

Mechanisms of Mindfulness: A Buddhist Psychological Model

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Abstract Several models have explored the possible change mechanisms underlying mindfulness-based interventions from the perspectives of multiple disciplines, including cognitive science, affective neuroscience, clinical psychiatry, and psychology. Together, these models highlight the complexity of the change process underlying these interventions. However, no one model appears to be sufficiently comprehensive in describing the mechanistic details of this change process. In an attempt to address this gap, we propose a psychological model derived from Buddhist contemplative traditions. We use the proposed Buddhist psychological model to describe what occurs during mindfulness practice and identify specific mechanisms through which mindfulness and attention regulation practices may result in symptom reduction as well as improvements in well-being. Other explanatory models of mindfulness interventions are summarized and evaluated in the context of this model. We conclude that the comprehensive and detailed nature of the proposed model offers several advantages for understanding how mindfulness-based interventions exert their clinical benefits and that it is amenable to research investigation.

Keywords Mindfulness · Meditation · Psychological model · Buddhism · Insight

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Introduction

Several models of change have been proposed to explain the processes by which mindfulness-based interventions (MBIs) exert their physical, psychological, and emotional effects. Each of these models posits one or more possible mechanisms of change: cognitive mediators, such as metacognitive awareness (Teasdale et al. 2002), decentering (Fresco et al. 2007), defusion (Fletcher and Hayes 2005), re-perceiving (Shapiro et al. 2006), and decreased rumination (Deyo et al. 2009); attentional mediators, such as modulation of attentional focus (Carmody 2009) through focused attention or open monitoring (Lutz et al. 2008); and neurobiological mediators, such as neurofunctional changes (see Fletcher et al. 2010 for review; Lutz et al. 2008). Collectively, these models further our understanding of specific aspects of MBIs while highlighting the complexity of the individualized change process resulting from participation in MBIs. However, no one model appears to be sufficiently comprehensive in describing the mechanistic details of this change process. Furthermore, there has been a call in the literature to reconstruct various aspects of current mindfulness models, including establishing a clear operationalization of the term “mindfulness,” with identification of its use as a trait, state, or practice in a given context (Davidson 2010); clarifying the precise mechanisms of mindfulness, preferably in a way that is amenable to neuroimaging research (Fletcher et al. 2010); and further elucidating how each component of mindfulness leads to specific outcomes (Coffey et al. 2010).

In an effort to address these issues, we turned to Buddhist psychological theories as many of the techniques used in MBIs have been adapted from Buddhist contemplative traditions. However, for the most part, the psychological model that accompanies these techniques has not

been explicitly incorporated into the theory or implementation of MBIs, nor into current mechanistic models of MBIs. This has resulted in an unnecessary loss of the context that explains how these techniques work and why they are used (Grossman 2010). We propose a new approach based on Buddhist psychological theories which we have termed the Buddhist psychological model (BPM). We begin by using the BPM to describe both the relationship between mindfulness and cognitive processes and the changes to those processes that are brought about by mindfulness training. We then use the BPM to hypothesize the mechanisms by which mindfulness practice leads to symptom reduction. This is followed by a discussion of the relationships of the BPM to current Western models in an attempt to clarify current areas of overlap.

Part I: Description of BPM

The BPM as described in this paper is based on commentaries on, and translations of, a set of Buddhist texts called the Abhidhamma Pitaka (Philosophical Collection; Mendis 2006; Narada Maha Thera 1987). While these texts are extremely detailed and extensive in their analysis and classification of awareness and mental states, we have simplified the concepts to present the foundations of the BPM.

We begin our presentation of the proposed model with a description of the components of mental activity. In the BPM, awareness of an object occurs when either a stimulus enters our field of perception and makes contact with a sense organ (i.e., sense impression) or when an object of cognition (a thought, memory, emotion) arises in the mind. This awareness lasts for a brief moment in time and then ceases (see Fig. 1). In the BPM, no practical distinction is made between awareness brought to sense impressions (i.e., physical sensations) versus cognitions (i.e., mental events) as they are worked with in the same manner during mindfulness practice. However, referring to both events as simply “sensations” is a foreign concept in Western psychology; thus, we will maintain a distinction between the two in our discussion of the BPM in an effort to enhance comprehensibility. It is important to realize, however, that this distinction is for the sake of clarity rather than being intrinsic to the BPM itself.

According to the BPM, attentional resources are limited: *an individual can only be aware of one object at a time*. The experience of a continuous stream of consciousness is produced by the rapid series of sense impressions and mental events arising and passing away, similar to how movement in a film is created by a rapid succession of individual still images (see Fig. 1). This process occurs

