Mindfulness-integrated Cognitive Behavioural Therapy:
Rationale for integration and the MiCBT model

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Abstract
Outcome research in traditional Cognitive-Behaviour Therapy (CBT) and mindfulness-based interventions suggests that both categories of approaches are effective treatments for a range of psychopathologies. The common view is that core elements of mindfulness practice, such as witnessing and accepting phenomena emerging in present moment experience, are fundamentally incompatible with the typical disputation, cognitive reappraisal and behaviour change methods of CBT. In contrast, this article highlights the overlap in reinforcement mechanisms underlying CBT and mindfulness processes, offering an expanded interpretation of operant conditioning, and presents a neurobehavioural rationale for the integration of mindfulness meditation with traditional CBT in the light of current brain imaging research. Each skill set of Mindfulness-integrated Cognitive Behavioural Therapy is then presented as an illustration of such integration.

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Cognitive behavioural therapy (CBT) has become one of the most commonly practised and empirically supported therapeutic approaches since its early development four decades ago (Meichenbaum, 1974; Norcross, Hedges, & Castle, 2002), with some authors describing it as “the fastest growing and most heavily researched orientation on the contemporary scene” (Prochaska & Norcross, 2003, p.369). Review of the sheer extent of evidence supporting the application of CBT formulations to a variety of psychological disorders is beyond the scope of the present paper. However, substantial empirical evidence has been presented elsewhere and posits CBT as an effective approach or ‘family’ of approaches (e.g. Butler, Chapman, Forman, & Beck, 2006; Roth & Fonagy, 2005). Nonetheless, traditional CBT is also limited in several ways, especially with regards to the processing of emotions emerging dynamically during crisis.

**Essential limitation of traditional CBT**

When we are upset, we tend to over-identify with the perceived problem, often misinterpreting the sensory cues and disregarding other interpretations that are just as valid, despite our ability for logical and rational thinking. More often than not, these interpretations are repeated over time and can be identified as habitual patterns of thinking, or schemas, triggered by certain kinds of events. The cognitive theory of emotional disorders suggests that core beliefs, learned since early childhood and reinforced throughout life, are at the origin of such problematic cognitive phenomena and their unhelpful consequences in daily life (Beck, 1976; Beck, Emery, & Greenberg, 1985). Accordingly, with conditions such as depression, cognitive-behaviour therapists do their best to help patients reappraise their deep-seated beliefs and unhelpful assumptions about life through reasoning and behavioural tasks.

However, evidence suggests that patients who undergo a course of traditionally delivered CBT need to rely heavily on the so-called “executive functions” to benefit from it (Mohlman & Gorman, 2005). Executive functions are mostly located in various regions of the prefrontal areas of the cerebral cortex and include the ability for focused and sustained attention, goal-directed action, emotion regulation, behavioural control, problem solving and motivation (Fuster, 1989). There is evidence that access to executive functions for self-regulation purposes decreases as a function of emotional distress, as typically experienced during depression and anxiety (e.g., Siegle, Thompson, Carter, Steinhauer, & Thase, 2007), potentially making the use of CBT difficult and less effective during emotional crisis, when we need it most.

Effortful cognitive reappraisal is an important aspect of cognitive therapy. Nevertheless, imaging studies show that it is significantly more difficult for patients with a mood disorder to decrease sadness than it is for controls (Keightley et al., 2003) and reappraisal attempts are minimally effective in decreasing the activation of limbic regions and associated emotional reactivity (Craig, 2002). The inability to regulate emotion is associated with dysfunction in the fronto-limbic network, where reduced prefrontal activation and inflated amygdala stimulation takes place (Holzel et al., 2009). Metaphorically speaking, the amygdala ‘hijacks’ the processing of information needed for rational thinking and generates or maintains an emotional experience instead. Worse, as brain reorganisation facilitates the chronicity of depression over time, the amygdala’s inhibiting effect on prefrontal executive functions does not even require being distressed (Siegle et al., 2007).

The advent of emotion research using psychophysiological and imaging procedures provides a reasonable platform for the observation that chronicity produces, and depends on, neuroplasticity in networks associated with emotional experience (e.g.,
Davidson & Cacioppo, 1992; Davidson et al., 2003). Accordingly, therapeutic tools that can affect the neurobehavioural aspects of chronic disorders in a way that helps patients to disengage from emotional reactivity are needed to address crisis and prevent relapse. Although there is abundant evidence that traditionally delivered CBT is a useful approach across a wide number of conditions (e.g., Whitfield & Williams, 2003), its limitation in addressing the experience of emotions without the assistance of psychoactive medication is leading numerous clinicians using CBT to seek complementary methods (e.g., Lang et al., 2012; Lau & McMain, 2005; Roemer & Orsillo, 2002, Whitfield, 2006). This is reflected by the increasing interest in learning acceptance and mindfulness approaches, which constitute the so-called “third wave” of behaviour therapy (Hayes, Masuda, & De Mey, 2003).

Interest in mindfulness training and its active mechanisms, in their Western, secularised contexts, has already produced a surge of theoretical and empirical studies (e.g. Holzel et al., 2011; MAMIG, 2006). Such work has resulted in the development and better understanding of several acceptance- and mindfulness-based therapies, including Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), Mindfulness Based Stress Reduction (Kabat-Zinn, 1982), Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), Dialectical Behaviour Therapy (DBT; Linehan, 1993) and more recently, Mindfulness-integrated Cognitive Behaviour Therapy (MiCBT; Cayoun, 2011), which integrates mindfulness meditation with well-established CBT skills and principles in a four-stage approach, as described below.

