to mimic physical exertion required of the yoga condition, making the control condition more comparable to yoga activity.

## Data Analytic Approach

The study used a between (treatment and control group) by within (pre and post-tests) subjects experimental design. A between by within ANOVA was conducted to assess the impact of the yoga intervention (vs control condition) on participants' self-reported scores on each measure. The main interest was in the Group (yoga vs control) X Time (pre vs post) interaction effect. A mixed-between within ANOVA was run via SPSS in order to determine the impact of scores on assessment tests of each group over time to determine if the yoga condition scores were significantly different over time and when compared to a control group. This test was chosen because it is a powerful test for assessing whether or not a treatment effect is present.

# Chapter 4

# Results

## Self-Compassion

Our first study hypothesis (i.e., yoga results in increases in self-compassion) was not supported by the research. There was no interaction between group and time; $F(1,$

137) = .004, $p$ = .95, partial eta squared = .000. Interestingly, there was a main effect for time; $F$ (1, 137) = 7027.4, $p$ = .000, partial eta squared = .98, with both groups showing a dramatic reduction in scores on the SCS-SF. Since higher values indicate higher degrees in self-compassion, scores indicate that both groups *decreased* in self-compassion scores over time. The main effect comparting the two groups was not significant, $F$ (1, 137) = .097, $p$ = .756, partial eta squared = .001, suggesting no overall difference between the yoga condition and the control condition. See Table 2.

Self-Criticism and Reassurance

*Self-Criticalness.* The items composing the SC/A-SR make up three subscales, including two forms of self-criticalness, and one form of self-reassurance. It was hypothesized that in comparison to a control group, participants engaging in the yoga group would have significantly greater decreases in self-criticism from baseline (pretest) through post test, as measured by the SC/A-SR. In order to examine the results properly, each subscale was analyzed separately.

The first subscale of self-criticalness, *inadequate self*, focuses on feeling a sense of personal inadequacy. Based on the previously established hypothesis, it was expected that self-criticalness, as measured by the *inadequate self* (IS) subscale, would decrease significantly more in participants who were in the yoga group than those who were in the control group. There was a marginally (assuming alpha = .05) significant interaction between group and time; $F$ (1,127) = 3.48, $p$= .064, partial eta squared = .027. Time was a significant factor in participant scores on the IS subscale, $F$ (1, 127) = 28.74, $p$ = .000,

partial eta squared = .185. The main effect of group (intervention) was not significant, $F(1, 127) = .52$, $p = .47$, partial eta squared = .004. See Table 2.

*Hated Self*

The second subscale of self-criticalness, *hated self (HS)* is designed to measure the desire to persecute, discipline, or injure the self. Our hypothesis that *hated self* scores would decrease for the yoga condition was not supported. There was not a significant interaction between group and time; $F(1,142) = .422$, $p = .52$, partial eta squared = .003. Time as a factor did not produce significant change; $F(1, 142) = .24$, $p = ..63$, partial eta squared = .002. Nor was there a significant main effect of group on this subscale; $F(1, 142) = 1.15$, $p = .29$. Refer to Table 2.

*Reassurance*

The final subscale that comprises the SC/A-SR is *reassured self (RS).* As the name suggest, these items evaluated one's ability to reassure oneself in difficult times, acting as a protective factor against the other subscales. A significant increase in RS scores in the yoga condition over pre and post measures would provide support to the hypothesis; if RS scores increase, they should protect against high scores in the subcategories that measure self-criticalness. However, there was no significant interaction between group and time type; $F(1, 123) = .89$, $p = .35$, partial eta squared = .007. No significant change was found using time as a factor; $F(1, 123) = .013$, $p = .91$. The main effect comparing the two groups was statistically significant, $F(1, 123) = 5.73$,

$p$ = .02. The yoga group had higher scores on both the pre and posttest scores. Refer to Table 2.

## Mindfulness

### *MAAS*

The MAAS surprisingly did not yield significant results as previously hypothesized. There was no significant interaction between group and time, $F(1, 137)$ = .13, $p$= .72, partial eta squared = .001. There was no significant effect for time, $F(1, 137)$ =1.16, $p$= .28, partial eta squared = .008. The main effect of comparing the two interventions was also not significant, $F(1, 137)$ = .30, $p$= . 58, partial eta squared = .002.