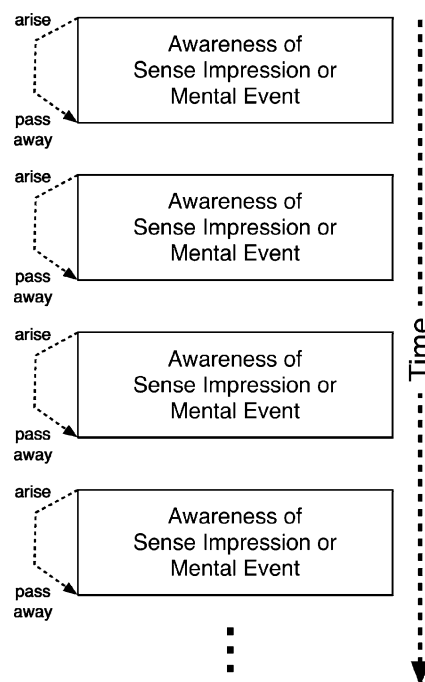


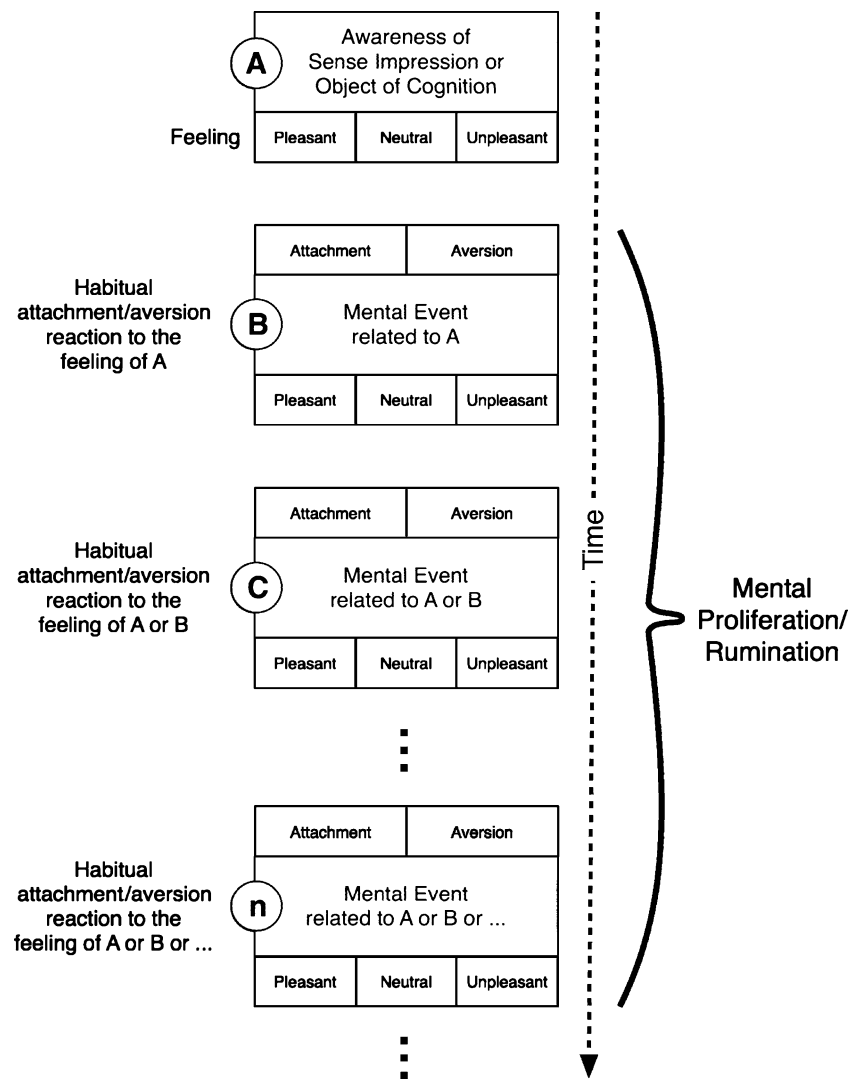
Fig. 1 Moment-by-moment awareness

extremely quickly with dozens of discrete mental events and sense impressions occurring in a given second.

With the awareness of any object, there is a concomitant feeling tone, which falls into one of three categories: pleasant, unpleasant, or neutral (neither pleasant nor unpleasant). The term “feeling tone,” as used in this context, does not refer to complex physiocognitive states, often called emotions, such as fear, joy, or anger; rather it is the immediate and spontaneous affective experience of this *awareness* of a physical sensation or mental event (Mendis 2006). Due to the rapid and transient nature of these feelings, constantly arising and passing away, they often go unnoticed and can serve as the key trigger to a chain reaction of thoughts (including emotions) and actions that can lead to suffering.

Our habitual reactions to feelings are to pursue those that are pleasant and to avoid those that are unpleasant. The Buddhist terms for these reactions are attachment and aversion, respectively. These habitual reactions are expressed as mental events (thought, memory, emotion) that rapidly follow the initial sense impression (Fig. 2). A commonly held assumption is that we desire, or are repulsed by, an object of awareness. However, integral to the BPM is that *attachment and aversion arise in reaction to the feeling state itself rather than to the object*. For example, seeing a slice of cake is accompanied by a feeling tone. Depending on one’s past experiences, culture, and other influences, that feeling will either be pleasant, unpleasant, or neutral. Those who experience the cake as pleasant will habitually react with thoughts, emotions, and/

Fig. 2 Attachment/aversion to feelings creates mental proliferation



or actions (e.g., the procurement of the cake) related to the desire to perpetuate the pleasant feeling. Similarly, those who experience the cake as unpleasant will habitually react with thoughts, emotions, and/or actions (e.g., avoidance of the cake) oriented toward ending the unpleasant feeling.

The mental events (see B in Fig. 2) that follow the initial feeling also have associated feelings (since a mental event is itself the awareness of an object of cognition and thus is accompanied by an inseparable concomitant feeling). Further mental elaboration occurs when there is attachment or aversion to the feelings arising with the mental events themselves. This is experienced as the production of additional mental events. Mental proliferation is simply a series of these mental events that has been triggered by an initial mental event or sense impression. Thus, in some cases, mental proliferation can feed on itself, with subsequent mental events having little to do with the sense impression that started the process. According to the BPM, *not being aware of how this pattern of attachment and*

aversion can lead to mental proliferation helps to keep the entire process habitual.

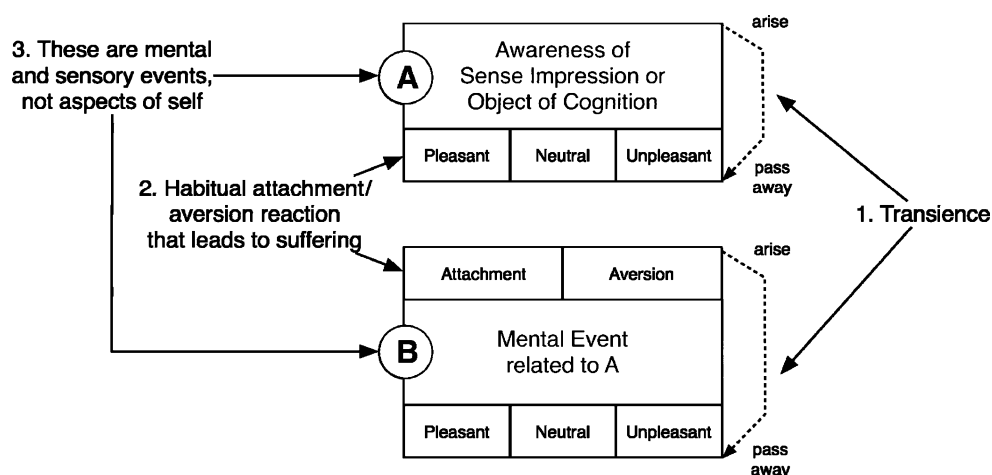
Finally, at the crux of the BPM are three main foci of mindfulness practice that are common to all sense impressions and mental events (see Fig. 3):

1. Sense impressions and mental events are transient (they arise and pass away)
2. Habitual reactions (i.e., attachment and aversion) to the feelings of a sense impression or mental event, and a lack of awareness of this process, lead to suffering
3. Sense impressions and mental events do not contain or constitute any lasting, separate entity that could be called a self

These are termed the “three characteristics” in Buddhist thought and are usually referred to as: (1) impermanence, (2) suffering, and (3) not-self (Nyanaponika 2010).