A neurobehavioural rationale for MiCBT: The co-emergence model of reinforcement

The theoretical basis of MiCBT is the co-emergence model of reinforcement (Cayoun, 2011). It is a model of embodied cognition (Isanski & West, 2010) derived from the so-called “five aggregates of the mind” described as essential human information processing in the Abhidhamma, the Buddhist psychological system (Narada, 1968; Nyanaponika, 1996). Its description of human behaviour and its maintenance is based on actual human experience and not from the standpoint that human beings are neutral observers of the external world, as was believed until recently by Western science.

The co-emergence model extends our understanding of learning principles through an analysis of the actual experience of reinforcement mechanisms. The model is an integrated (“non-dualistic”) conceptualisation of how mind and body co-emerge to produce an experience. As described below, it is anchored in modern learning theory, neural mechanisms and the phenomenology of mindfulness practice, and its operationalisation is entrenched in a cognitive-behavioural framework. It is presented in a simple form by means of generic functional components, rather than a complex conceptual architecture, and only briefly in this article (see Cayoun, 2011, for a comprehensive description).

Components of behaviour maintenance and change

The non-pathological functioning of the overall information system necessary for the reinforcement of learned behaviour is presented in Figure 1. An internally or externally generated stimulus (Stimulus) is perceived by the senses (Sensory Perception) in the form of smell, sight, touch, taste, sound, body sensation, or thought emerging from memory, and is converted to a cognitive process of evaluation (Evaluation)—though not all sensory stimuli are consciously evaluated or evaluated at all. In its default mode
of functioning, the Evaluation component filters perceived information by activating regions of the medial prefrontal cortex and inferior parietal lobule associated with self-referential processing (Philippi, Duff, Denburg, Tranel, & Rudrauf, 2012), such as one’s autobiographic memories, beliefs, values, personality, culture, perceived needs, and other self-referent filters, in order to make sense of the situation. Evaluation can be conscious or subconscious and learned (“automatic”). Drawing on Teasdale and Barnard’s (1993) terminology, the model posits that evaluation can be placed on a continuum of “implicationality”, where thoughts are increasingly “propositional” (descriptive, personally unimportant) towards one end and increasingly “implicational” (judgemental, personally important) towards the other end.

![Figure 1. Components of the co-emergence model of reinforcement during equilibrium in information processing (from Cayoun, 2011).](image)

The more implicational a thought is, the more viscerosomatic neurons produce interoceptive changes that co-emerge simultaneously and are experienced consciously or subconsciously as sensations in the body (Interoception). A body sensation can also precede Evaluation (e.g., pain), in which case it constitutes the Stimulus. The extent to which the information is judged as more personally important, such as the expectation of a threat or reward, to that extent it activates brain regions associated with self-referential processes along the cortical midline (Farb et al., 2010) and prefrontal networks that are excitatory to limbic regions, and feeds back into somatosensory pathways (Kirk, Downar, & Montague, 2011). This implies that the more implicational a thought is, the more intense the co-emerging body sensation will be, whether pleasant or unpleasant. The pleasantness, or hedonic tone, of a co-emerging body sensation is a function of the agreeableness of the evaluation. The more agreeable the evaluation is, the more pleasant the body sensation will be. The more disagreeable the evaluation is, the more unpleasant the co-emerging body sensation will be. Cognition is thus embodied.
The extent to which a body sensation is intense, to that extent Reaction, the last component, is likely to occur, as shown neurologically (e.g., Kirk et al., 2011). The reaction may be verbal (a thought) or non-verbal, conscious or subconscious, expressed or unexpressed behaviourally. Moreover, the extent to which body sensations are pleasant, to that extent the reaction will be an attempt to increase both the duration and frequency of the body sensations. The extent to which the sensation is unpleasant, to that extent the reaction will be an attempt to decrease the duration and frequency of the sensation. Craving behaviour is positively reinforced each time a pleasant body sensation is successfully maintained or increased. Aversive behaviour is negatively reinforced each time an unpleasant body sensation is successfully decreased; for example through avoidance.

One of the differentiating factors of this model is that Reaction is a direct consequence of Interoception and not a response to the stimulus or evaluation (e.g., an unhelpful schema). This alone has strong implications for therapy because Interoception is considered to be the locus of reinforcement. According to this conceptualisation, standard CBT approaches, such as the treatment of addictive disorders, need to be refined because people can only be addicted to an actual experience (body-sensations) and not to a substance or behaviour (e.g., gambling) per se. Similarly, hypervigilance to intrusive traumatic memories in Post-Traumatic Stress Disorder is a reaction to the thought’s co-emerging body sensation, rather than a reaction to the memory (Stimulus) or its meaning (Evaluation). In classical conditioning (e.g., phobias), phobic patients pair the evaluated stimulus with the co-emerging unpleasant body sensations, not with the response. The response is considered a learned reaction to body sensations, not to the phobic stimulus. The same applies to vicarious conditioning.

Traditionally, authors tended to conceptualise the role of such bodily focus as being implicated in numerous psychological difficulties (Cioffi, 1991). This approach framed interoceptive awareness in terms of ‘somatosensory amplification’ of symptoms – a process associated with related phenomena such as the catastrophic misinterpretations associated with panic disorder, for instance (e.g., Beck, 1988). However, as Mehling et al. (2009) have pointed out, the key feature of pathological interpretations of bodily experience is that it is not accurately representative of what is occurring within the body. In contrast, training patients to more accurately, and less evaluatively, become aware of interoceptive processes is a means of desensitisation (Bouton, Mineka, & Barlow, 2001) and key to mindfulness meditation, as discussed below.

