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Mindful Emotion Regulation: A Theoretical and Empirical Review

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Abstract
The aim of the present theoretical and empirical literature review is to evaluate the efficacy of mindfulness as an emotion regulation strategy. The adaptive significance of human emotion is first presented within an evolutionary framework. Neural correlates of emotion from recent fMRI and PET findings and their structural implications are then briefly reviewed to provide a common conceptual foundation. Next, one-versus two-factor models of emotion regulation are introduced, followed by a description of the emotion regulation strategies under examination: (a) incidental emotion regulation, (b) experiential avoidance or distraction, (c) expressive suppression, (d) thought suppression, (e) cognitive reappraisal, and (f) mindfulness, or mindful emotion regulation. The construct of mindfulness is considered within the context of both Tibetan Buddhism and Western Psychology. Findings from recently published (<3 years) empirical research on mindfulness and other cognitive-behavioral emotion regulation strategies are summarized and some general conclusions are drawn regarding their efficacy. Lastly, the utility of mindfulness in contrast to the other cognitive-behavioral emotion regulation strategies is discussed before considering future directions in psychological research, theory, and practice.

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Mindful Emotion Regulation:
A Theoretical and Empirical Review

A THESIS
SUBMITTED TO THE FACULTY
OF
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ABSTRACT

The aim of the present theoretical and empirical literature review is to evaluate the efficacy of mindfulness as an emotion regulation strategy. The adaptive significance of human emotion is first presented within an evolutionary framework. Neural correlates of emotion from recent fMRI and PET findings and their structural implications are then briefly reviewed to provide a common conceptual foundation. Next, one- versus two-factor models of emotion regulation are introduced, followed by a description of the emotion regulation strategies under examination: (a) incidental emotion regulation, (b) experiential avoidance or distraction, (c) expressive suppression, (d) thought suppression, (e) cognitive reappraisal, and (f) mindfulness, or mindful emotion regulation. The construct of mindfulness is considered within the context of both Tibetan Buddhism and Western Psychology. Findings from recently published (<3 years) empirical research on mindfulness and other cognitive-behavioral emotion regulation strategies are summarized and some general conclusions are drawn regarding their efficacy. Lastly, the utility of mindfulness in contrast to the other cognitive-behavioral emotion regulation strategies is discussed before considering future directions in psychological research, theory, and practice.
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Researchers and practitioners of Western clinical psychology have long noted problems with emotion regulation arising across the spectrum of mental pathology (Gross & Munoz, 1995; Repetti, Taylor, & Seeman, 2002). The DSM-IV (American Psychiatric Association, 1994) includes disturbances in regulatory processes as diagnostic criteria for several Axis I and Axis II disorders. Examples of psychological symptoms associated with emotion dysregulation include inappropriate affect, extreme emotional lability, constriction of emotion, sustained negative affect, chronic worry, and avoidance (American Psychiatric Association, 1994). People who have difficulty managing their emotions are at increased risk for mental disorders, physical illness, and social problems (John & Gross, 2004). More specifically, problems with emotion regulation have been associated with an array of mental disorders ranging from depression and anxiety, termed “distress disorders” (Watson, 2005), to personality disorders (Linehan, 1993; Wupperman, Neumann, Whitman, & Axelrod, 2009) eating disorders (Bydlowski et al., 2005) and substance use disorders (Tice, Bratslavsky, & Baumeister, 2001).

Emotion regulation has been defined as “the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals” (Thompson, 1994, pp. 27-28). The term can refer to the down-regulation of negative emotions or the up-regulation of positive emotions, though less research has been dedicated to the latter (Nelis, Quidbach, Hansenne, & Mikolajczak, 2011). Successful emotion regulation has been associated with positive health outcomes and improvements in relationships, academic, and work performance (John & Gross, 2004). People who demonstrate an ability to maintain and up-regulate positive emotions appear to reap even greater benefits across life domains including marriage, friendship, income, work performance, and health (Lyubomirsky, King, & Diener, 2005). However, disruptions in normal regulatory
processes are thought to result in the onset, maintenance, and reoccurrence of depression and anxiety (Schaefer et al., 2002). Hence many western psychotherapeutic interventions aim to help people manage their emotions with emotion regulation skills.

Though numerous mindfulness interventions have been designed and implemented in Western clinical practice, the efficacy of mindfulness as an emotion regulation strategy, especially in relation to other cognitive-behavioral emotion regulation strategies, has yet to be determined. Therefore, the present literature review aims to examine and evaluate the efficacy of mindful emotion regulation. Peer-reviewed, empirical studies published within the past 3 years comparing mindfulness with other emotion regulation strategies are summarized and general conclusions are subsequently drawn regarding the efficacy of mindfulness as an emotion regulation strategy.

**Evolutionary Basis of Human Emotion**

From an evolutionary perspective, humans are seen as acting in ways that maximize their inclusive fitness, even if decisions are not made at a conscious or rational level. Life history theory argues that individuals play an active (though not always conscious) role in determining their optimal developmental path. Organisms must choose how to spend time and resources in fitness-enhancing activities. This allocation of resources is largely dependent on the environment in which the organism finds itself. In particular, the level of environmental risk greatly influences reproductive strategies and parenting styles.

In predictable environments, where chances of survival to maturity are high, individuals make decisions based on maximizing their future fitness. For example, Belsky (1997) hypothesized that mid-high income families strategically have fewer children because they can invest more in terms of attention and resources for the future. Play behaviors also increase future
MINDFUL EMOTION REGULATION

reproductive success among mammals by fostering skills that will be important in adulthood (Fagen, 1981). Even behaviors that appear dysfunctional might be optimal in the long run, depending on the level of risk in the environment. For example, in unstable environments short-term reproductive value is maximized. This is explained by the observation that in unstable environments where chances of survival to maturity are low, individuals are more likely to make decisions maximizing their current fitness.

