J Relig Health (2011) 50:931–941
DOI 10.1007/s10943-009-9305-3

ORIGINAL PAPER

Mindfulness and Levels of Stress: A Comparison of Beginner and Advanced Hatha Yoga Practitioners

Nicholas M. Brisbon · Glenn A. Lowery

Published online: 1 December 2009

Abstract The present study was designed to examine mindfulness and stress levels in beginner and advanced practitioners of Hatha Yoga. Participants ($N = 52$) were recruited through Hatha Yoga schools local to western Massachusetts. Beginner practitioners ($n = 24$) were designated as those with under 5 years ($M = 3.33$) experience and advanced practitioners ($n = 28$) as those with over 5 years ($M = 14.53$) experience in Hatha Yoga. The participants completed the *Mindful Attention Awareness Scale* (*MAAS*; Brown and Ryan 2003) and the *Perceived Stress Scale* (*PSS*; Cohen et al. 1983) directly preceding a regularly scheduled Hatha Yoga class. Based on two independent-samples *t*-tests, advanced participants scored significantly higher in mindfulness levels ($P < .05$) and significantly lower in stress levels ($P < .05$) when compared to beginner participants. Additionally, a significant negative correlation ($r = -.45$, $P = .00$) was found between mindfulness and stress levels. No significant correlations were found between experience levels and mindfulness and stress levels. Hatha Yoga may be an effective technique for enhancing mindfulness and decreasing stress levels in practitioners.

Keywords Hatha yoga · Yoga · Meditation · Mindfulness · Stress · Awareness · Attention

Introduction

Meditative practice has been an integral part of many religious traditions throughout history. Actual technique differs between the various meditative practices; however, a relaxed breathing technique and focus on the present moment are universal (Broderick 2005). Breathing is done through the abdomen instead of the chest, which is more effective and allows a greater amount of air into the lungs (Arambula et al. 2001).

N. M. Brisbon (✉) · G. A. Lowery
Psychology Department, Springfield College, 263 Alden Street, Springfield, MA, USA
e-mail: N.M.Brisbon@gmail.com

G. A. Lowery
e-mail: glowery@spfldcol.edu

Many religions and spiritual movements have practiced meditation as a way to become more in tune with the present moment; however, psychological researchers have only recently recognized the practice of meditation to be beneficial to emotional well-being (Broderick 2005). The secular as well as the spiritual practice of meditation has gained popularity as research has shown that regular practice may increase overall physical health and decrease negative emotions such as anxiety and depression (Walton et al. 2002).

Yoga is a meditative practice based in Hinduism and Indian culture. Documentation of the practice of Yoga can be found in many Hindu texts, the earliest of which is the *Rig Veda*, believed to have been written between 1700 and 1100 BC (Hewitt 1977). There are many different forms of Yoga, which all have specific areas of focus, both physical and mental. Hatha Yoga, or "union by bodily mastery," has traditionally been considered a preparation for the more meditative form of Raja Yoga, which is referred to as "union by mental mastery." Through the practice of Hatha Yoga, a student learns to discipline the body, becoming physically healthy and relaxed. When this is achieved, the student can move on to the main aspects of Yoga, which involve inner mental work and introspection (Rama et al. 1976).

Hatha Yoga, specifically, is the form of Yoga that employs a number of different body positions, called asanas (Hewitt 1977). These positions, or asanas, are held in place for a period of time before moving to the next while utilizing a specific breathing technique. Although there is a focus on breath-work, and meditation is a component to Hatha Yoga, Hatha Yoga is more physical in nature than the other various forms of Yoga (Iyengar 2001). The asana is the physical component, increasing flexibility and circulation to certain areas of the body, depending on which asana is used. Movement is slow, and focus is placed on the body and how the body reacts to different asanas. Practitioners scan their bodies to become aware of stiff muscles, which they can then loosen until the posture is correctly attained. The abdominal breathing technique and focus of awareness onto the body are the mental component, with the focus of awareness to the present asana and physical experience helping to center the self in the present moment.

