

Chapter 7

Mindfulness, emotion regulation, and well-being

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reference:

Nyklíček, I., (2011). Mindfulness, emotion regulation, and health. In: I. Nyklíček, A. Vingerhoets, & M. Zeelenberg, *Emotion regulation and well-being (pp. 101-118)*. New York: Springer.

Abstract

Mindfulness is defined as a state of open and nonjudgmental attention to phenomena occurring in the present moment. Positive associations between mindfulness and psychological well-being are well-established both in correlational and in intervention studies comparing the effects of mindfulness-based psychological interventions with various control groups. Because emotion regulation is also related to psychological well-being, the relationship between mindfulness and emotion regulation is examined in this review. In addition, the possibility that emotion regulation may be mediating the positive effects of mindfulness on well-being is discussed. A review of theoretical perspectives on the topic is presented as well as a selective review of existing empirical studies. A new theoretical model (RICH model) of mindfulness effects is presented including direct effects of mindfulness (Relaxation, Insight, Contact, and Harmony) via which mindfulness is argued to exert its beneficial effects on a number of lower-level intermediate factors, including largely nonvolitional emotion regulation, finally influencing a person's psychological well-being.

7.1 Mindfulness

Mindfulness is a term originally stemming from ancient Asian spiritual traditions, mainly Buddhism (Nhat Hanh, 1976), seeking liberation from human suffering. In their view, human suffering is inevitably based on human desire for things to be different than they are, creating an inner conflict between the present state and an ideal state. This conflict is constructed and maintained by the human nonaccepting and judgmental mind, separating phenomena in "good", which should be strived for and "bad", which should be avoided and fought against. Mindfulness can be seen as a state of mind opposite to the state just described. This state can be cultivated, mainly by insight (vipassana) meditation, which is also an important aspect of the Mindfulness-Based Stress Reduction (MBSR) intervention, the most frequently applied and researched intervention aimed at stress reduction by cultivating mindfulness, which will be discussed below.

Various definitions of mindfulness have been provided, which mostly agree upon a three component definition, consisting of intention, attention, and attitude (Shapiro, Carlson, Astin, & Freedman, 2006), such as in "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994), and "bringing one's complete attention to the experiences occurring in the present moment, in a nonjudgmental or accepting way" (Baer, 2006; p. 27). In these definitions, intention and attention are reflected by the purposeful attention in the present moment and attitude is reflected by the nonjudgmental and accepting quality. A related operational definition has been provided by a group of mindfulness researchers, stating that mindfulness is "a process of regulating attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance" (Bishop et al., 2004, p. 234).

One may argue whether it is necessary to have such an elaborate definition, making a distinction between a process and a resulting state and even more fundamentally, whether the description of certain qualities of awareness (reflecting the attitude component) is necessary. The old definition of an experienced mindfulness practitioner may do as well: "the clear and single-minded awareness of what actually happens to us and in us at the successive moments of perception" (Thera, 1972). Because this awareness is situated "at the successive moments of perception", it implies a dynamic process of following the ever-changing phenomena occurring from moment to moment. The "clear and single-minded" property implies the perception to be open, accepting and nonjudgmental, otherwise the awareness would be obscured by thoughts narrowing and evaluating or judging the perception (Chambers, Gullone, & Allen, 2009). Also, one may wonder whether the intention aspect is necessary: is it really impossible to be completely mindful, aware of the present-moment experience, without the intention to do that? Of course there is always an intention when one is *practicing*

mindfulness (Shapiro et al., 2006), but that does not mean that mindfulness as a *state* of mind is not possible without this intention. Indeed, many practitioners (and ‘ordinary’ nonmeditators alike) report on a state of mindfulness just happening to them at unpredictable moments. In my view, the aspects of intention and attitude are inherent in the practice of mindfulness, but are not necessary to describe the state of mindfulness.

7.2 Mindfulness and well-being

7.2.1 Theory

From Buddhist theory, the four noble truths are about the causes of human suffering and ways to liberate oneself from this suffering. The main cause of human suffering is claimed to be the judging of phenomena as “good versus bad”, striving for reaching the “good” things, which become attached to, and avoiding the “bad” ones, which become feared, suppressed, and avoided. Not only the feared objects of the mind, but also the attached result in anxiety, as the latter is associated with the fear of losing the things one is attached to. Theoretically, nonjudgmental (and therefore nonattached) mindfulness of what is taking place in the moment resolves the resulting human stress, enhancing psychological well-being.

