Mindfulness-Based Approaches: Are They All the Same?*

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Mindfulness-based approaches are increasingly employed as interventions for treating a variety of psychological, psychiatric and physical problems. Such approaches include ancient Buddhist mindfulness meditations such as Vipassana and Zen meditations, modern group-based standardized meditations, such as mindfulness-based stress reduction and mindfulness-based cognitive therapy, and further psychological interventions, such as dialectical behavioral therapy and acceptance and commitment therapy. We review commonalities and differences of these interventions regarding philosophical background, main techniques, aims, outcomes, neurobiology and psychological mechanisms. In sum, the currently applied mindfulness-based interventions show large differences in the way mindfulness is conceptualized and practiced. The decision to consider such practices as unitary or as distinct phenomena will probably influence the direction of future research. © 2011 Wiley Periodicals, Inc. J Clin Psychol 67:404–424, 2011.

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Mindfulness meditations (MMs) and mindfulness-based interventions (MBIs) include a broad range of meditation practices and psychological interventions linked by the concept of ''mindfulness'' (Chiesa & Serretti, 2010; Ivanovski & Malhi, 2007). Both ancient Buddhist meditations, such as Vipassana meditation (Gunaratana, 1993) and Zen meditation (Kapleau, 1965), modern standardized group-based meditation practices, such as mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990) and mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2002), as well as a number of psychological interventions, including dialectical behaviour therapy (DBT; Linehan, 1993) and acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999), are commonly referred to as ''mindfulness-based'' approaches. However, significant differences exist across different authors[1] (e.g., Baer, 2003; Chiesa & Serretti, 2010; Hayes & Feldman, 2004; Ivanovski & Malhi, 2007; Ospina et al., 2007).

In recent years, there has been an increasing interest towards the possibility of using such approaches as a means for treating a variety of psychological and physical disorders (Baer, 2003; Chiesa & Serretti, 2010; Lynch, Trost, Salsman, & Linehan, 2007; Pull, 2009) and for reducing stress levels in healthy subjects (Chiesa & Serretti, 2009). In particular, building on historical accounts of MM practice, which suggest that it might help the practitioner to achieve freedom from dissatisfaction and suffering and to develop sustained joy and happiness (Analayo, 2003; Gunaratana, 1993; Kapleau, 1965), and on observations, which suggest that

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[1]There are several differences in the way different authors define and join together existing ''mindfulness-based'' approaches. Some join together MBSR, MBCT, DBT and ACT and call them ''mindfulness-based interventions'' (e.g. R.A. Baer, 2003). Others join together Vipassana and Zen meditation as well as MBSR and MBCT with the name of ''mindfulness meditations'' (e.g. Chiesa & Serretti, 2010; Ospina et al., 2007). Further, other authors join together all such kind of practices (e.g. Ivanovski & Malhi, 2007). In the present paper, we referred to Vipassana and Zen meditation as mindfulness meditations (MM) and to MBSR, MBCT, DBT and ACT as ''mindfulness-based interventions'' (MBI) in order to differentiate the former from the latter on the basis of the historical context in which they emerged.

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ancient MM might be clinically effective for a variety of disease conditions (e.g., Chiesa, 2009, 2010), several attempts have been made to incorporate elements of mindfulness into modern psychological interventions. The link between MM practice and the development of psychological health can be best understood if one considers that Buddhist philosophy and psychology are mainly devoted to the eradication of latent tendencies and habits associated with the onset and maintenance of the emotions usually described as destructive (e.g., anger) and to the increase of "positive" emotions such as happiness and compassion (Chambers, Gullone, & Allen, 2009; Goleman, 1988). Among the modern versions of mindfulness practice, MBSR has played the key role in introducing mindfulness into the field of psychology and medicine (Kabat-Zinn, 1990). Further interventions that have subsequently been developed build on the theory and the definitions of mindfulness supported by early works on MBSR (Hayes et al., 1999; Linehan, 1993; Segal et al., 2002).

Although early studies of MM and MBI were mainly concerned with evaluating their clinical efficacy (Baer, 2003; Bishop, 2002), recent studies started focusing on the psychological and physiological correlates of such interventions (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003; Ivanovski & Malhi, 2007) and on the possible underlying mechanisms, which found sometimes contrasting results. However, inconsistent findings emerging from those studies could result from differences as to how authors conceptualized mindfulness.

Furthermore, many studies into mindfulness, in general, and MM/MBI, in particular, have been criticized for their lack of scientific rigor. A major criticism concerns the lack of high-quality, randomized control studies comparing MM and MBI to adequate comparators, which include the expectation of a benefit but exclude the claimed "active ingredient" of the majority of mindfulness-based approaches, i.e., sitting meditation and related practices (Chiesa & Serretti, 2010). Authors who are well-versed in Buddhist meditation studies have raised concerns that modern MBI does not completely fit with classical theories of mindfulness (Rapgay & Bystrisky, 2009). In addition, critical issues, for instance, as to whether ancient Buddhist meditations such as Vipassana and Zen meditations should be considered within the broad category of modern MBI and the absence of consensus about an operational definition of "mindfulness," are the key points of an ongoing debate about such practices (Ivanovski & Malhi, 2007; Rapgay & Bystrisky; Malinowski, 2008). Finally, it is noteworthy that the word "mindfulness" is frequently used as a construct, a mental state, or as a number of practices designed to achieve this state, raising concerns as to what current studies are actually measuring when they claim they are measuring mindfulness and as to what exactly practitioners are doing when they are practicing modern MBI (Chambers et al., 2009; Rapgay & Bystrisky, 2009).

The present article aims to survey and compare distinctive features of the main MM and MBI to explore major commonalities and differences of such interventions. To achieve this goal, six main interventions usually subsumed under the definition of "mindfulness-based" approaches (Vipassana meditation, Zen meditation, MBSR, MBCT, DBT and ACT) will be compared with respect to philosophical background, main techniques, aims, outcomes, neurobiology and psychological mechanisms. Before doing this, the theoretical background of mindfulness will be briefly explored.

Theoretical Background of Mindfulness

The Concept of Mindfulness

A complete description of mindfulness is beyond the scope of the present article and the present section is not meant to be a comprehensive summary but rather a brief exposure of the main definitions of mindfulness. The word mindfulness derives from the Pāli word *sati*, which can be found in early Buddhist scriptures such as the Abhidhamma (Kiyota, 1978), a classic scholastic compilation of Buddhist psychology and philosophy and, later, in the Vishuddimagga (Buddhaghosa, 1976), a summary of the part of the Abhidhamma that deals with meditation. *Sati* and its Sanskrit equivalent, *smṛti*, are closely related to *sarati*, which

means "to remember" (Analayo, 2006). This original meaning of what is commonly translated as mindfulness often goes unnoticed. Such a link to memory may be surprising, as mindfulness is usually understood as awareness of the present moment, as opposed to dwelling in the past (or future). But as Analayo (2006) explains, if examined within the context of the Pāli discourses, it becomes evident that what is meant is that once *sati*/mindfulness is present, memory will function well. Accordingly, *sati* has frequently been described as a state of "presence of mind," which allows the practitioner to see internal and external phenomena as they really are (i.e., impermanent, lacking a self and ultimately leading to suffering) and to distinguish between projections and misunderstandings of the practitioner (Nyaniponika, 1973; Tsoknyi, 1998; Uchiyama, 2004). Because mindfulness concerns a clear awareness of one's inner and outer worlds, including thoughts, sensations, emotions, actions, or surroundings as they exist at any given moment, it has often been termed as "bare" attention (Gunaratana, 1993; Nyaniponika; Rahula, 1974) or alternatively as "pure" or "lucid" awareness (Das, 1997; Gunaratana; Sogyal, 1992), emphasizing that mindfulness is supposed to reveal what is occurring, before or beyond conceptual and emotional classifications about what is or has taken place.