### *CAMS-R*

No significant interaction was found between group and time $F(1, 139)$ = .86, $p$ = .36, partial eta squared=.006; nor was there any significant effect for time, $F$ (1,139) = 1.50, $p$= .22, partial eta squared = .011.

## Mood States

The final hypothesis examined mood states, specifically depressed mood, using the Profile of Mood States-Revised Version (POMS-RV; Grove & Prapavessis, 2003). The items on the scale are divided into seven subscales to determine Total Mood Disturbance (TMD). It was hypothesized that TMD would decrease significantly more in

the yoga group than in the control group, measured by pre and post tests. A between-within subjects ANOVA supported the hypothesis of a significant interaction between group and time, $F(1, 129) = 5.44$, $p = 0.21$, partial eta squared = .041. Although the effect size was mall, the yoga group showed a significant reduction of mood disturbance scores as a result of the interventions, whereas the control scores showed almost no change. Time was a significant factor, $F\ (1, 129) = 5.54$, $p = .20$, partial eta squared =.041 (small effect size). See Table 2.

# Chapter 5

## Discussion

Overall, this study yielded interesting results and implications for future research. The purpose of the study was to examine whether change in mood, self-criticism, self-compassion, and/or mindfulness could be measured after one yoga session compared with a control group. Certainly, the most notable results were taken from the POMS-RV, finding a significant decrease in Total Mood Disturbance after one yoga session, compared to almost no change in the control group, although the effect size was small. There was also a marginally significant interaction on the SC/A-SR, again with a small effect size. Based on scores of both subscales of the SC/A-SR relating to self-criticism, the yoga intervention was more effective in reducing feelings of inadequacy than in reducing feelings of hating or wanting to injure the self, although scores of the *inadequate self* were not quite significant. According to Gilbert et al., (2004), there is a floor effect on the hated-self scale, while there is a full range of score distribution on

inadequate self. It is suggested by Gilbert et al., (2004) that he floor effect in the hated self subscale is due to self-hate being a rare occurrence in a non-clinical setting. This is important information to note in considering utilizing yoga as an adjunctive therapy program for those experiencing self-criticism.

Contrary to the proposed hypotheses, participants in the yoga group did not evidence significant reductions in self-criticism, self-compassion, or mindfulness. If self-compassion and mindfulness are protective factors for self-criticism, and thus potential depressive symptoms, it may take individuals longer than one yoga session to learn and commit to using mindfulness skills. Additionally, almost one-third (31%) of participants reported being first-time yogis, possibly leading to some anxiety or arousal.

Significant improvements were found utilizing the Profile of Mood States—RV. Consistent with hypothesis 4, participants in the yoga group evidenced significantly greater reduction in Total Mood Disturbance. This scale, although it was the longest scale at 40 items, may have been one of the simpler forms to complete. While other items used whole sentences/phrases, POMS-RV only requests participants rate their mood using one-word descriptions. It is likely that the yoga asanas, pranayama and meditation improved mood, and the POMS-RV was the best scale to capture changes. This change is consistent with much anecdotal evidence, which can be heard at the end of any yoga class. Yogis can be heard in many studios expressing feelings of calm and relaxation, as well as feeling more grounded. This research may have shed a bit of qualitative light on what these anecdotal feelings are, utilizing a Profile of Mood States-Revised.

Other studies have examined short term changes in mood following participation in yoga. Utilizing the POMS questionnaire, Berger and Owen (1992) found significant, short term mood benefits following Hatha yoga practice over a three-day period. West et al., (2014) found significant reductions in perceived stress immediately following Hatha yoga, as well as decreases in negative affect. Chad-Friedman, Forgeard, McHugh, Beard, Kopeski, & Björgvinsson (2019) additionally found short term mood changes immediately after a yoga session, as well as increases in positive affect.