Because there is a focus of awareness to the present moment in meditation, the practitioner reaches a state of deep relaxation. Along with this are physiological changes resulting from a calming of the sympathetic nervous system, such as the lowering of breathing rate, blood pressure, heart rate, oxygen consumption, muscle tension, and a change in brain waves (Arambula et al. 2001; Murata et al. 2004; Telles et al. 2000). Due to these physiological changes and the mental focus on the present moment, meditative practice may help increase levels of mindfulness and decrease levels of stress in the practitioner.

One focus of research concerning Yoga has been that of physiological changes occurring with the practice. Heart rate is one of the focal points in research and was shown to reduce with Yogic practice. In a study conducted in India, a novice group of Yoga practitioners was compared to a control group measuring the ability to reduce heart rate voluntarily (Telles et al. 2004). The study consisted of two groups with 12 participants in each and ranging in age from 20 to 40 years. The Yoga group consisted of individuals who were inexperienced in Yoga and who were taking part in a 30-day introductory Yoga course. The control group included individuals, who had no Yoga experience, were recruited from a local institution and asked to simply go through their normal routine for the duration of the study. All participants were of equal educational background, were taking no medication, and had no medical condition that would have affected the outcome.

Participants in each group were assessed at the onset of the 30-day Yoga program and again at the termination (Telles et al. 2004). The method of assessment was an electrocardiogram (EKG). Participants were asked to sit quietly for 15 min prior to the assessment; their heart rate was recorded during this period as a baseline. Participants were then given 6 min to voluntarily reduce their own heartbeat, without suggestion as to how. The heart rate was recorded once every 30 s during the 6-min period. The Yoga group showed a significant reduction in both the baseline heart rate and the lowest heart rate achieved voluntarily after completion of the Yoga program. The control group, however, showed no change between the two assessments.

Little research has been conducted using Yoga experts, and most studies have involved participants with relatively little experience with the practice. Arambula et al. (2001) conducted a study in which a Yoga master with 32 years experience in many different forms of Yoga was recruited. The participant was a 59-year-old male and founder of his own school of Yoga. A form of Kundalini Yoga was used for the study, and the participant was seated in a shidda asana, or crossed leg posture, while a series of physiological data were recorded. The assessment began with 3 min of sitting quietly with eyes closed, followed with 15 min of eyes closed Yogic meditation, and ended with 3 min of sitting quietly with eyes closed. There were a total of three recordings taken; one during meditation and one during each of the pre- and post-baseline sittings.

There was a significant reduction in respiration during the meditation practice ($M = 5$ *breaths/min*) when compared with the pre- and post-baseline recordings ($M = 11$, 13, respectively; Arambula et al. 2001). During the Yogic practice, there was also enhanced alpha EEG activity and more theta EEG activity following the meditation and pre-baseline reading.

Kabat-Zinn (2005) referred to mindfulness as "moment to moment, non-judgmental awareness, cultivated by paying attention in a specific way, that is, in the present moment, and as non-reactively, as non-judgmentally, and as openheartedly as possible" (p. 108). Mindfulness may be more easily understood as the opposite of mindlessness (Langer 1989; Tart 1994). Langer (1989) gave three examples to understand the nature of mindlessness; trapped by categories, automatic behavior, and acting from a single perspective.

Many forms of meditative practice serve to center awareness to the present moment. This focus on the present does not promote a forgetting of past experience or of future goals; however, focus on the present does serve to eliminate the manner in which the individual dwells on them. Rumination is described as the random thoughts that fill the mind at any given time. Goleman and Schwartz (1976) found that mindfulness achieved through meditation helped decrease attachment to these ruminative thoughts. Participants were shown a series of workshop accidents, and although the meditation group displayed a heightened response to the accidents when compared to the control group, arousal returned to baseline more quickly with the meditation group. These and other similar results are suggestive that an increase in mindfulness through meditation will help practitioners become more deeply aware of emotions; while being less likely to attach to the emotions.

Various techniques have recently been developed, which serve to cultivate mindfulness in the practitioner. One of the more widely known of these techniques is the Mindfulness-Based Stress Reduction program, which has twenty-six years of clinical research documenting its effectiveness in the cultivation of mindfulness (Kabat-Zinn 1982; Shapiro et al. 2008). The current literature suggests that mindfulness-based meditative practices may aid in the treatment of various mental health problems as well as lead to a general improvement in the psychological functioning of the practitioner (Baer 2003; Carmody and Baer 2008; Kabat-Zinn 1982; Kabat-Zinn et al. 1992; Shapiro et al. 2008, 1998; Teasdale et al. 2000).