Although such descriptions provide an intuitive understanding of mindfulness as a state different from usual wakefulness, which is usually characterized by several biases, defenses, or ruminative thinking (Brown, Ryan, & Creswell, 2007), they do not easily lend themselves to an operationalization that could be used in current research. Modern psychologically oriented definitions of mindfulness tend not to suffer from this problem as they draw from psychological terminology and were specifically designed to be used within current psychological and medical research settings.

One of the first "modern" definitions of mindfulness was provided by Jon Kabat-Zinn, who described mindfulness as "paying attention in a particular way, on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). Bishop et al. (2004), in an attempt to operationalize Kabat-Zinn's definition of mindfulness, suggested that it should be considered as a particular focus of attention characterized by at least two distinct features: the first one involving self-regulation of attention towards the immediate present moment, while the second component would pertain to the adoption of an orientation marked by curiosity, openness, and acceptance. The former component describes mindfulness as a form of mental skill or state that emerges only when the individual is purposefully addressing his/her own attention to present experiences, the latter accounts for personality characteristics that underlie mindfulness tendencies, both of which are intricately linked (Bishop et al., 2004). Even though such a speculative definition was specifically formulated to be employed in current research, it is noteworthy that a psychometric scale (Lau et al., 2006) designed to assess mindfulness in terms of the definition by Bishop and colleagues (2004) did not yield evidence in support of one component of their definition (i.e., active self-regulation of attention). Furthermore, other authors have questioned the very validity of Bishop et al.'s (2004) definition as to how one can sustain attention on a target object while actively inviting and being open to other experiences at the same time (Brown & Ryan, 2004).

On the other hand, according to Brown and Ryan (2003), mindfulness should be described as "a receptive attention to and awareness of the present moment," and the scale they used to investigate trait mindfulness (Mindfulness Awareness and Attention Scale or MAAS) suggested a one-dimensional factor structure of mindfulness with present-centered attention/awareness as main feature. Shapiro, Carlson, Astin, and Freedman (2006) propose a three-component model to explain how mindfulness affects positive change. In addition to *attention* and *attitude*, which are similar to Bishop et al.'s (2004) two components, they point out that *intention*, i.e., the personal motivation or vision why somebody engages with mindfulness practice, needs to be considered.

Employing a psychometric approach, Baer et al. (2006) combined five different mindfulness self-report scales and the factor-analytical analysis of responses to them revealed a five-factor structure of mindfulness characterized by nonreactivity, observing, acting with awareness, describing, and nonjudging (Baer et al., 2008; Baer, Walsh, & Lykins, 2009; Malinowski, 2008) and found that many of these facets significantly predicted various psychological outcome measures.

It is worth mentioning, however, that criticism has been raised towards current instruments used to measure mindfulness and some authors have questioned the very validity of segregating mindfulness into discrete components (Ivanovski & Malhi, 2007). First of all, it has been suggested that current instruments mainly describe mindful behaviors and a general tendency towards being mindful in daily life, whereas the original definitions of mindfulness emphasize qualities of awareness (Chambers et al., 2009; Rapgay & Bystrisky, 2009). Further, it has been pointed out that modern MBIs have failed to distinguish between attention and awareness as two distinct components of meditation, raising doubts about what exactly practitioners are doing when they are practicing modern MBI (Rapgay & Bystrisky). In addition, the frequent lack of control groups in mindfulness scales' validation studies, along with recent findings that suggest that meditation practices that are conceptually very different from MM such as Transcendental Meditation are related to increases in mindfulness levels as well (Tanner et al., 2009), raise doubts about the specificity of modern constructs of mindfulness.

In sum, so far no consensus as to how mindfulness should be defined has been reached. Although there is general agreement regarding the involvement of sustained attention to the present moment, a broad range of differences exists between the proposed definitions and an unequivocal operational definition of the construct of mindfulness is still lacking (Malinowski, 2008). On account of these discrepancies, it would not be surprising to observe significant differences in the way mindfulness is understood and practiced in different MMs and MBIs.

The Place of Mindfulness Meditations Among Meditation Practices

Although a few authors criticize that mindfulness would often be too closely linked to meditation practice (e.g., Hayes & Feldman, 2004), we would like to emphasize that the historical and conceptual origins of mindfulness are deeply rooted in Buddhist philosophy and practice and are linked to the practice of specific meditation techniques (Rapgay & Bystrisky, 2009). Meditation has been employed as spiritual and healing practice for more than 5,000 years. The word "meditation" derives from Latin "meditari," which means "to engage in contemplation or reflection" and can be defined as both a process and a state. Unfortunately, such multiple meanings frequently raise concerns as to how the same word is used to describe several processes. Additionally, as reported earlier, such concerns are consistently associated with the word mindfulness as well, as multiple meanings subsumed under the word "mindfulness" make it difficult to understand when one is referring to mindfulness as a process, i.e., to the process of developing mindfulness skills, or as a state, i.e., when one is mindfully attending his or her own experiences.

According to the Yoga Sutras, meditation is the act of inward contemplation and the intermediate state between mere attention to an object and complete absorption within it (Taylor, 1999). It is worth noting that the Pāli and Sanskrit term *bhāvanā* that is commonly translated as meditation actually has a slightly different connotation. More literally, it translates as "cultivating" rather than contemplating and reflecting. Also, the translation of the Tibetan equivalent *sgom* (pronounced "gom") does not imply contemplation and reflection but may translate as "getting used to" or "familiarizing oneself." Frequently, mindfulness and other meditation practices are subsumed under the term "contemplative practices," but this term is especially misleading concerning mindfulness, as contemplation suggests an active engagement with a specific *content* of thought or experience, while mindfulness, as we shall see in more detail below, emphasizes the nonengagement with specific content. When considering the breadth of terminology, the complexity, diversity, and, sometimes, confusion of constructs become obvious, highlighting that it may be impossible to adequately capture the full spectrum of meanings with one simple definition.

Not surprisingly, there are several ways how meditation practices have been classified (Ospina et al., 2007). One of the most commonly cited classifications suggests a distinction of two main meditative styles, *mindful types* and *concentrative types* of meditation, depending on how the attentional processes are directed (Goleman, 1988). Furthermore, it is assumed that most meditative techniques lie somewhere on a continuum between the poles of these two

general methods (Andresen, 2000; Shapiro & Walsh, 1984; Wallace, 1999). MMs are characterized by open, nonjudgmental awareness of the sensory and cognitive fields and include a meta-awareness or observation of the ongoing contents of thought, whereas concentrative types of meditation involve focused attention on a given object such as an image or a mantra, while excluding potential sources of distractions (Cahn & Polich, 2006; Ospina et al.). With little differences across studies, this is the most common categorization of meditation practices employed by scientific research thus far. However some authors have recently raised some criticisms regarding the very validity of this classification, pointing out that it could derive from a misunderstanding of the original concept of meditation (Chambers et al., 2009; Rapgay & Bystrisky, 2009).