Modern western psychologists have elaborated on this theory (Ekman, Davidson, Ricard, & Wallace, 2005; Wallace & Shapiro, 2006). Wallace and Shapiro describe the four kinds of mental balance resulting from Buddhist meditation practice: conative, attentional, cognitive, and affective. Mindfulness, as a central component in Buddhist meditation, has been described in operational cognitive-attentional terms in order to facilitate research into the phenomenon (Bishop et al., 2004). In the broadest sense, mindfulness may be viewed with the glasses of self-determination theory, postulating three basic human psychological needs that are necessary for good mental health, these needs being competence, autonomy, and relatedness (Ryan & Deci, 2000). The latter two factors are important in Buddhist thought as well, but not competence (Nhat Hanh, 1988). Interestingly, a couple of years later, the importance of self-esteem, of which competence is an important component, for mental health has been questioned by one of the self-determination theorists, discussing vulnerability to mental disturbances as a consequence of the preoccupation with ones self-esteem (Ryan & Brown, 2003). Although a fascinating and provoking thought, it goes beyond the frame of the present chapter.

Most theories of mindfulness do not explicitly discuss emotion regulation strategies as mechanisms by which mindfulness exerts its putatively beneficial effects (Bishop et al., 2004; Brown & Ryan, 2003). The association between mindfulness and emotion regulation is discussed below. First, empirical research on the link between mindfulness and psychological well-being is summarized.

7.2.2 Research

Research on the relation between mindfulness and psychological well-being may be divided into correlational studies and intervention studies.

In several correlational studies, self-reported mindfulness, as measured by questionnaires, has been found to correlate positively with various measures of psychological well-being, and negatively with psychological symptoms of distress, including negative correlations with symptoms of general distress, anxiety, and depression (Baer, Smith, & Allen, 2004; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Of course, correlational studies do not provide any insights into the issue of causality. Experimental studies, including interventions, are the only kind of studies that may provide an answer to this issue.

Most experimental research has involved studies on the effectiveness of the Mindfulness-Based Stress Reduction (MBSR) protocol. This intervention usually involves 8 weekly sessions of 2 ½ hours and a silent retreat day, during which mindfulness psychoeducation is provided, and mindfulness is practiced during various exercises, such as mindful breathing, mindful moving (from hatha yoga), and vipassana (insight) meditation. In the early days of research, the studies were mainly uncontrolled trials, showing beneficial effects on the reduction of anxiety and pain symptoms (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985). More recently, well-performed randomized controlled trials (RCTs) in various patient and non-patient population, ranging from distressed students (Jain et al., 2007) to cancer patients (Speca, Carlson, Goodey, & Angen, 2000) have shown that MBSR is able to

decrease symptoms of general distress, anxiety and depression, and enhance positive mood and quality of life (Jain et al., 2007; Lengacher et al., 2009; Nyklíček & Kuijpers, 2008; Speca et al., 2000).

Factually, one still does not know if the beneficial effects are due to an actual change in mindfulness. Perhaps nonspecific effects such as social support from the group may have resulted in the beneficial effects. In two recent RCTs, it was shown that change in self-reported mindfulness statistically at least partially mediates the beneficial effects of MBSR on perceived stress and quality of life (Bränström, Kvillermo, Brandberg, & Moskowitz, in press; Nyklíček & Kuijpers, 2008). To provide a definite answer, an RCT should be performed using a control group in which all elements of MBSR but mindfulness are present or a design with multiple measurements of both mindfulness and well-being, providing an opportunity to unravel the temporal dynamics of changes in both variables. Despite the still unresolved issue of causality, the positive association between mindfulness and psychological well-being is well-established.

7.3 Emotion regulation and well-being

Emotion regulation (ER) is defined as the process of modulating one or more aspects of an emotional experience or response (Gross, 1998). It may be take place either at a conscious or unconscious level.

ER is viewed as crucial for human psychological well-being (Consedine, this volume; Tamir & Mauss, this volume). In many forms of psychopathology, ranging from affective disorders to personality disorders, a deficit in ER has been identified (Gross & Muñoz, 1995). In addition, psychological interventions, including Cognitive Behavioral Therapy (CBT) and Dialectical Behavioral Therapy (DBT) often use tools to enhance emotion regulation and have shown to be effective in reducing psychological symptoms of various kinds (Hofmann & Asmundson, 2008; Linehan, 1993).

However, empirical research regarding which forms of ER are adaptive and which forms are maladaptive has not yielded equivocal findings. Rather, more and more, the effects of ER are viewed as a complex process, heavily depending on the context in which ER takes place (Consadine, this volume). Nevertheless, for some forms of ER that have been extensively investigated, research findings do point in a certain direction, suggesting that some ER strategies are likely to promote or decrease psychological well-being across situations.

One such ER strategy is suppression of emotion. This strategy belongs to the group of *response-focused* ER strategies and involves the deliberate inhibition of emotional expression in the case one is emotionally aroused (Gross, 1998). Obviously, this strategy is very useful in all human societies in many circumstances in order not to disrupt social interactions. However, research has shown that this strategy is associated with decreased positive emotions (Gross & Levenson, 1997), interpersonal functioning (Butler et al., 2003), and well-being (Gross & John, 2003), and increased rumination regarding negative mood (Gross & John, 2003). Rumination or worry in themselves may be seen as emotion avoidant strategies as one function of rumination may be distraction from the emotional experience itself, paradoxically exacerbating the emotional experience (Roemer et al., 2009). Finally, evidence is also available for an association of emotion suppression with enhanced sympathetic nervous system reactivity to laboratory stressors, which under some conditions might lead to cardiovascular disease (Butler et al., 2003; Mauss & Gross, 2004). This has been especially shown to be the case regarding anger control, where however both anger suppression and anger expression (aggressive behavior, including a hostile attitude) have been linked with a larger cardiovascular risk (Mauss & Gross, 2004).