As explained in the traditional work of B. F. Skinner, operant conditioning takes place when the behaviour “operates” on the environment to generate consequences (Skinner, 1953). Skinner’s demonstrations of operant conditioning relied on the pleasant and unpleasant consequences of a stimulus on the organism. Attempting to increase pleasant body sensations and decrease unpleasant ones also constitutes operant behaviour, except that it manifests at the experiential level of information processing, causing a subsequent pull for action which only appears to be caused by the stimulus. This reactive process operates mostly at a sub-threshold of awareness (i.e., automatically) because of the great rapidity with which it takes place—a phenomenon that can hardly be witnessed directly unless skillful introspection is developed. Additionally, it may not involve an overt expression of behaviour if the activated body sensations lack sufficient intensity due to low levels of implicationality in Evaluation networks. The incessant flow of operant behaviour is precisely a main target of mindfulness meditation, especially during the technique known as “body-scanning”, as described below.
From the above description, a strong implication arises: *all* learned behaviours undergo operant principles, however subtle and covert the level of processing may be. It is suggested that all forms of conditioning include operant learning and depend on it. They are proposed to be layers of superimposed conditions that can produce learning *only* if operant learning is activated at the source. Beneath the apparent coupling of a stimulus and a response, there are body sensations we must experience and to which we respond. Technically speaking, conditioning is possible because interoception “operates” on the response. From this point of view, body sensations are the sole real operants, universally emerging at the source of all learning.

Figure 2 summarises the differences and similarities between the traditional and co-emergence models of operant learning. Note that in both models, the conditioned response can be maintained by erroneous beliefs and the consequence of successful desensitisation can lead to cognitive reappraisal. The co-emergence model uniquely assumes that since somatosensory cues are essential for emotional memory processing and long-term storage, making body sensations the locus of reinforcement, all conditioned responses rely on operant conditioning. Accordingly, desensitisation is proposed to be most successful when body-sensations, as “fundamental operants”, are targeted.

**Figure 2.** Summary of differences between traditional operant conditioning principles and co-emergence model of reinforcement.
System in disequilibrium and psychopathology

During stressful experiences, whether due to craving or aversion, a state of disequilibrium between these four information-processing components takes place. Attention is depleted from our senses (Sensory Perception and Interoception) and is reallocated to making judgement and reacting (Evaluation and Reaction). This is in line with fMRI evidence for the over-activation of “a cognitively evaluative neural network responding to emotion challenge, accompanied by the simultaneous deactivation of a viscerosomatic-centered experiential network” (Farb et al., 2007, p. 31). Figure 3 represents a state of disequilibrium in the information processing system, pictorially highlighted by the disproportionate size of boxes representing each stage of the model.

While the central nervous system is geared to handle discrete stress responses and usually recovers well from them, a disequilibrium state can be learned and can become the most habitual state of the system, resulting in a continual cycle of implicational evaluations (e.g., ruminative thinking, worry, etc.) and emotional reactivity. As shown in Figure 3, we become over-judgemental and over-reactive, facilitating the emergence and/or maintenance of psychopathology. As shown by neuroimaging studies (e.g., Farb et al., 2010; Kirk et al., 2011), decreased interoceptive awareness can be explained behaviourally through learned experiential avoidance and dissociative states, even (or especially) when body sensations are intense due to the implicationality of the thought (Evaluation). Leaned disequilibrium may be maintained through neuroplastic changes following sufficient exposure to operant reinforcement, maintaining chronic states, (e.g., Schwartz & Begley, 2003; Siegle et al., 2007), including chronic pain (Apkarian, 2008; Baliki et al., 2012) and personality (Cayoun, 2011).

![Figure 3. The co-emergence model of reinforcement during disequilibrium in information processing (From Cayoun, 2011).](image)

Moreover, the co-emergence model implies that, since early childhood, every important (“implicational”) memory is encoded and stored with a coupled bodily experience. Hence, body sensations that co-emerge with judgements become fundamental memory cues that help recognise important stimuli, such as implicit
memories of threats, and are essential for effective survival purposes. This is proposed to be a fundamental principle for the perpetuation of schemas. The maintenance of unhelpful schemas relies on reactivity to body sensations and can persist when the chosen therapy does not take body sensations into account, increasing the probability of relapse. Since we react to, or because of, body sensations, not being sufficiently aware of them leads to schema-based misattribution and automatic reactivity, leaving little time to choose a more adaptive response. This is in accord with important developments in psychophysiological research, such as Porges’ (2009) polyvagal theory, which also proposes that psychosocial behaviour and psychopathology are dependent upon interoception (“neuroception”), a subconscious, yet primary, sense that we use for detecting threats and safety since early childhood (Porges, 1993, 2004).

**The relevance of mindfulness meditation in therapy**

As a mental state, mindfulness is experienced as a heightened sensory awareness of the present moment, free from judgment, reactivity and identification with the experience. Training in mindfulness meditation requires deliberate sustained attention on sensory and cognitive processes with unconditional acceptance of the experience, with the ability to observe the essential impermanent, and therefore impersonal, nature of the experience. Consequently, mindful attention also requires a deliberate effort to prevent usual reactions and develop greater objectivity (less implicationality), acceptance and detachment with each experience, a skill known as “equanimity”. The premise here is that the more one is mindful, the more one is able to perceive that all experiences are impermanent and is accordingly able to decrease identification with the experience (self-referential processing), typically reflected in decreased attachment to expectations and intensity of general craving and aversion.