The term "stress" carries a broad range of meanings; however, in the field of psychology the term is understood to refer to the pressure that life events exert on an individual and to the way in which this pressure impacts emotions (McEwen and Lasley 2002). Stress is a normal part of life; however, if stress is allowed to build up over time, it can prove to be damaging to psychological as well as physical health. High stress levels can be detrimental to the physical and mental well-being of an individual (Selye 1976; Shapiro et al. 1998). With the increase in mindfulness and awareness to the present along with the physiological changes that occur with meditative practice, there may be a significant lowering of stress levels in the practitioner. Shapiro et al. (1998) conducted a study to determine the effects of an 8-week meditation practice on medical students. Stress levels were measured twice, once before the onset of the course and a final time at the completion. Initially, the meditative group was relatively equal to the control group in respect to stress levels. After the final measurement following completion of the meditation course, Shapiro et al. determined that a significant decrease in anxiety and depression as well as overall stress levels was present in the meditation group when compared to the control group.

The psychological effect meditation has on the practitioner is mostly considered a result of an increase in mindfulness (Maezumi and Glassman 2002). This increased awareness of the present moment can help an individual to let go of ruminative thoughts and not dwell on them, which may aid in the elimination of negative thought patterns. The increase in mindfulness along with the physiological effects of meditation may have a positive effect on stress levels.

In recent years, the practice of Hatha Yoga and other forms of meditation have increased in popularity. Some people take these practices into their lives for an increased clarity of mind or emotional balance and others for reasons more physical, such as increased circulation and flexibility. Although the origins of many of these techniques can be traced back to the ancient past, the techniques were practiced for more spiritual reasons and used to achieve higher states of consciousness, current researchers suggest that these techniques may offer many benefits to the physical and emotional health of practitioners, as well as aid in personal and spiritual development (Metzner 1998; Selye 1976; Shapiro et al. 1998; Tart 1975; Valente and Marotta 2005; Wilber 1977, 1999).

The purpose of the present study was to examine mindfulness and stress levels in beginner and advanced practitioners of Hatha Yoga. Hatha Yoga was specifically chosen because current research on meditation tends to focus on more recently developed techniques, such as *Mindfulness-Based Stress Reduction* (*MBSR*; Kabat-Zinn 1982) and that more traditional forms of meditative practice may be overlooked because of this. The researcher hypothesized that the advanced practitioners would show higher levels of mindfulness and lower levels of stress compared with beginner practitioners. The current investigation was also designed to determine the relationships between levels of mindfulness, stress, and experience with Hatha Yoga. The results may help meditative practices such as Hatha Yoga become more widely recognized for their benefits to the overall health of the practitioner.

Method

The current study was designed to examine the levels of mindfulness and stress in practitioners of Hatha Yoga meditation. The objective was to determine whether (a) there exists a difference in the levels of mindfulness and stress between beginner and advanced practitioners; and (b) a relationship exists between levels of mindfulness, stress, and

experience. The *Mindful Attention Awareness Scale* (*MAAS*; Brown and Ryan 2003) and the *Perceived Stress Scale* (*PSS*; Cohen et al. 1983) were used to measure levels of mindfulness and stress, respectively. *MAAS* and *PSS* scores were compared between the beginner and advanced Yoga practitioners. The method section contains the following subsections: participants, measuring instruments, procedures, and statistical analysis.

Participants

The study included two groups. One group consisted of beginners and the other group consisted of advanced Hatha Yoga practitioners. The beginner group ($n = 24$) consisted of those individuals having between 1 and 5 years experience ($M = 3.33$, SD = 1.13) in Hatha Yoga. The advanced group ($n = 28$) consisted of participants ranging in experience from 6 to 30 years ($M = 14.54$, SD = 8.02). The age of participants ranged from 21 to 65 years, with an average age of 43.8 years. In total, there were 6 male and 46 female participants ($N = 52$). All participants were recruited from western Massachusetts.

Measuring Instruments

Three instruments were used during this study. Levels of mindfulness were measured using the *MAAS* (Brown and Ryan 2003). Levels of stress were measured using the *PSS* (Cohen et al. 1983). Also, a short demographic questionnaire was used.