In summary, the BPM holds that the subjective sense of a continuous stream of consciousness is made up of

Fig. 3 The three characteristics



numerous, discrete sense impressions and mental events, most of which occur outside of one's awareness. Habitual reactions of attachment and aversion to the pleasant, unpleasant, and neutral feelings of prior sense impressions and mental events are expressed as a proliferation of mental events. All sensory and mental events are seen to share the three characteristics of impermanence, suffering, and not-self. Moreover, suffering, including clinical symptoms, is a direct result of the habitual attachment/aversion reaction to transient feelings and their concomitant mental proliferation. Although the BPM does not focus on symptom reduction (in the clinical sense), since this is not the aim of Buddhist practice, reduction in symptoms resulting from practices such as mindfulness meditation is explainable as a reduction in these habitual reactions and resulting mental proliferation. From this perspective, improvement in well-being occurs when sensory and mental events are allowed to naturally arise and fall away, without subsequent cognitive processing arising from either attachment or aversion. Sense impressions and mental events are still experienced as pleasant, unpleasant, or neutral; however, if there is no attachment, aversion, and thus no mental proliferation, adventitious suffering is not experienced.

BPM Part II: Effects of Attention Regulation and Mindfulness Practices

Based on the above and for the purposes of this model, we define mindfulness as the moment-by-moment observing of the three characteristics (impermanence, suffering, and not-self) of the meditation object. This definition is synonymous with the traditional definition for vipassana or insight meditation (Mahasi 2006). We have intentionally limited our mindfulness definition to a description of insight practice (i.e., mindfulness, as we define it in this paper, is an intervention; see Davidson 2010). This definition highlights the important distinction between mindfulness, or

vipassana (an insight-oriented practice), and concentration, or samatha (an attention regulation practice). In addition, we do not want to confound this definition with the results of mindfulness practice. Thus, we have been careful (as much as possible) not to include in the definition possible consequences of insight practice itself, such as the sequelae of increased mindfulness in day-to-day living or consequences of decreased proliferation of mental events as all of these possible outcomes of mindfulness practice have many other factors influencing them. We are careful not to include acceptance in our definition of mindfulness as this is an attitude that is brought to both insight and concentration practices and is not an inherent aspect of mindfulness itself (Mikulas 2011).

We begin with a general description of the effects of attention regulation on mental proliferation and then distinguish between the different effects of concentration and mindfulness practices on cognitive processes in the context of the BPM.

Effects of Attention Regulation

According to the BPM, attentional resources are limited, which means that only one object can be held in awareness at a time. Thus, if attention is sufficiently sustained on an object, the BPM posits that this prevents the awareness of other objects in that moment. Therefore, any form of attention regulation that results in sustained attention on an object has the effect of momentarily interrupting mental proliferation (Fig. 4). However, once attention lapses from the object, mental proliferation can resume, or other sense impressions or mental events can arise.

Distinguishing Between Concentration and Mindfulness Practices

Although mindfulness and concentration practices are often confused in the literature (Mikulas 2011), the BPM offers a

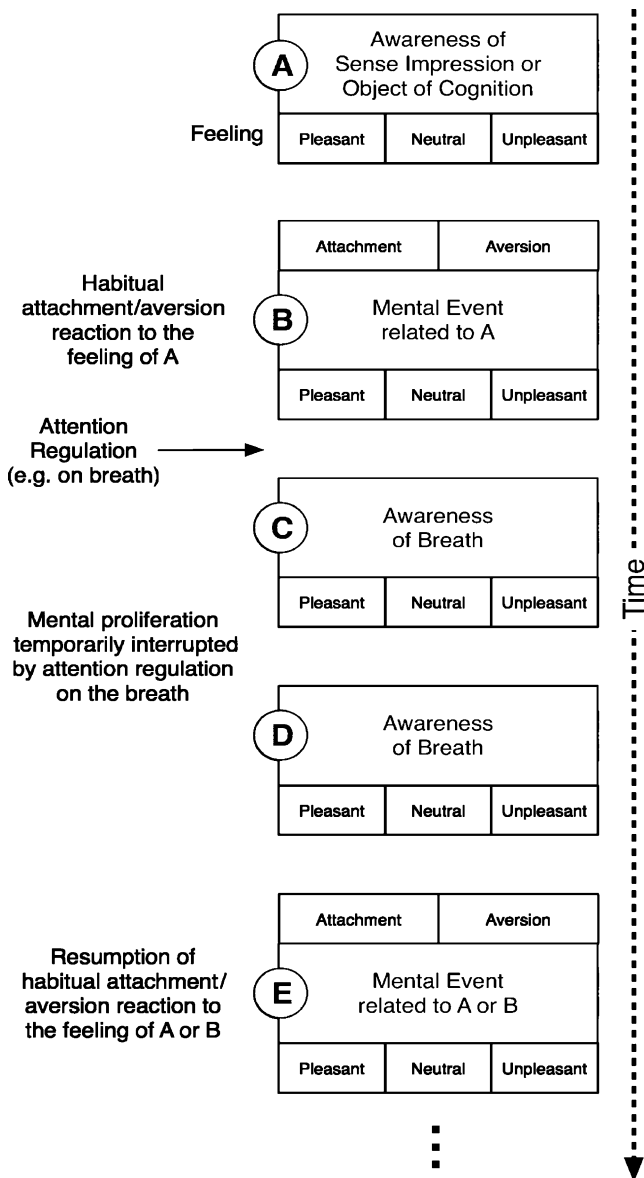


Fig. 4 How attention regulation affects moment-by-moment awareness

clear way to distinguish between these practices as it highlights the critical difference between the two. Whether implicitly or explicitly, mindfulness (as we have defined it in this model) involves observing the three characteristics with respect to the object of meditation, whereas concentration practice does not.