Recently, new descriptions of the spectrum of meditation practices were suggested. More specifically, concentrative meditations and MMs are no longer described as opposed processes. Instead, it is recognized that they share a common background of focused attention, which can take different directions depending on the specific meditation form (Lutz, Slagter, Dunne, & Davidson, 2008; Rapgay & Bystrisky, 2009). Thus, it is suggested that these two types of meditations are more accurately conceptualized as occupying orthogonal axes rather than opposed directions on a continuum and that MM includes explicitly or implicitly some degree of concentration (Chambers et al., 2009). Of note, however, this is not the only theoretical framework of meditation practices suggested so far, and further classification schemes have been put forward. One of the main ones involves a distinction between practices that attempt to either control or regulate attention/awareness in some way (e.g., concentrative meditations) and practices that do not involve any effortful control or manipulation of experiences including attention (e.g., Zen meditation's Shikantaza). It is worth mentioning, however, that even though the second group of practices are sometimes independently practiced, it is generally assumed that as the practice deepens, the need for effortful processes are greatly reduced, resulting in a form of "effortless" meditation (Lutz et al.).

Furthermore, major emphasis has recently been given to the analytical features of advanced Buddhist MMs, which are aimed at investigating the true nature of the self (Gunaratana, 1993; Nydahl, 2008), as well as to the self-referential and ultimately self-transcending process of awareness aware of itself, particularly expressed within the Tibetan traditions of tantric (or Vajrayana) Buddhism (Nydahl). This transcendence aims at the fleeting nature of the self, which, in this process, is an ever-changing flow of psychophysical phenomena and void of any lasting self—the liberating insight of the emptiness of the self. This, in turn, is supposed to reduce suffering related to the concept of an individual ego and ultimately lead to psychological well-being and happiness. These features are well-known in the original Buddhist traditions, from which recently developed MBIs are drawn; however, as described below, they have been scarcely considered in modern MBI.

The Comparison of Different "Mindfulness-Based Approaches"

Philosophical Background

As mentioned above, both Vipassana and Zen meditations (as well as the great variety of Tibetan Buddhist meditation practices that include, among others, MM) are deeply rooted in Buddhist philosophy and are largely based on the development of *Sati* (mindfulness), early descriptions of which can be found in the Abhidhamma. Although both the original Indian and, later, Tibetan Buddhist traditions show large agreement about the concept of mindfulness, there are subtle differences between the two in the context in which mindfulness is understood and practiced. In Tibetan Buddhism, mainly based on the Abhidhamma and its commentaries, mindfulness is classified and defined as one of the ascertaining mental factors that are responsible for all mental activities (Rabten, 1992). With respect to practice, mindfulness is both used as an antidote to deal with forgetfulness encountered during the practice of single-pointed concentration practice (Londro, 1992), and as a practice of introspective awareness as a part of a larger body of practices known as the 37 altruistic practices (Berzin, 2002).

In Theravada Buddhism, mainly based on the Satipatthana Sutta (Presence of Mindfulness/Frames of Reference), Anapanasati Sutta (Mindfulness of Breathing), Mahasatipatthana Sutta (The Great Presence of Mindfulness/The Great Frames of Reference), and Kayagata-Sati Sutta (Mindfulness Immersed in the Body; Rapgay & Bystrisky, 2009), mindfulness is usually considered as a continuum of phases (Bodhi & Wallace, 2006). Broadly speaking, the initial phase is mainly concerned with the development of sustained bare attention resulting from the practice of nonforgetful attention. A more advanced phase involves introspective awareness as a means to understanding the moment-to-moment workings of adaptive and maladaptive thoughts and feelings. A large number of Buddhist texts dealing with meditation clearly support these statements and go further by suggesting that for the correct development of *Sati*, both concentration and bare attention should be concurrently developed and that a minimal degree of concentration is indispensable in every state of consciousness (Gethin, 2001). When they are correctly developed, wisdom, i.e., the direct perception of the true nature of the self and of reality deriving from the correct practice of introspective awareness, can arise (Gilpin, 2009). In addition, when *Sati* is developed to its optimum measure, it is supposed to lead to tranquility, a calm and contented state that is particularly useful in counteracting negative emotions such as worry and restlessness (Gilpin).

Pertaining to modern MBI, MBSR is the only practice that is overtly rooted in Buddhist tradition. MBSR was conceived in 1979 in the effort of integrating ancient Buddhist philosophy and practice with current psychological and medical practice. MBSR is rooted in Buddhist Mahayana and Theravada traditions. Kabat-Zinn, the developer of MBSR, acknowledges influences derived from the Kwan Um school of Zen Buddhism as well as other Zen masters, such as Philip Kapleau, Suzuki Roshi, Thich Nhat Hanh (belonging to Mahayana tradition; Kabat-Zinn, 1990), and Robert Hover, a student of S.N. Goenka, Joseph Goldstein and Jack Kornfield, teachers of the Insight Meditation Society (belonging to Theravada tradition; Kabat-Zinn, Massion, Herbert, & Rosenbaum, 1998). Furthermore, Kabat-Zinn states that MBSR can be defined as "mostly Vipassana practice… with a Zen attitude' (Kabat-Zinn e-mail cited in Gilpin, 2009, p. 238). It is worth mentioning, however, that in spite of its important Buddhist derivations, MBSR remains a secular intervention. Indeed, as Kabat-Zinn himself has explained, there is no need to change one's own religion to participate in MBSR programs. Furthermore, scripts from Buddhist authors which are occasionally read by MBSR instructors during MBSR lessons are just considered as inspiring lectures for participants rather than dogmatic tenets or beliefs (Kabat-Zinn, 2003).

MBCT was developed in the 1990s by Segal et al. (2002) as a method for the prevention of relapses of major depression. Like MBSR, MBCT was developed as a secular, clinical intervention and does not require adopting any specific spiritual orientation or belief system, even though its philosophical background is influenced by Kabat-Zinn and other MBSR instructors at the University of Massachusetts (Teasdale et al., 2002). A further source for MBCT is cognitive-behavioral therapy, a psychotherapy based on the assumption that the way we perceive events largely determines how we feel about them and, in turn, how we behave (Beck, Rush, Shaw, & Emery, 1979), sharing with Buddhism the emphasis on self-responsibility in form of self-management, self-control, and self-improvement (Gilpin, 2009).

DBT was originally developed as an intervention for patients who met criteria for borderline personality disorders (BPD). Major influences of DBT derive from behavioral science, dialectical philosophy, and Zen practice. DBT is described as encompassing acceptance and change and is aimed to help patients to build a life worth living (Linehan, 1993). DBT interventions rely on the biosocial theory elucidated by Linehan, which suggests that a client's emotional and behavioral deregulation is derived from the transaction between an invalidating rearing environment and a biological tendency toward emotional vulnerability. The main dialectic for patients with BPD is the relationship between acceptance and change. According to the DBT model, such dialectic as well as similar ones can be resolved by finding a synthesis between a thesis and an antitheses. In accordance with the middle path approach of dialectics, which is also an inherent feature of Zen and mindfulness, skills are hypothesized to work by encouraging nonreinforced engagement with emotionally evocative stimuli, while blocking dysfunctional escape, avoidance behaviors, or other ineffective responses to intense emotions (Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006).

Finally, ACT relies on the Relational Frame Theory (Hayes, 2004a), which is derived from a philosophical view called functional contextualism (Gifford & Hayes, 1993). Although ACT does not describe its treatment methods in terms of mindfulness or meditation, it is often included among MBIs because several of its strategies are usually referred to as "consistent with the mindfulness approaches" (Baer, 2003, p. 128). According to RFT, the core of human language and cognition is "the learned and contextually controlled ability to arbitrarily relate events mutually and in combination, and to change the functions of specific events based on their relations to others" (Hayes, Luoma, Bond, Masuda, & Lillis, 2006, p. 5). Furthermore, it is assumed that "cognitions (and verbally labeled or evaluated emotions, memories, or bodily sensations) achieve their potency not only by their form or frequency, but by the context in which they occur" (Hayes, 2004b, p. 45). An important implication of RFT is that verbally mediated relationships among objects can alter and limit behavioral processes.