According to evolutionary principles, emotions serve the adaptive function of signaling organismic needs, thereby influencing behavior in ways that help maximize inclusive fitness. Organisms also tend to preserve homeostasis by seeking out pleasurable experiences and avoiding painful or distressing ones. Several developmental researchers have proposed that human emotions are inherently regulating in that they influence other cognitive, behavioral, and interpersonal processes in adaptive ways, termed incidental emotion regulation (Campos, Frankel, & Camras, 2004; Cole et. al, 2004).

**Neural Substrates of Emotion Regulatory Processes**

Research utilizing functional magnetic resonance imaging has provided new insights and information regarding the neural mechanisms involved in regulating emotional activity (e.g., Creswell et al., 2007). Of particular importance is the central role of the amygdala in the perception and production of negative emotion. Many researchers have suggested cognitive emotion regulation strategies involve specific pathways between the prefrontal cortex and the limbic system (Ochsner & Gross, 2005).

Several researchers have reported changes in neural activity within the amygdala associated with the conscious modulation of emotion (Ochsner & Gross, 2005; Schaefer et al., 2002). Schaefer and colleagues (2002) demonstrated that amygdalar activity increased when
participants were asked to maintain their emotional response to negative images. Participants self-reported levels of negative affect were significantly correlated with the increase in amygdalar activity. That is, conscious attempts to remain negative actually increased negative affect among participants, as indicated by both self-reports and fMRI. In terms of emotion regulation, Ochsner and Gross (2005) found the cognitive strategy of reappraisal capable of modulating emotion-generative systems such as the amygdala through activation of lateral prefrontal regions. Similarly, Creswell et al. (2007) found that dispositional mindfulness predicted increased activation of the prefrontal-cortex, as well as reduced activation of the amygdala.

More recently Goldin and Gross (2010) examined changes in brain–behavior measures of emotional reactivity and regulation of negative cognitions in patients practicing Mindfulness-Based Stress Reduction. They reported finding (a) decreased negative emotion experience, (b) reduced amygdala activity, and (c) increased activity in brain regions implicated in attentional deployment. On the basis of these findings the researchers suggest that MBSR training may reduce emotional reactivity, thereby enhancing emotion regulation.

Similarly, Herwig, Kaffenberger, Jancke, and Bruhl (2010) investigated the effects of cognitive strategies on neural emotion processing and investigated brain activity during the internal self-referential processes of making current emotions and self-related cognitions conscious. The conditions of self-reflection and emotion-introspection demonstrated distinguishable activations in medial and ventrolateral prefrontal areas, parietal regions, and the amygdala. Interestingly, amygdala activity decreased during emotion-introspection and increased during ‘neutral’ self-reflection.
These findings implicate prefrontal-limbic dysfunction in disorders of emotion regulation (e.g., depression, anxiety, aggression, and personality disorders), especially exaggerated amygdala activity in response to negatively valenced emotive stimuli. Mindful emotion regulation and other cognitive strategies have demonstrated the capacity to down-regulate amygdala activity via pathways involving the prefrontal cortex, orbitofrontal cortex, anterior cingulated cortex. Thus, these regions are hypothesized to facilitate emotion regulatory processes, though the unique impact of different emotion regulation strategies remains unknown.

**One- vs. Two-Factor Models of Emotion Regulation**

*The Process Model of Emotion Regulation*

Cognitive-behavioral researchers and practitioners have recently hailed theoretical support from the process model of emotion regulation (Campos, Frankel, & Camras, 2004; Gross, 2001; Linehan, 1993). The process model of emotion regulation is a two-factor model, meaning that a distinction is made between cognitive and emotional processes (Chambers, Gullone, & Allen, 2009). According to two-factor models, individuals are hypothesized to first subjectively experience an emotion, and then modulate the emotion in some way.

The process model of emotion regulation, proposed by Gross (2001) defines emotional experience and expression as discrete events, reflecting traditional cognitive-behavioral conceptualizations of the human psyche which tend to demarcate thoughts, emotions, and behaviors as if they were separate entities. The process model evaluates two common strategies of regulating emotion: expressive suppression and cognitive reappraisal. Expressive suppression is a response-focused strategy. It represents the process of consciously inhibiting emotional expression following emotional arousal. Significantly however, Gross (2001) reported that expressive suppression neither decreases subjective experience of negative emotions, nor the
physiological consequences of arousal. Moreover, research has shown that expressive suppression actually increases the intensity and frequency of sympathetic and cardiovascular activity, impairs information recall, disrupts social communication, and increases rumination regarding negative mood (Chambers, Gullone, & Allen, 2009). Not surprisingly, expressive suppression is also correlated with higher rates of depression (Gross & John, 2003).

Alternatively, cognitive reappraisal represents an antecedent-focused strategy. Cognitive reappraisal involves reinterpreting emotive stimuli in ways that modify the original meaning and emotional impact (Gross, 2001). Cognitive reappraisal attenuates emotional arousal without any apparent negative physiological repercussions (Ochsner & Gross, 2005). Although cognitive reappraisal appears more adaptive than expressive suppression, Chambers, Gullone, and Allen (2009) hypothesize that it may result in experiential avoidance, which, as Hayes (2003) has demonstrated, can lead to psychological harm. Moreover, experiential avoidance precludes mindful states of awareness and is explicitly targeted by mindfulness interventions.

