Introduction: defining meditation for scientific analysis

Three developments have fuelled cognitive interest in meditation in the past decade. The first was the development of mindfulness-based interventions (MBI) in medicine, psychotherapy and education. This has created pressure to both explain mindfulness meditation in non-traditional ways, and to scientifically evaluate its merit. Of course, from a sociological point of view, the popularity of mindfulness must also depend on research outcomes that support its effectiveness. It is therefore better to describe a feedback loop in which cognitive research promotes MBI’s popularity and that popularity encourages further research.

The second development was the successful dialogue between scientists and the Tibetan spiritual leadership. This was primarily the work of a dozen dedicated individuals who have been very successful in creating influential social and scientific structures. The fourteenth Dalai Lama is, of course, one of them. A group of scientists – including Richard Davidson and Daniel Goleman, to take two prominent examples – endeavoured to create a mutually respectful dialogue with meditation experts. Their very successful careers in neuroscience and science journalism, respectively, definitely helped to validate the dialogue and to promote a cognitive-neuroscientific outlook on meditation. One of the major institutions that arose from this dialogue was Mind and Life, which funds conferences, dialogues and research on meditation. The third development was of brain-imaging technologies that allowed investigation of the neural activity of meditators in more detail than had previously been possible. The nuanced images of brain functions in meditation and of experienced meditators (even when they are not practicing) are informative both to the understanding of meditation itself and to the study of the human brain in general. The result of these developments is rich scientific research of meditation that, although far from being conclusive, has made huge steps forward in terms of describing and explaining what meditation is and how it works with concepts from cognitive science and clinical psychology.

During the historical process of researching meditation, the term ‘meditation’ has gradually become problematic. It describes very different forms of human activity, each of which on its own deserves an entire study/project in cognitive science. The scientific literature covers anything from adept Tibetan meditators who practise compassion meditation to novices who learn to focus attention on their breath. In 2007 neuroscientists Antoine Lutz and Richard Davidson, along with Buddhist scholar John Dunne, suggested a model for grouping and analysing meditation in ways that would begin to address the problem of definition and help cognitive scientists...
to define their subject of study. To begin with, they defined meditation as any cognitive practice that (1) produces distinctive, reproducible states that can be phenomenally reported; (2) leads to a development or changes in specific traits; and (3) includes progression in the practice from the novice to the virtuoso (Lutz, Dunne and Davidson 2007). Based on further cognitive research, they later identified two main families of practice: focused attention and open-monitoring meditation (Lutz et al. 2008). More recently they expanded this typology (without Dunne) and suggested grouping meditations into three families: attentional, constructive and deconstructive (Dahl, Lutz and Davidson 2015). As explained below, these families partially overlap with the three psychological processes that are outlined in this chapter: attention control, approach and meta-cognition, respectively. In all cases the explaining concepts are derived from psychology, not Asian traditions, while the explananda are the different types of meditation: both traditional and modern.

To briefly expand on the topic, the attentional family of meditation would include practices that mainly train conscious awareness, and result in a better controlled awareness. This would include both focused attention (on breath, body or mantra, to give a few examples), and open-monitoring awareness that does not have a particular object. The main cognitive process operating in this family would naturally be attention control. The constructive family of meditation would include the active cultivation of attitudes like loving-kindness and compassion. The expected result, again, would be increased compassion as a trait. The characteristic cognitive process in this case would be approach. The deconstructive family would include analytical meditation, mindfulness practices, vipassanā and koan practices that are assumed here to have the common purpose of exposing the reality about the dynamics of self and the world. These practices lead to liberating insight and reduced grasping, obsessions and destructive thinking patterns. In spiritual traditions these aim at counteracting or deconstructing the current view of the self and the world, and opening up the potential of transcendence. In the case of therapeutic meditation, these would include distancing from negative thinking patterns and seeing them as ‘not myself’. The characteristic cognitive process in this case would be meta-cognition.