Another frequently research ER strategy is cognitive reappraisal, an *antecedent-focused* strategy, which reflects the deliberate reinterpretation of emotive stimuli in order to modify the emotional impact (Gross, 1998). In contrast to emotional suppression, cognitive reappraisal has been found to be generally related to positive effects on psychological well-being, such as increased interpersonal functioning and positive mood (Gross & John, 2003) and decreased negative affect, without any accompanying sympathetic nervous system activation (Butler et al., 2003; Ochsner et al., 2004). Physiologically, cognitive reappraisal has been associated with lower blood pressure levels (Nyklíček & Vingerhoets, 2009) and with activation of prefrontal and anterior cingulate brain structures, which are known to be involved in adaptive emotion regulation (Ochsner et al., 2004).

In sum, although empirical research into this topic is still developing, findings suggest a link between several forms of ER and psychological and physical well-being. If both mindfulness and ER

have shown to be beneficial for psychological well-being, and even therapies exist combining both (Linehan, 1993), one may wonder what the nature is of the relationship between the two and how they interrelate in their association with well-being.

In the next section, first, the relationship between the two is explored, both from a theoretical perspective as well as from available evidence.

7.4 Mindfulness and emotion regulation

7.4.1 Theory

7.4.1.1 Emotions are just emotions

From a mindfulness perspective, emotions and thoughts feeding emotions are strongly interrelated mental phenomena that do not really need to be dealt with, *because they are just that: temporary mental events*, not having a clear correspondence to external reality (Blackledge & Hayes, 2001; Ekman et al., 2005). Sometimes it is even argued that too much emphasis on emotion regulation may be harmful, because the importance of emotions is overemphasized making a) their impact larger than necessary and b) as a consequence making people undertake often unsuccessful attempts to regulate them. “Attempts to regulate emotions actually can be a major cause of psychopathology” (Blackledge & Hayes, 2001)(p. 243). In this view, emotions per se are not the problem, but the thoughts and actions following them resulting in attempts that can be summarized as *experiential avoidance*. Because negative emotions are viewed as undesirable, attempts are made to get rid of them in one way or another, which not only often is without success, but even often increase negative emotions, because of the failure to regulate them. When emotions can be seen as just emotions, temporary mental events (“a bit of our history brought into the present by the current context” (Blackledge & Hayes, 2001), and accepted fully as such, there is no need for regulation (except in the case the associated action tendency is translated into action that harms other people, such as in the case of uncontrollable anger). Instead, acceptance of the emotion experience leads to instant relaxation in the emotion, making room for living one’s life: “*To feel feelings as feelings, to think thoughts as thoughts, fully and without defense, and get on with the business of living*” (Blackledge & Hayes, 2001).

7.4.1.2. The examples of suppression and reappraisal

Regarding the two mostly investigated ER strategies to date discussed above, suppression and reappraisal, what is the relationship between mindfulness and these strategies? Mindfulness is incompatible with habitual suppression of emotion, because it involves a fundamental acceptance of what is taking place, including emotions as they unfold (Chambers et al., 2009). However, we should clearly make a distinction between suppression of *experience* and suppression of *expression* to the outside world. While mindfulness is accepting any *experience*, one may choose the degree to which one expresses the emotion behaviorally, depending on the appropriateness in a given situation. Thus, mindfulness is incompatible with suppression of emotional experience, but is not per se incompatible with behavioral suppression, independent of the former. One may argue that because emotional experience and expression most often are strongly interdependent, in most instances mindfulness will be also negatively related to emotional suppression on the behavioral level. This tendency is however counteracted by the naturally soothing effect of accepting mindfulness on emotional experience, often diminishing the need to express an emotion, of which the intensity is decreasing while being mindfully accepting (Nhat Hanh, 1991). On a more fundamental level discussed above, because the volitional regulation of emotional experience is not necessary from a mindfulness perspective, these regulatory effects that do occur as a result can be viewed as natural by-products of mindfulness.

Regarding cognitive reappraisal a similar argument may be provided. From a mindfulness perspective, there is no need to reappraise the situation, it is enough to just be aware of the appraisal without paying much importance to it (Kabat-Zinn, 1990). However, in a natural way, mindfulness leads to a kind of cognitive reappraisal at the moment one becomes aware of one’s appraisals, either negative or positive. At that moment, these appraisals may be seen as just thoughts, often not well corresponding with external reality. This will loosen the importance of the appraisal, which may be released completely. This process may more accurately be termed as *deappraisal* rather than reappraisal, as no new appraisal has to occur instead. However, one may become aware of the fact that difficult situations may lead not only to unpleasant feelings (which per se are not a problem as we have seen), but also to positive outcomes such as personal growth or deepening interpersonal

relationships. As a consequence, *reappraisal* may also occur, but as this new appraisal also may be viewed as just another thought, even such positive reappraisals may be released, leaving room for acceptance of the present reality just as it is.

