

THE THIEF CAN NOT CATCH THIEF HIMSELF

The ancestry of Meditation being explained by neurobiology

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Abstract

Is the state we experienced meditating a religious, philosophical, mystical experience? Or is it just a change in brain physiology? Is it possible to achieve a state "beyond the mind" (meditative state) through a technique that uses the mind (meditative technique)? This article explores these aspects by the perspective of neurobiology.

Keywords: meditation; neurobiology; operational definition

But after all, what is Meditation? Meditation is a word often used when we want to reflect on something important, being sometimes mistaken by Philosophy, which, among other definitions, can be understood as the study of general and fundamental questions related to the nature of human existence, mind, and language, as well as the universe in its entirety through rational and logical argumentation. However, in order to meditate it is necessary not to be involved with rational thought. Meditation is often regarded as a mystical experience, which can be true when we understand mystic as something beyond the usual and linear boundaries of thought, that is, beyond logic. Each major religious tradition also has some sort of procedure it calls Meditation, although it often refers to prayer or contemplation of a theme.

In ancestral traditions, such as Buddhism, Hinduism, Taoism, the meditative state is considered a transcendent state which would defy the limits of reason and logic, and lead us to a

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"metaphysical scenario" beyond cognition. It is not possible to describe a state that is "beyond the mind" through the language of the mind and here is the first great paradox of Meditation: it is necessary to use a technique initially performed by the mind to attain a state "beyond the mind" without allowing that, during the application of such technique, the logical mind prevails. This challenge was already quoted by the Hindu sage Ramana Maharshi when he said that it is not possible to ask the thief to help catch the thief himself (MAHARSHI, 1972). That is, we cannot silence our own mind simply by asking the mind to be silent. In this context, meditation techniques are a neural artifice to achieve a "logic relaxation" through an intense logic exercise.

Meditation is a practice performed through a specific and well-defined technique. Its effect, however, is what we call the meditative state, and this state is something non-describable. We can refer to Meditation until the point where we say that the possibility of a "non-sensorial self-perception without the participation of logic" is reached, but the state arising from it and perceived by the meditator is indescribable. In fact, the experiential environment attained is something that involves a logic relaxation, followed by a sense of unicity (or transcendence), with loss of the spatial feeling and loss of usual temporal references, while remaining fully aware.

Table 1. Basic premises for understanding that "the thief cannot catch the thief himself"

"The thief cannot catch the thief himself"
<ul style="list-style-type: none"> • It is not possible to reach a state outside the cognition line using cognition • It is not possible to describe a state "beyond the mind" using the language of the mind • It is necessary to use a technique, initially executed by the mind, without letting the logical mind predominate • Only through technique is it possible to attain the meditative state

In the teaching of Meditation, it is common to make a didactic mistake when confusing state and technique. Ancestral traditions generally use metaphors to briefly explain the meditative state, since this supramental state cannot be defined by the mind with words.

However, many practitioners (and also some instructors) take the metaphors literally and end up creating a mental state wholly produced by logic, which is extremely distant from the modified state of consciousness that meditation provides. A state beyond cognition cannot be described through cognition; but about the technique which, when well executed, leads to this state, we can speak at length. And it is through the application of such techniques that science has been studying the neurobiological changes that occur in the organism of meditators, generating psychophysical manifestations long described by the Ancestral Traditions.

According to the operational definition (CARDOSO et al., 2004), for a practice to be called meditation, it is necessary that there be a clear and specific, self-induced technique that at some point in its execution promotes muscle relaxation and uses a self-focus skill, also called an anchor, aiming to achieve the logic relaxation. To meditate is to keep your attention on an anchor with such intensity that "pauses of thoughts" begin to exist, not because the mind stops properly, but because the meditator stops engaging with the thoughts. Therefore, together with the focus on the anchor, there must be subtle, minimal, simultaneous attention to the eventual involvement in the sequence of thoughts. The moment the practitioner becomes wrapped in the flow of thoughts he gently lets go of these thoughts and returns all of his attention to the anchor as many times as necessary, for that is the meditative exercise.