Critics of this mapping exercise may point out its bias towards the cognitive aspects of Buddhist meditation. This is true. Almost the entire field of research is biased towards Buddhist practices, and, more specifically, their therapeutic modern adaptations. To overcome this problem Komjathy suggests a phenomenological approach to mapping the field of practices, casting the net much wider to also include non-Buddhist practices. His sole criteria for inclusion is what he calls ‘family resemblances’ (Komjathy 2015: 4). His approach results in no less than twenty-four types of practices without a predetermined organising criteria. Indeed, it is more inclusive, and allows a comparison between different types of contemplative practices, including prayer, meditative reading, ecstatic dance, as well as crossed-legged sitting meditation on various objects. But as a typology, it is weak exactly because it is deliberately loose. Some practices are groups by their being ‘communal’, others by being ‘secular’, ‘solitary’, ‘attentional’, ‘mantric’ and so on (Komjathy 2017: 36). Note how practices in these examples are grouped by either social aspects (communal), by ideology or philosophy (secular), by cognitive function (attentional) or by object (mantric). The value of this approach is clear for mapping the entire field of contemplative practices for the social sciences, but less helpful for cognitive neuroscience. For the purpose of this chapter, the analytical and cognitive approach is more appropriate as it captures the actuality of psychological research in the past twenty years – research that is indeed focused heavily on Buddhist meditation and its modern therapeutic derivatives.

It is within that research context that the three cognitive processes of meditation emerged: attention control, meta-cognition and approach. As we shall see, these processes are extremely informative for describing the differences between meditation techniques, and for
explaining how each practice brings about its psychological benefits. While this is certainly the case for the modern Buddhist- and Hindu-inspired therapeutic meditations, it may also become helpful for understanding the psychological aspects of traditional practices.

**Attention control**

**Transcendental Meditation: focused attention breaks the train of distracting thoughts**

Transcendental Meditation (TM) arrived in the west during the 1960s and was initially linked with the counter-culture movement and its interest in altered states of consciousness, creativity and drugs. The Beatles and other celebrities were attracted to the ashram of the Maharishi Mahesh Yogi in India, whose modern Hindu teachings aimed at the spiritual regeneration of the western world. The main vehicle was his mantra meditation – adapted from the Vedic tradition to suit modern life. The framing was initially not scientific in particular. The reformed mantra practice was said to help students to ‘draw attention to those higher beings or gods living [in some other worlds]’ (Harrington 2008: 211), and to experience ‘pure consciousness’, a blissful state that transcends the individual and is the basis of waking, dreaming and dreamless sleep. But in the early 1970s the encounter with science changed the discourse.

Herbert Benson was a Harvard physiologist studying stress (in monkeys, mainly). He was persuaded by TM practitioners in the United States to study their alleged ability to control physiological aspects linked to stress – namely blood pressure and metabolism. Teaming up with Robert Keith Wallace, who had discovered earlier that TM practitioners alter their brain activity while practicing meditation (Wallace 1970), they embarked on a research project that culminated with a bold statement: stress response can be downward-regulated, at will, by the practice of meditation. The stress response was an already accepted construct in physiology. It describes the natural physiological changes that occur when facing a threat, and that develop into chronic stress if prolonged. Benson’s encounter with TM brought about a new construct of an opposite direction: ‘the relaxation response’ is the activation of reduced metabolism and increased calm. It can be deliberately activated by meditation and thus counteract the health risks that come with chronic stress.

For Benson and the scientific community this, and not TM meditation per se, was the important news. He discovered that meditators could reduce their metabolism, blood pressure and heart rate. This was the first time that the medical world fully acknowledged that meditation had scientific and therapeutic value, and that a cognitive practice has measurable influences on the body. The findings were published in the journal *Science* (Benson et al. 1971). Benson, however, did not endorse the religious philosophy of the TM movement and he ‘got into an enormous argument with the TM people’, as he put it later (Harrington 2008: 217). He went on to publish a bestseller on the technique of the relaxation response, in which he mentions TM, but emphasises that ‘the various physiologic changes that accompanied Transcendental Meditation were part of an integrated response opposite to the fight-or-flight response and that they were in no way unique to Transcendental Meditation’ (Benson 1976: 94. Italics are in the original). Vedic mantras with transcendental aspiration were now replaced with neutral English words and simple breath-counting that evokes ‘decreased activity of [the] sympathetic nervous system’ (ibid.). Benson argued that, in fact, concentration on any object – be it visual, auditory, a movement or a word – would elicit the relaxation response. The editor of the *Harvard Business Review*, William Nolen, wrote on the back cover of the book that he was delighted that ‘someone has finally taken the nonsense out of meditation’ (Harrington 2008: 220).
The medicalised understanding of meditation allowed it to penetrate society more widely, but it also created a new way of looking at the practice of meditation and describing how it works within the newly debated phenomena of chronic stress in medicine. Meditation was now understood to produce the opposite effect of stress. What are the cognitive mechanisms by which this process happens? Benson describes it simply as cutting through the chain of thoughts. As stress is maintained by stressful thoughts, worries and anxieties, and as the mind cannot hold two thoughts at a time, the repetition of the ‘mantra’ (be it sacred religious syllables or not) naturally leads to decreased stressful thinking patterns and the physiological relaxation follows. In Benson’s words: ‘the repetition of the word or phrase is a way to help break the train of distracting thoughts’ (Benson 1976: 160).

