

## Self-reported measures of mindfulness in meditators and non-meditators: A cross-sectional study

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### ABSTRACT

**Context:** Mindfulness forms an important component of meditation practice and has been increasingly popular around the world. There has been growing interest in studying the mindful component of various meditation techniques. One of the various forms of mindfulness is the practice of a unique technique called cyclic mediation (CM). We aimed at ascertaining the level of mindfulness in experienced practitioners of CM using a Mindfulness Attention Awareness Scale (MAAS).

**Materials and Methods:** MAAS was administered anonymously in a classroom setup and two of the project coordinators were present to supervise the administration and to assist the participants where necessary. We executed a cross sectional design. One hundred and thirty-three ( $n = 133$ ) healthy male volunteers (66 meditators and 67 non-meditators) with ages ranging from 25 to 35 years participated in the study. Meditators had a minimum 3 years experience of meditation.

**Results:** Data were analyzed using IBM SPSS 20. The data were checked for normality and an independent samples  $t$ -test was employed to compare the means of both the groups. MAAS scores were significantly higher in meditators as compared with the non-meditators ( $P < 0.001$ ). We found a positive correlation ( $r = 0.620$ ) between the years of meditation practice and the levels of trait mindfulness.

**Conclusions:** CM can lead to development of higher levels of mindfulness and may have the ability to positively impact mental states and attention, thereby offering the potential for prevention of clinical levels of psychopathology and improving overall psychological well-being in healthy individuals.

**Key words:** Attention; cyclic meditation; meditation; mindfulness; yoga

### INTRODUCTION

Mindfulness refers to an awareness that emerges by paying attention to purpose and to the present moment and nonjudgmentally focusing on the unfolding of one's immediate experience.<sup>[1]</sup> More recently, mindfulness has been proposed as a cognitive behavior, rather than physiological, paradigm for meditation. Mindfulness aims to develop enhanced awareness of the moment-to-moment experience of perceptible mental processes<sup>[2]</sup> and forms an important component of meditation practices. Initially, a meditator engages in focused concentration or attention

over an object and as one grows in his practice, he leans towards the attentional disengagement or open monitoring.<sup>[3]</sup> Meditation imbibes an initial phase of mindfulness, making mindfulness a key determinant of meditation practice.

During the last decade, scientific interest in meditation and mindfulness practice has seen an explosive and unprecedented surge. Several studies have been conducted across the globe to report the development of mindfulness and its effects on health and well-being. One such study conducted on a martial art technique – Aikido using a Mindfulness Attention Awareness Scale (MAAS) concluded that consistent practice of Aikido leads to development of mindfulness.<sup>[4]</sup> Another study on insomnia in menopausal women reported that postmenopausal women with insomnia are less mindful than women without insomnia, thereby concluding that mindfulness-based interventions, such as meditation, may be beneficial for postmenopausal insomnia.<sup>[5]</sup> A study assessing the health risk behavior in

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adolescents concluded that mindfulness possibly shields against decision-making processes that place adolescents at risk for smoking.<sup>[6]</sup> There are several others studies looking at the effects of mindfulness on neurological and psychiatric diseases and also assessing the levels of mindfulness in normal and diseased individuals.<sup>[4-8]</sup> Most studies use MAAS as a tool for measuring mindfulness. One of the studies reviewing the instruments of measuring mindfulness concluded that the MAAS was used by most studies ( $n = 27$ ) and had positive overall quality ratings for most of the psychometric properties reviewed.<sup>[9]</sup> Given the fact that past studies have looked at the levels of mindfulness in various practices, health and disease conditions, we planned the current study to assess the levels of mindfulness in a moving meditation practice.

One of the various forms of mindfulness is the practice of a unique technique called cyclic mediation (CM). CM is a moving meditation derived from an ancient Indian text, *Mandukya* Upanishad.<sup>[10]</sup> It was fundamentally designed for novice practitioners and combines the practice of yoga postures with guided meditation. CM is known to induce a quiet state of mind, which is compatible with the description of meditation (*dhyana* or effortless expansion), according to Patanjali.<sup>[11]</sup> Although this moving meditation differs from the classic description of meditation, in which the practitioners remain seated, keeping as still as possible, the mental state in both practices (moving meditation and seated practices) is supposed to be comparable.<sup>[12]</sup> An essential part of the practice of CM is being aware of sensations arising in the body,<sup>[10]</sup> which emphasize the mindful component.

There have been several studies which have proven the beneficial effects of CM. In one of the studies conducted on middle managers, CM program decreased occupational stress levels and baseline autonomic arousal in 26 asymptomatic, male, middle managers.<sup>[13]</sup> Studies conducted to ascertain the effects of CM practice reported a decreased oxygen consumption indicating physiological relaxation as in mindfulness.<sup>[14]</sup> Few studies looking at the immediate effects of CM concluded that it improves attention, cognition, enhances slow wave sleep, and reduces anxiety.<sup>[12,15-17]</sup> Mindful yoga practices (like CM) may generate the state of mindfulness, which, when evoked recurrently through repeated practice, may accrue into trait or dispositional mindfulness.<sup>[18,19]</sup> Despite several studies on CM, none have reported its mindful component. The current study aimed at investigating the level of mindfulness in experienced cyclic meditators. We also report the correlation between the years of meditation experience and the level of mindfulness.