In concentration practice, the goal is to focus attention on the object of meditation to the exclusion of everything else. Using the breath as an example, the breathing process is meant to be experienced as continuously and uninterrupted as possible. The meditator attempts to maintain continuous awareness on the sensations of breathing, from the start of an inhalation, to the end of the inhalation, to the pause between inhalation and exhalation, to the beginning

of the exhalation, to the end of the exhalation, to the pause between the exhalation and subsequent inhalation, and so on (an example of this is “focused attention” in Lutz et al. 2008). Any awareness of the three characteristics with respect to the object of meditation is actively ignored, and if they are experienced, attention is refocused on the object of meditation in an effort to make attention on the object seem as stable and unchanging as possible (Snyder and Rasmussen 2009).

In mindfulness practice, on the other hand, the intention is to directly experience the three characteristics of sensations as they appear in awareness. Again using the breath as an example, the meditator will also focus on the inhale, pause, exhale, pause cycle of breathing. However, unlike in concentration practice, the focus of the meditation is the direct experiencing of the three characteristics of the breath. By noting the *qualities* of the breath, the meditator attempts to become aware of the three characteristics of the breath. In this way, the meditator experiences the breath as changing all the time (fast, slow, rough, smooth, short, long) and may become aware that no two breaths are the same—which corresponds to the first characteristic (impermanence). The meditator may also notice that they prefer one style of breath to another (e.g., slow and smooth to the fast and rough), and thus notice attachment to that, and perhaps become aware of efforts to change the breath to be of the preferred type—which corresponds to the second characteristic (suffering). Over time, the meditator will likely also notice that if they do not do anything to control the breath, breathing still occurs, without their intervention—which corresponds to the third characteristic (not-self). With continued practice, noticing the three characteristics becomes less conceptual and more experiential, with the individual sensations that make up the breath being experienced as a rapid sequence of small, discrete sensations, each of which arise and pass away in a very brief moment. Thus, over time, the object of mindfulness meditation becomes dissected or decomposed into smaller and faster discrete sensations in which the three characteristics are experienced directly.

This distinction between mindfulness and concentration meditation is reinforced by recent work on the neurobiological correlates of meditation practices demonstrating that different neural systems are used in concentration versus insight practices (Lutz et al. 2008).

It is common, however, for a mix of concentration and mindfulness meditation to be employed during mindfulness practice. Typically, this involves using concentration to help focus and calm the mind, followed by mindfulness practice. Periodically, the meditator will switch from mindfulness practice to concentration practice if attention needs refocusing, or if the mindfulness practice brings up sensations or thoughts that are too difficult to observe without getting lost in their content.

Attention regulation is used in both concentration and mindfulness practices, and both can lead to momentary reductions in mental proliferation. For example, in formal concentration meditation on the breath, awareness of the sensations of breathing disrupts mental proliferation. In informal practice, such as paying attention to daily physical sensations of touch, awareness of touch sensations interrupts mental proliferation. In formal mindfulness meditation on the breath, awareness of the three characteristics with respect to the sensations of breathing interrupts mental proliferation. In this case, the reduction in mental proliferation (strictly due to attention regulation) is momentary and not the same as the reduction brought about as a result of the development of insight. Finally, with cognitive activities, such as intentionally replacing an existing thought with a different, more skillful, thought, it is the awareness of the new thought that interrupts mental proliferation. Examples of this can be found in cognitive therapies and metacognitive awareness (see below).

Effects of Mindfulness Meditation and the Development of Insight

The purpose of mindfulness training in Buddhist practice is to achieve enlightenment, defined in this paper as a permanent, radical change in perception that stops the habitual process of identification that turns certain aspects of sense and mental experience into a separate self. This is achieved through the development and exploration of a series of insights into the nature of one's physical sensations and mental activities (Mahasi 2006). One of the side effects of the development of insight is a long-term reduction in habitual attachment/aversion reactions and a consequent decrease in mental proliferation. Insight, as used here, does not refer to conscious reflection, but rather a direct, non-conceptual understanding (Dorjee 2010) achieved through the repeated examination of the three characteristics (impermanence, suffering, and not-self) in the objects of meditation (Pa Auk 2000). As insight develops, the meditator begins to understand, on a nonverbal, experiential level, the transience of mental activity and, indeed, of all sense phenomena, including even those that make up sensations of space, attention, the body, and so on. The meditator eventually comes to realize that chasing after pleasure or trying to avoid pain cannot bring any lasting sense of contentment (due to their transient nature) and that fleeting mental and sensory activities are simply mental or sensorial events rather than aspects of self. Unlike the changes that result from attention regulation, the changes resulting from the development of insight are more lasting in nature and allow for a different relationship to feelings and attachment/aversion in daily life outside of formal meditation practice.

One of the interesting, and potentially very clinically useful, by-products of insight into the three characteristics is the development of equanimity (Mahasi 2006). In the BPM, equanimity is defined as a quality of awareness that views its object (sensory or cognitive) with neither attachment nor aversion. It can also be described as a balanced state of mind in which an equal interest is taken in the pleasant, unpleasant, and neutral. From the perspective of Buddhist practice, "equanimity prevents *identification* with as well as attachment [and aversion] to experience. This results in pleasant experiences being known without any gratification. And this is the point of equanimity, there is no reification of a sense of self" (Steve Armstrong, personal communication). Because equanimity is a quality of awareness, it is concomitant with the awareness of a sensation or object of cognition and is not a follow-on mental event or cognition (i.e., equanimity, as used in this paper, does not involve thinking "I will not attach to/push away this experience").

For completeness, it should be noted that according to Buddhist psychology, insight into the three characteristics is not the only way to develop equanimity. Skilled practitioners may enter a state of equanimity via concentration (*samatha*) practices alone (Pa Auk 2000; Narada Maha Thera 1987). Equanimity achieved in this manner tends to be short-lived and difficult to maintain during daily life.