A note of importance: This acceptance does not imply a surrender of the person to the situation. Acceptance includes the entirety of the reality, including acceptance of (potentially strong) personal feelings about a given situation, which may point to a natural need for action in order to enhance harmony in the person-environment interaction. Examples of such action may vary from simple walking away from a noisy environment to seeking help when being in an abusive relationship. Nevertheless, practicing accepting mindfulness does eventually lead to becoming comfortable in a wide range of situations, as many instances of person-environment mismatch stems from negatively colored mental phenomena, e.g. thoughts reflecting a rejecting attitude (Chambers et al., 2009; Kabat-Zinn, 1990).

In sum, although mindfulness is not aimed at explicit emotion regulation, including emotion suppression and cognitive reappraisal, theoretically it counteracts emotion suppression and enhances cognitive reappraisal and especially deappraisal in a natural way.

7.4.1.3 Specific mechanisms

According to Shapiro and colleagues (Shapiro et al., 2006), there are several mechanisms by which mindfulness may be beneficial for one's well-being. Let's examine to what extent these mechanisms involve intentional or nonintentional emotion regulation processes. A central mechanism in their thinking is labeled 'reperceiving', viewed as a meta-mechanism that comprises the other, subordinate, mechanisms. Reperceiving is conceptualized as a shift in perspective in which one is "able to disidentify from the contents of consciousness" (i.e. one's thoughts) and view his or her moment-by-moment experience with greater clarity and objectivity" (p. 377). In my view this actually reflects mindfulness itself, because mindfulness involves the clear, nonjudgmental perception of what is taking place in the moment, which implies disidentification, otherwise one cannot perceive clearly and nonjudgmentally (Krishnamurti, 1987). This view is supported by a recent study in which data on the relation between mindfulness and well-being testing Shapiro et al.'s model could be explained better when the reperceiving variable was combined with the mindfulness variable into a single variable, the correlation between the two being .74-.81 (Carmody, Baer, Lykins, & Olendzki, 2009). The disidentification process is the same as the one termed 'cognitive defusion' in relational frame theory (Hayes, Luoma, Bond, Masuda, & Lillis, 2006) and 'detached mindfulness' in metacognitive therapy (Wells, 2000). Thus, reperceiving and mindfulness are virtually identical concepts, implying the process of disidentification or cognitive defusion. Although this process is not intentionally aimed at regulating emotions, it does by the very process of seeing thoughts and emotions as just internal phenomena that can be observed, not identified with. Cognitive defusion is a central process in Acceptance and Commitment Therapy, leading to a decrease in negative affect, because negative affect is exacerbated by cognitive fusion of the self with ones thoughts (Blackledge & Hayes, 2001; Hayes et al., 2006).

What about the subordinate mechanisms? *Self-regulation* is a result of the reperceiving process, because as a consequence of disidentification with internal mental phenomena, one will be less ruled by the automatic patterns of thoughts and emotions that usually determine our behavior. As a result, one's degrees of freedom are substantially increased and behavior options expanded. An individual will therefore more likely choose behaviors that are congruent with well-being of the organism instead of behave according to the automatic, often maladaptive patterns. One may call this mechanism also behavioral freedom. *Values clarification* involves reconsidering the values that we have identified with and that have driven our behavior in the past. As values have been automatically formed through the influence of one's family, environment, and culture (Krishnamurti, 1987), disidentification helps to reconsider them, resulting again in greater degrees of freedom, this time regarding one's personal values. Those values that are in concordance with the being one is may start to be lived according to. Although not part of the conceptual area of emotional regulation, this will obviously influence one's affective state positively. *Cognitive, emotional, and behavioral flexibility* is a derivative from reperceiving or mindfulness that actually shows a large overlap with the first (self-regulation) as it involves the enhancement of one's options regarding cognitive, emotional, and other behavior as a direct result of disidentification from one's thoughts, emotions, and other internal events. Emotion

regulation, either volitional regulation of expression or non-volitional regulation of experience, may be viewed as part of this mechanism. The last mechanism discussed is *exposure*. It is clear that because of the willingness to attend to all phenomena unfolding in the present moment, be it external stimuli or internal ones, one exposes oneself to these phenomena, acknowledging them just as they manifest themselves, without defense. In this way, one learns that even strong emotions are not really as threatening as they seem to be, that they are only temporary phenomena in the mind and that one can tolerate them well. Exposure is effective in combating the consequences of experiential avoidance, driven by anxiety mainly, by some viewed as the most important factor leading to psychopathology (Blackledge & Hayes, 2001). Indeed, exposure is a well-known technique used especially in phobic anxiety patients, in whom symptoms diminish largely as a direct consequence of exposure (Barlow & Craske, 2000). Exposure directly leads to the decrease of negative emotions, especially anxiety-related.