## MATERIALS AND METHODS

One hundred and thirty-three ( $n = 133$ ) healthy male volunteers (66 meditators and 67 non-meditators) with ages

ranging from 25 to 35 years [group mean age  $\pm$  standard deviation (S.D.),  $24.6 \pm 4.5$  for meditators and  $24.1 \pm 4.7$  for non-meditators] participated in the study. Meditators were selected from S-VYASA Yoga University, South India and corresponding non-meditators (controls) matched for age, gender, and education were obtained from similar institutes in Bangalore, India. Meditators had a minimum 3 years experience of meditation (group mean experience  $\pm$  S.D.,  $5.12 \pm 1.35$  years). Non-meditators had no exposure to any yoga practices and were unaware of the aims of the study. Subjects with cognitive deficits ruled out by routine clinical examination were excluded from the study. This study was approved by the institutional ethics committee and a signed informed consent was obtained from all the subjects following explanation of the study.

The questionnaire was administered in a classroom setup (for approximately 30 min) and two of the project coordinators were present to supervise the administration and to assist the participants where necessary. The questionnaire was administered to 155 participants. All the participants filled out the questionnaire, but for whom more than 10% of the items were missing or whose reports were considered unreliable (i.e., consistently rated the highest or the lowest scores on all items), were excluded from the analyses ( $n = 06$ ; 4%). The subjects participating in this study had higher educational qualifications with almost 90% of the participants being postgraduates.

## Design

This was a cross-sectional study, where subjects (meditators) were recruited from S-VYASA Yoga University and other Universities (non-meditators) by convenience sampling.

## Assessments

We assessed mindfulness using the popular MAAS. MAAS is a 15-item self-reported single-factor scale that is exclusively focused on attention/awareness component of mindfulness construct. This instrument has been independently used to assess individuals either with or without meditation experience.<sup>[20]</sup> This scale has been widely used for various studies and has reported positive overall quality ratings for most of the psychometric properties reviewed.<sup>[9]</sup> MAAS is a brief, easy to administer scale, and has therefore been used in wide range of studies related to assessing mindfulness trait. MAAS is known to have good reliability ratings and a history of clinical and research use that was developed to assess the core attentional aspect of mindfulness, and the capacity for moment-to-moment attention in particular.<sup>[11]</sup> The MAAS consists of 15 items that measure the level of mindfulness (example items are “I could be experiencing some emotion and not be conscious of it until some time later”, or “I find it difficult to stay focused on what’s

happening in the present”). The items are answered on a six-point scale (1 = Almost always; 6 = Almost never) on which higher scores are an indication of higher trait mindfulness.

The MAAS has been validated in various samples of students ( $\alpha = 0.82$ ) and adults from the general community ( $\alpha = 0.87$ ).<sup>[1]</sup>

### Data extraction

The questionnaire was scored by computing a mean of the 15 items in the questionnaire. The data were tabulated for each subject to be subjected for analysis.

### Data analysis

Data were analyzed using IBM SPSS 20. The data were checked for normality and an independent samples *t*-test was employed to compare the means of both the groups. We also calculated the partial correlation (*r*) between the years of meditation experience against the levels of mindfulness.

For all the analysis, we present 95% confidence intervals and considered  $P < 0.05$  as significant.

## RESULTS

MAAS scores were significantly higher in meditators as compared to with the non-meditators (independent samples *t*-test,  $t = 10.391$ ,  $P < 0.001$ ). The 95% confidence interval for the difference in the levels of mindfulness trait between meditators and non-meditators was (1.05, 1.55).

We found a positive correlation ( $r = 0.620$ ) between the years of meditation practice and the levels of trait mindfulness.

Group mean values  $\pm$  S. D. are given in Table 1.

## DISCUSSION

In the present study, we studied trait mindfulness and its correlation with duration of meditation practice using a MAAS. We found that meditators had higher levels of trait mindfulness and were positively correlated with the duration of meditation practice.