Research on experiential avoidance has shown that individuals tend to engage in avoidant behaviors if they perceive their present or anticipated experience as intolerable (Bishop et al., 2004; Hayes, 2004). Unfortunately, although people engage in experiential avoidance in an attempt to maintain homeostasis, worry itself becomes an unwanted experience, prompting attempts to avoid it, which may paradoxically increase its frequency (Roemer & Orsillo, 2002). Since worry does not necessarily reflect real danger, the “fight or flight” response triggered at the physiological level can result in behavioral restrictions (e.g., “freezing” or procrastination) and excessive nervous activity (Borkovec, 2002; Roemer & Orsillo, 2002). Even more problematic,
Borkovec (2002) points out that cognitive worry is often negatively reinforced because people tend to worry about unlikely future events.

A Holistic Model of Emotion Regulation

In contrast to two-factor models of emotion regulation, the Buddhist philosophy of mind may be more accurately represented by a one-factor model (Chambers, Gullone, & Allen, 2009), in that thoughts, feelings, and physical sensations are seen as interdependent, dynamic forces that cannot logically be separated. In Buddhist psychology, the term *sukha* describes an enduring trait that can arise from the state of mental equilibrium facilitated by mindfulness (Ekman et al., 2005). Essentially this state of mind reflects an awareness of raw, unfiltered reality. Conversely, the Buddhist concept of *dukha* refers to psychological suffering arising from misperceptions of the true nature of reality. According to Ekman et al. (2005), the principles of Buddhist psychology assert that individuals can learn to discern the true nature of reality and avoid unnecessary suffering with dedicated meditative training in attention, emotional balance, and mindfulness. Mindfulness does not rely on cognitive strategies such as emotional suppression or cognitive reappraisal. Rather, mindfulness simply reflects awareness and attention to present experience. These two processes, awareness and attention, are considered fundamental activities of consciousness (Nyaniponika, 1973). The term *awareness* in the Buddhist sense refers to the conscious registration of both physical and mental stimuli, whereas the term *attention* refers to intentionally “taking notice” or “turning toward” a specific object or stimulus.

Introduction to Mindful Emotion Regulation

Buddhist Philosophy of Mind and The Four Noble Truths

Eastern approaches to the cessation of suffering begin with what is called the Four Noble Truths in traditional Buddhist literature. The truths of which the Buddha spoke have many
translations, but are essentially on suffering, its cause, its cessation, and the path to cessation. The Buddha’s first truth was “humiliation,” vulnerability or pervasive unsatisfactoriness. The Buddha’s second truth was “thirst,” also known as craving or the cause of suffering. The Buddha’s third truth, “release,” or the cessation of suffering indicates that those who have achieved a perpetual state of emptiness through constant awareness have reached enlightenment, a state where nothing has changed except the perspective of the observer. In Buddhism, “emptiness” means recognizing our idealized self-conceptions and allowing them to dissolve so we no longer feel the need to defend concrete images of the self. The fourth and final truth that the Buddha spoke of instructs individuals on how to develop the qualities of mind that facilitate the cessation of suffering. He called this truth, “nowhere standing,” and referred to it as a middle path where extreme idealization and denial is avoided. Instructions on the middle path are taught within four categories, namely behavioral, ethical, meditative, and wisdom. In following the path we learn to re-relate to our emotions, or as Epstein (1995, p. 92) put it, “instead of letting our misconceptions about our feelings influence our understanding, we must let our understanding change the way we experience our emotions.”

Where Western psychology has primarily focused on major pathology, Buddhist psychology and mindfulness meditation have centered on existential challenges and spiritual awakening. At its core, Buddhism is concerned with identifying the causes of suffering, the possibility of freedom, and the means to realize it. This journey begins with the subjective process of investigating the causes of suffering (Wallace & Shapiro, 2006). This analytic reflection on the causes of suffering is thought to create a motivational basis for ethical action. Through the practice of meditation, individuals come to see their perceptions of reality as dependent constructions, in contrast to the notion of a solid reality. Over time, individuals
presumably learn how their attitudes and actions relate to these constructions (Brown, 2006). Wallace and Shapiro (2006) also highlight the importance of cultivating intent and commitment related to specific goals and outcomes. This critical component to treatment has largely been overlooked in Western approaches to psychotherapy. The authors explain that without intentional goal-setting and commitment, complex goal directed activities are impeded. The authors suggest that intentional goal-setting and commitment is necessary to motivate the practice of mindfulness and drive complex, goal-directed behavior.

**The Integration of Mindfulness in Western Psychology**

Western theoretical and operational descriptions of mindfulness vary considerably, ranging from self-regulatory definitions (Brown & Ryan, 2003), to acceptance-based skills (Hayes, 2003; Linehan, 1993), and meta-cognitive skills (Shapiro, Carlson, & Astin, 2006). The term *mindfulness* may refer to a theoretical construct, mode of awareness, attentional training, or other psychological processes including self-regulation (Brown & Ryan, 2003), metacognition (Bishop et al., 2004), self-awareness or self-focused attention (Ingram, 1990), or even self-control (Masicampo & Baumeister, 2007). Meditation can be understood as attentional training in awareness, defined as the conscious registration of sensory and mental stimuli (Brown et al., 2007).

Both Eastern and Western conceptualizations of the human condition have demonstrated similar interest in the study of human consciousness and the role of awareness in psychological health and well-being (Brown, Ryan, & Creswell, 2007). The concept of integrated awareness underlies several Western models of psychology, including psychodynamic, humanistic, and cognitive-behavioral orientations. Furthermore, both Buddhist and Western approaches to mental health recognize the psychological and physiological harm caused by chronic stress and
hostility, as well as the benefits of awareness and openness to experience, or acceptance, in psychological health and well-being (Chambers, Gullone, & Allen, 2009).

