Chapter 5

Discussion and Conclusion

According to *Time* magazine (Pickert, 2014), this is the age of the mindfulness revolution. With the volume of literature and independent studies conducted in diverse contexts, there is overwhelming evidence and a popular consensus that there are various benefits and positive impacts of long term mindfulness practice. However, it is interesting to note that most of these studies were conducted among long term seasoned meditators. There is no sufficient evidence investigating the effect of short format mindfulness, especially body-scan meditation. This study aimed to fill that gap and attempted to find whether or not the short term body-scan technique of mindfulness meditation has an impact on affectivity and cognitive functions.

The study applied an experimental research design by randomly assigning the participants to an experimental group, receiving the 6-day short format mindfulness practice as an intervention, versus an active control group where participants spent the same amount of time reading texts of their choice and listening to soothing music. The baseline comparison of measures of all eight variables, except the measures of MAAS-State, was found to be not statistically significant. It is a characteristic result of any randomization process. One must note that the measures of all variables were taken after the randomization. Although participants were initially assigned to either the experimental or the active control groups through random allocation, participants knew their group while measures were taken. This can explain the slight difference in means of measures of MAAS-State at baseline between mindfulness and active control. Even
though participants voluntarily consented to be a part of the study and they were explained in detail about the nature of the study before they decided to participate, it was always likely that the participants, especially in the experimental group, could become curious and uncertain about the activity that might have caused the difference of baseline measures between the experimental and the active control group. It could have been avoided by randomly assigning the participants after taking the baseline measures. This way the participants would not have known about the group to which they were going to be assigned. If there was any factor that may have caused the difference, it would have automatically been addressed as it would have spread in both groups. This study could not apply this method because the baseline measure of the active control group was taken after the completion of the intervention among the experimental group. It was logistically not possible to conduct both the experimental and the active control group at the same time. Conduction of both experimental and active control group would have addressed that limitation.

The experiment results showed that short-term practice of body-scan mindfulness meditation could change affect by reducing the level of negative affect and increasing the level of positive affect with effect sizes ranging from mild to moderate. Similarly, there was a positive change in psychomotor function, attention, learning, simple memory, and emotional, social cognition as a result of the practice of body-scan meditation.

Understanding these changes in affect and cognitive function, induced through the practice of body-scan mindfulness meditation, requires insight into the mechanism of
mindfulness. Two separate lines of inquiry that are complementary to each other are proposed in an attempt to understand the concept of mindfulness; 1) first, by investigating and comparing the effect of mindfulness and looking into its active ingredients such as relaxation, behavioral and cognitive functions, and 2) second, by examining the mechanism of mindfulness and evaluating if the development of mindfulness state itself could lead to positive changes that are found to be associated with mindfulness (Shapiro, Carlson, Astin, & Freedman, 2006). Looking into the results obtained in this study based on the first line of inquiry, we find the following results. The positive changes, decrease in negative affect and increase in positive affect, and increased cognitive performance on the five cognitive functions, is consistent with the results that are usually associated with mental training involving long term practices (Slagter et al., 2007). These results are also consistent with the neural and behavioral evidence associated with mindfulness retreats (Lutz et al., 2009).

It is evident from this study that the mere practice of mindfulness body-scan for as few as 6-days could bring measurable changes, emphasizing results from earlier studies on short-term training. It points to the potential scalability of mindfulness, which has also been indicated in a study of compassion and short-term mindfulness training by Lim, Condon, and DeSteno (2015). Additionally, it builds the robust ground for short-format mindfulness training. This empirical finding also concurred with the observation made by the investigator in this study. Participants, in general, reported that they felt good overall and that they were able to focus and concentrate better in comparison to the beginning of the practice. Some participants also indicated that they were able to concentrate and pay
attention then before during the practice period and after the practice period in their daily activities. While these experiences were largely self-reported with no empirical way to verify them, it appears that these anecdotes are consistent with the objective observations made, especially on affect and the five cognitive functions including psychomotor function, attention, memory-simple, learning and social-emotional cognition. It is important to note that this study did not examine the sustainability of the mindfulness practice, and it also didn’t compare the results with long-term practice. Studies in future may attempt to consider these questions of sustainability and comparison between short-term and long-term mindfulness to find out how long it requires for one to practice mindfulness to attain irreversible changes through. Also, one needs to look into the duration of each practice in each training session and length overall in terms of the total span of practice and compare the results with long-format mindfulness training.

