

Chapter 4

Neurobiology of Meditation

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ABSTRACT

Meditation should not be considered a simple activity that is performed with focused attention; this is concentration. When practicing concentration correctly, with a good “anchor” for attention, a specific state of mind takes place, in which logic relaxation happens, and there is a relative freedom from self-identification. Such states of mind are to be experienced and cannot be practiced; thus, meditation techniques (concentrations) are the means to reach this goal. Those who achieve such a state experience positive neurophysiological effects, which have been studied for decades, such as increased functionality and connectivity of the brain, and also increased gray matter volume in specific cortical areas, whether in the young or in the elderly. Meditation has, thus, a proven potential role to help one maintain a healthy cognition and should be included in daily life routines of everybody who wishes for it.

INTRODUCTION

Even though meditation is a millennial practice such as yoga itself, during the past two decades it has underwent a huge growth of interest amongst both Easterners and Westerners. This has brought up many different approaches towards meditation and meditation-like states and techniques, as well as the interest of the scientific society in investigating its effects both on psychological and physiological variables. Nevertheless, although the growing interest and practice of meditation may be beneficial, it also creates the necessity of some methodological definitions and guidelines for the sake of increasing its positive effects and also to foster possible comparisons of results amongst papers and investigations. In this chapter we will elaborate on the neurobiological effects of meditation, after we come to a definition of what we consider it to be.

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WHAT IS MEDITATION?

Exactly in the second sutra given by Sri Patañjali – who supposedly lived in the 2nd century B. C. (Taimni, 2014), the great yoga master states that yoga is meditation, since it is said that “Yoga is the cessation of the agitations of the mind.” In fact, the whole *Yogasutras* are meant to be a practical guidebook towards achieving the state of *advaita* (non-duality), or the experience of interconnectivity amongst all living beings, which may only be lived and not explained, and needs the absence of the self to occur. The path for reaching this state is then, described into eight limbs (*Ashtanga Yoga*), all of each pointed to the same aim, *samadhi* (the permanent state of utmost multifactorial health of the living being). Although not necessarily sequential, practices tend to be conducted in such a way in the *Hatha Yogic* approach (yogic approach which developed many techniques to help practitioners achieve what Sri Patanjali prescribes; it describes many practices such as postures, breathing exercises and meditations); thus, *yamas* (restrictions of behavior) and *niyamas* (observances of behavior) are learned and applied to *asanas* (postures); a comfortable and steady posture which means no violence nor self deceive or attachment for the practitioner is necessary and prepares for the good practice of *pranayama* (breathing practices); when practiced respecting and keeping the previous components applied to it, within the orientations of the most experienced and well-intentioned master, the correct practice of *pranayama* brings the *sadhaka* (practitioner) and his/her mind to the state of *pratyahara* (abstraction of the senses), in which the most tenacious and richer inner experiences of yoga begin; away from external interferences, untouched by sensorial inputs, the practice of *dharana* (concentration) is made possible, and one focuses his/her mind in a given object (what we have called “anchor”). In the state/practice of *dharana*, the self or individual existence/experience still remains – there is the observer and the object of observation; mind and attention come and go, as the waves in the shore; although fluctuations of the mind, these waves of thoughts and/or perceptions and memories are much subtler than those experienced in ordinary states of mind. The deepening of possible states of consciousness goes further, and Patanjali shows that the next possible achievable state is called *dhyana* (meditation), before the utmost one named *samadhi*. In a *dhyana* state there is supposed to be a fusion of the observer and the object observed; a state of momentary disintegration of individual identity in which one observes the absence of thoughts, since thinking is a function of the identified mind. Such a state and experience may not be practiced; conditions for its manifestation must be built, and it is what Sri Patanjali does in his *Yogasutras*. Thus, the mere translation of *dhyana* with the Western term meditation is a reduction of its meaning and reach and makes it possible for people who have experienced and practiced *dharana* to misunderstand one for the other. The dictionary definition of “to meditate” is “to think about a specific subject”, what may resemble Patañjali’s definition of *dharana*, but not, by far, *dhyana*. Then, some of the so-called meditation techniques which are practiced worldwide are in fact concentration exercises, which may help the practitioner to achieve the state of *dhyana*.

In a modern approach and written in a scientific language, some authors (Cardoso et al., 2004) have contributed with an elegant definition of the called “meditation techniques”, or the means to create a meditative experience, in order to try and contribute to a better methodological control of variables, so results might be better compared and studies reproduced and replicated by others. According to the authors, it is an ancient technique used to induce a modified state of mind, consciousness and physical relaxation, and should follow an operational guideline as such: its technique should be clearly specified; there should be an emphasis on muscle relaxation during the process; a “logic relaxation” should occur; it should be a self-induced state; there should be a self-focusing object termed as “anchor”. The

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