When patients undergo a course of MiCBT, during Stage 1, they first learn to sustain attention to their breath and learn to quickly recognise thoughts that emerge spontaneously in consciousness, inhibit any identification with, and reaction to, these thoughts, and refocus attention on the breath as soon as possible. Patients inhibit the learned response only; they do not inhibit the thought itself. Briefly described, this practice requires the training of three executive functions: sustained attention to a target (breath), response inhibition to the intrusive stimulus (e.g., thoughts) and cognitive flexibility through switching attention back to the target. (Bishop et al., 2004). Rather than trying to modify the content of thoughts (as suggested by cognitive therapy), patients develop a degree of control over the process of thinking.

As per traditional Theravada teaching of mindfulness meditation in the Vipassana tradition, patients are also taught to pass their attention (“scan”) systematically throughout their body and develop an increasing ability to feel body sensations consciously while purposefully inhibiting habitual judgements and learned reactions. During mindfulness practice, executive functions are used to regulate emotions by preventing reactivity to body sensations, which are the building blocks of all emotions—indeed emotions cannot exist without body sensations. This involves activation of low-level interoceptive representations of the posterior insula and elevated activity in the somatosensory cortex (Kirk et al., 2011).

Based on the co-emergence model of reinforcement, since all significant life events, including schema-related memories, are encoded and stored with co-emergent body sensations, scanning the body with equanimity during mindfulness meditation is also scanning through the stock of stored memories. Fully allowing the interoceptive experience during body-scanning leads to experiencing sensations that are sufficiently
similar to those experienced in the past, capable of acting as memory cues for past emotions—many of which operate below the level of conscious awareness.

An important role of mindfulness training is to neutralise the learned response to such cues, with exposure and response prevention to interoceptive cues. Through regular mindfulness meditation, by continually allowing the interoceptive experience, the sustained extinguishment of the response progressively neutralises the emotionality of the related schema. Hence, the rationale for the integration of mindfulness meditation into CBT in MiCBT is to help neutralise the emotional dimension of unhelpful thoughts and behaviours (Evaluation and Reaction) in a way that can be generalised across time and contexts. To this end, mindfulness practice trains the individual to reallocate attention from over-emphasised components (Evaluation and Reaction) to under-emphasised or avoided components (Sensory Perception and Interoception), thus re-establishing equilibrium in the system (as in Figure 1) and decreasing the likelihood of being over-judgemental and over-reactive (as in Figure 3).

Recent neuroimaging studies show evidence that confirms the predictions of the co-emergence model of reinforcement in participants practising mindfulness meditation during induced distressing experiences. With induced pain, meditators display “a functional decoupling of the cognitive-evaluative and sensory-discriminative dimensions of pain, possibly allowing practitioners to view painful stimuli more neutrally” (Grant, Courtemanche, & Rainville, 2011, p. 150). They tend to deactivate the default mode network (where self-referential processing is represented) and process sensory cues with least implicational thinking. In contrast, novice practitioners and non-meditators tend not to deactivate the default mode network, thereby remaining identified with the experience and engaged with judgements and attempts to control their response (e.g., Baliki, Geha, Apkarian, & Chialvo, 2008; Grant et al.). As per the prediction of the co-emergence model, novices produce a disequilibrium state in the processing system, with inflated evaluative and reactive components at the cost of interoceptive and other sensory components. In contrast, with induced sadness, meditators display “a distinct neural response […] including visceral and somatosensory areas associated with body sensation. The greater somatic recruitment observed in the mindfulness training group during evoked sadness was associated with decreased depression scores” (Farb et al., 2010, p. 25).

According to the co-emergence model, a more balanced allocation of attention across the four components of the information-processing system helps regulate attention and emotion, and cannot co-exist with emotional disorders. Daily practice of mindfulness meditation promotes such balance. In their recent review of the extant literature, Ingram, Atchley and Segal (2011, p. 172) clearly identified that mindfulness meditation decreases self-oriented (implicational) evaluation and increases non-evaluative viscerosomatic representation of sensation and emotion, and argue that “mindfulness may serve to restore the neutral balance between evaluative and interoceptive activity”.

Meditators’ increasing ability to be less judgemental and reactive following regular practice is facilitated by enhanced excitatory pathways that promote awareness of sensory experience and inhibitory pathways that enable response prevention, as shown by Hölzel et al.’s (2011) review of neuroimaging research in the effects of mindfulness. The conclusion stated by Farb and colleagues accurately captures the equilibrium state of the co-emergence model (see Figure 1) described herein:

Affective reactivity, seen in the combination of cortical midline and language area recruitment and viscerosomatic suppression, characterized participants undergoing dysphoric mood provocation. By balancing participants’ regulatory responses to
sadness, with coordinated monitoring of less valence and more sensory visceral information, mindfulness may represent one neural path for reducing affective reactivity and disorder vulnerability (Farb et al., 2010, p.32).

There is also evidence to suggest that the integration of mindfulness skills with cognitive and behavioural models of therapy can generate greater therapeutic benefits than applying these models alone (Baer, 2003; Cayoun, 2011; Teasdale et al., 2000). However, CBT therapists abandoning effective CBT skills, such as exposure techniques, and using mindfulness meditation as the sole therapeutic approach may also “throw the baby out with the bath water” (e.g., Hipol & Deacon, 2012; Toneatto & Nguyen, 2007). We propose that a theoretically-congruent and technically-complementary integration of traditional mindfulness training and traditional CBT may provide an approach that can help patients address emotional distress rapidly, across contexts and conditions, while preserving evidence-based CBT methods that have been proven effective for several decades. As described below, MiCBT fits well this description.