Mindfulness: attending and discerning the wandering mind

The second wave of medicalised meditation entered the scene about ten years later with the mindfulness movement. It emerged from an integration of a few Buddhist traditions that had recently immigrated to the United States. The story of Jon Kabat-Zinn, who is considered by many to be one of the founders of the secular mindfulness movement, illustrates it well. Kabat-Zinn was a graduate student in microbiology at MIT when he encountered yoga and meditation, and he became a dedicated practitioner of both. After graduation he taught at the medical school of the University of Massachusetts, and in his free time he taught yoga, had strong ties with an American Korean Zen centre and practised vipassanā. In 1979 he managed to persuade officials at the medical centre to allow him to teach a relaxation programme for patients who had chronic illness. The programme was initially called the Stress Reduction and Relaxation Program; it later changed its title to Mindfulness-Based Stress Reduction (MBSR) before gaining unprecedented popularity throughout the world.

Kabat-Zinn defines mindfulness as the ‘awareness that emerges through paying attention on purpose, in the present moment, and non-judgementally to an unfolding of experience moment-by-moment’ (Kabat-Zinn 2003). The first part of the definition is clearly about attention control, and researchers agree that mindfulness meditation includes a component of attentional training (Malinowski 2013). In cognitive theory, attention is thought of in terms of three main cognitive functions: alerting, which is responsible for the level of arousal, alertness and attentional engagement; orienting, which is responsible for stimulus selection and focusing; and executive, which is responsible for top-down control of attention and is associated with self-regulation of attention.3 Recent evidence suggests that the executive system is far more complex than previously assumed, and is responsible for error detection, conflict management between different competing tasks and choosing to which channel to attend (e.g. sensory or emotional) and more. This led some to sub-divide this function, and to suggest a fourth function – salience – which is involved in the detecting of salient events, such as changes in bodily states, sensory input and emotions.

In meditation, alerting is linked with any attentional process – for example, focusing on the breath as the object of meditation. Salience is associated with noticing changes that are subjectively meaningful – for example, when the mind wanders, or an emotion is experienced. Executive comes to action with the decision to shift attention, and the shifting itself will be the function of orienting.

It is impossible to describe meditation without referring to mind-wandering, which has also gained unprecedented scientific interest in the past twenty years. The discovery of the Default Mode Network (DMN) in the brain opened up a possible neural description of what happens in mind-wandering, and to even hypothesise what its function(s) may be. In short, the DMN refers to vast areas of the brain that function collectively when the person is resting or not busy.
with any difficult task. Research has demonstrated that it is closely associated with the reported levels of mind-wandering, and also with autobiographical memory, planning the future and theory of mind. Its function is therefore hypothesised to include ‘perspective taking of the desires, beliefs, and intentions of others and in remembering the past as well as planning the future. All of these putative functions are self-referential in nature’ (Sheline et al. 2009: 1942). In other words, the function of DMN may be to create and sustain an image of the self from pieces of past memories and future projections. When we are not doing anything in particular, especially during rest or automatic and boring activities, this function increases and is experienced as mind-wandering into past events and into thoughts about the future.

With these cognitive functions at hand, the process of attentional meditation could now be described as follows:

Motivation is set to focus one’s attention, be alert and notice the object of meditation. Sustained alertness would be the basic function. Then, probably because the task is not particularly rewarding or interesting, and because it induces relaxation and rest, DMN increases its activity in what is experienced as mind-wandering. In most cases thoughts would be about past events (autobiographical memory, i.e., events involving oneself in the past) or future planning (i.e., self-related events that one wishes happened or be avoided). Then, the meditator recognizes mind-wandering. Beginners may recognize mind-wandering when a teacher makes a vocal reminder, but with time these reminders are internalized. This would be the function of salience. The executive would be responsible for the decision to disengage from mind-wandering and return to the meditation object. The orienting function is responsible for completing this shift of attention back to the breathing.