As outlined, MMs and MBIs have very different historical and philosophical backgrounds. Although Vipassana and Zen Meditations are deeply rooted in and influenced by ancient Buddhist philosophy, such influence is only marginally acknowledged in modern MBI, such as MBSR, MBCT (more Vipassana oriented), and DBT (more Zen oriented), and no direct influence is acknowledged for ACT. In addition, although MBSR does not specifically include elements other than those rooted in Buddhist philosophy, other interventions are deeply influenced by further psychological frameworks including cognitive-behavioral therapy (CBT; MBCT), behavioral science (DBT) and contextualism (ACT), thereby suggesting that several modifications have been introduced across different mindfulness-based approaches.

Main Techniques

Reflecting the outlined philosophical differences, there are significant differences across different MMs and MBIs regarding the specific characteristics of a "correct" practice. Such differences exist not only across different MMs and MBIs but also within a single tradition. On account of the impossibility to provide a complete description of every single practice, only the main features will be addressed in the present subsection.

The Theravada tradition provides a precise description of the mindfulness practice of attending as involving attention to both the inhalation and the exhalation while simultaneously being aware of the experience of the body as the breath flows in and out through it (Rapgay & Bystrisky, 2009). Note, however, that this practice does not include only Vipassana, but it is usually preceded by or developed concurrently to Samatha practice (more similar to concentrative meditations), in which sustained attention is completely directed to a target object and other objects of experiences are excluded (Rapgay & Bystrisky).

The training primarily involves sustained bare attention on the breath while peripherally being aware of the body as one breathes in and out. When sensations, thoughts, and feelings arise, introspective awareness may be applied to label them before returning attention to the breath (Gunaratana, 1993). The appropriate level of bare attention is determined by indicators such as the ability to sustain bare attention for a period of time and experience the target object in its bare form without elaborating any of its associative meanings that are usually triggered (Rapgay & Bystrisky, 2009).

Note, however, that current clinical trials investigating the effects of Vipassana meditation (Chiesa, 2010) are usually of brief duration, as suggested by the tradition led by S.N. Goenka (Hart, 1987). In addition, contrary to a number of Eastern traditions, which give higher emphasis on *Samatha* practice, they are decidedly Vipassana-orientated and often "bypass" *Samatha* (i.e., concentrative) practices (Gilpin, 2009). This is not the case for Zen meditation in which, although with some differences between traditions, the first meditation often practiced by novice meditators is *Su-soku*, a meditation more similar to concentrative meditations, in which the practitioners count their breaths so as to focus their attention. With ongoing practice, counting is omitted and the meditators remain simply aware of the present experience: this practice, which is devoted to the development of bare attention, is called *Shikantaza* and is considered the most advanced form of Zen meditation (Kapleau, 1965; Kit, 2001). A further Zen practice, particularly used by masters of the Rinzai sect, involves

focusing on a koan, a specific riddle that is unsolvable by logic, which is said to lead the practitioner to an insight into the true nature of reality (Kapleau, 1965). In any case, the main aim of such practices is to remain constantly aware of what is occurring in the present moment to keep the mind in the specific state in which the experiential insight (*satori*) can arise (Kapleau, 1965).

Pertaining to MBSR and MBCT, they are brief meditation programs mainly based on three different techniques: body scan, sitting meditation, and Hatha Yoga practice. Body scan involves a gradual sweeping of attention through the entire body from feet to head, focusing noncritically on any sensation or feeling in body regions and using periodic suggestions of breath awareness and relaxation. During sitting meditation, the practitioner develops both mindful attention on the breath or on the rising and falling abdomen as well as on other perceptions, and a state of nonjudgmental awareness of cognitions and the stream of thoughts and distractions that continuously flow through the mind. The Hatha Yoga practice encompasses breathing exercises, simple stretches, and posture designed to strengthen and relax the musculoskeletal system (Kabat-Zinn, 1990; Segal et al., 2002). These programs usually include eight sessions of about 2 hours each and homework for at least 45 minutes a day, 6 days a week (Kabat-Zinn, 1990, 2003), although they may be delivered in shorter or longer courses as well.

Despite such similarities, a number of differences between MBCT and MBSR should be clearly acknowledged. First, MBCT includes specific techniques and exercises derived from CBT (e.g., instruction on how to deal with the threat of depressive relapses). Then, it provides material about major depression for which treatment MBCT was specifically conceived (e.g., its characteristics and warning signs). Also, it introduces a fourth formal practice, called the ''three-minute breathing space,'' which is considered to be a way of integrating formal practice into daily life (Segal et al., 2002, p. 173), initially, at regular, preset times during each day, but subsequently applied to any times when unpleasant feelings are noticed.

Further differences exist between MBSR and MBCT, on the one hand, and Vipassana and Zen meditations, on the other. Although the latter meditation practices provide a clear distinction between attention (i.e., the main focus of attention such as the experience of air flow at the nostrils) and awareness (i.e., the concurrent receptive experience of other sensations arising, for instance, from the rest of the body), no such distinction is clearly defined by MBSR and MBCT (Rapgay & Bystrisky, 2009). Furthermore, it is noteworthy that only one MBSR practice, namely, ''choiceless awareness,'' in which the practitioner simply sits aware of awareness itself with no specific objects of attention, shows a marked similarity with some of the more advanced Theravada and Zen meditation practices. However, such practice is not mandatory in MBSR courses (Kabat-Zinn, 1990) and it is not included in other recent MBI.

It should also be noted that in all such practices the term ''mindfulness'' could be misleading for at least two reasons. The first one involves the notion that, as previously reported, both MMs and MBSR/MBCT are usually characterized by the development of at least some degree of concentration and that several practices such as focused attention on the breath and the body scan can be seen as concentrative practices. The second reason is that although there is a very clear focus in MBSR and MBCT on controlling attention, the ''attitude'' one is instructed to bring to this attentional control is one of nonjudgment, nonstriving, and noneffort. Accordingly, there is both a theoretical and a practical question as to how these two apparently divergent approaches or emphases can be reconciled. This issue can be resolved if one considers that as the practice deepens, the need for effortful processes of controlling attention are greatly reduced, resulting in a form of more ''effortless'' meditation, which is characterized by an enhanced ability of nonjudging and nonstriving (Lutz et al., 2008). At this point, one may talk about mental stability rather than concentration, as there is no particular object on which attention should be focused.

Contrary to the above-mentioned interventions, DBT and ACT do not involve formal meditation training. In DBT, clients are encouraged to accept themselves, their histories, and their current situations exactly as they are, while working intensively to change their behaviors and environments to build a better life (Baer, 2003). DBT includes a wide range of cognitive and behavioral treatment procedures, most of which are designed to change thoughts,

emotions, or behaviors. Mindfulness skills (including mindfulness "what" skills such as observing, describing and participating, and mindfulness "how" skills such as being nonjudgmental, being one-mindful and effective) are taught in DBT so as to allow the practitioner to reach a synthesis between acceptance and change (Linehan, 1993). They include, among others, behavioral skill training, exposure-based strategies, psycho-education, homework, cognitive modifications, and so forth. DBT clients learn mindfulness skills in a year-long weekly skills group, which also covers interpersonal effectiveness, emotion regulation, and distress tolerance skills (Linehan, 1993).