Structure and stages of the MiCBT approach

MiCBT is a systemic therapy approach that integrates mindfulness meditation and associated Buddhist principles (ethical action and compassion) with core elements of cognitive and behavioural methods based on the co-emergence model of reinforcement. The purpose of this integration is to teach patients to internalise attention in order to regulate attention and emotion, and externalise these skills to the contexts in which their impairment is triggered or maintained. MiCBT was developed in 2001 and piloted and refined for the following five years (Cayoun, 2003; Cayoun, Sauvage, & van Impe, 2004). It is used in individual and group therapy with equivalent clinical efficacy (Roubos, Hawkins, & Cayoun, 2011) and usually requires between eight and twelve sessions for most DSM-IV Axis 1 disorders; about twice longer for moderately severe personality disorders—though there are no controlled studies confirming the long-term efficacy of MiCBT with DSM-IV Axis 2 disorders.

MiCBT teaches mindfulness according to the traditional four-fold establishment of mindfulness, including mindfulness of body (posture, movement, and behaviour), body sensations (including those associated with emotions), mental states (including emotional states) and mental content (thoughts) (e.g., Hart, 1987; Brahm, 2006; see also Thanissaro Bhikkhu, 2011, for a translation of the Satipatthana sutta, and Goenka, 1990, for discourses and useful commentaries on the Satipatthana Sutta). Related support materials, such as audio instructions on various mindfulness practice compact discs and MiCBT-specific homework forms, have been developed.

Stage 1 - Personal Stage: attentional and emotional regulation

In stage 1, Mindfulness meditation training is taught to internalise attention in a way that decreases emotional reactivity and promotes deep levels of experiential awareness and acceptance. Emphasis is placed on the internal context of experience to equip patients with an increased sense of self-control and self-efficacy in handling thoughts and emotions before addressing life difficulties for which they sought therapy. Following standard intake assessment and contractual agreement on therapeutic goals, patients begin with the practice of progressive muscle relaxation (PMR) and mindfulness of body posture and movement. Besides its potential relaxing effect, PMR provides an initial and reassuring sense of agency over aversive bodily experiences, which assists in reinforcing patients’ initial effort to commit to a daily practice. However, PMR is only used for the first week in most cases, as a preparatory measure.
This is because patients can inadvertently use relaxation as a means of experiential avoidance, which is incompatible with the aims and acceptance-based features of mindfulness. Mindfulness of body (posture and movements) in daily actions introduces the notion of present-moment awareness, which is a relatively easy introduction to mindfulness principles, as commonly used in other integrations, such as DBT (Linehan, 1993).

Patients are then taught to practise mindfulness of breath for one to two weeks and basic (unilateral) body-scanning for the following two weeks (both described earlier). The increased ability to detect and withstand distress cues leads progressively to brain reorganisation in just a few weeks, both in grey matter (Holzel et al., 2001) and white matter (Tang, Lu, Fan, Yang, & Posner, 2012). Increased efficacy of self-regulation networks produced by neuroplasticity provides an invaluable biological apparatus to facilitate emotion regulation during exposure tasks in the following stages (Stages 2 and 3). For instance, a recent fMRI study shows that mindfulness of breath can produce a generalised reduction in amygdala response to emotional stimuli that is maintained during non-meditative states (Desbordes et al., 2012).

The emphasis on interoception as locus of reinforcement places body-scanning methods at the heart of daily MiCBT practice. The effort to decrease the habit of identifying with moment-to-moment experience trains patients to process information in a less self-referential, more ‘objective’, manner, as discuss in Farb et al. (2010). To increase training efficacy, patients learn to adhere to three fundamental principles: sufficient frequency (usually twice daily), sufficient duration (usually 30-min per session) and sufficient accuracy of practice (conscious effort to decrease identification with emerging experiences). The first two principles permit the third, which specifically reduces activation of default mode network and the need to react with craving or aversion, irrespective of the type of experience. Generalising interoceptive awareness and acceptance to everyday situations occurs as a spontaneous consequence of neuroplasticity.

In addition, patients are invited to monitor body sensations as continually as possible in everyday situations. The Interoceptive Signature form (Cayoun, 2011) is used to identify typical patterns of interoceptive dynamics experienced during stressful events and is used to record the patient’s increasing capacity to prevent the usual response (i.e., indicators of equanimity). Hence, interoceptive awareness, developed during formal meditation practice, becomes a skilful means for preventing the reinforcement of unhelpful habits in daily life.

Stage 1 requires between three and five weeks, depending on personal and clinical factors such as severity of the symptoms and adherence to treatment. Normalising and psycho-education about potential early difficulties of mindfulness practice are important at this early stage. Completion of Stage 1 is largely determined by enhanced sense of agency and responsibility through practice. Patients must have developed a reliable ability to accept and ‘stay with’ (expose to) most types of body sensations with some equanimity, i.e., the tendency to avoid aversive experiences is markedly decreased. Accordingly, patients are invited to start Stage 2 as soon as they can feel sensations in about 80% of the body. They also begin to learn more efficient (faster and more global) ways of scanning the body, as taught by the Burmese Vipassana tradition, and develop ability for rapid distress cue detection (See Cayoun, 2011, for detailed delivery).
Stage 2 - Exposure Stage: behavioural regulation

Meditating well, even for long periods, does not necessarily translate to behaviour change when avoidance habits are well-established (see Toneatto & Nguyen, 2007, for a review of controlled research). For example, personal isolation when sitting closed eyes on a cushion may be heaven for socially anxious or avoidant patients, but they may still be unable to confront fears in social contexts. Stage 2 is the first “externalising” stage, during which attention is partly directed outward to regulate behaviour by applying Stage 1 skills in contexts of avoidance. Patients learn to remain “equanimous” (expose to body sensations while preventing reactivity and identification with them, as in Stage 1) with external targets to extinguish the conditioned response; avoidance of stressful and avoided situations. Hence, mindfulness skills are now at the service of CBT.