![Cognitive functions in attentional meditation.](https://example.com/figure31.1)

Based on Malinowski (2013).
In these cognitive models, meditation is understood as a process of repetitive disengagement from self-referential thinking (DMN), and re-orienting attention back to the meditation object. In mindfulness courses, the object is typically breathing and bodily sensations. But the cognitive description is valid for any meditation object, including TM mantra and visual objects such as the Theravāda Buddhist coloured kasina (Pali; class of visual object).

Typically, for people untrained in meditation, bodily sensations feed into the process of self-referential thinking that is associated with DMN. It is experienced as judging, worrying, planning or ruminating about bodily sensations. To take a simple example, discomfort in the belly may lead to thinking about the previous meal and quickly into a chain of thoughts about food, weight, regret, health, medical examinations and so forth. But in meditation training, the present-moment sensation is prioritised over these mind-wandering processes. Because the brain is plastic (its structure is changed with experience), it is predicted that as meditators become more experienced, their brain function and eventually their brain structure would change, too. Remarkable evidence on this came from a 2007 study that showed that DMN brain areas reduced their activity pronouncedly after an eight-week MBSR course (Farb et al. 2007). Experienced meditators expressed lower DMN activity and higher activity in attention control areas of the brain. Phenomenologically, they were better at suppressing thinking about what they felt, and better at sustaining attention on the feeling itself.  

**Attention is not enough**

In cognitive language, negative and repetitive self-referential thinking processes are called rumination, and are considered a risk factor for developing depression and anxiety (Hamilton et al. 2015: 224). It has been known since the year 2000 that Mindfulness-Based Cognitive Therapy (MBCT) helps to prevent major depression for patients with three or more episodes in their past (Kuyken et al., 2016). Is attention control the function that mediates this outcome? There is some reason to believe that it is not, and that other cognitive functions must be involved. Indeed, people with major depression disorder typically show increased levels of DMN activity that are associated with higher levels of maladaptive and depressive rumination. However, cutting through the train of ruminative thinking brings about only temporary relief. Once meditation is over, self-referential thinking resumes. In fact, DMN must be associated with adaptive and helpful thinking processes as much as with destructive processes (Hamilton et al. 2011); its activity is probably value-free and is simply associated with self-referential memories and planning, regardless of whether they are positive or negative (in many cases these are actually constructive and adaptive patterns of thinking that contribute to planning). If attention control itself solved the negative impact of rumination, we would expect that any type of meditation would lead to the same outcome and help prevent depression. But this seems not to be the case. Something else is helping to prevent depression for people who learned to practise mindfulness meditation.

**Meta-cognitive insight: another way to work with automatic thoughts**

Meta-cognition is a cognitive process that reflects on, monitors and controls another cognitive process. It is phenomenologically rather easy to understand – human beings seem to be naturally good at thinking about thinking, and to be aware of internal processes such as emotions, feelings and motivations. Such awareness is often used to manipulate or better control these processes, especially when they are perceived to be in conflict with personal goals or views that are generally held by the person. If being angry or having a particular thought about the world
are defined as first-layer mental activity, being aware of these as belonging to the self (I know that I am angry) would be defined as second-layer meta-cognition. One can better manipulate these emotions, thoughts and behaviours once they are clearly brought under the light of awareness and stopped from operating automatically and subconsciously. As we have seen, not all meta-cognitions are necessarily supportive of wellbeing. Rumination, for example, can be seen as a meta-cognitive process that includes awareness and a wish to manipulate certain thoughts and emotions. Thinking about one’s thoughts of despair is a meta-cognitive strategy that generally fails, as it sustains in awareness the negative thoughts it seeks to eliminate.

Meditation, and some practices of mindfulness in particular, are thought to enhance a different type of meta-cognitive process. The psychologist John Teasdale, one of the developers of MBCT, explained that meta-cognitive insight is distinctly different from meta-cognitive knowledge (Teasdale 1999). The latter is propositional, and is similar to intellectually acquired knowledge that has no direct influence on emotions. It can be acquired ‘vicariously’ from others, from books, and without personal experience. Meta-cognitive insight, on the other hand, is implicative and is acquired by some form of experiential learning. According to Teasdale’s model it emerges from ‘sensory features, such as tone and loudness of voice, or proprioceptive feedback (e.g. from bodily sensations related to posture or facial expression)’ (Teasdale 1999: 148).

