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Mindful emotion regulation: An integrative review

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ABSTRACT

This review aims to integrate the constructs of mindfulness and emotion regulation. Research into both of these areas is relatively new, and while several reviews have emerged for each area independently, none has directly proposed a conceptual integration. The current review explores how key axioms and assumptions of traditional psychological models of emotion regulation and the psychological interventions that are derived from them (e.g., cognitive behavior therapy) differ fundamentally from mindfulness-based approaches in terms of the underlying processes they address. Accordingly, mindfulness and emotion regulation are each reviewed, followed by a conceptual integration. Fundamental difficulties arising from the attempt to integrate the two domains are highlighted, especially as to the “reality” of thoughts, the relationship between thoughts and emotions, and the need to move beyond a valence model of emotion. Finally, a model is proposed outlining the likely critical processes and mechanisms that underlie “mindful emotion regulation.”

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Mindfulness-based therapies are increasingly being adopted to treat an array of psychological disorders (Allen et al., 2006; Baer, 2003). At the same time, it is being recognized that many psychological disorders have, at their core, disordered emotion regulation (ER; Gross & Munoz, 1995; Repetti, Taylor, & Seeman, 2002). Thus, in order to promote mental health, it is imperative to better conceptualize, and thus learn to maximize, adaptive ER. Given that, at some level, mindfulness-based therapies have as a goal promotion of adaptive ER, this review examines specific ways in which such therapies may impact upon ER capacities.

It explores links between clinical, cognitive, and neurobiological psychological research, on one hand, and the Buddhist literature on mindfulness, on the other. Although previous reviews have explicitly explored the domains of mindfulness and emotion regulation, none has directly proposed a conceptual integration. For example, De Silva (1990) has acknowledged that a limited integration may be possible between certain elements of Buddhist and modern scientific psychology, and has outlined some preliminary commonalities between the two. However, his review focuses largely on behaviorism, and does not explore the relationship between Buddhist psychology and cognitive psychology (or ER). Recent work by Hofmann and Asmundson (2008) explores some of the issues surrounding the relationship between mindfulness/acceptance-based and “traditional” cognitive therapies within the context of the ER

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literature. However, beyond stating that each type of therapy targets different stages of the emotion-generative process, an integrated model has not been proposed. In addition, the authors assert that the therapy types are fully compatible. In the present review, it is proposed that the relationship is less clear. Mindfulness and ER are first reviewed independently, utilizing a selective search strategy that seeks to explore commonly-cited works in each area. Regarding ER, the review focuses on the process model proposed by Gross (1998a), as this is the most widely researched and validated model currently available. Areas of consistency and difference between each construct are then examined, and finally an integrative “mindful emotion regulation” model is proposed.

In reviewing the relevant literatures, it is concluded that integration of mindfulness and ER perspectives requires a reexamination of some of the assumptions and axioms underlying cognitive aspects of ER. More specifically, the conceptual demarcation between cognitive and emotional processes is challenged. Integration requires an expanded understanding of the nature of emotions and the emotion-generative process itself. While much of previous work in this area has attempted to introduce and explain mindfulness in terms of existing cognitive models, it is proposed herein that doing so risks distorting and significantly limiting the potential contribution of mindfulness (and Buddhist psychology generally) to mainstream psychology.

1. Mindfulness

The last decade has seen research into mindfulness and mindfulness-based psychological interventions increase exponentially (Allen et al., 2006; Baer, 2003). Several studies have demonstrated efficacy of mindfulness-based psychological interventions in preventing relapse of major depression (Ma & Teasdale, 2004; Segal, Williams, & Teasdale, 2002; Teasdale et al., 2000), and treating residual depressive symptoms (Kingston, Dooley, Bates, Lawlor, & Malone, 2007), anxiety (Evans et al., 2008; Kabat-Zinn, 1990), psychosis (Bach & Hayes, 2002; Gaudiano & Herbert, 2006), body-image problems (Stewart, 2004), substance abuse (Hayes, Strosahl, & Wilson, 1999), trauma (Follette, Palm, & Pearson, 2006; Ogden, Minton, & Pain, 2006), exhibitionism (Paul, Marx, & Orsillo, 1999), eating disorders (Fairburn, Cooper, & Shafran, 2003; Kristeller & Hallett, 1999; Telch, Agras, & Linehan, 2000), nicotine dependence (Gifford et al., 2004), attention-deficit hyperactivity disorder (Zylowska et al., 2008), and psychological distress and neuroticism (Brown & Ryan, 2003). Mindfulness-based interventions have also proven efficacious for treating a number of physical complaints such as psoriasis (Kabat-Zinn et al., 1998) and chronic pain (Kabat-Zinn, 1982), and improving mood and wellbeing in individuals with cancer (Specia, Carlson, Goodey, & Angen, 2000; Tacon, Caldera, & Ronaghan, 2004) and fibromyalgia (Kaplan, Goldenberg, & Galvin-Nadeau, 1993). Emerging research also points to the efficacy of mindfulness for treating secondary effects of severe and chronic physical conditions in children and adolescents (Thompson & Gauntlett-Gilbert, 2008).

In nonclinical populations mindfulness-based interventions have been associated with lowered intensity and frequency of negative affect (Brown & Ryan, 2003; Chambers, Lo, & Allen, 2008), reduced anxiety (Shapiro, Schwartz, & Bonner, 1998), more adaptive responding to stress (Davidson et al., 2003), improved romantic relationships (Cordova & Jacobson, 1993), decreased negative self-focused attention (Murphy, 1995), increased levels of cancer-preventing melatonin (Massion, Teas, Hebert, Wertheimer, & Kabat-Zinn, 1995), improved attentional and working memory functioning (Chambers et al., 2008; Tang et al., 2007), decreased ego-defensive responsivity under threat (Brown, Ryan, Creswell, & Niemiec, 2008), and generally improved wellbeing. These interventions all utilize some form of mindfulness-meditation (MM), either as a stand-alone intervention or combined with existing psychological interventions such as cognitive-behavioral therapy. Nevertheless, it should be noted that existing research does not conclusively demonstrate that increased levels of mindfulness mediate these positive outcomes. Until meditational models have

been applied to examine the role of increased mindfulness in reducing psychopathology and increasing wellbeing, it is perhaps more accurate to consider mindfulness and any potential positive outcomes as coemergent phenomena.

Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1982) was the first such intervention to be clinically evaluated. Based on formal MM practice, it has demonstrated efficacy for treating intractable cases of chronic pain, including associated disability (Bruckstein, 1999), with improvements maintained over 15 months (Kabat-Zinn, Lipworth, & Burney, 1985). It was later combined with elements of cognitive-behavioral therapy (Beck, Rush, Shaw, & Emery, 1979) to create mindfulness-based cognitive therapy (Segal et al., 2002), which has been demonstrated to significantly reduce depressive relapse rates in individuals who have experienced three or more episodes of major depression (Kuyken et al., 2008; Ma & Teasdale, 2004; Teasdale et al., 2000). Acceptance and Commitment Therapy (Hayes & Wilson, 1994) differs from MBSR and MBCT in that it does not include formal MM instruction or practice and was independently developed at around the same time as MBSR. Dialectical Behavior Therapy (Linehan, 1993) includes a component of formal MM as one of its five “modules,” and also uses the notion of “wise mind” to enhance the capacity to step out of a reactive mode of processing and bring mindful awareness to emotional responding. It should be noted however, that DBT does not explicitly attempt to *theoretically* integrate the mindfulness construct with any of the other modules. These interventions, referred to collectively as “Third Wave Cognitive Therapies” (Hayes, 2004), have provided initial cognitive operationalizations of mindfulness, upon which much of the current psychological literature is based.