Mindfulness

Brown and Ryan (2003) defined mindfulness as "an enhanced attention to and awareness of current experience or present reality" (p. 822). Mindfulness was measured using the *MAAS* (Brown and Ryan 2003). The *MAAS* consists of 15 statements used to measure the level of attention to and awareness of the present moment. Participants respond to each of the 15 statements on a 6-point Likert-type scale ranging from 1 (almost always) to 6 (almost never), and a total score is provided ranging from 15 to 90. The total score is then used to compute the mean. Higher scores indicate higher levels of mindfulness.

Evidence for the reliability and validity of the *MAAS* has been reported (Brown and Ryan 2003; Carlson and Brown 2005). The Cronbach alpha coefficient for the *MAAS* has been recorded as .87 (Carlson and Brown 2005) and as .81 (Brown and Ryan 2003). Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) have provided evidence for the construct and criterion validity, as well as the structural invariance of the *MAAS* (Carlson and Brown 2005; Mackillop and Anderson 2007).The *MAAS* has been shown to be a reliable measure in both college and general adult populations (Brown and Ryan 2003).

Stress

Stress was measured using the *PSS* (Cohen et al. 1983), which is a measure of perceived stress or "the degree to which situations in one's life are appraised as stressful" (p. 387). The *PSS* consists of 14 questions designed to measure to what degree certain current situations are appraised as stressful. The questions on the *PSS* ask how often in the last month the participant has felt a certain way. Participants respond to each of the 14 questions by use of a 5-point Likert-type scale ranging from 1 (never) to 5 (very often) and

provide a total score ranging from 14 to 70. The total score is the sum of the score for each question. Items 4, 5, 6, 7, 9, 10, and 13 on the *PSS* are positively stated and reverse scored.

The reliability and validity of the *PSS* (Cohen et al. 1983) have been reported (Cohen et al. 1983; Cohen and Williamson 1988). The Cronbach alpha coefficient for the *PSS* has been recorded as .75 (Cohen and Williamson 1988) as well as .84, .85, and .86 in each of three samples. Test–retest for a 2-day period was .85 (Cohen et al. 1983). Construct validity of the *PSS* has been examined and found to be acceptable (Cohen and Williamson 1988).

Demographic Questionnaire

A demographic questionnaire was given to each participant to categorize for experience level. The questionnaire consisted of four questions, which were used to determine age, gender, experience level, and whether or not the participant practiced any other form of meditation.

Procedures

Following approval by the Institutional Review Board, participants were contacted through Hatha Yoga schools local to western Massachusetts, specifically Hampshire County. The directors of each school were contacted and provided a letter requesting permission to recruit students enrolled in their school. This letter consisted of an explanation of the present study, characteristics of the possible participants, procedures, and permission to administer the scales before the start of each class.

Before the start of each class, participants were given a brief introduction to the purpose of this study and also an informed consent form. Participants who agreed to participate were asked to fill out the demographic questionnaire and complete both the *MAAS* (Brown and Ryan 2003) and the *PSS* (Cohen et al. 1983). Data collection took place before the scheduled Yoga class in the area of each school where students congregated prior to practice. The total span of time allotted for data collection was approximately 20 min before each class.

Statistical Analysis

Two independent-samples *t*-tests were performed to determine whether statistically significant differences existed in mindfulness and stress levels between beginner and advanced practitioners of Hatha Yoga. The independent variable was the experience level of the participant in regard to Hatha Yoga, and there were two levels, beginner and advanced. The dependent variables were scores on the *PSS* (Cohen et al. 1983) and the *MAAS* (Brown and Ryan 2003). The alpha level was set at .05, and SPSS version 15.0 was used to compute the statistics. In addition, three Pearson product-moment correlation coefficients were computed for number of years in Hatha Yoga practice and scores on the *PSS* (Cohen et al. 1983) and scores on the *MAAS* (Brown and Ryan 2003).

Results

The present study was designed to compare the levels of both mindfulness and stress in beginner and advanced practitioners of Hatha Yoga. In addition, the relationships among levels of stress, mindfulness, and experience were determined.