Summary of Mechanisms in BPM

The BPM, due to its detailed description of mental processes and the effects of various practices on these processes, allows us to propose a set of relationships to explain how mindfulness and attention regulation practices result in clinical symptom reduction (see Fig. 5).

Figure 5 summarizes the many mechanisms (including acceptance and ethical practices, discussed below) by which mental proliferation can be reduced, thus reducing symptoms and increasing well-being.

BPM Part III: Effects of Acceptance and Ethical Practices

Effects of Acceptance/Compassion

The BPM provides an explanation for the essential role of acceptance/compassion in training both mindfulness and attention regulation. During training, an attitude of acceptance and curiosity is used to bring a sense of lightness to the repeated refocusing of attention on the chosen object (see Fig. 5). As an untrained mind is easily distracted by ruminative or narrative thought processes, attention must be refocused many times. During this repeated refocusing, an

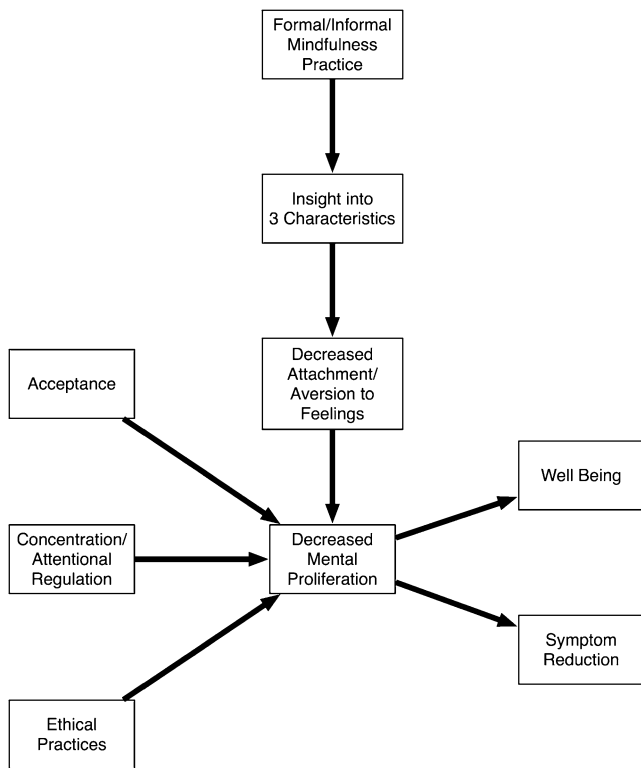


Fig. 5 Buddhist psychological model

attitude of acceptance prevents negative thoughts, such as self-judgment and resultant mental proliferation, from arising and prevents the practice itself from becoming a source of aversion. Indeed, an attitude of acceptance and curiosity is a nascent form of loving-kindness, a Buddhist compassion practice that is used to gradually prevent the formation of mental states that have their origin in aversion. As practice deepens, acceptance helps relax the attention and allows rapid, discrete sensations to be more easily noticed and followed during mindfulness practice. Without acceptance, awareness tends to become tighter and less flexible and so has more difficulty noticing the arising and passing away of a rapid series of sense impressions and mental events.

It should be noted that acceptance, as we are using the term here, is a quality of awareness: it does not involve cognition. As such, it is not equivalent to thinking accepting thoughts about one’s self or others. In fact, cognitive forms of acceptance are really a form of attention regulation. An example may help clarify this distinction. When meditating, the meditator notices that their attention has wandered. If the awareness of that wandering has the quality of acceptance, then no judgment arises (and no follow-on mental proliferation arises) and the meditator can redirect their attention to the object of their meditation without any intervening thoughts. If the meditator’s awareness, however, did not have the quality of acceptance, then judgment may arise, followed by a series of mental

events related to that initial judgment. The meditator may then recognize the judging thoughts and use attention regulation to be more accepting and replace the judging thoughts with more accepting thoughts.

Effects of Ethical Practices

In addition to training in concentration and mindfulness, Buddhist practices prescribe a code of ethics for practitioners to follow, such as not intentionally killing, stealing, having illicit sex, lying, and using intoxicants that can cloud judgment (Thanissaro 1997). In essence, from the perspective of the BPM, one of the major purposes of the ethical guidelines is to reduce the baseline amount of mental proliferation, thus aiding both concentration and mindfulness practices (see Fig. 5). Leading an ethical life, in the context of the BPM, implies that the meditator experiences less guilt, doubts, worries, etc. that can often be a source of mental proliferation.

Feedback Loops

Mindfulness practices, concentration practices, ethical practices, and acceptance are all closely related, however, and feedback loops (see Fig. 6) exist between these components of the BPM, as well as between decreases in attachment/aversion and mental proliferation. These feedback loops show how the various practices and their salutary effects reinforce one another.

Examples of such feedback loops include the positive effect that decreased attachment/aversion and mental

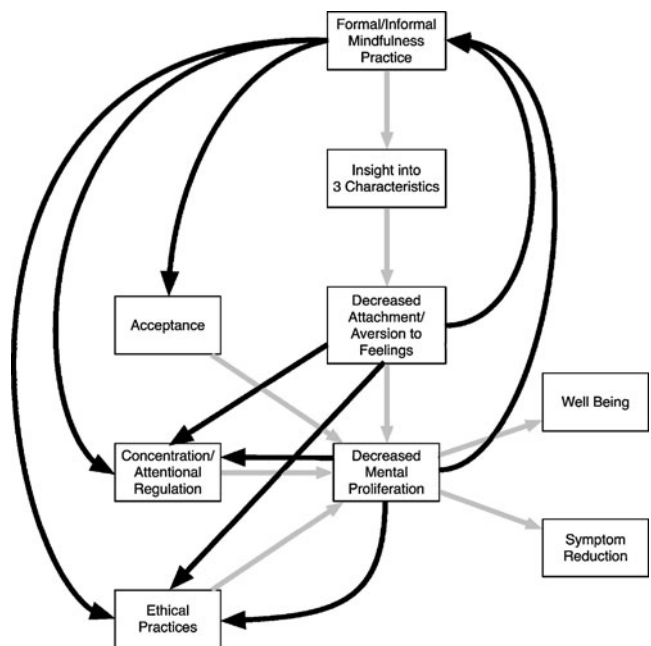


Fig. 6 Feedback loops in the Buddhist psychological model

proliferation have on mindfulness practice due to the increased clarity of awareness they engender. This decrease in attachment/aversion and mental proliferation also positively affects concentration and ethical practices in a similar way. Additionally, increased mindfulness practice improves concentration (via improving the ability to be aware of when concentration lapses), ethical practices (via improving the ability to notice when ethics are about to be transgressed), and acceptance (via improving the ability to be aware of a lack of acceptance in situations where acceptance would be beneficial).