Generally, cognitive operationalizations of mindfulness refer to nonelaborative awareness¹ of present-moment experience. Epstein (1995) has termed this “bare attention.” It involves intentionally paying sustained attention to ongoing sensory, cognitive, and emotional experience, without elaborating upon or judging any part of that experience (Kabat-Zinn, 1994). What is experienced is simply registered (Brown, Ryan, & Creswell, 2007). Germer (2005) concisely defines this as “(1) awareness, (2) of present experience, (3) with acceptance” (p. 7). Mindfulness training, such as MM, aims to increase one’s capacity to remain in this mental state. Various types of MM have been explored in the literature, all of which emphasize expanding present-moment awareness and avoiding secondary processing. The term “mindfulness” has thus been variously used to refer to a theoretical construct, a mode of awareness, a range of meditation and attention training practices, and a number of related psychological processes (Germer, 2005) such as self-regulation (Brown & Ryan, 2003), metacognition (Bishop et al., 2004), and acceptance (Linehan, 1994).

“Meditation” may be understood simply as attentional training, a process of consciously keeping one’s awareness focused in a particular wayawareness to be maintained in an open way on whatever is present, without fixating on any particular part of that experience or engaging in any secondary processing. By comparison, concentrative meditation (CM) requires attention to be focused exclusively on a single object, such that all other objects are no longer noticed. Goleman (1977, 1988) proposed that these represent two distinct forms of meditation. However, Lutz, Brefczynski-Lewis, Johnstone, and Davidson (2008) and Lutz, Slagter, Dunne, and Davidson (2008) have noted that this distinction may be misleading: while MM is associated with *open monitoring* of the entirety of one’s experience, and CM is associated with *focused attention* on a single object, such as a repeated word, or the sensations of breathing, open monitoring may initially involve focused attention. Rather than conceptualizing these two attentional modes as distinct types of meditation which occupy

¹ “Awareness” here refers to the conscious registration of sensory and mental stimuli (Brown et al., 2007).

opposite poles along a single continuum, it is perhaps more accurate to conceptualize them as occupying orthogonal axes.

MM practices have been drawn largely from Buddhist meditative traditions, since this is where they have been most fully and concisely formulated. These include the “Vipassana” (Hart, 1987) and “Insight” (Kornfield, 1993) meditation movements, as well as the “Theravadin” and “Zen” Buddhist traditions. These movements and traditions present MM in a broader framework of personal “spiritual” development (Goleman, 1977; Nydahl, 2008). However, they are fundamentally underpinned by mindfulness meditation techniques. Consequently, the terms “mindfulness” and “MM” risk generating confusion, and so efforts have been made in this review to explicitly state when the term “mindfulness” is being employed to describe a construct, mode of awareness, meditation practice, or psychological process. It is suggested that other researchers follow this example in order to minimize confusion and increase the validity of the construct.

It remains unclear whether mindfulness represents a distinct construct or a quality of consciousness that spans and incorporates other states. Brown and Ryan (2003) suggest that the capacity to remain aware of present-moment experience subsumes the need for acceptance and nonjudgment, since these latter two processes inherently reflect secondary processing, and thus a deviation from complete present-centered awareness. In contrast, Bishop (2002) proposes a two-facet model, which includes both awareness and nonjudgment/nonreactivity, in concordance with Kabat-Zinn’s (1994) original conceptualization. Still others have proposed multifaceted models, reflecting various activities involved in mindfulness training, such as nonjudgment, acceptance, present awareness, attention, and intention (Dimidjian & Linehan, 2003; Ivanovski & Malhi, 2007). A recent meta-analysis by Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) involving factor-analysis of the five most commonly used self-report mindfulness scales found strong support for the existence of five separable facets: *acting with awareness*, *nonjudging*, *nonreacting*, *describing experiences*, and *observing*. It should be noted that these reflect mindful behaviors, whereas the original definitions emphasize qualities of awareness (Kabat-Zinn, 1994). Indeed, some (e.g., Ivanovski & Malhi, 2007) have questioned the very validity of segregating mindfulness into discrete components. Further research is thus required before solid conclusions regarding the structure and construct validity of mindfulness can be drawn. Furthermore, as outlined above, there is a tendency within the literature to use the term “mindfulness” to refer interchangeably to a state, a number of related processes, and a series of practices designed to achieve that state. This may be another reason for the lack of consensus regarding the structure of the construct. To achieve conceptual clarity, future work in this area needs to be more explicit regarding use of the term.

1.1. Psychological processes underlying mindfulness

Several processes have been associated with mindfulness, whether it is considered to be a construct, practice, or process. It is important to note that such research is still somewhat speculative, and that any process or mechanism identified may be better thought of as correlates, until a body of research emerges demonstrating that they are true mediators of the relationship between mindfulness and behavior change. The most commonly cited of these processes is *relaxation* (Dunn, Hartigan, & Mikulas, 1999), although it has been suggested that this is, at most, a beneficial side effect and not a core process (Baer, 2003), since MM involves being open to whatever is experienced, rather than attempting to change one’s state of arousal. Kabat-Zinn (2003) has explicitly stated that MM is not aimed at producing relaxation, but rather is aimed at cultivating insight and understanding via direct experience of each moment, without judgment or elaboration. It should be noted however that descriptions in the Buddhist literature of states achieved via MM and other meditative

practices commonly emphasize relaxation of the mind (e.g., Nydahl, 2008). This has been associated with general decreases in arousal (e.g., Kabat-Zinn, 1990), which are potentially associated with a number of beneficial neurobiological changes (outlined below). Further research is warranted to elucidate the links between these processes.

MM may facilitate development of *metacognitive insight* (Bishop et al., 2004; Mason & Hargreaves, 2001; Teasdale, 1999; Teasdale, Segal, & Williams, 1995), whereby thoughts are perceived to be transient, insubstantial mental events rather than accurate representations of reality. This process, previously referred to as *decentering* (Safra & Segal, 1990), may result in *cognitive defusion*, which refers to perceiving thoughts as simply thoughts, rather than as an ontological reflection of reality which must then be altered in form, frequency, or situational sensitivity (Masuda, Hayes, Sackett, & Twohig 2003). Defusion increases the range and adaptability of responses to challenges, or *cognitive flexibility*, allowing challenges to be addressed consciously rather than merely reacted to (Hayes, 2003; Hayes & Shenk, 2004; Roemer & Orsillo, 2003). Indeed, Baer (2003) has proposed that mindfulness involves developing “flexible awareness.”

Other processes have been identified that are associated with vulnerability to psychological disorders, such as depression. For example, reduction in overgeneral autobiographical memory, which refers to systematic overgeneralizations in recalling self-relevant memories that can lead to globalized negative self-appraisals, has been found to occur following MM (Williams, Teasdale, Segal, & Soulsby, 2000). Reduced *rumination* may also result from MM (Kumar, Feldman, & Hayes, 2008; Ramel, Goldin, Carmona, & McQuaid, 2004). MM has also been observed to produce down-regulation of defensive action systems and increased adaptive behavior (Lanius, Lanius, Fisher, & Ogden, 2006). Within the context of interpersonal relationships, mindfulness may share a bidirectional relationship with secure attachment (Shaver, Lavy, Saron, & Mikulincer, 2007).

In addition, MM may result in enhanced levels of *acceptance* of one’s experiences (Brown & Ryan, 2004; Hayes, 1994; Roemer & Orsillo, 2002; Teasdale et al., 1995), in contrast to habitually responding with appetitive and avoidant drives. This may result in increased *exposure* to unpleasant emotional states such as anxiety that would otherwise engender cognitive and behavioral defenses (Baer, 2003; Borkovec, 2002; Kabat-Zinn, 1982; Kabat-Zinn et al., 1992). Such non-reactive awareness provides the opportunity for all thought processes to be examined in a less biased manner, and for concomitant emotional and physiological responses to diffuse. A related shift away from goal-based processing, referred to as “nonstriving” in the Buddhist literature, and as switching from “Doing” to “Being” modes (Segal et al., 2002) in the psychological literature, may result in improved openness to current experience (Teasdale, Segal, & Williams, 2003). Together, these may allow a decrease in *experiential avoidance* (Hayes & Wilson, 1994; Kumar et al., 2008), which occurs when one is unwilling to remain in contact with elements of one’s experience, and therefore acts to alter the form and frequency of related events, through avoidance strategies such as distraction, rumination, suppression or reappraisal. The result is that rather than using past experiences to predict and avoid possible future events, mindfulness allows present experiences to be explored nonreactively (Kabat-Zinn et al., 1992; Ogden et al., 2006). This may engender increased awareness of perceptual distortions resulting from unexamined thoughts, feelings, and sensations that may drive maladaptive behavior (Krasner, 2004). Mindfulness thus ultimately aims to alter the relationship individuals have toward their mental processes (Siegel, 2007).