In ACT, on the other hand, clients are encouraged to recognize an observing self that is capable of watching its own bodily sensations, thoughts, and emotions by seeing these phenomena as separate from the person having them. For example, people are taught to say, "I'm having the thought that I'm a bad person," rather than "I'm a bad person" (Kohlenberg, Hayes, & Tsai, 1993, p. 588). They also are encouraged to experience thoughts and emotions, including unwanted ones such as anxiety, pain, and guilt, as they arise, without judging, evaluating, or attempting to change or avoid them. Various mindfulness exercises are designed to reach this goal: (a) being present, i.e., being in nonjudgmental contact with environmental events as they occur; (b) adopting "a sense of self as a locus of perspective that provides a transcendent, spiritual side to normal verbal humans"; (c) choosing life directions in various domains; and (d) other strategies derived from CBT such as exposure, skills acquisition and goal setting (Hayes et al., 2006, p. 9). Apart from the lack of formal meditation training, it should be noted that DBT and ACT appear to be more oriented toward the modification of cognitions and behaviors (although in a way that is different from classical CBT; Hoffman & Asmundson, 2008) rather than on direct perception of pure experiences, such as MBSR and, especially, Vipassana and Zen meditations. In other words, they are more concerned with the content of experience than with the process of experience.

As we have seen, "mindfulness-based" approaches encompass a wide range of practices. The common background to all such approaches includes the explicit focus on present centered awareness. However, it should be pointed out that although four approaches are meditation based, two of them teach mindfulness skills *without* an explicit focus on formal meditation practice Also, while Vipassana and Zen meditations are mainly oriented to awareness of direct perceptions (e.g., sensations, sounds), DBT and ACT appear to be more concerned with the modification of cognitions, which, in turn, could change the way the patient perceives internal and external stimuli, whereas MBSR and, particularly, MBCT lie somewhere between these two extremes (Rapgay & Bystrisky, 2009). On the basis of such issues, it should be pointed out that significant differences exist in the way in which mindfulness is practiced across different MMs and MBIs.

Aims

The very aim of classical MM, such as Vipassana and Zen meditations, is to reach an insight about the true nature of the self and of the world so as to achieve freedom from suffering, which results from the incorrect understanding of reality (Gunaratana, 1993; Kapleau, 1965; Nyaniponika, 1973). To achieve this goal, the practitioner goes through different phases that include the development of the ability to keep their attention on a target object, observe their thoughts and emotions without being identified with them, and observe adaptive and maladaptive thoughts when they arise and when they disappear as well as their triggers and consequences. This awareness, in turn, allows an increase in adaptive thoughts and emotions and a decrease in maladaptive ones (Rapgay & Bystrisky, 2009). Furthermore, such interventions include a moral development that comprises, first, the "guarding" of oneself to be of service to others and, second, the "guarding" of others by the practices of patience, harmlessness, loving kindness, and sympathy (Gilpin, 2009).

Secondary aims, which are intrinsically related to the main one, include avoiding latent tendencies and habits whose eradication is the central purpose of the path, thereby leading to the arising of joy and happiness (Analayo, 2003). It is noteworthy, however, that a large number of western Vipassana and Zen practitioners practice such meditations for different aims, mainly

including health benefits. Furthermore, some Zen masters believe that it is acceptable for prospective students to be motivated by desires for good health because, over time, there is the possibility that their attachment to these less important purposes will be recognized (Kapleau, 1965). On the other hand, more recent MBIs are decidedly clinically oriented and their main aim is to provide relief from unwanted physical and psychological symptoms such as chronic pain or depressive symptoms. As some authors noted (Gilpin, 2009), interventions such as MBSR and MBCT are, in fact, not concerned with knowing the true nature of depression or of chronic pain. They are specifically concerned with achieving relief from such negative symptoms by targeting the extra baggage that is piled onto the symptoms in the form of, for example, negative thoughts/emotions by means of the development of an enhanced ability to cope with and/or relate differently to them. Examples include when patients recognize that they are not their symptoms or their thoughts. Also, rather than emphasizing detachment (which is used, for instance, by Buddhist masters to counteract sexual desire), instructors of modern MM tend to view practice in terms of acceptance and appreciation of one's "aliveness" (Gilpin, 2009). Similarly, the main aim of DBT and ACT is to help patients to manage their symptoms. At a very basic level, the primary aim of DBT is to help patients to reduce imminently dangerous or deadly behaviors, such as suicidal behaviors. When the primary objective is achieved, further focuses include shifting from quiet desperation to emotional experiencing, treating uncomplicated psychiatric disorders, career problems, and marital problems, and helping clients to develop an optimal functioning characterized by freedom and joy (for instance, by reducing feelings of emptiness and increasing experiences associated with feeling complete; Linehan, 1993). It should be recognized however, that the majority of available trials about DBT for BPD patients investigate only the first stage of treatment (Lynch et al., 2007).

Finally, the primary aim of ACT is to foster acceptance of unwanted thoughts and feelings, and to stimulate action tendencies that contribute to an improvement in circumstances of living (Hayes, 2005). According to Hayes and Feldman (2004), the main goal of ACT is to discourage experiential avoidance, i.e., the unwillingness to experience negatively evaluated feelings, physical sensations, and thoughts and substitute experiential avoidance with acceptance of things as they are.

As can be seen, all interventions reviewed above seem to target the reduction of negative emotional experiences associated with various types of sufferings. However, there are consistent differences in the importance such reductions occupy across different interventions. According to classical Buddhist MM, health benefits are secondary benefits that arise from a correct practice of meditation, whereas such benefits are the main, if not the only, aim of modern MBI. Furthermore, although relief from negative emotions, targeted by ancient MM, is directed towards a type of suffering that is supposed to be common to the whole mankind, modern MBIs are usually directed to the reduction of symptoms of a specific underlying disorder (such as major depression). It should be noted, however, that many of the of classical MM courses offered nowadays are explicitly directed to health benefits as well, even though further aims can arise at following stages of practice.

Clinical Research

The numbers of publications addressing the usefulness of MM and MBI for a variety of medical and psychological conditions has increased sharply in the last decade. Reviewing the growing number of studies addressing this topic is beyond the scope of the present article. Accordingly, only a relative handful of comprehensive reviews will be considered in the present section and we refer to such reviews for further details. The large majority of studies have focused on recently developed MBIs. This is probably because of the fact that such interventions are standardized and manualized, thereby facilitating empirical research and comparability across the studies. On the other hand, only a small number of controlled clinical trials focused on Vipassana and Zen meditations. More in detail, there is some evidence to suggest that Vipassana meditation could be useful for the reduction of alcohol and substance abuse among prisoners and for enhancing more mature coping strategies among healthy

subjects (Chiesa, 2010) and that Zen meditation could be useful for reducing pain perception, blood pressure, and stress levels, as well as for therapists in training and musicians (Chiesa, 2009).

On the other hand, there is consistent evidence suggesting the potential benefits of MBSR for a number of physical and mental disorders, including cancer (Ledesma & Kumano, 2008), chronic pain, rheumatoid arthritis, fibromyalgia, psoriasis, multiple sclerosis, and HIV (Chiesa & Serretti, 2010). Further uncontrolled studies also suggest possible benefits, derived from MBSR practice, for patients suffering from generalized anxiety disorders and panic disorder (Grossman, Niemann, Schmidt, & Walach, 2004; Kabat-Zinn et al., 1992; Miller, Fletcher, & Kabat-Zinn, 1995), even though it is too soon to reach definitive conclusions. In addition, MBCT showed efficacy towards the prevention of major depression relapses and for patients with residual depressive symptoms, as well as for fully symptomatic depressed patients (Barnhofer et al., 2009; Bondolfi et al., 2010; Coelho, Canter, & Ernst, 2007; Kenny & Williams, 2007; Kuyken et al., 2008). Other conditions for which MBCT was employed include, among others, social phobia, generalized anxiety disorder, and panic disorder, and reduction of inter-episodic anxiety levels in bipolar patients (Chiesa & Serretti, 2010).