In addition, these findings can be understood through a mechanism that sees mindfulness as an embodiment of three axioms, namely intention, attention, and non-judgmental attitude (Shapiro, Carlson, Astin, & Freedman, 2006). Although the proposed mechanism does not have far reaching acceptance, it appears to be most plausible leading to a theory of reperceiving that leads to a significant shift in one’s perspective. Reperceiving is a meta-cognitive mechanism. According to this point of view, these three axioms are interwoven aspects of a state of mindfulness occurring separately and simultaneously. Attention leads to the intention that in turn leads to a non-judgmental attitude and vice versa, as well as attention and attitude affecting each other. Here, attention means observing one’s moment to moment operations, including both internal
and external experiences. The intention is an awareness of the purpose of the practice of mindfulness. Attitude refers to a non-judgmental attitude indicating a particular way of paying attention. This mechanism appears to be an elaborate description of the definition of mindfulness by Kabat-Zinn (2006). The reperceiving process as a result of mindfulness practice explains the changes in physiological, behavioral, and cognitive measures that are observed in this study. The concept of reperceiving is similar to the idea of cognitive diffusion in which an individual focuses on changing one's relationship with thought instead of changing the thought itself (Hayes, Levin, Plumb-Vilardaga, Villatte, & Pistorello, 2013) which is a major impetus in Acceptance and Commitment Therapy (ACT) model.

The positive changes in affect and cognitive function could also be discussed from a perspective based on neural mechanisms. Deactivation of default mode network (DMN) during the practice of meditation is consistently associated with the practice of meditation (Baerentsen et al., 2010; Hasenkamp, Wilson-Mendenhall, Duncan, & Barsalou, 2012). DMN is considered as a network of the brain that is functional during the restful or non-goal-directive period, working as “housekeeping,” to perform tasks that are necessary in maintaining the autobiographical self, i.e. maintaining a sense of self and identity. This network is also thought to handle the generation of spontaneous thoughts during the straying of mind (Germer, Siegel, & Fulton, 2013). These studies also found that the areas of the brain that control attention and other cognitive functions are more active during meditation in contrast to restful time (Baerentsen et al., 2010; Hasenkamp, Wilson-Mendenhall, Duncan, & Barsalou, 2012). This underlying neural mechanism
could explain increased performance in cognitive functions in the study, especially in psychomotor, attention, memory-simple, and learning. Alerting, orienting and executive attention are considered as the domains of attention. Better regulatory functions as a result of mindfulness can be due to the activation of the anterior cingulate cortex (ACC) and the midline prefrontal cortex that are often associated with meditative practices (Siegel, 2007). The increase in performance attention domains can also be understood through attention restoration theory (Berman, Jonides, & Kaplan, 2008). Berman, Jonides, and Kaplan, while studying the benefit of interaction with nature, showed that interaction with nature in comparison to urban environments results in better working memory performance. They posit that an individual engages with bottom up process when they interact with nature by allegedly letting the top down mechanism to replenish. They view meditation as similar process as individual’s interaction with nature.