As MM practitioners cultivate the capacity to experience mental phenomena (thoughts, feelings, and sensations) without engaging in judgment or elaboration, it becomes possible to notice the field of awareness in which each mental event occurs. That is, awareness itself becomes an object of meditation. This is addressed, for example, in the MBSR practice of “choiceless awareness” (Kabat-Zinn, 1990), whereby one simply rests one’s awareness on what is and whatever sensory

and mental phenomena appear², without identifying or engaging with any particular stimulus. A degree of space, or a “mental gap,” is thus introduced between awareness and its objects—and between the stimulus–response relationships that shape automatic responding (Brown et al., 2007). This process has been variously referred to as *detachment* (Bohart, 1983), *mental freedom* (Krishnamurti, 1964), and *cognitive defusion* (Hayes & Wilson, 1994). According to this point of view, MM may result in the recognition that “mind”³ contains, but is not identical to, its contents: in other words, we are not our thoughts, feelings, or experiences (Hayes & Wilson, 1994; Nydahl, 2008).

This direct perception of awareness forms the basis of advanced Buddhist meditation practices, particularly within the Tibetan tantric traditions (Nydahl, 2008). However, it is also a natural development as one systematically develops the capacity to remain mindfully aware of mental phenomena. It is noteworthy that mainstream psychology has thus far tended to focus more on the process of developing non-judgmental, nonelaborative awareness of mental phenomena, and has not engaged to any significant degree with the notion of direct perception of awareness. Such a difference in focus is not surprising since it reflects the emphasis of the initial operationalization of mindfulness (e.g., Kabat-Zinn, 1990) and the emphasis in mainstream psychology on finding ways to overcome pathogenic mental processes. However, the notion of directly experiencing awareness is important in Buddhist psychology—indeed, it is revered by many as the most advanced level of teaching and methods (Nydahl, 2008). Given that such a focus may have the potential to further our understanding of how MM operates and how mindfulness relates to the observed benefits for mental health, it will be focused on in this review.

An awareness of awareness itself allows the individual to consciously attend to thoughts, emotions, and action tendencies (i.e., conditioned behavioral patterns; Ogden et al., 2006) that are concordant with their values and likely to produce adaptive behaviors and psychological states in any given context. In this sense, mindfulness can be understood to promote personal autonomy—that is, to enhance the individual's capacity to act in accord with their personal interests (Young, 1986) rather than being driven by self-relevant cognition (Brown et al., 2007). Learning to embrace our experiences in this way may reduce the need to directly control or change experience, and thus may result in increased adaptive behavior and psychological wellbeing.

1.2. Attentional and neurocognitive processes underlying mindfulness

Researchers are increasingly investigating the attentional and neurocognitive processes that underlie these psychological states. These include attentional control and other executive cognitive functions (Baer, 2003), particularly sustained attention and working memory (Chambers et al., 2008; Valentine & Sweet, 1999), attention switching and inhibition of elaborative processing (Bishop et al., 2004), reduced habituation to unexpected stimuli and greater visual perceptual sensitivity and acuity (Ivanovski & Malhi, 2007), visual discrimination

(Brown, Forte, & Dysart, 1984), reduced attentional blink (i.e., a deficit in perceiving the second of two stimuli presented in close temporal succession; Slatger et al., 2007), and improved conflict scores on the Attention Network Test (Tang et al., 2007). Research has demonstrated that “expert” meditators (e.g., those who have completed 10,000 h or more of meditation practice) are able to activate neural areas associated with specific emotional states by intentionally maintaining sustained attentional focus on these states (Lutz, Brefczynski-Lewis et al., 2008).

MM has been found to generate measurable neural activation patterns (Davidson et al., 2003), correlated with improved immune functioning and decreased anxiety. These persist beyond the period of meditation practice itself (Lutz, Greischar, Rawlings, Ricard, & Davidson, 2004), resulting in synaptic strengthening (Siegel, 2007), and observable changes in brain structure (Hölzel et al., 2007; Lutz, Brefczynski-Lewis et al., 2008; Lutz, Slagter et al., 2008; Schwartz & Begley, 2002). Furthermore, the extent of these changes is correlated with amount of practice (Lazar, 2005).

Dunn et al. (1999) demonstrated that MM, CM, and relaxation involve distinct forms of consciousness, each with qualitatively different EEG signatures. This further highlights the importance for researchers of meditation to be very specific in identifying and describing exactly the particular techniques they are investigating.

As noted above, it remains unclear whether these changes represent causal processes and mechanisms of mindfulness, consequences of MM, or both. Nonetheless, each of the psychological, attentional, and neurobiological mechanisms of mindfulness and MM outlined above are likely to play an important role in emotion regulatory processes, suggesting that emotion regulation may be a useful framework within which to integrate these findings.

Recent neurobiological research on meditation has also examined two temporally distinct forms of self-reference, each with their own unique neural correlates (Farb et al., 2007). *Narrative focus* represents monitoring of enduring self-relevant traits, while *experiential focus* represents monitoring of momentary experience. Functional magnetic resonance imaging (fMRI) data show these modes to be habitually integrated, although they may be dissociated through attentional training. Narrative focus may represent a neural correlate of the sense of “self,” supporting self-awareness by continuously linking subjective experiences over time (Gallagher, 2004; Neisser, 1997; Northoff & Bermpohl, 2004). Indeed, this mode has been linked with the medial prefrontal cortex (mPFC), an area also implicated in memory for traits related to both self and other, reflected self-knowledge, and aspirations for the future (Farb et al., 2007). Experiential focus, by contrast, reflects a shift away from midline cortical activation toward a right-lateralized network involving the ventromedial and dorsolateral prefrontal cortices, and insula (Farb et al., 2007). Narrative focus is thus linked to rumination while experiential focus avoids this by disengaging self-referential attentional processes.

Together, these studies suggest that relatively small amounts of meditation practice can produce observable changes in various neurocognitive functions. Furthermore, the magnitude of these changes increases in accordance with the amount of practice, whether this occurs intensively (as in the case of meditation retreats) or over a long period of time (as in the case of “expert” meditators).

Clearly, then, more mindfulness research must be undertaken in order to more consistently and fully operationalize the construct. That said, however, research thus far has demonstrated significant potential benefits for psychological and physical health, and also suggests that health and wellbeing in these areas are integrally related with the capacity for adaptively regulating emotional responses. Given that a key goal of mindfulness-based therapies appears to be the promotion of adaptive emotion regulation, gaining a clear understanding of the relationship between these two processes is of central importance.

² It should be noted that Buddhist psychology does not make a clear distinction between inner, subjective mental phenomena and outer, “objective” phenomena. Instead, both are understood as projections of the mind. This notion is fundamental to Buddhist psychology, and goes far beyond the scope of this review. See Nydahl (2008) for a concise, basic explanation of this idea.

³ The term “mind” has been used variously in the western psychological literature to refer to a number of things. Here, it is used in the sense in which it appears in most Buddhist literature—that is, as a field of awareness in which all phenomena manifest. It is understood as being distinct yet inseparable from any phenomena it experiences. Common analogies used to illustrate this are a mirror (mind) and its reflections (phenomena), or the ocean and its waves (Nydahl, 2008). This definition of mind concurs with Schwartz and Begley's (2002), although to avoid confusion it should be noted that this definition differs from that of Hayes (2003), who uses it to refer to language-based mental processing.