There is neurological evidence that mindfulness meditation in novices produces a down-regulation of the left amygdala during emotional processing, and that progressive acquisition of mindfulness skills induces a deactivation of the default mode network areas (medial prefrontal and posterior cingulate cortices) across all induced emotions (Taylor et al., 2011). Increasing ability to deactivate default mode network areas is a function of one’s ability to not identify with the experience, which increases one’s ability to extinguish a learned response. These findings are in line with the imagery-based exposure method called “bi-polar exposure”, which is the first procedure used with patients during Stage 2. Bi-polar exposure lasts about eleven minutes and is practised following each practice of mindfulness meditation (usually morning and evening) for two days (i.e., four times) prior to commencing in-vivo exposure.

Guided by a set of varied targets listed hierarchically as a function of subjective units of distress, bi-polar exposure consists of three steps: First, it requires imagining the worst case scenarios that could happen when in-vivo exposure takes place two days later, producing strongly implicational evaluations (catastrophic thoughts) and co-emerging body sensations, while remaining cognisant and non-reactive to unpleasant body sensations. This desensitisation step takes about five minutes. Second, it instructs to have a 1-minute break from exposure to “let go of the scenario” by focusing calmly on the breath. The third step requires imagining the best case scenarios that could happen when in-vivo exposure takes place two days later, also for five minutes, while remaining cognisant and non-reactive to pleasant body sensations. Because body sensations are considered to be the locus of reinforcement (Cayoun. 2011) and exposure is accordingly applied to co-emerging body sensations, bi-polar exposure helps down-regulate amygdala regions and reduces the intensity of learned avoidance before in-vivo exposure commences. Exposure to neutralise negative as well as positive expectations is important to develop experiential acceptance (equanimity), irrespective of the outcome; hence “bi-polar” exposure.

After four bi-polar exposure sessions, patients then proceed with in-vivo exposure to the chosen target applying the same focus on interoception and making the same effort of not reacting to body sensations. Once the task is completed, patients are asked to reproduce it daily, if appropriate. Within the same week, the patient undertakes the next target on the list, attracting a greater SUDS level. Patients are usually able to neutralise two to three different targets per week, producing immediate increase in self-confidence and decreased general avoidance. Interestingly, Stage 2 is usually implemented over two to three weeks, depending on needs. Because exposure is to co-emerging body sensations, the locus of reinforcement, during in-vivo exposure, distress tolerance can transfer to multiple situations that would habitually lead to some avoidance. Thus, Stage 2 makes exposure non context-specific. It helps generalise self-
confidence and, as emphasised in the ACT approach (Hayes et al., 1999), it helps patients follow their valued directions.

Stage 3 - Interpersonal Stage: interpersonal regulation

For a therapeutic approach to be transdiagnostic, it needs to address interpersonal dynamics. There is evidence that amygdala volumes correlate with the size and complexity of social networks in adults and this association does not seem to be present for other subcortical structures (Bickart, et al., 2011). Neuroplasticity research also shows evidence of larger amygdala volumes and decreased volumes in the hippocampus and prefrontal cortex of later-adopted post-institutionalised children (Davidson & McEwen, 2012). This further demonstrates that exposure to aversive social influences leads to developing a more emotionally reactive brain configuration. Moreover, socially-driven neuroplastic changes may be important factors for personality development in childhood that may persist well into adulthood. Accordingly, this and the next stage of MCBT foster social intelligence.

Stage 3 requires externalising attention further towards others by dividing attention between self and others. Patients learn to decrease self-referential processing by considering others’ emotional experiences and by not reacting to others’ reactivity. Patients apply stages 1 and 2 skills during interpersonal communication, knowing that their emotional reactivity to external stimuli is a function of their unawareness and unmanageability of body sensations. Although some patients will need more interpersonal skills than others, the social network of patients with chronic conditions or personality disorders is generally negatively affected by the patient’s symptoms, such as social withdrawal, avoidant behaviour, low mood, lack of motivation, agitation, anxiety, addictive behaviour, etc. The sense of disconnectedness during and following a psychopathology alone can be a maintaining factor for maladaptive behaviour, such as substance abuse, and often precipitates relapse.

In addition, the patient’s lack of social intelligence (Goleman, 2006) may also be a precipitating factor for crises. As we often hear in clinical practice, poor interpersonal boundaries, seeking validation in the wrong context or in destructive ways, reinforcing guilt about one’s needs or one’s right, or using passive/aggressive style of communication, are part of the patient’s interpersonal difficulties that clinicians try to address.

In the first week of Stage 3, patients learn a mindfulness-based interpersonal skill called “experiential ownership”, which uses a form of exposure to understand and accept others’ ways of communicating. This requires finding several (at least two) diverse interpersonally uncomfortable situations that are currently holding back the patient’s progress or that would contribute to it if resolved. In each situation, usually starting with one that produces mild to moderate distress, patients put in practice what they learned in Stage 1 and apply this insight to the current situation: They remain mindful that their suffering mostly resides in their unawareness of co-emergence reinforcement, that they react to body sensations produced by their own judgements and not to a person outside themselves, and therefore that they, not the interlocutor, are responsible for their experience and choice of reaction.