This foundational distinction was made already after Teasdale and his colleagues had encountered mindfulness meditation and began to investigate how it may differ from other cognitive trainings that have been central in cognitive therapy. Crucially, knowing that certain thoughts are not true (and therefore should not be uncritically accepted as true) is not the same as experiencing thoughts as mental events that pass through the mind. Only the experience of thoughts as impersonal mental events that come and go is considered meta-cognitive insight. Such insight has profound implications for the relationship between self and thoughts. It creates a distance, or de-fusion, between the thoughts and the self, and can be particularly therapeutic when the thought’s content is negative and self-harming.

Observing-thought meditation that is common in vipassanā and mindfulness training courses teaches the skill of ‘decentring’, a meta-cognitive process that disconnects the identification with views and reduces the absorption in their emotional content. The key features of these practices are non-identification and non-reaction to thoughts that arise moment after moment. Rumination, in this case, is counter-activated not by distracting attention into focusing on another object (e.g. breathing) but by developing a distant point of view – a meta-cognition – in which the contents of ruminative thinking are marginalised and attention is given to structural features such as the ever-changing nature of thoughts (they come, go, change) or their form (thoughts about the past, thoughts of planning, many thoughts, little thoughts). The distance helps to defuse the negative emotional tone that accompanies rumination, and eventually reduces rumination itself as its emotional fuel is gradually exhausted.

**Approach**

The third and final cognitive construct that emerges in research as central to the understanding of meditation is approach. It is easy to understand by looking at its opposite, withdrawal (or avoidance) and its role in creating mental suffering.

Both depression and anxiety are increased by withdrawal and avoidance attitudes and behaviours. In anxiety, avoidance is the behaviour of disengaging from activities that are perceived (wrongly) as dangerous. But it also manifests cognitively as avoiding certain thoughts that may evoke unpleasant emotional reactions (e.g. thoughts about illness, catastrophe or past events). Depressed individuals tend to feel isolated and lonely and experience emotions of guilt,
shame and rejection. These are withdrawal emotions, but they are coupled with another cognitive withdrawal – that which seeks to eliminate and escape from the emotions themselves. When this happens, rumination begins – i.e. thinking recurrent, self-reflective and uncontrolable thoughts that focus on the depressed mood and its causes and consequences.

As described above, controlled attention meditation may help to temporarily reduce the intensity of ruminative thinking, which can be relaxing for those who experience anxiety and depression. Meta-cognitive decentring may increase awareness of the rumination itself and help to reduce the emotional fusion with the negative thoughts. But to some extent, as long as the withdrawal continues, rumination will come back and the affect will continue to be coloured by the feeling of isolation or fear. The solution, therefore, could involve deliberately evoking approach, as the opposite of the feeling of withdrawal. The latter part of the definition of mindfulness by Kabat-Zinn captures this attitude with the term ‘non-judgementally’, which hints that attention control and detached awareness are accompanied by something else (Kabat-Zinn 2003). In other places, Kabat-Zinn insists that mindfulness is not an attention control technique but an attitude about ‘love and loving life’ (in Dunne and Harrington 2015: 629). He lists seven other attitudinal foundations that are part of what is cultivated: ‘beginners mind’, patience, non-judging, trust, curiosity, non-striving, acceptance and letting go (Kabat-Zinn 1990). At least three of these can be associated with approach attitudes: curiosity, which requires getting closer and growing interest and motivation; acceptance, which entails openness and willingness to experience whatever arises in the moment; and non-judging, which means reducing self-criticism and not rejecting unpleasant experiences.

Meditations that seek to cultivate approach attitudes more explicitly are generally referred to by scientists as ‘loving-kindness’ or ‘compassion’ (Kok and Singer 2017). In Buddhist traditional terms they are part of a four-fold group of practices and qualities: loving-kindness, compassion, sympathetic joy and equanimity. Here, in contrast to the detached observation stance of meta-cognitive mindfulness, practitioners strengthen feelings of warmth and care through the visualisation of others, and sequentially extend these feelings. Longitudinal studies have found that meditators who practise these increase in trait positive emotions and feelings of closeness to others (Kok et al. 2013).

The cognitive theory suggests that experiential avoidance is a key feature in the preservation of depression and anxiety and that the remedy is meditation that includes attention control, meta-cognitive awareness and a cultivation of an approach mode. The latter seems particularly important for anyone who experienced strong depressive moods in the past, because the strong negative experience (negative thoughts and unpleasant sensations) would evoke a strong urge to avoid it at any cost. Rumination and withdrawal are counterproductive strategies to escape from one’s own feelings and thoughts. To begin with, it is impossible to avoid the internal experiences of loneliness and isolation by activating a withdrawal attitude. Moreover, it leads to increased rumination about the depressed mode, which only prolongs it, and adds a layer of helplessness and despair.