2. Emotions and emotion regulation

As with mindfulness, emotion regulation (ER) is a relatively new field of psychological investigation. Consequently there is still little consensus regarding the precise operationalization of the construct. ER generally refers to the process of modulating one or more aspects of an emotional experience or response (Campos & Sternberg, 1981; Gross, 1998a,b). Adaptive ER is assumed to be intrinsic to mental health and adaptive functioning generally (Gross & Munoz, 1995). The construct is variously assumed to refer to both subjective experience and emotion-related behavioral responses (Feldman-Barrett & Gross, 2001; Gross, 1998a; Mauss, Evers, Wilhelm, & Gross, 2006), and concomitant changes in physiological, behavioral, and cognitive processes (Bridges, Denham, & Ganiban, 2004); internal and external processes. It also refers to bottom-up (e.g. perceptual) processes such as appraisal, and top-down (e.g. cognitive) processes like working memory and volitional control of attention (Bell & Wolfe, 2004). ER may also have an interpersonal element, extending to processes such as social interaction since strategies appear transferable between people, for instance mother and child (Cole, Martin, & Dennis, 2004).

ER deficits or problems have been identified in over half of the Axis I and all Axis II disorders (American Psychological Association, 1994; Gross & Munoz, 1995; Repetti et al., 2002). Indeed, numerous psychiatric disorders are associated with affective instability and emotion dysregulation (Koenigsberg et al., 2002; Phillips, Drevets, Rauch, & Lane, 2003). There is an emerging consensus linking emotional dysregulation especially with depression (Ochsner & Gross, 2007; Silk, Steinberg, & Morris, 2003; Strauman, 2002) and anxiety disorders (Coan & Allen, 2004; Mennin, Heimberg, Turk, & Fresco, 2002). Increasingly, many other disorders are also being conceptualized and investigated from an emotion regulation perspective (Rottenberg & Gross, 2007).

As a result, ER training is commonly included, explicitly or implicitly, in cognitive-behavioral therapies (Berking, Wupperman, Reichardt, Pejic, Dippel, & Znoj, 2008). Indeed, a central goal of cognitive-behavioral therapy (CBT; Beck et al., 1979) is the reduction of unpleasant affect via cognitive means. Berking et al. (2008) found that 6 weeks of CBT-based treatment resulted in increased self-reported use of adaptive ER strategies, with a large effect size. ER is a core skill taught in Dialectical Behavior Therapy (Linehan, 1993), an effective treatment for borderline personality disorder (Lynch, Trost, Salsman & Linehan, 2007), substance abuse, eating disorders, and depression (Lynch, Morse, Mendelson, & Robins, 2003). Other mindfulness-based cognitive therapies, such as Acceptance and Commitment Therapy (Hayes & Wilson, 1994) and mindfulness-based cognitive therapy (Segal et al., 2002) also target ER, although this is done indirectly, through development of mindfulness skills, as outlined in the previous section. The nature of this process will be explored in more detail later in this review.

There is some disagreement as to whether operationalizations of ER should be restricted to conscious, effortful processes (e.g., Eisenberg & Spinrad, 2004) or whether they should include both conscious and subconscious (automatic) processes (c.f. Gross, 1998a). There are multiple strategies for the conscious control of emotion (Gross, 1998a; Lazarus, 1991). However, there are also a number of forms of ER that do not require conscious control (Fitzsimmons & Bargh, 2004). Generally, it is thought that repetitive activation of conscious ER strategies in response to particular stimuli may over time lead to that strategy being employed automatically and nonconsciously (Bargh & Chartrand, 1999; Jackson et al., 2003). Mauss, Cook, Cheng, and Gross (2007) suggest that with sufficient effortful use, even complex social judgments, social behaviors, and the pursuit of higher-level goals will be executed automatically. Research also suggests that emotions, while amenable to conscious regulation, may themselves be inherently regulating (Cole et al., 2004) in that they may adaptively influence other (e.g. cognitive, behavioral, and

interpersonal) processes. ER may occur automatically or consciously, and may have its effect at one or more points in the emotion-generative process (Gross, 1998a).

Just as it is simplistic to assume that negative emotions disorganize functioning and positive emotions engender successful outcomes, ER represents more than simply the down-regulation of negative emotions (Gross, 1998a). That is, adaptive ER is not simply a matter of valence. Rather it may also act to initiate, increase, maintain, or decrease both positive and negative emotions in response to changing environmental contingencies, in turn influencing experiential, behavioral, and physiological processes (Parrott, 1993). Regulated emotion keeps the individual within a “window of tolerance” between hypo- and hyper-arousal, where optimal social functioning and goal engagement is possible (Schoe, 2003).

Neither is adaptive ER simply a matter of magnitude. Over-inhibition (Bridges et al., 2004), as well as overuse of cognitive ER strategies such as rumination (Treynor, Gonzalez, & Nolen-Hoeksema, 2003), are both linked to poor mental health outcomes. Research (e.g., Bridges et al., 2004; Gross, 1998a; Mennin et al., 2002) increasingly suggests that ER is a complex process, and that the adaptiveness of any strategy depends heavily upon the context in which it is employed. Indeed, Bridges et al. (2004) posit that problems emerge when ER is used inflexibly to cope with changing situational demands.

A number of methodological considerations concerning how ER is conceptualized in various studies further exacerbate the lack of operational consensus regarding the ER construct. ER has been examined as both a state and a trait (Cole et al., 2004). Some researchers (e.g., Barnett, Ganiban, & Cichetti, 1999) have used levels of expressed emotion to measure ER. For instance, Buss and Goldsmith (1998) combined positive, negative, and neutral social behaviors into a single variable, and Calkins and Johnson (1998) included venting of frustration as an ER strategy. Others (c.f. Bridges et al., 2004) have argued that doing so may confound ER with behavioral strategies influencing expressiveness. This has led some (e.g., Cole et al., 2004; Gross, 1998a) to suggest that ER may only be inferred from change in expressed emotions. However, there appears to be a common difficulty in adequately distinguishing ER from emotion, with most studies tending to simply infer the existence of ER from the observed interplay between emotions and other psychological processes, without providing any direct evidence of any regulatory process. Campos et al. (2004) have also highlighted the fact that ER processes may be better viewed as *control* than change, as emotion frequently involves constancy of behavior rather than change. Considerations such as these have led Cole et al. (2004) to challenge the very utility of ER as a construct.

Cicchetti, Ackerman and Izard (1995) have suggested that ER problems can be divided into two categories: difficulty in modulating emotional experience and expression, and frequent or automatic attempts to control or suppress emotional experience and expression (for example attending to cognitive information at the expense of the emotional experience itself). This has obvious implications for mood disorders such as depression, which may represent quintessential disorders of ER. As a result, effective ER interventions may need to address three main areas of emotional dysfunction: restructuring maladaptive cognitive appraisals, changing action tendencies associated with the disordered emotion, and preventing experiential avoidance of emotions (Moses & Barlow, 2006). Indeed, Hayes (2003) and Hayes and Wilson (1994) has proposed experiential avoidance to be the primary cause of psychopathology.

2.1. One- and two-factor models

The term “emotion regulation” implicitly suggests existence of some process of control that is separate from emotions themselves. This is consistent with subjective experience of having an emotion, and then modulating it in some way. However, there is disagreement in the literature over whether this distinction is ontologically valid or

merely represents a useful heuristic. Accordingly, some researchers (e.g., Cole et al., 2004; Gross, 1998a; Hoeksma, Oosterlaan, & Schipper, 2004) have proposed a two-factor model, which clearly distinguishes between emotion and ER, both conceptually and methodologically. Cole et al. (2004) concede that while emotions are inherently regulating, in the sense that the presence of certain emotions automatically influences perception and behavior to achieve a goal (e.g., to deal with potential threat in the case of fear), they are still meaningfully separable from ER.