Both traditions also clearly view delusional beliefs as pathological (Fulton & Siegel, 2005), though Buddhist psychology emphasizes that all people are prone to mental imbalances that contribute to psychological suffering. The Buddhist tradition teaches that intentional steps must be taken to cultivate the wisdom and awareness necessary for psychological health and well-being. Western psychology, on the other hand, has traditionally focused on correcting psychopathology rather than cultivating psychological health and wellbeing (Wallace & Shapiro, 2006). This difference is further supported by the observation that Buddhist approaches to psychological health focus on cultivating loving-kindness and compassion, whereas Western models tend to emphasize the therapeutic relationship and emotion regulation in psychological health (Kelly, 2008).

Although Buddhist and Western traditions converge on many developmental aspects of psychology, the two traditions diverge in terms of how psychological states, processes, and pathologies are conceptualized, and therefore treated. Western models of mental states and psychological phenomena tend to demarcate cognitions and emotions as if they were substantial entities that could be separated. Therefore, many Western approaches to psychological health and well-being attempt to regulate and control mental phenomenon by actively ignoring or changing unpleasant aspects of experience. Alternatively, Buddhist principles maintain that all cognitive and emotional mental phenomena represent interdependent patterns of thoughts, feelings, and sensations that naturally arise and fade within the field of awareness. Therefore, according to the Buddhist philosophy, emotions do not need to be acted upon for them to attenuate (Chambers, Gullone, & Allen, 2009), reflecting the evolutionary view of emotions as
inherently regulating in that they serve the adaptive function of signaling needs, thereby helping
the organism find routes to homeostasis (Campos, Frankel, & Camras, 2004; Cole et. al, 2004).

Although Western approaches have traditionally focused on examining the validity of
thought contents, mindfulness-based approaches emphasize helping patients increase awareness
and acceptance of their present experience, without needing to analyze it or change it in the
moment. This form of awareness and acceptance has been compared to the Western concept of
decentering (Roemer & Orsillo, 2002). The “near total abandonment of thinking” that
characterizes the Buddhist approach to health and well-being conflicts with the types of
cognitive and behavioral therapy tasks and techniques suggested by many practitioners of
Western psychology. With practice, novice meditators begin to identify less with their thoughts
– as well as any notion of the self as a real and tangible entity – reflecting the Buddhist notion of
“emptiness,” or “no self.”

Fundamentally, both traditions are concerned with alleviating suffering (Wallace &
Shapiro, 2006). Interestingly, both traditions offer two approaches to mental health, depending
on the needs of the novice/patient. According to Bodhi (1999) the two main types of meditation
include calm and insight meditation. Similarly, Epstein (1995) asserts that patients must
cultivate mindfulness before engaging in insight therapy.

The integration of mindfulness theory and practice in mainstream Western psychology
has resulted in a paradigm shift in which traits such as mindfulness and acceptance have been
embraced as critical components of psychological well-being. Still, Baer (2003) warns that
conceptualizing mindfulness through a Western scientific lens may “risk overlooking important
elements of the long tradition from which mindfulness meditation originates” (Baer, 2003,
p.140). Walsh and Shapiro (2006) similarly postulate that Western conceptualizations risk
misunderstanding or overlooking important Buddhist concepts related to mindfulness, a problem they refer to as decontextualization. The authors fear that the recent integration of the Buddhist and Western psychological traditions will neglect or mar much of the “richness and uniqueness” of Buddhism.

Contemporary Mindfulness-Based Clinical Interventions

The proliferation of mindfulness research and practice in the West following Jon Kabat-Zinn’s seminal treatment program, Mindfulness-Based Stress Reduction (MBSR), resulted in the widespread application of mindfulness techniques in Western clinical practice. Since the advent of MBSR, mindfulness interventions have been implicated in the treatment of numerous psychiatric disorders, eating disorders, and psychological aspects of medical illness (Kelly, 2008). In addition to MBSR (Jon Kabat-Zinn, 1992), popular integrated approaches to treatment in mainstream Western psychology currently include Acceptance-Based Behavior Therapy (Roemer & Orsillo, 2002; 2009) and Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale, 2002).

Roemer and Orsillo’s integrative model for the treatment of generalized anxiety disorder builds upon Hayes and colleagues (1996, 1999) model of experiential avoidance. The integrative treatment for GAD that Roemer and Orsillo proposed in 2002 combines elements of cognitive-behavioral therapy, acceptance-based approaches, and dialectical behavioral therapy. The four facets of treatment involve (1) psychoeducation, (2) mindfulness/monitoring, (3) relaxation/mindfulness, and (4) mindful action. The researchers explain that, functionally, worry can decrease internal distress in the short term and suggest that the chronic, pervasive worry that characterizes GAD represents a form of experiential avoidance. In 2009, Roemer and Orsillo expanded upon their original conceptualization and proposed treatment of anxiety with a new
model, Acceptance-Based Behavior Therapy (ABBT). In the ABBT model, Roemer and Orsillo (2009) identify three problem areas associated with anxiety, all informed by Buddhist psychology. These problem areas include problematic internal awareness (restricted or limited articulation, hyperawareness of negative states, reactivity and judgment, over-identification or entanglement); experiential avoidance; and behavioral restriction.

Recent research has largely focused on testing the efficacy of Mindfulness-Based Cognitive Therapy (MBCT). MBCT was first designed and tested by Segal, Williams, and Teasdale in 2002. The researchers successfully applied this treatment to recurrently depressed patients in remission to help them increase awareness of their moods and to de-center from dysphoric moods that might otherwise lead to depressive rumination and relapse. The researchers examined several factors involved in depressive relapse, including negative, automatic, and ruminative psychological processes.