In conclusion, potentially relevant mechanisms from this model may be summarized as flexible self-regulation, values clarification, and exposure.

7.4.1.4 The RICH central direct effects of mindfulness

According to Chambers et al. (Chambers et al., 2009), mindfulness implies the following crucial processes related to emotion regulation that are not mentioned as such in the model by Shapiro et al. (Shapiro et al., 2006): relaxation and metacognitive insight. Other relevant processes have been mentioned by Hayes and colleagues, claiming that mindfulness indirectly facilitates emotion regulation by decreasing both maladaptive overengagement (e.g., worry, rumination) and underengagement (e.g., experiential avoidance) with emotions (Hayes, Follette, & Linehan, 2004). These processes can be expected to be interrelated and associated with cognitive re/deappraisal, as discussed above. Thus, indirectly emotions are expected to be regulated by these processes as well. However, there may be other important factors overlooked in the current models, reflecting central direct effects of mindfulness, which may form important intermediate paths between mindfulness and well-being. Therefore, a new model is proposed, incorporating four central direct effects of mindfulness, incorporating and expanding previous models, while simultaneously omitting redundant factors. (see Figure 7.1).

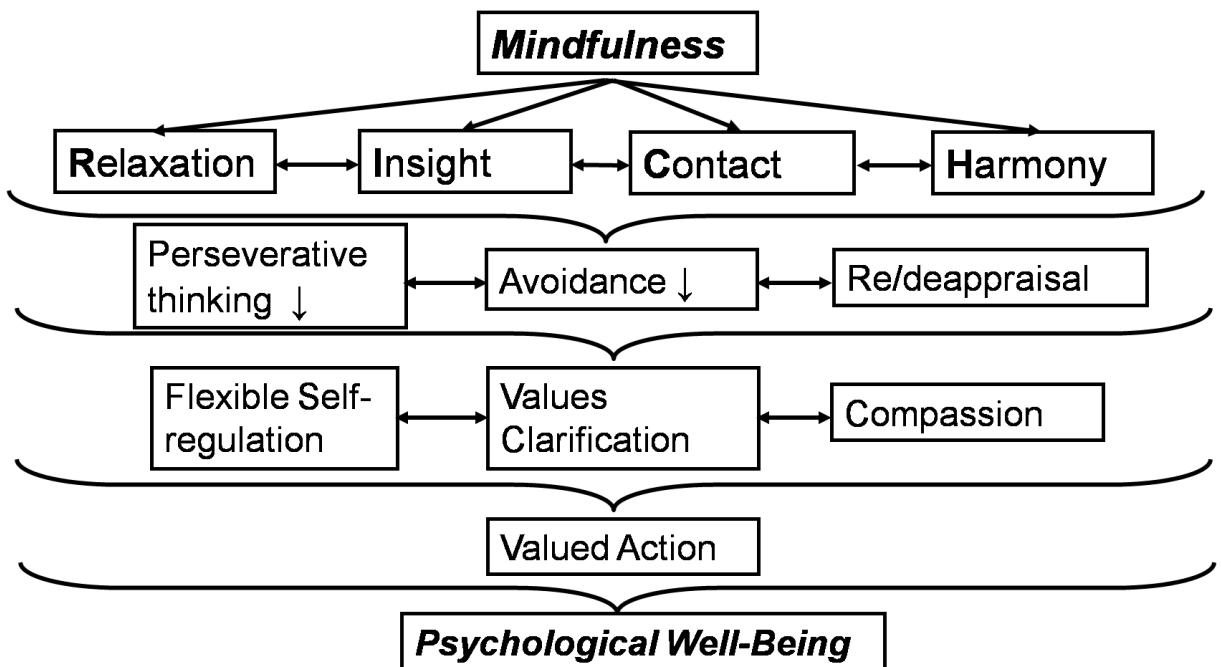


Fig. 7.1. The RICH model of mindfulness and psychological well-being

The first is Relaxation (R), a direct effect of the accepting and nonreactive attitude of mindfulness, although not always present in the first stages of mindfulness practice. Relaxation reflects relaxation of the whole body-mind system as a result of the release of (potentially disturbing) thoughts and other mental phenomena and acceptance of reality as it is (including the temporary potentially disturbing thoughts, emotions, etc.).

The second effect is Insight (I), also often not explicitly mentioned, except in the model by Chambers et al. (Chambers et al., 2009), although prominent in the original Buddhist thought (Nhat Hanh, 1988). According to Buddhist writings it is insight into the nature of phenomena (certainly including mental phenomena) which results in freedom from suffering. Insight involves insight into the various automatic mental processes, such as thoughts—including judgments—feelings, etc., and into the fact that the self is not identical to these processes (see cognitive defusion discussed above). This implies some distance between these mental processes and the awareness of them, which results in freedom of choice regarding the question to what extent it is favorable to get involved with these mental processes or just observe them passively and let them go.