## Limitations

There are many ways this study could be improved, much of which is a result of lack of data collection and research experience on the PI's part. The yoga condition was held in a "makeshift" yoga studio that is typically employed as a classroom or meeting room. Although the tables and chairs were pushed out of the way and mats were placed on the floor, the room was not created into a recognizable yoga studio. Typical yoga studios are more spacious, and are decorated often with figures of eastern philosophies, or other relaxing décor. Special consideration is taken to create soft lighting. Should this study be repeated, the location of the study would be made a priority and moved to another area more conducive to a typical yoga experience. There was additionally some initial discrepancy at the start of sessions. Initially, all participants would arrive at the main study room in Wayne Hall, sign in with the study PI, and complete consent forms and demographic data in that room, before being split into the two groups. Because this caused some confusion, and due to lack of space, the participants were checked in and

then directed to either stay in the main study room or to enter an adjacent room before completing any paperwork. Additionally, in order to save time, data collection could be improved by digitalizing the surveys and using tablets or smartphones.

The implications for future research in this area of study are plentiful. Empirically designed studies are needed to examine the effects of yoga on mood, both in multiple treatment and in one-session studies on depression, anxiety and other mood disorders. The benefits of examining the impact yoga can have after one session will continue to provide support for the notion that yoga can be utilized as a form of therapy, either adjunctive and contemplative, or as a first line of defense. Literature previously cited has examined yoga in special populations, such as those diagnosed with mental health conditions (i.e., depression, anxiety, PTSD). Well established mindfulness-based programs, such as Kabat-Zinn's (1990) Mindfulness Based Stress Reduction, have been effective in decreasing stress, improving perceived quality of life, and decreasing psychological distress. As the research base grows regarding yoga's effects on mood states, qualities of mind and psychological states, it is expected that more and more empirical data will be produced supporting the idea that yoga reduces stress, anxiety and depression.

This study could be done in clinical and non-clinical settings; in fact this may be a limitation to the current study that the participants were of a non-clinical background. Adding yoga to already existing group therapies or as an adjunctive therapy to CBT would almost certainly yield significant changes.

The purposes of this research were, at least in part, helpful in adding to the knowledge base on yoga's clinical implications. In this sample, it was determined that in a non-clinical setting, individuals who participated in a single yoga session had significant decreases in total mood disturbance when compared to a control group. Finally, this research may begin to identify more clearly the ways in which one yoga class can improve your mood.

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Appendix A

*Yoga Condition Script*

Find a comfortable seat on your mat, close your eyes and begin to take a few deep breaths—in through the nose, and out through the nose.

This is a yoga classed designed to be gentle and easy. There will be no hands-on adjustments, and if you feel any pain or strain at any point, I encourage you to come out of the posture, and push back into child's pose, or any other relaxed position until you are ready to rejoin the practice. Feel free to take as many breaks as you like, and know that any postures or movements I call are only suggestions.

**Warm Up**

We will begin the class by pushing back into child's pose.

Take a deep breath in through your nose, then pause, open your mouth, and forcefully exhale out of your mouth. Cycle through this way of breathing 3-5 more times

When you are ready, push up to your hands and knees. We will now flow through some cat/cow tilts. On an inhale, arch your back, bring your chest and your head forward, extending your face toward the ceiling

As you exhale, curl your spine toward the ceiling and drop your head between your shoulders.

Continue through this rotation 3 more times, following your own breath pattern.

When you are finished, come to a neutral spine on hands and knees.

Inhale deeply, and then as you exhale, tuck your toes, and use your arms and legs to push your hips up into downward facing dog. In this posture, your arms and your legs should be supporting your body equally. If it feels good, try bending opposite knees gently, stretching out the backs of the hamstrings. Take a few deep breaths in downward facing dog, and then push back to child's pose.

**Sun Salutation**

On your next inhale, push back into downward facing dog. Breathe in, and out.

As you inhale, slowly and mindfully bring your feet toward your hands, taking as many steps as feels comfortable to you.

Place your palms on the front of your calves, straighten the arms and elongate the spine

Exhale and fold forward, aiming your face toward your shins.

Place your hands flat on the mat, and step the feet to a high plank position.

Slowly and gently drop your knees down to the mat, lower the arms and chest until they are flat on the mat.