It is noteworthy, however, that current empirical studies of MM and meditation-based MBI have been criticized for several methodological shortcomings, such as absence of control groups, absence of randomization or randomization details, small sample size, and the frequent use of a waiting list as a comparator, which does not allow for distinguishing between specific and nonspecific (e.g., deriving from the simple expectation of a benefit) effects of MM interventions (Chiesa & Serretti, 2010). Further limitations of current studies include the frequent absence of follow-up measures, the fact that they frequently rely on self report instruments (Chiesa & Serretti, 2010), and the frequent differences across interventions with respect to total duration, homework, practices, nonmanualized interventions (e.g., Toneatto & Nguyen, 2007; Winbush, Gross, & Kreitzer, 2007).

There is, however, consistent evidence based on a relatively large number of randomized controlled trials comparing DBT to interventions carefully designed to control for a variety of nonspecific treatment effects, (e.g., treatment availability and hours of individual psychotherapy) and therapist factors (e.g., formal education and clinical experience) to suggest the efficacy of such intervention for BPD patients (Lynch et al., 2007) and other disorders such as alcohol abuse or other impulsive behaviors.

Finally a relatively high number of studies indicates the potential usefulness of ACT for several disorders, including anxiety disorders, chronic pain, drug abuse, trichotillomania and chronic skin picking, epilepsy, self-management of diabetes, and psychotic symptoms (Pull, 2009). It is noteworthy, however, that a great number of studies lacks replications and suffers from the same methodological limitations of meditation studies, including absence of control groups, inadequate control groups, and absence of randomization, suggesting the necessity for better designed trials on this topic.

In conclusion, there is consistent evidence for the possible benefits of MM and MBI. However, on account of the quality of the majority of such studies, it is often difficult to distinguish between specific and nonspecific effects of such practices, and it is unclear to what extent mindfulness can be considered the main active ingredient. Furthermore, on account of the paucity of data and the lack of direct comparison studies, it is difficult, if not impossible, to understand to what extent results, derived from the application of a specific intervention to a given disorder (e.g., MBCT for major depression), can be generalized to other interventions or other disorders (e.g., Vipassana for major depression or MBCT for alcohol abuse).

Neurobiological Findings

Evidence from the first neuroimaging studies in this area suggests that the changes in brain activity and brain dynamics and even brain structure related to the practice of MM and meditation-based MBI may be concordant with observed psychological changes. A striking difference in the clinical studies reviewed so far is that the majority of available data from neuroimaging studies relate to traditional Buddhist meditation practices, whereas only a small number of studies focused on recently developed MBI (Chiesa, Brambilla, & Serretti, 2010).

This bias may result from the fact that many of these studies aim at investigating cognitive (or affective) abilities at the extreme end, for which only experienced meditators of established traditions are currently viable participants.

A critical look at this research reveals several methodological weaknesses. The typical study compares meditators, with varying degrees of expertise, with a meditation-naïve control group. As these studies are cross-sectional, they do not allow drawing conclusions as to whether observed differences actually result from meditation practice. Interpreting these differences is furthermore limited by the fact that meditation and control groups are often insufficiently matched and, for instance, differ with regards to such fundamental properties as age, but also sociocultural background or lifestyle. In addition, the types of meditation practice that were studied vary largely, making it difficult, if not impossible, to relate the results of different studies to each other. Despite such methodological shortcomings, these pioneering studies prepared the ground for further studies, currently under way, that employ more rigorous methodologies.

In the following sections, we shall briefly summarize those studies that can be clearly linked to the different mindfulness approaches discussed in this article. As to our knowledge, no neuroimaging studies of DBT and ACT have been conducted, and the review will be limited to the remaining approaches.

There is some evidence that MM may induce specific, functional, i.e., "state dependent," changes in brain activity. During Vipassana meditation, increased activation of the rostral anterior cingulate cortex and the dorsal medial prefrontal cortex in both hemispheres was observed (Hölzel et al., 2007), suggesting an increased involvement of attentional control processes during meditation. In line with this interpretation was a study that compared mindfulness meditators with nonmeditators, showing superior executive control mechanisms and reduced automated responding of the meditators, which positively correlated with self-reported levels of mindfulness (Moore & Malinowski, 2009). Similarly, an electrophysiological study compared brain responses to potentially distracting auditory stimuli during Vipassana meditation compared to a control condition of free-wandering nonemotional thoughts, and found a reduced P3a component of the event-related potential, indicative of reduced automated reactivity and evaluative processing (Cahn & Polich, 2009). Based on another investigation of Vipassana meditators, Slagter, Lutz, Greischar, Nieuwenhuis, and Davidson (2009) conclude that cognitive resources of meditators may be less bound when processing a stimulus, thus making the cognitive system more readily available for processing more information in a given time. They employed the attentional blink paradigm, in which participants had to detect two targets within a stream of rapidly changing stimuli, and the variability in the timing of the theta oscillation (4–8 Hz) was measured after successful detection of the second target. The observed reduced variation in timing between trials of the meditators suggests that meditation may lead to more consistent and less resource-demanding stimulus processing. In accordance with such findings, long-term Zen practitioners have been found to display a reduced duration of the neural response linked to conceptual processing in regions of the default network, a network of brain areas thought to be engaged during normal resting states (Gusnard, Akbudak, Shulman, & Raichle, 2001), suggesting that meditative training may foster the ability to voluntarily regulate the flow of spontaneous mentation (Pagnoni, Cekic, & Guo, 2008). Cahn and collaborators reported that during Vipassana meditation, compared with a control condition (mind-wandering), increased oscillation over parieto-occiptal brain areas in the gamma frequency range (35–45 Hz) was measured, a brain signature they interpreted as increased sensory awareness (Cahn, Delorme, & Polich, 2010).

A further study compared participants who underwent an 8-week MBSR program and a control group on two tasks in which attention was either focused on a self-related narrative or directed to present moment experiences similar to mindfulness meditation. The MBSR participants showed a more pronounced reduction of activity in the medial prefrontal cortex during present-moment as compared with self-related attention (Farb et al., 2007), indicating that an important component in MBSR may be that the across-time self and the present-moment self may be dissociated. Furthermore, MBSR participants showed higher activity in a network lateralized to the right hemisphere. This network comprised the right prefrontal

cortex and several viscerosomatic areas. A subsequent study qualified the role of this network in mindfulness practice. During induction of sadness, the same network was recruited more strongly in MBSR participants than in controls, although self-reported sadness did not differ between groups (Farb et al., 2010). The authors speculated that MBSR might result in the ability to balance affective and sensory neural networks, leading to reduced vulnerability to dysphoric reactivity. Together, these two studies suggest changes to cerebral functional networks that are implicated in the switching between first and third person perspectives (Ruby & Decety, 2004) and associated to a more detached observation state of events characterized by lower emotional reactivity (Kalisch et al., 2005; Ochsner, Bunge, Gross, & Gabrieli, 2002).