The third direct effect is Contact with reality (C). Open, accepting mindfulness leads to being fully in touch with what is happening in the present moment, both internally in one's body-mind system and in the external environment. Where Insight refers to a somewhat distant perspective, as discussed above, contact implies fundamental intimacy with what is perceived. This contact leads to connectedness and compassion as discussed below. As such, this factor is strongly related to Shapiro et al.'s (2006) exposure, but explicitly including aspects of reality that are associated with neutral and positive affective states as well.

The final direct effect is Harmony (H), which involves a sense of positive resonance with what is in the moment: harmony between the various subsystems of one's body-mind system as well as between the system as a whole and the surrounding environment. This also is a direct effect of the open and accepting attitude of mindfulness. Where relaxation refers to a positive state of one's own system, harmony encompasses also the external reality. This factor, although usually not mentioned explicitly in theoretical models, is a known effect reported by meditation practitioners.

These four effects, which are interrelated, together comprise the RICH model of mindfulness' central direct effects, which are conceived as intermediate paths leading to other effects associated with well-being, which have been previously described, such as (self)compassion, behavioral flexibility, etc. (Baer, 2009; Kabat-Zinn, 1990; Shapiro et al., 2006). The model is conceived as a hierarchical model in which the higher order factors are most directly connected to mindfulness itself (most close: the direct RICH effects), while the lower order factors are more distant (most distant here: valued action). The lower order factors are under the influence of most higher-order factors of all higher levels, although one has to note that many associations are bidirectional as well. For instance, relaxation decreases rumination (a form of perseverative thinking, see below), but less rumination also enhances relaxation. Finally, psychological well-being, which in its broadest sense may be operationalized as general satisfaction with life, including low negative affect and high positive affect, is a result of all factors together.

7.4.1.5 *The lower level and other factors*

One level below the direct RICH effects, four cognitive phenomena are present, most of which have been previously described as important factors enhancing psychological well-being and decreasing the risk of psychopathology in general.

The first is perseverative thinking, defined as repetitive maladaptive thought, including rumination and worry. Perseverative thinking is viewed as an important mechanism involved in the etiology of various psychiatric disorders such as depression (perseverative thinking usually called rumination here) and anxiety disorders (here usually called worry) (Borkovec, Ray, & Stöber, 1998; Brosschot, Pieper, & Thayer, 2005).

Experiential avoidance is also viewed as a central mechanism involved in psychopathology, as discussed above, via experiences of failure of unsuccessful attempts to avoid unpleasant aspects of life and decreased involvement in activities that are considered as having important values in life (Blackledge & Hayes, 2001; Hayes, 2004).

Cognitive appraisal has also been discussed above as an important factor in emotion regulation and well-being with cognitive reappraisal often having beneficial effects on well-being. As discussed

above, mindfulness can involve both reappraisal, as one sees phenomena from a different perspective, and deappraisal: the letting go of unnecessary evaluations altogether.

One further level down, as a result of the preceding factors, notably the letting go of unnecessary and maladaptive thoughts, appraisals, and avoidance behaviors, flexible self-regulation emerges. Self-regulation here includes all forms of behavior: cognitive, emotional and overt behavior, which become less governed by automatic response patterns as developed across one's life. Another consequence is room for clarification of values that are truly important in one's life (Blackledge & Hayes, 2001; Hayes, 2004; Shapiro et al., 2006). This may lead to action enhancing living life congruent with these values. Finally, at this level, compassion, including self-compassion, emerges, as a result of all preceding factors, most notably insight into one's own and others' psychological processes, releasing judgments, and the accepting contact with what is present in the moment via a sense of connectedness with both oneself and other living beings.

Together the above factors, most directly stemming from the combination of factors described one level above, i.e. behavioral flexibility, clarification of values and (self)compassion, appropriate action follows that is congruent with one's personal values. All these factors together enhance ones psychological well-being.

One may question whether some factors should be included in the model and others excluded. One important example is acceptance. Should we consider it separately? One may argue that as a result of the multilevel nature of attention and awareness, one should. At one level, one may be judgmental about certain phenomena, either internal or external. When one is mindful, at a higher (meta) level one is acceptingly aware of this process, which will then be reducing the amount and severity of judgmental thoughts at the lower level, enhancing acceptance. However, albeit possibly present at several levels, because acceptance is part of the definition of mindfulness itself, it is not considered separately. The same holds for the process of decentering or cognitive defusion, meaning seeing internal mental phenomena such as thoughts etc. as just mental phenomena, not as aspects of the self or objective truths (Baer, 2009). This also is an inseparable aspect of mindful perception, not a consequence of mindfulness. This view is supported by the fact that both aspects are present in the Five Factor Mindfulness Questionnaire (Baer et al., 2006) in the 'accepting' and 'non-reactivity' subscales, respectively.