In 2010, Segal and colleagues tested the efficacy of MBCT relative to pharmacotherapy and placebo. The authors described MBCT as a “group-based psychosocial intervention designed to enhance self-management and the prodromal symptoms associated with depressive relapse” (Segal et al., 2010, p. 1236). Their analysis included 84 patients in remission from major depressive episodes, with a history of at least two prior episodes. The authors observed similar rates of relapse prevention among patients assigned to either MBCT or maintenance antidepressant pharmacotherapy conditions. The authors also reported a significant interaction between the stability of acute-phase remission and vulnerability to subsequent relapse, with stable patients (reporting no active symptoms) showing greater rates of relapse prevention. On the basis of this finding, the authors emphasized the importance of long-term treatment for patients showing signs of unstable remission.
Hofmann, Sawyer, Witt, and Oh (2010) conducted the most recent meta-analysis in the field examining the efficacy of mindfulness in reducing acute symptoms of anxiety and depression. The authors called particular attention to the quantitative nature of their study, contrasting it with the plethora of qualitative studies hitherto published. Their meta-analysis included data from 39 studies published between 1999 and 2009. Their sample was comprised of 1,140 patients total with various psychiatric and medical conditions including cancer, generalized anxiety disorder, and recurrent major depression. Their results showed that pre-post effect size estimates were in the moderate range for reducing symptoms of anxiety (Hedges’s $g = 0.63$) and depressive symptoms (Hedges’s $g = 0.59$). Thus, the authors concluded that mindfulness-based therapy was moderately effective in reducing symptoms of anxiety and depression in clinical populations. The authors suggest that the utility of mindfulness as a coping strategy may not be diagnosis specific, but rather beneficial across a range of psychiatric disorders.

In 2010, Manicavasgar, Parker, and Perich (2010) conducted an investigation comparing the efficacy of Mindfulness-Based Cognitive Therapy with Cognitive Behavioral Therapy in the treatment of non-melancholic depression. Participants who met criteria for a current episode of major depressive disorder were randomly assigned to either a MBCT or CBT group therapy condition. Significant improvements were observed in pre- to post-group depression and anxiety scores in both treatment conditions. In the CBT condition, participants with four or more previous episodes of depression demonstrated greater improvements in depression than those with less than four previous episodes. The researchers concluded that MBCT and CBT are equally effective in the treatment of current depression.
Further support for MBCT comes from research conducted by Raes, Dewulf, Van Heeringen, and Williams (2009) examining the relationship between mindfulness and cognitive reactivity. They defined cognitive reactivity as “the degree to which a mild dysphoric state reactivates negative thinking patterns.” The authors elaborate further that cognitive reactivity plays a causal role in depressive relapse (Raes et al., 2009, pp. 623). The authors reported two main findings: (a) trait mindfulness was significantly negatively correlated with cognitive reactivity, and (b) mindfulness-based cognitive therapy appeared to significantly reduce cognitive reactivity. On the basis of their findings, the authors concluded that the mindfulness component of mindfulness-based cognitive therapy has a direct impact on cognitive reactivity processes.

Proposed Mechanisms of Action

Although, mindfulness-based approaches to the treatment of anxiety and depression have clearly demonstrated efficacy, the exact mechanisms of action remain unknown. Mindfulness is hypothesized to help individuals relate to distressing stimuli as a transient aspect of experience, rather than the entirety of one’s experience (Chambers, Gullone, & Allen, 2009). This form of detachment is thought to help broaden perspective, in contrast to rigid, automatic, and/or fear-driven responses. Jon-Kabat Zinn (2003) teaches that, as stressors are encountered, a disproportionate focus on the past or future can lead to feelings of depression or anxiety. Similarly, Borkovec (2002) notes that although fear can exist in the present, anxiety cannot, since it is concerned with the future. Mindfulness- and acceptance-based strategies encourage individuals to accept or stay with their distressing experiences, rather than attempting to escape, avoid, or control internal experiences with worry, thereby continuing the cycle of avoidance. This facet of mindfulness has been compared to interoceptive exposure (Baer, 2003; Linehan,
In this way, mindfulness approximates exposure therapy, helping individuals increase their tolerance to distressing internal stimuli. Consequently, mindfulness is thought to help pacify the ruminative worry behind generalized anxiety disorder (Roemer & Orsillo, 2002).

Some mechanisms through which mindfulness training is thought to help prevent depressive relapse include exposure, cognitive change, self-regulation, relaxation, and acceptance (Baer, 2003; Brown, Ryan, & Creswell, 2007). The foundational attitude of acceptance and curiosity in MBCT helps patients with ruminative tendencies and hypersensitivity to negative moods – both of which have been implicated as precursors to major depressive episodes in vulnerable individuals – identify and disengage from thoughts and behaviors that contribute to depressive relapse. Segal, Williams, and Teasdale (2002) describe what they call a “working model” of depressive relapse involving the reactivation of automatic, negativistic, depressed patterns of thoughts, feelings, and physical sensations. Furthermore, they describe how constellations of thoughts, feelings, and sensations are maintained and reinforced when individuals ruminate on negative emotional states, events, and problems. The authors suggest that the ruminative thinking patterns associated with depressive relapse reflect a goal-based mode of cognitive processing, wherein individuals monitor, evaluate, and judge perceptual discrepancies between actual and desired states. The authors of the text refer to this process as discrepancy monitoring (p. 68). The authors argue that mindfulness training helps individuals vulnerable to depression reduce risk of depressive relapse by helping them cultivate skills that allow them to “switch out” of goal-based processing (Teasdale, Segal, & Williams, 2006).