In summary, we are proposing the BPM as a model of the underlying mechanisms of mindfulness. The BPM describes in detail the processes by which attachment/aversion to intrinsic pleasant/unpleasant feelings lead to mental proliferation and adventitious suffering. It also explains how concentration, mindfulness, and other practices, such as acceptance/compassion and ethical practices, affect this process. The next section reviews metacognitive awareness and associated concepts as they relate to the BPM.

Relationship of the BPM to other Mindfulness Models

We place the BPM in relation to other proposed models of change mechanisms and explore areas of congruence, as well as important differences, between the BPM and existing models. From a clinical perspective, the BPM offers several advantages for understanding how MBIs exert their clinical effects; based on these, we make suggestions for refinements of MBIs to improve their clinical effectiveness. Research implications of the BPM and relationship of the BPM to current challenges in the research field are outlined.

Definitions of Terms: Metacognitive Awareness, Decentering, Defusion

There are many terms in the MBI literature that refer to the ability to observe one's thoughts and feelings as temporary events in the mind rather than as reflections of the self that are true or accurate (Fresco et al. 2007). Some of these terms are: metacognitive awareness, decentering, defusion, distancing, and reperceiving. Current proposed models of change mechanisms (see below for summaries) give these concepts a central role. In order to understand the differences and similarities of the BPM to these other models, we will first explain how metacognitive awareness and the other related terms map onto the BPM.

The term metacognitive awareness, often used interchangeably with the term metacognition, was first coined by Flavell in the field of educational psychology to describe one's knowledge of one's own cognitive processes and

products. This definition emphasized the executive role of metacognition as a regulatory process (Flavell 1976). The therapeutic importance of this concept was identified over 50 years ago by Rogers, who wrote "the thoughts and emotions that we take to be so real and are so worried about do not exist in the way that we imagine them...they do exist but we can know them in a way that is different from identifying with them" (Rogers 1959, as cited in Corcoran and Segal 2008). More recently, metacognitive awareness was identified as a key component of change in cognitive behavioral therapies and spurred the development of therapies such as mindfulness-based cognitive therapy (MBCT; Segal et al. 2002), which aims to enhance this capacity in order to decrease rumination. For example, Teasdale et al. (1995) defined metacognitive awareness as the process whereby "negative thoughts and feelings are seen as passing events in the mind rather than as inherent aspects of self or as necessarily valid reflections of reality" (p. 285).

Other proposed definitions of metacognitive awareness utilize the concept of decentering, defined as "the capacity to take a present-focused, nonjudgmental stance in regard to thoughts and feelings and to accept them" (Fresco et al. 2007, p. 448). For example, metacognitive awareness has been defined as "the process of experiencing negative thoughts and feelings within a decentered perspective" (Teasdale et al. 2002, p. 276). Metacognitive awareness was also described in the same paper as a form of metacognitive insight, referring to "...the way mental phenomena are experienced as they arise" (ibid, p. 286). Defusion, a similar concept, has been defined as "the recognition of thoughts, feelings, and bodily sensations as passing events without buying into the literal content of the temporal and evaluative language that accompanies these experiences" (Fletcher et al. 2010, p. 43). Finally, reperceiving has been described by the authors (Shapiro et al. 2006) as akin to decentering. The above definitions encompass a wide range of processes, ranging from pure metacognition (as in Flavell's definition) to a process that appears to be very similar or identical to acceptance (as in Fresco and Segal's definition of decentering).

Comparing Metacognitive Awareness, Defusion, and Insight

Although the terms metacognitive awareness and defusion may, from a Western psychological standpoint, appear to be similar to insight or its sequelae (such as equanimity), a clear distinction between them is made in the BPM. When a practitioner of a MBI develops a degree of metacognitive awareness or defusion, they are able to use these skills to intercept undesirable thoughts and choose a more skillful response. Metacognition involves focusing attention on a

stream of mental events (mental proliferation) and volitionally interrupting that stream with a new series of mental events whose objects are the preceding thoughts that were part of the mental proliferation. These are cognitive processes and thus, from the perspective of the BPM, fall under the rubric of attention regulation. Definitions of metacognitive awareness that include “decentering” (as defined by Fresco et al. 2007) would also map onto the acceptance component of the BPM. In contrast, insight and its side effects are non-conceptual and non-cognitive in their origin and result in reductions in attachment/aversion or mental proliferation without requiring any cognitive intervention or processing.

Models of Change

Current MBIs and explanatory models focus on attention regulation, acceptance, and decreased mental proliferation, which lead to symptom reduction and well-being. The main difference between the BPM and other mechanistic models of mindfulness is the identification in the BPM of the central role of attachment/aversion to feelings (defined as the immediate and spontaneous affective experience of the awareness of a physical sensation or object of cognition; Mendis 2006) in the production of adventitious suffering and symptoms. The BPM proposes that addressing experience at the level of feelings is another way of decreasing adventitious suffering and reducing symptoms. Below, we show how some of the other models map onto the BPM.

Mindfulness-Based Cognitive Therapy

The theoretical rationale underlying the development of MBCT identifies the key mechanism of change as being decreased rumination through the development of metacognitive awareness (Segal et al. 2002; Teasdale et al. 2002). In addition, observation of the arising and passing of thoughts and sensations, and labeling of qualities of sensation is taught. In MBCT sessions, participants learn, in part, to identify mental events that are consistent with their depressive relapse signatures and use this recognition as an opportunity to consciously choose skillful self-care, whether this involves the deliberate switching of attention to a neutral focus, such as the breath, or consciously engaging in a positive self-care action that provides pleasure or a sense of mastery. A kind and gentle approach toward one’s experience is embodied and modeled by MBCT therapists.