Although experiential avoidance may be viewed similarly (as the opposite of mindfulness, which reflects fundamental experiential approach), experiential avoidance involves both fundamental mindlessness as well as an important consequence of mindfulness at the behavioral level. The practice of mindfulness decreases daily behaviors aimed at avoiding potentially unpleasant experiences, such as unpleasant emotions or anxiety-provoking social situations. This decreased experiential avoidance enhances behavioral flexibility, which is an important consequence of mindfulness practice, related to well-being. Therefore, this aspect is included as a separate factor in the model, albeit a part of it is included in the concept of mindfulness itself.

What about emotion regulation? Although emotion regulation is not mentioned explicitly in the model, it is present as part or result of several factors, mainly flexible self-regulation. Volitional emotion regulation especially pertains to regulation of expression of emotion that may be more effectively regulated. Emotional experience, as argued above, does not need to be regulated from a mindfulness perspective, although it usually indirectly is regulated as a result of a combination of the higher order factors, important drivers being relaxation, harmony, de/reappraisal, and less perseverative thinking and less avoidance.

Thus, the RICH model of mindfulness provides a new theoretical framework that may guide research into the working mechanisms of mindfulness regarding psychological well-being. Emotion regulation is included in the model, although not as one separate explicit factor. Is empirical evidence available supporting an association between mindfulness and emotion regulation factors?

7.4.2 Research on mindfulness and emotion regulation

In a recent theoretical article reviewing some evidence it was suggested that mindfulness mediates effects on well-being, probably by decreasing rumination and experiential avoidance, and improving self-regulation (Baer, 2009). A number of illustrative studies are discussed below.

In some studies, relations have been reported between self-reported measures of mindfulness and general emotion regulation (Baer et al., 2006; Roemer et al., 2009). However, the instrument used

to measure emotion regulation in these studies can be questioned in the context of examining the association between these two constructs. It is not a pure measure of emotion regulation as defined above, but includes aspects of emotional awareness, clarity, and acceptance (Roemer et al., 2009). Conceptually, these aspects are not aspects of *regulation* per se, but are either prerequisites for adequate emotion regulation (i.e., awareness and clarity) or even overlap with the definition of mindfulness (i.e., awareness and acceptance). This inflates correlations between mindfulness and emotion regulation making interpretations difficult. However, in a group of 342 students, mindfulness was found to be inversely related to passive and impulsive emotion-regulation strategies (Wupperman, Neumann, & Axelrod, 2008), suggesting more adequate self-regulation being associated with mindfulness. A related finding was obtained in a specific study in 33 married couples (Wachs & Cordova, 2007), showing that acting mindfully correlated with a greater control of anger expression.

Regarding the specific factors discussed in this chapter, self-reported mindfulness was found to correlate negatively with rumination, worry, thought suppression, alexithymia—poor insight into one's emotions—, and experiential avoidance in various student samples (Baer et al., 2006; Brown & Ryan, 2003; Feldman et al., 2007). For instance, in one correlational study in 233 students, mindfulness was negatively associated with a measure of experiential avoidance, showing about 25% shared variance (Moore, Brody, & Dierberger, 2009).

Regarding acute effects of mindfulness practice, change in certain brain potential patterns (frontal fast theta EEG power), which is claimed to be associated with mindfulness, correlated with decreased scores on harm avoidance, which is related to experiential avoidance, during Zen meditation in novice meditators (Takahashi et al., 2005). In another experimental study, acute effects of a brief mindful breathing instruction were found to decrease negative affect intensity when viewing aversive slides, and also increase the willingness to view the slides, indicating decreased experiential avoidance (Arch & Craske, 2006).

Dialectical Behavioral Therapy (DBT) uses extensively both mindfulness and enhancement of emotion regulation skills as important aspects of the intervention. It is often used in patients with complex psychological problems, such as borderline personality, where DBT has been shown to enhance both mindfulness and emotion regulation skills, the interrelation of which however was not examined (Stepp, Epler, Jahng, & Trull, 2008).

In conclusion, although not many studies have been performed to date, the available evidence suggests an association between mindfulness and several emotion regulation factors. However, more research is needed on this topic, especially experimental studies and randomized controlled trials including measures of emotion regulation, which have been hardly performed to date.

7.5 Does emotion regulation mediate the relationship between mindfulness and well-being?

Only a few studies have been performed on the relationship between mindfulness, potentially mediating mechanisms related to emotion regulation and psychological well-being. In addition, most studies to date have not included formal mediation analyses to examine this issue. For instance, in the above mentioned study in 233 students, decreased avoidance and increased mindfulness predicted well-being after writing, but no mediation analyses were performed (Moore et al., 2009). This is also true for the other correlational studies discussed above (Baer et al., 2006; Brown & Ryan, 2003; Feldman et al., 2007). Another example is a study in chronic pain patients, in which mindfulness was positively correlated with pain acceptance, and values-based action, as well as negatively with pain and psychological symptoms (McCracken & Keogh, 2009). However, again, no mediation analyses were performed, not permitting any conclusions regarding possible paths between these factors.