One study investigated the thickness of the brain’s gray matter among lay practitioners versus non-practitioners matching control using FMRI (Lazar et al., 2005). Gray matter refers to the area of the brain where neural activity is very high in comparison to white matter that is widely responsible for long distance communication in a body. The result showed the first empirical evidence that meditation practice can induce cortical plasticity of the brain. This result was consistent with other similar studies. For example, another study found that long-term meditation could increase cortical thickness in the sensory cortex, anterior insula, and regions that are involved in observing external and bodily sensations (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007). Interestingly, these results are based on long term effect of meditation, and similar effects
or changes cannot be predicated on short-term practice. However, increased cognitive performance measured immediately after short-term mindfulness practice can be due to increased activity in the areas of the brain that are mostly responsible for these functions even though performance may not sustain for long. The sustainability of the enhanced performance in short format meditation is a separate line of inquiry that requires further examination. However, this study was able to show that even practicing mindfulness for as short as 25 minutes per day for 6-days can bring significant changes in wellbeing of an individual by increasing positive affect and decreasing negative affect as well as by increasing the various cognitive functions when measured immediately.

Another mechanism that is linked with meditation is the concept of attunement. Siegel (2007) points the role of mirror neurons in the attunement process. Mirror neurons represent the emotion of other’s minds leading to intersubjectivity (Gallese, 2003). According to Siegel (2007), mindfulness meditation increases the intersubjectivity of an individual due to the activation of mirror neurons. It is possible to think that the mirror neuron hypothesis could explain the increased performance in social cognitive emotion task (SECT) among the participants who practiced in the 6-day mindfulness program. The study also analyzed the effect of short format body-scan on positive and negative affect. The increase in PANAS\textsuperscript{pos} and the decrease in PANAS\textsuperscript{neg} is consistent with earlier findings involving other forms of mindfulness training (Glück & Maercker, 2011; (Keune & Perczel Forintos, 2010). This result demonstrates that short format mindfulness training can be an option to enhance wellbeing. Positive emotion is one imperative domain of well-being in the PERMA concept of wellbeing (Seligman, 2011).
This study’s results may not be conclusive by themselves and require replication of the study, but nonetheless, they provide encouraging evidence for individuals who may not always have ample time to practice long term meditation. Furthermore, these findings increase the scope of utility of mindfulness. Individuals could also practice it in a brief therapeutic setup. However, there need to be more studies regarding this aspect of mindfulness and relating it to benefits among clinical populations.

**Limitations**

It is suggested to practice meditation in a peaceful and calm place where there are fewer distractions to get the optimum benefit. In this study, the participants practiced meditation during college timings. Although various precautions were taken to maintain silence and avoid distractions from outside, some level of distraction outside of the laboratory in which the experimental mindfulness groups was being held was noted during practice. The effect size obtained from the experiment could have been better had the mindfulness training experimental group practiced in isolated and in a more peaceful place ideally recommended for meditation. Also, the study did not follow up on the participants to check how long the impact of the practice would have been sustained. However, a sustainability study could not be included because the participants were not available for a more than a month after the training on account of the subsequent college examinations and scheduled vacation. Furthermore, the study proposes the short-time bound format but fails to examine whether the effects last beyond 6 days of practice. If
the practice is required to sustain the effect, then any time saving is lost. The lack of follow-up is a serious limitation of this study.

**Implications and recommendation**

Short term mindfulness practice could be an alternative for individuals living a busy lifestyle, or who may find it difficult to practice long term meditation for other reasons. It is recommended that further studies to examine the benefit of short term body-scan and other forms of mindfulness practices including other forms of meditation be conducted in different setups including clinical populations and another different age group. One must note that mindfulness is a broader term often confused with meditation practice. Mindfulness meditation further can be put into three categories; focused mindfulness attention, open monitoring, and loving-kindness and compassion meditation (Germer, Siegel, & Fulton, 2013). This study suggests that the impact of such practices be investigated on other variables, including physiological variables. It is imperative to compare the benefit of short term and long term practice to get a better understanding and make an informed decision when choosing among these. The long term meditation facilitated by a certified instructor could be a matter of luxury for many. Studies can also extend to investigate the effect of web based or internet based short-term meditation. It will help to broaden the utility and scalability of mindfulness practice.