Most intriguing, long-term Vipassana and Zen meditations may also be associated with changes to brain structures. More specifically, there is some evidence suggesting that Zen meditation might offer protection from age-related cognitive decline through inhibition of the reduction in both grey matter volume and attentional performance associated with age (Pagnoni & Cekic, 2007). In addition, Vipassana meditation could be related to increased volume of brain areas related to interoception and attention, such as the PFC, putamen, and right anterior insula (Hölzel et al., 2007; Lazar et al., 2005), as well as the right hippocampus (Hölzel et al., 2008), cerebral areas related to attention, and visceral awareness, presumably reflecting the specific training during Vipassana meditation, namely, the awareness of bodily sensations. Of note, the extent of these changes seems to be correlated with amount of practice (Lazar et al., 2005). Greater cortical thickness in the anterior cingulated gyrus, the parahippocampal gyrus, and the anterior insula was furthermore related to reduced pain sensitivity in Zen meditators. The first longitudinal study investigating structural brain changes showed a reduction of grey matter density in the right basolateral amygdala, which was positively correlated to the stress levels reported by the participants, indicating that adaptive changes to brain structure may also occur in the form of, possibly dysfunctional, grey matter density (Hölzel et al., 2010).

Though less extensively investigated through rigorous controlled studies, further evidence suggests that MBSR and MBCT could affect prefrontal alpha asymmetry in healthy subjects and in patients who attempted suicide, respectively (Barnhofer et al., 2007; Davidson et al., 2003). These meditative practices were found to result in a topographical pattern of oscillating alpha activity, which is indicative of increased left-sided brain activity, previously associated with positive emotions and dispositional mood (Davidson, Ekman, Saron, Senulis, & Friesen, 1990). One of these studies also demonstrated possible positive effects of MBSR on immune system reactivity (Davidson et al., 2003).

Mechanisms of Mindfulness-Based Approaches

Several studies attempted to investigate the psychological mechanisms underlying MM and MBI. Contrary to neuroimaging studies, however, there is an almost total absence of studies investigating the mechanisms that underlie Vipassana and Zen meditations. In contrast, a large number of studies investigated the psychological mechanisms related to modern MBI. On account of the majority of findings concerning modern MBI, they will be explored first.

Several self-report questionnaires were developed in an attempt to measure mindfulness and its distinct features and facets. One of the most widely used questionnaires is the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). It mainly relates to the conceptualization expressed in DBT manual (Linehan, 1993) and was derived from pooling several previously published questionnaires designed to explore mindfulness in nonmeditators as well as meditators with different degrees of experience. The resulting five-factor structure was tested with a hierarchical confirmatory factor analysis, which suggested that at least four (all apart from "observe") of the identified factors were components of an overall mindfulness construct. Furthermore, the factor structure of mindfulness was found to vary with meditation experience. Also, variations in three mindfulness facets (acting with awareness, nonjudgment, and nonreactivity) significantly predicted improvements in psychological outcomes. A recent investigation performed by the same group (Baer et al., 2008) comparing long-term

mindfulness meditators (practicing unspecified Buddhist meditations) to nonmeditators have further extended previous findings and confirmed that three of the five facets (observing, nonjudging, and nonreactivity) of FFMQ were especially helpful in understanding the changes that occur with the long-term practice of mindfulness meditation and in relating these facets to symptom reduction and improved psychological functioning.

It should be noted, however, that such description of mindfulness, mainly based on DBT, was tested on subjects who practiced different types of meditations such as MBSR, even though, as shown above, there are several differences across such interventions. Furthermore, several criticisms have been raised towards such questionnaires (and similar ones), including the fact that it measures trait mindfulness, i.e., a general tendency of being mindful in daily life, but not "state" levels of mindfulness, such as, for instance, when attention to experience is intentionally cultivated with an open, nonjudgmental orientation to experience (Lau et al., 2006) and primarily taps mindful behaviors rather than mindfulness itself (Rapgay & Bystrisky, 2009).

Other studies have explored the mediators of change in MBCT studies and tried to consider mechanisms underlying such changes within the context of current cognitive theories and models. Crane and colleagues investigated the effect of MBCT on self-discrepancy, one of the key psychological processes involved in the maintenance of depression according to cognitive model (Strauman, 1989). The concept of self-discrepancy relies on the theory that people suffering from major depression often believe themselves to be falling short of their own or other's goals or expectations. In both the MBCT and the treatment as usual (TAU) groups (who started with equivalent levels of self-discrepancy), baseline level of depression was associated with larger discrepancies between ideal and actual self. By the end of treatment period, there were large and significant differences between MBCT and TAU groups, such that the MBCT group had a smaller discrepancy and an increased adoption of more adaptive self-guides than the TAU group (Crane et al., 2008). Other authors have found that mindfulness levels, as measured by the Cognitive and Affective Mindfulness Scale (CAMS; Feldman, Hayes, Kumar, & Greeson, 2004) increased significantly during the treatment and that they were accompanied by a concurrent decrease in avoidance and ruminations (Kumar, Feldman, & Hayes, 2008). Further, the greater the change in mindfulness, the greater the reduction in depressed mood and in the extent to which participants dealt with difficulties through rumination and avoidance. Of note, this is consistent with a number of studies that observed a decrease in ruminations after MBSR training (Jain et al., 2007; Ramel, Goldin, Carmona, & McQuaid, 2004; Shapiro, Brown, & Biegel, 2007).

Pertaining to DBT, several mechanisms of change have been put forward. Some of them, such as cognitive restructuring, exposure, and response preventions, have been suggested as a mechanism in common with other behavioral therapies, whereas other ones, such as dialectical focus, validation strategies, mindfulness skills, distress tolerance skills, and commitment strategies, have been described as fairly specific for DBT (Lynch et al., 2006). There is, however, a lack of rigorous empirical research supporting these statements, and, thus, further research is needed to investigate the mediators of outcome in DBT trials. Similarly, a number of mediators of change have been suggested for ACT. However there is a paucity of clinical trials that have attempted to clarify psychological mechanisms underlying ACT (Blackledge & Hayes, 2001). Studies suggest that ACT could reduce experiential avoidance due to an increase in emotional acceptance and cognitive defusion, i.e., the ability of recognizing thoughts as thoughts and not necessarily as an accurate readout of reality. A number of empirical studies recently provided preliminary support for this theory (Forman, Herbert, Moitra, Yeomans, & Geller, 2009; Lundgren, Dahl, & Hayes, 2008).

In an attempt to clarify the common mediator of changes in MM and MBI, Chambers and colleagues suggested that they "involve a systematic retraining of awareness and nonreactivity, leading to defusion from whatever is experienced, and allowing the individual to more consciously choose those thoughts, emotions, and sensations they will identify with, rather than habitually reacting to them" (Chambers et al., 2009, p. 599). However, it should be noted that significant differences might exist across different mindfulness-based approaches, especially between classical MM and modern MBI (Rapgay & Bystrisky, 2009).

More in detail, some authors have suggested that modern MBIs have diverged from classical MMs. First of all, the emphasis on acceptance and cognitive defusion, typical for modern MBI, is not shared by classical MM. Psychological changes resulting from MM practice are derived from directly perceiving when adaptive and maladaptive experiences arise and when they do not. The improved ability to do so would allow practitioners to increase adaptive experiences and decrease maladaptive experiences in their daily life (Thanissaro, 1997), as cited in Rapgay and Bystrisky (2009). On the other hand, as Rapgay and Bystrisky recently stressed, the implementation of many cognitive therapy-oriented exercises employed by modern interventions such as MBCT and ACT, including, as an example, recognizing that "thoughts are just thoughts," could represent a slightly different process in comparison with classical MM, which is characterized by primarily addressing cognitions rather than direct perceptual processes.