Place the palms flat on the mat next to the ribs. Push into the hands, gently leaning backwards, straighten the arms and push up into a cobra pose. Breathe in, out and in again.

On an exhale, push back into child's pose or downward facing dog. Take a few breaths.

As you inhale, gently and slowly walk the feet to the hands, taking as many or as few steps as feels appropriate to you.

Place the hands on the front of the shins, inhaling and elongating the spine.

Exhale and fold forward to your degree, face aiming towards the shins.

Take a big inhale as you bring your hands to your sides, and slowly rise up, bringing the arms above the head.

Bring the palms together above the head, inhaling deeply.

As you exhale, bring the hands to heart center, and breathe.

On an inhale, stretch your arms above your head, and as you exhale, fold forward.

As you inhale, place your palms on the front of your calves, straightening the arms to create length in the spine. Exhale as you fold forward, aiming your face toward your shins.

Place your palms on the mat, and step your feet back into a high plank position. Inhale.

As you exhale, drop your knees to the mat and come down onto your belly.

Place the palms flat on the mat next to the ribs. Push into the hands, gently leaning backwards, straighten the arms and push up into a cobra pose. Breathe in, out and in again.

Push back into child's pose, and take a few breaths.

**Warrior Sequence (R)**

Inhale deeply as you push up into hands and knees position, and exhale as you push back into downward facing dog.

As you inhale, gently bring your right foot towards the space between your hands. Rotate your left heel right, dropping the foot to the ground. Take a minute here to distribute your weight equally between both feet, creating a safe and solid base. When you are ready, inhale, and raise your torso slowly, bringing yourself straight up, hips facing the front of the room, arms extend above your head. Take a few breaths here in Warrior I position. If you feel too much strain in your legs, you may want to bring your legs closer together.

On your next exhale, open your torso and hips to the left. Extend your right hand forward, left hand extends back behind you. Gaze out beyond your right fingertips and breathe. This is Warrior II position.

As you inhale, drop the left arm gently alongside the left leg behind you. As you exhale, stretch the right arm forward and up above the head, stretching from the side ribs. Breathe here.

Exhale back to Warrior II; right fingertips reach right, left fingertips reach out behind you. Hips facing out towards the left, and gaze out front of the right fingertips. If you feel strain in your lower back, you may want to tuck your tailbone slightly.

Inhale as you step the left foot up to meet the right foot

Raise hands above head, palms to heart center.

**Warrior Sequence (L)**

On an inhale, step the right foot back, pivoting the right heel towards the left, dropping the foot. Rotate the hips forward on an exhale, bringing the arms straight above the head, coming into Warrior I on the opposite side. Breathe.

On an exhale, rotate the hips towards the right, stretching the left fingertips towards the front of the room; right fingertips reach towards the back of the room. Left knee pushes forward, mindfully; to whatever degree feels good to you. Breathe here in Warrior II

Inhale, then exhale the right arm back behind you. Inhale as you stretch the left fingertips forward, then up and above the head for a side stretch.

Exhale, and return to Warrior II, with hips facing towards the right, left hand stretching forward, right hand stretching towards the back of the room.

Pivot the heel of the right foot; rotate the hips forward and draw the arms up above the head—Warrior I.

Inhale, and bring the right foot to meet the left foot.

Exhale, bringing hands to heart center.

Inhale, bring hands above head, palms together. Swan-dive forward, aiming your face to your shins. Place your palms on the front of your calves, facing the crown of the head forward, elongating the spine. Fold over again, aiming your face towards your shins in a forward bend position.

As you inhale, bend your knees deeply, placing your hands on the mat and stepping feet back into a high plank position. Exhale as you gently and mindfully drop the knees down to the mat, lowering your arms and chest down until you are flat on the mat.

Draw your arms up, placing the palms flat on the mat next to your ribs. Inhale, gently pushing into the arms and bending slightly backwards into Upward facing dog position.

Exhale and push back into child's pose, breathing deeply.