One of the few exceptions is the study on the relationship between mindfulness and borderline features in a sample of 342 students (Wupperman et al., 2008). In this study, when emotion regulation strategies were controlled statistically, mindfulness still was associated with fewer symptoms of borderline features. This suggests a direct inverse link between mindfulness and these specific symptoms. In contrast, in the above mentioned small study of 33 couples (Wachs & Cordova, 2007), control of anger did statistically mediate the association between acting mindfully and marital quality, suggesting that control of anger may be a mechanism in this specific association.

Of course, more compelling evidence for the role of mediating variables has to come from experimental or intervention studies. An intervention combining mindfulness techniques and emotion regulation skill enhancement showed positive effects on psychological well-being and physician's

ratings of joint tenderness in rheumatoid arthritis patients that had previous depressive episodes (Zautra et al., 2008). However, the relation between mindfulness and emotion regulation was not assessed. Similarly, several studies on the effectiveness of DBT have shown positive effects on mood and lower borderline symptoms (Harley, Sprich, Safren, Jacobo, & Fava, 2008; Stepp et al., 2008), but the components of mindfulness and emotion regulation were not analyzed separately, let alone interrelated. One exception is a very recent small randomized trial in patients with major depression receiving a DBT-based intervention or waitlist (Feldman, Harley, Kerrigan, Jacobo, & Fava, *in press*), which found enhanced emotion processing to be associated with a larger decrease in depressive symptoms in the DBT group. However, this enhanced emotion processing did not mediate the intervention effect.

In an uncontrolled small trial, pre-to post-MBSR assessments showed both decreased mindfulness, decreased rumination and decreased depressive symptoms (Deyo, Wilson, Ong, & Koopman, 2009). Although changes in mindfulness correlated modestly with changes in rumination, no mediation analyses were performed. The same applies to another small uncontrolled study, in which mindfulness-based cognitive therapy was found to reduce insomnia, worry, and rumination in a group of patients with anxiety disorder (Yook et al., 2008).

In a small randomized intervention trial comparing MBSR with two control groups, increases in mindfulness were found to mediate decreases in rumination and distress (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). Potential mediation by rumination was not examined in that study, but it was in another investigation conducted by that research group (Jain et al., 2007). Here, mindfulness meditation was compared to a relaxation control group in a randomized trial conducted in 83 distressed students. Decrease in rumination was found to partially mediate the positive effects on stress reduction in this study.

In a controlled study on the effects of a mindfulness (vipassana) meditation course on alcohol use in 173 prisoners, avoidance of thoughts decreased, which partially mediated the effects of the meditation course on alcohol use and alcohol related problems in daily life (Bowen, Witkiewitz, Dillworth, & Marlatt, 2007).

In summary, the studies reviewed here suggest both direct effects of mindfulness and indirect effects of mindfulness via various mechanisms related to emotion regulation on various indices of psychological well-being. This is consistent with the presented RICH model of mindfulness effects. However, one must note that the number of well-conducted studies, especially the number of well-controlled trials and experiments applying mediation analyses is very small. More research is obviously needed to be able to draw firm conclusions.

7.6 Concluding remarks

In this chapter the associations between mindfulness, emotion regulation, and psychological well-being were examined. As both mindfulness and emotion regulation are related to well-being, it is worthwhile examining their interrelationship as well as the possibility that mindfulness exerts its effects on well-being via mechanisms of emotion regulation.

Theoretical perspectives on the issue were discussed and compared, showing a large diversity in viewpoints ranging from mindfulness being viewed as an emotion regulation strategy to emotion regulation being regarded as rather irrelevant from mindfulness perspective. It has become clear that although a link between mindfulness and emotion regulation does exist, this relation is not a straightforward one. Although for some mindfulness theorists emotion regulation *per se* is neither a goal in itself nor a mean towards a goal, emotions do get regulated when practicing mindfulness, albeit perhaps not in a volitional way. A new theoretical model of mindfulness effects on well-being via several pathway levels is proposed, in which emotion regulation is included at various levels of the model, finally influencing a person's well-being.

Empirical research pertaining to the various links between mindfulness, emotion regulation mechanisms, and well-being is reviewed. It has become clear that research in this field is young and that paucity exists of methodologically well-conducted studies. Especially studies examining the potentially mediating role of emotion regulation in the link between mindfulness and well-being are scarce. Future research should therefore focus on such studies including formal mediation analyses in controlled intervention trials. In addition, attempts should be made to examine to what extent emotion

regulation related to mindfulness is explicit and volitional or an indirect and nonvolitional consequence of mindfulness.

Nevertheless, the available evidence does suggest that links exist between mindfulness and various emotion regulation strategies, notably lower use of suppression, avoidance, and rumination, which are included in the presented RICH model of mindfulness effects. Future studies should examine whether these, or other emotion regulatory processes, are indeed mechanisms in the mindfulness-well-being link.

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