Table 1 Descriptive statistics for beginner and advanced groups of Hatha Yoga practitioners

Variable	Beginner ($n = 24$)		Advanced ($n = 28$)	
	M	SD	*M*	SD
Age	41.00	13.00	46.20	10.50
Experience (years)	3.33	1.13	14.53	8.02

In the two groups, beginner and advanced, there were more female participants than there were male, although gender distribution was similar. There were 24 participants (beginner = 12, advanced = 12) who documented that they practiced another form of meditation in addition to Hatha Yoga. Descriptive statistics of participants are summarized in Table 1.

Levene's test for equality of variances was used to determine whether the variance of the beginner group and advanced group for scores on both the *PSS* and *MAAS* was similar. No significant ($P > .05$) difference was found in the variances on either the *PSS* ($P = .258$) or the *MAAS* ($P = .785$). Thus, the assumption of homogeneity of variance was met for both tests.

Two independent-samples *t*-tests were performed to determine whether significant differences existed in mindfulness and stress levels between beginner and advanced practitioners of Hatha Yoga. Beginner practitioners ($M = 34.92$, SD = 6.93) scored significantly higher ($P = .00$) on the *PSS* (Cohen et al. 1983) when compared with advanced practitioners ($M = 29.82$, SD = 4.98). Advanced practitioners ($M = 4.62$, SD = 0.51) scored significantly higher ($P = .03$) on the *MAAS* (Brown and Ryan 2003) when compared with beginner practitioners ($M = 4.28$, SD = 0.59). The results are summarized in Table 2.

Pearson product-moment correlation coefficients were computed among the number of years of Hatha Yoga practice and scores on the *PSS* (Cohen et al. 1983) and scores on the *MAAS* (Brown and Ryan 2003). No significant correlations were found between experience level and scores on the *PSS* ($r = -.11$, $P = .42$) as well as between experience level and scores on the *MAAS* ($r = .22$, $P = .11$). A significant negative correlation was found between scores on the *PSS* and the *MAAS* ($r = -.45$, $P = .00$). The results are summarized in Table 3.

Table 2 Independent groups *t*-tests comparing mindfulness and stress scores of beginner and advanced groups of Hatha Yoga practitioners

Variable	*n*	*M*	SD	*t*	*P*
PSS					
Beginner	24	34.91	6.93	3.07	.00*
Advanced	28	29.82	4.98		
MAAS					
Beginner	24	4.28	0.59	−2.19	.03*
Advanced	28	4.62	0.51		

PSS perceived stress scale (Cohen et al. 1983), *MAAS* mindful attention awareness scale (Brown and Ryan 2003)

* Significant at the .05 level (2-tailed)

Table 3 Pearson product-moment correlation coefficients for experience level and scores on the PSS and MAAS ($N = 52$)

	MAAS	PSS
Experience	.22	−.11
MAAS		−.45**

PSS perceived stress scale (Cohen et al. 1983), *MAAS* mindful attention awareness scale (Brown and Ryan 2003)

** Correlation is significant at the .01 level (2-tailed)

Discussion

In the present study, beginner and advanced practitioners of Hatha Yoga were compared on levels of mindfulness and stress. The researcher indicated that advanced practitioners did exhibit higher levels of mindfulness and lower levels of stress when compared to beginner practitioners. Additionally, a moderate negative correlation was found between mindfulness and stress levels. No correlations were found between experience levels and mindfulness and stress levels.

The majority of the current researchers have mainly focused on the effects of short-term meditation programs, such as the *Mindfulness-Based Stress Reduction* (*MBSR*; Kabat-Zinn 1982) program and usually make use of control groups and pre- and post-testing (Galantino et al. 2005; Jain et al. 2007; Lavey et al. 2005; Murata et al. 2004; Oman et al. 2006; Shapiro et al. 1998, 2007; Telles et al. 2004). The present study is, perhaps, the first in which levels of mindfulness and stress between beginner and advanced practitioners of Hatha Yoga were compared. Participants had all been training in local Hatha Yoga schools before the present study began, and many participants were longtime practitioners. The researcher also examined correlations among levels of mindfulness, stress, and experience in Hatha Yoga.