**Back Bends/Heart Opening Poses**

We will now practice a few back-bending postures. If you have, or are prone to, any back problems, or if you experience discomfort at any point in time during these postures, I encourage you to ease out of the posture and push back into child's pose until you are ready to rejoin the practice.

We will first come into locust pose

When you are ready, exhale and come onto your hands and your knees. Inhale into a cow pose—your back arches, elongating your head and neck towards the ceiling. Exhale into a cat pose, rounding the back and shoulders, facing between your hands. Cycle through these poses 3 or 4 more times, following the pattern of your own breath.

When you are finished, come down to the mat flat on your belly, arms alongside of your torso, palms up, forehead resting on the floor. Keep the tops of your feet flat on the mat, big toes pushing toward each other.

Inhale and gently lift your head, upper torso and arms straight off the mat. Be mindful to keep the crown of your head pointing forward, so as to not strain the back of the neck. Exhale and gently release.

If that felt okay, inhale and gently lift your head, upper torso, arms and legs straight off the mat. Take a few deep breaths here, then gently release.

Inhale and gently lift again, taking 3 deep breaths before gently releasing to the floor.

Push back into child's pose.

We will now come into Bow pose. This is often a difficult pose, so take care to be mindful, coming out of any position that causes your pain or strain.

Lie on your belly with your hands alongside your torso, palms facing towards the ceiling. Take a big inhale, and as you exhale bend the knees up behind you, flexing your feet so the bottoms of the feet are towards-parallel with the ceiling.

Inhale, and as you exhale bring your heels in closer towards the body. Very gently so as not to cause strain in the shoulders, reach both arms back towards your ankles. If you can't quite reach your ankles, just keep your arms actively stretching back towards them, leaving your knees bent, feet facing the ceiling.

Wherever your hands are, take a deep inhale and strongly lift your heels away from your body as you lift your thighs away from the floor. Allow your upper torso and head to come off the floor, to whatever degree feels good to you. You should feel a stretch, but no pain or strain. Keep your back muscles soft—if they are straining, ease out of the posture just slightly. Push your shoulder blades down away from your ears, opening your chest to the front of the room. Take a few breaths in bow position, feeling free to come in and out of the posture as you need to. After you have taken 3-4 breaths in this position, gently release your arms, legs and chest, breathing as you lie flat on the mat.

Draw your elbows up and set them directly below your shoulders with your palms and forearms parallel to each other. Point your toes straight out behind you, stretching the legs and creating space in your spine. Inhale as you lift your upper torso away from the floor, into a very gentle backbend. Take 4-5 breaths here in Sphinx pose, then gently press back into child's pose.

**Inversion to Savasana**

Gently bring yourself up to a seated posture and come down so you are lying flat on your back.

Place your feet flat on the floor, so your knees are facing towards the ceiling.

Place your hands underneath your low back, and as you inhale draw one leg up towards the ceiling, and then the other. You can keep your knees bent, or straighten the knees,

flexing the feet. Point and flex your feet in opposition as you take 3-4 deep breaths at your own pace.

As you inhale, remove your hands from behind your back, and bend your knees in towards your chest, hugging your knees in, and with an exhale release everything down to the floor.

We will end our practice with Savasana, or Corpse Pose. It is also known as final relaxation. Lie on your back with your legs splayed towards the outer edges of the mat, arms relaxed on either side with palms facing the ceiling. You can close your eyes in you feel comfortable, or leave them open, breathing deeply.

Take a big inhale, and as you feel your lungs fill, pause the breath, open the mouth and forcefully exhale. You can repeat this breathing pattern 2 or 3 more times, before returning to your natural pattern of breath.

As you lie here, try to let go of any remaining tension or hold you have on your muscles. Close your eyes, or lower them softly.

Take an inhale, and as you exhale notice any tension you may be feeling in your head or face, and try to let it go. Release any tension in the forehead, eyes or cheeks. Relax your jaw, and release any tension you may be holding in your neck.

Take another inhale, and as you exhale take notice of any strain in your shoulders, or your upper back, gently releasing onto the mat.

Inhale again, and as you exhale continue to scan from the arms, down to the elbows, wrists, hands and fingers. Notice any tension or strain, and release it.