In contrast to this, Campos et al. (2004) argue that any such distinction is at best analytical and conceptual, rather than ontological, proposing a one-factor model as an alternative. They suggest that emotions are regulating at the same time as they are regulated, since there are no unregulated emotions: even selecting from a number of possible responses to a single emotion is inherently regulatory. That is, both emotion and ER reflect different facets of a single set of processes. This concurs with proposals put forth by others (e.g., Cole et al., 2004; Stansbury & Gunnar, 1994) that an ongoing process of appraisal and preparation for action alters our emotional experience and concomitant behavior, and that, at least in adults, emotions are always regulated in some way (Gross, 1998a). This can occur before an emotion is manifested experientially or behaviorally (Campos et al., 2004), possibly preventing it from fully manifesting and altering its quality. Campos et al. point to evidence supporting such mutual interaction between emotion-generative and ER processes. For example, they note that (1) cortical inhibition can precede emotional elicitation, (2) residual effects of previous regulation can influence subsequent processes, (3) future emotional reactions may be influenced by manipulating expectations, (4) simply choosing one's environment can influence one's emotions, and (5) a single stimulus can engender more than one emotion. Adding further support to the interaction between emotion-generation and ER is the finding that infants and toddlers demonstrate a capacity for ER well before they develop the cognitive capacity for meta-emotion (Campos et al., 2004). On the other hand, there could also be a limited understanding of emotion that prevents us from distinguishing it from ER, rather than an ontological lack of distinctiveness (Kagan, 1994).

In summary, emotions, which are biologically-based processes that facilitate rapid decision-making and adaptive behavior by influencing (among other things) cognitive processes, and at times even bypassing them, have clear adaptive benefits. However, poorly regulated emotions can engender a number of adverse physiological and psychological consequences. As a result, various ER strategies are required in order to maintain optimal functioning. The following section explores two cognitive strategies that have received significant empirical attention. The foundational ER model conceptualizes emotion and ER as separate processes, although it is not explicitly a one- or two-factor model (Gross, 1998a). Indeed, as Gross himself proposes, the distinction is merely heuristic, in the sense that it may be experimental design rather than ontology that determines whether emotion regulation appears differentiable from emotion.

2.2. Expressive suppression and cognitive reappraisal

The identified key strategies of expressive suppression and cognitive reappraisal emerge from a process model of ER (Gross, 1998a, 2002; Gross & John, 2003), which suggests that since emotions are temporal events. It may be useful to distinguish different ER strategies according to their location in the emotion-generative process. Gross (1998a) and Feldman-Barrett and Gross (2001) has identified five major points on the emotion-generative continuum where individuals may alter the trajectory of their emotional experience and expression. These include *situation selection and modification*, *attentional deployment*, *cognitive change*, *response selection*, and *response modulation*. While there is debate in the psychological and physiological literatures as to which strategies are more useful, there is some consensus

that some are inherently more adaptive than others (Bridges et al., 2004).

To address this, Gross (1998a) and Gross and John (2003) modeled the emotion-generative continuum at the broadest possible level of distinction. At one end, *antecedent-focused* strategies represent manipulation of input to the emotion-generative system, including selecting/modifying the situation, controlling attentional deployment, and cognitively reevaluating the situation to alter emotional salience. At the other end, *response-focused* strategies manipulate the output of the system, such as inhibiting behavioral expression. The two strategies represent one canonical example from each end of the continuum—the antecedent-focused strategy of *cognitive reappraisal*, and the response-focused strategy of *expressive suppression*—to explore the differential effects of using either broad type of ER strategy.

Expressive suppression represents a process of consciously inhibiting emotional expression when emotionally aroused (Butler, Wilhelm, & Gross, 2006; Gross, 1998a). While this strategy may be adaptive in situations where it is necessary to inhibit escalation of emotions, such as anger and anxiety (Butler et al., 2003) or to maintain optimal interpersonal distance between people, thereby facilitating smooth social interaction (Clark & Taraban, 1991), there is mounting evidence that expressive suppression has a number of maladaptive effects. For instance, it does not appear to decrease experience of negative emotions (Gross, 1998a,b; Gross & Levenson, 1997; Harris, 2001), although it has been shown to decrease the experience of positive emotions (Gross & Levenson, 1997). It has also been found to increase the intensity and frequency of sympathetic and cardiovascular activities, both of which are linked to immune and cardiovascular problems (Gross, 1998; Gross & Levenson, 1997; Harris, 2001; Richards & Gross, 1999). Other findings include that it has been shown to impair recall of information, particularly social information, similar to cognitive avoidance and distraction strategies (Bonanno, Papa, O'Neill, Westphal, & Coifman, 2004; Richards & Gross, 1999, 2000), to disrupt social communication, causing “stonewalling” (Gottman & Levenson, 1988; Gross & John, 2003; Levenson, 1994), to produce adverse physiological events in others (Butler et al., 2003), and to increase rumination regarding negative mood and self-image (Gross & John, 2003), thereby maintaining psychopathology (Butler et al., 2003), especially in social situations with high cognitive demands (Gross, 1998a; Wegner, 1994). In particular, use of expressive suppression has been linked to greater incidence of depression (Gross & John, 2003). Supporting findings include that depression has been linked with suppression in children (Zeman, Shipman, & Suveg, 2002), adolescents (Betts, Gullone, & Allen, 2009), and adults (Beevers, Wenzlaff, Hayes, & Scott, 1999; Rude & McCarthy, 2003).

At the other end of the emotion generative process is cognitive reappraisal, which involves actively reinterpreting emotive stimuli in terms that modify the emotional impact (Gross, 1998a). It has proven particularly effective for down-regulating intense negative emotions (Gross, 2001; Ochsner & Gross, 2004), is a strategy frequently employed in everyday life (Gross, 1998a) and may reflect a relatively stable trait (Gross & John, 2003; Ochsner & Gross, 2005).

Reappraisal has many benefits. It is thought to occur before emotional response tendencies become fully activated (Gross & John, 2003; Ochsner & Gross, 2004), and is thus able to alter the entire subsequent emotion trajectory. Indeed, it has proven more adaptive than both no attempt at ER and the use of expressive suppression for responding to emotions such as disgust, sadness, and distress (Gross, 2001). It decreases emotional experience without any observable physiological costs (Butler et al., 2003; Levesque et al., 2003; Ochsner et al., 2004) and it results in decreased behavioral and subjective indications of emotion, particularly negative emotions such as anger, without elevated physiological responding (Mauss et al., 2007). It also provides an increased sense of meaning (Fredrickson, 2003), as it naturally evokes unconscious and conscious processes of appraisal, which inherently access goal and value representations (Arnold, 1960;

Smith & Lazarus, 1993). Nevertheless, potential pitfalls of using reappraisal have been identified, including making unrealistic and inflexible reappraisals that deny important features of the environment. Nevertheless, the strategy clearly appears more adaptive than expressive suppression.

With regard to physiological processes, Ochsner et al. (2004; Ochsner & Gross, 2005) found reappraisal to modulate emotion-generative systems such as the amygdala through activation of lateral prefrontal regions. Consequently, they proposed that such systems represent neural correlates of both up and down-regulation of emotion, since both rely on reappraisal of meaning. Capacity for reappraisal appears to emerge at around age 10 years, likely reflecting development of the prefrontal cortex, a proposed neural substrate (Ochsner & Gross, 2005). Use of reappraisal has been argued to continue to increase throughout adolescence (Harris, 1989) and adulthood (Gross et al., 1997) although empirical data are needed to support this.

2.3. Neurobiological correlates of ER

Recent advances in psychophysiology and brain imaging techniques have begun to provide support for potential neural correlates of ER. Brett, Johnsrude, and Owen (2002) suggest that there are clear conceptual and observable links between ER and certain areas of the prefrontal cortex (PFC). Indeed, many other researchers have begun to suggest that ER may involve specific pathways between the PFC and the limbic system, particularly the amygdala (Banks, Eddy, Angstadt, Nathan, & Phan, 2007; Ghashghaei, Hilgetag, & Barbas, 2007; Ochsner, Bunge, Gross, & Gabrieli, 2002; Ochsner et al., 2004). Strength of this connection may predict any decreases in negative emotion following the use of cognitive ER strategies (Banks et al., 2007). Indeed, emerging research has demonstrated a relationship between the PFC and limbic system during cognitive ER, in particular cognitive reappraisal (Banks et al., 2007). This is salient as clinical data implicate prefrontal–limbic dysfunction in disorders of affect regulation such as depression, anxiety, aggression, and personality disorders, and also indicate that people exhibiting these disorders demonstrate exaggerated amygdala activation in response to negatively valenced emotive stimuli (Phillips et al., 2003). Strength of the neural pathways linking the amygdala and areas of the PFC has been shown to predict successful ER in terms of decreased self-reported negative affect (Banks et al., 2007). The orbitofrontal cortex appears to play an especially crucial role in ER (Quirk & Beer, 2006), through down-regulation of amygdala activity. In sum, this evidence suggests that prefrontal–limbic interactions are central neural correlates of emotional control processes.