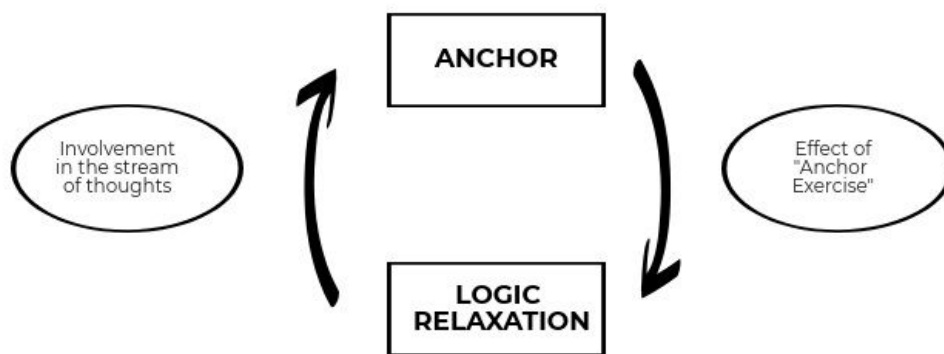


Figure 1. The basis of meditative exercise. During meditation, all attention must be kept in the self-focusing device (anchor), which allows the so-called logic relaxation. When the meditator perceives himself involved in the thought sequence he returns his attention to the anchor (CARDOSO et al., 2004).

Thus, the anchor intends to maintain full-attention focus despite the large number of thoughts that may surface. This can be obtained through a "positive" anchor, focusing on a point

of the body, a sound, breathing, among others (called focused attention technique), or through a "negative" anchor, which would be the anchor in the absence of an anchor, used in open monitoring techniques, such as Mindfulness Meditation (CARDOSO et al., 2007). As we can see, what differentiates a meditative practice from another is the type of anchor used, but the operation of the technique (anchor - relaxation of logic - involvement in the sequence of thoughts - anchor) is the same for all practices.

Hasenkamp and Barsalou studied through functional magnetic resonance imaging the brain areas involved in this cycle of sustained attention at the anchor, followed by involvement in the thought sequence, awareness of this involvement and return to the anchor (HASENKAMP et al., 2012). During sustained attention at the anchor there is activation the dorsolateral prefrontal cortex, an area involved in executive-minded functions and complex cognitive functions such as temporal integration, abstract thinking and directed attention (DIETRICH, 2003).

The involvement in thought sequence occurs when there is loss of attention to the anchor, also known as wandering mind, with the activation of a brain network called the Default Mode Network, where there is detection of activity in the ventromedial prefrontal cortex and posterior cingulate cortex, areas respectively related to self-perception and complex emotions, and to basic emotions and emotional memory. The wandering mind, or stimuli-independent thoughts, seems to be the standard operational mode of the human mind. Individuals are estimated to be "wandering mind" more than fifty percent of the time they are awake, and this mode consists of spontaneous thoughts, self-referenced in nature, unrelated to a specific task, desires, beliefs and intentions of others, and involved in reminiscing about the past or planning for the future (BUCKNER et al., 2008). Although this operational mode of the mind has allowed an important evolution of the human species, since it makes us aware of the threats that may be around us, it has now been associated with an increase in the incidence of anxiety and depression disorders and the sensation of unhappiness (SHELINE et al., 2009; KILLINGSWORTH et al., 2010). Brewer et al. have shown that in experienced meditators there is a difference in the activity and connectivity of the Default Mode Network. These individuals keep focused attention for a longer time, and there is a reduction in the time they remain involved in the thought sequence, either

during the execution of the meditation technique or out of this period (BREWER et al., 2011). In the moment the meditator becomes aware that he is involved in the thought sequence, activation of the dorsal anterior cingulate cortex and the bilateral anterior insula occurs, and lateral prefrontal cortex (dorsal and ventral) and lateral inferior parietal cortex, with larger clusters and more robust activation in the right hemisphere, move from wandering mind to attention focused on the anchor again.