Also, it has been pointed out that MBIs differ from classical MMs in that they reject the idea of mindfulness having goals that the practitioner strives toward, and, consequently, nonjudgmental awareness of the present moment is seen as the essence of the practice (Baer, 2003; Roemer & Orsillo, 2003); while according to classical literature, change can occur only through the recognition of adaptive and maladaptive thoughts, feelings, and behaviors as they arise (Rapgay & Bystrisky, 2009). There is a distinct lack of empirical studies investigating such issues, presumably reflecting the focus of current studies on descriptions of mindfulness suggested by Kabat-Zinn and other researchers involved in modern MBI.

In conclusion, empirical research investigating the psychological mediators of change in MM and MBI is still in its infancy. Several attempts to investigate the psychological mechanisms underlying mindfulness-based approaches have been made. However, on the basis of current studies, it is unclear whether certain mechanisms are unique for the practices for which they have been investigated. Only future studies aimed at comparing the psychological changes underlying different MM and MBI will be able to better explore commonalities and differences existing across such interventions.

Discussion

In the present article, we compared the most common mindfulness-based approaches, including ancient MM and modern MBI, with respect to philosophical background, main techniques, aims, outcomes, neurobiology, and psychological mechanisms and reviewed major commonalities and differences existing across such interventions.

From the review of existing literature about MM and MBI, several issues have emerged. First of all, there are various differences in the theoretical background of different interventions. Overall, although Vipassana and Zen meditations are deeply rooted in Buddhist philosophy, one can observe a general tendency toward mixing Buddhist elements with current psychological theories in modern MBI. The influence that such modifications could have on the attitude of practitioners of different interventions remains unclear, given the lack of empirical studies. On the other hand, such issues could be of high importance, given that several meditation teachers explicitly suggest which attitudes are more adequate for approaching meditation practice (Gunaratana, 1993; Kabat-Zinn, 1990), and it was found that the outcome of meditation practice may depend on the intention of the practitioners (Shapiro, 1992).

Another critical issue can be raised about different ways of practicing "mindfulness" across different interventions. As an example, Vipassana and Zen meditations differ from MBSR and MBCT in that they often explicitly suggest prior or concurrent practice of some sort of concentrative meditation. There is consistent evidence to suggest that different forms of meditation engage different cerebral areas (Cahn & Polich, 2006) and that concentrative meditation could be an easier approach to meditation for novice meditators that facilitates the following monitoring ability which is the main skill required for practicing MM (Lutz et al., 2008). Consequently, one could ask whether adding a brief period of purely concentrative meditation training to modern meditation-based MBI could be useful for practitioners so as to facilitate their practice, or whether direct engagement in MM practice could bypass concentrative training. Accordingly, it seems reasonable to ask whether the beneficial effects

of such interventions are a consequence of participants' developing greater attentional control and/or the result of them letting go of the habitual tendency to control or manipulate different aspects of their internal experience (including attention). Furthermore, "classical" MM include particular emphasis on cultivating an introspective awareness that grants one greater access to the rich features of each experience, such as the degree of phenomenal intensity, the emotional tone, and the active cognitive schema, whereas such characteristics are only partially recognized by modern MBI.

Researchers, particularly in the field of depression and anxiety, are also raising concerns about whether modern MBI as a stand-alone treatment could be appropriate for treating psychopathology (Teasdale, Segal, & Williams, 2003). According to such authors, it is unlikely that mindfulness by itself can change the underlying mechanisms of psychopathology and assert that the range of efficacy of mindfulness for psychopathology, which some researchers such as Baer (2003) and others have suggested, may be somewhat premature and unlikely, because modern MBIs do not focus on changing maladaptive thoughts, feelings, and behavior. Clinical research that mainly suggests nonspecific effects of MM and meditation-based MBI raises further concerns in this direction (Chiesa & Serretti, 2010). However it remains unclear whether the scarcity of studies suggesting a specific effect of such practices depends on the low-quality design of the majority of current meditation studies or on a misunderstanding of the original concept of mindfulness. In accordance with the latter possibility, some authors have recently suggested that mindfulness could be an appropriate clinical tool if it was modified to address specific and appropriate clinical issues (Rapgay & Bystrisky, 2009).

Also, it should be pointed out that although the majority of mindfulness-based approaches are specifically meditation-based, some MBIs do not specifically involve meditation training and suggest that meditation is not necessarily the only way through which mindfulness can be cultivated. Hayes and Shenk (2004), for instance, go to the extreme of suggesting the necessity of letting go "unnecessary" attachment to meditation and attempted to describe a way of approaching mindfulness at the level of the psychological processes involved. This stands in stark contrast to the more traditional approaches to mindfulness, where it is understood that mental stability and clarity is a prerequisite for being fully mindful. Without this stable mental clarity, it may not, according to this perspective, even be possible to fully acknowledge the ongoing currents in one's mind. However, from this brief description of the diverse techniques employed by different MM and MBI, it seems clear that specific differences occur across the variety of mindfulness-based approaches. These difference include the perceptual versus cognitive nature of interventions along with the different ways in which attention and awareness are (or are not) considered and the inclusion or exclusion of "introspective" awareness as a key feature of some interventions.

Pertaining to the aims for which different MMs and MBIs are used, one may notice the great difference existing between classical MM and modern MBI. However, as outlined above, the aims for which specific mindfulness-based approaches are practiced seem to vary according to individual perspectives and not according to different approaches. Further, there are several differences in the clinical applications, neurobiological correlates, and psychological mechanisms of MM and MBI. However it remains unclear to date whether this reflects real differences across such interventions or whether they simply reflect the interest of researchers to investigate specific uses of any given practice. As an example, there are no studies that attempted to investigate potential usefulness of Zen meditation for major depression or whether Vipassana meditation could change levels of self-discrepancy.

On the basis of the reviewed findings, it is clear that specific differences exist across different MM and MBI, at least in the way mindfulness is considered and practiced. This leads to two main possible scenarios. In the first one, there is the possibility that higher emphasis is given to the original characteristics of classical MM and that they could be, in turn, applied to modern MBI. Some authors explicitly identify the misunderstandings of the concept of mindfulness in modern MBI as the reason for the lack of consistent evidence (Rapgay & Bystrisky, 2009). Such a scenario could lead to a more rigorous and unequivocally defined concept of mindfulness, more closely aligned with the original Buddhist roots from which the majority of MBIs are drawn. The second scenario involves the possibility that different MMs and MBIs

are really different versions of an underlying construct of mindfulness and that each of them could lead to different outcomes and/or be associated with different neurobiological correlates and underlying psychological mechanisms. According to this scenario, further research would be needed to better explore similarities and differences of current MM and MBI in different domains by means of direct comparison studies. Additionally, this second scenario could allow exploring the great variety of approaches that are currently used as complementary treatments for a great number of psychological and medical conditions, taking into account their differences. It could, thus, lead to the possibility to better differentiate and categorize such interventions.

In conclusion, there is consistent evidence suggesting that significant differences exist across reviewed interventions as to how mindfulness is understood and practiced. Although at first glance it appears as if a large body of research converges on understanding the effects of mindfulness practice and the underlying psychological and neurophysiological processes, the closer inspection of the philosophical background, aims, and practices of different MMs and MBIs revealed a large diversity that may question the usefulness of using mindfulness as umbrella term for this rich diversity. On the other hand, the scarcity of available data does not allow concluding to what extent the different approaches differ with respect to clinical benefits, neurobiological correlates, and underlying psychological mechanisms, suggesting the necessity for further research on this topic. However, future research will probably take different directions depending on the decision to consider modern MBI as a distinct entity from classical MM or, alternatively, to better clarify the specific differences and similarities existing across different MM and MBI.

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