It should be noted that research into the neural correlates of ER has generally focused on suppression and reappraisal (Ochsner & Gross, 2005; Quirk & Beer, 2006). Further research is warranted to determine the neural correlates of other cognitive ER strategies, as well as to shed light on mechanisms underlying automatic forms of ER. Furthermore, there is disagreement as to whether the pathways identified thus far are unidirectional (that is, descending from top-down attentional and executive processes to impact lower-order, bottom-up processes; e.g., Davidson, Jackson, & Kalin, 2000) or bidirectional (that is, top-down and bottom-up processes mutually influencing one another; c.f., Banks et al., 2007; Gross, 1998a).

In summary, the antecedent-focused ER strategy of cognitive reappraisal has been demonstrated to have a number of key benefits, particularly when contrasted with expressive suppression. Research has demonstrated its effectiveness in successfully regulating a wide array of emotional reactions across a variety of contexts, with clear benefits for psychological and physical wellbeing. Furthermore, emerging neurobiological data have demonstrated that reappraisal recruits a number of neural pathways that have previously been linked with adaptive psychological outcomes. Despite these advances, the field of ER research remains relatively new, and a great deal more empirical

investigation is needed before solid conclusions can be drawn regarding the validity of ER as a distinct construct. More research also must be done to examine the apparent effectiveness of cognitive reappraisal. This is particularly so in light of the emerging models of mindfulness-based emotion regulation strategies such as those outlined above. The following section attempts to draw parallels between mindfulness and ER, to demonstrate where there are inherent conflicts, and finally to suggest ways in which the two constructs may be integrated.

3. Mindful emotion regulation

Mindfulness meditation has been shown to facilitate attentional self-regulation and ER (Kabat-Zinn, 1994). Erisman, Salters-Pednault, and Roemer (in preparation) found a significant relationship between self-reported levels of mindfulness and scores on the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a self-report measure of adaptive ER strategies, even after controlling for symptoms of stress, anxiety, and depression. Likewise, Feldman Hayes, Kumar, Greeson, and Laurenceau (2007) found strong correlations between self-reported mindfulness and self-reported use of adaptive ER strategies.

Nonjudgmental awareness may facilitate a healthy engagement with emotions (Hayes & Feldman, 2004), allowing individuals to genuinely experience and express their emotions (Bridges et al., 2004) without underengagement (e.g. experiential avoidance; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996, and thought suppression; Wegner, 1994) or overengagement (e.g. worry; Borkovec, 1994, and rumination; Nolen-Hoeksema, 1998) with them. Such improved mental health outcomes may result at least in part from changing one's relationship with one's experiences (Ivanovski & Malhi, 2007; Kabat-Zinn, 1990).

However, the exact relationship between mindfulness and the ER strategies reviewed above remains unclear. Mindfulness is antithetical to expressive suppression, in that there is an emphasis on increasing awareness of, and fully accepting, all emotional experience, regardless of its apparent valence, intensity, or perceived utility. This view is shared by Hofmann and Asmundson (2008), who suggest that while cognitive interventions such as CBT seek to alter the *content* of cognitive and emotional events (and are largely antecedent-focused), mindfulness/acceptance interventions alter one's *relationship* to these events, and are thus response-focused. This relationship is altered via learning to accept, rather than reflexively act on, thoughts and emotions.

Mindful ER is also fundamentally different to cognitive reappraisal. While reappraisal has received empirical support as a more adaptive cognitive ER strategy, it may result in experiential avoidance in cases where its use is motivated by an unwillingness to risk experiencing or remain in contact with a particular negative emotion associated with the initial appraisal. As outlined in detail above, reappraisal refers to a process of cognitively re-evaluating certain situations in such a way as to negate the generation of potentially distressing emotions. Often this occurs prior to, or very early in, the emotion-generative process. Experiential avoidance of unpleasant emotions has been demonstrated to cause psychological harm (Hayes, 2003) and is specifically targeted by mindfulness interventions. It has been proposed that experiential avoidance of both unpleasant and pleasant emotions may ultimately be potentially harmful, and acceptance of emotional experiences, beneficial, irrespective of valence (Whelton, 2004).

Cognitive reappraisal—indeed all cognitive ER strategies—differs fundamentally from mindfulness in that thoughts and emotions are treated as having some kind of inherent existence, and thus must be acted upon in some way. CBT can engender an enhanced sense that thoughts are merely appraisals rather than facts, but ultimately the idea remains that appraisals can be changed to be more accurate or more psychologically beneficial representations of reality (hence reappraisals). Thus, unpleasant thoughts/appraisals must be acted upon or manipulated in some way to render them more acceptable and less distressing. In stark contrast to this, mindfulness holds that all mental

(cognitive and emotional) phenomena are merely mental events, and thus do not *need* to be acted upon. A capacity to simply allow these mental events to come and go is systematically developed, and from this base, thoughts and behaviors that are likely to lead to helpful and pleasant outcomes may then be consciously chosen. That is, thoughts and behaviors deemed useful are given energy, and those deemed unhelpful are simply not identified with, which is a distinct cognitive strategy from reappraisal.

This altered view is unique to mindfulness, and sets it apart from other approaches. However, this fundamental distinction has been often overlooked, or at least somewhat obscured, in the various cognitive-behavioral operationalizations of mindfulness. That is, while metacognitive processes such as defusion have been emphasized (Bishop et al., 2004; Mason & Hargreaves, 2001; Teasdale, 1999; Teasdale et al., 1995), the various extant operationalizations of mindfulness in the psychological literature appear to reflect attempts to encapsulate Buddhist notions of mindfulness in existing cognitive terms.

This point is illustrated by the example of Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990) and the development of successive mindfulness-based interventions. MBSR comprises a series of practices designed to give participants experiences of mindfulness. Information is provided to facilitate understanding of these experiences (Kabat-Zinn, 1994), but at no point is an explicit model proposed in cognitive terms. With the advent of mindfulness-based cognitive therapy (Segal et al., 2002), however, an attempt was made to do exactly this. Initial attempts by Segal et al. (2002) to operationalize mindfulness in purely cognitive terms proved unviable, and the authors ultimately combined elements of MBSR and CBT into a single treatment package. Doing so has made MBCT extremely accessible to cognitively oriented clinicians and researchers, a process facilitated by early outcome data suggesting the efficacy of MBCT for preventing depressive relapse (Segal et al., 2002) and treating residual depressive symptoms (Kingston et al., 2007). However, this cognitive-behavioral operationalization may obscure some of the psychological processes that actually underlie mindfulness.

The main problem, as already alluded to, has been the tendency to ignore the rich Buddhist metaphysical model underlying mindfulness in favor of a materialist model. As a result, the core contribution of mindfulness is missed. Such contribution refers to the tenet that phenomena do not ultimately exist in the way we think they do, and that if one searches for the “self” (i.e., that which appears to be the “experiencer” of thoughts and emotions), none can be truly found. Instead, mindfulness has been formulated in a much more limited way, as a method of working with unpleasant experiences which are themselves assumed to be ontically real. This has led to a number of subsequent misinterpretations of mindfulness: for instance, the recent assertion that Acceptance and Commitment Therapy (a mindfulness-based cognitive therapy) differs from CBT only in its emphasis on response-focused ER, rather than antecedent-focused ER, as in the case of CBT (Hofmann & Asmundson, 2008). Such oversimplification severely limits the potential benefits of broadening our understanding of human consciousness that would be possible if the contributions of traditional Buddhist psychology to western psychology were fully explored, rather than purely the other way around. This is significant, as theories of mental health generally assume that an accurate view of reality is necessary for adaptive psychological adjustment (Leary, 2004).