Valentine and Sweet (1999) compared mindfulness meditation with concentrative meditation and found that both forms increased mindfulness and attention when compared with a control group. The researchers also concluded that long-term practitioners exhibited higher levels of mindfulness when compared with short-term practitioners. In the current study, levels of mindfulness of those in the advanced group were found to be higher than those in the beginner group. In addition, the stress levels of those participants in the advanced group were found to be lower than those participants in the beginner group. These results are consistent with previous research; with higher experience levels of meditative practice, such as Hatha Yoga, higher mindfulness levels in the practitioner result, which may help decrease levels of stress (Easterlin and Cardena 1998; Oman et al. 2006; Ramel et al. 2004; Valentine and Sweet 1999).

Additionally, a low to moderate negative correlation was found between mindfulness and stress levels, indicating that as the level of mindfulness increased, the stress level decreased. This relationship between mindfulness and stress was supportive of previous research and suggests that mindfulness may be the specific mechanism by which these various meditative practices decrease stress levels in the practitioner (Jain et al. 2007).

The current study was limited in several ways. The main limitation was that of adequately measuring experience level of the participants. In the present study, no relationship was determined between experience level and either mindfulness or stress levels. This may be due, in part, to the way in which experience levels were measured. Participants were

asked how many years they had practiced Hatha Yoga, and this information was later used to designate the participants to either the beginner or the advanced groups. Although this method of measuring experience level does reveal the total duration of practice, the measure does not offer any knowledge regarding consistency of practice. Two individuals who have practiced Hatha Yoga for the same number of years may differ in measures of stress and mindfulness if the consistency of practice differs between both individuals.

In the present study, psychological measures were completed at each Hatha Yoga School directly preceding a class in which participants were members. The measures were given before the class so that the practice of Hatha Yoga would not have a direct influence on the results. The researcher speculated that the recruitment of participants directly before a class would yield more accurate results, as opposed to after a class when participants would likely feel more relaxed and centered due to the meditative practice. Even with taking this precaution, the school environment itself may have had a calming effect on the participants because this would be the environment in which they normally practice. This calming effect could lead some participants to perceive their current life situation as less stressful than it may normally be.

A further limitation was due to the fact that data collection for this study took place during a span of approximately 20 min prior to each class. Even though all participants fully completed the study in the time allowed, some participants may have been influenced by the time constraint. If participants felt at all pressured to finish in the time given, they may not have been able to dedicate enough time to each item on the psychological measures, and this may have influenced their final score.

A final limitation of the study was that of generalizability. Most participants were women and due to this it is uncertain whether results apply to men as well. The present results may generalize to other self-selected populations and may not apply to the general population.

In future research, a study similar to the present one could take these limitations into consideration. If the researcher could measure experience level by consistency of practice as well as length of time, this could lead to more accurate results. Also, beginner and advanced groups could be compared with a group that practices a different form of meditation to explore whether or not other forms of meditative practice yield similar results to Hatha Yoga. Finally, additional psychological measures could be utilized and issued to participants in a more controlled and neutral setting, such as a classroom. In selecting a more controlled and neutral setting, the researcher could also allow more time for participants to complete the study. A study such as this could be used to confirm and expand on the results of the present study.

Researchers have demonstrated how mindfulness may be a key factor in how various meditative practices help to improve overall emotional balance and decrease stress levels in practitioners (Jain et al. 2007; Ramel et al. 2004). Meditative techniques have been practiced throughout human history and as part of a wide variety of cultures. A recent increase in the popularity of these techniques has led to the development of scientific inquiry into the subject. In the coming years, continued research may shed more light on the nature of meditative practice, the various benefits toward physical and psychological health, and the potential applications in the mental health field or even the education system.

In conclusion, the researcher indicated that advanced practitioners of Hatha Yoga have higher levels of mindfulness and lower levels of stress when compared to beginners. Also, an inverse relationship between mindfulness and stress levels was determined, but no relationship existed between experience and either mindfulness or stress.

The practice of Hatha Yoga continues to be a promising area of research in the field of psychology, and the other sciences as well. The findings of the present study serve to confirm previous research (Easterlin and Cardena 1998; Jain et al. 2007; Oman et al. 2006; Ramel et al. 2004; Valentine and Sweet 1999) in the area of meditation, Hatha Yoga specifically, and applications to mental health and emotional well-being.

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