Inhale. Exhale and bring your awareness to your back, chest and abdomen, releasing any tension and sinking deeper onto the mat, feeling the support of the floor under you.

Inhale again and as you exhale take notice of any strain in your hips or lower back.

Take an inhale and exhale, bringing your awareness to your legs and your knees, releasing any hold you may still be carrying.

Inhale and as you exhale, relax the ankles, feet and toes.

Take a moment to breathe.

When you are ready, roll over to the right side, and use your arms to push yourself up into a comfortable seat on the floor

Inhale, bringing the arms above the head, palms meet together. Exhale, draw hands to heart center, and gently to your lap.

Appendix 2

*IRB Approval Document*

WCU
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Office of Research and Sponsored Programs | West Chester University | Wayne Hall
West Chester, PA 19383 | 610-436-3557 | www.wcupa.edu

TO: Blaire Cain

FROM: Nicole M. Cattano, Ph.D.
Co-Chair, WCU Institutional Review Board (IRB)

DATE: 11/15/2018

**Project Title:** **Immediate Effects of Mindfully Practiced Yoga on Mindfulness, Self-Compassion, Self-Criticism and Depressed Mood**

**Date of Approval:** 11/15/2018

☒**Expedited Approval**

This protocol has been approved for a period of one year. Approximately two months prior to the approval end date, you will receive a Continuing Review of Research form. Per Federal regulations, this form must then be completed as soon as possible and returned to the IRB at irb@wcupa.edu , even if the project has been completed or discontinued. Any revisions to this protocol that are needed before that time will require approval by the WCU IRB. Please see www.wcupa.edu/research/irb.aspx for more information.

***Any adverse reaction by a research subject is to be reported immediately through the Office of Research and Sponsored Programs via email at irb@wcupa.edu.***

**Signature:**

Co-Chair of WCU IRB

Table 1

*Frequencies and Percentages for Demographic Characteristics of Participants*

| Variable | n | % |
|---|---|---|
| Age | 151 | 100% |
| 18-21 | 145 | 96% |
| 22-25 | 6 | 4% |
| Gender | | |
| Female | 113 | 74.8% |
| Male | 37 | 24.5% |
| Transgender | 1 | 0.7% |
| Ethnicity | | |
| Black/African American | 30 | 19.9% |
| White | 106 | 70.2% |
| Hispanic/Latinx | 4 | 2.6% |
| Asian/Pacific Islander | 5 | 3.3% |
| Other/More than one | 6 | 4.0% |
| Yoga Experience | | |
| Never | 46 | 30.5% |
| 1-3 Times | 56 | 37.1% |
| 3-10 Times | 23 | 15.2% |
| >10 Times | 26 | 17.2% |

Table 2

*Means and Standard Deviations for Yoga versus Control Trials*

| Measure | Pre Yoga | | Post Yoga | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| SCS-SF | 36.40 | 5.0 | 2.63 | .51 |
| SC/A-SR(IS) | 18.18 | .97 | 14.77 | 1.0 |
| SC/A-SR(HS) | 2.20 | .44 | 2.23 | .42 |
| SC/A-SR(RS) | 25.30 | 5.0 | 25.58 | 5.1 |
| POMS-RV | 15.90 | 19.40 | 0.32 | 13.83 |
| MAAS | 3.81 | .62 | 3.86 | .89 |
| CAMS-R | 27.36 | 4.72 | 27.92 | 4.96 |
| Measure | Pre Control | | Post Control | |
| | *M* | *SD* | *M* | *SD* |
| SCS-SF | 36.51 | 5.0 | 2.80 | .41 |
| SC/A-SR(IS) | 18.22 | .91 | 16.57 | .94 |
| SC/A-SR(HS) | 2.93 | .43 | 2.73 | .41 |

| | | | | |
|---|---|---|---|---|
| SC/A-SR(RS) | 23.44 | 5.31 | 23.22 | 5.1 |
| POMS-RV | 18.80 | 18.30 | 18.70 | 13.83 |
| MAAS | 3.71 | .74 | 3.81 | 1.24 |
| CAMS-R | 25.90 | 4.76 | 25.97 | 5.21 |