One such insight concerns the relationship between thoughts and emotions. An axiom of cognitive therapy is that thoughts antecede, or lead to, emotional reactions and behaviors (Beck et al., 1979). This assumption requires that thoughts and emotions be meaningfully separated from each other. However, there is no direct evidence for this in the cognitive literature. Furthermore, the literature from which mindfulness has been drawn⁴ makes no such distinction. Indeed,

the native languages in which this literature has historically been documented contains no word for “emotion” in the sense of being meaningfully separable from cognitive processes (Ekman, Davidson, Ricard, & Wallace, 2005).⁵ Rather, this distinction is the legacy of western moral philosophers, notably Plato and Descartes, who implied a separation between emotions and the intellect, and suggested that the former was morally inferior and thus in need of regulation by the latter. In contrast, it has been proposed in the Buddhist literature that emotions represent mental states containing both an implicit appraisal and a strong feeling component (Goleman, 1995). The point here is not that thoughts are seen as unimportant in the Buddhist literature, but just that they are no more important than emotions.

In support of this, neurophysiological research has demonstrated that all so-called “emotional centers” in the brain are also implicated in some aspect of cognitive processing (Davidson & Irwin, 1999), and that cognitive and emotional events always have physiological correlates (Ogden et al., 2006). Indeed, Wilber (1996) proposes that information processing occurs hierarchically across cognitive, emotional, and physiological systems, which have been suggested to be functionally interdependent and inseparable (Damasio, 1999; LeDoux, 1996; Schore, 1994).

A key implication of this with regard to ER is that if emotions and cognitive processes are indeed inseparable, then ER is best reflected in a one-factor model. That is, given such inseparability, both emotional reactions and any regulation of these reactions—whether controlled or automatic—can be understood to occur as an integrated process.

Within the Buddhist literature itself, there are a number of different ways of conceptualizing these cognitive/emotional complexes (Goleman, 1977). Given that the focus of this review is on ER, it is perhaps most useful to explore the notion of “disturbing emotions.”

3.1. Disturbing emotions

As noted above, a fundamental tenet of Buddhist psychology is that the mind is comprised of two unified aspects: awareness and objects of awareness (Nydahl, 2008). Awareness itself is understood to be that which gives rise to the experience of phenomena, or qualia. Its nature is explored in depth in the Buddhist literature, and is beyond the scope of this review. However, a fundamental point is that it cannot be understood conceptually, but must instead be experienced directly. As described above, sensory phenomena (including thoughts and emotions) emerge within this field of awareness, and are inseparable from it. However, while they are inseparable, with MM training, one becomes able to cease habitually identifying with sensory phenomena. Instead, one can simply allow them to pass through awareness, acting on those cognitions and emotions that seem appropriate to any given situation.

However, there is a habitual tendency to infer a separation between these aspects of the mind. This results in the mind becoming disturbed, creating psychological difficulties ranging from minor worries and neuroses through to severe psychopathology. Indeed, from a Buddhist perspective, even relative happiness (i.e. positive affect associated in any way with this habitual separation) is seen as mental disturbance. Overcoming this tendency is what Buddhists refer to as “enlightenment,” the ultimate goal of Buddhist mental training. This disturbance results in a sense of duality, whereby the perceivers erroneously experience themselves as existing separately from what they perceive. This then engenders the appraisal process (Arnold, 1960), whereby

⁴ The “mindfulness” literature is drawn primarily from various traditions of Buddhist teachings, in a number of languages, dating back 2550 years.

⁵ Interestingly, the Dhammapada (Müller, 1881), a Theravadin Buddhist text, does refer to “thoughts” as that which precedes behavior. It is an important characteristic of Buddhist psychology that in cases where it is useful to analyze reality into discrete components (such as “thoughts”) this is done. Simultaneously, there is acknowledgement that any attempt to describe the ultimate nature of reality is intrinsically flawed, and that any analysis is therefore limited. Such flexibility is a key strength of Buddhist psychology.

incoming stimuli are automatically evaluated in reference to the self (Brown et al., 2007) and appraised as pleasant or unpleasant (Bargh & Williams, 2007), or possibly neutral (Brown et al., 2007). This results in attraction toward stimuli that are experienced as pleasant, aversion toward stimuli that are experienced as unpleasant, and indifference toward those experienced as neutral (Ekman et al., 2005). According to Arnold (1960), this is the source of positive and negative emotional states and is also the source of appetitive and avoidant behavioral patterns.

In the Buddhist literature, these three appraisal valences—attraction, aversion, and indifference—comprise what are referred to as the “Three Poisons” (Nydahl, 2008). They are referred to in this way because they arise as a result of the mistaken experience of the separation of perceiver, perceived object, and the act of perception (which are understood to be, in reality, inseparable). They then give rise to higher-order emotions: *desire* and attachment arise when we wish to possess things we are attracted to; *jealousy* arises when others have what we ourselves would like; unsuccessful attempts to avoid things we have aversion towards can give rise to *anger*; and indifference can result in both an inclination toward *ignorance* of things around us as well as a sense of being better than others, which results in feelings of *pride*. These five disturbing emotions then combine with each other and various situations to produce the rich emotional world that is subjectively experienced (Goleman, 1995; Nydahl, 2008).

Saliently, all of these emotions are understood from a Buddhist perspective to be problematic. They result from an incorrect understanding of the nature of reality, and when identified with and acted upon they reinforce this erroneous sense of separation, further exacerbating the problem. Indeed, there is a habitual tendency to react to these emotions as though they were real, and there is also a widespread belief that such reactions are at times necessary—for example justified indignation toward injustice. Overcoming (or at least becoming aware of) this habitual tendency is the primary objective of MM training. As such, it is proposed here that a model of mindful ER must extend beyond the dimensions of valence and arousal classically used to model emotion generation (Russell, 1979). Instead, mindful ER involves classifying any emotion that results from the basic misinterpretation of reality outlined above as “disturbing.” Obviously this can include emotions traditionally viewed as problematic, such as sadness, anxiety, fear, disgust, and so forth but also includes emotions such as pride and desire, which are often considered to be “positive” (Buck, 1988; Seligman, 2002).

3.2. Regulating disturbing emotions

Disturbing emotions (DEs) are problematic in the sense that they disturb one's ability to remain mindfully present. Recall that mindfulness refers to the ability to bring a wide and spacious quality of attention to whatever is experienced, such that whatever stimuli are present pass through awareness without engendering any judgment or evaluation (i.e., appraisal). Ideally, one remains open and simply aware of whatever happens from moment to moment. Once an appraisal has occurred, it becomes increasingly likely that subsequent appraisals will move in the same direction (Bargh & Williams, 2007). It is proposed here that unless negated, this progression gains strength and results in the generation of DEs. These DEs then result in a narrowing of attentional focus, restricting what Fredrickson (2003) terms the “thought–action repertoire”: attentional focus is restricted and cognitive performance impaired. In addition, action tendencies (i.e., conditioned behavioral patterns) are triggered (Ogden et al., 2006). Out of habit, and influenced by a restricted cognitive focus, one then identifies with the DEs, further reinforcing them.

This then begs the question of how best to regulate DEs. Recall that attempts to suppress emotional reactions or cognitively reappraise emotive stimuli are somewhat antithetical to mindfulness. As outlined above, these strategies, to varying degrees, represent cognitive and

behavioral avoidance. At their extreme, they reflect experiential avoidance, which has been demonstrated to have a number of deleterious consequences for mental health (Hayes et al., 1999). A more efficacious method of ER therefore may be to not engage with the emotions as they occur. This is the stated goal of MM training. It is conceptually simple but very difficult to achieve. To do so requires systematic training in not engaging with DEs as they appear, which in turn requires a disengagement from self-concern (Brown et al., 2007). This process is presented in two main ways in the mindfulness literature (e.g., Kabat-Zinn, 1990). One is to learn to simply observe mental phenomena (thoughts, feelings, and sensations) as they manifest, noting any tendency to evaluate or appraise, and consciously not engaging with these processes. This is the process that has been incorporated into the current pool of mindfulness-based interventions. The other approach is to directly focus on awareness itself. This is addressed in the MBSR practice of “choiceless awareness” (Kabat-Zinn, 1990). There are many descriptions of this state in the Buddhist literature although they are somewhat poetic and abstract, as this mode of awareness is considered by some to be beyond concepts and thus unable to be articulated. However, it should be noted that this aspect of mindfulness has not been incorporated into mainstream mindfulness-based interventions, aside from MBSR. This perhaps reflects the focus on these interventions on providing ways to adaptively cope with pathogenic cognitive processes. It also likely results from the tendency among psychologists to explore the *content* of consciousness (e.g., mental and sensory phenomena) rather than consciousness/awareness itself (Brown et al., 2007), which would be required if this focus on objectless awareness were to be emphasized. Nonetheless, it is an interesting notion that warrants further exploration in mainstream psychological research and practice.