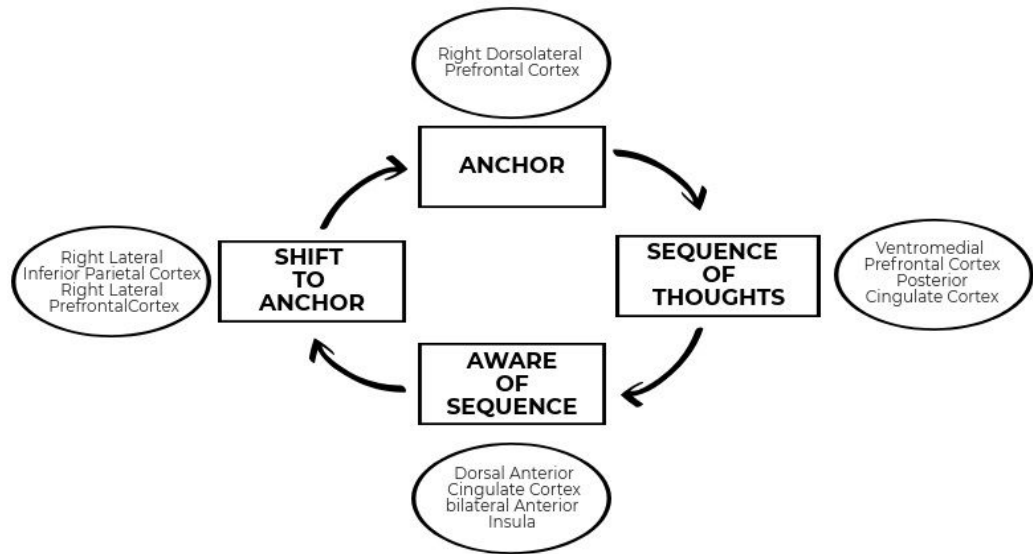


Figure 2. Different brain areas are involved in the anchor exercise phases. While the attention is focused on the anchor the most active brain areas are found in the Right Dorsolateral Prefrontal Cortex. When attention is lost to the anchor and involved in the sequence of thoughts, the activation pattern of the Default Mode Network predominates in the Ventromedial Prefrontal Cortex and the Posterior Cingulate Cortex. In the moment the meditator is aware of his involvement in thought sequence the active brain areas are the Dorsal Anterior Cingulate Cortex and the bilateral Anterior Insula. During the change from the Default Mode Network to the attention focused on the anchor there is activation of the right Lateral Inferior Parietal Cortex and the right Lateral Prefrontal Cortex (dorsal and ventral) (HASENKAMP et al., 2012).

In meditation the attentional resources are directed to actively amplify a particular event - the anchor - until it becomes the exclusive content of the mind. This intentional concentration on the anchor causes all other cognitive abilities of the prefrontal lobe to be temporarily deactivated and after some time this initial activation of the prefrontal lobe becomes a dysfunctional activity resulting in "transient hypofrontality", which has been reported by some meditators as a loss of temporality perception, self-denial, reduction of emotional content, reduction of abstract thinking, lack of planning, and a sense of "becoming one with the world" (DIETRICH, 2003). Making a connection between the operational looping described by Cardoso et al and the functional model

of meditation described by Thomsen (THOMSEN), we can assume that through the anchor exercise and logic relaxation the meditative technique activates the cerebral attentional network and after a certain period, it can lead to the release of beta-endorphins, related to the reduction of the painful sensations and the production of joy and euphoria sensations. Substances with similar effects to certain hallucinogens may be released and this could explain mystical experiences reported by some meditators. The intense stimulation of the pineal gland could also lead to the synthesis and release of 5-methoxydimethyltryptamine (DMT), a substance related to "extracorporeal experiences" and the distortion of time and space perception. During the practice, the meditator often experiences a sense of great relaxation and well-being, with a noticeable reduction of the so-called "state of alarm" (stress). As a result, heart and respiratory rates are reduced; muscles relax; body metabolism decreases (the energy expenditure of our body falls). These changes occur due to parasympathetic activation, caused by hypothalamic activation. Increased stimulation of one of the Autonomic Nervous System's arms, in this case the parasympathetic one, can result in a simultaneous discharge of the two systems - sympathetic and parasympathetic -, which would justify the sensation of relaxed attention reported by experienced meditators.