Initially, the developers of MBCT called their intervention (designed specifically for the prevention of depression) ‘attention control training’. The idea was that, by controlling attention, participants will be able to decentre from negative thinking patterns and break the cycle of rumination. However, mixed results forced them to rethink the active component. What was missing in their training was the aspects of ‘welcoming and allowing’ (Segal et al. 2013: 56). Only when participants learned to also get closer and befriend unpleasant emotions and sensations was the full effect of the training manifested.

The therapeutic theory here is closely linked to cognitive research that had identified the motivational systems of approach and avoidance, and their neural correlates. Simply put,
approach motivation is defined as ‘the energization of behavior by, or the direction of behavior toward, positive stimuli’ (Elliot 2013: 8); Avoidance motivation is ‘the energization of behavior by, or the direction of behavior away from, negative stimuli’ (Elliot 2013: 8). Some evidence suggests that they are associated with different frontal lobe activation in the brain: higher right activation (compared with left activation) is associated with avoidance and depression. Well-cited research on MBSR showed that after eight weeks, asymmetry is changed and moved leftward, as self-reported measures also show reduction of depression and anxiety symptoms for course participants (Davidson et al. 2003).

This line of research points to a crucial characteristic of modern medicalised meditation training. To bring about the therapeutic benefits, the training of attention should include a particular attitude towards experience: not that of a detached observer, but that of a friendly companion that is actively seeking to approach, allow, welcome and accept experience. The approach system is naturally activated towards pleasant experiences, but in learning meditation individuals begin to activate it towards the unpleasant as well.

A similar process happens in constructive meditations, largely derived from Buddhism, that explicitly train compassion and loving-kindness. In compassion, the meditator evokes both the suffering of others (or of oneself) and the wish to approach and help. In loving-kindness the context of suffering is less pronounced, but approach is clearly and deliberately evoked with the wishes for care, happiness and ease – directly towards oneself and towards others. In both traditional and therapeutic frameworks, the activation of approach towards what is not pleasant is closely related to kindness and compassion.

Whether mindful awareness enables a fundamental shift in how we relate to what is arising in the external or internal world depends on whether friendliness and compassion can be brought to those elements of present-moment experience to which we attend.

(Seagal et al. 2013: 137)

The attitude of approach is therefore central to the psychological understanding of meditation and how it works. It also helps to differentiate between mindfulness, as understood in this particular modern and therapeutic context, and other forms of meditation. TM, for example, seems to not emphasise this particular aspect of the practice, while compassion meditation, loving-kindness and self-compassion would take it even further and more explicitly than the mindfulness taught in MBSR and MBCT.

**Conclusion**

The picture that arises from the cognitive study of meditation includes three main processes that operate within meditation. *Attention control* is required for almost any type of meditative practice, regardless of what the object of attention may be. What perhaps had been known intuitively by practitioners has been now articulated in scientific terms: different cognitive mechanisms and (their correlative neural systems) function even within the simplest event of mind-wandering and returning to the meditation object. Mindfulness of breathing and mantra meditations can now be described as involving cycles of activating the cognitive functions of alerting, mind-wandering, salience, executive and re-orienting attention back to the object. *Meta-cognition* helps to identify additional processes that involve insight into one’s own mental events, and in particular creates deliberate distance between oneself and one’s thoughts and emotional turbulence. Much of what we normally call ‘awareness’ or ‘self-awareness’ may now be described as
Meditation and the cognitive sciences

Meta-cognition, as long as it involves the internal reflective process of mental events themselves. Lastly, approach is pointed out as crucial for understanding the motivational aspect of meditation. It is the ‘warmth’ component that is linked to the cultivation of friendliness and compassion that also bring about therapeutic benefits. While these three are clearly cognitive concepts which are well situated within the scientific and clinical literature, they become helpful to our understanding of what meditation is and how it works.