This is particularly salient because it is proposed in the Buddhist literature that awareness itself has particular qualities that are similar to positive emotions identified in the positive psychology literature (e.g., Fredrickson, 2003; Seligman, 2002). A full explanation of these qualities is beyond the scope of this review (Nydahl, 2008). Briefly, as one comes to recognize experientially that sensory phenomena occur within awareness yet do not alter nor harm that awareness regardless of their valence or intensity, one naturally becomes increasingly comfortable in any situation. Similarly, as all sensory phenomena come to be experienced free from appraisal, a sense of contentment naturally arises, since one no longer is compelled to respond to stimuli either appetitively or avoidantly. Finally, as one recognizes directly that all beings are ultimately aware in the same way, one spontaneously develops a sense of concern, or compassion, for their suffering.

It is interesting that these are described in the Buddhist literature as qualities rather than emotions. This perhaps suggests that it is identification with awareness itself—and concomitantly to these qualities—that underlies the processes of cognitive expansion and enhanced well-being represented in Fredrickson's (2003) “broaden and build” model of positive emotionality. Research suggesting enhanced gamma EEG synchrony (associated with brain-wide neural synchronization) in advanced meditators (Lutz, Greischar et al., 2004) perhaps provides preliminary neurobiological correlates of this process.

In sum, mindful ER may operate by either training oneself not to identify with DEs as they appear in awareness, or increasing one's perception of awareness itself, or both. These processes are two sides of the same coin, and as such mindfulness may intrinsically operate on both levels. As mainstream psychological operationalizations of mindfulness up to this point have focused almost exclusively on the former, it is recommended here that future research focus more explicitly on the latter, as this is likely to provide a normative description of what healthy, positive mental states may look like, rather than falling into the usual trap of simply assuming that the absence of pathology (in this case, an absence of DEs) is enough to understand healthy functioning. Indeed, this is in accordance with fundamental principles of the Positive Psychology movement (Seligman, 2002) and

the notion of Quality of Life (Patrick et al., 2002). That said, it must be acknowledged that the majority of current research into mindfulness is occurring within the context of so-called “third wave” mindfulness-inclusive cognitive therapies. As such, it is clearly also important to continue to investigate the cognitive mechanisms underlying mindfulness, such as negation of the appraisal process, and the relationship between mindfulness and cognitive ER strategies. This will continue to increase the acceptability of third-wave cognitive therapies.

3.3. Mindfulness and cognitive ER processes

Cognitive regulation of DEs, such as the ER strategies outlined above, intrinsically results in identification with the DEs. Research suggests that in order to negate a certain mental object, one must first evoke it (Lakoff, 2004; Wegner, Schneider, Carter, & White, 1987). That is, to use the canonical example, in order to “not think of a pink elephant,” one must first think of a pink elephant, and then actively inhibit any further thinking about it. Engaging in reappraisal thus inherently requires one to identify with DEs (in this case, the original appraisal which has engendered or has the potential to engender the DE). This generates aversion toward the particular emotional experience (as well as the emotive stimulus), resulting in a loss of mindful awareness in that moment.

Perhaps mindfulness can therefore be understood as cognitive reappraisal at a *process* rather than a *content* level. That is, while reappraisal involves changing one’s thinking regarding emotive stimuli, mindfulness can be best described as engendering changes to how one relates to emotive perceptions—that is to, appraisals—in general. Nonelaborative awareness may perhaps terminate the very processes of reconstruction, attribution, and prediction (that is, appraisal), which Campos et al. (2004) have suggested underpin emotion-generation and ER.

This process initially requires conscious effort, as engagement with DEs is a long-term habit (both ontogenetically and phylogenetically). However, it has been proposed that the process of non-identification eventually becomes automatized and effortless (Trungpa, 1973). Recent research has demonstrated a number of attentional and structural changes that accompany this sense of increased proficiency (for a review, see Lutz, Brefczynski-Lewis et al., 2008). It has been proposed that one eventually becomes able to cease interfering with perceptual processes at any level, including preconscious levels such as appraisal (Young, 1994).

Cognitive and neurobiological research (e.g., Carter et al., 2005; Lutz, Brefczynski-Lewis et al., 2008; Slagter et al., 2007) has provided support for this notion. Specifically, it has been shown that such attentional processes become automated in experienced meditators (those with more than 10,000 h of meditation practice) or in less experienced meditators immediately following intensive meditation retreats. In addition, research has identified observable concomitant functional and structural brain changes (Lutz, Greischar et al., 2004), particularly in areas implicated in both mindfulness and adaptive ER (Gray et al., 2002; Lazar et al., 2005).

4. Summary and conclusions

Mindful emotion regulation represents the capacity to remain mindfully aware at all times, irrespective of the apparent valence or magnitude of any emotion that is experienced. It does not entail suppression of the emotional experience, nor any specific attempts to reappraise or alter it in any way. Instead, MM involves 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. In this way, it erodes the automatic process of appraisal that gives rise to disturbing emotions in the first place. At the same time, mindful ER encourages

the practitioner to increasingly perceive the awareness that underlies all mental phenomena. As this occurs, a number of positive “emotions” or qualities emerge, which reinforce the capacity for mindfulness, and leads in turn to increasing levels of openness.

As a caveat, it should be noted that certain emotional reactions have clear evolutionary benefits. The restricted thought–action repertoire engendered by becoming aware of a snake or other such danger is clearly adaptive if it results in survival. The capacity to focus on a particular task or a subset of momentary experience, even at the expense of other aspects of experience, is one of the key evolutionary advantages of human beings. Whether the ultimate goal of mindfulness training is to completely overcome these processes is not addressed here: however this question is dealt with extensively in the Buddhist literature (e.g., Nydahl, 2008). Instead, the purpose of this review is to highlight the nature of these processes, and to suggest that they may be problematic in certain situations if allowed to operate unconsciously and unregulated. Obvious examples are rumination as an attempt to manage depressive symptoms (Teasdale et al., 2000) and worry as a maladaptive method of alleviating anxiety (Mennin, 2004). In these situations, it is clear that some degree of control, or disengagement from, these otherwise reflexive processes may be of some benefit to individuals in particular situations. Indeed, this is the purpose of mindfulness-based therapeutic interventions: to bring relief to the suffering caused by unregulated psychological processes operating out of conscious control or awareness.

Mainstream psychology will arguably be well served by engaging in a more open, but nonetheless critical and rigorous, examination of the wider issues and implications of Buddhist psychology, including but not limited to points raised in this review. This has previously been proposed by De Silva (1990), who argues that while a complete integration of Buddhist and western psychology is not likely to be possible or desirable, the adherence of both to empiricism and restriction to clearly testable hypotheses suggests that some aspects of Buddhist psychology may be assimilated. This review has particularly highlighted the potential benefits of practices that train participants to focus on awareness itself (as opposed to the contents or mental objects in awareness), based on the importance of this concept in Buddhist psychology. Currently there has been little integration of these techniques into “third-wave” cognitive behavior therapies that are either partially or wholly based on mindfulness concepts, the major exception being MBSR, which includes practice of “choiceless awareness” (Kabat-Zinn, 1990). Operationalization of mindfulness into existing mainstream psychological models continues to have very real and profound benefits for the treatment of an ever-increasing range of psychological problems as it highlights a mode of emotion regulation that is not captured by western psychological models. However, it is quite possible that a more open-minded examination of Buddhist psychology may be able to profoundly inform the way we understand human psychological functioning.

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