Editorial

Meditation Research: Issues and Limitations

The practice of yoga supports and accelerates the development of humans as it imparts the knowledge of the true dimension of earthly life and its purpose and potential. The ability to stop fluctuations or modifications of the mind through practice is called yoga. Yoga is considered to be acquired through constant practice. It is to be noted that simply the quiescence of the mind without any effort, independently of any volition, is not yoga.

Patanjali wrote an exposition on yoga, now regarded as the defining text for the traditions that have become known as classical yoga. This text, the *Yoga Sutra*, is one of the most detailed maps of higher consciousness ever produced on this planet. It deals primarily with the nature of mind, and with how mind is transformed through different stages of *samadhi* (higher consciousness) until the liberated state, or *kaivalya*, finally appears (Taimini, 1986). It is also extraordinary in its integration of theory and practice. Patanjali mentions two systems of yoga in the *Yoga Sutra*: *kriya yoga*, and *Ashtanga yoga*, the well-known eightfold path. With the help of these two systems, it is possible to systematize and explain yoga practice in a manner that makes both the goal of yoga practice and the method of practice leading to the goal exceptionally clear (Iyengar, 1993).

The recent advancements in scientific research, especially in the domain of neuroscience, raised a lot of attention among people regarding the benefit and well-being of the people. The researchers are trying to find the various impacts of *samadhi* on the brain, heart, and even the whole body. Conventionally, people from different schools of philosophy practice *samadhi* in a very specific way. Even some yogis like Ramakrishna Paramhansa did practice various such techniques one after another. Various groups of scientists from all over the world are investigating the effect of *samadhi* or meditation on the neuronal activities of the brain, i.e., trying to find the neuronal correlates in the brain using imaging machines such as electroencephalography, magnetoencephalography, and functional magnetic resonance imaging (Davanger *et al*., 2010; Lee *et al*., 2012; Travis and Shear, 2010; Wells *et al*., 2013).

On one side, although we have hundreds of studies on different practices of meditation across various disciplines such as psychology, cognitive science, and neuroscience, it is important to notice that few researchers also argue and emphasize various limitations and issues associated with the scientific studies of meditation.

These limitations arise because of various sources such as methodological issues, a shortcoming in the study design, instruments employed in measuring various activity parameters, as well as the analyzing methods and techniques adopted for a particular study (Awasthi, 2012). We summarize some of the issues and limitations as follows:

How an individual considers meditation and benefits from it seems to depend on various factors such as brain structure, genetic predisposition, individual differences in personality, experiences in life, and environmental factors. Because of the involvement of some of these above-quoted subtle factors, it becomes tough to estimate the actual influence of meditation practices on an individual. Thus, it poses limitations on the various claims made in regard to the effects of meditation. In addition, while estimating a baseline in meditation research, the role of neural structural plasticity on different subjects of diverse age groups seems to be neglected in some neurophysiological studies. In general, while comparing subjects in meditation research, subjects are evaluated and selected based on the number of hours of meditation practice. This is a severe restriction because the initial baseline of the subject is not done. Depending on individual variation, the baseline varies from subject to subject. For some individuals, this number may be very less and for some others be very large. Many enlightened masters in India got enlightened at a very early age, for example, Adi Shankaracharya got enlightened during his childhood days. Hence, one should find some other criteria to evaluate the issue like "deep meditator."

A different group of researchers worldwide are studying neuronal correlates based on various techniques of meditation (Mosini *et al*., 2019; Newberg and Iversen, 2003). For example, the scientists working with "Buddhist meditation techniques like Vipassana" found the dominance of gamma oscillations (high-frequency oscillations), some are getting dominant of alpha oscillations, and so on. All of the subjects involved in these experiments are considered "deep meditators" or who did the practice at least for certain hours. Again, it is found that a different type of cognitive activities is related to a different type of synchronized oscillations. It is important to investigate the association of different cognitive activities associated with different meditative techniques. Moreover, it is necessary to understand the cognitive activity for various subjects with short-term as well as long-term practices even within the scope of the same meditation technique.

The same person can practice different meditations during his lifetime. For example, Ramakrishna practiced all types of meditation from various traditions, but he reached the same state in each case. When he said the same state, is it beyond the cognitive state or not? A more serious issue is: if there exist various states of meditation-say states of *samadhi*, then for *samadhi* like "Savikalpa Samadhi" or "conceptual" or cognitive, then is it possible to experience all these states within the cognitive domain using various meditative techniques or simply depend on meditation techniques? So far, the authors' knowledge goes no such study has been done with subjects practicing various meditation techniques. It is worth mentioning that some permanent changes occur at the anatomical level due to certain meditation practices. It immediately raises the following issue. Suppose somebody practices a certain kind of meditation and some changes occur, then the same subject practices another technique and how the effect of the previous anatomical changes matter in the findings in comparison to the subject who never has a prior practice of the first technique. This is needed to characterize the various states of meditation.

The above analysis clearly indicates that we the scientists who are involved in studying various aspects of the effect of meditation research should try to make a comprehensive framework to build up an efficient protocol for meditation research that will help to characterize various stages of meditation using the present knowledge of science.

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