This certainly applies to types of meditation that were subject to scientific research, such as TM and modern mindfulness. Moreover, it helps to deconstruct the umbrella term ‘mindfulness’ into several components that function sequentially and simultaneously. An MBSR course, for example, includes training of controlled attention as well as a good portion of meta-cognition, each expressed in a different phase of the course. The approach element is less explicit, perhaps, but is clearly embodied in the accepting and gentle attitude of the course leader who is skilled in demonstrating approach towards participants and their difficult experiences.

The same analysis could apply to traditional forms of meditation, even those that are less researched. To take a few examples, devotional practices may be understood as involving a strong aspect of approach as they are encouraging heightened motivation for getting close, appreciating and serving the object of devotion. This almost begs further empirical research. Zazen (in the sense of shikantaza, ‘just sitting’) could be understood as an attentional practice that emphasises the role of the alerting system, and is less bothered with executive control and the redirecting of attention to a particular object. Vipassanā as taught by S. N. Goenka involves executive attentional control (scanning the body) and the entire cycle of disengaging from mind-wandering. It also includes meta-cognition when it encourages insight into impermanence of all mental and physical sensations. These are only snippets of possible descriptions that require further research, but they demonstrate the utility of using the above-mentioned empirically based cognitive models for the study of many other forms of meditation.

Glossary

Decentring: A meta-cognitive process that disconnects the identification with views and reduces the absorption in their emotional quality.

Default Mode Network (DMN): vast areas of the human brain that function collectively when the person is resting or not busy with any difficult task. Closely associated with the reported levels of mind-wandering, and also associated with autobiographical memory, planning the future and theory of mind. Hypothesised to be the correlate of mind-wandering in meditation.

MBCT: Mindfulness-Based Cognitive Therapy. An eight-week programme based on MBSR, which was originally designed for the prevention of major depression. Research demonstrates that it reduces the risk of recurrent depression for those who had a few previous episodes. Now part of what the National Health Service (NHS) in Britain offers patients.


Meta-cognition: A cognitive process that reflects on, monitors and controls another cognitive process.

Relaxation Response: Coined by the physiologist Herbert Benson. The activation of reduced metabolism and increased calm. The opposite of Stress Response. Can be activated by meditation.
Rumination: Negative and repetitive self-referential thinking. Considered a risk factor for depression and anxiety.

Stress Response: The natural physiological changes that occur when an organism is facing a threat.

Transcendental Meditation: A modern mantra meditation technique, introduced to western culture by the Maharishi Mahesh Yogi in the 1960s. One of the first techniques to be scientifically studied.

Vipassanā: (Pali) clear sight or insight. Also, a form of Buddhist meditation that has gained popularity in modern times, and in the west.

Notes

1 For a summary of Davidson’s life-long scientific research into meditation, see Goleman and Davidson 2017. *Mind and Life* has published several volumes that document the dialogues between the Dalai Lama and scientists. Notably: Goleman 1997; Harrington and Zajonc 2006; Kabat-Zinn and Davidson 2012. For the development of Mindfulness-Based Cognitive Therapy and its psychological theory, see Segal et al. 2013.

2 A Theravāda fifth-century commentary on mindfulness of breathing gives a similar outlook: ‘for counting, by cutting off thoughts which cling to external things, serves the purpose of establishing mindfulness in the in-breaths and out-breaths as object’ (Nanamoli 1952: 27).

3 For a detailed discussion of attentional system in the brain, see Peterson and Posner (2012).

4 Evidence from neuroscience suggests that it is not only brain function that is altered soon after a meditation training course, but also that more stable structural changes can be detected in experienced meditators (Fox et al. 2014).

5 Mindfulness meditation has moderate strength of evidence (SOE) for improvement in anxiety, depression and pain, but the SOE effect of TM on depression is insufficient according to a detailed report that investigated the impact of meditation on psychological stress and wellbeing (Goyal et al. 2014. See in particular p. viii and table at page ES-12).

6 Kabat-Zinn himself refused to give his definition a higher status than that of a practical working definition, and has claimed that what he teaches is in fact dharma (Kabat-Zinn 2011).

7 Approach is included in the two last items that are measured in the Five Facet Mindfulness Questionnaire (FFMQ), which is used in research to measure levels of mindfulness. The five are: observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience (Baer et al. 2006).

8 ‘Habitual patterns of experiential avoidance are one of the key planks that trigger and maintain depression. A distinctive feature therefore of MBCT is its emphasis on learning how to notice and then intentionally transform these patterns through choosing to turn towards or “approach” experience’ (Crane 2017: 39).

Bibliography


Meditation and the cognitive sciences


Asaf Federman