Accordingly, once they have rapidly scanned their body and taken full responsibility (“ownership”) for what they feel, they turn their attention towards the interlocutor and apply the same insight with regards to the interlocutor’s probable experience. They pay careful attention to the interlocutor’s body language, including tone and inflexions of voice and possible changes in skin redness, and make a hypothesis about the interlocutor’s emotional experience. This implies that patients
train themselves to interrupt self-referential (default mode) processing and remain as objective as possible, relying of sensory cues and not their usual judgements, to chose their response. They aim at producing non-harmful action, rather than automatic defensive reaction. Although patients learn to perceive others’ distress and take into account that others may have behaved otherwise had they received the same training, they also “disown” the interlocutor’s experience on the basis that they, too, react because of their own body sensations. They learn not to feel responsible for how others choose to react. Thus, patients learn to discern healthy interpersonal boundaries while remaining as nonjudgemental and non-reactive as possible.

In the second (and perhaps the third) week of Stage 3, patients learn assertiveness skills and other social skills training if necessary. They learn to use standard assertive communication, which they are taught to combine with experiential ownership skills in as many situations as possible (at least two). Awareness of interpersonal boundaries and assertiveness skills are more likely to develop if the patient is able to contain his or her own arousal and is able to allow time for the other’s reactivity to diffuse. Hence, mindfulness skills are again at the service of CBT.

Stage 4 - Empathic Stage: ethical insight and relapse prevention
Stage 4 extends Stage 3 skills to a more global awareness of how human beings can overcome the perpetuation of unnecessary suffering and influence each other for the better. This stage also helps normalise patients’ perceived shortcomings and distress, further assisting in reducing the strength of neural connections in the default mode network maintained by the tendency to over-identify with the experience. Through normalising suffering, patients learn to disidentify from usual judgements about themselves and others and allow unpleasant events to arise and pass more easily. Non-identification with painful experiences promotes a sense of connectedness within oneself and with others that relies on learning to produce positive emotions rather than decreasing negative ones (Neff, 2004).

Patients learn to generalise to others what they have learned to integrate in their own life in the first three stages: people suffer essentially out of unawareness of three profound phenomena; (1) everything is essentially impermanent, including one’s sense of self, (2) they react to the somatosensory consequence of their thoughts and not to the external triggers, and (3) their craving and aversive reactions to body sensations maintain their general state of emotional reactivity. Stage 4 emphasises these phenomena and helps patients develop a sense of interdependence of fate; suffering is a universal, not idiosyncratic, human condition, and acceptance leads to a better outcome than avoidance (Cayoun, 2011; Hayes et al., 1999).

There is behavioural and neurological evidence that compassion can be learned through meditation practice (e.g., Jazaieri et al., 2012; Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008), suggesting that two main brain areas are particularly relevant to the ability to share emotions and empathy, the insula (central to the detection of emotions and for mapping physiological responses to emotions and passing on the information to other brain regions) and the junction between the right temporal and right parietal lobes (promotes the processing of empathy, especially the ability to perceive the mental and emotional states of others). It appears that these two regions are markedly more developed in expert meditators than in novices (Lutz et al.), providing an important neural substrate for the ability to maintain fulfilling relationships and a sense of connectedness with others.

There is also evidence that becoming more compassionate helps patients remain more resilient when exposed to common stressors (Neff, Kirkpatrick, & Rude, 2007). In
particular, people who learn to adopt a more self-compassionate perspective seem to be more able to acknowledge their role in negative events without feeling overwhelmed with emotions and can attenuate their reactions “in ways that are distinct from and, in some cases, more beneficial than self-esteem” (Leary, Tate, Adams, Batts Allen, & Hancock, 2007, p. 887).

During this stage, patients also learn that they are the first recipients of the emotions they generate and learn to choose carefully what emotion to promote and what emotion to let go. This stage teaches empathic skills grounded in bodily experience and in genuine respect for ethical boundaries in daily actions. It also becomes evident to practitioners that “self-compassion helps to engender and is engendered by mindfulness” (Neff, 2004, p. 29).

In the first week of Stage 4, patients are taught “loving-kindness” meditation, which has been taught as part of mindfulness training ever since mindfulness has been taught in Buddhist teachings (Hart, 1987; Salzberg, 1995). This combines a set of simple positive affirmations that are paired with the pleasant body sensations produced by advanced body-scanning methods to create or enhance self-compassion and compassion towards others. This includes (but is not restricted to) producing thoughts of acceptance while pairing pleasant body sensations with memories of people with whom patients may have been in conflict or with whom they expect to be in conflict in the future, in a way that acts as counter-conditioning method and helps prevent relapse. The practice lasts between five and eight minutes and is practised at the end of each mindfulness meditation practice. Hutcherson, Seppala and Gross (2008) demonstrated that just a few minutes of loving-kindness meditation can increase one’s sense of social connectedness on both explicit and implicit levels, which may help decrease social isolation.

In traditional Buddhist teaching, taking mindfulness training without initially committing to ethical conduct is simply inconceivable, theoretically unsound and technically unsuccessful. Indeed, actions that are harmful to oneself or to others tend to maintain or even reinforce an existing psychological condition and are counterproductive in a course of therapy. Accordingly, in the second week of Stage 4, patients learn to materialise their sense of connectedness with others through observable actions. They learn to “ground” their developing empathy for others in ethical awareness and make a commitment to perform ethical actions for the entire week, as a behavioural experiment.