Discrepancy monitoring represents a goal-based mode of consciousness, driven toward achieving an aim, described as the “doing mode” by Segal, Williams, and Teasdale (2002, pp.
In terms of subjective experience, the authors describe the doing mode as a “recurring sense of unsatisfactoriness.” Furthermore, they state that processing in the doing mode is “not intentional, conscious, or planned,” but rather automatic and largely driven by unconscious impulses. In contrast to the doing mode, the authors describe the “being mode” as awareness and acceptance of whatever is present (2002, pp. 73-75). They explicitly identify awareness and intentionality of focus, or attention, as the two most basic components of mindfulness. The authors describe a shift in experiencing thoughts and feelings as any other sensation, like sound, arising in awareness and passing away. They explain that the relationship to thoughts and feelings in this, “decentered,” way is one of the primary mechanisms of change in cognitive therapy. Decentering, or the capacity to step back mentally from automatic thoughts and reactions and respond more flexibly, has been suggested by other authors as well (Bishop et al., 2004; Teasdale et al., 2002). Teasdale et al. (2002) explain that with the “intentional use of attention and awareness,” individuals can learn to recognize and disengage from mind states characterized by negative, ruminative patterns (pp. 75, 2002), reducing the risk of depressive relapse. The authors concluded that both modes of consciousness are beneficial at times.

**Literature Search and Selection**

Even with the expansion of Buddhist psychology into Western clinical practice, there is a paucity of research examining the unique contribution of different emotion regulation strategies (Rogojanski, Vettese, & Antony, 2011). Furthermore, though numerous mindfulness interventions have been designed and implemented in Western clinical practice, the unique contribution mindful emotion regulation and its subcomponents remains undetermined. Therefore, literature on these topics was sought and selected from the psychology database PsycINFO.
A search of the psychology database PsycINFO of keywords *mindfulness* AND *emotion regulation* in peer reviewed journals published within the past 10 years (in English) returned 27 results, 19 of which met criteria for empirical studies. Of these, 5 publications examined the efficacy of mindfulness in relation to other coping strategies. A search of keyword *mindfulness* in peer-reviewed journals published within the past 10 years (in English) returned 902 results. Limiting search results to empirical studies reduced this number to 492 publications. Of these, an additional 8 publications comparing mindfulness with other coping strategies were identified and added to the present literature review.

Following are summaries of the 13 original investigations published within the past three years in peer-reviewed journals that focus on mindfulness in relation to other coping strategies. The studies reviewed in the first section divide emotion regulation strategies into those seen as adaptive and maladaptive. The next section examines the relative utility of different emotion regulation strategies. In the final section, studies comparing different facets of mindfulness are examined. General conclusions and a brief discussion of the findings and directions for future research follow.

**Findings**

*Adaptive vs. Maladaptive Emotion Regulation Strategies*

Researchers Nelis, Quidbach, Hansenne, & Mikolajczak (2011) created the Emotion Regulation Profile-Revised (ERP-R) to compare individual differences in emotion regulation. Exploratory factor analysis yielded two theoretically meaningful factors: down-regulation of negative affect and the up-regulation of positive affect. The researchers identified eight “functional” and eight “dysfunctional” approaches to emotion regulation. Functional strategies were defined as strategies that appear beneficial in maintaining mental health, physical health,
social relationships, and work performance. Dysfunctional strategies were defined as strategies that can damage mental health, physical health, social relationships, and work performance.

In terms of down-regulating negative affect, functional strategies included situation modification, attention reorientation, positive reappraisal, and emotion expression. Dysfunctional strategies for down-regulating negative affect included learned helplessness, substance abuse, rumination, and acting out. In terms of up-regulating positive affect, functional strategies included behavioral display, savoring the present moment, capitalizing (communicating and celebrating positive events with others), and positive mental time travel. Dysfunctional strategies for up-regulating positive affect included inhibition of emotion expression, inattention, fault finding, and negative mental time travel (Nelis, Quidbach, Hansenne, & Mikolajczak, 2011).

Aldao, Nolen-Hoeksema, and Schweizer (2009) conducted a meta-analysis examining the relationship between six emotion regulation strategies and four groups of psychopathology (i.e., anxiety, depression, eating disorders, substance-related disorders). The researchers compared three widely accepted “adaptive” emotion regulation strategies with three hypothetically “maladaptive” strategies. Adaptive strategies included cognitive reappraisal, problem solving, and mindfulness. Maladaptive strategies included avoidance (both experiential avoidance and behavioral avoidance), suppression (both expressive and though suppression) and ruminaiton. The researchers focused on the non-judgmental acceptance of emotions as the key component of mindfulness in their study. The population under study (clinical versus normative samples) significantly moderated the relationships among variables. The researchers reported finding a large effect size for rumination, a medium to large effect size for avoidance, problem-solving, and suppression, and a small to medium effect size for reappraisal and acceptance. These results
suggest that the use of maladaptive strategies (i.e., rumination, avoidance, problem-solving, and suppression) is a better predictor of psychopathology than the absence of adaptive strategies (i.e., reappraisal and acceptance). It is interesting to note the small to medium effect size for reappraisal and acceptance, given the recent proliferation of literature examining these two strategies. Still, reappraisal and acceptance may be better predictors of psychological health and wellbeing, not measured in the present study.