It is possible to notice that regular practice of meditative exercise causes changes in hormones and neurotransmitters, as well as in the overall functioning of the organism, and relevant changes related to the meditator's attentional, psychic and emotional behavior. These psychophysical changes initially occur during the execution of the technique and are called "the state", but with years of practice they become constant, even while the individual is not performing the technique, and they are called traits (GOLEMAN; DAVIDSON, 2017), perhaps one of the greatest motivators of meditative practice within ancestral traditions - "personal transformation."

Final considerations

Meditation is a word that can contain many meanings: from reflecting on a subject to a technique that is part of a specific religious or philosophical tradition. When we understand Meditation as a specific, well-defined technique (which may or may not be tied to a religious tradition) operationalized through attention in an anchor and logic relaxation, it is possible to

obtain a state "beyond the mind" in which a "non-sensorial self-perception without the participation of logic" occurs.

In recent years science has been studying how meditation techniques alter the functioning of the body and mind, and we can draw a parallel between the current neurobiological findings and the aphorisms that ancient traditions have taught for many centuries.

Through meditative exercise the activation and alteration of the functioning of certain brain areas occur, among them the prefrontal lobe, cingulate gyrus and posterior parietal lobe, with release of neurotransmitters that alter attentional quality, the perception of self, space-time perception, as well as modulation of the autonomic nervous system, promoting a sensation of relaxed attention. Within the ancestral traditions, these sensations can often be described as unicity, concentration and intuition, detachment from the concept of self, and experiences that transcend the body.

The purpose of Meditation, within religious, philosophical traditions or within lay thinking, is personal transformation (change of trait). This transformation can be described by ancestral traditions through innumerable metaphors, and today the metaphor can be understood even as the language of science itself. However, what is important to emphasize is that this change of trait is only obtained through regular practice. Since it is not possible to ask the thief to help to catch the thief himself, we need to be attentive to the correct understanding of the technique and the excellent execution of the meditative exercise, because only in this way shall we obtain the neurobiological changes that can lead to personal transformation.

References

- BREWER, J. A. et al. Meditation experience is associated with differences in default mode network activity and connectivity. *Psychological and Cognitive Sciences*, v. 108, n. 50, p. 20254–20259, 2011.
- BUCKNER, R. L.; ANDREWS-HANNA, J. R.; SCHACTER, D. L. The brain's default network: anatomy, function, and relevance to disease. *Annals of the New York Academy of Sciences*, v. 1124, p. 1-38, 2008.
- CARDOSO, R. et al. Meditation in health: an operational definition. *Brain Research Protocols*, v. 14, p. 58-60, 2004.
- CARDOSO, R. et al. Prefrontal cortex in meditation. *NeuroQuantology*, v. 5, n. 2, p. 233-240, 2007.

DIETRICH, A. Functional neuroanatomy of altered states of consciousness: the transient hypofrontality hypothesis. *Consciousness and Cognition*, v. 12, p. 231-256, 2003.

GOLEMAN, D.; DAVIDSON, R. J. *Altered traits: Science reveals how meditation changes your mind, brain and body*. New York: Avery, 2017.

HASENKAMP, W. et al. Mind wandering and attention during focused meditation: a fine-grained temporal analysis of fluctuating cognitive states. *Neuroimage*, v. 59, n. 1, p. 750-760, 2012.

KILLINGSWORTH, M. A.; GILBERT, D. T. A wandering mind is an unhappy mind. *Science*, v. 330, n. 6006, p. 932, 2010. doi: 10.1126/science.1192439.

MAHARSHI, R. *Ensinamentos espirituais*. São Paulo: Pensamento Cultrix, 1972.

SHELINE, Y. I. et al. The default mode network and self-referential processes in depression. *Proceedings of the National Academy of Sciences of the United States of America*, v. 106, p. 1942–1947, 2009.

THOMSEN, C. V. *Running head: meditation and the brain*. Maryland: Loyola College in Maryland, s.d.