Specifically, patients are asked to pay effortful attention to their motivation in daily actions to prevent harmful intensions and actions toward themselves and others, including basic acts such as killing, lying, stealing, intoxicating, and harmful sexual acts. These are presented as experiments and means of education rather than dogmatic moral stands. Patients are asked to monitor body sensations just preceding any harmful action, examine the sensation, inhibit the usual response, let the sensation pass in its own right, acknowledge that their conscious effort has prevented harm, and keep a record of each effortful ethical action and how this made them feel about themselves and the positive influence they can have on their environment. As patients learn to generate helpful thoughts and perform worthwhile actions, they gradually internalise the locus of self-worth. Since there is less reliance on external factors to feel worthy and deserving self-acceptance, the likelihood of relapse is lessened.

Other mindfulness-based programmes make mindful ethical training the essence of their teaching (e.g., Monteiro, Nuttall, & Musten, 2010). Clinicians often report observing patients making decisions for significant life changes during Stage 4, often mentioning that they now value more their life and happiness (see Cayoun, 2011, for
Thus, the probability of relapse is further reduced. Figure 4 displays the hierarchical structure of the MiCBT four stage model. Each stage and associated rationale is described below (see Cayoun, 2011, for a more comprehensive account and implementation protocol).

**Figure 4.** The 4-stage model of Mindfulness-integrated Cognitive Behaviour Therapy. Note that this schedule is only an approximate indication of standard delivery. Each stage can be extended to a longer duration, depending on the patient’s needs and requirement for progressing to the next stage.

**Stage structure**

There is evidence to suggest that the ordering of the four stages in their current format is an advantage. For example, an electroencephalographic investigation of prefrontal alpha-asymmetry in previously depressed individuals revealed that responses to meditation types (Mindfulness of breath and loving-kindness) were moderated by their ruminative brooding (Barnhofer, Chittka, Nightingale, Visser, & Crane, 2010). Although both forms of meditation practice had beneficial effects on prefrontal alpha-asymmetry, individuals high in ruminative brooding tended to respond to mindfulness of breath (taught in Stage 1 of MiCBT) but not loving-kindness meditation (taught in Stage 4), whereas those low in ruminative brooding showed the opposite pattern.

Another randomised controlled study, with novice meditators, showed that participants in the mindfulness-of-breath condition reported greater decentering (non-identification with emerging thoughts) relative to loving-kindness meditation (Feldman, Greeson, & Senville, 2010). Moreover, the frequency of repetitive thoughts and
negative reactions to thoughts was strongly and positively correlated in the loving-kindness condition, but relatively weaker in the mindfulness-of-breath condition.

Both these studies support the view that patients who ruminate need to develop skills to address unhelpful thoughts first, before being able to benefit from producing helpful ones, such as those produced by loving-kindness meditation. This is precisely the reason for which the MiCBT programme places mindfulness of breath earlier and loving-kindness meditation later, when skilful means to address ruminative and other unhelpful thoughts have been developed through meditative practice and used effectively in daily life. Although the sequential integration of core CBT skills across the stages has intuitive appeal, future studies may investigate the relative advantage of such structure across disorders.

Future directions

We are aware of several studies currently being carried out to investigate the efficacy of MiCBT in drug and alcohol addiction, carers’ quality of care and quality of life, chronic pain, cognitive decline in older adults, and the differential effects of the various mindfulness techniques used in Stage 1 of the MiCBT four-stage programme. Moreover, an RCT to explore the possible outcome similarities and differences between MiCBT and MBCT is currently undertaken. This type of investigation is currently uncommon and more is needed since, to our knowledge, there are no data reporting on the differential efficacy among mindfulness-based interventions to date. A current limitation for clinicians is the lack of evidence-based methodology for choosing the preferred mindfulness-based therapy. Future research will need to investigate possible parameters to guide clinicians in their decision.

MiCBT research is in its infancy and more studies will help examine the magnitude of its efficacy across conditions and up to what degree we can teach mindfulness skills beneficially to people in psychological distress. Future studies may assess the efficacy of sub-components of MiCBT, such as the effects of experiential ownership (Stage 3) or grounded empathy (Stage 4) on the symptoms of Asperger’s Disorder (AD), where neuroplastic changes may assist AD patients, whose probability of rapid improvement in understanding social cues using a top-down approach is minimal. Moreover, the experiential ownership technique (in stage 3 of MiCBT) and loving-kindness meditation (in Stage 4) may also be of assistance in decreasing narcissistic symptoms by developing greater interpersonal awareness and compassion for others. With reduced narcissism, fMRI investigations may show facilitated disengagement from default mode network accompanied by reduced self-referential processing during behavioural and cognitive tasks.

Conclusion

Despite the popularity of CBT and strong evidence for its efficacy in a wide range of disorders, its ability to address emotions directly is limited, especially once maintained emotional reactivity has led to brain reorganisation. Accordingly, there is an increasing interest for the use of mindfulness-based approaches, which have been shown to address the neurobehavioural nature of learned unhelpful responses. The co-emergence model of reinforcement has helped clinicians understand the rationale for the use of mindfulness meditation in therapy for over a decade, as it makes two major contributions to the fields of behavioural science and clinical psychology.

The first contribution is the understanding that reactivity is uniquely triggered by body sensations and not by mere dysfunctional thoughts or stimuli in the
environment. This alone has implications for the conceptualisation of operant conditioning and treatment methods for behaviour modification. The second contribution is the understanding that using mindfulness meditation helps address the emotionality of beliefs by re-establishing and maintaining attentional equilibrium during emotional distress, across four broad information processing components, and is therefore advantageous to therapeutic interventions for a broad range of disorders.

The four-stage model of MiCBT offers a comprehensive approach that takes into account empirically demonstrated neurophenomenological components of emotions and coping mechanisms. Bringing neurobehavioural science into the clinical setting, MiCBT is a promising integration of the best that Eastern and Western psychological systems can offer, broadening the scope of clinical choice and potentials.

References