On the basis of these findings, it seems that the field has reached a general consensus regarding the categorization of emotion regulation strategies into adaptive versus maladaptive strategies, depending upon whether they serve as protective or risk factors for psychopathology. Emotion regulation strategies seen as maladaptive include behaviors such as experiential avoidance, expressive suppression, thought suppression, rumination, and distraction. Adaptive strategies can include behaviors such as problem-solving, cognitive reappraisal, positive mental time travel, and, most recently, mindfulness, which may depend on sub-components such as attention to the present moment and the non-judgmental acceptance of emotions (Aldao, Nolen-Hoeksema, Schweizer, 2010; Gratz and Roemer, 2004).

**Relative Utility of Emotion Regulation Strategies**

In 2008, Kumar, Feldman, and Hayes examined the relationship between mindfulness and two maladaptive emotion regulation strategies, avoidance and rumination, which the authors described as “conceptual opposites” of mindfulness. All participants (N=29) met criteria for Major Depressive Disorder using the structured clinical interview for DSM-IV and underwent mindfulness training as part of an exposure-based cognitive therapy program for depression developed by Hayes, Beevers, Feldman, Laurenceau, and Perlman (2005). Outcome measures included the Cognitive and Affective Mindfulness Scale (CAMS) (Kumar, 2005), the
Acceptance and Action Questionnaire (Hayes et al., 2004), and a rumination subscale from the Response Style Questionnaire (Nolen-Hoeksema & Marrow, 1991). Researchers measured pretreatment to posttreatment changes in mindfulness, avoidance, and rumination. Self-reported mindfulness increased significantly over the course of the program and the change in mindfulness was associated with reductions in experiential avoidance and rumination, as well as decreases in depression.

Mitmansgruber, Beck, Höfer, and Schüßler (2008) examined the role of experiential avoidance and mindful awareness in the prediction of wellbeing. The authors proposed a new, third construct referred to as “meta-emotions,” described as emotional reactions to one’s own emotions. Participants (N=339) filled out several measures including the Acceptance and Action Questionnaire (Hayes et al., 2004), the Mindful Attention and Awareness Scale (Brown & Ryan, 2003), the Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), and Scales of Psychological Wellbeing (Ryff, 1989). Of the six subscales selected, “contempt/shame,” “suppression,” “thought control,” and “interest” showed strong predictive power, whereas the subscales for “anger” and “compassionate care” did not. All three predictors under examination (experiential avoidance, mindful awareness, and the Meta-Emotion Scale) were strong predictors of psychological wellbeing.

Gonzalez, Solomon, Zvolensky, and Miller (2009) examined the interaction of two emotion regulation strategies, disengagement coping and mindful attention and awareness, with symptoms of anxiety and depression among HIV/AIDS infected individuals. The researchers reported that disengagement coping had a positive relationship with anxiety symptoms and a negative relationship with mindfulness. A similar trend was observed for symptoms of depression, though not statistically significant. These results suggest that mindful attention and
awareness is capable of attenuating symptoms of anxiety, and possibly depression, whereas disengagement coping may worsen these symptoms.

Kuehner, Huffziger, and Liebsch (2009) investigated the effects of three emotion regulation strategies (rumination, distraction, and mindful self-focus) on mood, attitude, and cortisol response. Participants \((N=60)\) were randomly assigned to a rumination, distraction, or mindful self-focus condition. Four saliva cortisol samples were obtained during the session. Participants induced to ruminate demonstrated significant increases in dysfunctional attitudes from baseline to post-induction. The authors propose that rumination perpetuates dysfunctional thought content linked to depression. They further suggest the possibility of a link between induced rumination and the cortisol stress response. Compared to induced rumination, distraction improved dysphoric mood, whereas mindful self-focus did not. These results suggest that mindful self-focus does not significantly improve mood among individuals induced to ruminate, though distraction techniques do. One hypothesis may be that distraction techniques lower distress by helping individuals increase external awareness, versus the aversive, internal, subjective hyper-awareness associated with rumination and self-focus.

In 2010, Hooper, Villatte, Neofotistu, and McHugh designed and tested an implicit measure of experiential avoidance. Participants \((N=50)\) were randomly assigned to either a thought suppression or mindfulness condition. Both groups listened to a 10-minute audio description of either suppression or mindfulness as a coping strategy for unwanted thoughts. Participants were asked to respond to an implicit (Implicit Relational Assessment Procedure) and explicit (Acceptance and Action Questionnaire) measure of experiential avoidance. The researchers reported finding that the mindfulness group engaged in less experiential avoidance compared to the thought suppression group on the implicit measure, but not the explicit measure.
These results illustrate the potential to overcome experiential avoidance with mindfulness in contrast to suppression strategies.

Recently researchers Rogojanski, Vettese, and Antony (2011) also compared mindfulness to suppression strategies for coping with smoking cravings. The authors examined whether individual differences in anxiety sensitivity moderated responsiveness to mindfulness versus suppression. Participants ($N = 561$) were asked to engage in a mindfulness or suppression strategy to manage their cravings during cue exposure to cigarettes. Surprisingly, greater anxiety sensitivity after cue exposure was associated with increased self-efficacy in the suppression condition. This research suggests that anxiety-sensitive individuals who utilize suppression may cope better with cravings, at least within the first few days of learning these strategies.

Argus and Thompson (2007) studied the effects of three coping strategies among currently depressed inpatients ($N = 141$). Specifically, they examined the effects of social problem solving, adaptive and maladaptive perfectionism, and mindful awareness on symptom severity. They reported finding a negative relationship between social problem solving and depression severity, as well as a positive relationship between maladaptive perfectionism and depression severity. The authors suggest that mindfulness may mediate the relationships between the aforementioned coping strategies and depression symptom severity. Overall, mindful awareness accounted for the most variance in depression symptom severity, though its incremental validity above and beyond social problem solving and maladaptive perfectionism remains unknown.