While there are known differences between Buddhist views of mindfulness and modern psychological adaptations, there is broad agreement that a clearly formulated mental training, usually referred to as meditation, is required for developing and improving levels of mindfulness.<sup>[21]</sup> The practice of CM involves physical postures (asanas), breath work, physical and mental awareness together leading to a state of meditation.<sup>[10]</sup> Mindfulness develops as a result of consistent practice or attempt of meditation practice. According to Patanjali, development of meditation (*dhayana*) is a process and takes a series of practices, which together are called *Ashtanga* yoga – the eightfold path to reach the highest state of consciousness. One reaches the state of mindfulness or meditation or *Antaranga* yoga as a result of continued and consistent practice of the first six limbs of yoga.<sup>[22]</sup> Our results are very much in accordance with *Patanjali's* concept of the process of development of mindfulness and meditation. Another school of yoga, Hatha yoga comprises practices of postures, breath work, and cleansing practices, all aimed at striking a balance between the body and the mind. Consistent practice of these hatha yoga techniques transforms the practitioner and establishes him in the state of mindfulness and meditation.<sup>[23]</sup> The meditation technique practiced in the current study comprises all these components, which justifies the higher levels of mindfulness in the meditation group. Also, higher levels of trait mindfulness in CM practitioner can be accredited to the years of CM practice, which would have lead to the development of mindful trait in the meditators as signified by the positive correlation between level of mindfulness and the duration of meditation practice.

The findings of the present study are in line with earlier studies on trait mindfulness in meditators. Highly experienced Zen meditators showed similar trends where levels of mindfulness were found to have strong positive correlation to the years of meditation experience.<sup>[1]</sup> The results of this study indicate that MAAS is sensitive to individual differences in levels of mindfulness and suggest that the higher scores among those consciously practicing this skill are due to such training. An 8-week Mindfulness-Based Stress Reduction (MBSR) program showed increase in the trait mindfulness of the participants, which mediate the effects of training on clinical outcomes.<sup>[24,25]</sup> In a similar study, 8 weeks of yoga training resulted in significant increases in trait

**Table 1: Mean total scores of meditators and non-meditators on the Mindfulness Attention Awareness Scale. Values are mean  $\pm$  standard deviation**

Characteristic	Meditators (n=67)	Non-meditators (n=68)	Effect size ( <i>r</i> )	Partial correlation with meditation experience ( <i>r</i> )
Mean age	24.6 $\pm$ 4.5	24.1 $\pm$ 4.7	0.054	0.045
Years of education	15.13 $\pm$ 1.57	14.12 $\pm$ 1.76	0.290	0.026
Mindfulness Attention Awareness Scale	4.69 $\pm$ 0.72***	3.39 $\pm$ 0.72	0.670	0.62

\*\*\* $P < 0.001$ , Independent samples *t*-test

mindfulness of practitioners.<sup>[26]</sup> Another study with cancer patients undergoing 8-weeks of MBSR, showed improved levels of mindfulness and lowered mood disturbances and symptoms of stress.<sup>[27]</sup> A similar study like ours, comparing two different meditation techniques concluded that meditation improves the levels of mindfulness regardless of the meditation technique.<sup>[28,29]</sup>

Studies explaining the underlying mechanisms of development of mindfulness have been its stage of infancy. There is very little research focusing on the mechanisms of mindfulness. However, if mindfulness is considered to be a component of self-awareness and meditation, one of the studies reports the role of frontal control systems in neuroanatomical models of self-awareness.<sup>[30]</sup> Several neuroimaging and Electroencephalography (EEG)/Event Related Potentials (ERP) studies have shown changes in activation of prefrontal cortex (PFC) and the anterior cingulate cortex (ACC), as well as significant increases in alpha and theta activity during meditation. This pattern of activation is commonly associated with meditation and relaxation.<sup>[31]</sup> There is substantial evidence of changes in PFC during mindfulness meditation, which is known to be associated with attention, concentration, and emotion regulation. In another study, individuals with higher levels of mindfulness demonstrated less emotional reactivity in the midbrain (amygdala, dorsal ACC), which is likely due to an enhanced ability to engage the PFC.<sup>[32]</sup> Functional magnetic resonance imaging studies comparing experienced mindfulness meditators and novice controls have suggested increased neuronal activity in regions of the brain related to self-awareness (e.g., dorsolateral and medial PFC), particularly momentary self-awareness/self-reference.<sup>[33]</sup> Majority of the studies on mindfulness meditation and other mindfulness training programs have demonstrated significant changes in the PFC. These findings show promise for the individual's ability to train the mind, changing not only emotional experiences, but also brain structure and functioning; moreover, the ability to do so appears to improve over time as experience with meditation increases.

One of the limitations of our study is that the meditators participating in this study lived in a yoga institute and practiced other yoga techniques. Therefore, we are not sure if the development of higher levels of mindfulness is due to the meditation practice or an influence of other yoga practices. Further studies should be conducted on subjects practicing only CM and not adhering to any other yoga practices. Another limitation could be the small sample size. Given the huge number of yoga practitioners in today's date, studies with larger sample sizes are warranted.

## CONCLUSION

Consistent practice of moving meditation practices like CM can lead to development of higher levels of mindfulness.

This may positively impact mental states and attention, which can in turn help psychological well-being of individuals. This furthers the scope for clinical trials with CM as an intervention in the management of psychological disorders.

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