From the perspective of the BPM, the more concentration-oriented MBCT meditation practices map onto the attention regulation and acceptance components of the BPM. In addition, the BPM highlights the importance of investigating

the three characteristics of all objects as an explicit focus of meditation in MBCT. With this focus, participants may notice aspects of the three characteristics and thus begin to develop some degree of insight and reduction of attachment/aversion to unpleasant/pleasant/neutral feelings.

Reperceiving

The reperceiving model (Shapiro et al. 2006) asserts that mindfulness practices (componentized as intention, attention, and attitude) lead to an increase in dispositional mindfulness (a greater clarity and objectivity when viewing moment-by-moment internal and external experiences). This results in increases in four areas: self-regulation, values clarification, exposure, and cognitive and emotional and behavioral flexibility. This fundamental shift in perspective is posited to lead to disidentification with thoughts. The authors state that reperceiving is akin to decentering. As such, reperceiving maps onto attention regulation and acceptance in the BPM.

Acceptance and Commitment Therapy

In acceptance and commitment therapy (ACT), based on relational frame theory, mindfulness is defined in terms of four interrelated processes: acceptance, defusion (defined above), present moment awareness, and the observer self (Fletcher and Hayes 2005). Acceptance is described as the allowing of thoughts and feelings to be as they are without trying to change their content, form, or frequency. Present moment awareness is defined as contact with stimuli occurring in the present moment and includes awareness of thoughts, feelings, and bodily sensations. The observer self is the experience of self as an observer of one’s experiences rather than becoming identified with them.

ACT maps onto the BPM components of acceptance and attention regulation. The observer self does not map onto the BPM as a separate component; rather, it is implicitly present in the various components, such as mindfulness and attention regulation. From a Buddhist perspective, during the progress of insight, the concept of a separate observer self that is aware of one’s experience is abandoned (Mahasi 2006) and is replaced by “the understanding that each moment is nothing but ‘something being known’ precluding any identification of the process with [an observer self]” (Steve Armstrong, personal communication).

Attention Regulation Model

The attention regulation model (Carmody 2009) proposes that sensations of the breath are affect-neutral for most people; thus, intentionally directing attention to the breath when subjectively adverse symptoms arise (and redirecting

attention to the breath when it naturally wanders) results in a decrease in the usual emotional arousal accompanying the patients' symptoms. The model states that with practice, people develop proficiency at noticing when their attention has gone somewhere that they do not want it to go, and they get good at bringing it to an affect-neutral object such as the breath. As such, this model maps onto the attentional regulation component of the BPM.

Carmody (2009) states that metacognitive awareness can be developed once attention is allowed to move beyond the restricted confines of the affect-neutral object, such as the breath. Although metacognitive awareness is seen as an ultimately more effective method of symptom reduction, Carmody makes a convincing case that in practice, as current MBIs are taught, most of the benefits of the MBIs are likely due to attentional redirection to affect-neutral objects.

A possible clinical pitfall of the attention regulation model is that patients may become "averse to aversion"; if indeed they are frequently using aversive stimuli as a cue to switch their attention to neutral stimuli in order to decrease their levels of arousal, they are at risk of strengthening self-referential processes and a sense of narrative self while at the same time increasing the sense of "danger" and aversion when unwanted experiences, including symptoms, arise.

Self-Focused Attention

In a recent review of mechanisms of mindfulness (Baer 2009), the author states that "It is still not clear how observing one's present moment experience nonjudgmentally and nonreactively is beneficial" (p. 17) and suggests that self-focused attention may exert beneficial effects as it "emphasizes experiential awareness of present moment details and is nonjudgmental and nonreactive" (p. 18). The BPM suggests that this description is actually a description of concentration practice with an attitude of acceptance rather than mindfulness practice. The paper concludes that increased mindfulness (as defined in the paper) mediates improved psychological functioning via self-focused attention that results in: (1) reduced rumination; (2) reduced emotional avoidance; and (3) improved behavioral self-regulation, which, in the BPM, are proposed to occur as a result of attention regulation and acceptance practices.

Statistically Derived Model

Coffey et al. (2010) used a path analysis approach to explore the mediating roles of clarity about one's internal life, the ability to manage negative emotions, rumination, and the extent to which one's happiness is independent of

specific outcomes and events, between mindfulness and mental health. They utilized the definition of mindfulness of Bishop et al. (2004) as present-focused attention with an attitude of acceptance. They found that acceptance exerted much stronger effects on other variables in the model than did attention in individuals with little or no exposure to attention regulation practice.

The model of Coffey et al. demonstrates that in the absence of specific training to investigate the three characteristics or train concentration, one's ability to alleviate symptoms and enhance well-being is predominantly due to acceptance and, to a lesser degree, attention regulation.

Positive Reappraisal

The mindful coping model (Garland et al. 2009) proposes that events that are perceived as negative can be responded to by the deliberate initiation of a decentered mode of broadened awareness and increased attentional flexibility, from which the given event is reappraised in a positive manner by attributing to it a new meaning. In this model, positive reappraisal, rather than mindfulness, is understood to be the key mediator of therapeutic change. Mindfulness is identified as a tool to be used for the construction of a positive reappraisal. Positive reappraisal can be mapped onto the BPM as attention regulation since it is volitionally replacing existing thoughts with different thoughts.

One possible concern with this model is that the emphasis on positive reappraisal, which is embedded in the narrative experience of self over time, may actually increase vulnerability to cognitive processes underlying mood and anxiety symptoms as it reinforces the narrative experience of self.

Summary of Models of Change and their Relation to the BPM

We conclude that the majority of existing models of change can, from the perspective of the BPM, be reduced to a model of how attention regulation, with the addition of acceptance, decreases mental proliferation and thus improves symptoms and well-being. This view is supported by Mikulas (2011) who argues that current definitions of mindfulness used in Western psychology are actually definitions of concentration practice and that many of the benefits ascribed to mindfulness are actually benefits derived from training in concentration. The BPM disambiguates concentration-based practices and insight practices, highlights that both concentration and insight practices can result in a momentary reduction in rumination, and describes how symptom reduction can result from insight gained during mindfulness training.