**Examining Mindfulness Components**

Perlman, Salomons, Davidson, and Lutz (2010) compared the regulatory qualities of two different meditation practices: focused attention and open monitoring. Focused attention is hypothesized to regulate negative affect through a sensory gating mechanism, whereas open
monitoring is hypothesized to regulate negative affect through a mechanism of nonjudgmental, nonreactive awareness of sensory experience. The researchers reported that while both novice and long-term meditators reported experiencing similar levels of pain intensity, long-term meditators reported experiencing a reduction in unpleasantness while practicing open-monitoring meditation. These results suggest that open monitoring (i.e., acceptance of one’s entire present experience) may attenuate unpleasantness associated with painful stimuli more effectively than focused attention (i.e., focus on one aspect of experience).

Wupperman and colleagues (2009) investigated whether deficits in mindfulness underlie variability in interpersonal functioning, impulsivity, and emotion regulation in a psychiatric sample of adults (N=70) diagnosed with borderline personality disorder (BPD). These researchers defined mindfulness as attention, awareness, and acceptance of the present moment. Measures included the MAAS (Brown and Ryan, 2003), the Means-End Problem-Solving Test (MEPS-Int; Platt and Spivack, 1975), and an adapted Means-End Problem-Solving Test for emotions (MEPS-Emo; Kehrer and Linehan, 1996). As expected, trait mindfulness was inversely associated with BPD features and the aforementioned core areas of dysfunction. Mindfulness deficits continued to predict BPD features when controlling for interpersonal effectiveness, passive and impulsive emotion regulation, and neuroticism. Neuroticism was defined as the propensity toward negative affect and reactivity to negative stimuli, the conceptual opposite of acceptance of the present moment. These findings not only suggest that mindfulness may be a unique predictor of borderline personality pathology, but also highlight the role of attention and awareness as subcomponents of mindfulness in addition to acceptance of the present moment.
Van Dam, Sheppard, Forsyth, and Earleywine (2011) compared the ability of the Self-Compassion Scale and the Mindful Attention and Awareness Scale (Brown and Ryan, 2003) to predict symptoms of anxiety, depression, worry, and quality of life. Participants represented a large community sample of individuals seeking help for symptoms of anxiety ($N = 504$). Multivariate analysis revealed self-compassion to be a strong predictor of symptom severity and quality of life. Interestingly, outcomes from the Self-Compassion Scale, particularly the self-judgment and isolation subscales, accounted for up to ten times more unique variance in the prediction of symptom severity and quality of life than the MAAS. These findings indicate that self-compassion is a better predictor of quality of life than mindful attention and awareness.

**Conclusions**

- MBCT and CBT appear equally effective in the treatment of current depression (Manicavasgar, Parker, & Perich, 2010).
- MBCT appears more effective than placebo and roughly equal to medication management and psychotherapy in the treatment of recurrent depression (Segal et al., 2010).
- Mindful ER appears less deleterious to health than suppression strategies (Hayes, 2004). However, suppression strategies have demonstrated greater efficacy early in recovery (Rogojanski, Vettese, & Antony, 2011).
- Overall, mindful ER appears more effective than expressive suppression, experiential avoidance, distraction techniques, and cognitive reappraisal in response to distressing stimuli.
- Notably, recent research has shown that self-compassion, a key component of mindful emotion regulation, may have robust incremental validity above and beyond mindfulness as a coping strategy (Van Dam, et al., 2011).
In terms of study design, mindfulness researchers have had difficulty including control groups and standardizing treatment delivery. Furthermore, few studies to date have successfully compared treatment modalities, accounted for the passage of time, or discussed placebo effects. Lastly, there is insufficient research on the neurobiological correlates of the long-term effects of mindfulness and specific mechanisms of action are still uncertain.

**Discussion**

Buddhist psychological concepts and practices such as mindfulness have had a profound impact on Western psychological theory and practice, especially in recent decades. Given that the Buddhist tradition has been concerned with the alleviation of suffering and the attainment of well-being for centuries, the study and integration of Buddhist concepts and practices with Western psychology is pertinent to a comprehensive and accurate understanding of the human psyche.

The present review examined literature emotion regulation strategies, specifically the efficacy of mindful emotion regulation compared to other coping strategies including various forms of expressive and thought suppression, cognitive reappraisal, and experiential avoidance and distraction techniques. Mindful emotion regulation focuses on altering one’s internal relationship to the self or Ego, whereas cognitive reappraisal focuses on altering the mind’s contents, suppression strategies deal with inhibition of thoughts and behavior, and experiential avoidance engages ruminative and distraction techniques.

Although Dialectical Behavior Therapy (Linehan, 1993) also utilizes mindfulness as an emotion regulation strategy, it was developed on the premise that emotion dysregulation underlies borderline personality pathology with deficits in awareness seen as a byproduct of this dysregulation. Conversely, mindfulness researchers have proposed that deficits in awareness
may underlie problems with emotion regulation, rather than the reverse (Chambers, Gullone, & Allen, 2009; Herwig, Kaffenberger, Jancke, & Bruhl, 2010; Wupperman, 2008).

Findings from present literature review suggest that the self-referential mental state of making the actual emotional state aware appears capable of attenuating emotional arousal (Herwig, Kaffenberger, Jancke, & Bruhl, 2010; Wupperman, 2008). This extends current theories of emotion regulation and has implications for the clinical application of mindfulness techniques as a component of treatment of affective disorders, as well as everyday emotion regulation.

Research testing the mechanisms of action underlying both mindfulness and emotion regulation is needed, especially fMRI and PET studies revealing the neural correlates of these processes, to better understand the relationship between mindfulness and emotion regulation.
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