Clinical Implications of the BPM

We propose that refining the techniques currently employed in MBIs to include the key elements of the BPM may result in the enhanced efficacy of such treatments. The four areas we consider are:

1. *Insight*: We propose that the explicit investigation of the three characteristics during both formal and informal practice could be a practical method of optimizing the effectiveness of the MBIs, providing that the potential risks and how to mitigate them are well understood (see below). Although there is a commonly held belief that attaining insight is a rarified and uncommon occurrence (and therefore impractical), we propose that with clear instruction and diligent practice, insight into the three characteristics can be developed by most individuals. Furthermore, given that even small accruals of insight could lead to lasting and highly beneficial salutary effects resulting in symptom reduction, it would be propitious for clinicians with the proper training to guide patients to engage in these practices.

The risks involved in insight practice are well known to advanced practitioners, but not commonly openly discussed; thus, clinicians involved in delivering MBIs may not be fully aware of them. We will introduce the risks here; however, it should be understood that a detailed examination of the potential negative side effects of insight practice is beyond the scope of this paper. In summary, insight practices tend to proceed in a series of stages that are robust across traditions and individuals, and these stages are described in detail in the Theravada tradition (Mahasi 2006). Typically, as skill in insight practice develops, meditation moves from a conceptual understanding of the three characteristics to a more direct experience of impermanence, suffering and not-self, in which the sensate world of the meditator is decomposed into a rapid sequence of small, discrete sensations. Side effects of these early stages of insight can include an increase in physical pain and tension. As insight practice develops further and the meditator experiences the three characteristics with more clarity, a high point in the practice is reached that may be accompanied by intensely pleasurable feelings. Following this high point, insights that are particularly associated with suffering are experienced, which, while powerful and illuminating, can be very destabilizing for some meditators. Side effects of these later stages can include experiencing a variety of intense negative emotional states, including experiences similar to depressive symptoms. If these side effects do occur, management includes continued practice with

the guidance and support of someone experienced with these stages and their side effects; progress in insight can then continue, which alleviates the symptoms. Given the potential for these challenging side effects, we strongly suggest that clinicians who use insight practice must be sufficiently experienced that they can safely and effectively guide practitioners through the potentially destabilizing stages of this practice. If properly managed in this way, insight practice can be a clinically valuable addition to MBIs due to the salutary effects of insight described earlier in this paper.

2. *Acceptance*: Although current MBIs vary in their emphasis on teaching acceptance, the BPM highlights the importance of explicitly teaching acceptance to optimize the efficacy of MBIs due to the role of acceptance in reducing mental proliferation and facilitating attention regulation and mindfulness practice. Instruction and practice of acceptance should clearly delineate cognitive versus insight-based qualities of acceptance, and the important role of cognitively based forms of acceptance should be acknowledged while not overlooking the development of insight-based acceptance.
3. *Attention regulation*: Attention regulation strategies are effective, useful, and popular with patients (e.g., 3-min breathing space). A potential risk when over-emphasizing attention regulation in MBIs is that patients may inadvertently strengthen their aversive reactions to unpleasant feelings; for example, during an aversive reaction, patients may preferentially redirect their attention to the breath in an attempt to achieve immediate symptom reduction via attention regulation rather than carefully examining the transience, suffering and not-self characteristics of the feeling.
4. *Theoretical transparency*: Providing patients with a theoretical grounding in insight and concentration practices is advantageous as it serves to both motivate as well as to orient the intention of practice. It can also help the clinician clarify goals of mindfulness training and address common misperceptions. One example of a frequent misperception is the expectation by patients that they can use mindfulness or other techniques to eliminate the experience of unpleasant feelings, which is impossible. Patients sometimes have the impression, when engaging in MBIs, that if they are doing the practices correctly, they will no longer experience uncomfortable thoughts or physical sensations. Thus, they can feel that they are “not doing it right” when they continue to experience sensations or mental events associated with the arising of an unpleasant feeling. The BPM can be used

clinically to explain that the continual arising of unpleasant or pleasant feelings with the awareness of sense impressions and mental events is an intrinsic part of experience and will never cease, i.e., participants are “doing it right” even when this keeps happening. Understanding the theory, on an intellectual level, that both pleasant and unpleasant feelings are unavoidable and that we habitually cling to them helps reduce attachment/aversion. An understanding of the theory of the BPM can support the clinician in guiding patients to progress from attention regulation using an affect-neutral object to observing feelings directly with skill and courage while observing the three characteristics in them and decrease habitual attachment/aversion reactions.

Research Implications

Though much progress has been made in the last 20 years with regards to measures of mindfulness related constructs, recent studies have found very high correlations between self-report measures such as the Five Facet Mindfulness Questionnaire (Smith et al. 2008) and the Experiences Questionnaire (Fresco et al. 2007) used to measure decentering as well as other emotional regulation measures (Carmody et al. 2009; Coffey et al. 2010). This overlap highlights the need to develop more precise instruments in order to discern the various components of these constructs. From the perspective of the BPM, these measures seem to be quantifying a combination of both aspects of practice as well as consequences of practice. In order to test the pathway in the BPM of how insight leads to increased well-being, measures will need to be developed for each of the specific components influencing mental proliferation (acceptance, attention regulation, insight, ethical practices) as well as attachment/aversion to pleasant/unpleasant/neutral feelings.

The BPM provides clarity regarding the components comprising insight and concentration practices (see Fig. 5) that may permit more precise component analysis studies of MBIs. The next steps would be to examine the proposed synergistic effects from combining the above components in an MBI to determine whether greater symptom reduction could be obtained through synergistic effects than that produced by simple additive effects alone. Such research, in addition to evaluating the validity of the BPM, would provide data useful to clinicians for optimizing MBIs since they would be able to quantify the relative contributions of acceptance, insight, attention regulation, and ethical practices on symptom reduction.

From the perspective of neurobiological research, the components of mindfulness practice and concentration practice in the BPM are analogous to the open

monitoring and focused attention meditations, respectively, as defined in Lutz et al. (2008). As such, research employing these definitions can explore the neural correlates of these two practices in the BPM (for example, see Manna et al. 2010).

Conclusion

The BPM outlines multiple mechanisms by which mental proliferation is reduced. It provides a detailed description of the stream of consciousness and demonstrates how mindfulness and other practices alter that flow. We hope that this model will help stimulate further discussion and understanding of the complex, multifaceted nature of mindfulness and its allied disciplines.

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